

The Rosette Gazette

Volume 26, Issue 1

Newsletter of the Rose City Astronomers

January, 2013



The Cosmological Spacetime Professor Fulvio Melia

The "golden age" of relativity, from 1960 to 1974, was a period during which black holes were closely studied and understood. Cosmology today finds itself at a similar stage of development, with breathtaking observations now making it possible to more fully grasp the role played by general relativity in shaping our view of the origin and evolution of the cosmos as a whole. The Universe has much in common with black holes, and appears to be far simpler than once thought.

Fulvio Melia is Professor of Physics and Astronomy at the University of Arizona and Associate Editor of The Astrophysical Journal Letters and he is the author of six books and more than 230 articles on theoretical astrophysics.

He is especially known for his work on the galactic center, particularly developing a theoretical understanding of the central supermassive black hole, known as Sagittarius A*. With his students and collaborators, he was the first to propose imaging this object with millimeter-interferometry, which should be feasible within a few years, proving beyond any doubt that it possesses an event horizon, as predicted by Einstein's theory of general relativity.

Professor Melia is also a well-respected and popular publicist of astronomy and science in general, delivering many lectures at public venues, including museums and planetariums. His books have won several awards of distinction, including the designation of Outstanding Academic Books by the American Library Association, and selection as worldwide astronomy books of the year by Astronomy magazine.

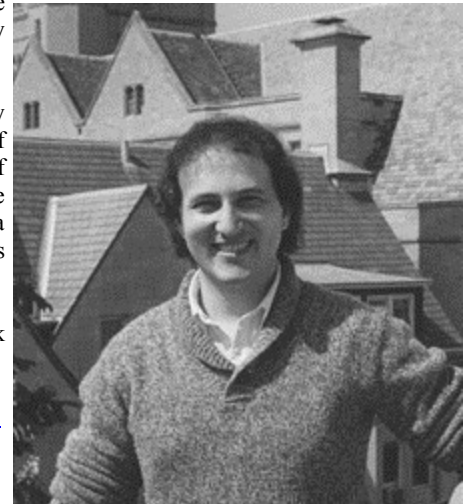
His most recent popular book "Cracking the Einstein Code: Relativity and the Birth of Black Hole Physics" briefly describes the history of general relativity and its key ideas and then focuses on the role of New Zealand mathematical physicist Roy Kerr in elucidating the theory during the "golden age of general relativity". Professor Melia will be signing copies of his book immediately following his presentation.

Please see the links below for more information regarding the book and Professor Melia.

<http://press.uchicago.edu/ucp/books/book/chicago/C/bo6817175.html>

http://en.wikipedia.org/wiki/Fulvio_Melia

<http://www.physics.arizona.edu/~melia/>



All are Welcome! Monday January 21st
New Member 6:30 Social Gathering: 7 pm. General Meeting Begins: 7:30 pm.
Location: OMSI Auditorium

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Trout Lake Star Party photo above courtesy Michael Minnhaar
Moon photos below courtesy David Haworth

In This Issue:

- 1...General Meeting
- 2...Club Officers
-Magazines
-RCA Library
- 3...RCA Board Minutes
- 4...Special Interest Groups
- 5...The Observers Corner
- 9...Classic Telescopes
- 13...Calendars

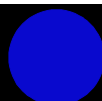


RCA is a member of the
Astronomical League.
<http://www.astroleague.org>

Last Quarter Moon
Jan 4



New Moon
Jan 11



First Quarter Moon
Jan 18



Full Moon
Jan 26



CLUB OFFICERS

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Sister Club Liaison	Jan Keiski	sisterclubs@rosecityastronomers.org

RCA MAGAZINE SUBSCRIPTIONS

One of the benefits of RCA Membership is a reduced rate subscription to Sky & Telescope and Astronomy magazines.

The RCA member rate for Sky & Telescope Magazine is \$33 for one year or \$66 for two years. The RCA member rate for Astronomy magazine is \$34 for one year or \$60 for two years. For more information and payment options please see the website.

<http://www.rosecityastronomers.org/mags/index.htm>

Larry Godsey <magazines@rosecityastronomers.org>



RCA LIBRARY

The Rose City Astronomers maintains a comprehensive club library of astronomy related articles, books, CDs and videos. These items can be borrowed by members through checkout at the general meetings for a period of one month with renewals available by phone or e-mail to the club library director. The RCA library is constantly growing through many donations and the purchase of new materials. A listing of library materials (PDF format) can be found at the library web page.

<http://www.rosecityastronomers.org/library.htm>

Jan Keiski <library@rosecityastronomers.org>

Minutes of the Rose City Astronomers Board November 5th 2012

Held at OMSI Classroom 1



Chair : Sameer Ruiwale
Secretary : Ken Hose for Duncan Kitchin

Board Members Present

David Nemo (Observing Site Director)
Sameer Ruiwale (President)
Larry Godsey (Treasurer, Webmaster, Magazine Sales)
Jim Higgs (VP Community Affairs)
Scott Kindt (Special Interest Groups Director)
Larry Froberg (Sales Director)
Diana Fredlund (Media Director)
Mark Martin (VP Programming)
Ken Hose (VP Membership)
Steve Jaynes (VP Observing)
Howard Knytych (New Member Adviser)
David Horne (Telescope Librarian)
John Oreskovich (Guest/Youth Director)

Call to Order

The meeting was called to order at 7:10pm by Sameer Ruiwale and, there being 12 board members present, the quorum requirement of 9 was declared to be met.

Approval of Minutes

We decided to wait until next meeting to vote on the approval of the October minutes.

Directors' Reports

Secretary's Report – Duncan Kitchin: Absent.
Treasurer's Report – Larry Godsey: Nominal
VP Programming – Mark Martin: The draft 2013 speaker schedule was posted on the forum. So far we are lacking 1 speaker. The November speaker is Doug Buettner (Aerogel/Stardust mission). Mark has arranged for a 45% discount on the book *Breaking the Einstein Code* which will sell for about \$15. It was resolved that Mark would again order pizza for the December holiday potluck.
VP Observing – Steve Jaynes: We have received a proposal from Kahneeta for a May star party with a minimum of 20 room-nights (May 10th and 11th). As for Camp Hancock, there was some confusion about maximum vs. minimum headcount that we need to resolve for our April star party. AR: Steve Jaynes.
VP Community Affairs – Jim Higgs: The weather interfered with September and October outreach events. Jim will give his meteor talk at Cleveland High School and Seaside H.S.
VP Membership – Ken Hose: In October we had 10 renewals, and 4 new members. Total membership stands at 300 vs. 294 last October. Total dues were \$307.
Alcor – Ken Hose: No new observing logs submitted but I received 2 Messier awards from the Astronomical League

for Seth Jelen and Brett Schaerer.

New Member Advisor – Howard Knytych: At the next new members meeting (11/19/2012) Howard will give a talk on AL observing programs.

Media Director – Diana Fredlund: Nominal

Sales – Larry Froberg: \$651 in merchandise sales. One-half of the inventory of Richard Berry's new book has been sold. The Sue French book has been well-received and we will order more.

Book Library – Jan Keiski: Absent.

Telescope Library – Dave Horne: Dave is planning on another sale at the holiday potluck. David Nemo could use some 2" eyepieces for Haggart Observatory. AR: Dave Horne to see what we have on hand to donate.

IDA – Dawn Nilson: Absent.

Magazine Subscriptions – Larry Godsey: Nominal.

Webmaster – Larry Godsey: 135 folks have not renewed and were purged from the forum. Larry found that 110 members who joined in 2011 did not renew. This raised the question of whether or not we are meeting peoples' expectations. It was agreed that we would do some follow-up investigation. AR: Howard/Jim/Diana/Steve to find out why people quit the RCA.

Site Committee – David Nemo: Haggart Observatory. David has scheduled 1 event per month starting in January.

Youth Director – John Oreskovich. John came to the meeting to volunteer for the youth director position. The board explained the position. There are usually between 3 and 5 kids at the meetings and attendance is spotty. The kids' meetings are held between 7:00PM and 7:45PM. Sameer moved to approve John as the youth director and Steve Jaynes seconded the motion. The vote was unanimous in favor of the motion. It was decided to have the first meeting in January and John could use the time between now and then for planning. We will make the announcement at the November and December general meetings. John agreed to have a background check completed. AR: Sameer to email John the contact information for Ada Hayes and Glenn Graham.

Newsletter Editor – Scott Kindt: Nominal. The newsletter has 17 pages this month.

SIGs – Scott Kindt: Nominal.

OMSI – Jan Keiski: Absent

Sister Club update – Jan Keiski: Absent.

Old Business

RCA Generic Business Cards. Diana Fredlund brought 2 boxes of completed business cards and handed them out at the meeting. AR completed.

RCA Calendar Update– Larry Godsey proofed the calendar on Saturday and identified about 2 dozen edits. We should have the completed calendars by November 15 (before the next general meeting). The order is for 125 calendars and the total cost is \$1,000.

Stub Stewart – We need to get the park to update the day use procedures with the goal of getting permission for an entire year.

Dark Sky Symposium planning update – Dawn absent. AR not

done.

Election committee update – Scott Kindt: we have a slate of candidates and it has been announced. We are on track for the election.

Honorarium / Donations guidelines draft for commercial (not non-profit events) – Jim Higgs: Jim wants help/ collaboration. Jim will prepare a draft guideline.

New Business

Introduce John Oreskovich. Done. See above (Youth Director)

Discussion on ASL interpreter for hearing-impaired attendees – All: We discussed some of the cost and logistical issues. Apparently, a few years back, we hired an interpreter but the intended beneficiary did not always attend the meeting. We would need some sort of advance “reservation” system going forward. But the costs are still an issue. The best solution for the cost issue is to try to get a grant. AR: Dave Horne to follow up with the Oregon School for the Deaf and the State to see if grant money is available.

AR: Howard Knytych & Jim Higgs to create proposal for a survey of recently joined members.

Adjournment

There being no further business, the meeting was adjourned at 8:40.

Astronomical League Awards



Seth Jelen
Messier Program Certificate #2425

Brett Schaerer
Messier Program Certificate #2605

Pat Hanrahan
Southern Skies Telescopic Award #35

Greg Rohde
Stellar Outreach Award #292s



Special Interest Groups

Astro-Imaging Special Interest Group

When: Wednesday, Jan 9th, 7pm
Wednesday, Feb 13th, 7pm
Location: Beaverton Public Library
12375 SW 5th St - Beaverton

Note New Meeting Night

SIG Leader: Greg Marshall
Email: ai-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/astroimage.htm>

Junior Astronomers

When: TBD
Location: TBD
Topic: TBD

Check website for the next scheduled Junior Astronomers.

Leader: Vacant
Email: youth@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/youth.htm>

Downtowners Luncheon

When: Friday, Feb 1st, Noon
Location: Kell's
112 SW Second Ave. Portland
SIG Leader: Margaret Campbell-McCrea
Email: downtown-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/downtowners.htm>

New Members Special Interest Group

When: Monday, Jan 21st, 6:30pm
Location: OMSI Planetarium
Topic: Basic Terminology
SIG Leader: Howard Knytych
Email: newmembers@rosecityastronomers.org
http://www.rosecityastronomers.org/sigs/new_members.htm

Telescope Workshop

When: Saturday, Jan 26th
10:00am - 3:00pm
Location: Technical Marine Service, Inc.
6040 N. Cutter Circle on Swan Island-Portland
SIG Leader: John DeLacy
Assistant: Don Peckham
Email: tw-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/tmw.htm>

Astrophysics / Cosmology SIG

When: Wed, Feb 20th, 7pm
Topic: TBA
Presented by: TBA
Location: TBA
SIG Leaders: Lamont Brock, Viktors Berstis
Email: cosmology-sig@rosecityastronomers.org
www.rosecityastronomers.org/sigs/cosmology.htm

Note No Meeting In January 2013



The Pleiades

Charles Messier did not discover all the objects in his famous list of non-comets. His friend and colleague Pierre Méchain discovered quite a few, but Messier added M45 to his list even though it looks nothing like a comet. The first version of Messier's list was published in 1769 and had 45 objects, but considering that the Orion Nebula (M42 and 43) the Beehive (M44) and the Pleiades (M45) were all well known naked eye objects it seems that he was simply rounding up his list to a more impressive total.



DSS image

Even though included in Messier's list, the Pleiades never received an NGC number. This is probably because they have no historical discoverer, and I'll also bet the narrow field of view of most 18th and 19th century telescopes played a part.

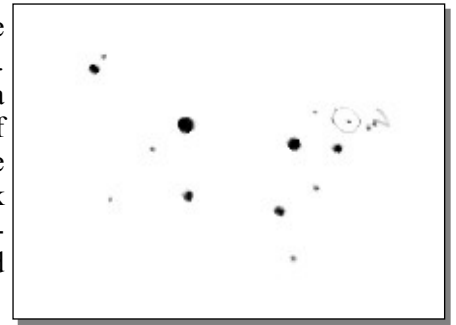
Regardless, the Pleiades is one of the great sights in the night sky and it hardly matters whether you see it from a true dark sky site or from a light polluted urban center, it's always worth a look. There are multiple ways to enjoy observing the Pleiades - naked eye, binoculars, a wide field telescope at low power or a large Dob at high power. Better yet, combine your observations by all these methods and gain a deeper appreciation of this multi-faceted object.

Naked Eye

One of the great things about M45 is that they catch your eye, even if you can't make out any of its stars at first. Not many deep sky objects are big and bright enough to do this. At first you'll see that something starry and nebulous looking is there but it may take a few moments before you see individual stars, especially if you're under a light polluted sky. The darker the sky the faster you'll notice stars.

Beginners sometimes confuse the brighter stars of the Pleiades with the Little Dipper (Ursa Minor) because they do indeed look like a little dipper. Several folks who asked me about this over the years were a little disappointed because they thought they'd found the Little Dipper all by themselves. It did show they have good eyesight though.

M45 has been called the Seven Sisters for millennium but as you start to see the individual stars you'll probably have a tough time seeing more than six. Where's number seven? Several cultures around the world have a tradition of a lost Pleiad and it may very well be the star Pleione, which is variable by a half magnitude. Even so, if you keep at it under a dark and steady sky you might see Pleione and several other, fainter stars. The best I've done, along with Chuck Dethloff, is 13 Pleiads in November 1994. My sketch here was made in October 1999 and shows 11 confirmed Pleiads with one possible sighting. I also had one false sighting, which is the lower right star in the sketch.



Walter Scott Huston counted 18 Pleiads and several other sharp eyed observers have seen almost as many. It will take time and patience to see much more than 6 stars, so be patient, make a little sketch to keep track of what you've seen and check again every time you see the Pleiades under a good sky. Practice helps.

To begin, I suggest you see what you can without consulting a photograph. Once you've given this some effort use binoculars or consult a photo to check yourself and then try to see fainter stars where you now know they're located. It's often surprising how much easier is it to see a faint star when you know right where it is.

There are those who also say that the nebulosity that envelops the Pleiades is visible without optical aid. I haven't seen it, but it's worth the effort when you have the chance.

Binoculars

Any pair of binoculars will show way more stars than the very best naked eye view, and depending on their size may very well provide the best possible view of this stunning open cluster. For instance, a pair of 100mm binoculars in a dark sky could provide a view second to none, but even a small pair of 8x25mm binos will give a tremendously satisfying view under nearly any sky.

The trick is to hold the binos steady enough. An unsteady view quickly becomes frustrating, and unfortunately many binos are difficult to hold steady more than a minute or two. The most direct way to firmly mount your binoculars is on a tripod, but unless the Pleiades are less than about 30 degrees above the horizon you'll quickly get a stiff neck. A parallelogram mount with a lounge chair works great at any angle but is more equipment to deal with.

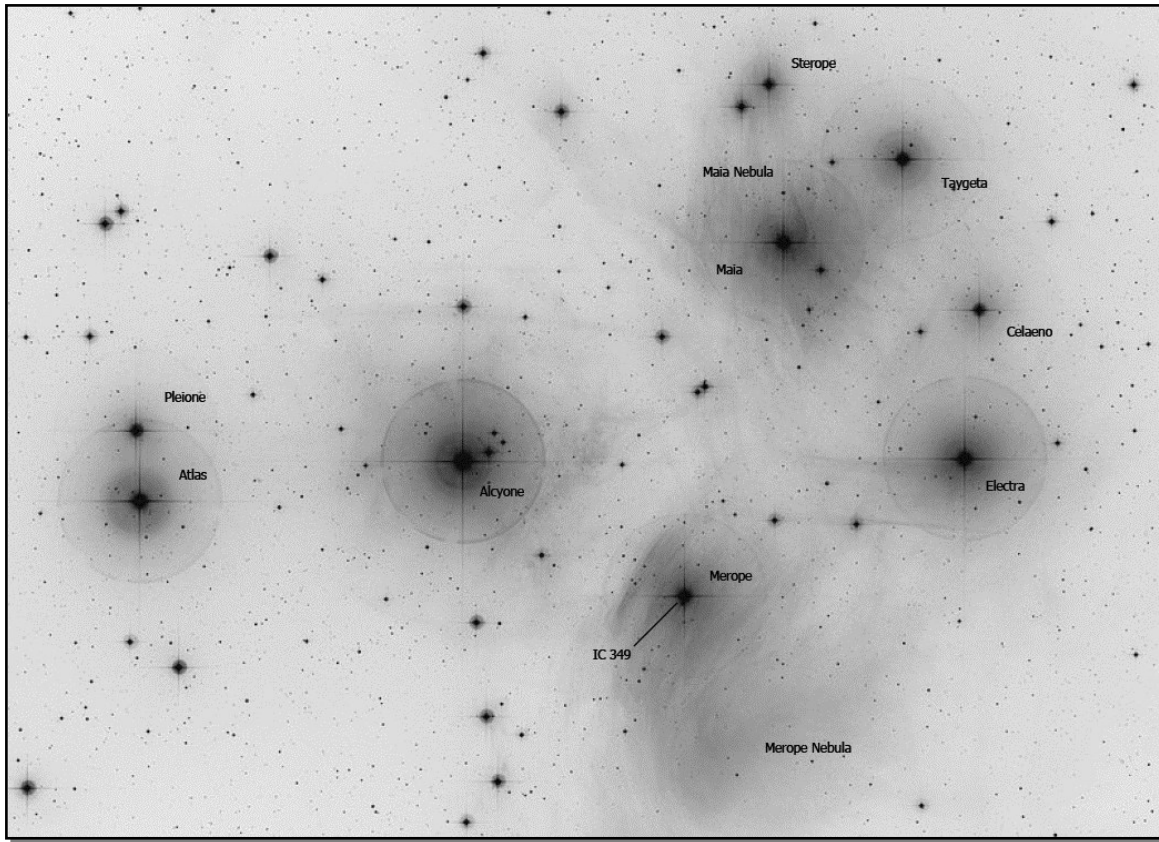
The next step up is image stabilized binoculars. I've had a look at M45 through 15x 50mm Cannon IS binos at the Oregon Star Party a few times and they've blow my socks off every time. My wife Judy had a look during the 2012 OSP and instantly wanted to buy a pair. Her enthusiasm declined a bit when she found out how expensive they are, but I think she might go for it if we find a used pair at a good price.

Even more spectacular was a view I had through an image intensifier about 10 years ago at the OSP. The number of stars at least doubled and the entire group was obviously involved in faint nebulosity. The only drawback was that looking into the device completely ruined my dark adaptation.

Small Telescopes

Perhaps the finest view I've had of M45 so far was through a 6 inch f/5 refractor at the Visitor's Center on Mauna Kea in January 2012. At low power the big refractor perfectly framed the cluster and instantly showed the Merope Nebula, which is the brightest and most obvious area of nebulosity. I could also tell that the area closest to Merope had a light bluish tint and the area further from the star had a slight yellowish tint. The color DSS image at the beginning of this article shows this color contrast less well than I saw it. Maia, Alcyone and Electra all had obvious halos of bluish nebulosity and the field of view was full of bright, beautiful stars.

The black and white inverted version of this image shows the nebulosity in more contrast. By the way, the nebulosity associated with M45 had for a long time assumed to be left over from the creation of the cluster. But its estimated age of 100 million years suggests that the gas and dust of its creation was dispersed long ago by radiation pressure from the Pleiades stars, and that their proper motion is now carrying them through a particularly dusty area of the Milky Way's interstellar medium. Check out this Astronomy Photo of the Day from 2010 to get an idea just how dusty: <http://apod.nasa.gov/apod/ap101118.html>



I've also had excellent views with my 8 inch f/4 Newtonian but I've never had it under a really good sky. I've seen the Merope Nebula a few times rather well and one of these days look forward to a view at least as good as I saw in Hawaii through the 6 inch refractor. I'm currently building an 8 inch f/3.3 scope for Judy, which I think of as her Pleiades scope. It should frame them beautifully and bring out the nebulosity really well.

One thing to keep in mind while trying to observe the Pleiades nebulae is that they're quite subtle and usually look much like the radiance seen around bright stars when your eyepiece is lightly fogged. It's a good idea to point your scope at other similarly bright stars before and after looking at the Pleiades to make sure your optics are dry and clear.

The brightest area of nebulosity is around the star Merope and trails off to the south. It was discovered by Wilhelm Tempel in 1859 using a 105mm refractor equipped with an eyepiece giving a 2 degree true field of view at 45x. It was given the designation NGC 1435, and along with the nebula later discovered around Maia, NGC 1432, are the two closest NGC objects to us at approximately 430 light years distant. 1432 also has the distinction of being the only NGC object that was discovered by photography.

Larger Telescopes

When Tempel first discovered the Merope Nebula his findings were quickly confirmed by astronomers using relatively small telescopes. This was quickly followed by other astronomers reporting that they couldn't see it with

much larger telescopes, including the 72 inch Leviathan of Lord Rosse. That began a controversy on reality of the nebula. And then Temple reported later observations of his own that he thought indicated the nebula was variable, which still other observations seemed to support.

The discussion went back and forth for several years as further observations were compiled, some of which showed very faint portions of the Pleiades nebulosity around and between Alcyone, Maia and Electra. Soon, the first long exposure wide field photographs of the Pleiades were taken that confirmed the existence of the Merope Nebula and much of the other nebulosity indicated in sketches made by visual observers – but not all. More controversy, some of which became personal.

Aside from Tempel, other famous astronomers engaged in this long running debate were d'Arrest, Charcorne, Otto Struve, the Reverend Webb, Dreyer, Lawrence Parsons, Schiaparelli, Common, Swift and Barnard. The photographs of the Henry brothers, Isaac Roberts and Barnard stirred the pot even more as they tended to cast doubt on the reality of the visual and competing photographic observations.

Eventually things got sorted out as it became apparent that large, long focus telescopes with narrow fields of view aren't very good at showing large, diffuse nebulosity – something that's common knowledge today.

It also became plain that the Merope Nebula wasn't variable, but that the sky changes constantly, greatly modifying what can be seen. This is also common knowledge today.

The photographic debate went away as film became more sensitive and the quality of exposures improved. Photography quickly replaced visual observations in professional astronomy.

Wrapped into the debate were the opinions of a few astronomers who were so sure of the quality of their telescopes and the “trueness” of the images they formed that if they couldn't see an object, it didn't exist. Hubris indeed!

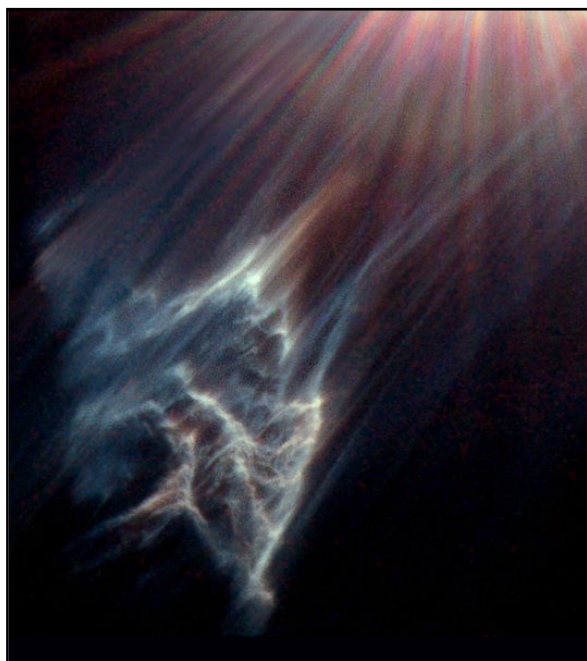
A Pleiades Challenge

In 1890, Barnard visually discovered a small, bright nebula right next to the star Merope with the 36 inch refractor at Lick Observatory. He was able to see a “comparatively bright round nebula close south and following Merope... It is about 30” (30 arc seconds) in diameter, of the 13th magnitude, generally brighter in the middle, and very cometary in appearance.”

The HST image shown here is a beautiful close up of what is now called IC 349, and its location is indicated on the two DSS images in this article.

This is a much more challenging object than the large and diffuse Merope Nebula (NGC 1435) because of how close the nebula is to Merope. The brightness and glare from the star hide this little nebula quite well and on many nights it's completely overwhelmed. Poor seeing can also mask it effectively. I've only had one decent sighting of it with a 20 inch Dob by keeping Merope just outside the field of view, and it looked much as Barnard described it. He was also able to detect it with a 12 inch refractor by blocking Merope with an occulting bar. More recently, Sue French of Sky & Telescope has been able to see it well with her 14.5 Newtonian using an occulting bar.

Whether you'll be able to see IC 349 depends a great deal on sky conditions, your experience as an observer and your telescope, but whatever you do don't overlook the unmatched beauty and majesty of the incomparable Pleiades. For that you only need a clear winter sky and your sense of wonder.





Classic Telescopes

Monoceros the Unicorn offers Tasco owners some glorious stellar sights.

By John W. Siple

LOOK TOWARD the east of Orion on a clear winter's evening and enter the land of the celestial unicorn. Monoceros, a rather obscure group of 4th-magnitude and fainter

stars, occupies the fertile gulf of sky bounded by the "Winter Triangle" of Betelgeuse, Sirius and Procyon. A comparatively new constellation, it was formulated around 1624 by the German mathematician Jakob Bartsch, son-in-law of Johannes Kepler, who listed it on his star charts as *Unicornu*.

A visual tour through the glimmering byways of this fascinating region was made with lucrative 1960's Tasco equipment. Several examples were selected from their acclaimed series of 2.4-inch Solarama refractor telescopes, each model providing a remarkable view of the area's strange and wondrous sights.

The litany of deep-sky treasures starts with the young open star cluster NGC 2244 (embedded within the central hollow or cavity of the famous Rosette Nebula), then follows to the brilliantly illuminated Christmas Tree Cluster, smartly defined and heavenly abode of the Cone Nebula. It continues with the heart-shaped richness of M50 and eventually ends at several multiple stars including the beautiful stellar triplet Beta (β) Monocerotis.

The Cone Nebula, a textured cloud of backlit gas and dust, is found at the southern extremity of the bright star cluster NGC 2264. Measurements indicate that the silhouetted figure lies approximately 2,600 light-years away from Earth. Its full glory becomes apparent in photographic exposures, such as that shown here by Michael Gariepy and Adam Block (NOAO/AURA/NSF).



This literature from Tasco Sales Inc., published in 1970, mentions one of the author's fine 2.4-inch instruments. Cleverly embodied in black and white along with an eye-catching cover, the catalog's 40 pages showcase a wide assortment of optical goods that include microscopes, riflescopes, and binoculars. Readers with an interest in astronomy are treated to four excellently illustrated pages of specialty refractor and reflector telescopes plus many useful accessory options. Keen competition between American and Japanese workshops during the 1960s and '70s resulted in astronomy gear of incredible appeal and craftsmanship. Designed for the ardent beginner and skilled professional alike, Tasco's precision engineered 60mm equatorial refractor telescope, model #7TE-5, is attractively priced inside the yearly catalog at \$199.95. The essence of quality small telescope observing is demonstrated by its ability to "travel the skyways down to the 10.7 magnitude with a resolving power of 1.9 arc-seconds."

Solarama

This pictorial discussion features a high-end refractor telescope out of Tasco's past. Crafted in Japan by skilled professionals and advertised as "an outstanding optical import with the precision qualities of much larger instruments," it was offered in two separate focal lengths. Today, among collectors their twin equatorials remain perhaps the most popular of all 2.4-inch vintage telescopes.

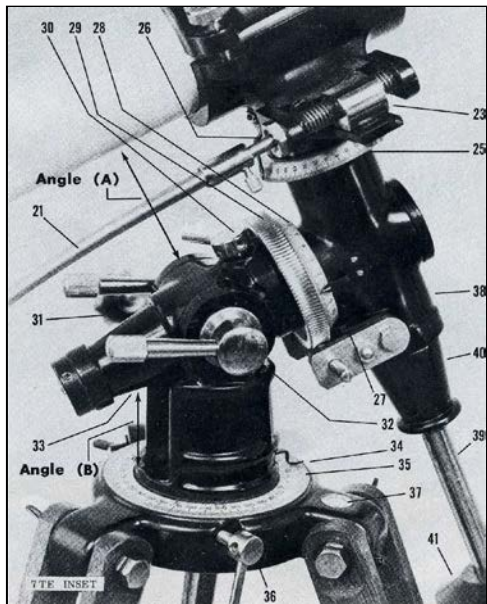
HISTORY

In the late 1950s, Tasco began the worldwide distribution of an elite series of refractor telescopes. Among them was their '304X60mm #7TE-2,' a modestly priced instrument featuring a 910mm (F/15.2) objective lens. Full manufacture was discontinued in about 1964, and several years later a switchover to their slightly modified '500X60mm #7TE-5' was announced. This new model from Tasco's overseas supplier Astro Optical Industries boasted a longer focal length of 1,000mm. An accurate chronology based on company literature indicates that sales ended sometime in 1977.

Mounting ►

One of the trademark characteristics of a Solarama telescope is its equatorial head. Engineers in Japan patented several variants but retained the same basic casting pattern throughout its lifetime of sales.

A closer look at the German-type mount reveals a plethora of important features that include indexed setting circles for both the declination (25) and polar (28) axes. Only the #7TE-2 base came supplied with an azimuth circle (35) and spirit level (37).



OPTICAL CHARACTERISTICS

Refractor telescopes in the #7TE series mentioned above use legendary optics from Carton Optical Co., which are housed in an adjustable 'push-pull' or Hastings-type cell for precise collimation. Every crown and flint lens set (hard-coated with magnesium fluoride and air-spaced) is fully corrected for spherical and chromatic aberration plus any residual coma. Rigorous factory testing of achromatic surfaces assures that the Dawes limit criterion is consistently reached.



Photo by James Witt

DIFFERENCES

Solarama class instruments elegantly combine symmetry and proportion. Through the proper use of durable materials perfect balance and rock-steadiness of images is guaranteed. Constantly striving for improvement, their newer edition model #7TE-5 (shown above) possesses a marvelous array of minor upgrades. These include a fancier chromed focuser/drawtube section, and for scratch-free storage die-cut Styrofoam inserts have now been placed inside its dovetailed mahogany carrying case. Engraved numerical information on each instrument also offers further proof of provenance.

▼ Accessories

Tasco sold many useful tools for making stargazing easier and more satisfying. All optical items possess 24.5mm diameter barrels that fit into imported Japanese drawtubes. For peak performance, three eyepieces (6mm, 12.5mm, and 20mm) of simple design are originally provided. To avoid an awkward position when pointed toward the zenith, a 90° star diagonal is standard issue. Other items of importance are an image erecting prism, sun projection screen (bracket only shown), and Barlow amplifier. Pictured along with the accessory set is the telescope's counterweight and rod.



Photo by Mark Kuba

AVAILABILITY AND PRICING

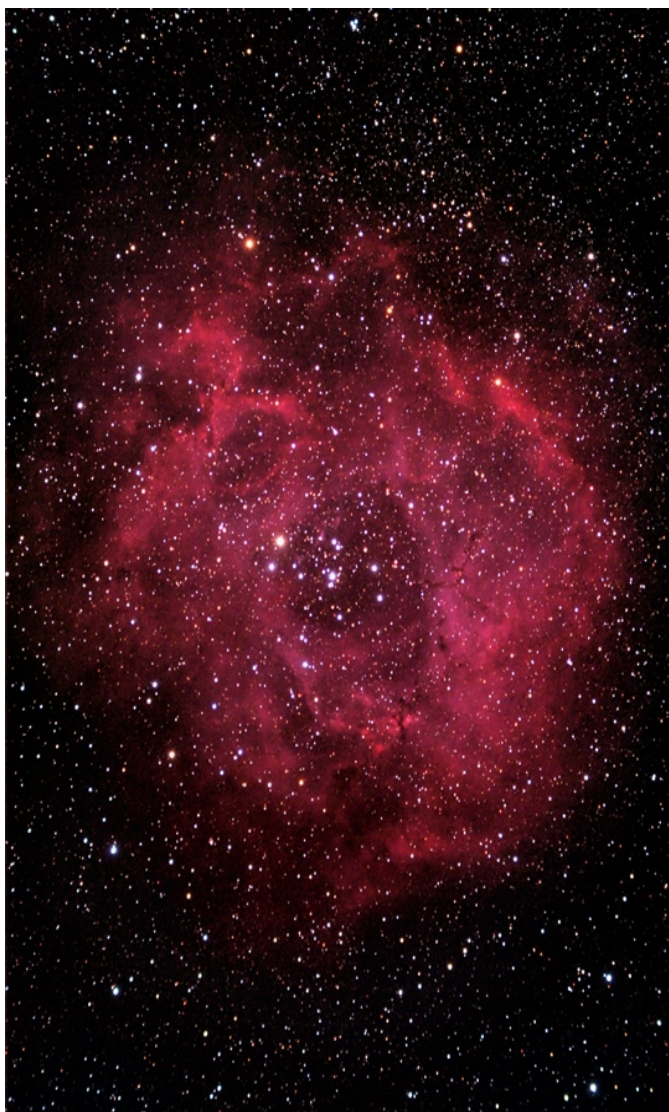
As a popular mass-market item with thousands sold, Solarama telescopes can be purchased secondhand from a variety of different sources. Such outlets include periodic advertisements and related auctions on the Internet. Other places to scout are retailers of previously owned goods; every metropolitan area has at least one business where used items are constantly changing hands. Cost is variable, but depending on condition a basic telescope often sells for \$100 to \$200.



NGC 2264 and neighboring region

Christmas Tree Cluster, Cone and Fox Fur Nebulae

Davide De Martin/Caltech, Palomar Observatories, Digitized Sky Survey



Photograph of the Rosette Nebula courtesy of Herb Bubert

ROSETTE NEBULA

The deep-sky terrain in central Monoceros is dominated by this luminous vortex and associated cadre of glittering stars. The host star cluster (cumulative magnitude 4.4) is called NGC 2244, while its gaseous attendant carries the primary designation NGC 2237. Since the nebula's girth is so great (90' or three times the apparent diameter of the full Moon) the most heavily illuminated portions are designated with their own four separate NGC numbers.

In Tasco's longest focal length Solarama refractor the dozen brightest members of NGC 2244 form a distinct rectangular pattern. A yellow star, shining at magnitude 5.9, is the group's lucida. Most difficult to detect visually in model #7TE-5 telescopes are the wreath's ghostly segments. Brighter sections of the glowing circling can be glimpsed on pristine nights with the aid of an appropriate filter and at extreme low power. This oft-photographed nebular colossus is located 4,900 light-years away with an actual diameter of 90 light-years.

CHRISTMAS TREE CLUSTER

Another favorite stopover when visiting the region is at the 4th-magnitude open cluster NGC 2264. Easily spotted by its fir-tree outline, this starry brocade is coarse and brilliant in Tasco's 2.4-inch F/15.2 (model #7TE-2) refractor at 45x. Some 25 stellar points are tallied within the cluster's 20' boundary, while visible at the tree's base is the fifth magnitude variable star S (15) Monocerotis.

Lending visual spice is the presence of the Cone Nebula, a mottled 5' by 3' finger of obscuring matter positioned at the top (southern edge) of the group. However, this dark region and several adjoining clouds of fluted nebulosity (such as Sharpless 2-273 or the 'Fox Fur Nebula' immediately to the northwest) require transparent skies and a good 10-inch telescope (or larger) for best observation.

MESSIER 50

Our celestial Unicorn's only plotted Messier object is M50 (NGC 2323). The notable 6th-magnitude open star cluster was added to his famous list on April 5, 1772. It is readily located a little more than a third of the way along an imaginary line drawn from Sirius to the 3rd-magnitude star Beta (β) Canis Minoris.

Classical #7TE series telescopes show a dense 16' heart-shaped region populated by dozens of 8th-magnitude and fainter stars. The brighter members extend outward into short arcs and chains, but the middle of the cluster remains suffused in a soft, cloistered glow. An 8th-magnitude orange luminary, identified as the Cepheid variable RS Monocerotis, is positioned just 7' south of M50's center. The linear diameter is about 13 light-years and the calculated distance 2,970 light-years.

BETA MONOCEROTIS

This luxurious multiple star, described as "one of the most beautiful sights in the heavens" by Sir William Herschel, graces the sky in southwestern Monoceros. Beta's entangled bluish-white suns (labeled A, B, and C) shine at respective magnitudes 4.5, 5.2 and 5.6. Component B lies 7.4" southeast of ranking member star A, and can easily be split in most amateurs' telescopes.

Lesser orbs B and C form a tight pair themselves, spaced only a scant 2.8" apart. At a relatively low magnification of 50x the author's 2.4-inch F/16.7 (model #7TE-5) telescope shows an isolated but very pretty double star. When the power is trebled to 150x with the supplied Barlow lens, all three kindred stars are plainly resolved into a slender (acute) triangle of beautiful whitish starlight.

EPSILON (ϵ) MONOCEROTIS

An attractive, colorful double star conveniently found 7° southeast of Betelgeuse and only 2.5° west of the Rosette Nebula. The magnitudes of Epsilon's involved stars are 4.5 and 6.5, and their current separation is 13.2". In a well-corrected #7TE-2 (910mm) telescope the primary shines vibrant yellow and the dimmer star appears almost Brittany blue. Seasoned observers using different equipment often record white and pale yellow for the two components, which has better agreement with their documented spectral types of A5 and F5.

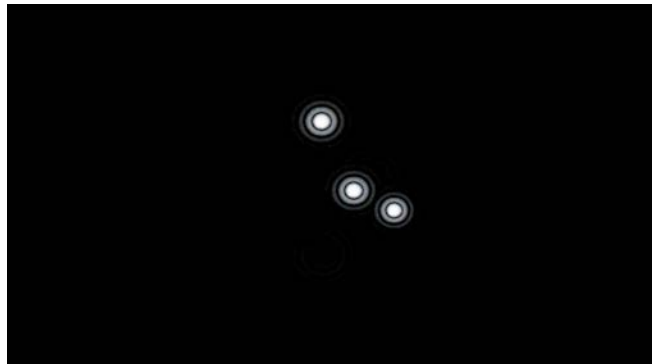
HAGRID'S DRAGON

Tasco owners might also want to take a glance at NGC 2301, an unusual stratum of stars located directly underneath the belly of Monoceros and straddling the galactic equator. Underrated by most guidebooks, 'Hagrid's Dragon' glows with an integrated magnitude of 6.0 and measures nearly 12' across. At 73x in Tasco's 910mm refractor, it is partially resolved into a canted (Y-shaped) archipelago of about ten 8th-magnitude suns. The wavy N-S branch dominates the assemblage, which contains numerous mottled knots. Several nice doubles are present, including an obvious pair just east of the cluster's center.

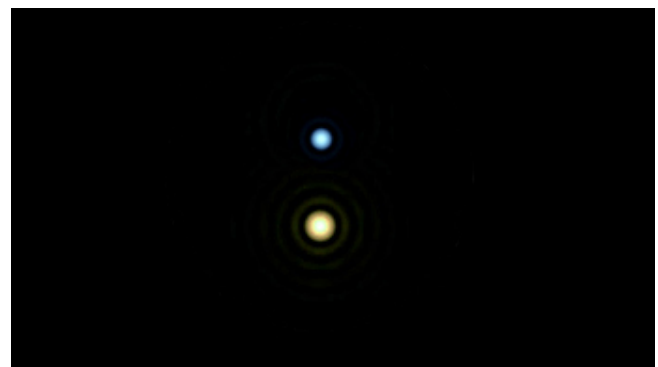


Courtesy of Jeremy Perez

Arizona astronomer and professional sketch artist Jeremy Perez made this fine (unfiltered) impression of M50 through his 6-inch F/8 Newtonian reflector telescope at a magnification of 48x. It shows nearly the same distribution of stars seen through older quality Tasco 2.4-inch equipment.



Beta (β) Monocerotis, located 11° south of the Rosette Nebula, is a favorite object for small telescope users. All three resolved components (spectral types B3) appear brilliant white in the author's drawing above, in sharp contrast with the gold and blue colors of the double star Epsilon (ϵ), below, found in the same constellation. Both observations demonstrate what can be gleaned at extreme magnification through a classic Tasco #7TE series Solarama astronomical telescope.



JANUARY 2013

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4 Noon Downtowners Luncheon Kell's	5
6	7 7pm Board Meeting OMSI Classroom 1	8	9 7pm Astro Imaging SIG Beaverton Library	10	11	12 Haggart Observatory Public Night
13	14	15	16	17	18	19
20	21 6:30 New Member and Junior Astronomers 7:30pm General Meeting OMSI Auditorium	22	23 7pm Cosmology SIG <div style="border: 1px solid pink; padding: 2px; display: inline-block;">Note No Meeting In January 2013</div>	24	25	26 10am - 3pm Telescope Workshop
27	28	29	30	31		

February 2013

Feb 01	Friday	Downtowners' Luncheon	Kell's	Noon
Feb 04	Monday	Board Meeting	OMSI Classroom 1	7pm
Feb 09	Saturday	Haggart Public Night	Haggart Observatory	
Feb 13	Wednesday	Astro-Imaging SIG	Beaverton Public Library	7pm
Feb 18	Monday	General Meeting	OMSI Auditorium	7:30pm
Feb 20	Wednesday	Cosmology SIG	Linus Pauling House	7pm
Feb 23	Saturday	Telescope Workshop	Technical Marine Service Building	10am-3pm

<http://www.rosecityastronomers.org>

Rose City Astronomers
Oregon Museum of Science and Industry
1945 SE Water Ave
Portland, OR 97214-3356

The Rosette Gazette

Volume 26, Issue 2

Newsletter of the Rose City Astronomers

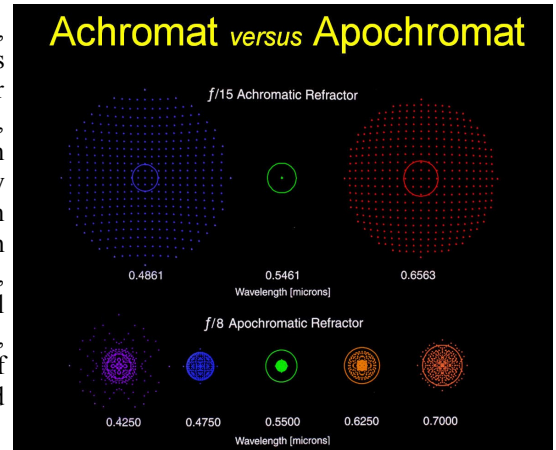
February, 2013



Telescopes, Eyepieces, and Astrocameras

Richard Berry

We all use telescopes and want them to perform well, yet how they work sometimes seems mysterious. This talk is an introduction to optics as applied to amateur astronomy. I introduce the basic concepts in a simple, non-mathematical way and then show how, when analyzed, the familiar telescopes we all love actually work and perform. Although I'll focus primarily on telescopes -- achromatic refractors, Newtonian reflectors, apochromats, various Cassegrain types, SCTs, and Maksutovs -- and their performance, I'll also review classic eyepiece types and their modern, wide-angle successors. I will conclude with a brief discussion of astrographs, that is, telescopes optimized for imaging with CCD cameras.



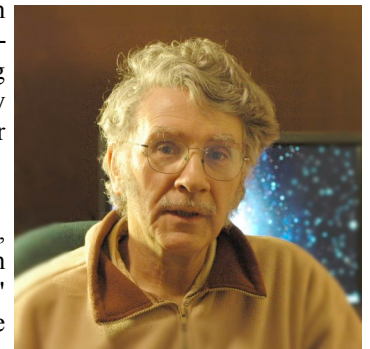
In This Issue:

- 1....General Meeting
- 2....Club Officers
-Magazines
-RCA Library
- 3....RCA Board Minutes
- 4....Special Interest Groups
- 5....Minor Catalogs
Project: Markarian
- 9....The Dreaming
Universe: A Gedankenexperiment
- 12...Planet Formation:
More Questions Than Answers
- 13...Star Parties
- 14...Calendars

Richard Berry has been an amateur astronomer and telescope maker for as long as he can remember. At age 13, he ground and polished his first telescope mirror, and went on to complete a dozen more telescopes. Early in his career, he built payloads launched on Black Brant research rockets, tested and certified components flown in the Apollo Soyuz mission, and measured ozone pollution with laser light.

Then, in 1976, Berry joined the staff of Astronomy magazine. In sixteen years as its editor, he built Astronomy magazine from a struggling start-up to the largest circulation astronomy magazine in the world. During this time, he also founded and edited Telescope Making, the quarterly journal that helped make the 1980s such explosive growth years for amateur astronomy.

In the last two decades, Richard's books "Build Your Own Telescope", "Discover the Stars", "The CCD Camera Cookbook", "The Dobsonian Telescope" and "The Handbook of Astronomical Image Processing" have introduced thousands to the joys of amateur astronomy, telescope making, CCD imaging, and digital image processing.



RCA is a member of the Astronomical League.
<http://www.astroleague.org>

All are Welcome! Monday February 18th
Social Gathering: 7 pm. General Meeting Begins: 7:30 pm.
Location: OMSI Auditorium

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Trout Lake Star Party photo above courtesy Michael Minnhaar
Moon photos below courtesy David Haworth

New Moon
Feb 10

First Quarter Moon
Feb 17

Full Moon
Feb 25

Last Quarter Moon
Mar 4



CLUB OFFICERS

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Youth Programs Director	Vacant	youth@rosecityastronomers.org
Sister Club Liaison	Jan Keiski	sisterclubs@rosecityastronomers.org

RCA MAGAZINE SUBSCRIPTIONS

One of the benefits of RCA Membership is a reduced rate subscription to Sky & Telescope and Astronomy magazines.

The RCA member rate for Sky & Telescope Magazine is \$33 for one year or \$66 for two years. The RCA member rate for Astronomy magazine is \$34 for one year or \$60 for two years. For more information and payment options please see the website.

<http://www.rosecityastronomers.org/mags/index.htm>

Larry Godsey <magazines@rosecityastronomers.org>



RCA LIBRARY

The Rose City Astronomers maintains a comprehensive club library of astronomy related articles, books, CDs and videos. These items can be borrowed by members through checkout at the general meetings for a period of one month with renewals available by phone or e-mail to the club library director. The RCA library is constantly growing through many donations and the purchase of new materials. A listing of library materials (PDF format) can be found at the library web page.

<http://www.rosecityastronomers.org/library.htm>

Jan Keiski <library@rosecityastronomers.org>

Minutes of the Rose City Astronomers Board December 3rd 2012

Held at OMSI Classroom 1



Chair : Sameer Ruiwale
Secretary : Duncan Kitchin

Board Members Present

Sameer Ruiwale (President)
Ken Hose (VP Membership)
Mark Martin (VP Programming)
Jim Higgs (VP Community Affairs)
Larry Godsey (Treasurer, Webmaster, Magazine Sales)
Duncan Kitchin (Secretary)
Larry Froberg (Sales Director)
Howard Knytych (New Member Advisor)
David Nemo (Observing Site Director)
Scott Kindt (Special Interest Groups Director)

Peter Abrahams (Guest)

Call to Order

The meeting was called to order at 8:10 by Sameer Ruiwale and, there being 10 board members present, the quorum requirement of 9 was declared to be met.

Approval of Minutes

Moved: approve October minutes. Moved: Sameer Ruiwale. Second: Mark Martin. Motion passes 10-0-0. Moved: approve November minutes. Moved: Sameer Ruiwale. Second: David Nemo. Motion passes 10-0-0.

Directors' Reports

Secretary's Report – Duncan Kitchin: **Quorum (9)** met with 10 voting members present.
Treasurer's Report – Larry Godsey: Accounts distributed and available on the web. Report essentially nominal for this month.
VP Programming – Mark Martin: Mark has a volunteer to help with programming. Also has a suggestion to look into getting time on the Discovery Channel 4.2m scope. December potluck: was hoping to assess what inventory we have tonight, but was unable to due to another large meeting in the auditorium. May need an additional budget of about \$100. Setup will start at about 6pm, so that we are ready to start at about 6:30pm.
VP Observing – Steve Jaynes: Not present, but report from Larry Godsey. We have an agreement with Ka-Nee-Ta. The proposed rate has increased to \$110.80 including taxes and resort fees.
VP Community Affairs - Jim Higgs: Not much activity in the last month. Jim Higgs has visited some high schools for outreach activities. Numerous inquiries have been coming in. Event at the Hillsboro museum went very well; attended by about 7 volunteers from RCA. Suggested that we consider some recognition for members who volunteer

in outreach events. One possibility would be to have outreach volunteer shirts that are only available to participants. Jim Higgs will send Larry Godsey a list of the outreach events for inclusion on the website.

VP Membership – Ken Hose: This month we had 8 new members and 6 renewals, bringing in a total of \$263 in membership dues. Membership currently stands at 314 member families, compared to 310 at this time last year and 389 the year before. About 150 people have not rejoined in the last two years, which is comparable with the typical turnover of about 20%. Ken is putting together a list of questions to ask members not re-signing to find out why they chose to not re-subscribe, to make sure that we are meeting our members' needs.

Alcor – Ken Hose: This month we have 2 Messier awards to hand out, which will be presented at the December potluck meeting.

New Member Advisor – Howard Knytych: Met last month, with the meeting devoted to Astronomical League observing programs. Planning a new members meeting in January, to talk about basic observing information and methods.

Media Director – Diana Fredlund: Not present. No news release for this month, due to the potluck meeting.

Sales – Larry Froberg: Calendar was on sale at the November meeting. Sold 37 calendars so far out of a total order of 125. Book order for Fulvio Melia at January's meeting: have signed up 15 sales so far. Larry is stepping down from the post at the end of this year.

Book Library – Jan Keiski: Not present, but report submitted by email: Larry has figures from book sale. Continuing to clean out library materials storage areas with David Horne's help. No library at December meeting potluck.

Telescope Library - David Horne: Not present, but report submitted by email: proposed that there will be no telescope sales event at the December potluck.

IDA – Dawn Nilson: Not present.

Magazine Subscriptions – Larry Godsey: Nominal.

Webmaster – Larry Godsey: Larry Godsey needs information from Ken Hose about the Astronomical League awards for inclusion on the website.

Site Committee – David Nemo: Information about the Haggart Observatory will be posted on the RCA website, and then linked from the Clackamas Community College website. There will also be a locked filing cabinet available for storage of eyepieces for the telescope. Have a schedule set up for next year, with one event a month.

Youth Director – John Oreskovich: Not present, but John is currently working on a plan for youth programs.

Newsletter Editor – Scott Kindt: This month's newsletter is almost ready for publication.

SIGs – (vacant): The cosmology SIG has a new venue; details forthcoming shortly.

OMSI – Jan Keiski: Not present, but report submitted by email: Nominal.

Sister Club update – Jan Keiski: Not present, but report submitted by email: GAMA Liaison Leo Cavagnaro reports star parties going well.

Old Business

RCA generic business cards – Diana Fredlund / Sameer Ruiwale - DONE

RCA Calendar update – Larry Froberg / Larry Godsey - DONE
Stub Stewart Observatory and option for housing club's 12" LX200 scope there – David Nemo. Nothing to report.

Dark Sky Symposium planning update, costs for IDA light pollution board – Dawn Nilson. No updates.

Election committee update – Scott Kindt. DONE

Honorarium / Donations guidelines draft for commercial / not non-profit events – Jim Higgs. Proposal circulated at the meeting, and has also been discussed on the forum. Feedback has been almost entirely positive, with only a few minor corrections suggested. Discussion as to whether the guidelines should include monetary amounts. Straw poll of members present: 5-4-1 in favor of leaving the monetary amounts in the guidelines. Motion: adopt the proposed policy: Moved: David Nemo. Second: Howard Knytych. Motion passes 9-1-0.

New Business

Vote on Herry Tedja as Sales Director. Tabled until next month.



Jupiter - Bruce Alber
Captured 1/12/2013 in Vancouver, WA
Meade ETX-125, Phillips webcam
1200 frames

Special Interest Groups

Astro-Imaging Special Interest Group

When: Wednesday, Feb 13th, 7pm

Location: Beaverton Public Library
12375 SW 5th St - Beaverton

Note New Meeting Night

SIG Leader: Greg Marshall

Email: ai-sig@rosecityastronomers.org

<http://www.rosecityastronomers.org/sigs/astroimage.htm>

Junior Astronomers

When: On Hold

Location: TBD

TBD

Topic: TBD

Leader: Vacant

Email: youth@rosecityastronomers.org

<http://www.rosecityastronomers.org/sigs/youth.htm>

Downtowners Luncheon

When: Friday, Mar 1st, Noon

Location: Kell's
112 SW Second Ave. Portland

SIG Leader: Margaret Campbell-McCrea

Email: downtown-sig@rosecityastronomers.org

<http://www.rosecityastronomers.org/sigs/downtowners.htm>

New Members Special Interest Group

When: Monday, Mar 18th, 6:30pm

Location: OMSI Planetarium

Topic: TBD

SIG Leader: Howard Knytych

Email: newmembers@rosecityastronomers.org

http://www.rosecityastronomers.org/sigs/new_members.htm

Telescope Workshop

When: Saturday, Feb 23rd
10:00am - 3:00pm

Location: Technical Marine Service, Inc.
6040 N. Cutter Circle on Swan Island-Portland

SIG Leader: John DeLacy

Assistant: Don Peckham

Email: tw-sig@rosecityastronomers.org

<http://www.rosecityastronomers.org/sigs/tmw.htm>

Astrophysics / Cosmology SIG

When: Wed, Feb 20th, 7pm

Topic: TBA

Note New Location See website for map

Presented by: TBA

Location: 8036 SE Raymond St., Portland, OR 97206

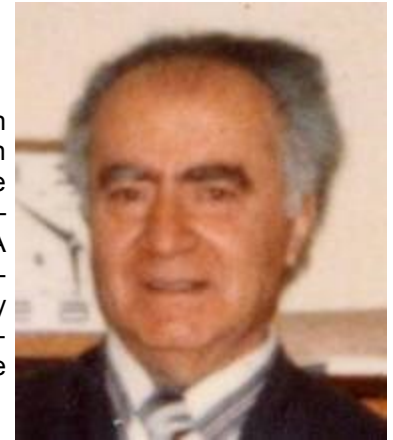
SIG Leaders: Lamont Brock, Viktors Berstis

Email: cosmology-sig@rosecityastronomers.org

www.rosecityastronomers.org/sigs/cosmology.htm

Minor Catalogs Project The Markarian Galaxies

By Margaret Campbell-McCrea



Benjamin Egishevich Markarian
1913 - 1985

I started this irregular series of biographies of astronomers whose names appear in star atlases, usually as abbreviations, back in September of 2010 when I wrote an article on Robert Trumpler, known as Tr in the star atlases. There followed an article on Jurgen Stock in the January, 2011 issue of *Rosette Gazette*. That spring an unusual number of images of the Markarian Chain of galaxies showed up on the RCA forum, so I took that as clue for whose life I should research next. However, between the lack of information on Markarian's personal life, and way too much of my own personal life taking over my time and energy, this article and this series of articles slowed way down. Entirely. Until now. So with a deep breath and a little free time, at last we begin again, with a life that takes some explaining.

The two-word description of Benjamin Markarian is that he was a "Russian scientist." And we are instantly plunged into a broiling cauldron of geography, history and politics which are worth sorting out, a little anyway.

Markarian was a Russian scientist the way Roberto Clemente was an American baseball player. Clemente was American because Puerto Rico is an American dependency or is occupied territory, depending on your political leanings. Markarian was Russian because Armenia had been taken over by Soviet Russia in 1922, which won it in a war with Turkey. A post-WWI war.



So what is Armenia? Currently Armenia is an independent country which broke off from the Soviet Union as the latter was crumbling in 1991. It's a small country, wedged between Turkey, Iran, Azerbaijan and Georgia in the Caucasus region of Southwest Asia, but there are Armenian people spread throughout all the countries listed above, and even into Syria, Israel, and Central Asia.¹ It's an ancient part of the world. There are archaeological finds going back to the Bronze and Iron Ages in this region, and every empire in ancient history has left its mark in the country, which is mountainous and beautiful and is the location of Mt. Ararat, the alleged resting place of Noah's Ark, though Turkey also claims it.

The Armenians claim to be the first people who, as an entire nation, adopted Christianity back in the 300s. This makes them different from their neighbors to the south who are mostly Muslim and to the north who are Russian Orthodox. The Armenian Apostolic church practices a very ancient form of Christianity. They have an alphabet (Հայերեն)² based on the Greek alphabet, but no one really uses it any more. And many, many - - most - - Armenians have a last name that ends in -ian or -yan, such as Kardashian and Saroyan. That's the most reliable way to tell if someone is Armenian or has Armenian ancestors.

So when Benjamin (Beniamin) Markarian was born in 1913 in what is now known as Shahumian, was he was born in Russia, in Armenia, in Turkey, in the Georgian region of Russia, or in the currently disputed territory of Nagorno-Arabakh? At any rate, by the time he was ten years old, the Soviet Union put a lid on everything, corralling millions of ethnic people into a forced marriage of unity and worker's paradise. At least Soviet rule brought stability to a region that is addicted to upheavals during Markarian's lifetime. And it apparently wasn't an easy life. His official biography on the Byurakan Astrophysical Observatory website states that he lost his parents early and moved to Yerevan, the capital of Armenia, "in hungry 30s." Meaning the 1930s. He did his undergraduate work in mathematics, and later entered "the Armenian branch of the USSR Academy of Sciences."³ I wonder what that means? Was it simply a matter of providing instruction in one's native language, or was it a form of discrimination? He later ma-

¹And California, where many Armenian refugees settled after the Turkish attempt at Armenian genocide at the end of WWI.

²According to Wikipedia, this is the word "Armenia" in the Armenian alphabet.

³Both quotations and subsequent quotations taken from the Byurakan Astrophysical Observatory's biography of Markarian found at <http://www.bao.am/BMarkarian.html>

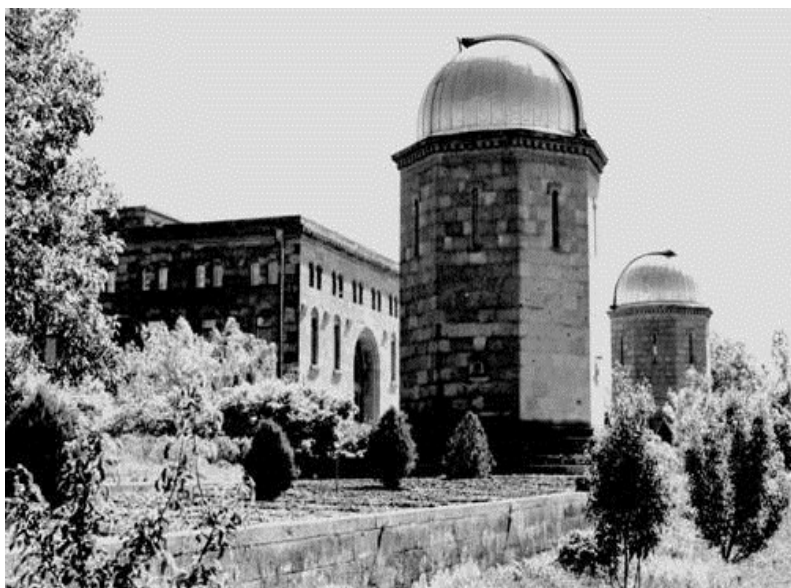
triculated at Leningrad University with a specialty in astrophysics, but was drafted into the Russian Army during World War II and spent his war years in Iran.⁴ After the war, he resumed his academic work and defended his thesis in 1941. The topic was "Fluctuations in the visible distribution of stars and the cosmic absorption," an area of research he would make his life's work.

For the next several years, Markarian worked as a university professor in Yerevan, and was one of the founders of the Byurakan Astrophysical Observatory. Victor Ambartsumian (Viktor Hambardzumyan) is credited with being the founder of the BAO, but Markarian was active in finding the site for the BAO and "mounted and functioned" all the telescopes of the observatory.⁵ Markarian was director of the BAO from 1953 to 1956, but he gave up the duties of ad-

ministration to concentrate on research. One of the only personal comments that the official biography makes is that Markarian was known as a "strict, requiring but ultimately fair chief." In an attempt to learn more about the man as a person, I emailed the BAO and received a very polite and warm response from their director, who referred me to an elderly woman who had been a colleague of Markarian's at the observatory. I sent back questions asking about Markarian's personality, his life, his friendships, and so forth, but I did not receive an answer. Was I bothering an old woman? Was I poking into personal or political sore places? Was I writing in English to someone who hadn't used it for a while? I don't know. But I waited eighteen months, so I gave it enough time. Thus there is little this article can say about Markarian the Man.



Mt. Ararat



Byurakan Observatory as it probably looked in the 1950s, when it was first built.

But I can talk about Byurakan the Observatory. It's located near Mt. Aragats (which is *not* Mt. Ararat) not far northwest of Yerevan. It was founded in 1946, and replaced the Yerevan University Observatory. Armenia has a dry and pleasant climate. It is protected from Russia's vicious winters by the Caucasus Mountains to the north and is warmed by the air circulation over the Black Sea. It's hilly and mountainous, giving it many high places, and is famous for its Mediterranean products, such as apricots, melons, grapes, peaches, figs, pomegranates and other fruits of the land. The BAO is located at 40 N. Latitude, putting it at the same latitude as northern California. It's about 1500 meters above sea level. The sky conditions must be very good most of the time. It gets average annual sunshine of 2,700 hours and annual rainfall of less than 12". In Willamette Valley, we get 34 – 45" annually. Considering that there are a number of other observatories in the region,⁶ it seems like a

good place to locate.

It was difficult for this researcher to sort out which contributions to astronomical understanding were made by Ambartsumian and which by Markarian. It seems from a comment in the biography that Markarian was "a brilliant observer," so I'm wondering if Ambartsumian did the theoretical work and Markarian did the observing, which is not

⁴Ironically, Jurgen Stock was drafted into the German Army and spent his war years somewhere in Russia. I wonder if the two men ever crossed paths?

⁵Ambartsumian seems to have had the more internationally active career. He was a member of the Royal Academy, was twice president of the International Council of Scientific Unions, and was president of the IAU from 1961 to 1964. He is a "Hero of Armenia" and his face is on the 100 Armenian dram bill.

⁶Zelenchukskaya Radio Astronomical Observatory in southern Russia; Abastumani Astrophysical Observatory in modern Georgia, and Shemakha Astrophysical Observatory in Azerbaijan.

at all to say that he was not a very smart astronomer in his own right. For example, the previously mentioned biography states that “In just the first years of the existence of the Byurakan Observatory, obtaining photos of a significant number of stars of open clusters with a small telescope, Markarian made up an “Atlas of stellar clusters,” which was used widely by astronomers of many observatories.” But it is Ambartsumian who is credited by his work at this same time with the discovery of the existence of stellar associations, different from star clusters. Associations are stars born about the same time, of the same material, that have not yet had the time to drift away from each other. They are larger, looser groups than globular or open clusters and are not bound together gravitationally. They run in the same part of the spectrum, and it was their work regarding the young, bright, hot O and B stars that led to the positing of associations.



Byurakan image with Mt. Aragats in the background.
(Modern Flickr image.)

Markarian and Ambartsumian seem to have transferred this concept over to the study of galaxies. In the work he is most famous for among amateur astronomers, “Physical Chain of Galaxies in Virgo and its Dynamic Instability,” *Astronomical Journal*, Dec. 1961, Markarian suggested that this group of galaxies was not a random array of galaxies but a “real physical system.” The original chain had eight galaxies, but the list of galaxies in the Markarian Chain has grown over the years, and now stands at twelve. A table of the Markarian Chain is at the end of this article.

In 1965, the observatory undertook the First Byurakan Spectral Sky Survey (FBS, also known as the Markarian Survey) using a 40” Schmidt telescope. It was this research that confirmed the existence of the Markarian Galaxies, which Markarian first posited in 1963. A Markarian Galaxy has a blue color in its nucleus that, if the galaxy were a star, would classify it as somewhere between A and F. Additionally, this blue core does not match the spectrum of the rest of the galaxy. Markarian undertook to find these galaxies with an “ultraviolet excess” and found 1500 of them. The survey took until 1980 to complete, and in 1981, Markarian started publishing the first of fifteen articles that described all of these items.⁷ In 1986 he published a much more accessible list, *First Byurakan Survey* which you can find as a text file on the Internet, and if you want a copy of it, I can send it to you. In 2007 the BAO published an updated atlas and database of the, by now, 1544 galaxies that fit this category. Closer study has found, inevitably, that not all the objects on the list fit the classification, but at the same time, the list continues to expand. Seyfert Galaxies are Markarian Galaxies. And Halton Arp has credited Ambartsumian with suggesting that peculiar galaxies have odd shapes because new galaxies are being formed from them. Perhaps that is the significance of the hot blue cores.

So I am left with two questions. First, are the galaxies of the Markarian Chain also Markarian Galaxies, meaning young, hot, bright, and having an ultraviolet excess in their cores? The only way to find that out is to compare the list of the dozen Markarian Chain objects to the Markarian Galaxy list and look for duplications. And in spite of the hundreds of articles published on these galaxies, that turned out to be a surprisingly hard thing to do, mainly because the atlas of Markarian Galaxies does not seem to cross reference to NGC or M objects.

My second question is my original question: what kind of person was he? Did he thrive under the Soviet system, or was he hindered by it? How many languages did he speak? Did he lose his parents early because of the Turkish genocide of Armenians after WWI? Did he have a family? There is an R. Markarian publishing mathematical articles on the movement of billiard balls, a fitting legacy for a son or daughter if he had one. His biography mentions that he continued to work in spite of ill health in his later years. So was he brave, stubborn, obsessive or oblivious? What kind of teacher or mentor was he? Would he have welcomed the creation of the Armenian Republic six years after he died, or would he have ignored politics and kept on working? He was much honored and awarded in his later years, so we should know more about him.

And also the other Armenian observers associated with the Byurakan Observatory. In 2010, Matt Vartanian,

⁷Links to all 15 of these articles, translated into English, are available in the Wikipedia article on Markarian Galaxies.

RCA member, created a Level III observing list for OSP in which every object had an Armenian astronomer's name attached to it. A brief survey shows that two of them are associated with BAO. They are Gyulbudhagian (Gyulbudaghyan) and Armen L. Parsamyan (Parsamian). Yerevant Terzian,⁸ an American, was also active at BAO, while Agop Terzan was an Armenian astronomer who did his work in France so was considered a French astronomer. He discovered a number of the most faint globular clusters by reviewing images taken in infrared. Most of his objects are towards the center of the Milky Way. He also worked with the BAO. Matt's list included Ambartsumian's Knot, a small blue dot, or dwarf elliptical galaxy, off the "bottom" of the elliptical NGC3561A, part of Arp 105. It might be time for RCA to consider organizing a trip to the BAO to sort this all out. Armenia seems like a very nice place to visit, and those apricots are supposed to be world famous.

⁸He was a professor of Matt Vartanian, RCA member.

Resources

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Object	Constellation	RA	Dec	Mag	Size
NGC 4388	Virgo	12 25.8	+12° 39.7	11.8	8' x 1'
M84	Virgo	12 25.1	+12° 53.3	9.2	6' x 6'
NGC 4387	Virgo	12 25.7	+12° 48.6	13.0	2' x 1'
M86	Virgo	12 26.2	+12° 56.8	8.9	9' x 6'
NGC 4402	Virgo	12 26.1	+12° 26.1	12.6	5' x 1'
NGC 4438	Virgo	12 27.8	+13° 00.5	10.0	9' x 3'
NGC 4435	Virgo	12 27.7	+13° 04.7	10.8	3' x 2'
NGC 4461	Virgo	12 29.1	+13° 11.0	11.1	4' x 1'
NGC 4458	Virgo	12 28.9	+13° 14.5	11.8	2' x 2'
NGC 4473	ComB	12 29.8	+13° 25.8	10.2	5' x 3'
NGC 4477	ComB	12 30.0	+13° 38.2	10.4	4' x 3'
NGC 4479	ComB	12 30.3	+13° 34.7	13.4	2' x 1'

The Dreaming Universe: A Gedankenexperiment

By Robert McGown FRAS

Spending time in the mountains under the stars, one might easily ponder the complexity and large scale structure of the universe. From our first experience, spending time in the mountains with its' unparalleled vistas gives us a new perspective in the surreal environment. Great vistas clear our mind and give us insight. At night, the entire Milky Way and the celestial canopy of stars rotates against the silhouette of the rolling hills and the serpentine shaped mountain ridges as the Earth turns. How far can you see in the mountains on a thought experiment or mind journey? From this high mountain slope, can you see all the way around the universe and beyond?

Scaled Neural Nets

We reflect from the landscape of the mountains as the Moon, planets and the colorful red and blue discs of star light are like our extended networks of consciousness. From our lofty perspective, we scan the night sky connecting the intimate star patterns with our mind. From our perspective, scaling the universe up or down, it could be viewed as a neural network. We reflect on our own consciousness and its interaction with the universe with our understanding of reality and neural networks. In a neural network of the human brain, there is information processing with chemical electrical signaling between the axon, dendrites, and neurons. The quantum process that makes us part of a stellar neural network is the absorbing of photons by our eye that is like a photo synapse as we connect to the stars with the star light absorbed. The conceptional synapse of starlight with different frequencies and properties of light is the visual connection. The eye absorbs the points of starlight in frequencies and color from the various magnitudes of stars. Our mind visualizes the starlight as neural dendritic microcircuits that are happening before us. As we scale neural nets up or down, they are difficult to identify for longer time spans. However the universe acts in ways that it has consciousness where the laws and axioms of quantum physics are the consciousness. As an example, matter and energy have a tendency to self organize itself and may be repeated on a larger scale. In the study of neuroscience, there is a false 90 color image of the functioning of the brain called the brainbow (1) that has beautiful images. In one abstract analogy, the aurora borealis is a brain bow of the Earth. Although it is not quite like the fluorescing of neural activity of the brain, it does show scaled interaction of proton and electron particle fields, interacting with a magnetic field.



Neural net animation

Wheeler -Feynman Absorber Theory

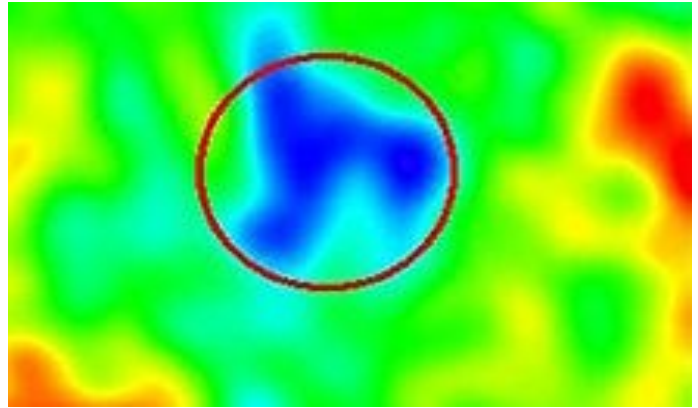
In quantum theory, Wheeler and Feynman worked on a theory called Absorber theory that is different than the fathoming of dendritic structures that remotely are part of a reality structure we are exploring. However, some of the processes have similar phenomena. Is the separate neural network interaction of light and sub atomic particles a reality structure, RS, in itself? In the Wheeler Feynman Absorber theory there are time symmetric vectors. If there were only time-symmetric constraints on the system, the absorption could have just as well have involved the advanced wave and have occurred before the emission, giving an "absorber-emitter" time sequence. It is complex to understand, "why emitter-absorber events are observed in nature but not absorber-emitter events by explaining the origin of the time-asymmetric constraints on the system?"

Scaled Reality Structures

On the grand scale with neural nets, the mind is looking at the net and the possible reality structures. Here, there is an exceedingly complex process going on. A reality structure may be like a self aware identity, organic or inorganic, that uses a neural network or scaled reality structure that may be used to describe its method of thinking, interaction or association, acting in ways that can be described as consciousness. In mathematics, a reality structure is a complex vector space that is the composition of two subspaces of V that are broken down into the real and imaginary parts of V . The mathematical models are very intri-

cate and are explained in note two in more mathematical detail.
 (2) $K^2=Id$

In the first description of a reality structure in physics, the brain is looking at neural networks on the scale of light years. Consequently, there is a neural network looking at a neural network as light is absorbed from star light that is light years away. The scale of the neural network to the first order is the brain is reflecting on its own mechanics. The second order reality structure is the human brain looking at the star structure of the Milky Way galaxy. The third order is the reality structure neural networks of galaxies as viewed visually through a telescope or virtually in a filamentary connected large scale network.



Eridanus Cold Spot in the Cosmic Microwave Background (NASA)

The fourth order neural net reality structure is a possible quilted multiverse beyond the event horizon of our universe. There is possible evidence in the microwave background radiation map of the universe that shows parallel universe may have bifurcated from our universe early on. The evidence is two antipodal super voids 7-10 billion light years out. (3)

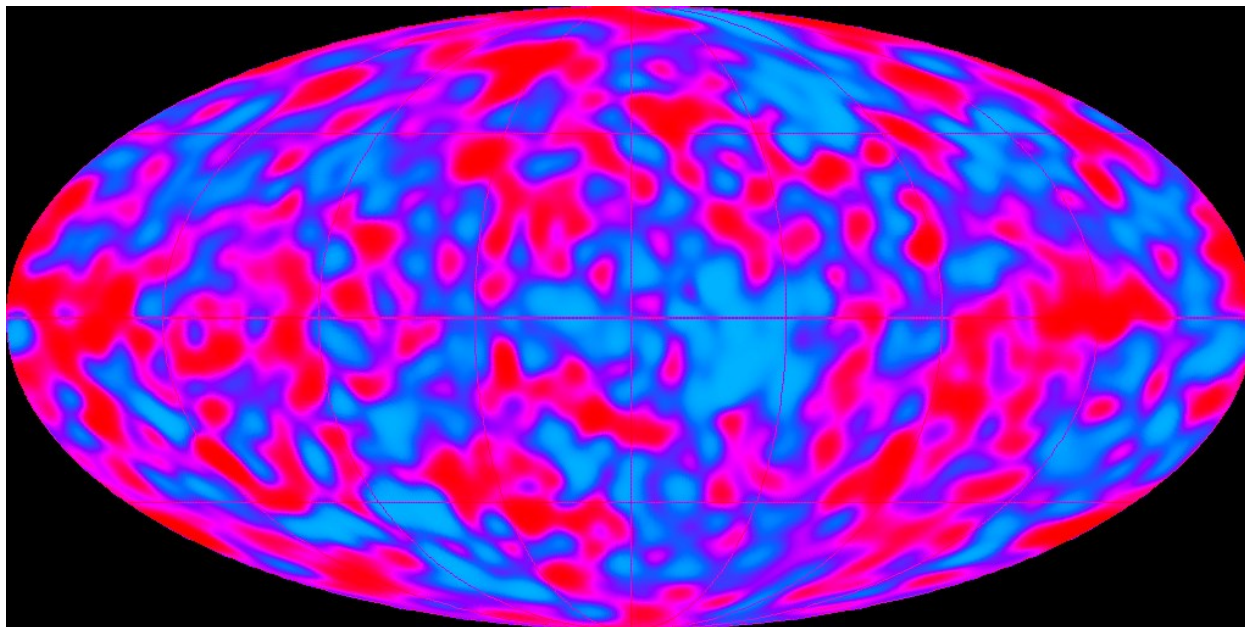
The bifurcated parallel universe is part of the quilted multiverse. The quilted multiverse is a series of universes that is theorized to go on in all directions. (4) The large scale structure of the universe of the universe may not be as isotropic and homogeneous as thought with the recent discovery of a quasi stellar structure four billion light years across.

Scaled Neural Net- Reality Structure Table

Ordered Neural Net	Neural Net scale $Z \rightarrow Z'$	Reality Structure correspondence $K^2=Id$
Sub order Baryonic & Non Baryonic	Microscopic-sub atomic: Quarks, leptons, gluons, photons	MV 1-(-1)
Neural Net One	Human mind: neurons, dendrites,& axons	MV 1-1
2nd Order Neural Net	Starlight to galactic structures Stellar network	MV 1-2
3 rd Order Neural Net	Galaxies through a telescope Clusters & Super Clusters	MV 1-3
4 th Order Neural Net	Quilted Multiverse structures of the different laws of physics	MV 1-4

If there were a reality structure, in the second order stellar RS or galactic neural network RS order light years across, would it have a level of awareness and be able to fathom or see a fourth order neural network of a quilted multiverse? A quilted multiverse isn't exactly a checkerboard universe; however it is like a series of universes with a red limit event horizon where the universes are not in contact with each other. This would be on a scale of the universe with a cosmic neural net consisting of other universes. Also would the fourth order reality structure fathom the sub orders of reality structures? Thus there is an electrical signaling of the brain of starlight that triggers the quantum absorption visual connection with the neural network of star light. What are the windows of transparency of the dark universe? For us, the connection to the fourth order reality structure exists as we visually view through a telescope at galaxy structure. Although under the night sky, our eye absorbs the photons of galaxies out side of our own without being aware of their galactic structure. On a larger scale, we may receive photons from beyond our galaxy, however they may be out side the wavelengths that our eyes can detect.

There could be scalar neural nets and reality structures in the world of non baryonic particle universes. Non baryonic particles are particles that don't interact with normal atoms and matter. After the discoveries of the WMAP satellite, we know the universe is composed of 4% atoms, 24% dark matter and 71% dark energy. Some of these (dark matter) particles are neutrinos and WIMPS (weak interacting massive particles) for example. With the entire other realm of dark matter and non baryonic particles in the universe, there could be scaled neural net reality structures.



Cosmic Microwave Background Radiation (NASA)

Conclusion

In our Gedankenexperiment, we can only compare the reality structure that we are in contact with or advance the concepts using mathematical operations, theorizing about their existence that may give us a deeper connection with reality. Like superstring theory, scaled neural nets and scaled reality structures are a complex thing to wrap our mind around. However, like superstring theory, there may be predictions that would allow us to understand certain large scale absorption and particle behavior in the universe. As we absorb and interact with starlight, fathoming the neural nets of light particles of the Cosmos, we ponder what level of consciousness that reality structures that the various particles have. We will all eventually turn into photons and particles, and again be recycled into the universe. Our goal is to find out patterns of global scaled neural network activity that reflect scaled reality structures and the deep mechanisms of consciousness of the universe.

If multiple levels of scaled reality structures interacted with each other, there may be assigned astrophysical predictions that may be observed. In the web of particle complexity, there are Feynman diagrams to show the interaction of these particles. Although these neural net reality structures would have gone through the process of separate evolution, their complexity may be similar. Comparing scales of the universe in general terms: the human brain has 200 billion neurons, the galaxy has 200 billion stars and the visible universe had 200 billion galaxies. Perhaps, extrapolating on this scale, cosmic evolution of the quilted multiverse with the laws of physics like our universe has a level of 200 billion universe structures. The familiar web of patterns and curious fractal like shapes that make up the reality structures and scalar neural nets that we see through a pair binoculars or a telescope, bring many beautiful ideas of the universe to mind from our mountain vantage point. Even when I am alone in the darkness under the night sky, I feel like I am connected and surrounded by my family of friends and other reality structures, sharing fond memories, as we walk together, wandering amongst the timeless mountains.

References:

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- 2 Reality Structure: The differences between these two signatures can be codified by the notion of a reality structure on the space of spinors. Informally, this is a prescription for taking a complex conjugate of a spinor, but in such a way that this may not correspond to the usual conjugate per the components of a spinor. Specifically, a reality structure is specified by a hermitian 2×2 matrix K whose product with itself is the identity matrix: $K^2 = Id$. The conjugate of a spinor with respect to a reality structure K is defined.
- 3 Rudnick et al, The Eridanus Cold Spot, from the WMAP satellite data, 2001 compiled over 3 years
- 3a Mersini- Houghton, Laura et al, Parallel Universes and the Eridanus Super Void
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- 5 Goswami A, The Self Aware Universe, University of Oregon quantum physics 1993, Putnam books



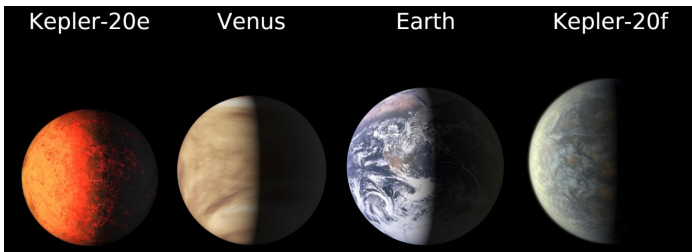
847 and counting: that's the number of planets confirmed as existing around 642 stars within several hundred light-years of our Sun. And more than 2,000 additional detections are awaiting confirmation by follow-up observations. By far, the most potential exoplanets have been found by the NASA spacecraft Kepler (launched in 2009), whose mission is to find Earthlike planets in a habitable zone around other stars, by staring at 150,000 stars and recording minuscule dips in brightness.

So far, Kepler hasn't yet found an identical twin to Earth: a rocky body of similar mass, sweet with liquid water, in the "Goldilocks zone" for temperatures just right for life as we know it to evolve. In fact, Kepler hasn't yet found even an exoplanetary system resembling our Solar System, with rocky planets on the inside, gas giants in the outer reaches, and orbital periods ranging from months to centuries. Instead, most exoplanetary systems are—by the standards of our Solar System—so bizarre they are challenging astronomers and computational astrophysicists to reexamine long-held models of how planets form

Constrained by the data

"With many observations, theorists have less freedom to speculate how planets form," explains Brad M. S. Hansen, associate professor of physics and astronomy at the University of California, Los Angeles. "Any theoretical or computational models have to explain what we actually find."

One big early surprise (1995) was the ground-based discovery of "hot Jupiters:" gas giants the size of Jupiter in orbits



The first Earth-sized planets were found in December 2011 by NASA's Kepler mission around a sun-like star Kepler-20. Kepler-20e is slightly smaller than Venus with a radius 0.87 that of Earth; Kepler-20f is a bit larger than Earth at 1.03 times the radius of Earth. Both are rocky but with scorching temperatures, as their "years" (orbital periods) are only 6.1 and 19.6 days, respectively. Three larger, likely gaseous, planets also circle Kepler-20.

Image credit: NASA/Ames/JPL-Caltech

around their parent stars much closer than Venus—or even Mercury—is to the Sun. How does something that massive form so close to a parent star? Would there have been enough material for such a big body to form in place, without being ripped apart by tidal forces? Or might it accrete from dust and rocks farther out in its planetary system and later migrate inward toward its parent star?

Later, lower mass, rocky planets—"super-Earths" only a few times the mass of Earth—were identified from Kepler da-

ta. "Now there also is an intermediate class of 'hot Neptunes' midway between the super-Earths and the hot Jupiters," Hansen continues. In a paper published in June 2012, he and coauthor Norm Murray describe an analysis of their formation from a set of numerical simulations based on a purely gravitational calculation of planetary scattering, collision and assembly.

Meantime, in December 2011, confirmation was announced of two rocky Earth-sized planets in the Kepler-20 system. They are two of five planets orbiting a G-type star a little smaller and cooler than our Sun. But the entire planetary system could almost fit inside the orbit of Mercury; both Earth-sized planets zoom around their star in less than three weeks; the three other planets are slightly smaller than Neptune; and the sequence of planets from star outward neatly alternates large-small-large-small-large.

Working models

So what do the observations and calculations tell astrophysicists about how planetary systems form?

One key is the relative distribution of mass among planets in a system. "Higher mass systems seem consistent with planets assembling in place," Hansen says. "That is somewhat unsettling because the mass required for *in situ* formation is a hundred times what we see in our own Solar System." One possibility is that the mass still moved radially inward, but early when it was smaller chunks like gravel, boulders, or asteroids.

That still leaves an important question: what processes in a whirling solar nebula allow smaller chunks to stick together to accrete larger objects and eventually planets? Especially, notes Hansen, "the dust-to-pebbles step is poorly understood."

One possibility is very cold temperatures. "At 100K, small objects may be covered with water ice, dry ice, and other ices," Hansen says, "so when objects collide, they stick together. My money is on another possibility suggested by fluid-dynamics simulations: turbulence in the collapsing solar nebula causing some fluid wavelike behavior in local areas of the gravitational collapse that triggers a jump from dust to boulders."

Stay tuned!

—Trudy E. Bell, M.A.

Further reading: Hansen, Brad M.S., and Norm Murray, "Migration then assembly: Formation of Neptune mass planets inside 1 AU," *Astrophysical Journal* 751 (2): 158–174 (06/2012) <http://iopscience.iop.org/0004-637X/751/2/158/>

The University of California High-Performance AstroComputing Center (UC-HIPACC), based at the University of California, Santa Cruz, is a consortium of nine University of California campuses and three Department of Energy laboratories (Lawrence Berkeley Laboratory, Lawrence Livermore Laboratory, and Los Alamos National Laboratory). UC-HIPACC fosters collaborations among researchers at the various sites by sponsoring an annual advanced International Summer School on AstroComputing (ISSAC), offering travel and other grants, co-sponsoring conferences, and drawing attention to the world-class resources for computational astronomy within the University of California system. More information appears at <http://hipacc.ucsc.edu>

**OMSI - Vernal Equinox Celebration
March 23rd, 2013**

On Saturday March 23, OMSI, Rose City Astronomers and Vancouver Sidewalk Astronomers will celebrate the vernal equinox and the beginning of spring with a free Star Party at both [Rooster Rock](#) State Park and [Stub Stewart](#) State Park! From beginners to experts of all ages, here's your opportunity to view the stars and other celestial objects up close and personal through telescopes. Viewing highlights includes Jupiter, Saturn and the moon. As the sky darkens, will view the deep sky objects including the Orion Nebula, Beehive star cluster and more!

On the scheduled day of each OMSI Star Parties, it is suggested that interested visitors call the OMSI Star Parties Hotline, 503 797-4000 Press #3 then #5, or check the OMSI Star Parties web site for possible [weather](#)-related cancellations. The event starts at sunset and is free with \$5 parking per vehicle. Warm clothing and a flashlight with red light are recommended. Personal telescopes and binoculars are welcome.

See <http://omsi.edu/starparties> for more information or cancellations.

**Maupin Star Party
March 08-10, 2013**

The Rose City Astronomers have been granted permission to use private property approximately 8 miles West of the town of Maupin for members-only scheduled Star Parties.

The Maupin Observing Site is located on a private airstrip about 8 miles east of Maupin, Oregon. Warning: this airstrip is used in the morning, but at the far end of the airfield. Most people don't even wake up.

There is no registration for the event itself, just show up and enjoy the weekend. You don't even need a telescope to participate; other members are enthusiastic to share their views. This is a good opportunity for beginners to get acquainted and seasoned observers to get some serious observing.

It can always be cold at night no matter what the season, so bring warm clothing.

RVs, trailers and tents will be allowed on the observing site (see observing site map for instructions). The town of Maupin offers lodging, restaurants and recreation if you don't want to rough it. We will have a portable outhouse on site.

More information can be found on the RCA website: <http://www.rosecityastronomers.org/sp/maupin.htm>



**Camp Hancock
Apr 05 - Apr 07, 2013**

OMSI's Camp Hancock with meals and cabins fits the bill for a great outing on a cool Spring weekend. Dark skies, warm cabins, real bathrooms, hot showers, good meals and great friends top off the list of things to like and all are provided with the \$45 per night registration fee (OK, maybe not the friends).

Camp Hancock is an OMSI sponsored field station for the promotion of science education. It is located about 150 miles from Portland and is 2 miles east of the John Day River in Eastern Oregon in the Clarno Fossil Beds. Camp Hancock is NOT a resort hotel; it is a rustic kid's camp with 16 bunkhouses that sleep up to 14 people each in A-frame buildings. The bunkhouses are one room with bunks, mattresses, limited electricity and heaters on a 60 minute timer. You will be sharing the bunkhouse with others in our group, but it's never crowded and we usually average less than 3 people per cabin. There is a limited area for Tents, RVs and trailers.

Registrations will be taken at both the February and March general meetings. The Registration and Payment Deadline is March 30th. For mail in registration forms, or to register and pay online please visit <http://www.rosecityastronomers.org/sp/hancock.htm>.





Haggart Observatory Public Nights

Through a partnership with Clackamas Community College, the Rose City Astronomers (RCA) maintains the Observatory and coordinates public access to the Observatory. During 2013, we have scheduled several Public Nights at the Observatory. We invite those interested to visit the Haggart Observatory webpage at: <http://www.rosecityastronomers.org/sp/haggart.htm> to find out dates and times for these sessions.

Star Parties Coming Soon in 2013!

Maupin Dark Sky Star Party Weekend	April 12-14
OMSI Astronomy Day	April 20
Maupin Dark Sky Star Party Weekend	May 03
Kah-Nee-Ta Star Party Weekend	May 10-12
Prineville Reservoir Star Party	May 18
OMSI Planet Parade Star Party	May 25
Rooster Rock Dark Sky Star Party	Jun 01
Maupin Dark Sky Star Party Weekend	Jun 07-09
OMSI Summer Solstice Star Party	Jun 15
Golden State Star Party	Jul 06-09
Trout Lake Star Party	Jul 12-14

FEBRUARY 2013

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1 Noon Downtowners Luncheon Kell's	2
3 	4 7pm Board Meeting OMSI Classroom 1	5	6	7	8	9 Haggart Observatory Public Night
10 	11	12	13 7pm Astro Imaging SIG Beaverton Library	14	15	16
17 	18 7:30pm General Meeting OMSI Auditorium	19	20 7pm Cosmology SIG <div style="border: 1px solid pink; padding: 2px; display: inline-block;">Note New Meeting Location</div>	21	22	23 10am - 3pm Telescope Workshop
24	25 	26	27	28		

February 2013

Mar 01	Friday	Downtowners' Luncheon	Kell's	Noon
Mar 04	Monday	Board Meeting	OMSI Classroom 1	7pm
Mar 08	Fri-Sun	Maupin Star Party	Wapinita Airstrip Near Maupin OR	
Mar 13	Wednesday	Astro-Imaging SIG	Beaverton Public Library **Note new meeting day**	7pm
Mar 16	Saturday	Haggart Public Night	Haggart Observatory	Dusk
Mar 18	Monday	General Meeting	OMSI Auditorium	7:30pm
Mar 20	Wednesday	Cosmology SIG	Firland Apartments Community Room 8036 SE Raymond St., Portland, OR 97206	7pm
Mar 23	Saturday	OMSI Star Party	Rooster Rock and Stub Stewart State Parks	Dusk
Mar 30	Saturday	Telescope Workshop	Technical Marine Service Building	10am-3pm

<http://www.rosecityastronomers.org>

Rose City Astronomers
Oregon Museum of Science and Industry
1945 SE Water Ave
Portland, OR 97214-3356

The Rosette Gazette

Volume 26, Issue 3

Newsletter of the Rose City Astronomers

March, 2013



Observing with the Discovery Channel Telescope and the Lowell Amateur Research Initiative

Lowell Observatory's Discovery Channel Telescope (DCT) is a 4.3-meter (170 in) telescope located at an elevation of around 7,740 ft in the Coconino National Forest in the small town of Happy Jack in Northern Arizona. Lowell Observatory partnered with Discovery Communications to build the \$53 million DCT, which will be utilized by astronomers at Lowell and several partner institutions, including Boston University, the University of Maryland/Goddard Space Flight Center, and the University of Toledo. The DCT is currently operated in an f/6.2 Ritchey-Chrétien mode with a 30 arcminute diameter corrected field. Its initial suite of instruments includes the Large Monolithic Imager (LMI), the Near-Infrared High-Throughput Spectrograph (NIHTS), the DeVeny Spectrograph, and the near-infrared Rapid IMager Spectrometer (RIMAS). The LMI is a 36-megapixel, visible-spectrum CCD camera with a 12.5x12.5 arcminute field of view. It was built at Lowell specifically for the DCT and is currently in the final stages of commissioning. The NIHTS is a low-resolution, near-infrared spectrograph that can be used simultaneously with the LMI. The DeVeny Spectrograph, currently in use at Lowell's 72" Perkins Telescope, measures spectra from the near-infrared to the near-ultraviolet over a range of resolutions. RIMAS, which is under development at the Goddard Space Flight Center in Greenbelt, Maryland, will complement NIHTS by offering near IR imaging and a higher resolution near-infrared spectroscopic mode.



In This Issue:

- 1....General Meeting
- 3....Club Officers
-Magazines
-RCA Library
- 4....RCA Board Minutes
- 5....Special Interest Groups
- 6....From Asteroids to High-Redshift Galaxies
- 9....The Observers Corner
- 11...Telescope Collecting in the Pacific NW
- 15...Annular Solar Eclipse In Mt Shasta's Rain Shadow
- 17...Star Parties
- 18...Astrophoto of the Month
- 19...Calendars



RCA is a member of the Astronomical League.
<http://www.astroleague.org>

(Continued on page 2)

All are Welcome! Monday March 18th
Social Gathering: 7 pm. General Meeting Begins: 7:30 pm.
Location: OMSI Auditorium

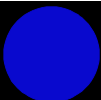
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Trout Lake Star Party photo above courtesy Michael Minnhaar
Moon photos below courtesy David Haworth

New Moon
Mar 11

First Quarter Moon
Mar 19

Full Moon
Mar 27

Last Quarter Moon
Apr 3





(Continued from page 1)

The DCT will be used to study a broad range of topics, extending from objects in our own solar system to the large-scale structure of the universe. The Kuiper Spectral Survey will utilize the LMI and NIHTS to characterize hundreds of Kuiper Belt objects. The LITTLE THINGS Survey is scrutinizing 41 nearby dwarf irregular galaxies to understand how star formation proceeds in the smallest galaxies. Lowell Research Astronomer and RCA member Kevin Covey will use the DCT to study the formation and evolution of low-mass stars, and the planetary systems they may host.

Several of the research projects at Lowell, including some of those utilizing the DCT, are seeking help from amateur astronomers through a program called the Lowell Amateur Research Initiative (LARI, pronounced “Larry”). Someone wanting to participate in LARI creates an account via the

Lowell Observatory web site and constructs a profile describing their skills and equipment. Their profile will then be matched with existing opportunities and they will be invited to participate if there is a suitable project. Some researchers are asking amateurs with moderately sophisticated imaging equipment to gather data on various types of astronomical phenomena. Others are asking for help with processing data collected using professional equipment. There is even a project asking for help identifying historical astronomical instruments from Lowell's collection of over 500 such instruments.



During our general meeting on Monday, March 18th, weather at the telescope permitting, we will receive a tour of the Discovery Channel Telescope and its control room, most of it conducted live via video teleconference, as the DCT team prepares for and begins to conduct an observing session. Our hosts will be Kevin Covey and Lowell Astronomer and Deputy Director of Technology Stephen Levine. Audience members will have the opportunity to ask questions live via the video link. The night's observations will likely include several targets associated with existing LARI programs, including a

dwarf irregular galaxy in the LITTLE THINGS Survey and a highly variable young star that Kevin is studying. If these observations are successful, RCA members will be invited to participate in processing and analyzing this imaging data. To participate in this aspect of the program, it is necessary to create a LARI account (at http://www.lowell.edu/LARI_create_account.php) and include a note in your profile indicating that you are associated with the Rose City Astronomers and specifying the project you'd like to participate in. LARI accounts created in connection with our meeting will be retained for 6 months and removed from the LARI system thereafter. If you wish to continue participating in LARI after this time, you will be able to re-establish your LARI account via the Lowell web site. In the unfortunate event that the weather doesn't cooperate, some portions or all of this program could be canceled or rescheduled. Snow at the telescope is still fairly likely at the time of our meeting and the road to the telescope may be impassible.



CLUB OFFICERS

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OMSI Liaison	Jan Keiski	omsi@rosecityastronomers.org
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SIG Director	Vacant	sigs@rosecityastronomers.org
Youth Programs Director	Kathy Kornei	youth@rosecityastronomers.org
Sister Club Liaison	Jan Keiski	sisterclubs@rosecityastronomers.org
Haggart Obs. Coordinator	Rusty Baumberger	haggart@rosecityastronomers.org

RCA MAGAZINE SUBSCRIPTIONS

One of the benefits of RCA Membership is a reduced rate subscription to Sky & Telescope and Astronomy magazines.

The RCA member rate for Sky & Telescope Magazine is \$33 for one year or \$66 for two years. The RCA member rate for Astronomy magazine is \$34 for one year or \$60 for two years. For more information and payment options please see the website.

<http://www.rosecityastronomers.org/mags/index.htm>

Larry Godsey <magazines@rosecityastronomers.org>



RCA LIBRARY

The Rose City Astronomers maintains a comprehensive club library of astronomy related articles, books, CDs and videos. These items can be borrowed by members through checkout at the general meetings for a period of one month with renewals available by phone or e-mail to the club library director. The RCA library is constantly growing through many donations and the purchase of new materials. A listing of library materials (PDF format) can be found at the library web page.

<http://www.rosecityastronomers.org/library.htm>

Jan Keiski <library@rosecityastronomers.org>

Minutes of the Rose City Astronomers Board January 7th 2013

Held at OMSI Classroom 1



Chair : David Nemo
Secretary : Duncan Kitchin

Board Members Present

David Nemo (President)
Ken Hose (VP Membership)
Mark Martin (VP Programming)
Steve Jaynes (VP Observing)
Larry Godsey (Treasurer, Webmaster, Magazine Sales)
Duncan Kitchin (Secretary)
Diana Fredlund (Media Director)
Howard Knytych (New Member Advisor)
Jan Keiski (Library Director, OMSI & Sister Club Liaison)
David Horne (Telescope Library)
Dawn Nilson (International Dark Sky Liaison)

David Hamblin (Guest)
Lamont Brock (Guest)
Linda Brock (Guest)

Call to Order

The meeting was called to order at 7:01pm by David Nemo and, there being 11 board members present, the quorum requirement of 9 was declared to be met.

Agenda

A modification was made to the published agenda to add Stub Stewart to new business, cosmology SIG to other business and appointment of the new sales director to new business.

Approval of Minutes

Moved: Approve minutes from the December 2012 board meeting. Moved: Duncan Kitchin Second: Mark Martin. Motion passes 11-0-0.

Officer Reports

President (David Nemo): David is the new club president, and is also still managing the observing site for the time being. Goals for this year: update the bylaws. Apply for award for club outreach.

Secretary (Duncan Kitchin): Nominal.

Treasurer (Larry Godsey): Currently under budget. Financial details circulated, and also available on the board website. The potluck ran to a little under \$400.

VP Programming (Mark Martin): Potluck came in very slightly over budget. Book order has been placed for the upcoming meeting. Depending on availability of a sales table at the meeting, sales of the book may need to be handled separately. Mark needs to know whether there will be a youth program

meeting this month for purposes of making announcements. VP Observing (Steve Jaynes): First Haggart event is scheduled for the 12th January, but weather is not looking very good. Next Haggart meeting is on February 9th. Star parties do not start up until March 8th. Need to decide what to do in the event of bad weather. Details of the upcoming meeting are on the website. Diana Fredlund will use that material to create a press release. VP Community Affairs (Jim Higgs): Not present.

VP Membership (Ken Hose): This month we had 3 new members join and 4 renewals, bringing the total to 321 member families compared to 320 at the same time last year and 295 for the year before that. In total, \$124 in dues were brought in this month.

ALCOR (Ken Hose): Ken has received a package on the sunspotter program which is in the process of being reviewed. Has also sent a list of AL programs to Larry Godsey and Scott Kindt as previously promised.

Board Operations

Meeting day/time/place. Discussion on whether the current board meeting schedule works for everybody. No change proposed at this time.

Meeting format and length. Discussion as to whether this should change. No change proposed at this time.

Communications. David reminded everyone that the Forum is the place to start and carry on discussions of issues and information relevant to the whole Board, in order to ensure that discussions are all captured in one place for easy reference. The Board email list is appropriate for sharing announcements and reminders to the Board, but not for starting or carrying on a discussion of policies, programs or projects.

Discuss 2013 Goals

David Nemo: request board members to think about any goals for the Club or their programs during 2013, and bring any proposals to the next board meeting.

Director Reports

New Members (Howard Knytych): Meeting this month on the topic of "Basic Terminology".

Media (Diana Fredlund): News release will go out this week.

Merchandise Sales (Herry Tedja): Not present, but report from Larry Froberg: Total of \$522 brought in last month. Have sold 76 out of 125 calendars so far, with a breakeven point of approx. 106. Have not formally handed over the post yet.

Book Library (Jan Keiski): Nominal

OMSI Liaison (Jan Keiski): Nominal

Sister Club (Jan Keiski): Nominal

Telescope Library (David Horne): Have held last sale of surplus telescope library equipment, and brought in \$287. David is looking to acquire a high end laser collimator capable of collimating SCTs. This will be available at events such as the telescope workshop. Has also been talking to a company that rents equipment for deaf and hearing impaired people, for the purposes of making our meetings more accessible. Also has a donation of a 10" scope with driven mount, possibly to be

located at Stub Stewart on a semi-permanent loan arrangement. IDA (Dawn Nilson): Goal for 2013 to host a showing of "The City Dark" video. IDA is interested in participating in a panel discussion. Also working on new poster materials for upcoming meetings; a laminated poster on foam-core board will cost about \$80. Motion to increase IDA budget to \$150 to cover the expenses. Moved: Larry Godsey. Second: David Nemo. Motion passes 10-0-0.

Magazine Subscriptions (Larry Godsey): Nominal
 Webmaster (Larry Godsey): Nominal
 Observing Sites (David Nemo): Nominal
 Youth Program (John Oreskovich): Not present
 Newsletter Editor (Scott Kindt): Proof circulated at the meeting.
 SIGs (Vacant): Post remains vacant.

Old Business

Appointment of Herry Tedja to replace Larry Froberg. Moved: Duncan Kitchin. Second: Howard Knytych. Motion passes 11-0-0.

Need to resolve setup issues with Stub Stewart; somebody needs to meet with the Ranger to discuss what the procedure is for cooperation on events and issue of passes.

New Business

Prior member surveys. Jim Higgs and Howard Knytych have put together a prior members survey. This will be posted on the

forum for discussion.

Applications for awards. We should consider applying for awards such as for the newsletter.

Other Business

Cosmology SIG: some issues have arisen about location and timing of meetings. Hopefully most of these issues have been resolved, but there are remaining accessibility issues at the current site. David Nemo and Lamont Brock have identified a possible alternative location. The location requires a \$50 refundable deposit, which we would make a club expense. David Nemo will contact members who regularly attend cosmology SIG meetings to ask opinions about the new site, and will then send a broadcast to the wider membership. Decision to be made by the board at the next meeting.

David Nemo is preparing a presentation for the general meeting to summarize the state of the club and accomplishments over the last year. David will be sending requests for statistics and other information to the board members.

Adjournment

There being no further business, the meeting was adjourned at 9pm.

Special Interest Groups

Astro-Imaging Special Interest Group

When: Wednesday, Mar 13th, 7pm

Location: Beaverton Public Library
 12375 SW 5th St - Beaverton

SIG Leader: Greg Marshall
 Email: ai-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/astroimage.htm>

Note New Meeting Night

Youth Program

When: TBD

Location: TBD

Leader: Kathy Kornei
 Email: youth@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/youth.htm>

Downtowners Luncheon

When: Friday, Apr 12th, Noon
 Location: Kell's
 112 SW Second Ave. Portland

SIG Leader: Margaret Campbell-McCrea
 Email: downtown-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/downtowners.htm>

New Members Special Interest Group

When: Monday, Mar 18th, 6:30pm
 Location: OMSI Planetarium
 Topic: Messier Marathon

SIG Leader: Howard Knytych
 Email: newmembers@rosecityastronomers.org
http://www.rosecityastronomers.org/sigs/new_members.htm

Telescope Workshop

When: Saturday, Mar 30th
 10:00am - 3:00pm
 Location: Technical Marine Service, Inc.
 6040 N. Cutter Circle on Swan Island-Portland

SIG Leader: John DeLacy
 Assistant: Don Peckham
 Email: tw-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/tmw.htm>

Astrophysics / Cosmology SIG

When: Wed, Mar 20th, 7pm
 Topic: TBA

Note New Location See website for map

Presented by: TBA
 Location: 8036 SE Raymond St., Portland, OR 97206
 SIG Leaders: Lamont Brock, Viktors Berstis
 Email: cosmology-sig@rosecityastronomers.org
www.rosecityastronomers.org/sigs/cosmology.htm

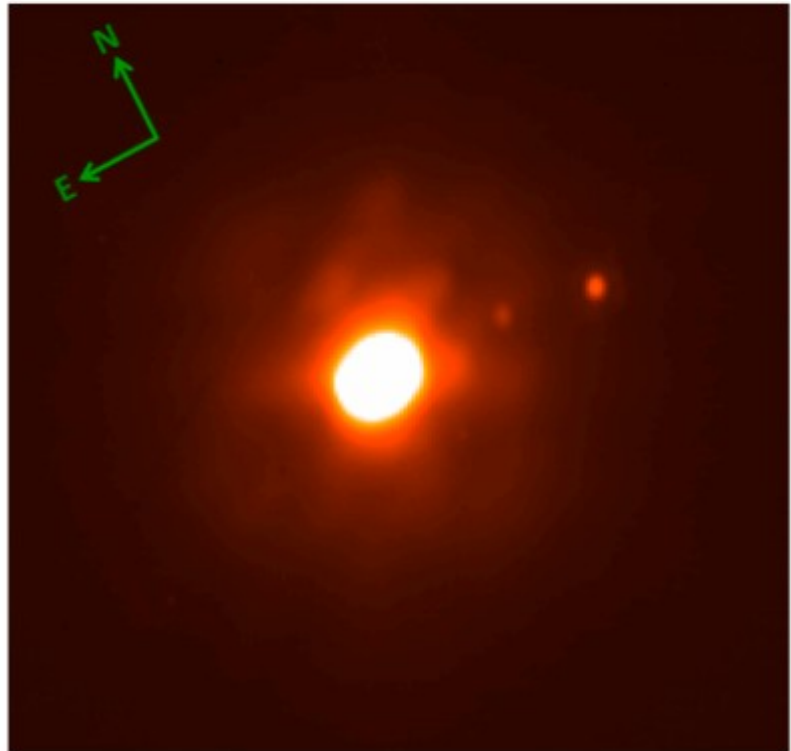
From Asteroids to High-Redshift Galaxies

by Dr. Katherine Kornei

An order of magnitude is sometimes not enough. In highlighting the research of different sub-fields of astronomy - the Solar System, nearby stars, the Galactic center, local galaxies, and the high-redshift Universe - it is necessary to make jumps in distance of a factor of approximately 1,000. Recent developments in several branches of astronomical research are presented below. The distance to each target is roughly three orders of magnitude larger than that of the previous target.

Asteroids in the Solar System (light hours)

The asteroid belt, located between Mars and Jupiter, is home not only to numerous individual asteroids but also to systems of asteroids that are gravitationally bound to one another. Triple systems, in which a larger asteroid has two satellites, are rare and only several have been discovered to date. Julia Fang, a graduate student researcher at the University of California, Los Angeles, studied the triple asteroid system 87 Sylvia and determined the properties of its constituent members. Ms. Fang and her collaborators used near-infrared imaging data from the W. M. Keck Observatory in Hawaii and the Very Large Telescope in Chile to accurately determine the positions of the two satellite asteroids Romulus and Remus in the 87 Sylvia system. The team fit models to the positional measurements of Romulus and Remus and estimated the masses and orbital characteristics of the satellites.



Near-infrared image of the 87 Sylvia asteroid system. Remus and Romulus, the two smaller satellites, are approximately 707 and 1400 km from the primary asteroid, respectively. Image courtesy of Ms. Julia Fang, UCLA.

In their paper published in the *Astronomical Journal*, the authors concluded that the three asteroids orbit in nearly the same plane. "87 Sylvia is an interesting system with a very flat architecture -- the orbits of both satellites around the primary asteroid are very well aligned," said Ms. Fang. The coplanarity of the 87 Sylvia system suggests that satellites orbiting larger asteroids may preferentially form in or near the equatorial plane of the primary asteroid.

Nearby Young Stars (light years)

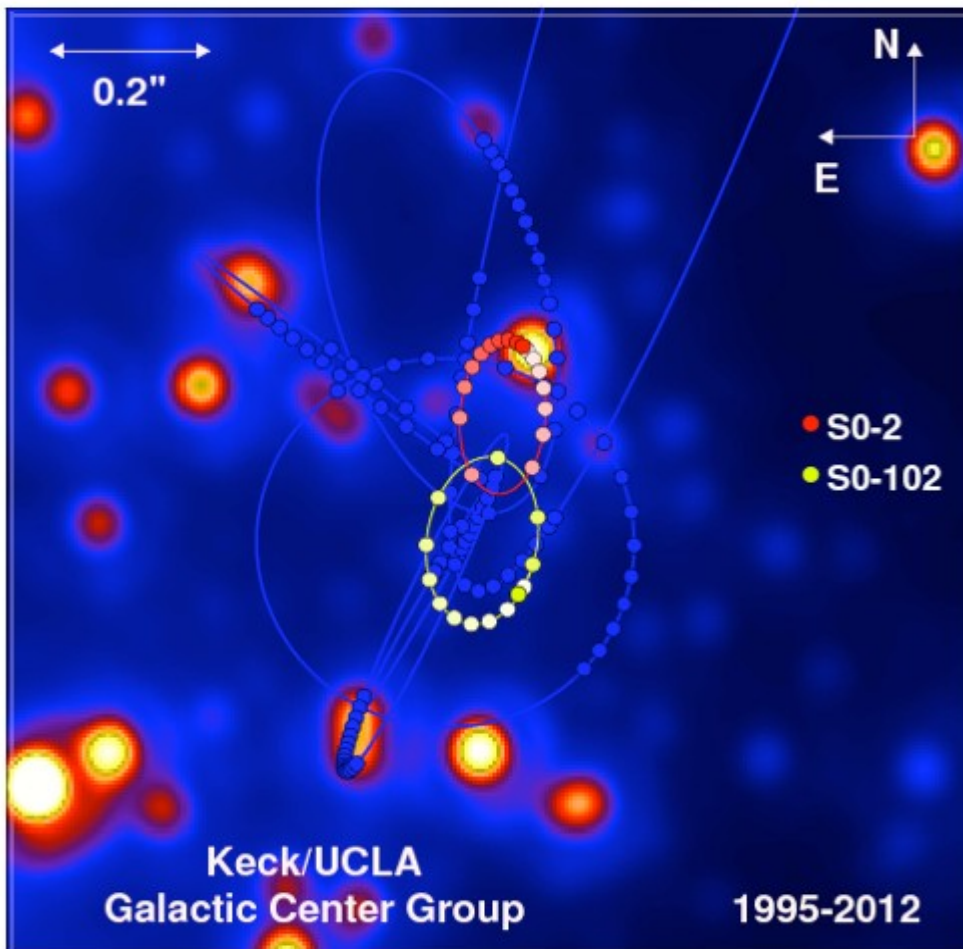
With 100 billion stars in the Milky Way galaxy, astronomers are able to study stellar systems that are relatively local (fewer than 100 light years away). The proximity of these stars means that they can be studied in greater detail than more distant stars. Research focusing on

nearby stars that are also young is important for understanding the early evolution of stars and the potential presence of dust disks around stars that are the precursors to planet formation. An international team led by Dr. David Rodriguez, a FONDECYT postdoctoral fellow at Universidad de Chile, is studying nearby young stars using both ultraviolet and infrared observations from the GALEX and WISE telescopes orbiting Earth. The team's methodology focuses on finding low-mass stars (8-50% the mass of the Sun). Other studies have found that low-mass stars are surprisingly rare, although Dr. Rodriguez and his collaborators are finding that low-mass stars are indeed present and may simply have been too faint to be detected by prior surveys. "This study will help complete the census of nearby young stars, which will greatly benefit the study of planet formation and evolution in the years to come," said Dr. Rodriguez.

The Galactic Center (thousands of light years)

The majority of galaxies are thought to contain a supermassive black hole in their center. Our own Milky Way galaxy is no exception, and the relative proximity of our Galaxy's core provides an excellent view of the black hole. Using near-infrared observations to see through the obscuring dust near the center of the Galaxy, astronomers observe individual stars orbiting in the gravitational potential well of the Milky Way black hole Sgr A*.

The orbital motions of these stars constrain the mass of Sgr A* to great precision. Stars with full phase coverage of their orbits - that is, stars that have been observed over their entire orbit around Sgr A* - are particularly valuable probes as measurements of these systems provide strong constraints on the mass of Sgr A*. Dr. Sylvania Yelda, a postdoctoral fellow at the University of California, Los Angeles, contributed to a recent paper announcing the discovery of a star near the Galactic center with full phase coverage of its orbit. Using detailed near-infrared images of the Galactic center obtained from the W. M. Keck Observatory, the team determined the existence of a star that orbits Sgr A* in just 11.5 years.



The orbit of stars around the Milky Way's black hole, where the orbit of the star S0- 102 is shown in yellow. The scale bar in the upper left corner indicates an angular size of 0.2", or, equivalently, a physical size of approximately 1600 Astronomical Units at the distance of the Galactic center.

Image courtesy of Dr. Andrea Ghez, UCLA.

The discovery of this star, called S0-102, doubles the numbers of known stars in the vicinity of the Milky Way's black hole with periods fewer than 20 years. S0- 102 is in fact that shortest-period star seen orbiting the Milky Way's black hole, the team announced recently in the journal Science. The orbital measurements of S0-102 will be critical for refining the mass estimate of Sgr A* and testing Einstein's theory of general relativity around black holes.

The Formation of Local Elliptical Galaxies (millions of light years)

Galaxies are fundamental building blocks of the Universe and understanding how these systems are assembled over cosmic time is an important field of astronomy. A recent study found that elliptical galaxies are typically assembled in multiple stages of star formation as opposed to a single burst. Dr. Sara Petty, a research scientist at Virginia Tech, led the research team that analyzed 49 elliptical galaxies within 650 million light years. Dr. Petty and her collaborators used ultraviolet, optical, and infrared imaging of the galaxies to determine how their colors varied as a function of distance from each galaxy's center. The authors found that galaxies were typically redder near the center and bluer near the edge, indicating that older, redder stars populate the inner regions of galaxies while younger, bluer stars are preferentially found farther out. Based on these radial color profiles, Dr. Petty and her collaborators suggest that elliptical galaxies are typically assembled in two distinct stages of star formation separated by approximately 1 billion years. "Our results show that another stage of star formation occurred at least 1 to 2 billion years later than the rapid star-forming phase that formed the galactic bulge," Dr. Petty said. "The fuel for this second phase of star formation would either be from mergers of gas-rich galaxies, or from gas accreted from the intergalactic medium." These results suggest a complex evolutionary history for elliptical galaxies.

The High-Redshift Universe (billions of light years)

Studying faint galaxies billions of light years away requires long integration times on large telescopes. A new study of galaxies at a redshift of 5.7 - when the Universe was only approximately one billion years old - utilized deep spectroscopy of a spectral line of hydrogen, the most abundant element in the Universe. Dr. Alaina Henry, a NASA Postdoctoral Program Fellow at Goddard Space Flight Center, was part of a team of astronomers looking for early galaxies that may represent the precursors to galaxies like the Milky Way. Dr. Henry and her collaborators were searching for evidence that early galaxies at $z = 5.7$ emitted ionizing radiation that contributed to the overall reionization of the Universe. Since numerous, faint galaxies can collectively emit a substantial amount of ionizing radiation, it is important that surveys are sensitive to these dimmest galaxies. The team used the IMACS spectrograph on the Magellan telescope at the Las Campanas Observatory in Chile to study the faintest galaxies and calculated the surface density of these objects on the sky. Dr. Henry and her collaborators found that these early galaxies are present in sufficient numbers to account for a significant fraction of the ionizing flux density required for reionization at $z = 5.7$. These results, published in the *Astrophysical Journal*, suggest that these dim galaxies - undetectable in even the deepest Hubble Space Telescope surveys - are an important component of the early Universe. These studies highlight the enormous range of distances encompassed by modern astronomical research. Even with the advent of ground-based telescopes larger than 10 meters and space-based observatories far above the Earth's atmosphere, astronomers are still challenged by the sheer extent of their laboratory. From light hours to billions of light years, from asteroids to high-redshift galaxies, the Universe continues to amaze.



NGC 2163, Cederblad 63

Discovered by Edouard Stephan (of Stephan's Quintet fame) in 1874 using the 31.5 inch Foucault reflector at the Marseille Observatory, NGC 2163 went missing because J.L.E. Dreyer copied Stephan's declination measurement incorrectly in the first edition of the New General Catalog. Even though the error was corrected in the second Index Catalog, for a variety of reasons the correction didn't make it into the Revised New General Catalog and 2163 became one of the "lost" NGC objects.

Much later it was included in Sven Cederblad's 1946 Catalog of Bright Diffuse Galactic Nebulae and became known as Cederblad 62. In the fairly recent past Brian Skiff of Lowell Observatory figured out that Ced 62 really was the long lost NGC 2163.

Interestingly, my 2nd edition Sky Atlas 2000 plots it as Ced 62 but Uranometria 2000.0 as NGC 2163. Sky Tools 3 Professional Edition shows NGC 2163 as a nebula a few degrees northeast of Sirius in Canis Major, a real blooper! This is actually Ced 90, which is the bright southern tip of the Seagull Nebula, IC 2177. Sky Tools does show Ced 71 at NGC 2163's location, but Aladin and Sinbad show nothing at Ced 71's location, which is quite close to NGC 2182, a small reflection nebula in Monoceros. So this is yet another positional mystery, although Aladin correctly plots the location of NGC 2163.

Regardless, we can be certain of NGC 2163's true identity and location in northeast Orion near the feet of Gemini, which is a fairly easy to star hop starting from Mu and Nu Gemini.

The NGC/IC Project at <http://www.ngcicproject.org/> or O'Meara's Hidden Treasures, pages 174-177, both have a more detailed account of the NGC 2163 lost and found saga.

The convolutions of 2163's lost and found saga are an interesting story, but let's not let that distract us from the physical nature of this fascinating object and what we can see of it, which I find even more fascinating.

2163 is a beautiful example of a bi-polar reflection nebula created by a young star still evolving onto the main sequence. It shows what appear to be two opposing outflows, with the northern flow being the brighter of the two. Although I'm still investigating the exact nature of 2163, a post on the Deep Sky Forum (<http://www.deepskyforum.com/forum.php>) suggests that instead, the bi-polar appearance is due to the central star, LkHA 208, having cleared the molecular cloud it's located in along the axis of rotation of this star's protoplanetary disk. These opposing cone-shaped, cleared out areas are illuminated by the star from the inside, producing the hourglass shape of the nebula. Cool!

The illuminating star is an irregular variable that generally shines around 11th magnitude. From a dark site an experienced observer can easily see the star and, with more difficulty, the bi-polar shape of the nebula in a 4 inch scope. The star looks fuzzy even in a 2.5 inch scope, so this is an object that can be appreciated in any size scope.

I've observed 2163 twice, once under fairly typical Coast Range dark skies and once under nearly ideal Steens Mountain skies.

Notes from my first observation from April 1, 2008 state:

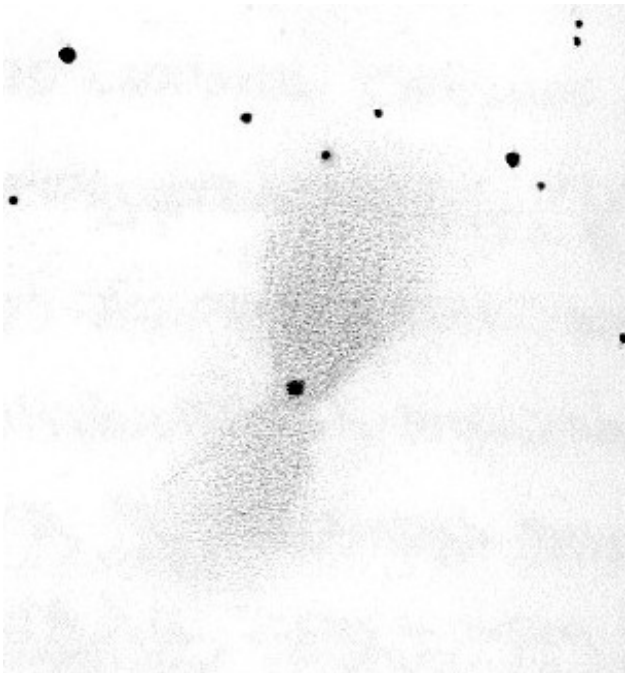
“This bi-polar nebula is considerably fainter than I expected. One side is obviously brighter, but then that’s still pretty faint. The best view is at 253x and is slightly enhanced with the broadband filter. This is a nifty object; too bad it’s not a little brighter. 10:23pm, 21.20 SQM.” (28 inch f/4 from Chuck Dethloff’s front yard, 600 feet altitude)

My second observation from September 28, 2008 was a little better:

“A much better view of this bi-polar nebula than from Chuck’s place – the two flows are quite distinct and relatively easy to see at low power. The northern flow is brightest and most distinct though. Best view at 253x but almost as good at 408x. 4:53am, 21.95 SQM.” (28 inch f/4 from Steens Mountain, 7400 feet altitude)

Not surprisingly, this shows how a darker, more transparent sky and altitude can improve an observation, but also that my first observation was pretty good – even though I had to work harder to see 2163 well and I didn’t benefit from using a higher magnification.

Here’s my sketch from Steens Mountain and a DSS image to compare – note there’s a lot of fainter nebulosity in the DSS image than I saw in either of my observations.



The pinched waist area was pronounced in both observations, which makes the north and south areas resemble an hourglass, although the nebula visually surrounds the central star LkHA 208, which is illuminating the nebulae.

I haven’t tried a smaller scope on 2163 yet, although O’Meara’s sketch in Hidden Treasures clearly shows both the north and south nebulae, and he used a 4 inch refractor. He notes that the nebula seems separated from the star “by a tiny spit of dust” – what do you see?

Right: An odd assortment of classic refractor telescopes from the past point skyward in this Oregon amateur's unique collection.



Telescope Collecting in the Pacific Northwest

These wonderfully made telescopes from yesteryear, a source of great curiosity and value to educators and astronomers, are now popular elements in our technologically driven culture.

By John W. Siple

THE LAND OF MULTNOMAH, encompassing all of Portland and the spectacular Columbia Gorge, is a perfect place to get a start in the burgeoning field of telescope collecting. The charming metropolis and its outlying areas in the Willamette Valley function as a central hub for seekers of those unique and sometimes rare scientific icons from the past.

A gallery of distinctly different telescopes populates the Pacific Northwest. Lurking in attics, basements and storerooms are what can only be termed 'timeless treasures.' The inventory is essentially endless, a fact that makes their retrieval astonishingly easy.

For the sake of our discussion, only those creative instruments sold from about 1950 until the mid-'80s are mentioned. This was a period of unmatched telescope innovation and refinement, and saw the wholesale presentation of tantalizing astronomical merchandise by

many independent businesses. Visionary high-tech works from such companies as Cave and Unitron had a very real influence during this time. Not forgotten, these stalwarts of optical and mechanical engineering, often shown alongside other desirable products in past ads, are currently at the forefront of a massive treasure hunt and revival.

Broadly speaking, there are four major venues of telescope discovery—classified ads, garage/estate sales, auctions, and thrift (secondhand) shops—but the list also includes similar sources for best values: swap meets, astronomy club meetings and star parties where members can talk and exchange items, telescope dealerships, and others.

Telescope hunting trips, if not in the local neighborhood, can be enlivened by side visits to some of our region's premier restaurants and museums, while the passing terrain offers unending scenic amusement. If that chosen

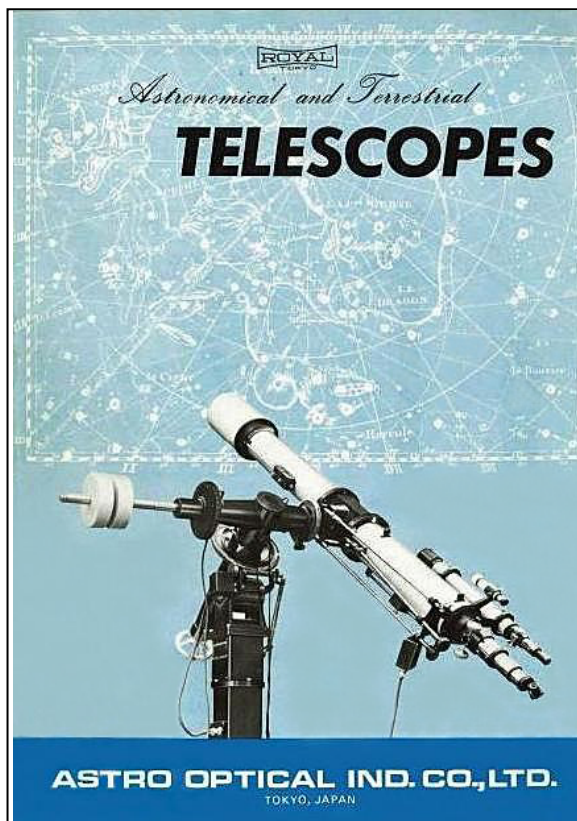
item should suddenly appear without advance notice, an anticipated solo journey may quickly transform itself into your family's long awaited vacation.

Immediacy is of prime importance once that promising advertisement has been uncovered (whoever answers first usually wins the telescope). For peace of mind, before leaving on your whirlwind tour thoroughly check out any remaining details regarding the telescope and meeting place with the seller, since arriving at an intended destination only later to discover that the information given was inaccurate or false is extremely frustrating and costly.

Individuals who embrace customary collectables such as jewelry and pottery are pleasantly surprised when first introduced to the obscure realm of accumulating astronomy gear. Savvy shoppers that hoard academic wares may be cognizant about the nature of 19th century telescopes and related reproductions, but are often stymied when confronted with important optical goods of a more recent origin.

Those willing to take the plunge should familiarize themselves with available literature. Guides on the topic occasionally appear in trade publications, while mining data from a web-sponsored restoration project is oftentimes useful. A nostalgic advertisement undoubtedly constitutes the best means of gathering information about any particular model of telescope.

A patchwork library of articles and books might contain *Telescopes for Skygazing* by Dr. Henry E. Paul (1966, Amphoto) and more recently *Classic Telescopes* by Neil English (2013, Springer). One significant website that caters exclusively to erstwhile collectors is maintained by professional astronomer Robert Provin. Its beautifully scanned archives are filled with dozens of classic telescope catalogs, illustrated brochures and dedicated owners' manuals. A short number of keystrokes entered at the computer to <http://geogdata.csun.edu/~voltair/e/classics/> brings up the valuable



Several of the best 2.4- and 3-inch refractor telescopes offered by Sears and Tasco were ordered directly from Astro Optical in Japan, which ostensibly are better known worldwide as 'Royal' brand products. Competing successfully were those instruments sold by Unitron, a name familiar to generations of devoted amateurs and collectors. One of their precision instruments, a 75mm f/16 modified model on a clock-driven base, is pictured during the 1970s on the wintry slopes of Mt. Bachelor in Central Oregon (top).

time. Recruiting the online help of Peter Abraham's wonderfully comprehensive database, found at <http://www.europa.com/~telescope/binotele.htm>, or the hardcopy expertise of George Lovi's *The Telescope Catalog of Catalogs* (1979, A Courier Book—David McKay Co.) may also prove beneficial.

Assembling a collection depends mainly on available finances and personal preference. Veteran collectors tend to focus their talent and energies on a narrow range of vintage items rather than randomly adding equipment, a good policy for neophytes. Subsets can be categorized into domestic and imported brand name refractors, reflectors, and lens-mirror type catadioptrics.

A common strategy worthy of consideration entails bringing home only those models that were sold within a chosen company's product line—this happens with regular frequency among Unitron, Cave, Sears and Tasco instrumentation. Another popular plan of action is to pick a fine representative sample from each maker. Such collections could foster sleek achromatic refractors by Swift and Nikon, bulky Newtonians from Star-Liner, and compound models from Celestron, Questar and Meade. Others are motivated by

Commercial telescopes from such sources as Edmund, Optica b/c, and Criterion offer a lifetime of future enjoyment.



Patterned after the venerable 1960's Optical Craftmen 'Discoverer' series of 8-inch telescopes, this customized reflector awaits nightfall at Washington's Golden-dale Observatory.

recovering a lost or discarded childhood telescope and reliving fond memories under the stars with their newfound prize.

Forethought may lead to the conclusion that not every telescope is worth owning. Those damaged beyond repair, unless absolute bargains or seldom seen should be passed over in favor of better kept examples. Condition and rarity are always key factors in the decision making process and may ultimately determine what vintage instrument ends up in your collection.

Judgment calls on value are largely subjective, but a general observation would suggest that anything marked lower than twice its original list price is most likely a fair bargain. This rule applies to almost all company entries across the nation predated before about 1973, when inflation became rampant.

For example, those smitten with Cave

Astrola reflectors could buy a factory fresh, no-frill's 6-inch 'Student Standard' Newtonian for \$215 in the early 1970s. In today's world, this same model would fetch about \$400, still within our duplex margin. Similarly, a relatively scarce Lafayette 'Arcturus' (shown below) that was priced at \$270 five decades ago has a current market value close to \$500. Exceptions frequently arise; this is especially true with superior Nikon and Unitron equipment.

Mainstream outlets carried rare and

exclusive models from time-to-time. A good example is the coveted Sears 3.5-inch f/16 'Discoverer,' which was advertised for only a brief period during 1969-72. Meade also promoted a first rate 4-inch refractor telescope throughout 1977-79, one that was available by special order in Japan from Nihon Seiko Kenkyusho, Ltd.

A universal guideline applicable to any telescope concerns how it is supported or mounted: an equatorial model, given the same aperture, will be more valuable monetarily than an alt-azimuth version. Manufacturers simply placed the same tube with identical optics on different styles of bases. A further demarcation involves wooden tripods versus metal pedestals or pillars; the dollar ratio clearly favors tall piers, but these are seldom encountered and are greatly outnumbered by their three-legged brethren.

Telescopes made in Japan, especially small to medium-size astronomical refractors, were normally outsourced for individual parts. Many are literally built piecemeal out of interchangeable components



Nippon Kogaku (Nikon) placed an especially nice rack-and-pinion focuser on its 65mm refractor telescopes (above). Right: A rotating unit provides the necessary focusing on this 3-inch f/12 instrument from Lafayette Radio.





Above: Swift's desirable 50mm f/12 refractor telescope is described in this 1961 ad. Below: A wonderful example of telescope technology from the past is Criterion's RV-6 Dynascope, which is still a reliable workhorse for thousands of astronomers.



from a host of different suppliers. To the potential collector, this can create a puzzling maze of originality and provenance. Dubious questions about a telescope's character may arise if it has had two or more previous owners. It is not unusual to see missing and sometimes replaced viewfinders and brackets, wooden tripods, dew-shields, and counterweights—the author once had the opportunity to view an example of the rare Sears 3.5-inch refractor where everything had been switched out, including the main objective lens!

If your aim is to amass big-name items and ignore provenance issues, then contradictory combinations of equipment may play an important role in defining a vintage telescope collection. In fact, popular hybrid themes are Brandon-Unitron and Cave-Meade, but other equivalent mixtures of shared technology are very commonplace.

Often overlooked during a telescope purchase are those mysterious eyepieces and accessories. Quick sleuthing sometimes uncovers hidden gems: Königs and Abbè designs from University Optics, Gailands tendered by Telescopic, Ortho-Stars promoted by Coast Instrument Co. (the makers of the famous 1950's Trekerscope), and all kinds of Tele Vue products. Boxes chock full of Barlow and zoom lenses, star diagonals, drive correctors and reams of period literature and catalogs have been known to accompany actual sales. There will be some items that are important insofar as they make a significant contribution to the value of that telescope, planetary oculars sold by 'Zeiss' and 'Clavè' top the list.

Acquisition of a memento from the past, especially after an exhaustive search, will require proper maintenance. Most writers tell how telescopes should never be taken apart by inexperienced hands or left out in the weather without adequate storage. Other stories sadly relate harsh treatment of optical relics by wannabe astronomers. 'Loaners' may also return in poor shape, which seriously degrades their overall performance and inherent market value. Indeed, each of these older

items from a bygone era needs 'kid glove' handling and awarded respect.

Today, classic telescope memorabilia can be found showcased everywhere from public institutions to the home and office. Architectural edifices such as amateurs' domed and roll-off observatories house them. A better solution for some schools is to place trusted instruments into active service in their community outreach and science programs, where students can learn firsthand about the wonders of astronomy.

Practical telescopes from yesteryear have naturally been influential in the collector's arena, but appreciated by traditional astronomers are the great optics and carefully executed mountings. Equal in many cases to contemporary works, they perform elegantly when trained on the heavens above.

From cities dotting the outer coast to townships nestled among the foothills



A 10-inch Cave Astrola Cassegrainian-style reflector sits atop a massive Meade Research Grade equatorial mounting in this deep-sky observer's setup.

of the Cascade Range, people in vast numbers are turning their attention toward the exciting field of telescope collecting. As you venture out, select one of these terrific marvels and then enjoy its company under the starry night sky!

Annular Solar Eclipse In Mt Shasta's Rain Shadow

May 21th 2012

By Robert McGown

The new agers were selling large quartz crystals at the Oregon border near Mt. Shasta as astronomical artist John Foster and I headed south to the eclipse path of annularity next to the great volcano. We bought a beautiful crystal from the road side vendors for five bucks. It made us think of all the unusual science that is done with crystals. Experimental physicists have even used crystals to detect exotic dark particles that have cosmological implications.

The sky was completely overcast as we approached Mt. Shasta, we were worried that we would not see the Sun and miss the eclipse. There was snow on the surrounding hills. As we drove past Ashland (the Shakespearian play center) , I shared the story with John about Shakespeare being eight years old when Tyco's supernova flared up and years later he put it in his play Hamlet . Just before we reached Ashland, there was a small town called Talent that made me smile. It must be where the best actors live! The village of Talent brought to mind this quote:

"It is not in the stars to hold our destiny but in ourselves." — William Shakespeare

On the drive down to Shasta, John Foster and I listened to John Williams' music for Star Wars, Indiana Jones, Jurassic park, ET, and Close Encounters of the Third Kind. When the space music came up, unusual saucer shaped lenticular clouds appeared over the top of Mt. Shasta and we laughed hysterically. We also had Brian Greene's "*Hidden Realities Superstrings*" tape for the drive, so we were tutored by Brian Greene on quantum physics and black hole theory in the superstring landscape of highway Interstate-5.

At this stage on our eclipse expedition our only hope was to find the rain shadow of Mt. Shasta on the east side and with luck the clouds would be broken up enough to observe the annular eclipse through the summit lenticular clouds. We decided to drive around the mountain to Hat Creek Radio Observatory and check out the rain shadow of Mt. Shasta. We drove around the mountain and discovered that there were not the pristine forests around Mt. Shasta like we have on Mt. Hood National Forest.

As we drove around to the east side of Shasta it got drier and drier and the trees got smaller as we entered the rain shadow. It was Saturday and we decided to drive the Subaru Outback up remote gravel past the A frame cedar cabin homesteads on the east slopes of Mt. Shasta. After an hour of driving through the forested farm like subdivisions, we found a clear cut after crossing many switch backs at logging roads. We were at the snow line and the roads started to deteriorate with patches of snow. We saw light up ahead a ¼ mile through the trees and almost gave up our explorations. John got out of the car and



Annular Eclipse over Mt Shasta's glaciers
J.R. Foster, R. McGown

hiked up through the forest and came across a clear cut. We decided to stay at this remote site until Eclipse time. The day before the eclipse we had found a site with the Sun in a good position, with the mountain in the rain shadow of Mt. Shasta. We set camp where the #31 logging road turned to snow. Near sunset, we hiked up to the clear cut near sunset and photographed the mountain. The rain shadow broke up the clouds into big patches of blue sky as the clouds peeled by Mt. Shasta's 14,000 foot summit. We looked for the hot fumarole pools steaming on Shasta's summit using our telephoto lenses. John and I photographed jagged cathedral ridges and the steaming summit, while we waited for the eclipse from the clear cut.

After the Sun set behind the mountain and we set camp, warm Chinook adiabatic winds came down off the mountain. The winds were surprising considering the evening chill camping at the snow line. During the night, two elk came down the logging road while we were sitting on chairs at our camp. The elk headed into the woods by the tent breaking branches and making noise. It really surprised us. In the morning, we followed their tracks down the logging road while we were hiking up to the clear cut to check on photo conditions.

After hiking around our campsite, John noticed a solar halo above our campsite. We spent some time photographing it when some ATV riders came by our remote camp site at the snow line and warned us not to look at the Sun during the eclipse! We had our three Nikon cameras and telescopes ready to pack them up the slopes of Mt. Shasta, like Himalayan Sherpa's ferrying loads of astro gear. We had to move quickly in Sherpa mode carrying our equipment in packs and tripods to the edge of the clear cut in time for our photo shoot with the eclipse.

While we waited at our camp for the Sun to get into position, we rock hounded chipping quartz crystals in the road cuts, staged pictures and bird watched. We hiked around the east side of Mt Shasta shooting pictures of falling water cascades with the summit in the background. During the day we were visited by birds, Evening Grosbeaks and Kinglets that hung out at our campsite.

In the afternoon, the weather again became socked in as we thought of making a quick dash to Susanville where our friend Greg Babcock was observing the eclipse as we scanned the horizon to the east with our binoculars.

After the second night's camp at our eclipse site, we packed our gear up through the forest to the snow at the edge of the clear cut. We staged photographs and prepared for the transit of the Moon across the Sun's disk. As the eclipse approached, there was crescent of the Moon and three spectacular sunspot groups lined up next to the shadow crescent.

As the annular eclipse got closer and closer, we scurried around photographing and using welder's glass to stage photographs on the east face of Mt. Shasta. The weather stayed clear as the mountain rain shadow kept the east side dry. John and I were excited to see the high cirrus clouds act as a solar filter while we staged photographs. When annularity finally came after the first crescent, we observed a large diamond ring around the Sun. The light slightly dimmed down during the four minutes at annularity that we experienced. As the eclipse finished its final transit, we had both shot and bracketed over 100 photographs each.

The next morning after the eclipse, we stopped to photograph Burney falls and headed for Hat Creek Radio Observatory. I am a member of the SETI Institute and there was a special gathering at the SETI members at the radio observatory. Seth Shostak and Jill Tarter had an eclipse party at the observatory. The second phase of telescope construction on the project had just been finished. The SETI Institute researchers were working on a project using the Kepler space observatory data targeting some of the 500 of the extra solar planets of the newly discovered star systems. Using the Allen radio telescope array, they are looking at the nearby stars with planets. Bill, the resident radio astronomer at the Observatory explained how they calibrated the search using galactic radio sources and quasars as well as the resolution of the dishes. The new fiber optic processing systems had synthesizers for detecting alien extraterrestrial signals from other star systems at vastly improved resolution. John and I photographed the radio observatory and visited with the radio engineers and SETI Institute scientists in the AM. It was a long drive back to Portland that evening and we had another great astronomical adventure in northern California.

OMSI - Vernal Equinox Celebration

March 23rd, 2013

On Saturday March 23, OMSI, Rose City Astronomers and Vancouver Sidewalk Astronomers will celebrate the vernal equinox and the beginning of spring with a free Star Party at both [Rooster Rock](#) State Park and [Stub Stewart](#) State Park! From beginners to experts of all ages, here's your opportunity to view the stars and other celestial objects up close and personal through telescopes. Viewing highlights includes Jupiter, Saturn and the moon. As the sky darkens, will view the deep sky objects including the Orion Nebula, Beehive star cluster and more!

On the scheduled day of each OMSI Star Parties, it is suggested that interested visitors call the OMSI Star Parties Hotline, 503 797-4000 Press #3 then #5, or check the OMSI Star Parties web site for possible [weather](#)-related cancellations. The event starts at sunset and is free with \$5 parking per vehicle. Warm clothing and a flashlight with red light are recommended. Personal telescopes and binoculars are welcome.

See <http://omsi.edu/starparties> for more information or cancellations.

Maupin Star Party

March 08-10, 2013

April 12-14, 2013

The Rose City Astronomers have been granted permission to use private property approximately 8 miles West of the town of Maupin for members-only scheduled Star Parties.

The Maupin Observing Site is located on a private airstrip about 8 miles east of Maupin, Oregon. Warning: this airstrip is used in the morning, but at the far end of the airfield. Most people don't even wake up.

There is no registration for the event itself, just show up and enjoy the weekend. You don't even need a telescope to participate; other members are enthusiastic to share their views. This is a good opportunity for beginners to get acquainted and seasoned observers to get some serious observing.

It can always be cold at night no matter what the season, so bring warm clothing.

RVs, trailers and tents will be allowed on the observing site (see observing site map for instructions). The town of Maupin offers lodging, restaurants and recreation if you don't want to rough it. We will have a portable outhouse on site.

More information can be found on the RCA website:

<http://www.rosecityastronomers.org/sp/maupin.htm>



Camp Hancock

Apr 05 - Apr 07, 2013

OMSI's Camp Hancock with meals and cabins fits the bill for a great outing on a cool Spring weekend. Dark skies, warm cabins, real bathrooms, hot showers, good meals and great friends top off the list of things to like and all are provided with the \$45 per night registration fee (OK, maybe not the friends).

Camp Hancock is an OMSI sponsored field station for the promotion of science education. It is located about 150 miles from Portland and is 2 miles east of the John Day River in Eastern Oregon in the Clarno Fossil Beds. Camp Hancock is NOT a resort hotel; it is a rustic kid's camp with 16 bunkhouses that sleep up to 14 people each in A-frame buildings. The bunkhouses are one room with bunks, mattresses, limited electricity and heaters on a 60 minute timer. You will be sharing the bunkhouse with others in our group, but it's never crowded and we usually average less than 3 people per cabin. There is a limited area for Tents, RVs and trailers.

Registrations will be taken at both the February and March general meetings. The Registration and Payment Deadline is March 30th. For mail in registration forms, or to register and pay online please visit <http://www.rosecityastronomers.org/sp/hancock.htm>.

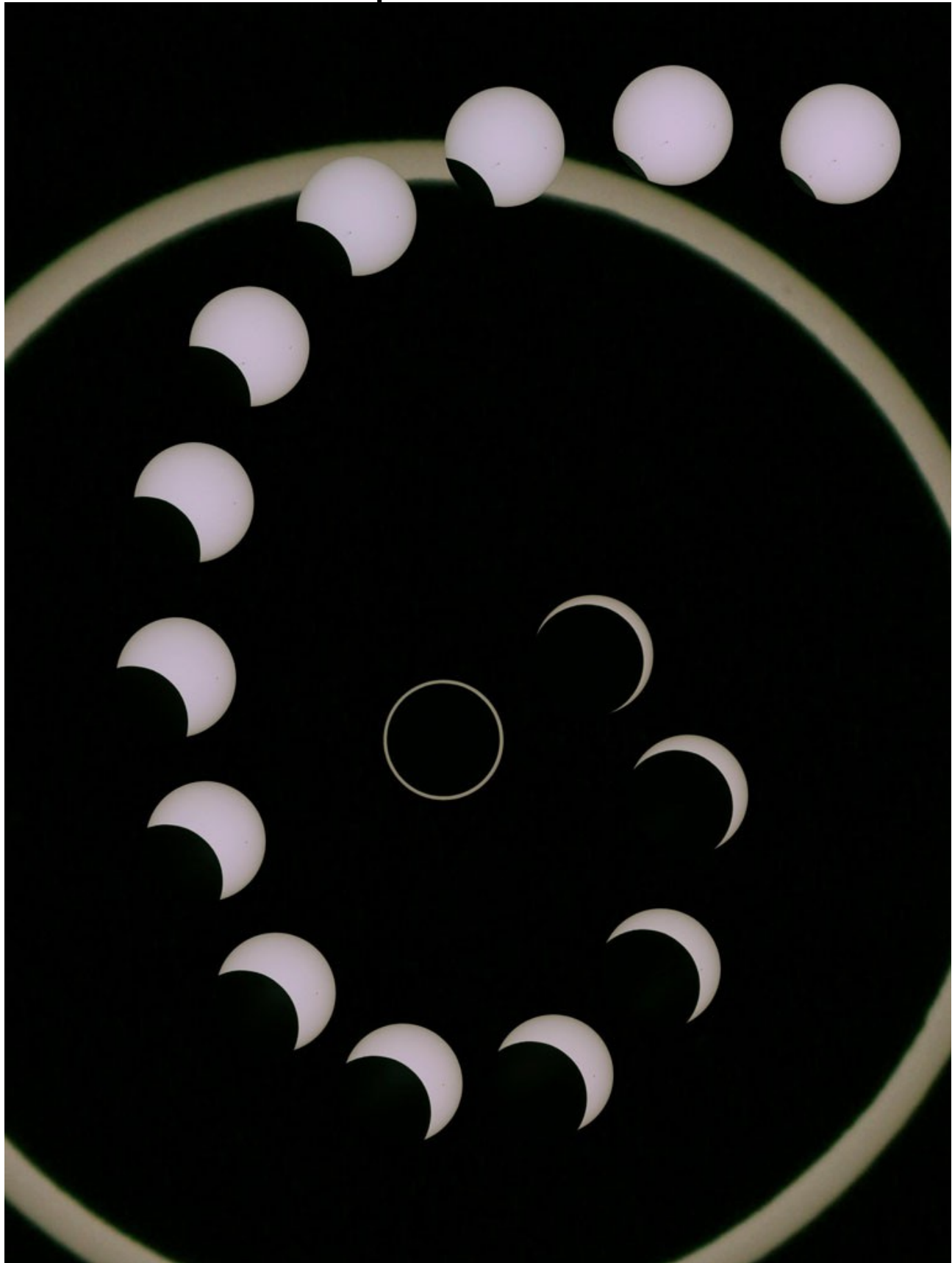
Haggart Observatory Public Nights

Through a partnership with Clackamas Community College, the Rose City Astronomers (RCA) maintains the Observatory and coordinates public access to the Observatory. During 2013, we have scheduled several Public Nights at the Observatory. We invite those interested to visit the Haggart Observatory webpage at: <http://www.rosecityastronomers.org/sp/haggart.htm> to find out dates and times for these sessions.

Star Parties Coming Soon in 2013!

OMSI Astronomy Day	April 20
Maupin Dark Sky Star Party Weekend	May 03
Kah-Nee-Ta Star Party Weekend	May 10-12
Prineville Reservoir Star Party	May 18
OMSI Planet Parade Star Party	May 25
Rooster Rock Dark Sky Star Party	Jun 01
Maupin Dark Sky Star Party Weekend	Jun 07-09
OMSI Summer Solstice Star Party	Jun 15
Golden State Star Party	Jul 06-09
Trout Lake Star Party	Jul 12-14
OMSI Lunar Viewing Star Party	Jul 20

Astrophoto of the Month



**Solar Eclipse Sequence May 2012 - Kent Pittard
Orion ED80, Canon Rebel XT**

MARCH 2013

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1 Noon Downtowners Luncheon Kell's	2
3	4 7pm Board Meeting OMSI Classroom 1	5	6	7	8 Maupin Star Party	9 Maupin Star Party
10 Daylight Savings Time Begins, Set Clocks Ahead 1 Hour	11	12	13 7pm Astro Imaging SIG Beaverton Library	14	15	16 Haggart Observatory Public Night
17	18 6:30 New Member 7:30pm General Meeting OMSI Auditorium	19	20 7pm Cosmology SIG Note New Meeting Location	21	22	23 OMSI Star Party
24/31	25	26	27	28	29	30 10am - 3pm Telescope Workshop

April 2013

Apr 01	Monday	Board Meeting	OMSI Classroom 1	7pm
Apr 06	Saturday	Haggart Public Night	Haggart Observatory	Dusk
Apr 10	Wednesday	Astro-Imaging SIG	Beaverton Public Library **Note new meeting day**	7pm
Apr 12	Friday	Downtowners Luncheon	Kell's	Noon
Apr 12-14	Fri-Sun	Maupin Star Party	Wapinita Airstrip Near Maupin OR	
Apr 15	Monday	General Meeting	OMSI Auditorium	7:30pm
Apr 17	Wednesday	Cosmology SIG	Firland Apartments Community Room *New Location 8036 SE Raymond St., Portland, OR 97206	7pm
Apr 20	Saturday	OMSI Star Party	Rooster Rock and Stub Stewart State Parks	Dusk
Apr 27	Saturday	Telescope Workshop	Technical Marine Service Building	10am-3pm

<http://www.rosecityastronomers.org>

Rose City Astronomers
Oregon Museum of Science and Industry
1945 SE Water Ave
Portland, OR 97214-3356

The Rosette Gazette

Volume 26, Issue 4

Newsletter of the Rose City Astronomers

April, 2013



Behind the Mighty Mars Rovers Elizabeth Rusch

This month's program will be a video-packed, family-friendly exploration of the Mars exploration program through the stories of Spirit, Opportunity and Curiosity – and the scientists and engineers behind the missions. Children's book author Elizabeth Rusch will take the audience behind the scenes of these successful missions by sharing NASA video clips and stories from researching and writing her book *The Mighty Mars Rovers: The incredible adventures of Spirit and Opportunity*. Published in Houghton Mifflin's highly acclaimed *Scientists in the Field* series for readers ages 10 to 100, *The Mighty Mars Rovers* is a Junior Library Guild selection and has garnered starred reviews from *The Horn Book*, *School Library Journal*, *Booklist* and *Kirkus*, which called the book "enthralling," "stellar," and "edge -of-your-seat reading." It has been named a Best Book of 2012 by *Kirkus*, *School Library Journal*, and the New York Public Library.

THE MIGHTY MARS ROVERS

The Incredible Adventures of Spirit and Opportunity



In This Issue:

- 1...General Meeting
- 2...Club Officers
-Magazines
-RCA Library
- 3...RCA Board Minutes
- 4...Special Interest Groups
- 5...Striking Nebulae In The LMC
- 10...The Art of Space Imagery
- 12...Music of the Spheres: Astronomical Connections
- 16...Star Parties
- 17...Astrophoto of the Month
- 18...Calendars



ELIZABETH RUSCH is an award-winning children's book author and magazine writer. She writes both nonfiction and fiction in the areas of science, art, sports, waves, jokes, crayons, and mud — anything that catches her fancy. A former writer and editor for *Teacher Magazine*, Rusch has published more than 100 articles in numerous national magazines. Her publishing credits include articles on wave energy and intraplate earthquakes for *Smithsonian* and a feature on salmon scientists in *Portland Monthly*, among many others. Her other nonfiction science books for young readers include *Will It Blow?: Become a Volcano Detective at Mount St. Helens*, a *Natural History* magazine Best Book for Young Readers, a *Washington Reads* pick, and a finalist for the *Oregon Book Award*; and the nonfiction picturebook biography *The Planet Hunter: The Story behind what Happened to Pluto*, which the *L.A. Times* called "a fascinating tale, charmingly told."

Rusch teaches nonfiction writing and children's literature at the Attic Institute and speaks widely at schools and writing conferences. To learn more about her books, articles, awards, school visits, and speaking engagements, please visit her website at www.elizabethrusch.com. Elizabeth Rusch is a member of the Ink Think Tank and blogs about nonfiction writing on the *Interesting Nonfiction for Kids* blog at inkrethink.blogspot.com. Rusch lives in Portland, Oregon.



RCA is a member of the
Astronomical League.
<http://www.astroleague.org>

All are Welcome! Monday April 15th
Social Gathering: 7 pm. General Meeting Begins: 7:30 pm.
Location: OMSI Auditorium

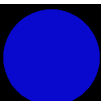
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Trout Lake Star Party photo above courtesy Michael Minnhaar
Moon photos below courtesy David Haworth

New Moon
Apr 10

First Quarter Moon
Apr 18

Full Moon
Apr 25

Last Quarter Moon
May 02



CLUB OFFICERS

Office	Name	Email
President	David Nemo	president@rosecityastronomers.org
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Sister Club Liaison	Jan Keiski	sisterclubs@rosecityastronomers.org
Haggart Obs. Coordinator	Rusty Baumberger	haggart@rosecityastronomers.org

RCA MAGAZINE SUBSCRIPTIONS

One of the benefits of RCA Membership is a reduced rate subscription to Sky & Telescope and Astronomy magazines.

The RCA member rate for Sky & Telescope Magazine is \$33 for one year or \$66 for two years. The RCA member rate for Astronomy magazine is \$34 for one year or \$60 for two years. For more information and payment options please see the website.

<http://www.rosecityastronomers.org/mags/index.htm>

Larry Godsey <magazines@rosecityastronomers.org>



RCA LIBRARY

The Rose City Astronomers maintains a comprehensive club library of astronomy related articles, books, CDs and videos. These items can be borrowed by members through checkout at the general meetings for a period of one month with renewals available by phone or e-mail to the club library director. The RCA library is constantly growing through many donations and the purchase of new materials. A listing of library materials (PDF format) can be found at the library web page.

<http://www.rosecityastronomers.org/library.htm>

Jan Keiski <library@rosecityastronomers.org>

Minutes of the Rose City Astronomers Board

February 4th 2013

Held at OMSI Classroom 1

Chair : David Nemo

Secretary : Duncan Kitchin



Board Members Present

David Nemo (President)
Ken Hose (VP Membership)
Mark Martin (VP Programming)
Jim Higgs (VP Community Affairs)
Steve Jaynes (VP Observing)
Larry Godsey (Treasurer, Webmaster, Magazine Sales)
Duncan Kitchin (Secretary)
Herry Tedja (Sales Director)
Jan Keiski (Book Library/ OMSI & Sister Club Liaison)
Howard Knytych (New Member Advisor)

Call to Order

The meeting was called to order at 7:05pm by David Nemo and, there being 9 board members present, the quorum requirement of 9 was declared to be met. (One member arrived after the quorum count was made, bringing the number to 10).

Approval of Agenda

The agenda was approved by unanimous consent

Approval of Minutes

Moved: Approve minutes from the January 2013 board meeting.

Moved: Jim Higgs. Second: Howard Knytych. Motion carries 10-0-0.

Officer Reports

President (David Nemo): David made a state of the club presentation at the last meeting, which was well received. Possibly this could be something we have at more frequent intervals.

Secretary (Duncan Kitchin): Nominal.

Treasurer (Larry Godsey): Financial reports passed out, and also available on the Board website. Would like to increase the SIG budget to \$50 to cover the deposit for the cosmology SIG.

Moved: Larry Godsey. Second: Duncan Kitchin. Motion passes 10-0-0.

VP Programming (Mark Martin): Updating schedule for speakers for the year. Updates are posted on the forum as available. Sue French will not be able to make this year, but hopefully should be able to make next year. For June we currently have one of the founders and current VP of SBIG. For July we have David Grinspoon, and for August we have Michael Rice of New Mexico skies. In September we have Kevin Covey, a Portland native who works at the Lowell Observatory, who will be talking about low mass star formation and the Lowell Amateur Research Initiative. He will also be talking about the Discovery Channel telescope. In October, Matt Vartanian will be talking about atmospheric phenomena, and in November Doug MacDougal will be talking about celestial mechanics. Jim Todd has mentioned that if we have a speaker that we expect to draw a particularly large audience, the OMNIMAX theater can be made available for us to use.

VP Observing (Steve Jaynes): Meeting with Stub Stewart park

ranger. Observing night at the Haggart Observatory this weekend. In March, we have an RCA star party at Maupin, an OMSI star party at Stub Stewart and then Cam Hancock later in the month. Registration for Camp Hancock is now open. Ken Hose will manage this.

VP Community Affairs (Jim Higgs): Just held first event of the year at the Washington County Museum, with a talk provided by Howard Knytych. Jim Higgs has contacts from several schools wanting to schedule events.

VP Membership (Ken Hose): Brought in a total of \$309 in dues in the last month. We have 5 new members and 5 renewals, bringing the total to 330 member families. ALCOR: Ken has received a Lunar observing award request, and has one outstanding Sun Spotter request with the Astronomical League.

Action Items (Requiring Decision)

Cosmology SIG meeting location. David has been to visit the proposed site, which is a meeting room in an apartment complex and is handicapped accessible. David also conducted a brief survey of the membership, and the responses indicate that the new venue would be either an improvement or at least acceptable. The club will need to finance a \$50 refundable deposit (approved – listed under treasurer's reports). This has previously been funded for the Astro-Imaging SIG.

Declare youth director position vacant. Moved: David Nemo. Second: Larry Godsey. Motion passes 10-0-0.

Discussion Items

2013 Board Goals. David Nemo: revise the bylaws. Revitalize the youth program. Work out something with Stub Stewart to permit some sort of telescope storage there, possibly as part of an observatory project. Find a dark sky observing site. Jim Higgs: increase the total number of outreach events; targeting about 25 events a year. Cooperative events between outreach and a to-be-defined youth program. Herry Tedja: new sales table items targeted for beginners, such as red flashlights and binoculars, along with some additional books catering to beginners. Jan Keiski: Add a Northwest corner to the library and the library website featuring member authors. Duncan: get the minutes archive up to date. Locate and scan any historical club documents. Mark Martin: Organize a mirror making class. Steve Jaynes: formalize and revitalize our relationship with the State Parks, particularly Stub Stewart & Rooster Rock. Ken Hose: get the member survey completed and running. Jim Higgs: expand astronomy day this year (April 20th & October 13th). Facility to allow people to bring their telescopes for tuning and advice.

Member surveys. David Nemo has set up an RCA account on Survey Monkey and circulated a sample survey to Board members. There are some potential questions that we may be able to answer this way.

Youth program. We need to determine what direction the club wants to go. David Nemo announced that a sub-committee of himself, Jim Higgs and Mark Martin would meet to discuss and make recommendations to the Board.

Director Reports

New members (Howard Knytych) : Talk last month on basic terminology; about 20 attendees. This seemed to be very well received. Suggested that David Nemo should also attend new members meetings to welcome members and give a general overview of the club.

Media (Diana Fredlund) : Not able to attend, but report submitted by email: The February news release was distributed with Richard Berry's information; Diana will post the info to the TV community calendars this week.

Diana spoke with Janet Paulson from Clackamas Community College. They posted a news release about the observatory. The link is <http://www.clackamas.cc.or.us/client/NewsDetail.aspx?id=3465>

Merchandise Sales (Herry Tedja): Recorded \$718 total sales last month, but have additional money that was in the account, indicating there may be some sales unaccounted for. Sold all non-preordered copies of Fulvio Melia's book, plus two extra. Have 8 copies on hand, 10 copies pre-ordered have not yet been picked up. Will consider pre-payment for pre-ordered books in the future.

Book Library/ OMSI/ Sister Clubs (Jan Keiski): Library Nominal. OMSI: Star parties start in March. GAMA: Modified Messier Marathon starting this weekend.

Telescope Library (David Horne): Not present.

IDA (Dawn Nilson): Not able to attend, but report submitted by email: spoke to David Ingram of IDA on the phone to try to nail down some dates for the film screening and panel discussion event. Has since sent two reminders but has not heard back. Once some dates are available, Dawn will coordinate with Jim Todd and Portland Audubon Society to establish a date.

Magazine Subscriptions (Larry Godsey): Nominal.

Webmaster (Larry Godsey): Nominal.

Observing Sites (David Nemo): Haggart Observatory was open for members this last weekend. About 9 people showed up on Friday, and about 4-5 on Saturday, including a few attendees who have asked to be more involved as volunteers. We now have multiple sets of keys available. Clackamas Community College has a number of telescopes in a storage shed that are now surplus to requirements. We are discussing how to distribute or sell these.

Youth Program (Vacant): No report

Newsletter Editor (Scott Kindt): Nominal.

SIGs (Vacant) : No report.

Old Business

Stub Stewart access. Steve Jaynes is working on this.

New Business

Software program needs. David Nemo informed the Board that as a non-profit, RCA has access through a website called TechSoup to purchase software at a deep discount, and that any Board members with a legitimate need for software that is primarily used for RCA business should work with Larry or David to obtain. Not all programs are available and are subject to manufacturer's limitations and restrictions.

Other Business

No other business.

Adjournment

There being no further business, the meeting was adjourned at 9:01pm

Special Interest Groups

Astro-Imaging Special Interest Group

When: Wednesday, Apr 10th, 7pm

Location: Beaverton Public Library
12375 SW 5th St - Beaverton

SIG Leader: Greg Marshall

Email: ai-sig@rosecityastronomers.org

<http://www.rosecityastronomers.org/sigs/astroimage.htm>

Youth Program

When: TBD

Location: TBD

Leader: Kathy Kornei

Email: youth@rosecityastronomers.org

<http://www.rosecityastronomers.org/sigs/youth.htm>

Downtowners Luncheon

When: Friday, Apr 12th, Noon

Location: E-San Thai
133 SW 2nd Ave.

SIG Leader: Margaret Campbell-McCrea

Email: downtown-sig@rosecityastronomers.org

<http://www.rosecityastronomers.org/sigs/downtowners.htm>

Note different meeting location and day for this month.

New Members Special Interest Group

When: Monday, May 20th, 6:30pm

Location: OMSI Planetarium

Topic: TBD

SIG Leader: Howard Knytych

Email: newmembers@rosecityastronomers.org

http://www.rosecityastronomers.org/sigs/new_members.htm

Telescope Workshop

When: Saturday, Apr 27th
10:00am - 3:00pm

Location: Technical Marine Service, Inc.
6040 N. Cutter Circle on Swan Island-Portland

SIG Leader: John DeLacy

Assistant: Don Peckham

Email: tw-sig@rosecityastronomers.org

<http://www.rosecityastronomers.org/sigs/tmw.htm>

Astrophysics / Cosmology SIG

When: Wed, Apr 17th, 7pm

Topic: TBA

Note New Address
See website for map

Presented by: TBA

Location: 8012 SE Raymond St., Portland, OR 97206

SIG Leaders: Lamont Brock, Viktors Berstis

Email: cosmology-sig@rosecityastronomers.org

www.rosecityastronomers.org/sigs/cosmology.htm

Striking Nebulae in the Large Magellanic Cloud

by Leo Cavagnaro

Bright Emission Nebulae and a Supernova Remnant are Found in the Northeast Region of our Satellite Galaxy

The sky is getting darker at Uspallata Valley¹, in central west Argentina. Slowly, the Magellanic Clouds become visible in the southern sky. Hidden not too far from the heart of the Large Magellanic Cloud (LMC) an interesting complex of small nebulae is situated. The question arises, how much you can see there with a common 8-inch telescope? Is this area of that galaxy impressive enough to observe and study with this kind of optical instrument?

I have tried to describe in this article all the details you can observe in this complex, one of the most interesting within our satellite galaxy.



The Southern Sky in summer. The Large Magellanic Cloud (right on the picture) is an astounding unaided eye object together with the Eta Carinae nebula (upper) and the Coalsack nebula (middle left). Photo by the author.

I spent two nights, March 8 and 9, observing a small region centered at R.A. 05h 39m, Dec. $-67^{\circ} 40'$ which corresponds to "area 24" of my big observing project about this galaxy. Using an 8-inch telescope and an eyepiece that gave me 37x and a wide field I got a first view of the zone. At that moment, the galaxy was 48 degrees above the

horizon. The stars in the field mostly have visual magnitudes fainter than 11. The star HD 38616 with a magnitude of 7 (Figure 1), is the brightest one there. On the west edge of the eyepiece field a nebulae complex is easily visible even without filters. It is by far the most conspicuous feature in the field.

The N59 Nebula

Named LHa-120² N59, and also known with the name of “Dragon’s Head Nebula”, this HII region is centered at R.A. 05h 35m 25s, Dec. -67° 35′ 00″ at the boundary with the structure known as LMC-4³.

Focusing in this complex, three patches are visible at 37x. The brightest and biggest zone, known as N59A (see Figure 2), exhibits the shape of a fan with several filaments which may be ionization fronts thus making it the third brightest nebula of the LMC after 30 Doradus and N11B. It is composed of two regions or maybe just one big region elongated roughly west-east with a dark lane across dividing it into two parts of similar brightness. These two parts have

NGC numbers, 2035 and 2032. The first one was discovered by James Dunlop in 1826. The other one, NGC 2032, was observed by John F. W. Herschel in 1834 but surely Dunlop observed it too because it is very similar to the other area discovered by him. *“The dust lane seems to be mixed in with the nebular gas and the stars, suggesting a site where star formation may still take place. However, from the morphology revealed by those direct images, it is impossible to ascertain whether those nebulae are physically related or even, whether they are located at the same distance”* (extract from the paper **“Kinematics of the very young nebula N59 at the edge of the supershell LMC-4”** M. Rosado et. al. 1998). N59A is closely related with the OB association⁴ LH 82⁵ which covers an area of 3' x 6' and virtually coincides with the nebula.

A third patch, round in shape through an 8-inch scope, that looks fainter than the other two, lies about 5 arc minutes to the east of the brightest part of the complex, in the region known as N59B (see Figure 2) which is, according to C. Armand, L. Deharveng and J. Caplan in their paper **“The Stellar Content of the Large Magellanic Cloud HII Region N59A”** (*Astronomy & Astrophysics*, 1992), a filamentary nebula that includes a photoionized region in the north, a supernova remnant in the south and a Wolf-Rayet star. The photoionized patch I saw is known as NGC 2040, a diffuse nebula discovered by James Dunlop in 1826 using a 9-inch telescope.

At 48x the view is more detailed. In the brightest area divided by the dark lane the eastern patch (NGC 2035) looks slightly smaller while the western patch (NGC 2032) appears bigger, showing two stars at the west edge. An extension of fainter nebulosity which becomes narrower to-

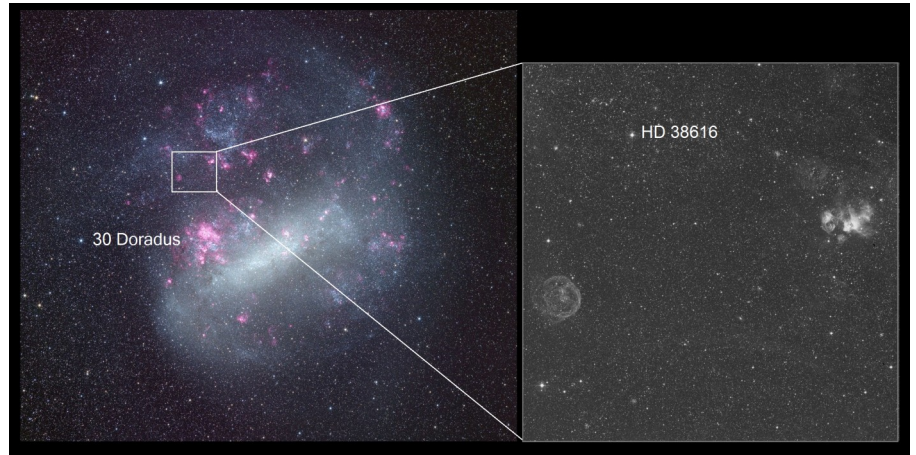


Figure 1. The region under observation is situated to the north of 30 Doradus (Tarantula nebula). North is up.

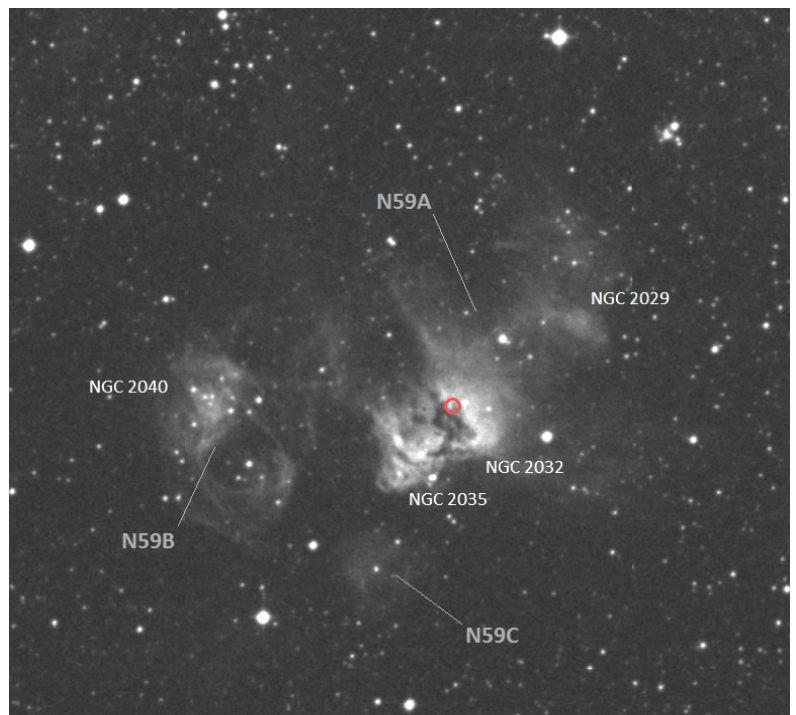


Figure 2. N59 complex. North is up.

ward the west when seen through an 8-inch telescope is visible at this power. I'm speaking of NGC 2029 (see Figure 2). On the other hand, NGC 2040 was clearly seen, fainter than the other patches and with smooth brightness. With averted vision a very small spot seems to lie very close. Maybe the two stars in the region of the supernova remnant? Read more below.

Applying higher magnification (64x), I got a beautiful view of this complex. NGC 2032 and 2035 look very bright. Although both nebulae together are slightly elongated west-east, NGC 2032 specifically, is a bit elongated north-south. Even if the overall shape of NGC 2040 is round, at this magnification some clues of irregular shape appear. The small and faint region known as N59C (see Figure 2) could not be visible at this magnification.

I applied a UHC filter to this eyepiece on the second observing night to observe this complex. I started the observation at 10:35pm local time (UT-3hours) with the Large Magellanic Cloud at 47 degrees of altitude in the sky. The view was very clear with the patches NGC 2032 and 2035 obvious in the eyepiece. NGC 2029 is visible like a smooth nebulosity while NGC 2040 is more easily visible than the view with the other eyepieces. Through this filter it looks slightly fainter than NGC 2032/35. With averted vision a bright dot is visible within the nebula, maybe a star member of the OB association LH88 associated with NGC 2040. This filter improves the overall view of the complex. It is especially useful for a better view of NGC 2029 that shows a triangular shape getting narrower outwards of the brightest part of the complex. Although it was difficult, the view of N59C, a small, round and faint nebulosity in the southeast part of the pair NGC 2032/2035, was possible at this power using this kind of filter.

Through an Orion UltraBlock filter, N59 looks very good. Like the UHC filter, this one slightly improves the view of the whole complex. However, it can be observed without a filter as well. This filter helped for the observation of the two faint nebulae NGC 2029 and 2040.

I spent most of the second night, March 9, observing these nebulae with higher magnification. At 120x the view of N59 is more interesting and detailed. Each region or patch is clearly visible and identified. NGC 2040, which shows a similar brightness to NGC 2029, and fainter than the two main patches, also shows some faint stars embedded in the nebulosity. It is surely the aforementioned OB association LH88 (Lucke & Hodge 1970).

Moving the telescope to NGC 2032 & 2035, both nebulae look outstanding at this magnification. NGC 2035 looks round while NGC 2032 appears a bit elongated. C. Armand et. al. point out that the main star that excites the region N59A is an O5 spectral type star they name "star 226" in their paper. I have indicated it in Figure 2 with a small red circle. The detached black lane between the bright nebulae adds an interesting feature to the region. NGC 2029 looks faint at this magnification, being better viewed using averted vision.

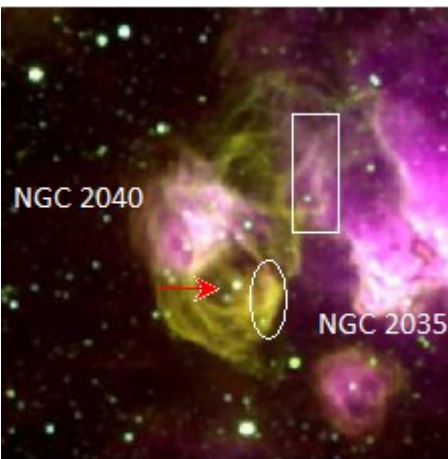


Figure 3. The [S II] emission (yellow) defines the supernova remnant. Picture from Smith et al 1999. North is up.

With a UHC filter, NGC 2029 and NGC 2040 show similar brightness. A slightly brighter region is visible within NGC 2029 (look Figure 2). For brief moments, a star is visible within NGC 2040. Meanwhile N59C is still difficult to see even with this filter, averted vision is necessary.

An Extragalactic Supernova Remnant

A supernova remnant, known as SNR 0536-676, is situated in this complex. It was identified as such by Mathewson et. al. (1985). It appears to be a blow-out of the dense HII region N 59B around the OB star association LH 88 (Chu & Kennicutt, 1988).

I invited my friend Carlos Gutierrez to observe this elusive object using a 16-inch telescope. A first observation at 106x made it possible to identify two very faint stars situated in a key position to try to delineate the shape and size of the supernova remnant. They are indicated with the red arrow in Figure 3. After that we tried to see some nebulosity in the region immediately to the south and west of NGC 2040. However it was impossible to view at this magnification and under the observing conditions that night. Using a UHC filter with this eyepiece an extremely faint, elusive and small nebulosity could be glimpsed in the region indicated by the ellipse in the picture, which is coincidental with the brightest portion of the supernova remnant. The view was very difficult and it was close to "retinal torture". This elusive nebulosity is also visible in the DSS image in Figure 2. There it looks a little brighter than N59C but it was

harder to see even in this bigger telescope. The nebulosity labeled with the square in Figure 3 was also visible using averted vision for both of us. Carlos stated that it had a triangular shape, narrowing toward NGC 2040. According to the picture this nebulosity seems to not be a part of the supernova remnant, but an extension of the NGC 2035 region.

At 144x the two stars are clearly visible and another star (to the north) is also detected. The small patch close to the stars is visible for some moments. The zone in the square shows a faint star within (visible in Figure 3). With a UHC filter the view is similar to that at 106x.

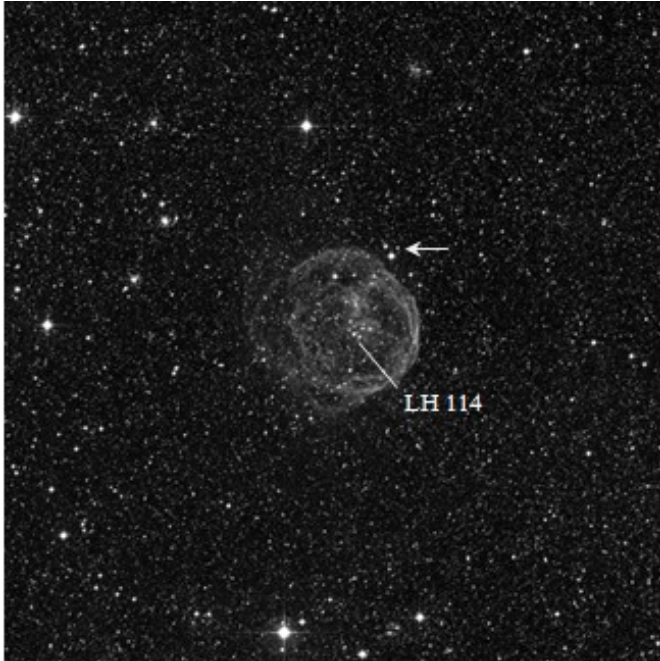


Figure 4. The N70 nebula. North is up

able to identify a close pair of stars of magnitudes 10.8 and 12.5 (white arrow in Figure 4). Very close to it a faint nebulosity can be glimpsed using averted vision. Two stars within the nebulosity are also visible, one of them looks like a defocused faint star and is coincidental with the position of the OB association LH 114. This is an association consisting of at least nine stars of type B0 or earlier (Oey 1996a).

At 48x I could clearly identify the double star. Observing in the area of this nebulosity, a very small and compact stellar group is detected where LH 114 lies. This compact group appears surrounded by a faint and smooth nebulosity, N70.

At 64x, in the central zone within the faint nebulosity a sort of “defocused star” can be glimpsed. For a moment, and using averted vision, 2 or 3 stars very close to each other seem to lie in the zone. At this magnification and using a UHC filter, N70 looks a little more detached from the surrounding sky, but it is a very faint object. Averted vision suggests its round shape, showing a smooth and faint brightness. At the center of the nebulosity the small slightly brighter region is easily distinguishable.

The N70 Nebula

Also known as DEM L⁶ 301, it is one of the most outlying bright emission-line objects, located in an isolated region of the disk far from supergiant shells (Meaburn 1980), H II regions, and bright diffuse H α emission, a textbook example of an isolated superbubble. “It is an especially prominent bubble of line-emitting gas which appears to be powered by a population of hot massive stars in its interior” (paper, **Emission-Line Properties of the LMC Bubble N70**, B. Skelton et. al. 1999). To observe this object you need a very dark sky, good dark adaptation and patience to detect the faint nebulosity 45 arc minutes to the southeast of N59.

At 37x the view of this nebula was interesting. It looks faint on DSS (Digitized Sky Survey) images and it is extremely faint when you try to see it visually under a dark sky. It can hardly be glimpsed even without a nebular filter through an 8-inch telescope. A good way to find it is to identify the triangle of stars (lower edge in Figure 4), and then to move about 15 arc minutes to the north. Once there you will be

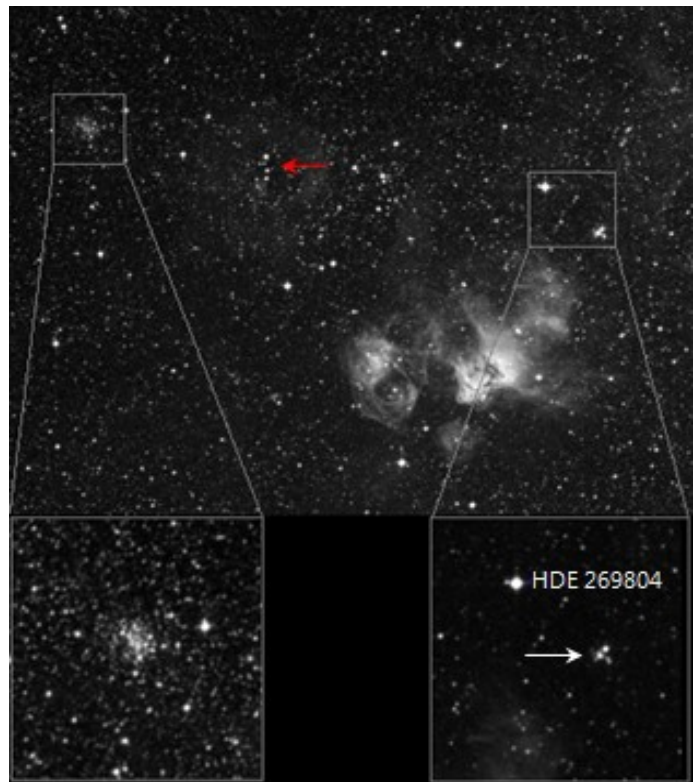


Figure 5. The cluster NGC 2053 (left), North is up

Through an Orion UltraBlock filter the view is very similar. The stellar nature or content of the small central region embedded in nebulosity can be confirmed.

How does N70 look using 120x? Well, the stellar configuration mentioned above is easily identified in the eyepiece field and the faint nebula can be glimpsed, showing smooth brightness and engulfing the stars there. LH 114 appears like a small and compact stellar group and some members can be spotted using averted vision. The view with a UHC filter is not very different.

In the outskirts of the complex N59, to the northeast, two small hazy spots are visible. Averted vision helps to see them better. According to the DSS image one of them, indicated with a red arrow in Figure 5, is a group of 3 stars surrounded by faint nebulosity. At low power (37x) and using averted vision it looks nebular and a little elongated suggesting the 3 stars in a row. Higher magnification is necessary to see it in detail. I personally don't know if these stars are members of the OB association LH 92. I could not find detailed information about this association but the DSS image obtained from http://archive.stsci.edu/cgi-bin/dss_form shows the area of the three stars as the place of LH 92. The other one is the open cluster NGC 2053 (see Figure 5) discovered in 1837 by John Frederick William Herschel, an object with a magnitude of 12.2 according to the NGC/IC Project web page and the [Wolfgang Steinicke's Revised NGC and IC Catalog](#). The zone of the two objects seems to be connected with faint nebulosity. The three stars are in the region known as DEM L 250. The DSS image of this nebula shows the three stars at the center.

At 48x the three stars are better viewed very close to each other. NGC 2053 looks like a small hazy spot of smooth brightness visible with averted vision. I got the same view of this open cluster at a little higher magnification (64x), appearing round in shape. At 120x, this cluster looks faint but appears relatively big in the field of this eyepiece. Averted vision improves the view. At this power, the three stars were clearly visible and no nebulosity was glimpsed there.

At 64x I saw a "star" that looked faint and surrounded by a slight amount of nebulosity, it appeared as a defocused star. You can see it doesn't show the point-like appearance of a star if you compare it with the nearby (only 2.5 arc minutes away) 9.3 magnitude star HDE 269804. Observing this area with 120x I could see a very small group of 2 or 3 stars very close to each other. Later, when I checked the DSS image I saw the three faint stars (see the small picture on the right hand of Figure 5).

Once again, I'm amazed at how many small details and faint objects can be observed with an 8-inch telescope, when they are observed carefully and with good charts, deep-sky images (DSS for example) and a peaceful place to observe from.

- ¹ It is situated about 75 miles to the west of Mendoza city, in Los Andes mountains. It is a good place to observe the skies. Geographic coordinates, 32° 36' 32" S 69° 21' 18" W
- ² **LHa-120 N**- This is the full name of an entry in the Henize catalogue of LMC emission nebulae. "L" refers to the Lamont-Hussey Observatory of the University of Michigan; "Ha" means the Hydrogen-alpha emission line, the key signature line used in the survey; "120" refers to the plate number (objective prism plate) for the LMC; "N" labels the object as a nebula, as distinct from a star (label "S").
- ³ **LMC4** is a kpc-sized ring of H II regions in the Large Magellanic Cloud.
- ⁴ **OB Association:** The concept of a stellar association was originally introduced in 1949 by V. A. Ambartsumian, who later separated them into OB and T associations (Ambartsumian 1968). Morgan, Sharpless, & Osterbrock (1952) considered as a stellar association any loose group of stars within an area where bright OB stars exist and with evidence of a common origin.
A recent definition of a stellar association (Kontizas et al. 1999) refers to it as a single, unbound concentration of early-type luminous stars, embedded in a very young star forming region.
- ⁵ **LH** is a catalogue of OB associations in the Large Magellanic Cloud compiled by Lucke & Hodge.
- ⁶ **DEM** is a catalogue of 357 nebulae in the Large Magellanic Cloud and 167 nebulae in the Small Magellanic Cloud that was published in 1976 by R.D. Davies, K.H. Elliot and J. Meaburn. The LMC catalogue is DEM L and the SMC catalogue is DEM S.

The Art of Space Imagery

By Diane K. Fisher

When you see spectacular space images taken in infrared light by the Spitzer Space Telescope and other non-visible-light telescopes, you may wonder where those beautiful colors came from? After all, if the telescopes were recording infrared or ultraviolet light, we wouldn't see anything at all. So are the images "colorized" or "false colored"?

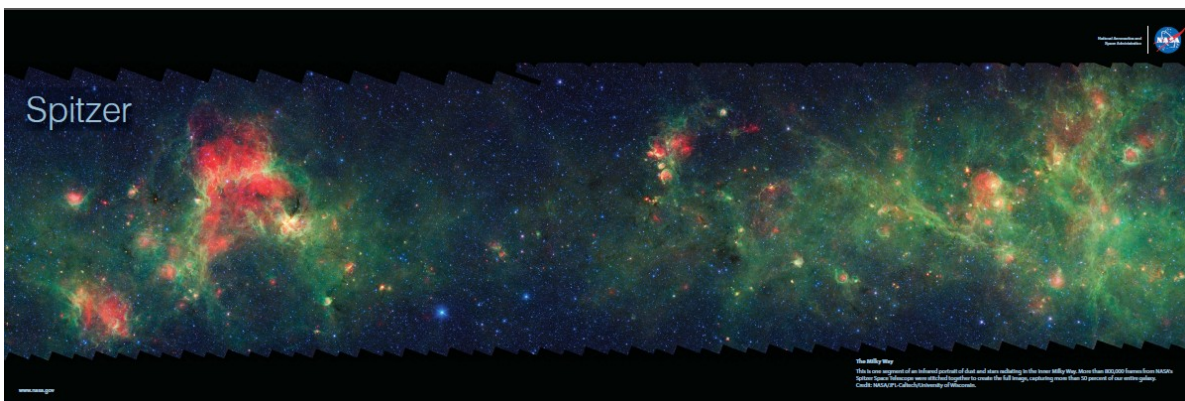
No, not really. The colors are translated. Just as a foreign language can be translated into our native language, an image made with light that falls outside the range of our seeing can be "translated" into colors we can see. Scientists process these images so they can not only see them, but they can also tease out all sorts of information the light can reveal. For example, wisely done color translation can reveal relative temperatures of stars, dust, and gas in the images, and show fine structural details of galaxies and nebulae.

Spitzer's Infrared Array Camera (IRAC), for example, is a four -channel camera, meaning that it has four different detector arrays, each measuring light at one particular wavelength. Each image from each detector array resembles a grayscale image, because the entire detector array is responding to only one wavelength of light. However, the relative brightness will vary across the array.

So, starting with one detector array, the first step is to determine what is the brightest thing and the darkest thing in the image. Software is used to pick out this dynamic range and to re-compute the value of each pixel. This process produces a grey-scale image. At the end of this process, for Spitzer, we will have four grayscale images, one for each for the four IRAC detectors.

Matter of different temperatures emit different wavelengths of light. A cool object emits longer wavelengths (lower energies) of light than a warmer object. So, for each scene, we will see four grayscale images, each of them different.

Normally, the three primary colors are assigned to these gray-scale images based on the order they appear in the spectrum, with blue assigned to the shortest wavelength, and red to the longest. In the case of Spitzer, with four wavelengths to represent, a secondary color is chosen, such as yellow. So images that combine all four of the IRAC's infrared detectors are remapped into red, yellow, green, and blue wavelengths in the visible part of the spectrum.



Download a new Spitzer poster of the center of the Milky Way. On the back is a more complete and colorfully-illustrated explanation of the "art of space imagery." Go to <http://spaceplace.nasa.gov/posters/#milky-way>.



This image of M101 combines images from four different telescopes, each detecting a different part of the spectrum. Red indicates infrared information from Spitzer’s 24 -micron detector, and shows the cool dust in the galaxy. Yellow shows the visible starlight from the Hubble telescope. Cyan is ultraviolet light from the Galaxy Evolution Explorer space telescope, which shows the hottest and youngest stars. And magenta is X-ray energy detected by the Chandra X-ray Observatory, indicating incredibly hot activity, like accretion around black holes.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Telecoil service now available at the General Meetings.

Thanks to OMSI, Telecoil (or T-coil) systems are located in the Auditorium and Planetarium. These systems allow hearing impaired people with compatible hearing aids or cochlear implants to receive an audio signal directly from the room's sound system. For more information, see <http://en.wikipedia.org/wiki/Telecoil#Telecoil>. Jim Todd said that probably 80 or 90% of hearing impaired people use compatible devices. These systems should make our meetings much friendlier to those with hearing impairments. Once again, thank you OMSI!



Music of the Spheres: Astronomical Connections

by Robert McGown FRAS

As we look back in time, music theory started in the sixth century BC in Greece with Pythagoras. His followers carried on his knowledge and tradition, although little was written down. The Pythagoreans believed that all matter emanated musical tones; however they were at a level where we couldn't hear them. Pythagorean followers construct an Earthly model based upon musical tones. Pythagoras segued his musical tones model with his theory, "all in numbers". The Pythagorean philosophy was based upon numbers and music. Pythagoras is credited for the creation of the musical scale. The musical scales credited to Pythagoras were different for each Greek writer. Pliny, a Greek writer who died in a volcanic eruption, describes the musical planetary intervals as follows:

Earth - Moon a tone
Moon - Mercury a semi tone
Mercury - Venus a semi tone
Venus - Sun a minor third
Sun - Mars a tone
Mars - Jupiter a semi tone
Jupiter - Saturn a semi tone
Saturn - the fixed stars a minor third

His concept is that the Moon is the closest body and should correspond to the shortest string and Saturn is represented by the longest string of the lyre. Some looked for the harmony of the universe blindly in the planets while others looked to the stars.

In the *Music of the Spheres*, a book by Guy Murche, the author explores harmonies of physics and early Greek thought. Most of his ideas date back to relationships and connections of early science. Murche describes briefly the mathematics of simple musical instruments, although the book is primarily about physics...

Plato's concept was that the radii of planetary orbits were proportional to the numbers 1, 2, 3, 4, 8, 9, and 27. The last of these numbers didn't correspond to Greek music.

Johann Kepler in the early 1600's, also believed that the planets were arranged in orbital positions like a musical progression. Each orbital plane was like a cord of a musical instrument. Sounds like Bode's law. Kepler sought out these mathematical musical relationships and tried to incorporate them into his own theories. In a musical production of *Star Date*, by the Mc Donald Observatory, the actual musical tones of the planets are played in a Keplerian orchestra.

The great astronomer William Herschel was also a composer. He eventually set composing music aside enough to discover the planet Uranus and discover 2400 deep sky with his sister Caroline and son John. William pursued astronomy in the late 1700's. In the Wilner Library at Harvard College, William Herschel's autobiography describes him dividing his time between his harpsichord at the theater and his telescope with the recently discovered Uranus. His musical compositions are available on compact disc, today.

Many times, the sound of musical notes share the properties of light waves emanated from a star. There is an apparent increase in frequency and decrease in wavelengths the waves from the source are moving away. An Austrian physicist, Christian Doppler, proved this phenomenon in the early 1800's. He proved it with an orchestra on a moving railroad car. As the orchestra rapidly went past the observer, the music changed pitch. This became known as the Doppler Effect. Six years later, a French physicist, Freazau, proved the principle for light waves. Today this receding radiation, as applied to light is known as the Red Shift.

Gustav Holtz 1874-1934 personified the planets to music and emotion to give them a mythological orchestral setting. The early Greek philosophers were knowledgeable about the astrological identities of the planets. The seven known planets were: The Sun, Moon, Mercury, Venus, Mars, Jupiter, and Saturn. There may be some correspondence to the seven notes of the western musical scale. In his suites, Gustav replaced the Sun and Moon with Uranus and Nep-

tune. The order in which the suite performance is played is Mars, Venus, Mercury, Jupiter, Saturn, Uranus, and Neptune. There was no suite for Pluto since it wasn't discovered for 12 more years in 1930. Gustav first conducted the Planets Suite in the fall of 1930. Gustav Holtz studied mythology, astronomy, and enough mathematics to learn of space-time. The Planets suite was mythological personified as follows:

Mercury, the winged messenger:	The winged footed Mercury flies around this piece like a cosmic firefly.
Venus, the bringer of peace:	Venus is depicted in nature's garden of beauty in ancient Rome. Her femininity is weighed against the unchaste violence of Mars.
Mars, the bringer of war:	This suite brings the violence of war upon us, although it was completed before WW1.
Jupiter, the bringer of jollity:	The tone of this music keeps to the tone of the astrological nature of Jupiter as a planet of generosity and benevolence. The music moves to a median plateau with graceful dance music and sinks into care free patterns.
Saturn, the bringer of old age:	The tone is serene and deliberate. A final mortality is expressed with a feeling of peace. Saturn approaches from a long ways off, and eventually traverses the seasons of life.
Uranus, the magician:	This Uranus is not the mythological god but the ruler of Aquarius. This bumbling magician hides deep wisdom. Before he makes his last mistake his knowledge of eternity leads him to the threshold of the infinite.
Neptune, the mystic:	Now that the void of Neptune's watery abyss is open before us, we hear the choir of the goddess in the distance.

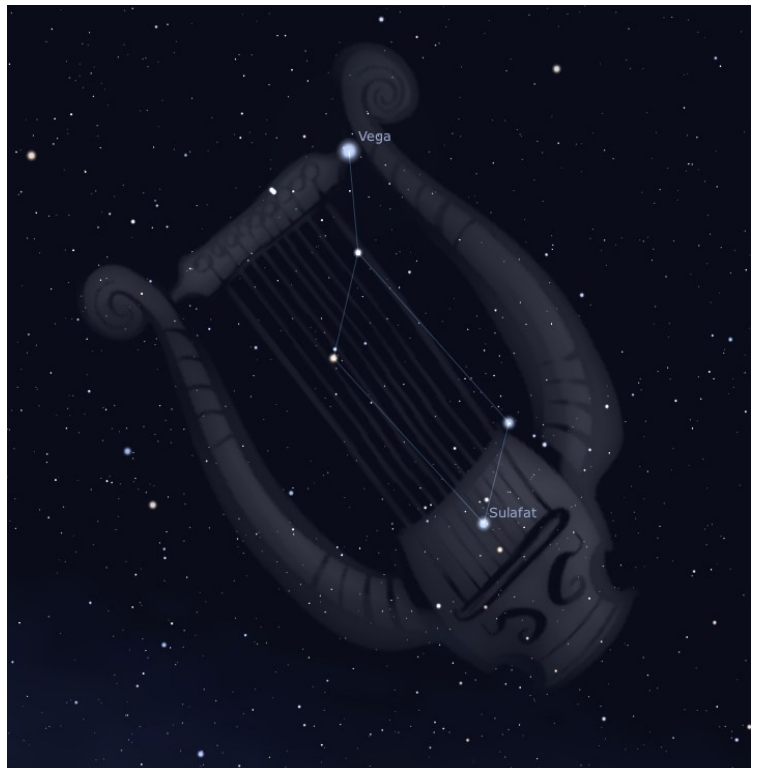
Moving to a musical analogy made by Timothy Ferris about Sir William Huggins' spectroscope. When Huggins had his spectroscope trained on a star or comet, the spectrum gave off light and dark banding like the gaps in piano keys. Sir William Huggins studied these spectral lines to discover cyanogen gas in Comet Halley's tail.

Being a radio astronomer, I think of the electromagnetic spectrum as musical scales of a piano. It is 50 octaves across from gamma waves to radio waves. Middle C is the visible spectrum in the middle of the electromagnetic spectrum. The sharps and flats of the keyboard are like the emission and absorption lines of the spectrum.

Music gave Apollo 13 astronauts sojourn on the long return to Earth, after their oxygen tank burst. Jim Lovell and his two companion astronauts listened to a small tape deck with country-western music when Apollo 13 systems shut down. Eventually, the batteries ran out and the music died. It wasn't a George Lucas' Star Wars space opera for the ride home.

The lyre is an ancient musical instrument that is also a constellation that is directly overhead in the summer time. The constellation contains the deep sky objects M56 and M57. In Greek mythology, Lyre was associated with the myth of Orpheus, the greatest musician. In the myth Orpheus played music for the gods of the underworld to win his wife back. He was killed by the Bacchantes and his lyre was thrown into the river after his death. The Greek God Zeus sent an eagle to retrieve the lyre, and placed them both in the sky. The legend of the lyre in Wales is a wonderful myth. The lyre is known as King Arthur's Harp (*Talyn Arthur*), and also as King David's harp

Modern sci-fi movies sometimes effectively use sound waves or music theme to the big screen. In the movie *Alien* it was said, "In space, no one can hear you scream." There is no sound in space. It is carried by sound waves in air.



The unforgettable music of *2001: A Space Odyssey* symbolizes a unique moment in our solar system's history: the dawn of man. A cosmic monolith is surrounded by great apes, mesmerized by the monolith's appearance. It is later symbolic of a type 1 civilization meeting a type 2 civilization when the monolith is found in space.

The popular teenage movie, *Masters of the Universe*, stars Kevin, who is a hip adolescent Earth musician composing tunes on his keyboard synthesizer. Kevin must remember a musical cosmic key to open a wormhole through space-time and duplicate this on his keyboard synthesizer. With his keyboard, he opens a dimensional gate to another galaxy to save his friends and teleport them back to Earth.

In the story line of Steven Spielberg's classic movie, *Close Encounters of the Third Kind*, the characters are trying to decipher mental cosmic notes. Only select people can hear these notes, which turn out to be coordinates on the map. People from all over the Earth hear the notes and assemble at the striking rock formation Devil's Tower for an alien encounter.

In the first five minutes of *Contact*, a movie based on Carl Sagan's book, starring Jodi Foster, radio signals with all types of music emanate into space. For 70+ years, the TV and radio signals travel through space. We move away from Earth, traveling through transparent space with our imagination, and powers of ten at light speed and beyond. The radio wave signature of our civilization has carried the human voice 70 light years from our solar system into the realm of the stars.

In an abstract analogy, the pulsar is the classical musician of the universe. Its spinning pulse of radiation from 30 to beyond 1000 beats per second is listened to by the radio telescope. Some pulsars, like PSR 1257+12, give off a synchronized rhythm as planets orbit them. Radio astronomers listen to their radiation and light as electrons fly from their sequences of notes. Sounds in every wavelength, like the hymn of the radio galaxy, emanate from the heart of the Cosmos. The Earth based radio telescope is a vestibular extension of the human ear.

The waves of radiation in a large range of frequencies, given off by the Sun, are that of a jazz musicians score. The same chords with different notes represent the solar activity. During the 11-year sunspot cycle, the solar activity is just one octave higher or lower. The sun's rotation is differential, different from equator to pole. Improvising with different notes, the Sun displays musical emotion in its hourly solar flares and prominences looping into space. A star truly is the jazz musician of the universe.

Physicists, too, describe physical properties with analogies of music to relate the complicated physics interactions to the lay scientist. In an interview with a superstring physicist Edward Witten, he was asked the question "are there many different types of string?" His response was as follows.

"There are a few possible string theories, but in most of the string theories there is basically one kind of string. You see, one kind of string can execute many different kinds of motion. If you think about a violin, a violin string when you play on it can vibrate at many different frequencies, called harmonics. The different harmonics of the violin string are essential to the richness of the sound, and that's the reason that different musical instruments sound different, even if you play the same note. You can play C on a piano or on a violin, and it will sound quite different because the same string can vibrate in different ways with different harmonics. The different instruments produce the different harmonics in different proportions.

"In the case of a violin string, the different harmonics correspond to different sounds. In the case of a superstring, the different harmonics correspond to different elementary particles. The electron, the graviton, the photon, the neutrino and all the others, are different harmonics of a fundamental string just as the different overtones of a violin string are different harmonics of one string."

A theoretical physicist, Saul-Paul Sirag from Eugene, Oregon, discusses the harmonics of quantum gravity and superstrings in ten dimensional physics, in an article called "Hyperspace Crystallography."

"The most startling thing about this [superstring] theory is that it works only in 10 dimensions—9 of space, and 1 of time. This means that everything in the world from electrons to galaxies must be described as vibrations of extremely tiny circles, which are not only vibrating but also rotating and bumping into each other and joining to make

bigger circles and then breaking apart—joining and breaking, joining and breaking—making intricate patterns as they go. Keep in mind that this is all going on in a 9d space, so that all the movements—the vibrations, rotations, joinings and breakings—are extremely complicated and rich in harmonics. If guitar strings can make wonderful music in 3d space, how awesome must be the "string music" of 9d space!"

In this essay, we have discussed some of the properties and associations with their connection to space. On this planet, human brain's share the ability to identify the sound of musical harmonies. We wonder about beings of other worlds in space and whether or not they would share the splendor of music. Consequently, the builders of the spacecraft that traveled beyond the solar system placed a musical record on the craft as a greeting of peace to any intelligent being that discovers it.

The incredible Voyager 2 spacecraft carried a gold plated 33-1/3 record as it made the ring plane crossing of Saturn. The record was covered in an aluminum jacket, as a greeting to anyone that might discover the spacecraft a million years into the future. The record would tell extraterrestrials of the Earth, its people, and the builders of the spacecraft.

There were some complaints about the record by Astronomer Royal Sir Martin Ryle. He was concerned that the Voyager record would reveal our location to extraterrestrials in the galaxy. They should be able to figure out the craft's origin by its orbit, and wouldn't need a record...

The Voyager record contains sounds of the Earth, sixty different language greetings, the President and Secretary General of the UN, and ninety minutes of the world greatest music. Indian drumming and chanting, oriental music, Mozart's magic flute, Dark is the Night, and Johnny B. Goode are some of the classic pieces. A few of the team members who worked on the record were Carl Sagan (team leader), Frank Drake, Timothy Ferris, Murray Sidlin, Linda Sagan, and others. Their spartan budget, \$18,000, was about the same as that to produce a popular 45 rpm record. The last thing they did before they placed the record on the spacecraft was to carve this greeting on the inner label.

"To the Makers of Music—All Worlds, All Times"



REFERENCES

- 1) *A Theory of Everything?* Edited by P.C.W. Davies and J.Brown (Cambridge, 1988).
- 2) Proceedings of the Fourth International Symposium on New Energy, Denver, Colorado, May 23-26, 1977)
- 3) Milton, a contemporary of Bach, 1671 Paradise Lost, Jesus and the Devil compete for man's soul
- 4) Pythagoras' comma

**OMSI - Astronomy Day Celebration
April 20th, 2013**

On Saturday April 20, OMSI, Rose City Astronomers and Vancouver Sidewalk Astronomers will celebrate Astronomy Day with a free Star Party at both [Rooster Rock](#) State Park and [Stub Stewart](#) State Park! From beginners to experts of all ages, here's your opportunity to view the stars and other celestial objects up close and personal through telescopes. Viewing highlights includes the planet Jupiter and Saturn, waxing gibbous moon, Beehive star cluster and more! Also the ISS should be passing over twice during the viewing! On the scheduled day of each OMSI Star Parties, it is suggested that interested visitors call the OMSI Star Parties Hotline, 503 797-4000 Press #3 then #5, or check the OMSI Star Parties web site for possible [weather](#)-related cancellations. The event starts at sunset and is free with \$5 parking per vehicle. Warm clothing and a flashlight with red light are recommended. Personal telescopes and binoculars are welcome.

See <http://omsi.edu/starparties> for more information or cancellations.

**Maupin Star Party
April 12-14, 2013
May 3-5, 2013**

The Rose City Astronomers have been granted permission to use private property approximately 8 miles West of the town of Maupin for members-only scheduled Star Parties.

The Maupin Observing Site is located on a private airstrip about 8 miles east of Maupin, Oregon. Warning: this airstrip is used in the morning, but at the far end of the airfield. Most people don't even wake up.

There is no registration for the event itself, just show up and enjoy the weekend. You don't even need a telescope to participate; other members are enthusiastic to share their views. This is a good opportunity for beginners to get acquainted and seasoned observers to get some serious observing.

It can always be cold at night no matter what the season, so bring warm clothing.

RVs, trailers and tents will be allowed on the observing site (see observing site map for instructions). The town of Maupin offers lodging, restaurants and recreation if you don't want to rough it. We will have a portable outhouse on site.

More information can be found on the RCA website: <http://www.rosecityastronomers.org/sp/maupin.htm>



**Kah-Nee-Ta Star Party
May 10-12, 2013**

You don't even need a telescope to participate; other members are enthusiastic to share their views. This is a good opportunity for beginners to get acquainted and seasoned observers to get back into the groove. We look forward to seeing you there!

Known for its clear, dark skies this time of year, the Kah-Nee-Ta Resort offers a family retreat atmosphere with many amenities and activities. Come and observe your favorite objects under Central Oregon's clear dark skies, spend a wonderful weekend with other astronomers swapping observing stories and exchanging information, or even just spend a relaxing weekend with your family, all in comfortable accommodations that offer various other activities. RCA Special Hotel Rate is \$90 per room per night (RCA Special Hotel Rate is \$90 per room per night, Plus \$10.80 tax (12%) per room per night, Plus \$10 Resort Fee per room per night, Total with fees is \$110.80 per room per night), advance reservations highly recommended! Deadline for the special rate is April 10th.

You must CALL to make your own reservations and be sure to mention that you want the RCA rate Group ID #25J3DM. The special rate is NOT available online. 1-800-554-4786

RCA is NOT responsible for your reservations or your deposit with the resort. No Refunds within 72 hours of your first reserved night.

More information can be found on the RCA website: <http://www.rosecityastronomers.org/sp/kahneeta.htm>

Haggart Observatory Public Nights

Through a partnership with Clackamas Community College, the Rose City Astronomers (RCA) maintains the Observatory and coordinates public access to the Observatory. During 2013, we have scheduled several Public Nights at the Observatory. We invite those interested to visit the Haggart Observatory webpage at: <http://www.rosecityastronomers.org/sp/haggart.htm> to find out dates and times for these sessions.

Star Parties Coming Soon in 2013!






Prineville Reservoir Star Party	May 18
OMSI Planet Parade Star Party	May 25
Rooster Rock Dark Sky Star Party	Jun 01
Maupin Dark Sky Star Party Weekend	Jun 07-09
OMSI Summer Solstice Star Party	Jun 15
Golden State Star Party	Jul 06-09
Trout Lake Star Party	Jul 12-14
OMSI Lunar Viewing Star Party	Jul 20
Oregon Star Party	Aug 6-11
Skyview Acres Star Party	Aug 7-11
OMSI Perseid Meteor Watch	Aug 12

Astrophoto of the Month



M10 - Ken Hose
Captured in 2009 in Wilsonville
12.5" RCOS
16 minutes of RGB exposure

APRIL 2013

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1 7pm Board Meeting OMSI Classroom 1	2	3 	4	5 Camp Hancock Star Party	6 Haggart Observatory Public Night Camp Hancock Star Party
7	8	9	10  7pm Astro Imaging SIG Beaverton Library	11 See website for Downtowners location address 	12 Noon Downtowners Luncheon E-San Thai Maupin Star Party	13 Maupin Star Party
14	15 7:30pm General Meeting OMSI Auditorium	16	17 7pm Cosmology SIG	18 	19	20 OMSI Star Party
21	22	23	24	25 	26	27 10am - 3pm Telescope Workshop
28	29	30				

May 2013

May 03	Friday	Downtowner's Luncheon	Kell's	Noon
May 03-05	Fri-Sun	Maupin Star Party	Wapinita Airstrip Near Maupin OR	
May 06	Monday	Board Meeting	OMSI Classroom 1	7pm
May 08	Wednesday	Astro-Imaging SIG	Beaverton Public Library	7pm
May 10-12	Fri-Sun	Kah-Nee-Ta Star Party	Kah-Nee-Ta Resort	
May 18	Saturday	Haggart Public Night	Haggart Observatory	Dusk
May 20	Monday	New Members SIG	OMSI Planetarium	6:30pm
May 20	Monday	Astronomy Fair	OMSI Auditorium	7:30pm
May 22	Wednesday	Cosmology SIG	Firland Apartments Community Room <i>*New Location</i> 8036 SE Raymond St., Portland, OR 97206	7pm
May 25	Saturday	Telescope Workshop	Technical Marine Service Building	10am-3pm
May 25	Saturday	OMSI Star Party	Rooster Rock and Stub Stewart State Parks	Dusk

<http://www.rosecityastronomers.org>

Rose City Astronomers
Oregon Museum of Science and Industry
1945 SE Water Ave
Portland, OR 97214-3356

The Rosette Gazette

Volume 26, Issue 5

Newsletter of the Rose City Astronomers

May, 2013



Astronomy Fair and Swap Meet

The RCA General Membership meeting on May 20th will feature the Club's annual Astronomy Fair. This is an opportunity for members and the general public to learn about the many programs and activities of the RCA, as well as participate in hands-on demonstrations and instructions on common telescope usage and maintenance.

The event will be held at OMSI and is open to the general public, and especially anyone with an interest in learning more about telescopes and astronomy. Doors open at 7:00 p.m. with activities and demonstrations from 7:30 - 9:00 p.m.

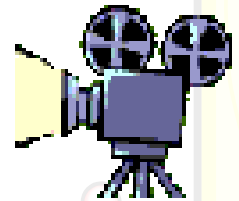
The Rose City Astronomers is one of the largest amateur astronomy clubs in the country, with an active year-long calendar of observing, lectures and special interest groups.



The Astronomy Fair will also feature a Swap Meet for members to liquidate surplus equipment and acquire other stuff.

Officers, program directors and SIG leaders will be on hand to answer questions about their activities and help connect you to whatever advice or resources you might need. Here is the schedule for the evening:

- 6:30 New Members Meeting (Planetarium)
- 7:00 Exhibitors and swap meet start set up (Auditorium)
- 7:30 Exhibitors and swap meet open
- 7:45 Announcements
- 8:00 Main Stage Demonstration: Telescope Collimation
- 8:00 Screening & discussion of Losing the Dark - a short video produced by the International Dark-Sky Association
- 8:15 Screening & discussion of Losing the Dark - a short video produced by the International Dark-Sky Association
- 8:30 Main Stage Demonstration: How to set up a DSLR camera on a German-equatorial mount
- 8:30 Screening & discussion of Losing the Dark - a short video produced by the International Dark-Sky Association
- 8:45 Screening & discussion of Losing the Dark - a short video produced by the International Dark-Sky Association
- 9:00 Meeting Adjourned



In This Issue:

- 1....General Meeting
- 2....Club Officers
-Magazines
-RCA Library
- 3....RCA Board Minutes
- 4....Special Interest Groups
- 5....Star Parties
- 6....The Observers Corner
- 8....The Magnificent Deep-Sky of Corvus
- 12...Planets Amidst the Noise
- 14...Calendars



RCA is a member of the Astronomical League.
<http://www.astroleague.org>

All are Welcome! Monday May 20th
New Members Meeting: 6:30pm, OMSI Planetarium
Astronomy Fair Begins: 7:30 pm, OMSI Auditorium

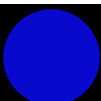
©Copyright 2013 The Rose City Astronomers All Rights Reserved.
Trout Lake Star Party photo above courtesy Michael Minnhaar
Moon photos below courtesy David Haworth

New Moon
May 09

First Quarter Moon
May 17

Full Moon
May 24

Last Quarter Moon
May 31



CLUB OFFICERS

Office	Name	Email
President	David Nemo	president@rosecityastronomers.org
Past President	Sameer Ruiwale	pastprez@rosecityastronomers.org
VP Membership	Ken Hose	membership@rosecityastronomers.org
VP Observing/Star Parties	Vacant	observing@rosecityastronomers.org
VP Community Affairs	Jim Higgs	community@rosecityastronomers.org
VP Communications	Mark Martin	communications@rosecityastronomers.org
Treasurer	Larry Godsey	treasurer@rosecityastronomers.org
Secretary	Duncan Kitchin	secretary@rosecityastronomers.org
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Newsletter Editor	Scott Kindt	editor@rosecityastronomers.org
Media Director	Diana Fredlund	media@rosecityastronomers.org
New Member Advisor	Howard Knytych	newmembers@rosecityastronomers.org
Webmaster	Larry Godsey	webmaster@rosecityastronomers.org
ALCOR	Ken Hose	alcor@rosecityastronomers.org
Library Director	Jan Keiski	library@rosecityastronomers.org
Telescope Director	Dave Horne	telescope@rosecityastronomers.org
Observing Site Director	David Nemo	sitefund@rosecityastronomers.org
IDA Liaison	Dawn Nilson	ida@rosecityastronomers.org
OMSI Liaison	Jan Keiski	omsi@rosecityastronomers.org
Magazines Director	Larry Godsey	magazines@rosecityastronomers.org
SIG Director	Vacant	sigs@rosecityastronomers.org
Youth Programs Director	Kathy Kornei	youth@rosecityastronomers.org
Sister Club Liaison	Jan Keiski	sisterclubs@rosecityastronomers.org
Haggart Obs. Coordinator	Rusty Baumberger	haggart@rosecityastronomers.org

RCA MAGAZINE SUBSCRIPTIONS

One of the benefits of RCA Membership is a reduced rate subscription to Sky & Telescope and Astronomy magazines.

The RCA member rate for Sky & Telescope Magazine is \$33 for one year or \$66 for two years. The RCA member rate for Astronomy magazine is \$34 for one year or \$60 for two years. For more information and payment options please see the website.

<http://www.rosecityastronomers.org/mags/index.htm>

Larry Godsey <magazines@rosecityastronomers.org>



RCA LIBRARY

The Rose City Astronomers maintains a comprehensive club library of astronomy related articles, books, CDs and videos. These items can be borrowed by members through checkout at the general meetings for a period of one month with renewals available by phone or e-mail to the club library director. The RCA library is constantly growing through many donations and the purchase of new materials. A listing of library materials (PDF format) can be found at the library web page.

<http://www.rosecityastronomers.org/library.htm>

Jan Keiski <library@rosecityastronomers.org>

Minutes of the Rose City Astronomers Board March 4th

Held at OMSI Classroom 1

Chair : David Nemo
Secretary : Duncan Kitchin



Board Members Present

David Nemo (President)
Ken Hose (VP Membership)
Mark Martin (VP Programming)
Jim Higgs (VP Community Affairs)
Steve Jaynes (VP Observing)
Larry Godsey (Treasurer, Webmaster, Magazine Sales)
Duncan Kitchin (Secretary)
Diana Fredlund (Media Director)
Howard Knytych (New Member Advisor)
Jan Keiski (Library Director, OMSI & Sister Club Liaison)
Sameer Ruiwale (Past President)
Scott Kindt (Newsletter Editor)
Peter Abrahams (Guest)
Katherine Kornei (Guest, subsequently appointed as youth director)

Call to Order

The meeting was called to order at 7:00pm by David Nemo and, there being 12 board members present, the quorum requirement of 9 was declared to be met.

Approval of Agenda

The agenda was approved by unanimous consent

Approval of Minutes

Moved: Approve minutes from the February 2013 board meeting. Moved: Duncan Kitchin. Second: Mark Martin. Motion passes 12-0-0.

Officer Reports

President (David Nemo): <report not captured>
Secretary (Duncan Kitchin): Minutes adopted from the February meeting as noted.
Treasurer (Larry Godsey): <report not captured>
VP Programming (Mark Martin): Mark has been getting ready for the Discovery Channel telescope event. Everything has been tested in the auditorium with Jim Todd and appears to be working. David Grinspoon is our July speaker; some details are still being worked out. Mark also is looking into setting up another SkyTools class.
VP Observing (Steve Jaynes): There is a Maupin star party this weekend, followed by an OMSI star party at Rooster Rock on March 23rd, and Camp Hancock star party in the first weekend of April.
VP Community Affairs (Jim Higgs): No nighttime events in February. There is an event at Scappoose High School scheduled in March, date TBD. A senior home has also asked for a night of observing, to be arranged

some time in March. Also during February, Howard Knytych taught a session at the Washington County museum, and Katherine Kornei has visited four elementary schools.

VP Membership (Ken Hose): We had 11 new members join and 8 renewals in the past month, bringing the total membership to 345 families, compared to 341 this time last year and 323 the year before that. Total of \$595 brought in in membership dues. ALCOR: one award certificate has arrived from the astronomical league for the Lunar program.

Discussion Items

Youth Program. Memorandum presenting a youth program proposal, drafted by David Nemo, Jim Higgs and Mark Martin circulated at the meeting. Set of objectives discussed, based on the draft presented. Discussion on age groups, specifically what we can support, and what should we initially target. Straw poll taken of options for age groups suggests that the sense of the board is to focus on 5th to 8th grade. Astronomy Academy concept – this is intended to create a more structured curriculum; there is a point of completion of a set of classes. In addition, there is a proposed telescope making component. Katherine (now appointed as youth director) will continue to work on the proposal. Aim to make a short presentation to the membership in April, and have some details ready for the info fair in May.

Action Items (Requiring Decision)

Youth Director Appointment. Motion to appoint Katherine Kornei as youth director. Moved: David Nemo.
Second: Sameer Ruiwale. Motion approved 12-0-0.
Delete SIG Director Position From Board. This is included in the bylaws, so cannot be deleted without an amendment. Table this for now.

Director Reports

New Members (Howard Knytych): New member meeting this month. Subject will be a Messier marathon and comets.
Media (Diana Fredlund): News release will go out this week for the next general meeting. There was also a news release sent out concerning the Haggart Observatory.
Merchandise Sales (Herry Tedja): Not present, but report received: \$517 brought in in sales this month.
Book Library / OMSI / Sister Clubs (Jan Keiski): Library Nominal. OMSI has star parties at Rooster Rock and Stub Stewart in March. GAMA have cancelled their Messier marathon for this month because the road has been washed out.
Telescope Library (David Horne): Not present
IDA (Dawn Nilson): Not present.
Magazine Subscriptions (Larry Godsey): Nominal
Webmaster (Larry Godsey): Nominal.
Observing Sites (David Nemo): Looking at several sites in western Washington. Purchasing digital setting circles for the telescope at the Haggart Observatory, to be

reimbursed by the college.
 Youth Program (Vacant): Already discussed.
 Newsletter Editor (Scott Kindt): Newsletter will be published shortly.

SIGs (Vacant): Discussion about projectors: many of the SIGs have a requirement for a projector at various times. Motion: authorize Larry Godsey to research and buy a projector up to \$500. Moved: David Nemo. Second: Duncan Kitchin. Motion approved by unanimous consent.

Old Business

No items

New Business

No items

Other Business

Starlight Parade application has been submitted. Sameer is waiting for a response. No plans to change the design of the float from last year. Sameer will coordinate volunteers.

Adjournment

There being no further business, the meeting was adjourned at 9:00pm

New Telescope Check Out Policy

Due to the popularity of checking out telescopes during the summer months and to cut down on issues during check out/in at the monthly meetings, the telescope library has implemented a new system.



This check out policy is effective from May through October: During the viewing season, requests to check out telescopes must be received by email not later than the Thursday of the week prior to the Monday night Meeting. This will give me enough time to confirm availability and prepare it for check out. All loaned telescopes must be returned at the next general meeting. If you wish to check the telescope out for an additional month you must contact the telescope librarian no later than the Thursday prior to the general meeting to determine if the telescope is available for the next month.

Please email me at telescope@rosecityastronomers.org.

Thank you for your patience.

David Horne
 Telescope Librarian

Special Interest Groups

Astro-Imaging Special Interest Group

When: Wednesday, May 8th, 7pm
 Wednesday, Jun 12th, 7pm
 Location: Beaverton Public Library
 12375 SW 5th St - Beaverton

SIG Leader: Greg Marshall
 Email: ai-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/astroimage.htm>

Youth Program

When: In Process, Details to follow
 Location: In Process, Details to follow

Leader: Kathy Kornei
 Email: youth@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/youth.htm>

Downtowners Luncheon

When: Friday, June 7th, Noon
 Location: Abu Rasheed
 1921 SW 6th Ave Portland

SIG Leader: Margaret Campbell-McCrea
 Email: downtown-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/downtowners.htm>

Note different meeting location and day for this month.

New Members Special Interest Group

When: Monday, May 20th, 6:30pm
 Location: OMSI Planetarium
 Topic: TBD

SIG Leader: Howard Knytych
 Email: newmembers@rosecityastronomers.org
http://www.rosecityastronomers.org/sigs/new_members.htm

Telescope Workshop

When: Saturday, May 25th
 10:00am - 3:00pm
 Location: Technical Marine Service, Inc.
 6040 N. Cutter Circle on Swan Island-Portland

SIG Leader: John DeLacy
 Assistant: Don Peckham
 Email: tw-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/tmw.htm>

Astrophysics / Cosmology SIG

When: Wed, May 22nd, 7pm
 Topic: TBA

Presented by: TBA
 Location: 8012 SE Raymond St., Portland, OR 97206
 SIG Leaders: Lamont Brock, Viktors Berstis
 Email: cosmology-sig@rosecityastronomers.org
www.rosecityastronomers.org/sigs/cosmology.htm

Note New Address See website for map

OMSI - Star Parties
May 25th, 2013 - Planet Parade
June 15th, 2013 - Summer Solstice Celebration

On Saturday May 25, and June 15th, OMSI, Rose City Astronomers and Vancouver Sidewalk Astronomers will celebrate Astronomy Day with a free Star Party at both [Rooster Rock](#) State Park and [Stub Stewart](#) State Park! From beginners to experts of all ages, here's your opportunity to view the stars and other celestial objects up close and personal through telescopes. Viewing highlights includes Jupiter, Venus, Saturn, the Moon and more!

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See <http://omsi.edu/starparties> for more information or cancellations.

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June 7-9, 2013

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It can always be cold at night no matter what the season, so bring warm clothing.

RVs, trailers and tents will be allowed on the observing site (see observing site map for instructions). The town of Maupin offers lodging, restaurants and recreation if you don't want to rough it. We will have a portable outhouse on site.

More information can be found on the RCA website: <http://www.rosecityastronomers.org/sp/maupin.htm>



Rooster Rock Star Party
June 01, 2013

This is an RCA member star party and is not one of the OMSI public star parties.

There is no registration for RCA star parties at this location, just show up and enjoy the evening. You don't even need a telescope to participate; other members are enthusiastic to share their views.

The exit gate will be left open for us all night. There is a security guard onsite that will be checking during the night while we are there.

This is a day-use only park and there is no viewing at this park outside of RCA or OMSI scheduled star parties.

Rooster rock does have public restroom, drinking water, sidewalk, plenty of parking, and trails.

Rooster Rock State Park is located east of Troutdale.

At the I-205 and I-84 junction take I-84 East towards The Dalles - 16 miles - then take exit 25 into Rooster Rock State Park.

http://www.rosecityastronomers.org/sp/r_rock_rca.htm

Haggart Observatory Public Nights

Through a partnership with Clackamas Community College, the Rose City Astronomers (RCA) maintains the Observatory and coordinates public access to the Observatory. During 2013, we have scheduled several Public Nights at the Observatory. We invite those interested to visit the Haggart Observatory webpage at: <http://www.rosecityastronomers.org/sp/haggart.htm> to find out dates and times for these sessions.

Star Parties Coming Soon in 2013!

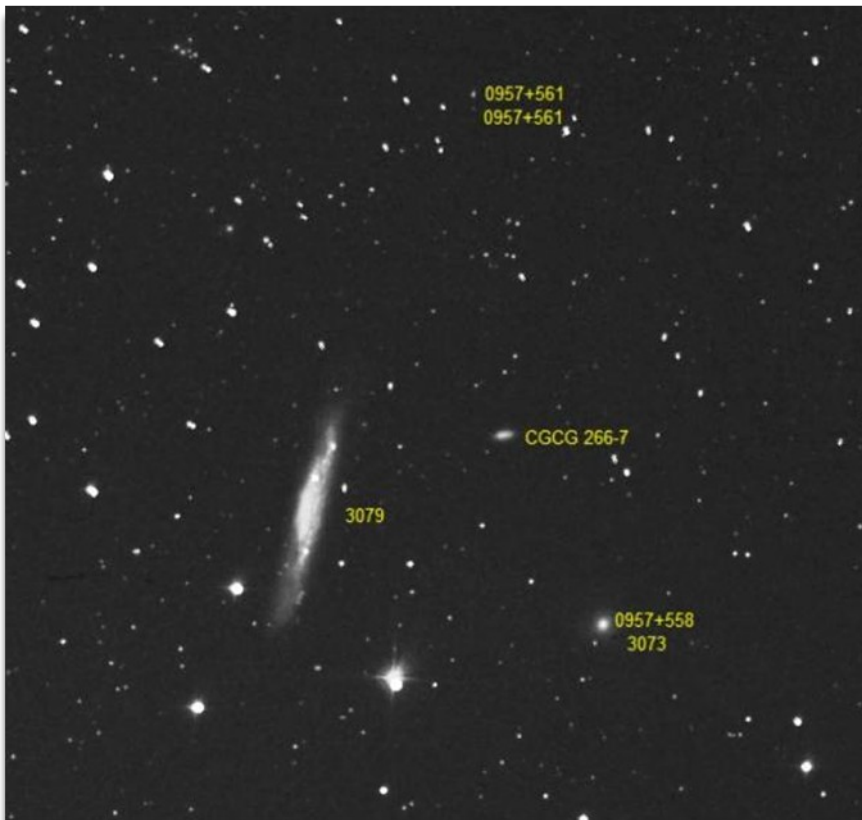
Prineville Reservoir Star Party	July 3
Golden State Star Party	Jul 06-09
Trout Lake Star Party	Jul 12-14
OMSI Lunar Viewing Star Party	Jul 20
Oregon Star Party	Aug 6-11
Skyview Acres Star Party	Aug 7-11
OMSI Perseid Meteor Watch	Aug 12
Stub Stewart Star Party	Aug 31
Sunriver Star Party	Sep 4-8
Maupin Star Party	Sep 6-8
OMSI Autumnal Equinox Celebration	Sep 21



NGC 3079 and the Double Quasar

If you like to observe edge on galaxies there's one in Ursa Major you may not have seen – NGC 3079. As a bonus, there are two small companion galaxies in the same field of view, and the three of them serve as the gateway to the exotic Double Quasar.

3079 is only a notch below the nearby edge on galaxies M82 and M108. NGC 3079 is listed at magnitude 11.7, which is nearly a magnitude brighter than the much more famous edge on galaxy, NGC 4565. So if you've enjoyed observing the justly famous M82, M108 and NGC 4565, you'll also like 3079.



The two close companion galaxies are grouped together with 3079 to form a relaxed triangle, with NGC 3073 being the brighter of the two at magnitude 13.5. It has a lovely stellar core that stands out well when the seeing is steady. CGCG 266-7 is magnitude 14.6 and has only a slight brightening toward its center, making it a difficult object in less than dark and transparent skies. Both are elliptical galaxies and appear much smaller than 3079, but are close enough together to fit in the same medium power field of view.

After observing 3079 for a while you may notice that it has a gentle, bow-like shape, a slight complex curve that appears best with averted vision. It doesn't have a condensed core or other bright areas along its length that I've been able to see.

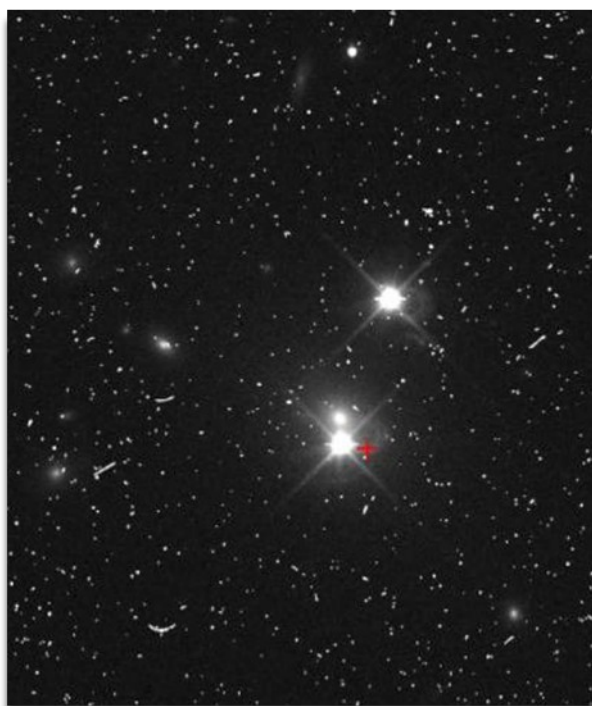
Photos show a low contrast dust lane curving along the central area of the galaxy. I haven't seen the dust lane yet but the ends gradually taper away and are difficult to pinpoint where they end. With averted vision this galaxy will appear to grow in length. I made my sketch at 408x with my 28 inch scope.

To me, however, the best part about this area of the sky is the Double Quasar, Q0957+561 A and B. Discovered in 1979 from Kitt Peak, the DQ is the first example of two images of the same object formed by a gravitational lens, in this case an intervening galaxy that's about 4 billion light years away and part of a galaxy cluster. The raw HST image below shows the two quasar images (the two brightest "stars") and the lensing galaxy, along with part of the galaxy cluster. The red + is part of the image, not sure what it indicates.

The A quasar component is on the upper right center in the HST image, and the B component just below the bright lensing galaxy. The short streaks scattered about are cosmic rays that hit the HST detectors during the exposure.

Amazingly, both gravitational images of the quasar and the lensing galaxy have been seen by visual observers. I've not seen the lensing galaxy, at least not yet, but it's cool to know a visual sighting is possible.

Light from the quasar started its journey approximately 7.8 billion years ago, more than half the age of the universe. To be able to detect anything at all from that distance and time is incredible, and I get chills every time I see its gravitationally doubled image. It looks just like a 16.7 magnitude double star with a 6 arc second separation. The magnitude varies slightly over time, and the light from lensed A image reaches us about 417 days earlier than lensed B image because of the geometry of the lensing galaxy and the galaxy cluster it's a part of. How cool is that?

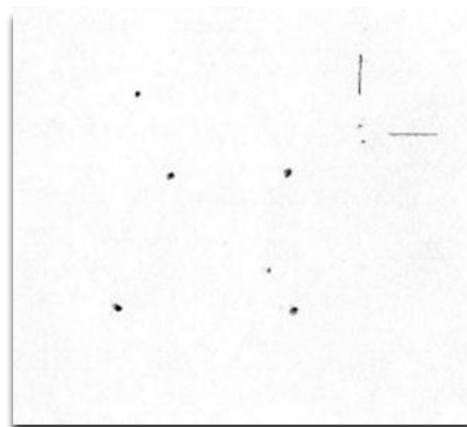


The best view I've had of the two quasar images was last April from Likely Place RV in northeastern California. Make no mistake, they're a tough object and just seeing the two images of the quasar as a faint blur is doing pretty well on most nights. Last April I was lucky to get a night that was not only dark and transparent, but also had steady seeing. Jackpot! I was able to resolve both components quite well but still needed averted vision for the best view. High power was essential and I found 695x gave the best view. Some observers have split the DQ with scopes as "small" as 12 inches, so you don't need a huge scope to give it a shot.

As you can see in the DSS image at the beginning of this article, the star hop from NGC 3079 to the DQ is pretty short due north. The position of the DQ is easy to find because of a distinctive, Hercules keystone type asterism that is seen in the DSS photo and my

sketch. Knowing exactly where to look is often the difference between seeing something and nothing at all, and this is a good case in point.

Perseverance will help too. It's likely that it will take several attempts before you see something but repeated attempts should eventually pay off. There are few objects within reach of amateur size telescopes that offer the chance to see photons that are over half the age of the universe so, if you find that exciting, it's more than worth the extra effort.



THE MAGNIFICENT DEEP-SKY OF CORVUS

Apollo's raven messenger harbors a large number of celestial treats.

By John W. Siple

Legends from ancient Greco-Roman history single out Corvus as the feathered consort of Apollo, worshipful god of light and music. According to a popular myth, the crow was sent to retrieve a cup of water for Jupiter's court but instead flew into the branches of a fig tree, eating fruit as it slowly ripened. Returning late with the needed spring water, Corvus

of pure liquid from Crater's now forbidden cup. The sly bird's ivory apparel was transfigured black, final judgment for its misguided deed. Atlases commonly show ill-fated Corvus pecking in mock frustration on the snake's curved body.

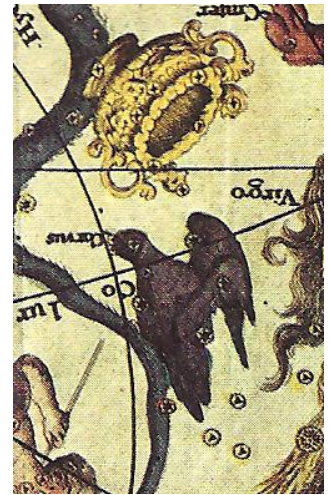
For actual stargazers, its four brightest members, of third magnitude, form a distinctive trapezoid southwest of Spica. Hydra scoots di-

but to the trained or experienced eye, Corvus is valued for a different reason—it's an adventuresome kingdom filled with imposing, spatially odd galactic and extragalactic treats.

One of the most prized sights is NGC 4038/39, described by astrophysicists as a titanic collision between two distant island universes. Computer modeling indicates that the "Ring-tail's" bizarre appearance (see the photograph at left) may be a future copy of our own Milky Way's oblivion, when looming tidal interaction with the Andromeda Galaxy completely scrambles both Local Group systems.

Moving above the raven's dominant four-star pattern and toward Virgo's boundary in the northeast produces more strange deep-sky artifacts; the "Stargate," consisting of dual starry triangles; M104, or the famous "Sombrero," an especially nice rift galaxy; and a whimsical mélange of starlight known as "Jaws" whose members point directly at the Sombrero galaxy's dark central band.

Two highly popular, stylish



Corvus is shown piggybacked on Hydra in this old sky map.

instruments offered the author charming insights into this nocturnal wonderland's alluring deep-sky magic. A classical, first rate 3.1-inch (80mm) f/11.4 equatorial refractor telescope, chosen from Celestron's diverse lineup, spotted the constella-

Celestron's Firstscope 80EQ was used for several of the needed deep-sky observations.



An incredible amount of detail is visible in this image of the interacting galaxy pair NGC 4038/39 (also known as the Ring-tail or Antennae). Courtesy of NASA/ESA/Hubble Heritage Team/STScI/AURA.

contrived an encounter with the deadly serpent Hydra as reason for its tardiness.

Receiving harsh punishment, Apollo's winged storyteller was placed among the stars, eternally after a sip

rectly below, while Crater dangles nearby in the west.

The small southerly constellation may evoke images of multiple star systems, distant galaxies, and hazy nebulae to the new observer,

tion's brightest showpieces, while discerning intricate detail in dimmer objects was relegated to the robust optics of an Obsession 15-inch f/4.5 "light bucket."

Both commercial telescopes are the handiwork of skilled professionals. Celestron's sleek achromatic refractor (Model #21070) is made in China, while the companion reflector with its custom mirrors and sturdy woodcraft is a fine product of America's heartland. Dedicated stargazers are offered supreme viewing pleasure in two beautifully conceived and functional engineering packages.

Only the slightest optical aid is needed to split the unequal pair Delta (δ) Corvi, known in Arabian sky lore as "Algorab." It marks the northeastern corner of the naked-eye asterism, and has a 3.0-magnitude primary married to a 9.2-magnitude star 24" to the southwest.

To the author Algorab seems most lovely in the Celestron telescope at 35X—though when viewed through the 15-inch Dobsonian and a medium power eyepiece, it becomes a blazing, eerie spectacle of lucid purple and saffron stained light. The binary is in rapid movement across our sky, tracing out a distance equal to one full Moon's apparent diameter every 7000 years.

Our next double star, Struve 1669 ($\Sigma 1669$), can be found in a casual sweep along an imaginary bowed line drawn from δ Corvi to the bright Messier galaxy M104. It skips off toward the east, just $1\frac{1}{2}^\circ$ below the Sombrero.

The two gravitationally bound suns are of nearly equal brightness, magnitudes 6.0 and 6.1, bridged

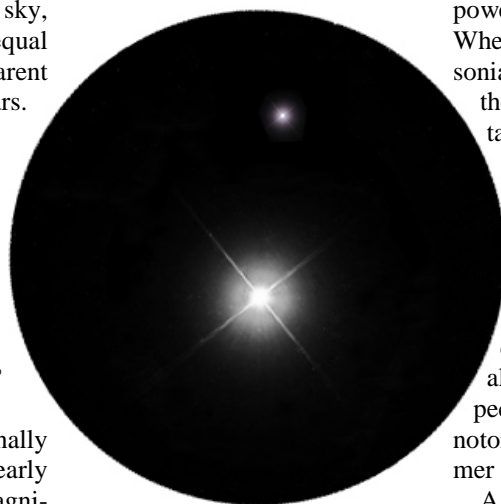
by a tight gap of 5". Careful measurements show a position angle of 311° , meaning the fainter star is locked in orientation northwest of the slightly brighter one.

Occupying the orbital framework is another member 59" distant from the main pair; a dimmer though obvious echo of starlight glowing at 10th-magnitude.

The dominant suns of $\Sigma 1669$ are fetchingly attractive in the Celestron refractor at 130X, their yellowish-white diffraction disks crisply defined by the telescope's superb optics. Obsession's reflector helps to intensify the colors while at the same time broadening the dark space between the two stars.

Corvus' blue ribbon winner in the galaxy category is NGC 4038/39. Observing guides reverently refer to it as the "Antennae" or "Ring-tail." The strange interacting system lies about 90 million light-years away and illuminates its fixed position with the combined light of an 11th-magnitude star.

A simple star-hop to these peculiar galaxies starts at 31 Crateris, an unassuming 5th-magnitude luminary now in the raven's grip but once part of neighboring Crater.



The double star Algorab in Corvus.



NGC 4038/39 is a merging galaxy pair with distorted outlines, colorful star clouds, and long curving tails of matter. The collision has resulted in a profuse amount of star formation. Photograph courtesy of Bob and Bill Twardy/Adam Block/NOAO/AURA/NSF.

Put this stellar landmark off center (east) in a low power eyepiece, and then shift your telescope $\frac{3}{4}^\circ$ northward.

Perhaps the easiest of the two-fold system is the northern half or NGC 4038. At magnitude 10.5 and possessing dimensions 3.4' X 1.7', it is of slightly greater cosmic stature than its attached twin NGC 4039. A visual struggle through the 3.1-inch telescope, they become an observer's dream of mottled grandeur in 8-inch and larger instruments.

The best recipe for seeing buried features is to use plenty of light-gathering power and averted vision. When the 15-inch Dobsonian reflector is applied to the cashew-shape of our target galaxy pair, a complex pond of ebony material fills the inside of the brighter Ring-tail system. The twisted contours of both NGC 4038 and its symbiotic companion assume an almost photographic aspect, albeit missing their notoriously difficult gossamer tails of star stuff.

A trifle bit more challenging is NGC 4027, a lesser

known Sc-type galaxy that glows softly at magnitude 11.1. Possibly related to the now-fabled Ring-tail, this nebulous puff, 3.2' X 2.1' in overall apparent size, lies in the same low power starry field as 31 Crateris.

From a study through the sensitive optics of the 15-inch scope at 286X, an unambiguous one-armed spiral structure emerges along with the presence of a stunted nu-



The one-armed spiral galaxy NGC 4027 lies only 41' southwest of the Ring-tail. Image courtesy of ESO.

clear bar. Keen-eyed observers should also see the whispered ember of a 14th-magnitude star, located about 45" northeast from the galaxy's center and sitting squarely in its outer halo.

Traveling eastward across



The Stargate (Struve 1659)
Multiple star or asterism with six components

Visual data recorded on the night of April 3, 2013
through an Obsession 15-inch f/4.5 telescope

Tele Vue 13mm Ethos eyepiece * 132X * good seeing conditions *
5.4 sky magnitude * 49 degree ambient air temperature * Observing
location in the mid-Willamette Valley of Oregon

The Universe of the Sombrero



A dramatic rift-type galaxy tipped a
mere 6° from our line of sight.

§

Interested amateurs can explore its
depths by first locating the Stargate, then
traveling in a northeastward direction for
70 arc-minutes.

Photograph courtesy of NASA and The Hubble
Heritage Team – STScI/AURA



Adam Block (Mount Lemmon SkyCenter/University of Arizona) imaged NGC 4361's bladed whorls with a 24-inch RC Optical System Telescope and an SBIG STL 11000 CCD astro-camera.

the constellation at about the same declination brings us to NGC 4361. It is an awkward looking, moderately bright misty disk found directly inside the naked-eye quadrilateral of the winged raven, forming an isosceles triangle with Delta (δ) and Gamma (γ) Corvi.

The rotary, non-stellar character can be perceived quite well in the smaller Celestron refractor, but with the increased optics of the 15-inch telescope, morphs into a packet of delightful imagery. When seen under dark, transparent night skies the little gem offers an unusual greenish color, delicate swirling, and an eye-catching 13th-magnitude central star. Reference books list a total magnitude of 10.9 and size of 2.1' for this classic planetary nebula.

Flush against the northern border of Corvus is an alluring trio of off-world abstract shapes—a jumbled collection of geometric beauty and mystery. The highest ranking member is Virgo's NGC 4594 (M104), familiar to observers as the dark brimmed Sombrero galaxy.

Ultra easy because of its 8.0 magnitude and 8.7' X 3.5' sky coverage, it presents a large, bright central bulge split by a black lane of obscuring dust. A heavenly masterwork of tilted spiral

form, the Sombrero galaxy appears as a flattened saucer, not unlike those from a "B-grade Sci-Fi thriller."

Only a hazy ellipse in the Celestron 3.1-inch glass, M104 is a fine sight in the 15-inch reflector at 132x, with prominent rift architecture. And just 24' west-northwest of its elongated spindle is a sprightly asterism known as "Jaws" or "Little Sagitta," a cute, arrow-shaped trail of four 8th- and 9th-magnitude stars.

The final object on our spatial odyssey across Corvus is the unusual multiple star Struve 1659 ($\Sigma 1659$), which amateurs call "The Stargate." It lies only 1.1° west-southwest from M104.

This coincidental group of six stars is a rare example of a triangle-within-a-triangle pattern in the fabric of interstellar space. Both golden-hued triangles—individual magnitudes range from 6.6 to 11.0—are markedly isosceles through both astronomical telescopes.

A delightful brush with the raven's hoard of celestial treasures occurs on April and May nights. Whether using a 3.1-inch or larger instrument, navigating its nest of one-of-a-kind splendors leaves a lasting and valuable impression. Why not call upon its feathered doorstep your next time out?

Planets Amidst the Noise

Tau Ceti's planets were not supposed to be there.

They revealed themselves when Steven S. Vogt, astrophysics professor at UC Santa Cruz, and his collaborators were testing a new noise-analysis method on spectrometer data to calibrate their technique. Indeed, the team of 15 astronomers from seven institutions on four continents had picked Tau Ceti specifically because meticulous observations strongly suggested the star had no planetary system.

From the earliest days of the hunt for exoplanets almost 20 years ago, astronomers suspected that evidence of Earth-like planets might be buried in the noise of spectroscopic measurements of stellar radial velocities (stars' velocities in space toward or away from us). Such noise arises from flares and other activity on a star's surface.

The tiny signal...

Earth-like planets are low mass compared to stars. Even so, planets revolve not around a host star's center (axis of rotation); instead, both star and planets revolve around the planetary system's barycenter (center of mass). Like a smaller boy gamely wrestling a bigger one, the gravitational mass of a planet throws a star's weight around just a little, even though the bigger mass is in control.

The barycenter for our own solar system, for example, slowly wanders from near the center of the Sun to farther than a solar radius above the Sun's surface: when all the planets are on the same side of the solar system as Jupiter, the barycenter is farther from the center of the Sun toward Jupiter than it is when all the planets are on the opposite side of the solar system from Jupiter. In other words, the Sun itself is doing a slow dance like a meandering box step of hundreds of thousands of kilometers around the solar system's barycenter.

In the 1980s, exoplanet hunters began to wonder whether the barycentric wandering of a distant star could betray the existence of planets. Would it be even detectable? Most stars speed toward or away from Earth by 10,000 or more meters per second. A star's barycentric wandering due to the pull from an orbiting Earth-sized planet, however, would speed or slow that RV by under a meter per second, Vogt noted.

But it might be measurable by a precision spectrometer, such as the High Resolution Echelle Spectrograph (HIRES) Vogt had designed, built, and used at Keck Observatory for 20 years. Its 25-megapixel CCD detector measures Doppler shifts of spectral lines finer than 1 part in 300,000,000, a precision of stellar RV to under 1 meter per second.

...amidst stellar "jitter"

Detecting the barycentric wandering of a distant star is a colossal challenge for both measurement and computational analysis. Vogt and his collaborators needed a nearby Sun-like star whose RV had been meticulously measured for years, with no evidence of a planetary system. They needed a bright star to eliminate so-called Poisson noise due to statistical variations in the rate of photons detected. By studying noise signatures from the planetless star, they hoped to learn precise characteristics of noise produced by stellar surface activity—so as to remove its masking of extremely weak variations in a star's RV from the gravitational effect of Earth-sized planets.

Seeming to fit the bill was Tau Ceti, a 3.5-magnitude G8 star about three-quarters the size of the Sun closer than 12 light-years, speeding toward us at 16.4 kilometers per second. Some 6000 precision radial velocities existed in three independent sets of high-precision RV measurements by three different teams, in runs ranging from 6 to 13 years.

Vogt's mathematician collaborator Mikko Tuomi at the University of Hertfordshire developed statistical techniques for analyzing and comparing the three data sets, identifying and removing noise. The goal: to identify variations in signals appearing periodically and simultaneously in all three sets of data (and therefore due to real planetary-induced changes in Tau Ceti's RV) versus variations in only one set of data due to

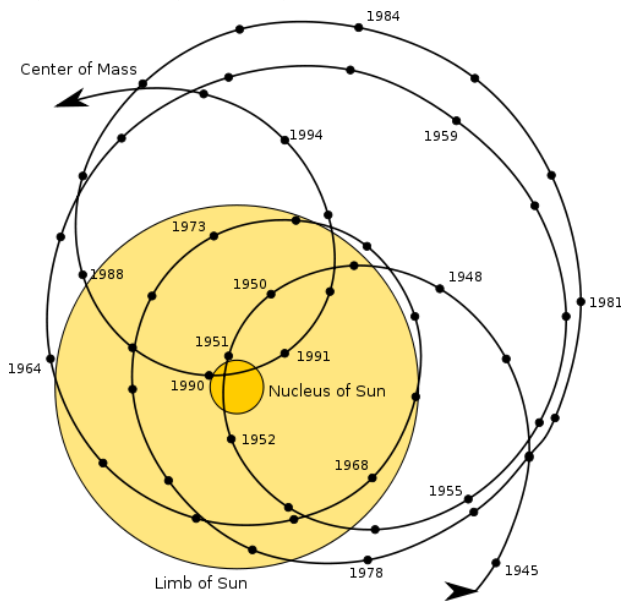
stellar surface activity and/or instrumental errors. Tuomi also developed methods for analyzing the long-term pattern of a star's barycentric motion to calculate number of possible planets, their masses and orbits.

When the group applied the computational techniques to Tau Ceti's runs of spectrometry data as a dry run for the stellar surface noise calibration, "five statistically significant planet -like signals popped out!" Vogt exclaimed. "It was a surprise!" The signals suggested the planets were not much bigger than Earth, with the outermost two *e* and *f* being in the habitable zone where water could be liquid.

The team is now applying their new techniques to runs of RV data for other nearby stars. *—Trudy E. Bell, M.A.*

Further reading: "Signals embedded in the radial velocity noise: Periodic variations in the τ Ceti velocities" *Astronomy & Astrophysics* 551: 79, March 2013, <http://arxiv.org/abs/1212.4277>.

The University of California High-Performance AstroComputing Center (UC-HIPACC), based at the University of California, Santa Cruz, is a consortium of nine University of California campuses and three Department of Energy laboratories (Lawrence Berkeley Laboratory, Lawrence Livermore Laboratory, and Los Alamos National Laboratory). UC-HIPACC fosters collaborations among researchers at the various sites by offering travel and other grants, co-sponsoring conferences, and drawing attention to the world-class resources for computational astronomy within the University of California system. More information appears at <http://hipacc.ucsc.edu>



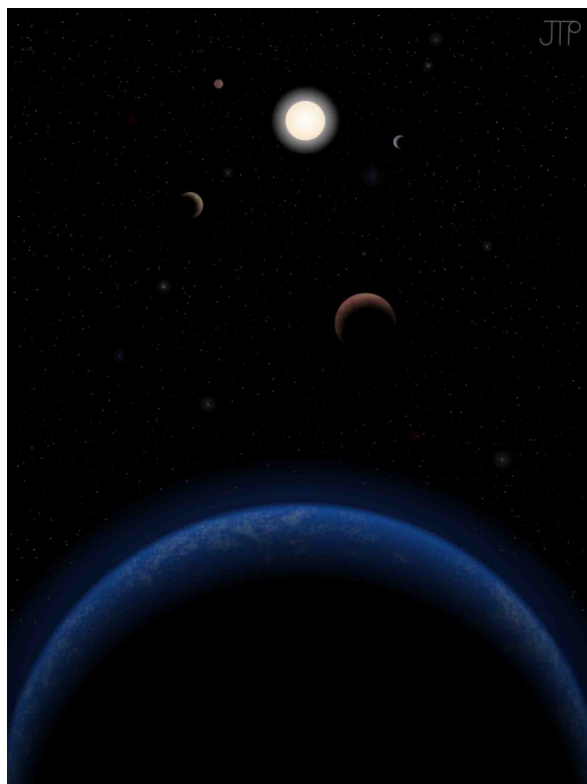
The Sun moves around the barycenter (center of mass) of our solar system, depending on the positions of the planets. Detecting barycentric movement of other stars from precision radial velocity (RV) measurements can reveal the presence of Earth-mass planets; the pattern of movement can reveal number, masses, and orbits.

Credit: Carl Smith, Rubik-wuerfel

http://en.wikipedia.org/wiki/Barycentric_coordinates_%28astronomy%29

Rendering of the Tau Ceti planetary system shows the five planets b, c, d, e, and f, from closest to farthest from the star. All range in mass from 2.0 to 6.6 times the mass of Earth with orbital periods ranging from 13.9 to 642 days. The two outermost planets e and f are at 0.5 and 1.5 A.U. from Tau Ceti.

Credit: J. Pinfield for the RoPACS network at University of Hertfordshire, 2012.



May 2013

May 03	Friday	Downtowner's Luncheon	Maya Taqueria	Noon
May 03-05	Fri-Sun	Maupin Star Party	Wapinita Airstrip Near Maupin OR	
May 06	Monday	Board Meeting	OMSI Classroom 1	7pm
May 08	Wednesday	Astro-Imaging SIG	Beaverton Public Library	7pm
May 10-12	Fri-Sun	Kah-Nee-Ta Star Party	Kah-Nee-Ta Resort	
May 18	Saturday	Haggart Public Night	Haggart Observatory	Dusk
May 20	Monday	New Members SIG	OMSI Planetarium	6:30pm
May 20	Monday	Astronomy Fair	OMSI Auditorium	7:30pm
May 22	Wednesday	Cosmology SIG	Firland Apartments Community Room <i>*New Location</i> 8034 SE Raymond St., Portland, OR 97206	7pm
May 25	Saturday	Telescope Workshop	Technical Marine Service Building	10am-3pm
May 25	Saturday	OMSI Star Party	Rooster Rock and Stub Stewart State Parks	Dusk

June 2013

Jun 01	Saturday	Starlight Parade	Portland	Dusk
Jun 01	Saturday	Rooster Rock Star Party	Rooster Rock	Dusk
Jun 03	Monday	Board Meeting	OMSI Classroom 1	7pm
Jun 07	Friday	Downtowner's Luncheon	Abu Rasheed - 1921 SW 6th Ave, Portland	Noon
Jun 07-09	Fri-Sun	Maupin Star Party	Wapinita Airstrip Near Maupin OR	
Jun 12	Wednesday	Astro-Imaging SIG	Beaverton Public Library	7pm
Jun 15	Saturday	OMSI Star Party	Rooster Rock and Stub Stewart State Parks	Dusk
Jun 17	Monday	General Meeting	OMSI Auditorium	7:30pm
Jun 19	Wednesday	Cosmology SIG	Firland Apartments Community Room <i>*New Location</i> 8034 SE Raymond St., Portland, OR 97206	7pm
Jun 22	Saturday	Telescope Workshop	Technical Marine Service Building	10am-3pm
Jun 22	Saturday	Haggart Public Night	Haggart Observatory	Dusk
Jun 30	Sunday	Astronomy Day	OMSI	1pm-4pm

<http://www.rosecityastronomers.org>

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The Rosette Gazette

Volume 26, Issue 6

Newsletter of the Rose City Astronomers

June, 2013



Answering the Big Questions – SBIG Then and Now

Michael Barber

A product review in the most recent issue of Sky & Telescope Magazine begins with the statement "No name is better known in the world of amateur CCD imaging than SBIG, short for Santa Barbara Instrument Group."



What is not so well known is how the threat of US/USSR nuclear test ban treaty violations and an "Ogre" were crucial to SBIG's beginnings. To fill in some of these interesting details, one of SBIG's co-founders, Michael Barber, will present a talk about SBIG's origins, some milestones in its history and the latest developments in its product line for amateur astronomers, including some demonstration and prototype items.

Michael Barber - Vice President and a co-founder of SBIG. Avid amateur astronomer. Although his previous professional experience was in a different field, from the early days of the group's Gamma Ray Burst research, he has been an active contributor to the design discussions and decision making process for the development of the SBIG products. His ideas to produce the ST-10, the ST-2000 and large format cameras with internal and remote guiding helped start the ball rolling on these popular models

PUBLICATIONS - The Perseus Flasher and Satellite Glints, Astrophysical Journal (320:398-404, 1987 September 1).

AWARDS - Royal Commendation for services in support of scientific education projects of His Majesty King Rama IX of Thailand, 2007

Mike Barber, a co-founder of the Santa Barbara Instrument Group and a lawyer for about 20 years, can obviously feel at home in two separate worlds. Sometimes, he even does it literally. "My wife, Nui, and I currently have a home in Santa Barbara and a home in Thailand, where she was born," he says. "We go back and forth about once each year."

Barber was born in Berkeley, California, and, despite extensive travel through Asia, he's lived in the state all his life. And most of that time he's loved astronomy, thanks to a friend of his grandfather. "One night [the friend] brought over a telescope he made in his garage," Barber says. "I remember seeing the homemade mirror and looking through the eyepiece at Orion and Saturn." Barber's father also played a part in cultivating this interest. "My dad used to take us to [San Francisco's] Morrison Planetarium," Barber says. "It was a real thrill for me to deliver a talk on CCD imaging in that same planetarium many years later!"

All are Welcome! Monday June 17th
Social Gathering: 7 pm. General Meeting Begins: 7:30 pm.
Location: OMSI Planetarium

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Trout Lake Star Party photo above courtesy Michael Minnhaar
Moon photos below courtesy David Haworth

In This Issue:

- 1....General Meeting
- 2....Club Officers
-Magazines
-RCA Library
- 3....RCA Board Minutes
- 4....Special Interest Groups
- 5....Star Parties
- 6....The Observers Corner
- 8....DNA to the Stars
- 12...Youth Astronomy Academy
-Starlight Parade
- 13...Calendars



RCA is a member of the
Astronomical League.
<http://www.astroleague.org>

New Moon
Jun 08

First Quarter Moon
Jun 16

Full Moon
Jun 23

Last Quarter Moon
Jun 30



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RCA MAGAZINE SUBSCRIPTIONS

One of the benefits of RCA Membership is a reduced rate subscription to Sky & Telescope and Astronomy magazines.

The RCA member rate for Sky & Telescope Magazine is \$33 for one year or \$66 for two years. The RCA member rate for Astronomy magazine is \$34 for one year or \$60 for two years. For more information and payment options please see the website.

<http://www.rosecityastronomers.org/mags/index.htm>

Larry Godsey <magazines@rosecityastronomers.org>



RCA LIBRARY

The Rose City Astronomers maintains a comprehensive club library of astronomy related articles, books, CDs and videos. These items can be borrowed by members through checkout at the general meetings for a period of one month with renewals available by phone or e-mail to the club library director. The RCA library is constantly growing through many donations and the purchase of new materials. A listing of library materials (PDF format) can be found at the library web page.

<http://www.rosecityastronomers.org/library.htm>

Jan Keiski <library@rosecityastronomers.org>

Minutes of the Rose City Astronomers Board April 1st 2013

Held at OMSI Classroom 1



Board Members Present

David Nemo (President)
Ken Hose (VP Membership)
Mark Martin (VP Programming)
Larry Godsey (Treasurer, Webmaster, Magazine Sales)
Duncan Kitchin (Secretary)
Diana Fredlund (Media Director)
David Horne (Telescope Librarian)
Jan Keiski (Library Director, OMSI & Sister Club Liaison)
Katherine Kornei (Subsequently appointed as youth director)

Don Peckham (Guest, Telescope Workshop Co-leader)
Viktors Berstis (Guest, Cosmology SIG Co-leader)
Jim Todd (Guest, OMSI)
Rusty Baumberger (Guest, Haggart Observatory Coordinator)

Call Meeting To Order

David Nemo 7:00 p.m.

Determine if Quorum (9) Present

Duncan Kitchin: The meeting has a quorum, with 9 board members present

Approval of Meeting Minutes

Duncan Kitchin: Move to adopt minutes from the March 2013 meeting, as distributed on the forum and subsequently amended and distributed at the meeting. Moved: Duncan Kitchin. Second: Mark Martin. Motion Passes 9-0-0

Officer Reports

7:10 p.m.

President (David Nemo): Nominal

Secretary (Duncan Kitchin): Nominal.

Treasurer (Larry Godsey): Monthly reports distributed. Income and payments, profit & loss statement for the last year. There is a payment for the Haggart observatory of \$741.65 which will be rebated to us by Clackamas Community College. The proposed budget for next year is also attached, for discussion at a future meeting.

VP Programming (Mark Martin): Report posted on the forum. Have been keeping orders open for the speaker's book for this month. Will be sending out an announcement to notify members that the order list will be closing in the next few days so as to submit the order and have books available in time for the meeting. New Mexico Skies will be here in August. Still working on finalizing the July speaker. Also working with Greg Crinklaw to potentially arranging another SkyTools class

some time early next year.

VP Observing (Vacant): No candidate has been identified for this post as yet. We need to find somebody to take care of arrangements for Kah-Nee-Ta. David Nemo is going to contact Sameer Ruiwale to ask for his advice. Mark Martin: issue with obtaining permits at Stub Stewart: currently need to be at the ranger station between 9am and 4:30pm Monday to Friday in order to get a permit. Investigate whether this can be set up electronically. Camp Hancock is this coming weekend. We need to have 12 people attending for 2 nights in order to make our quota; currently only about 8 or 9 signed up. This is a significant reduction in numbers that have been seen in the past. From feedback received, part of this is due to the cost, and part is due to perceived limited availability of space suitable for Dobsonian telescopes. Ken Hose will be the on-site host for this event. Also have a star party at Maupin in two weeks.

VP Community Affairs (Jim Higgs): Not present, but report submitted to forum.

VP Membership (Ken Hose): 14 new members joined this month, with 7 renewals bringing the total to 364 member families, compared to 350 at the same time last year, and 334 the year before that. Brought in a total of \$652 in dues in the last month.

ALCOR (Ken Hose): 2 observing logs received and submitted to the Astronomical League.

Discussion Items

7:30 p.m.

Jim Todd, OMSI 2013-14 OMSI/RCA agreement passed to David Nemo. The agreement is exactly the same as last year's. The agreement will be posted online and acted on at the next meeting. Jim expressed thanks for the continued partnership between RCA and OMSI.

Request for funding from NASA is being drafted for an exhibit outside the planetarium. Looking for partners and advisers; particularly to continue to assist at OMSI star parties, promote awareness and understanding of the night sky, and disseminate information about OMSI events. Jim has drafted a proposed agreement between RCA and OMSI. David Nemo will send a letter of support for this effort on behalf of RCA.

Astronomy day 2013 at OMSI. Sunday June 30th. Astronaut Don Pettit will be at OMSI that day to present. There will be more information forthcoming as details are determined.

Building an observatory with a retractable roof at Camp Hancock. There is a donation of two 16" Meade Magellan telescopes; would like to investigate if this is possible. Will start a discussion on this topic on the forum.

Jim was approached by Cycle Oregon, who would like to hold a star party at the Cycle Oregon event this year. September 10th and 11th at Frenchglen. The organization proposes making a \$500 donation to the club. Would like to have a number of volunteers available with telescopes for the two nights.

We have a Telecoil system available in the auditorium and

the planetarium for hearing aid users. This is tapped directly into the audio system, so it is only necessary to make an announcement that it is available.

Astronomy Day 7:45 p.m. Already discussed earlier, will continue to discuss this at future meetings.

7:50 p.m.

Info Fair: Program. Mark Martin: trying to organize more activities and demonstrations for the info fair this year. Mirror cleaning and collimation demos were very popular last year. David Nemo will send a note to Greg Marshall asking if it would be possible to have some astro-imaging displays or demonstrations. The telescope workshop SIG will investigate setting up cleaning and collimating demonstrations.

Signs. Proposed to have some new signs made for the Astronomy Fair (formerly the Info Fair).

Haggart observatory: need another 6 or 7 volunteers to expand the program and make it more responsive to requests. Have had between 8 and 15 attendees at recent public viewing nights. The Astronomy Fair will present an opportunity to promote this.

Director Reports

8:35 p.m.

Merchandise Sales (Herry Tedja): Not present, but report submitted. Herry may not be able to continue long term because of time constraints. David Nemo is working on this issue to either ease the time commitment or find somebody else to assist. We had \$215 in sales this month. Would also like to get some new merchandise carts; the current carts are a little inadequate for the task. Larry Godsey is looking into this.

Youth Program (Katherine Kornei): Update on the survey: received about 50 responses, with some very good feedback. Have about 15 people who signed up to volunteer in various capacities. Much information received on suitable times, costs and content of the classes. Now have a list of class topics that are generally favored. Working now on reaching out to those who volunteered to help and assembling details of the program. Would like to start in August.

Adjourn

David Nemo 8:58 p.m

Action Items (Requiring Board Decision)

David Nemo 8:30 p.m.

Special Interest Groups

Astro-Imaging Special Interest Group

When: Wednesday, Jul 10th, 7pm

Location: Beaverton Public Library
12375 SW 5th St - Beaverton

SIG Leader: Greg Marshall
Email: ai-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/astroimage.htm>

Youth Program

When: See details in this newsletter

Location: See details in this newsletter

Leader: Kathy Kornei
Email: youth@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/youth.htm>

Downtowners Luncheon

When: Friday, July 12th, Noon
Location: India House
1038 SW Morrison Portland

SIG Leader: Margaret Campbell-McCrea
Email: downtown-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/downtowners.htm>

Note different meeting location and day for this month.

New Members Special Interest Group

When: Monday, July 15 th, 6:30pm
Location: OMSI Planetarium
Topic: TBD

SIG Leader: Howard Knytych
Email: newmembers@rosecityastronomers.org
http://www.rosecityastronomers.org/sigs/new_members.htm

Telescope Workshop

When: Saturday, June 22nd
10:00am - 3:00pm
Location: Technical Marine Service, Inc.
6040 N. Cutter Circle on Swan Island-Portland

SIG Leader: John DeLacy
Assistant: Don Peckham
Email: tw-sig@rosecityastronomers.org
<http://www.rosecityastronomers.org/sigs/tmw.htm>

Astrophysics / Cosmology SIG

When: Wed, June 19th, 7pm
Topic: TBA

Note New Address
See website for map

Presented by: TBA
Location: 8012 SE Raymond St., Portland, OR 97206
SIG Leaders: Lamont Brock, Viktors Berstis
Email: cosmology-sig@rosecityastronomers.org
www.rosecityastronomers.org/sigs/cosmology.htm

OMSI - Star Parties
June 15th, 2013 - Summer Solstice Celebration

On June 15th, OMSI, Rose City Astronomers and Vancouver Sidewalk Astronomers will celebrate Astronomy Day with a free Star Party at both [Rooster Rock State Park](#) and [Stub Stewart State Park](#)! From beginners to experts of all ages, here's your opportunity to view the stars and other celestial objects up close and personal through telescopes. Viewing highlights includes Jupiter, Venus, Saturn, the Moon and more!

On the scheduled day of each OMSI Star Parties, it is suggested that interested visitors call the OMSI Star Parties Hotline, 503 797-4000 Press #3 then #5, or check the OMSI Star Parties web site for possible [weather](#)-related cancellations. The event starts at sunset and is free with \$5 parking per vehicle. Warm clothing and a flashlight with red light are recommended. Personal telescopes and binoculars are welcome.

See <http://omsi.edu/starparties> for more information or cancellations.



Oregon Star Party

August 6 - 11, 2013

Indian Trail Spring + Ochoco National Forest

For more information or register go to
www.oregonstarparty.org



[Trout Lake Star Party](#)
July 12-14, 2013

You will be setting up your telescopes on asphalt or gravel. There are fancy pit toilets on the south side of the parking lot. The nearest gas/food/water is in Trout Lake.



If you bring an RV, park in an organized way that leaves access lanes for others who may be coming/going over the weekend. All RVs must be on the pavement.

You can tent camp on the side of the parking lot in the grassy areas. You will want a ground cloth under your tent and a reflective cover during the day helps keep the inside temperatures down. Propane stoves only and please use them up off the ground on a table or stand. No open fires or charcoal briquettes.

There is no formal registration for the event itself, just show up and enjoy the weekend. You don't even need a telescope to participate; other members are enthusiastic to share their views. This is a good opportunity for beginners to get acquainted.

There are lots of daytime activities in the area. Ice caves, waterfalls, day hike trails and Mt. Adams to name a few. Directions can be found on the RCA website:
http://www.rosecityastronomers.org/sp/trout_lake.htm

Haggart Observatory Public Nights

Through a partnership with Clackamas Community College, the Rose City Astronomers (RCA) maintains the Observatory and coordinates public access to the Observatory. During 2013, we have scheduled several Public Nights at the Observatory. We invite those interested to visit the Haggart Observatory webpage at: <http://www.rosecityastronomers.org/sp/haggart.htm> to find out dates and times for these sessions.

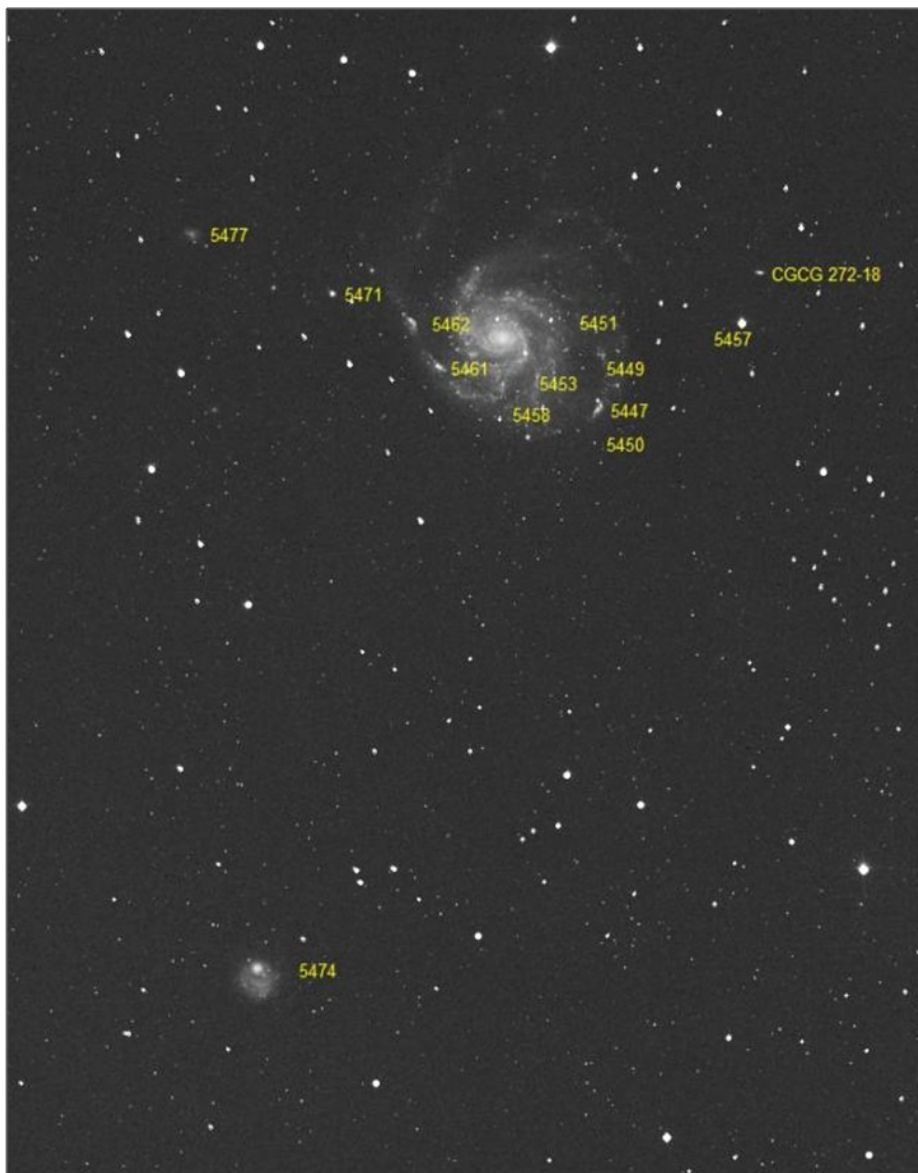
Star Parties Coming Soon in 2013!

Golden State Star Party	Jul 6-9
OMSI Lunar Viewing Star Party	Jul 20
Oregon Star Party	Aug 6-11
Skyview Acres Star Party	Aug 7-11
OMSI Perseid Meteor Watch	Aug 12
Stub Stewart Star Party	Aug 31
Sunriver Star Party	Sep 4-8
Maupin Star Party	Sep 6-8
OMSI Autumnal Equinox Celebration	Sep 21
Skyview Acres Star Party	Sep 26-29
White River Star Party	Sep 28



NGC 5474, a Genuinely Remarkable Galaxy

M101 sits in a field of smaller, fainter galaxies, and if there's only one you take the time to see after enjoying the splendors of M101, I suggest it be NGC 5474.



DSS-MegaStar image

Scan south of M101 by less than one degree at low power and you'll come across 5474. It's about the same size as the central region of M101 and is rather faint – or bright, depending on the size of your scope - at 11th magnitude, but what makes it so visually remarkable is its extremely off-center core, which is a result of gravitational interaction with M101. Surprisingly, 5474 is perhaps M101's closest companion galaxy.

Classified as a dwarf spiral galaxy, 5474 is a rarity among dwarf galaxies. Although its spiral shape is difficult to see, you'll notice right away that the bright core is offset to the north edge of its disk, making it much more lopsided than M101.

Both galaxies are about 21 million light years away, with 5474 perhaps ever so slightly further away. Gravitational interaction with M101 has triggered star formation, sloshed 5474's nucleus to its northern edge, and has probably given M101 its somewhat offset shape as well.

So even though 5474 and M101 look like they're too far away from each other to be interacting, that's exactly what they're doing. The photo below was taken with the 4 meter Mayall telescope on Kitt Peak and shows a fairly bright HII region in the northern edge of the galaxy as well as many smaller HII and stellar associations scattered through its disk and along its periphery. All this activity was stirred up by M101.

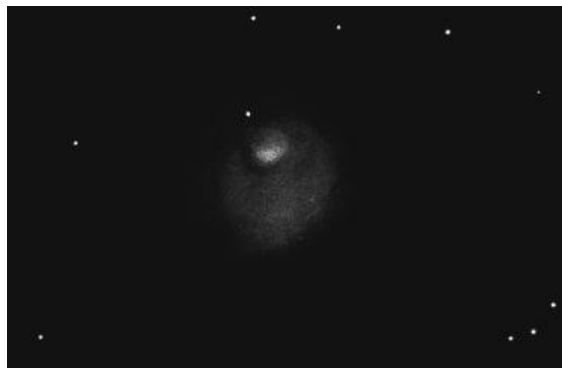
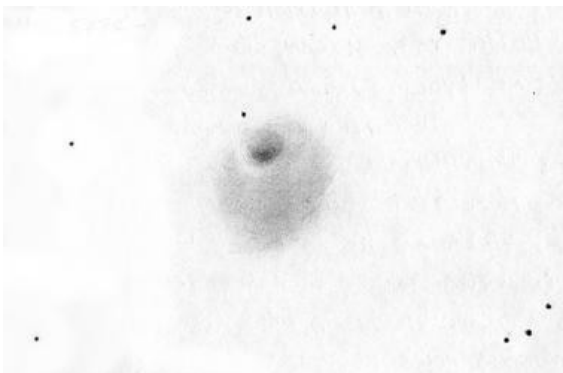
With an 8 inch and smaller scope under a dark sky, 5474 will be a faint, soft glow, and it will take relatively high power, averted vision and patience to be able to see the offset nucleus. Scopes 10 inches and above will start to show the offset nature of 5474 with more certainty, and you may notice a 12.5 magnitude star just northwest of the nucleus, especially in steady seeing.

My first observations of 5474 didn't note the offset nucleus, and I didn't make a sketch. The first time I did draw it was at the 2007 Oregon Star Party, and I recently returned for another sketch on the evening of May 8, 2013 at Chuck and Judy Dethloff's place in the Coast Range due west of Portland. As it turned out, it was one the darkest nights we've had in western Oregon in many years, with Sky Quality Meter (SQM) readings that topped out at 21.52.



NOAO/AURA/NSF

In my 28 inch scope, 5474 reminded me of an off-center version of M64, the Black Eye galaxy, because there's a dark lane that wraps underneath the southern edge of the bright core region, which helps suggest an overall spiral pattern. The southern part of the core is brightest, furthering this visual suggestion.



Sketch by the author

There's a broadly shaped fantail that's very slightly brighter than the rest of the spiral arm area that protruded out the southern edge of 5474 and extended vaguely towards the core. I wasn't able to see any of the individual HII regions that show up in the 4 meter Mayall photo, but I suspect together they helped create the impression of this slightly brighter area. Perhaps with steadier seeing conditions and higher magnifications I could see some of them as discrete bright spots. Time will tell.

My sketch was drawn at 253x, and at the time I rated the seeing a 4 on a scale of 10, with 10 being perfectly steady. My rating of 4 means small scale structure was smeared out and the use of higher magnifications didn't improve the view. The transparency and darkness were both excellent though, so with steadier seeing and an even darker sky I think there's a good deal more to see in NGC 5474.

DNA to the Stars

By Robert McGown

To use Newton's words, our efforts up till this moment have but turned over a pebble or shell here and there on the beach, with only a forlorn hope that under one of them was the gem we were seeking. Now we have the sieve, the minds, the hands, the time, and, particularly, the dedication to find those gems—no matter in which favorite hiding place the children of distant worlds have placed them.

Frank Drake and Dava Sobel.

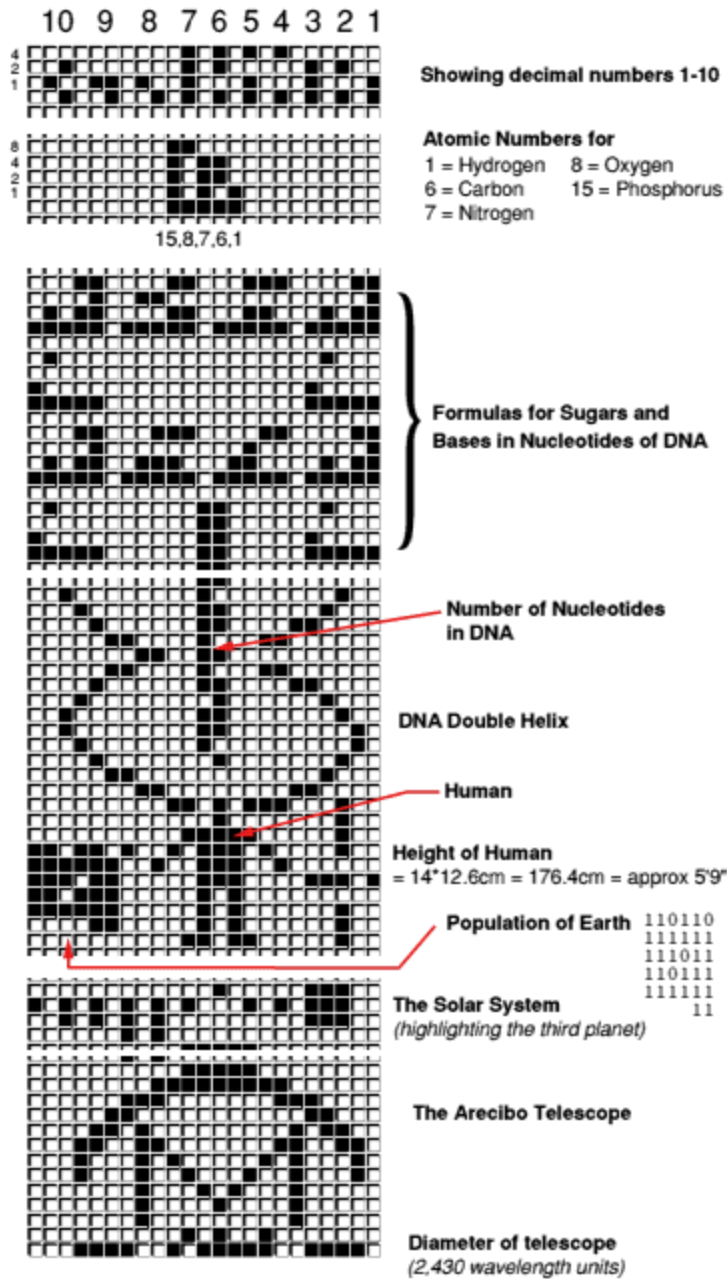
Perhaps as an advanced species in the universe our calling card is a message about our DNA. In the movie *Contact* (1997), radio astronomers receive a message from space that they can't understand and finally they figure out that the message is an instruction for a machine that will allow for space time travel through a wormhole. The engineers from Earth eventually build the machine and the scientists are able to communicate with the ancient ones of the universe. In a small way, we are trying to communicate with other civilizations today. Radio astronomers have sent out messages to target stars in space with information from Earth. Most radio telescopes are passive and you can't send messages to the stars. They are just capable listening, however some of the great ionic atmospheric bounce radio telescopes of the cold war are capable of sending messages to the stars.

An early message that was sent to the stars was done on the Arecibo telescope in November 1974 by Dr. Frank Drake, Cornell University, who was the creator of the Drake equation. Drake wrote the message, with help from his colleagues Carl Sagan, and Barney Oliver founder of Hewlett Packard. The Arecibo message was broadcast into space a single time via frequency modulated radio waves at a ceremony to dedicate the remodeling of the radio telescope. They aimed the radio telescope at the globular star cluster M13, about 25,000 light years away because M13 was one of the largest globular clusters in the northern hemisphere. At the time they knew the stars in the globular cluster were some of the oldest stars in the galaxy. However they didn't know that stars in globular clusters tend not to have solar systems with planets, so the chance of the message going to a solar system in M-13 was very slim. The message was also sent out at 2380 MHz on a pulsar frequency instead of the cosmic watering hole so an extraterrestrial species would be looking at 1420 MHz instead of a pulsar frequency. The Arecibo message consisted of 1679 binary digits, approximately 210 bytes, transmitted at a frequency of 2380 MHz with a broadcast time of three minutes. The signal was modulated by shifting the frequency by 10 Hz, with a power of 1000 kW. The "ones" and "zeros" were transmitted by frequency shifting at the rate of 10 bits per second. The Arecibo message is the product of two semi primes with a cardinality of 1679. It was arranged rectangular as 73 rows by 23 columns. These prime numbers were used because they would not normally be found in nature together. The alternative arrangement, 23 rows by 73 columns, produces jumbled nonsense. The message forms the image shown below, or its inverse, when translated into graphics characters and spaces. Some scientists like Stephen Hawking or Martin Rees have said that maybe we should not be sending messages into space because an advanced alien race could come to Earth and take our resources.

The Arecibo message consists of seven parts that encode the following (from the top down) The body of this message is now included in Russian transmissions along with other information in the Teen Age message broadcast in Russian and English.

How to decipher the message

Original 1974 message



Because it will take 25,000 years for the message to reach its intended destination of stars (and an additional 25,000 years for any reply), it's clear that the transmission was more a symbolic event than an actual attempt at communication -- if we were attempting to communicate, we'd probably send the message more than once, or to more than one spot in the sky. A 1999 press release said as much, with Cornell Professor Donald Campbell explaining, "It was strictly a symbolic event, to show that we could do it." Although the Arecibo message was more a demonstration of human technological achievement than a real attempt to enter into a conversation with extraterrestrials, the possibility remains that some intelligence could intercept the message and perhaps decode it -- and maybe, just maybe, reply.

In mid 2001, a group of Russian teens from the Moscow Center of Teen Activity, participated directly and via the Internet in composing a Teen-Age Message (TAM) to extra-terrestrial intelligence, and in the selection of target stars. Organized by Russian Scientist Alexander L. Zaitsev, their message was transmitted in the Autumn of that year, from the Evpatoria Deep Space Center. Teen-Age Message (TAM) was transmitted at 18:00 UT on August 29, 2001 from 70-m dish of Evpatoria Deep Space Center to the Sun-like star HD 197076 in Dolphin Constellation. The total duration of TAM was 2 hours 12 minutes. The interstellar broadcast message consisted of three distinct parts:

1. Sounding Section -- coherent signal with slow Doppler wavelength tuning to imitate the transmission from Sun's center (10 min)
2. Analog Section -- Theremin concert to Aliens (15 min)
3. Digital Section -- Message: Logo of TAM, Greeting to Aliens both in Russian and English (70 min).

The Coherent Sounding Signal was transmitted in order to help Aliens detect the message and to investigate some radio propagation effects in the interstellar medium. The Analog Information represents music, performed on the Theremin. This musical instrument produced quasi sinusoidal signal, which is easily detectable across interstellar distances.



OSETI Lynette Cook-copyright

There were 7 musical compositions in the 1st Theremin Concert for Aliens:

1. Melody of Russian romance 'Egress alone I to the ride'
2. Beethoven: Finale of the 9th Symphony
3. Vivaldi: Seasons. March. Allegro
4. Saen-Saens: Swan
5. Rakhmaninov: Vokalise
6. Gershwin: Summertime
7. Melody of Russian folk-song "Kalinka-Malinka"

The Concert program was composed by the Russian teens. The Theremin performers were Lidia Kavina, Yana Aksenova and Anton Kerchenko from the Moscow Theremin Center.

A transcription of the digital TAM message the teens sent to aliens read:

Greetings from Teens to Aliens - TAM Text: Dear friends from the Universe! We are the children from the Earth planet, sending this Message to you. We want you to know, that you are not alone in the Universe. We offer to be your friends. The Galaxy, where you and we live, is our common Home. We named it the Milky Way. The Earth planet is moving around the star named Sun. The planet itself is covered by ocean and land. There are many creatures living our planet; but only people have created a technological civilization. We live in families: parents and children. Children like to play. We would like to show you our games, drawings, music. The duration of our life is about 80 years. While writing this Message, we are from 13 to 18 years old. So, we hope to receive your answer. People have many cultures, languages and



Byrd steerable passive radio telescope, Greenbank West Virginia

religions. People have reached the technical progress, but scientists have also invented horrible weapons, which may destroy the life on our Earth. Our planet is very beautiful, but it is ill. Our problems are wars, ecology, exhaustion of natural resources. But we hope we shall overcome these problems and all people on Earth will be happy! We would like to know about you! Please, reply. We would be very glad. We wish you peace and love. The children from the Earth, August-September, 2001.

The latest TAM target stars were:

HD Designation	Constellation	Distance (ly)	Spectral Type	Signal Power (kW)	Date Sent	Arrival Date
HD197076	Delphinus	68.5	G5V	126	August 29, 2001	February 2070
HD95128	Ursa Major	45.9	G0V	96	September 3, 2001	July 2047
HD50692	Gemini	56.3	G0V	96	September 3, 2001	December 2057
HD126053	Virgo	57.4	G1V	96	September 3, 2001	January 2059
HD76151	Hydra	55.7	G2V	96	September 4, 2001	May 2057
HD193664	Draco	57.4	G3V	96	September 4, 2001	January 2059

Additional SETI research (Lynette Cook, Denise Keiser)

Youth Astronomy Academy



The Rose City Astronomers is one of the largest amateur astronomy clubs in the country, and is committed to helping educate and enable anyone interested in astronomy to **reach for the stars** (and planets, galaxies, and nebulae). The RCA **Youth Astronomy Academy** is a unique educational program developed for young students with an interest in learning more about our universe, and how to use a telescope to observe its many wonders.

Who can attend?

- ☆ Any local student who is in the fifth through eighth grades.

When and where will the Academy be held?

- ☆ The Academy will be held twice a year.
- ☆ Fall 2013 Schedule: Saturday August 17, September 21, October 19, and November 16
 - Location: Kennedy School, 5736 N.E. 33rd Ave., Portland, OR
 - Hours: 9:30 – 11:30 a.m.
- ☆ Spring 2014 Schedule: TBD

How much will it cost to attend the Academy?

- ☆ Current RCA family member: **\$25**
- ☆ Non RCA member: **\$37** (which includes \$12 RCA Student Membership)

What will students learn at the Academy?

- ☆ The history and basics of astronomy, exciting astronomy discoveries, basic skills and techniques of observing, and how to navigate the night sky and find things in a telescope.
- ☆ Interactive classes will be taught by experienced RCA members.

What else will students receive?

- ☆ An observing kit including a planisphere and copy of the *Pocket Sky Atlas*.
- ☆ Opportunity to attend night-time observing sessions with one-on-one RCA mentor.
- ☆ Opportunity to receive Astronomical League observing program certifications.
- ☆ Opportunity to build their own telescope with help from RCA members (at additional cost).
- ☆ Participants completing the course will receive a *Certificate of Achievement*.

How do I apply to attend the Academy?

- ☆ Send an email to youth@rosecityastronomers.org to receive an application.

**Rose City
Astronomers
Float for the
2013 Starlight
Parade**

Thanks Guys!



June 2013

Jun 01	Saturday	Starlight Parade	Portland	Dusk
Jun 01	Saturday	Rooster Rock Star Party	Rooster Rock	Dusk
Jun 03	Monday	Board Meeting	OMSI Classroom 1	7pm
Jun 07	Friday	Downtowner's Luncheon	Abu Rasheed - 1921 SW 6th Ave, Portland	Noon
Jun 07-09	Fri-Sun	Maupin Star Party	Wapinita Airstrip Near Maupin OR	
Jun 12	Wednesday	Astro-Imaging SIG	Beaverton Public Library	7pm
Jun 15	Saturday	OMSI Star Party	Rooster Rock and Stub Stewart State Parks	Dusk
Jun 17	Monday	General Meeting	OMSI Auditorium	7:30pm
Jun 19	Wednesday	Cosmology SIG	Firland Apartments Community Room 8036 SE Raymond St., Portland, OR 97206	7pm
Jun 22	Saturday	Telescope Workshop	Technical Marine Service Building	10am-3pm
Jun 22	Saturday	Haggart Public Night	Haggart Observatory	Dusk
Jun 30	Sunday	Astronomy Day	OMSI	1pm-4pm

July 2013

Jul 01	Monday	Board Meeting	OMSI Board Room	7pm
Jul 06	Saturday	Haggart Public Night	Haggart Observatory	Dusk
Jul 10	Wednesday	Astro-Imaging SIG	Beaverton Public Library	7pm
Jul 12	Friday	Downtowner's Luncheon	India House 1038 SW Morrison Portland, OR 97215	Noon
Jul 12-14	Fri-Sun	Trout Lake Star Party	Flatop Sno Park near Trout Lake, WA	
Jul 15	Monday	New Members SIG	OMSI Planetarium	6:30pm
Jul 15	Monday	General Meeting	OMSI Planetarium	7:30pm
Jul 17	Wednesday	Cosmology SIG	Firland Apartments Community Room	7pm
Jul 20	Saturday	Telescope Workshop	Technical Marine Service Building	10am-3pm
Jul 20	Saturday	OMSI Star Party	Rooster Rock and Stub Stewart State Parks	Dusk

<http://www.rosecityastronomers.org>

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Portland, OR 97214-3356