



Mingo Creek Park  
Observatory

# The Guide Star

Newsletter of the Amateur Astronomers Association of Pittsburgh, Inc.

Founded June 9, 1929 by Chester B. Roe and Leo J. Scanlon

Website: [3ap.org](http://3ap.org)



Nicholas E. Wagman  
Observatory

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Amateur astronomers, with modest equipment, from practically any location, can trace the history of lunar science and view features that have changed the way we think about the early Solar System.

The presentation will contain views and descriptions of important surface formations, observing basics and hints, a smattering of selenographic history, some observing projects, and recommendations for books and observing aids.

John Cheng is a retired systems architect whose educational background was in theology and philosophy. This year marks his tenth year as an AAAP member. He's been an astronomical observer for much of his life.

Hope to see you there!

## Next Meeting: John Cheng on "Observing the Moon"

By Ann Norman

Friday, March 13<sup>th</sup>, 2009 at 7:30 p.m. in the Carnegie Science Center Main Auditorium, our own John Cheng will share with us his expertise and enthusiasm for "Observing the Moon". He writes:

It was just 400 years ago that the Moon tempted Harriot and Galileo to look skyward and give birth to telescopic astronomy. It was just 50 years ago that it inspired a nation to set out on the greatest of adventures.



Photo by Fred Klein

## INTERNATIONAL YEAR OF ASTRONOMY

By Ed Moss, President AAAP

The year 2009 marks the 400<sup>th</sup> anniversary of the first use of a telescope by Galileo to observe objects in the heavens. This event, as we all know, forever changed how man viewed the universe around him. The world is celebrating this history-changing event by participating in the “International Year of Astronomy”.

Our club will be involved in these events throughout the year. There will be one event in March and another in April. These two events will kickoff our celebration of IYA 2009. The first event will be on Thursday, March 26<sup>th</sup>, 2009 at the Carnegie Science Center starting about 6 PM. There will be around nine hundred people in attendance at the CSC that evening. This event will be covered by all three news channels. We will need as many AAAP members as possible to attend this event both with telescopes and without.

This is probably the best opportunity this club has ever had to promote itself to the public. I would like to have displays on the club and our two observatories along with some Night Sky Network demonstrations and information on light pollution.

The CSC is producing six planetarium shows that evening. Our participation is to provide astronomical information to the attendees waiting to see the planetarium shows and also afterward. The attendees at this event will be the big donors to WQED and the CSC. There may also be some political types at this event as well. We need to utilize this event to promote both astronomy and the AAAP. If you can help out, please e-mail [president@3ap.org](mailto:president@3ap.org).

The next day Friday, March 27<sup>th</sup> is the start of our annual AAAP-CSC astronomy weekend now renamed Spaced-out Weekend. We also will need volunteers to help man the event. We only need a few members for Friday, but Saturday and Sunday will require our usual staffing. Also contact [president@3ap.org](mailto:president@3ap.org) if you can help out in any way.

The next event will be Cornerstone Project’s “100 Hours of Astronomy Global Star Party” at the CSC and Wagman Observatory. We will use the Wagman Star Party on April 3-4<sup>th</sup> as one aspect of this event. The other part of this event is scheduled for April 2-5<sup>th</sup>, 2009 at the CSC. We will need help manning this event for all four evenings. If you cannot help out at the CSC or Wagman, you can have an event in your own neighborhood. Just set up your own scope and invite your neighbors to view the heavens.

All IYA 2009 events count toward our Night Sky Network participation. If you decide to do your own event, please e-mail your results and number of people at your event to [president@3ap.org](mailto:president@3ap.org). More details will be forthcoming at the next membership meeting at the Carnegie Science Center on March 13<sup>th</sup>.

## NEW GEAR ANTARES FINDER, 2-INCH AT DIAGONAL

By Todd Kelly

I recently placed an order with Astronomics for a few items with some so-so results. Due to some members' recommendations, I decided to pick up the Antares 7x50 RACI finder (\$90). My current finder is a simple red dot type, and I am not a fan. I typically spend the night hunching over and contorting my body while trying to get a view of the red dot—not the best way to observe. After viewing the Antares model at a star party last year, I decided to take the plunge. I also ordered the SCT mount for the finder (\$33).

The box arrived quickly and I received a small discount for being a member of the Cloudy Nights forums, which was a nice bonus. The items were packed well, but upon inspection, I noticed that the finder's eyepiece was in pieces. It screws back together easily enough, but there was an issue. The eyepiece's crosshairs are created using tiny wires soldered to a thin brass ring. This ring was lying loose with some other parts in the packaging, and one wire was broken. Rather than send the unit back, I decided to fix it myself with a soldering iron and a new piece of wire. Since the remaining crosshair was loose as well, my fix actually made it better!

The mount was another issue—it is supposed to fit SCTs 6-inch and larger, and I have a 6-inch. However, the mounting holes were not aligned to the scope, and I needed to drill out a small amount of the material in the mount using a drill and a small round file. I was scared to do this since I risked ruining the mount, but eventually I got everything working. Mounting screws are not included, so a trip to the hardware store was needed to pick up a few metric screws.

Aligning the finder was simple enough, thankfully, and the optics are very good. Focus is obtained by moving the eyepiece up and down in the diagonal, and there is a small focus ring for fine adjustment. Overall, a nice improvement, even if I did spend more time getting it all working. No more neck-breaking observing!

I also picked up a 2-inch dielectric Astro-Tech diagonal. I was using a 1.25-inch stock Celestron diagonal, which was not very sturdy and was of below-average build quality. I wanted something larger to use larger eyepieces and, eventually, camera mounts. The 99% reflectivity 2-inch from AT (\$150) comes with a 1.25 adapter, is made from a wonderfully beefy block of aluminum, and is beautifully constructed. It features compression rings to avoid marring eyepieces and large thumbscrews. The best part is that this particular diagonal attaches directly to the rear cell of an SCT—just remove the visual back and screw the diagonal in place. This allows the scope to be completely vertical with no clearance issues. I have yet to test it under observing conditions, but I have high hopes due to the build quality and features. The links to all items are on the following page:

**Antares RACI finder website:** (copy and paste in browser)  
[http://www.astronomics.com:80/main/product.asp/catalog\\_name/Astronomics/category\\_name/5QKXWMM37DFH9HWGT0JW88RNN2/product\\_id/750EBK](http://www.astronomics.com:80/main/product.asp/catalog_name/Astronomics/category_name/5QKXWMM37DFH9HWGT0JW88RNN2/product_id/750EBK)

**Antares mounting rings website:** (copy and paste in browser)  
[http://www.astronomics.com/main/product.asp/catalog\\_name/Astronomics/category\\_name/TJE16ASM84H59KKXLGF4LLTSQ6/product\\_id/50QRB](http://www.astronomics.com/main/product.asp/catalog_name/Astronomics/category_name/TJE16ASM84H59KKXLGF4LLTSQ6/product_id/50QRB)



## DAN MCKEEL'S MOON IMAGE

By Al Paslow

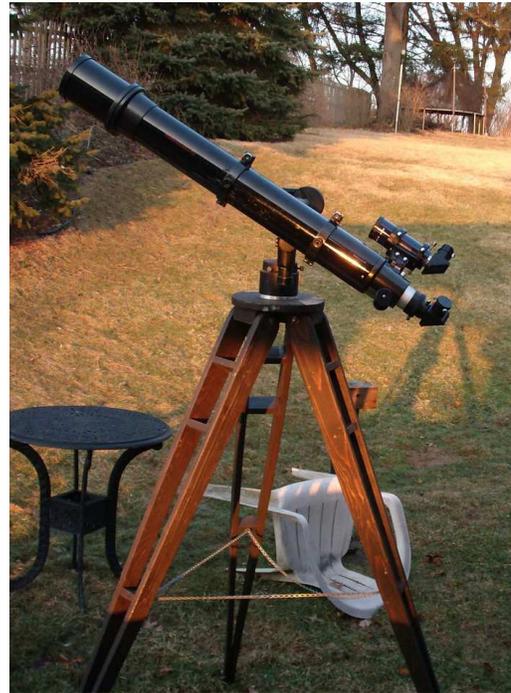
Dan McKeel sent me this image of the moon taken February 6, 2009 with a 4-inch refractor (Light sharpening, grayscale mode noise reduction).



[http://al-paslow.smugmug.com/photos/470983020\\_tBcSF-X2.jpg](http://al-paslow.smugmug.com/photos/470983020_tBcSF-X2.jpg)

Here's an image of the instrument Daniel used to take the shot:

[http://al-paslow.smugmug.com/photos/470986313\\_hUcet-X2.jpg](http://al-paslow.smugmug.com/photos/470986313_hUcet-X2.jpg)



## COOL WEBSITES

Click on the link below. You will view the constellation page. Click on a constellation of your choice and look at the objects and information visible within that constellation.

<http://www.wingmakers.co.nz/Constellations.html>

For a quick check of Comet Lulin's location, Heavens-Above has a list of comets with maps of it's updated locations.

<http://www.heavens-above.com/comet.aspx?cid=C%2F2007%20N3&lat=40.441&lng=-79.996&loc=Pittsburgh&alt=0&tz=EST>

John Pane made a video to show the comet's motion using the same 1.25 hours of images from February 17. You can also see a bunch of satellites in the upper left (there were many more in the un-cropped images).

<http://www.cs.cmu.edu/~pane/lulin/movie/>

Earth makes diamond ring effect from the Moon:

<http://www.msnbc.msn.com/id/29287935/>

More information can be examined concerning Saturn observations on a day-by-day basis at the following link. Many are complete with images:

<http://alpo-j.asahikawa-med.ac.jp/Latest/Saturn.htm>

## STAR PARTIES 2009

Compiled by Terry Trees: [TreesT@Comcast.net](mailto:TreesT@Comcast.net)

Combining the work of John Labrecque (who annually presents a schedule of upcoming Star Parties to the Kiski Astronomers club) with a list I produced of star parties I might want to visit, I produced the data below. Mingo and Wagman are public nights at the 2 AAAP observatories. Kunkle is a public night function that the Kiski Astronomers hold in Kunkle Park, Washington Township, Westmoreland County (near Apollo, PA).

The colors designate light pollution levels as indicated by the light pollution maps attached to Attila Danko's "*Clear Sky Chart*". Here are some examples of sites with which you might be familiar. (Pennsylvania's Cherry Springs State Park's not being black was a surprise to me.)

### LEGEND:

White	(W)	Pittsburgh, Youngstown, Philadelphia, Toronto ON
Red	(R)	Erie, Barrie ON
Orange	(O)	Wagman/Mingo/Kunkle, Durham ON
Yellow	(Y)	Astroblast, Huronia Star Party
Green	(G)	Laurel Highlands Star Cruise/StarFest
Blue	(BL)	Blackwater Falls/Cherry Springs State Park
Charcoal	(C)	Enchanted Skies Star Party, Manitoulin Star Party
Black	(BK)	OkieTex Star Party/Texas Star Party

Mingo, Wagman and Kunkle indicate astronomy public nights occurring in the Pittsburgh, PA area.

**Feb 22-28** Cedar Key Star Party, Cedar Key, FL (BL)

**Feb 22-28** Winter Star Party, Marathon, FL (BL)

**Feb 25-Mar 1** Orange Blossom Star Party, Dade City, FL (Y)

**Feb 28** Wagman Winterfest (O)

**Mar 7** Tri-Star 2009, Greensboro, NC (R)

**Mar 25-29** Hodges Garden, "Kisatchie" Star Party, LA (BL)

**Apr 3,4** Wagman (O)

**Apr 16-19** NEAF, Suffern, NY (R)

**Apr 17,18** Mingo (O)

**Apr 19-26** Texas Star Party, Fort Davis, TX (BK)

**Apr 22-25** Mid-South Star Gaze, French Camp, MS (BL)

**Apr 23-24** South Jersey Star Party, Belleplain State Forest, NJ (Y)

**Apr 23-24** Georgia Sky View, Indian Springs State Park, GA (Y)

**Apr 23-24** Two Rivers Spring Star Party, Barry, IL (G)

**May 1, 2** Mingo, Wagman (O)

**May 2** Kunkle (O)

**May 13-17** Southern New Mexico Star Party, City of Rocks State Park, NM (C)

**May 15, 16** Mingo (O)

**May 21-25** Joshua Tree SP, Joshua Tree Nat'l Park, CA (Y)

**May 22-25** RTMC Astronomy Expo, Big Bear City, CA (Y)

**May 29, 30** Wagman (O)

**Jun 12-13** Apollo Rendezvous, Dayton, OH (W)

**Jun 12, 13** Mingo (O)

**Jun 13** AAAP Picnic (O)

**Jun 13** Kunkle (O)

**Jun 13-20** Grand Canyon Star Parties-North (BK), South (BL)

**Jun 18-21** Cherry Springs Star Party, PA (BL)

**Jun 25-28** Almost Heaven Star Party, Spruce Knob, WV (BK)

**Jun 26, 27** Wagman (O)

**Jun 27** Mingo (O)

## Star Parties (continued)

- Jul 2-5** Greenbank Star Party, WV (BK)  
**Jul 11** Kunkle (O)  
**Jul 16-19** Gateway to the Universe, Restoule Provincial Park, ON (BL)  
**Jul 17-21** Stargazing Manitoulin (C)  
**Jul 19-24** Nebraska Star Party, Valentine, NE (BK)  
**Jul 23-25** Table Mountain Star Party, Ellensburg, WA (BL)  
**Jul 24, 25** Mingo, Wagman (O)  
**Jul 24-26** Butterpot Star Party, Butterpot Provincial Park, NF (BL)  
**Jul 24-26** Star-B-Que, Caroline, AB (Y)  
**Jul 24-26** Mason-Dixon Star Party #1, Shreveport, PA (O)
- Aug 8** Kunkle (O)  
**Aug 13-16** Stellafane (Y)  
**Aug 13-16** RASC General Assembly, Saskatchewan S Summer Star Party Cyprus Hills Interprovincial Park, SK (C)  
**Aug 14-18** Manitoulin Star Party, Manitoulin Island, ON (C)  
**Aug 15-23** Mt. Kobau Star Party, BC (BL)  
**Aug 18-23** Astroblast, Oil City, PA (Y)  
**Aug 19-23** Oregon Star Party, Ochoco, Nat Forest, OR (BK)  
**Aug 20-23** StarFest, Mt. Forest, ON (G)  
**Aug 21, 22** Mingo (O)  
**Aug 28, 29** Wagman (O)  
**Aug 29-Sep 1** Nova East, Smileys Provincial Park, NS (Y)
- Sep 5-7** Spruce Woods Star Party, Spruce Woods Provincial Park, Manitoba (BL)  
**Sep 12** Kunkle (O)  
**Sep 12** Mingo, Wagman (O)  
**Sep 12-20** Okie-Tex Star Party, Kenton, OK (BK)  
**Sep 12-19** Fall Star Quest, Loon Lake, BC (BK)  
**Sep 15-20** Northern Prairie StarFest, Black Nugget Lake, AB (G)  
**Sep 17-20** Huronia Star Party, Duntroon, ON (Y)  
**Sep 17-20???** RASC-Toronto Centre, Algonquin Adventure, Mew Lake, ON (C)  
**Sep 18-20** Hidden Hollow, Mansfield, OH (Y)  
**Sep 18-20** Black Forest Star Party, Cherry Springs Park, PA (BL)  
**Sep 18-20** Blackwater Falls Star Party, Blackwater Falls State Park, WV (BL)  
**Sep 26** Mingo, Wagman (O)
- Oct 10** Mingo, Wagman (O)  
**Oct 12-18** Mid-Atlantic Star Party, Robbins, NC (G)  
**Oct 14-17** Enchanted Skies Star Party, Socorro, NM (C)  
**Oct 16-18** Mason-Dixon Star Party #2, Shreveport, PA (O)  
**Oct 18-25** Peach State Star Gaze, Sharon, GA (G)  
**Oct 24** Mingo, Wagman (O)

## OBSERVATIONS

**Dan Fundo:** Posted to Yahoo Group February 4, 2009 from Memphis, TN. I got home more than an hour earlier than usual due to a computer problem and took Tom Reiland's advice. It was clear and cold in the teens (that's equal to single digit temps for you folks) but I managed to stay out for 20 minutes. The Moon was just east of the Pleiades and the pair looked great in the 20x80 binoculars. I scanned through Orion and Cannabis Major and got M41—looked better after I put Sirius out of the FoV. I swept over to M 35 & 37, then over to Leo and picked out Ceres with no problem. (Hmmm....serious and series in one night). There's a good chart in the March S&T—it was almost due north of Delta Leonis. The wind suddenly got gusty and started blowing through my new Christmas present jacket, and I baled (my good wife had hot cocoa ready!!!) It was the clearest night we've had in weeks. The last full Moon was shining through a lot of "frozen fog" and had a multi-hued diffraction like disk around it (no, not a halo! Too hazy for that). I tried to get a photo of it, but the Moon washed it out. Maybe I should have PhotoShopped it!

**Tom Reiland:** Posted to Yahoo Group on February 17, 2009. I decided to go to Wagman Observatory when I saw the clearing develop around 5:30 PM. I packed up my charts, logbook, cold weather gear and binoculars and headed up to the observatory at 6:45 PM. I arrived "shortly" after 7 PM to find clear skies and an empty hilltop. I prepared the Manka Scope and started to bundle up while I waited for the scope to cool down. I realized that one of my boots must have fallen out in my garage when I was loading stuff in the car. I stuck with my tennis shoes and used three pairs of socks. It was for the best because I could move around much easier than if I wore my heavy boots. Just as I was starting to set up on Venus, another car pulled onto the field. It was our new member from Russellton, Dan Cousineau. He joined me in the Manka room and brought in his 4-inch Newtonian to check out Saturn. It's a nice small scope. He stayed for about an hour and a half. I was going to pack up at 10 PM, but I decided to wait for Comet Lulin and one object led to another, and another, and another until I finally quit at 12:30 AM. The Orion Nebula was stunning as usual; R Leporis was deep red and Saturn, with its rings close to wafer thin, featured four moons, two on each side. I had no trouble locating Ceres next to a 6th mag star in Leo and at 11:08 PM I made my first observation of Comet Lulin for the night. I found nine new objects to enter in my logbook and five are Herschel Objects. At 11:54 PM I started my run through the Coma-Virgo Galaxy Cluster and thirty minutes later I had bagged 56 of them. I went back to Comet Lulin with the 21-inch, 5-inch and my 10 X 50's. It was then that I decided to try to pick it out with my nude eyes. I was surprised to catch a couple of glimpses of it without using any optics. There are no stars between Spica and Theta Virginis brighter than 7.0 mag. That

means that the comet is close to 5.5 magnitude for me to see it naked-eye from Wagman.

Transparency was very good, at least a 4/4.5 on a scale of 1/5 and so was the seeing. The wind was light to calm, but the temperature started out at 27 degrees and dropped to 19 degrees by the time I closed up. There was less sky glow/light pollution than I expected for a Winter's night in western Pennsylvania.

**Tom Reiland:** Posted on Yahoo Group February 18, 2009. I was able to observe Comet Lulin again this morning when I noticed a large break in the sky and I made a quick scan around Theta Virginis with my 10 X 50s. It's still 5.5 magnitude. I was checking magnitudes listed on this object and SN 2008 IN in M61 to get a fix on Monday night's transparency. I was able to catch the supernova at the limit of my vision through the 21-inch at 282X and observers had it listed at 15.5 to 15.6 mag. Considering the location of both of these objects in the brightest area (greatest light pollution) of the sky (SE to South), the transparency was excellent. Naked-eye visibility of objects overhead on the best night is close to 5.7 mag for me. I was able to see objects fainter than 6th mag objects in the 1980s and early 1990s from Wagman Observatory.

**John Pane:** Posted to Yahoo Group February 17, 2009. Last night I observed and photographed Comet Lulin from my driveway. It was a very easy target in binoculars, but I was not able to see it naked-eye. I was in and out of the house from about midnight until moonrise after 2 AM. It was interesting to note how far the comet moved during that time.

I captured a set of about 140 images between 1:02 AM and 2:19 AM. After discarding the poor-quality ones, I ended up with a set of 105. I then processed them three different ways. In the first photograph, I aligned the images on the stars. This shows the comet as a streak because of its movement over the span of 1.25 hours. In the second and third photographs, I aligned on the comet and the stars show as streaks. I used two different processing methods; the second method had the effect of suppressing the star trails. The photos are cropped to roughly 3 degrees wide.

<http://www.cs.cmu.edu/~pane/lulin/>

Additional details are: Canon 40D camera, 200 mm f/2.8 lens, and IDAS light pollution suppression filter. Series of 105 30-second exposures at ISO 1600 and f/4. I hope we get more clear skies this weekend when the comet is at its nearest approach.

**John Pane:** Posted to Yahoo Group February 21, 2009. I was using Starry Night to look at the path of Comet Lulin for the next few days. The software made me realize that the ion tail should become foreshortened as the comet moves toward and through opposition. Since the ion tail points away from the sun, it will be behind the comet at opposition (25th). Then, after that date, it should switch to the same side as the dust tail though not the same angle.

I wonder if the comet will brighten right at opposition due to an effect similar to what we see with the Moon? I think the theory behind it has to do with reflectivity of particles being stronger at 180 degrees than at other angles. The Baltimore Sun had an article about Comet Lulin yesterday, and their online copy of the article links to my video. I don't know how they found out about it.

[http://www.baltimoresun.com/news/local/bal-md.comet20feb20.0.6898674.full\\_story](http://www.baltimoresun.com/news/local/bal-md.comet20feb20.0.6898674.full_story)

**Bill Hayslip:** Posted to Yahoo Group February 21, 2009. I found myself still up at 2AM and noticed that the sky was clear. I quickly checked for a location with the Heavens-Above comet maps and saw that it had moved considerably further west halfway to Saturn. So I bundled up and grabbed my 10x50s this time. I found the comet very quickly but was disappointed with the 10x50s. I think I've been spoiled with the 15x70s. So back in the house (dragging snow everywhere) and picked up my larger pair. I easily found the comet again and it was in the south and pretty high up which got it away from my light pollution problem. The view was much better for me than earlier this week. A nice crisp view of the round fuzzy comet but I found myself wobbling all over the place and couldn't keep the image still. Next time I'll drag out the binocular stand for a better view. And so to bed.

## WELCOME NEW MEMBER

Chris Flynn

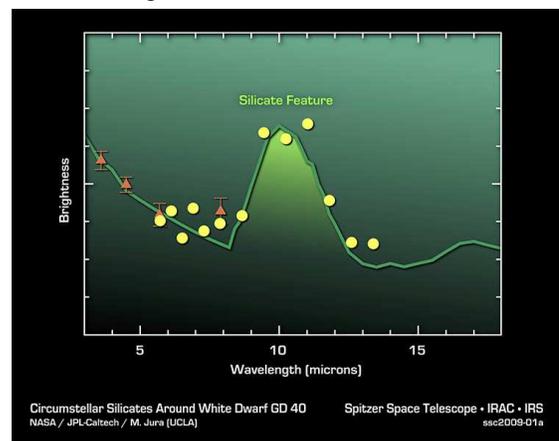
## TALES FROM THE STELLAR CRYPT

By C. C. Petersen, [The Spacewriter's Ramblings](http://thespacewriter.com/wp/)

<http://thespacewriter.com/wp/>

Dead Stars tell No Tales...or Could They?

The galaxy is full of stars that are dead or dying. You'd think that their stories would be over and we could move on to the next star, right?



Silicates in the dust from alien asteroids circling the white dwarf GD 40; data from Spitzer Space Telescope shows the silicates as seen in recent studies (yellow dots) and older data (orange triangles).

*Au contraire...* as it turns out, some dead stars are surrounded by the dust of asteroids they chewed up and spat out. And, astronomers are getting a chance to “bite” that dust again by studying the infrared emissions from that material with the spectroscopic “eye” of Spitzer Space Telescope.

The data are intriguing, even if you’re not used to looking at it in X-Y plots like this one. It shows that the asteroid dust surrounding a dead “white dwarf” star contains silicates. That’s a very common mineral here on Earth — many of our rocks are made of silicates. So are rocks on the Moon and the other rocky planets such as Mars and Venus. And, as it turns out, silicates are found in clouds of debris around other kinds of stars and in the the ghostly shrouds of planetary nebulae. So, how do asteroids get chewed up and ground to dust around a white dwarf star?

We all know the story of planetary formation around young stars. Dusty material left over from star birth swirls around the star in a kind of shroud. The dust and particles stick to each other over time, forming larger and large protoplanetary lumps. Eventually, if you stick enough of this stuff together and wait a while (say a few million or so years), you get planets. What’s left over circulates around as chunks of rocks. We call those chunks “asteroids”.



What would shredded asteroids around a white dwarf look like? If you could be close by in a spaceship, this artist's conception might be what you'd see. Courtesy CalTech.

Now, fast-forward through the life of the star and its associated planetary system—say, one similar to our Sun. When such a star gets old and cranky, it puffs itself up into a red giant. That action eats up the inner planets and jostles whatever asteroids and outer planets that survive the angry red giant phase. As the star continues to die, it does a most amazing thing: it blows off its outer layers and then shrinks down into a skeleton of its former self. The end result is a white dwarf, an object with an intense gravitational field. If

anything wanders too close — say an asteroid — it gets shredded to pieces by the gravitational pull of the white dwarf. That scatters around a lot of dust. The chemical fingerprints of the elements in that dust can be picked out by the infrared spectrograph on Spitzer Space Telescope (for example).

Spitzer looked at eight white dwarf systems and found the dust to be very rich in a glassy silicate material like olivine (which is commonly found here on Earth). The scientists who did the looking, led by Mike Jura at University of California at Los Angeles, plan to search out more of these “dust-bitten” regions around white dwarfs. What they find from the tales these dead stars tell will give us some pretty unique insights into how other star systems treat their planets and asteroids as they form, grow, evolve, and then die.

Note: This story was first released during the AAS meeting a couple of weeks ago. I headlined it at the time, but have been wanting to give it more detailed treatment. For more information, check out the Spitzer press release at <http://www.spitzer.caltech.edu/Media/releases/ssc2009-01/release.shtml>

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## HOW MANY ALIEN CIVILIZATIONS ARE REALLY OUT THERE?

By Ray Villard, Cosmic Ray

[http://blogs.discovery.com/cosmic\\_ray/](http://blogs.discovery.com/cosmic_ray/)

Earlier this month there was a widely published story on the Internet that a graduate student at the Royal Observatory in Edinburg, Scotland has estimated the number of advanced civilizations in our Milky Way galaxy, and the number is, tada: 361. Not 360, not 400, or even “several hundred” but 361? hmmm. . . .



This statistical modeling paper by Duncan Forgan was published online by the International Journal of Astrobiology. He set up “Monte Carlo” numerical simulations that ran several hundred different scenarios of how life begins and evolves in the galaxy. Forgan reported that his model relies

on current observational knowledge of stars and planetary systems, as well as some assumptions about the viability of life and its ability to evolve into intelligence.

With all respect to Mr. Forgan, this study is simply more arm waving when it comes to solving one of the biggest science questions of our time: "are we alone"?

Arriving at so precise a number seems awfully presumptuous and deceptively authoritative (unless you're Mr. Spock). A Monte Carlo simulation is utterly meaningless in addressing this question because it is full of unknown upon unknown about the genesis and evolution of life off the Earth. We don't even know how life began on Earth, much less have any evidence if it is truly a cosmic imperative, or instead a chemical fluke.

As far as suitable homes for life, we have cataloged so far 339 planets orbiting other stars. But we won't have solid evidence for the statistical abundance of Earthlike planets in habitable zones until NASA's upcoming Kepler mission completes 3 to 4 years' worth of observations of 170,000 stars in the constellation Cygnus.



Speaking this weekend at the meeting of the American Association for the Advancement of Science (AAAS) in Chicago, exoplanet sleuth Alan Boss (Carnegie Institution of Washington) predicted that Kepler will find that Earths are common around nearly all sun-like stars.

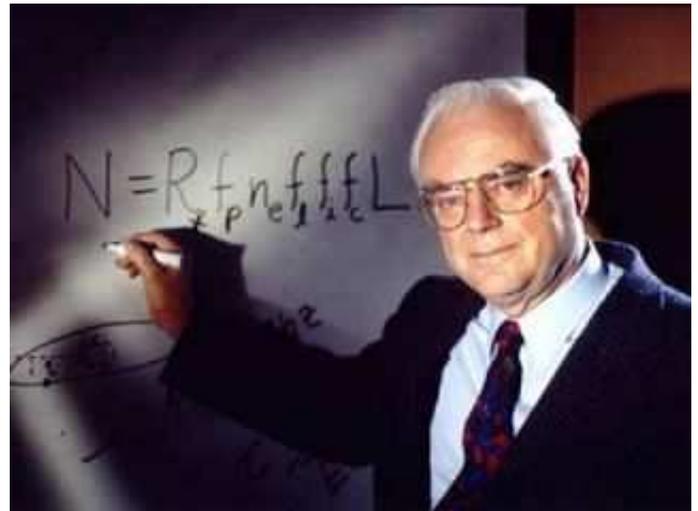
This is simply because Earth-sized planets are easier to make than the bigger planets discovered so far (just as there are more pebbles on the beach than boulders). "Radial velocity surveys show that 30 percent of solar stars have planets that are five to ten times the mass of Earth (dubbed 'Super-Earths') on short period orbits. "This is just tip of iceberg," says Boss.

Even when Kepler delivers the real statistics, we won't have a clue if any of the exo-Earths are inhabited. It will take vastly larger space telescopes to do the kinds of observations to spectrally sniff-out the presence of a biosphere. But Kepler will tell us if we need to design

telescopes to look for life within 100 light-years of Earth, or within 1,000 light-years or more.

Even if a cesspool-smelling planet is found, we won't be able to do any imaginable observation that demonstrates if the life on the planet is self-aware and technologically evolving -- short of passively eavesdropping for radio transmissions from any intelligent beings living there.

Critics argue all of this is premature because the score today is a big fat "zero" for evidence of life off the Earth. If microbial life is found on Mars, we can conclude that single-celled life is a "condition of the universe". Genesis happened twice in our solar system. But the string of chance events that led to intelligent life on Earth would be extremely hard to duplicate elsewhere in the universe say those skeptics who support the Rare Earth Hypothesis (which is horribly anti-Copernican).



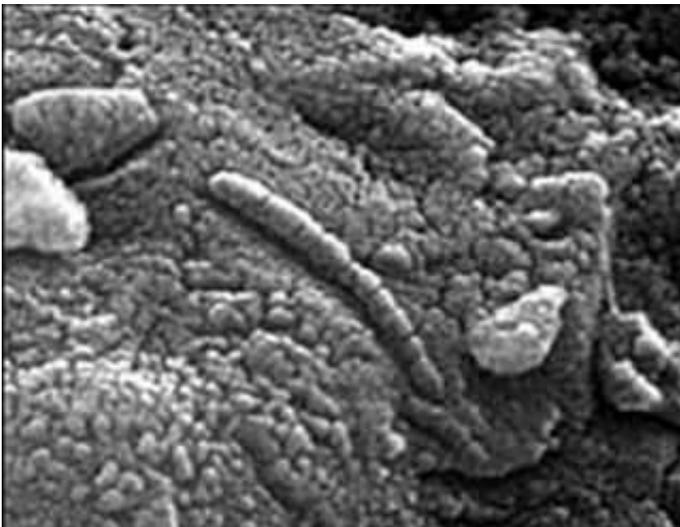
The father of SETI (Search for Extraterrestrial Intelligence), Frank Drake, took a more fundamental approach in the early 1960s to the question of alien civilizations – and he didn't need computer simulations.

What has come to be known as the Drake Equation (which is standard fare in all college astronomy texts, but is curiously dismissed in Forgan's paper), attempts to estimate the number of civilizations in our galaxy by factoring in a string of variables: abundance of solar-type stars, odds of planet formation, planets in habitable zones, planets the mass of Earth, etc.

Drake and his colleagues quickly realized that the bottom line from the equation is the estimate of the longevity of a civilization. If technologically advanced civilizations are inherently unstable and blow themselves up (as dramatically told in the 1950's film classic *Forbidden Planet*) then we are alone in the galaxy. If they survive for 1 million years or more, then one could be relatively nearby. Drake himself made a simple guess: one percent of the Milky Way stellar population supports advanced life, which comes out to 1 billion civilizations.

Alan Boss believes that every sun-like star in the galaxy has at least one inhabited Earthlike planet, this would yield 100 billion living worlds. When asked why he's so optimistic, Boss retorted: "If the glass is half full, it's probably completely full."

"I'd like to think that every other Earth in the galaxy is inhabited, but then again the answer might be zero", says Paul Davies (Arizona State University), who is cautious about sweeping assumptions on the inevitability of life arising from a soup of organic compounds. The famous Miller-Urey experiment from the 1950s made a tar of organic material from chemical reactions in an electrified primordial atmosphere in a test tube. But who knows how this gooey asphalt could turn into a living organism?



In a discussion I had with Virginia Trimble (University of Maryland) also at the AAAS meeting, she summarized the dilemma of estimating the number of advanced civilizations: "You'll never have the real answer until you take time to actually look, which is what the SETI folks are doing".

So, today the estimates for alien civilizations in our galaxy range from 0 to 100 billion -- which means we don't have a clue. But certainly the value of 361 is no more accurate than pulling a number out of a hat.

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## IMPORTANT DATES

**March 1**—Mercury 0.6° south of Mars  
**March 4**—First quarter Moon 2:46 a.m.  
**March 7**—Moon at perigee  
 Mars 0.8° south of Neptune  
**March 10**—Full Moon 10:30 p.m.  
 Saturn 6° north of Moon  
**March 13**—**Membership meeting Carnegie Science Center 7:30 p.m.**  
**March 17**—Antares 0.2° south of Moon  
**March 18**—Last quarter Moon 1:47 p.m.  
**March 19**—Globe at Night  
**March 20**—Spring Equinox 7:44 a.m.  
 Globe at Night  
**March 21**—Globe at Night  
 Allegheny Observatory Lecture 7:00 p.m.  
**March 22**—Jupiter 1.5° south of Moon  
 Globe at Night  
**March 23**—Neptune 2° south of Moon  
 Globe at Night  
**March 24**—Mars 4° south of Moon  
 Globe at Night  
**March 25**—Globe at Night  
**March 26**—New Moon 12:06 p.m.  
 Globe at Night  
 Night Sky Network Telecon 9:00 p.m.  
**March 28**—**Carnegie Science Center Spaced Out Weekend**  
**March 29**—**Carnegie Science Center Spaced Out Weekend**  
 Globe at Night  
**March 30**—Globe at Night  
**March 31**—Globe at Night

**April 3**—**Wagman Public Star Party Carnegie Science Center Fair**  
**April 4**—**Wagman Public Star Party**  
**April 7**—Saturn 6° north of Moon  
**April 9**—Full Moon 10:56 a.m.  
**April 10**—**Membership Meeting Carnegie Science Center 7:30 p.m.**  
**April 13**—Antares 0.4° south of Moon  
**April 15**—Mars 0.5° south or Uranus  
**April 17**—**Mingo Public Star Party**  
 Last quarter Moon 9:36 a.m.  
**April 18**—**Mingo Public Star Party**  
 Allegheny Observatory Lecture 7:00 p.m.  
 Venus 6° north of Mars  
**April 19**—Jupiter 2° south of Moon  
 Neptune 2° south of Moon  
**April 21**—Lyrid Meteor Shower  
**April 22**—Earth Day  
 Uranus 5° south of Moon  
 Venus 1.1° south of Moon  
 Lyrid Meteor Shower  
**April 24**—New Moon 11:23 p.m.  
**Churchill Star Party**  
**April 26**—Mercury at greatest elongation 20° east and 1.9° south of Moon

**Amateur Astronomers Association of Pittsburgh, Inc.**

*Founded June 9, 1929 by*

*Chester B. Roe and Leo J. Scanlon*

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