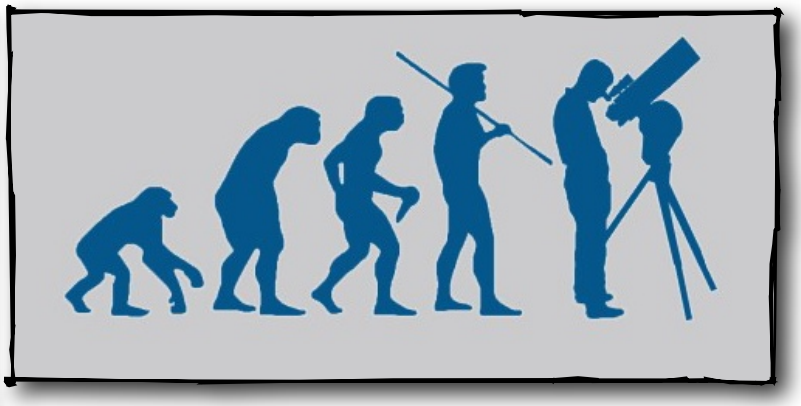
Star Gazer News

Astronomy News for Bluewater Stargazers
Vol 7 No. 2 February 2013

February 2013 Contents



The evolution of Homo "Universalis"

The human evolution diagram has taken on many forms lately. Here is another version that I found on the Internet. As for the type of telescope depicted (a cannonball on a wedge?) your guess is as good as mine. It must have evolved as well.

A long filament that erupted on the sun from noon August 31, 2012 EDT to 1:45 a.m. the next morning is shown here in a Solar Dynamics Observatory (SDO) image. Light at 304 Angstroms and 171 Angstroms, was used to image the sun's atmosphere, or corona. The magnificent filament produced particles that smashed into Earth producing beautiful aurora on Sep 3. Unfortunately, no aurora were seen in this area because of cloudy weather that Labour Day weekend as well as a bright full moon sky. Good images came in (to the spaceweather.com auroral gallery) from N. Europe and NW Canada, however.

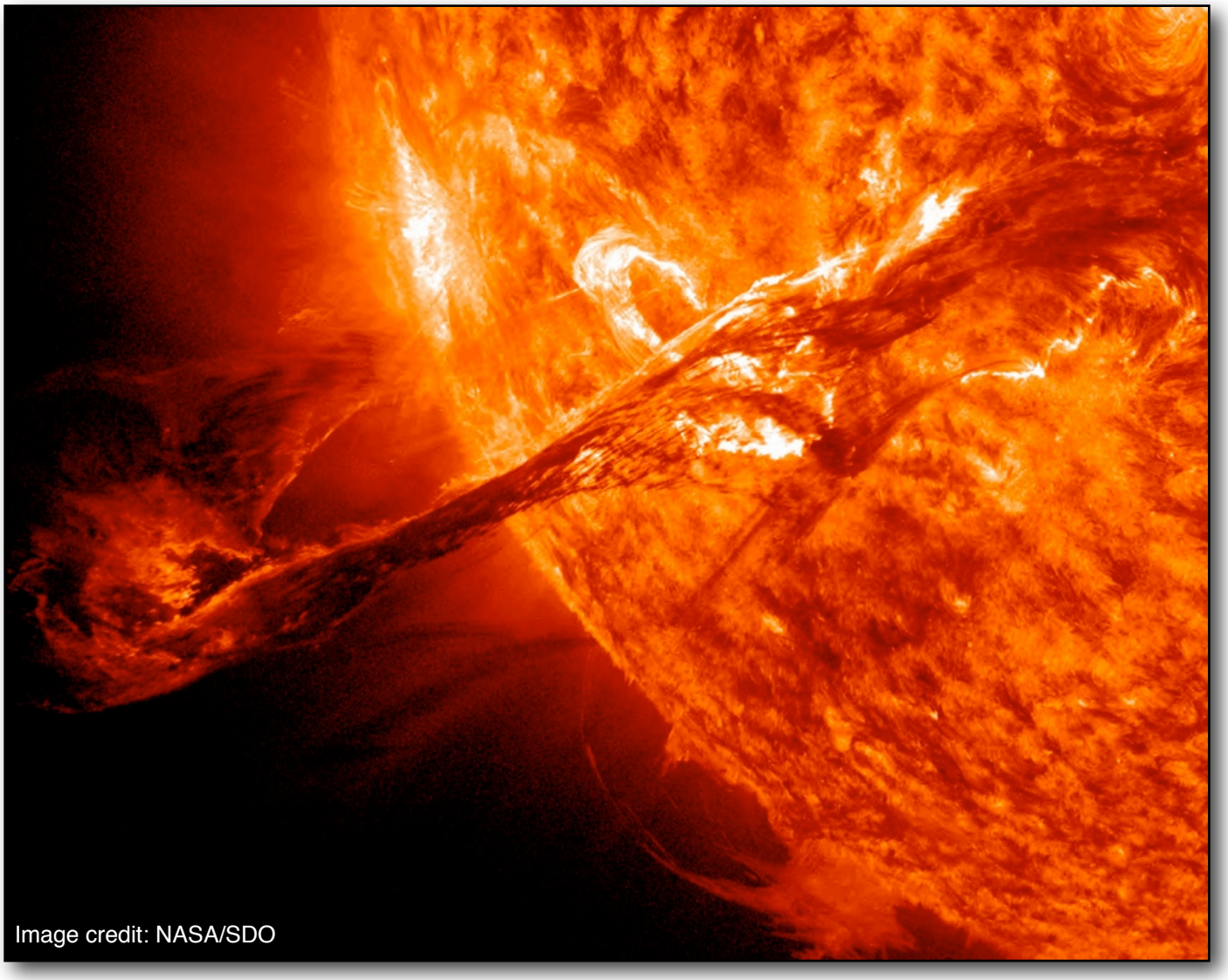


Image credit: NASA/SDO

BAS Executive 2011-2012

President:	Brett Tatton	tattons@bmts.com
Vice-President:	John Hlynialuk	stargazer@wightman.ca
Secretary:	David Green	davgre@bmts.com
Treasurer:	Cheryl Dawson	cheryl.dawson@bell.net
Past-President:	Dan Gieruszak	hiddenwell@bmts.com
Membership:	David Skelton	dskel@golden.net
Public Outreach:	Joan Skelton	andromeda@gto.net

BAS Events for Feb 2013

No BAS meetings are held during January and February. Our next BAS meeting is on Mar 6, 2013 at Grey Roots Museum.

BAS needs your help!

In 2013, BAS has its elections for executive positions as required by our constitution. Technically, all four executive positions are available but current executive members have the option of continuing on in their position (although any current BAS member can be nominated for any position). If more than one candidate is available for a position, a member vote is taken at the General Meeting in March and the position filled. Cheryl D. and John H. have agreed to stand for Treasurer and Vice-President respectively but the position of Secretary has no nominee. The position of President has one official nominees at this point. Also looking for a replacement is the position of public outreach chair so ably filled by Joan S. in the past.

Our membership has grown in the last few years and interest in club activities is pretty high. Though the club tends to keep things low-key to reduce the amount of organization required, we still get a lot done. Furthermore, the Fox Observatory is completed, and, except for a couple of unpredictable comets, there are no particularly special astronomical events that need lots of attention in 2013. The year should be pretty low stress from an executive perspective. Besides, the current executive have completed planning for 2013, so the new members get an easy introduction into their duties.

If you are thinking about an BAS executive position, 2013 would be a good year to start. Get in touch with any of the current exec to see what the job entails. Also keep in mind that this is a group effort (I am always amazed at how easily we all get along) and that you will have lots of support and guidance in any role you accept.

Three executive positions, President, Secretary and Public Outreach chair are vacant for 2013 to 2015. Cheryl D. and John H. wish to continue in their roles as V-P and Treasurer if there are no other nominees for these positions. Contact Brett or John if you have a nomination for any of these positions or wish information about the duties of any executive member. So far only one nominee has come forward.

Join the BAS Exec team!

Duties of Executive Officers

(paraphrased from current Bylaws)

President

1. to create agendas and preside over all Board, executive and regular meeting. (The president can designate this duty to another exec member.)
2. to supervise (or designate a supervisor) for club voting when required;
3. to inform members of meetings (executive/ board and regular club meetings

V-President

1. to assist the president as requested by the president;
2. to direct the society in the president's absence or as requested by the president;

Secretary

1. to inform members of meetings (executive/board, annual general meeting and regular club meetings;
2. to record minutes of all meetings and distribute these to members;
3. help maintain an inventory of club assets.

Treasurer

1. to transact and record financial activities of the Society and report these to exec when requested;
2. insure all members are covered by Liability Insurance through the Society.

Public Outreach Chair

1. to co-ordinate public astronomy events for the society;
2. to serve as contact person with local educational groups (museums, for ex. with regard to public programs;

[**Note**: most of the PO programs are in place and the current job of chair would be to maintain those programs.-ed]

M31 through a 3.5-inch refractor

Frank Williams sent me his most recent image of M31 taken through a TV85 refractor. All I can say is "WOW!" The image was a 1h 45min exposure that involved some computer processing as Frank describes: "Still core blow out, but improving as I add more time (my processing skills and clear skies are limiting)."

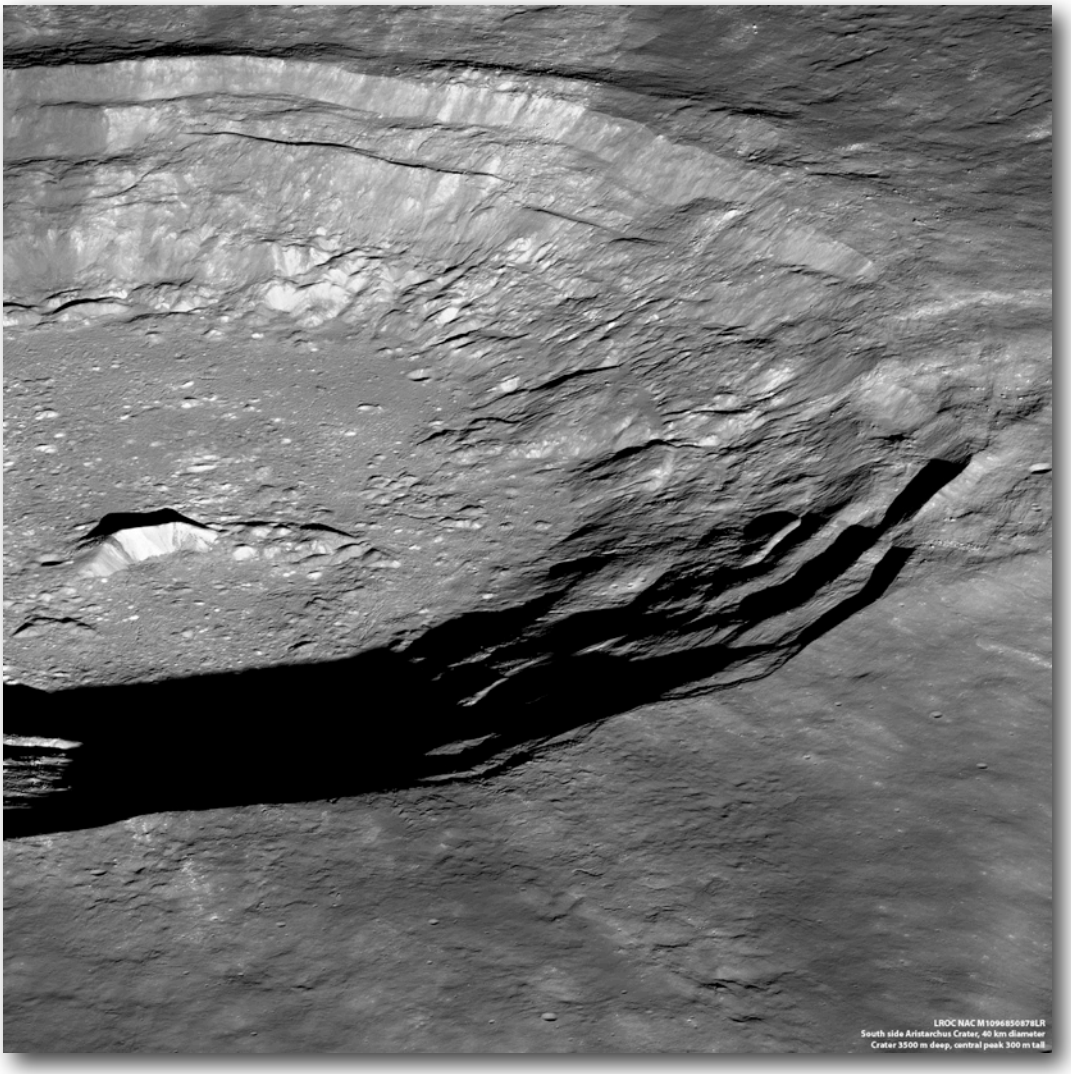
Camera used was a modified Canon T2i mounted at prime focus of his guided telescope.

Jupiter and 5 moons

Christmas Moon with Jupiter (composite image)
Canon 50D with 370 mm telephoto at f/5.6,ISO 640
photo by J.Hlynialuk Dec 25/12

Totally by luck, I happened to look outside on Dec 25 last year around 7:45 pm and there poking through the clouds was a waxing gibbous moon with Jupiter above it. It took only a few minutes to fire off a few shots and again totally by accident (and the benefits of bracketing the exposure), I was able to capture Jupiter above the moon shining through the clouds. Looking closely at the Jupiter image (inset) I noticed that there were three moons visible. But closer inspection showed a tiny faint blip to the right of Jupiter, right where Starry Night said the fourth Jovian satellite, Io should be. Callisto and Ganymede are to the left of the overexposed Jupiter image and Io and Europa are to the right. Most remarkable of all is that this is a 1/16th second exposure! To be truthful, the image above right, is actually a composite because the nicely exposed moon is pasted in from a 1/750 s shot. Jupiter and its four moons were not adjusted in any way but to get the Jovian moons to show, a longer exposure was required and our own Moon ended up overexposed. My preference in astrophotography of this sort is to do as little "photoshopping" as possible, but the composite in this case shows what the scene looked like to the eye. Features were visible on the face of the moon as was Jupiter above it. So I am not averse to doing some photo-magic to create an image that is pretty much as the naked eye would have seen it.

The blue blob to the left of the moon is actually an inverted internal reflection of the moon -a problem with many zoom lenses due to the large number of optical elements inside the lens. The 5th moon in the title to this piece is, of course, our own.

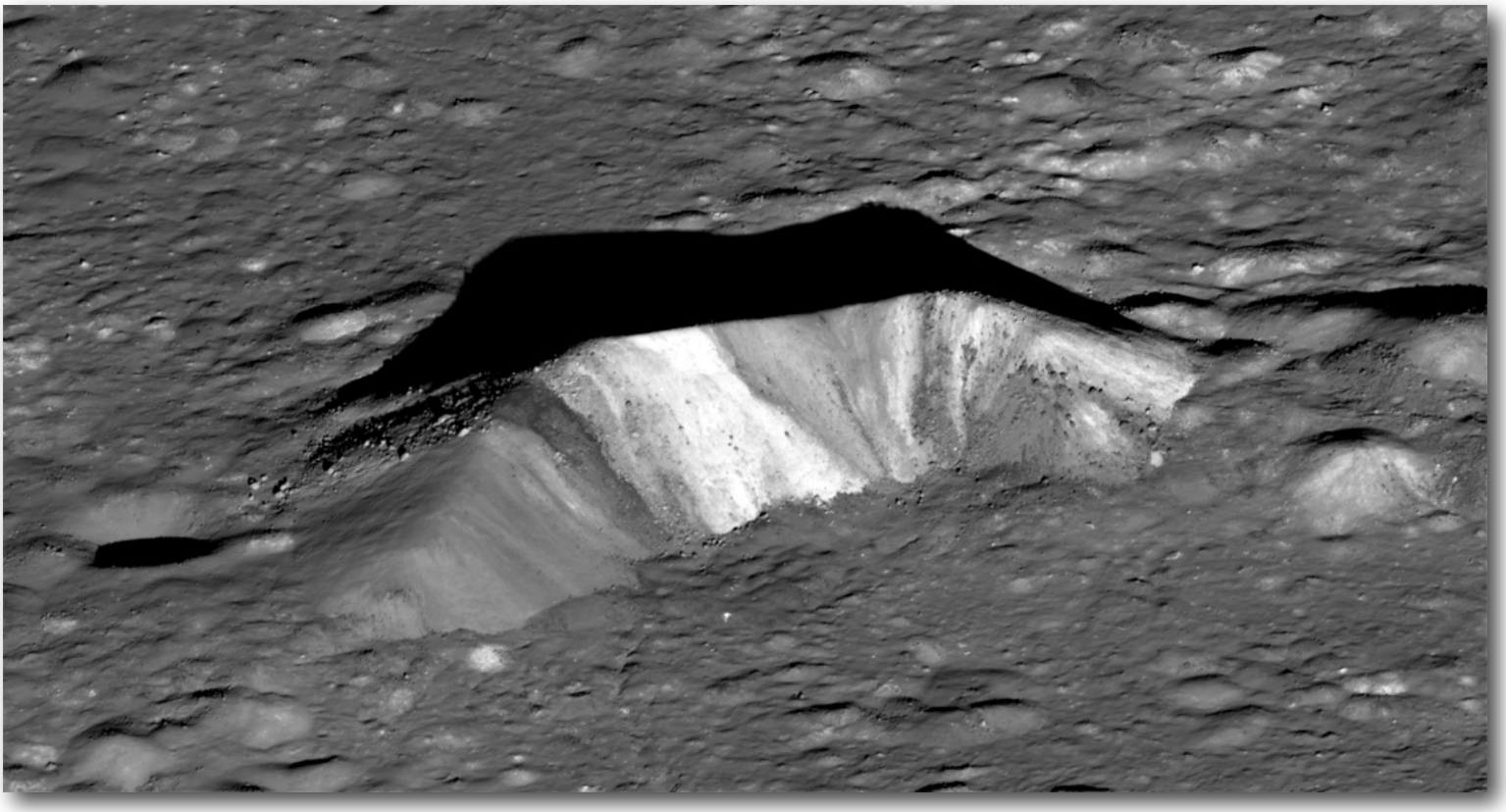


The impact that created Aristarchus an estimated 450 million years ago excavated subsurface material, melting and spraying it tens of kilometers over the surrounding plateau. It's thought that the central peak is likely composed of the same stuff, dredged up by the impact and frozen in place.

Future lunar explorers, should they ever visit this region, would be able to collect samples from the base of the central peak and compare them to samples from the bright rays to see if they match up, allowing researchers to learn about the composition of the material underlying the plateau from rocks scattered conveniently around the surface… this is the beauty of such (relatively) recent craters! The digging's already been done for us.
Read more about this on Arizona State University's LROC site and explore a zoomable version of the original NAC frame here.

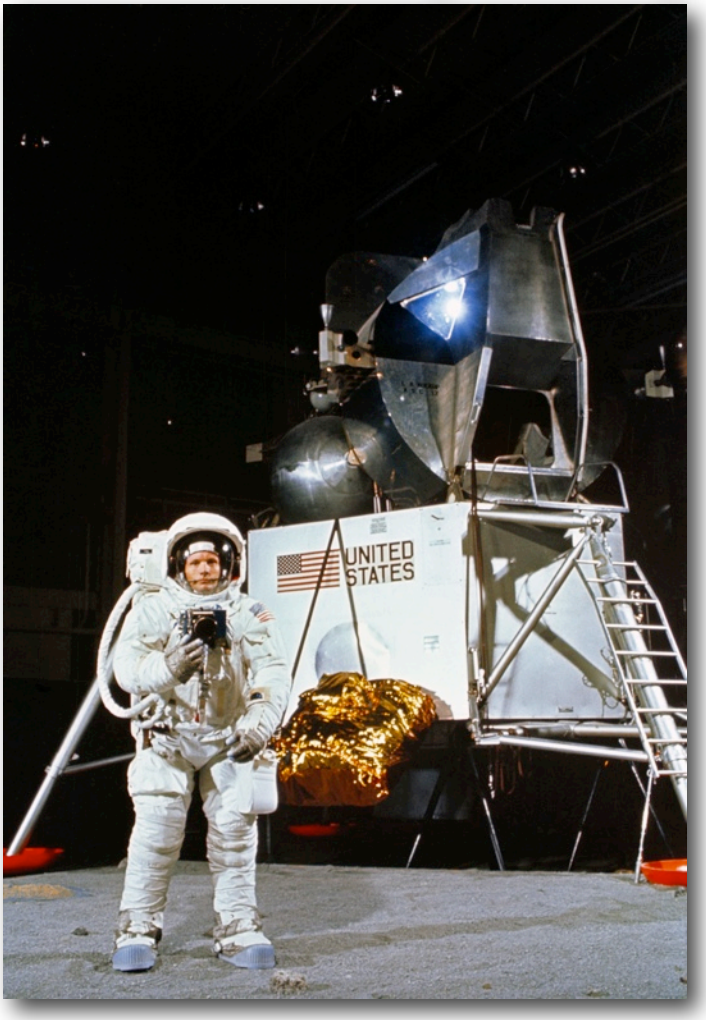
Left: *LROC view looking obliquely of the south rim of Aristarchus from the west (NASA/GSFC/Arizona State University)*

Below: *Detail of the 4.5-km-long central peak of Aristarchus (NASA/GSFC/Arizona State University)*



British tabloids calling Armstrong "Liar"

Andrew Chaikin responds: (used with permission)



Astronaut Neil A. Armstrong, wearing an Extravehicular Mobility Unit, participates in a simulation of deploying and using lunar tools during a training exercise in Building 9 on April 22, 1969. In the background is a Lunar Module mock-up.
Image below: *Buzz Aldrin's boot print*
CREDIT: NASA (both)

When I [Chaikin] asked about the experience of taking the first human footsteps on the moon, he [Armstrong] surprised me by saying that for him, "The emotional moment was the landing. That was human contact with the moon… And the business of getting down the ladder, to me, was much less significant. You know, I wouldn't have focused on that at all except that the press and everyone was making so much of a big thing about the exit from the vehicle and step on the surface with the boot."

Let's get one thing straight right now: Neil Armstrong was not a liar. But that's the outrageous accusation made about him in screaming headlines following a new BBC documentary on his life.

The controversy stems from a comment made by Armstrong's brother Dean, who says in the film that Neil shared his famous "one small step" quotation with him shortly before the mission. The problem, in some people's minds, is that this seems to conflict with Neil's own statements over the last 40 years about when and where he composed what became an immortal sentence when he took his first step onto the moon. So let's look at the facts."I did think about it. It was not extemporaneous, neither was it planned. It evolved during the conduct of the flight and I decided what the words would be while we were on the lunar surface just prior to leaving the LM."

In the Aug. 22, 1969, issue of LIFE magazine, Armstrong elaborated a bit more. "I had thought about that a little before the flight," he wrote, "mainly because so many people had made such a big point of it. I had also thought about it a little on the way to the moon, but not much. It wasn't until after landing that I made up my mind what to say."

This is the story Neil told me when I interviewed him in 1988 for my book "A Man on the Moon" (even though I did not specifically ask the question, knowing he was probably tired of answering it). It was also the story Armstrong told his biographer James Hansen in 2003. It is simply not true, as several recent news articles have claimed, that Armstrong always said he composed the quote "spontaneously." It would have been completely out of character for Armstrong, who was thoughtful about nearly everything he said and did, to have offered such an important quote without thinking it through beforehand.

Nothing in Neil's post-flight statements rules out the possibility that he thought up the "one small step" line before leaving Earth. He didn't say "I thought up the quote after we landed;" he said, "I decided what I would say after we landed." Dean Armstrong's story just adds a little ambiguity. Maybe Neil had more than one quote in mind at that point, and only shared one of them with his brother. Or maybe the quote he showed his brother was an early draft, but after all these years, Dean remembers seeing the final version.

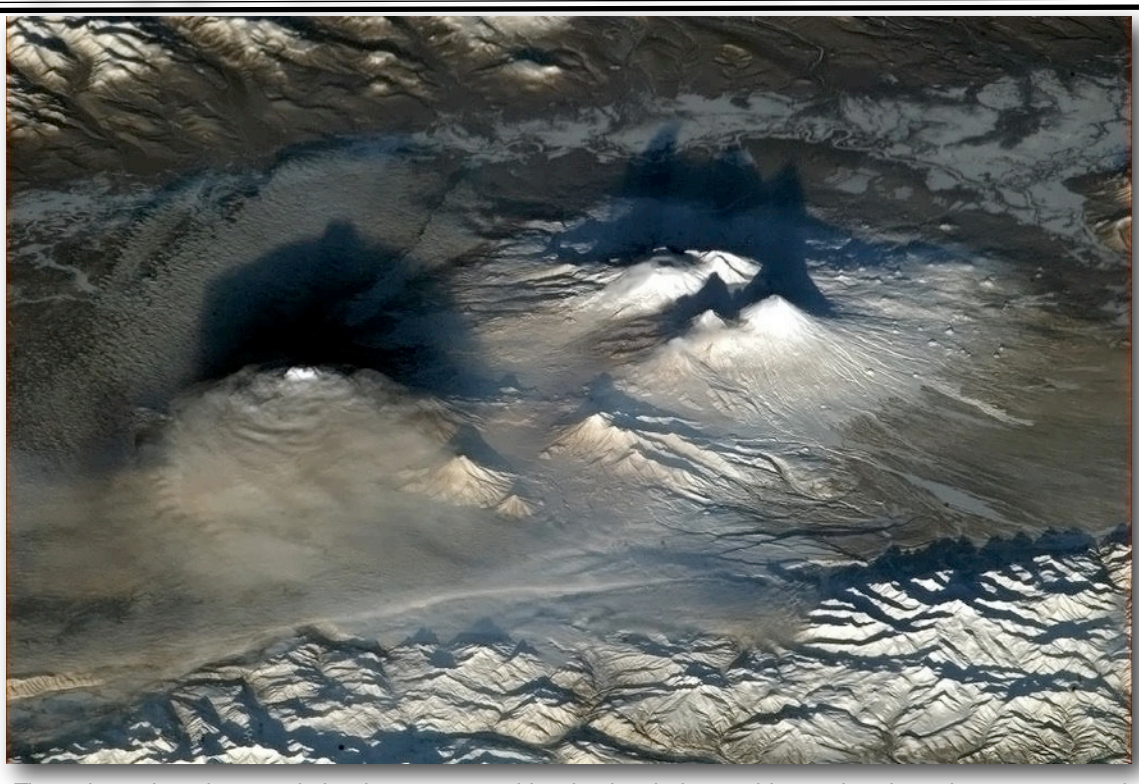
We'll probably never know the answer.

What it does not mean is that somehow Armstrong "fibbed" or "lied" to the public for 40 years. Everyone who knew Neil well has described him as extraordinarily principled. That was certainly the man I saw when I interviewed him, and in the years that followed, as we became friends. And it's worth remembering that Neil Armstrong went to the moon, above all, as a consummate engineering test pilot. As he told me in 1988, making the first lunar landing was the greatest technical challenge, and before the flight, he thought he and Buzz Aldrin had only a 50-50 chance of pulling it off.

Stepping onto the surface was far less central in his focus, and coming up with a quote for the first step was way down on his list of priorities when faced with the awesome challenge of his mission. And yet, he understood its importance, and he gave us a quote worthy of the moment, one that will live forever.

And that's the point: Neil Armstrong did right by history. And now we should do right by him.

Space journalist Andrew Chaikin is an Apollo historian and author of "Man on the Moon," "A Passion for Mars" and co-author (with Victoria Kohl) of "Voices From the Moon" and the children's book "Mission Control, This is Apollo." You can find him at: [www.andrewchaikin.com.](http://www.andrewchaikin.com)



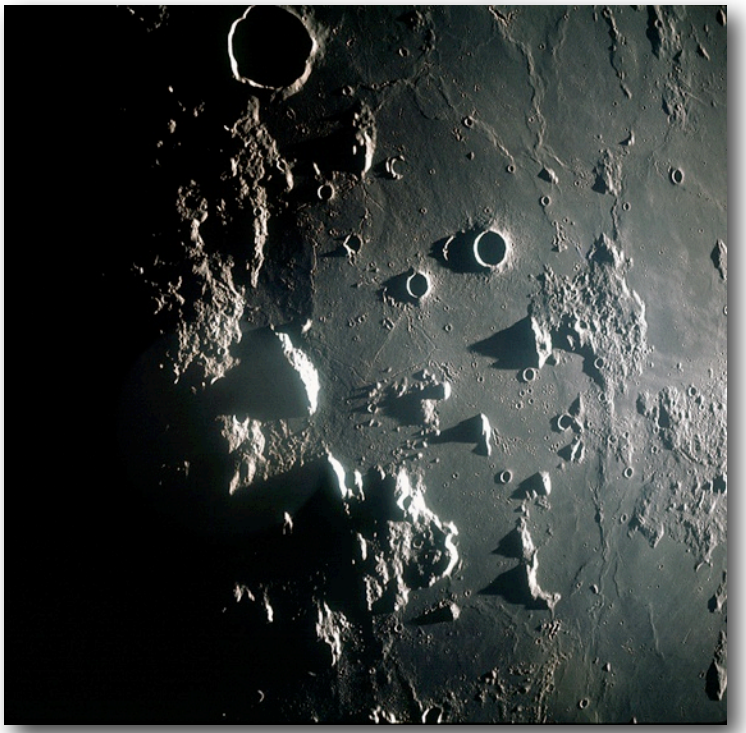
These jagged peaks are obviously an eye-catching landmark from orbit, as they have been a target of observations before — by Yuri Malenchenko in November of 2012 and by Clay Anderson in December of 2011. Posted on Universe Today www.universetoday.com

Stunning view from orbit!

Astronaut Chris Hadfield captured this shot of the volcanoes of Kamchatka in Russia. “Volcanoes look dramatic at dawn,” Hadfield said via Twitter. “They startled me when I spotted them through the lens.” [Hadfield is now aboard ISS and has 250000 contacts, and counting, in the Twittersphere].

Note the huge shadows created by the Sun, which is low on the horizon at dawn. These are just a few of the 160 volcanoes on the Kamchatka Peninsula in the far eastern part of Russia. 29 of the 160 are active. Thanks to Peter Caltner on Twitter who identified the volcanoes seen here: Tolbachik (at left, in clouds and smoke plume, active presently); Ushkovsky (in the back, right); Kliuchevskoi (right edge, peak in front). Little ones in the foreground: Udina (left) and Zimina (right).

Lunar Terminator Shadows: X marks the spot



This image, taken from Apollo 12 in orbit about the Moon, shows the lunar terminator, the line separating daylight from darkness. Objects near the terminator appear high and sharp due to the long shadows produced by the low sun angle. The crater Gambart is on the terminator at the north (upper) part of the frame, 25 km in diameter centered at 1 N, 15.2 W. The area in this photograph is just to the northeast of the Apollo 14 landing site in Fra Mauro. (Apollo 12, AS12-H-50-7438)

One of the most striking features on the moon is the lunar terminator - the “line” dividing the dark side from the bright. It can be called the sunset/rise line because if you were standing there you would be experiencing a lunar dawn looking East. Looking West, your long shadow would be projected down-sun.

Through a telescope, features are enhanced along the terminator and stand out boldly. Often, the tops of peaks and other high spots appear as isolated bright points against the dark surface. If you are patient, it is possible to see these changing with time. Some characteristic bright features can be observed regularly when the lunar phase is just right. Perhaps the most famous is the Lunar “X” shown in the image below.

Once a month when the sun rises over Crater Werner in the Moon's southern hemisphere, sunlight floods the region's high terrain and makes a luminous criss-cross shape. "Observing the X has little or no scientific value. It is a trick of the light. But the effect is striking, and it is exciting to rediscover each month," writes David Chapman in "A Fleeting Vision near Crater Werner" (Journal of the Royal Astronomical Society of Canada, Vol. 101, Issue 2, p.51). The next apparition: Feb 17, 2013. Mark your calendar with an X.

First Meteorite Linked to Martian Crust

Press Release: Carnegie Institution for Science
Jan 3, 2013

Washington, D.C.—After extensive analyses by a team of scientists led by Carl Agee at the University of New Mexico, researchers have identified a new class of Martian meteorite that likely originated from Mars's crust. It is also the only meteoritic sample dated to 2.1 billion years ago, the early era of the most recent geologic epoch on Mars, an epoch called the Amazonian. The meteorite was found to contain an order of magnitude more water than any other Martian meteorite. Researchers from the Carnegie Institution (Andrew Steele, Marilyn Fogel, Roxane Bowden, and Mihaela Glamoclija) studied carbon in the meteorite and have shown that organic carbon (macromolecular) similar to that seen in other Martian meteorites is also found in this meteorite. The research is published in the January 3, 2013, issue of *Science Express*.

The unique meteorite, dubbed Northwest Africa (NWA) 7034, has some similarities to, but is very different from other Martian meteorites known as SNC (for three members of the group: Shergotty, Nakhla, and Chassigny). SNC meteorites currently number 110. And so far they are the only meteoritic samples from Mars that scientists have been able to study. However, their point of origin on the Red Planet is not known. In fact, recent data from lander and orbiter missions suggest that they are a mismatch for the Martian crust.

As co-author Andrew Steele, who led the carbon analysis at the Carnegie Institution's Geophysical Laboratory explained: "The texture of the NWA meteorite is not like any of the SNC meteorites. It is made of cemented fragments of basalt, rock that forms from rapidly cooled

NWA 7034 (nicknamed Black Beauty) could help scientists piece together a previously unstudied time in Martian geologic history. CREDIT: Carl Agee

lava, dominated with feldspar and pyroxene, most likely from volcanic activity. This composition is common for lunar samples, but not from other Martian meteorites. This unusual meteorite's chemistry suggests it came from the Martian crust. It is the first link thus far of any meteorite to the crust. Our carbon analysis also showed the presence of macromolecular organic carbon in feldspar grains associated with iron oxides, hinting that perhaps there is a different non-biological process at work than that explaining the presence of macromolecular carbon in other Martian meteorites."

Lead author Agee, of the Institute of Meteoritics at the University of New Mexico, remarked: "The basaltic rock in this meteorite is consistent with the crust or upper mantle of Mars based on findings from recent Martian rovers and orbiters. Our analysis of the oxygen isotopes shows that NWA 7034 is not like any other meteorites or planetary samples. The chemistry is consistent with a surface origin and an interaction with the Martian atmosphere. The abundance of water, some 6000 parts per million, suggests that the meteorite interacted with the Martian surface some 2.1 billion years ago."

"Perhaps most exciting, is that the high water content could mean there was an interaction of the rocks with surface water either from volcanic magma, or from fluids from impacting comets during that time," said Steele. "It is the richest Martian meteorite geochemically and further analyses are bound to unleash more surprises."

Jupiter Occulted by Moon -on video

Universe Today posted an amazing video by Rafael Defavari showing the Jupiter occultation Dec 25, 2012 that was not visible from Canada. Captured on camera by astrophotographer Rafael Defavari from his location in São Bernardo do Campo, Brazil, this video shows the Moon passing in front of Jupiter during the event on December 25, 2012 -disappearance and reappearance. Click on the link below to have look.

http://www.universetoday.com/99174/amazing-video-of-a-lunar-occultation/

At Least One in Six Stars Has an Earth-sized Planet

Press Release Harvard-Smithsonian Center for Astrophysics Jan 7, 2013

Long Beach, Ca - The quest for a twin Earth is heating up. Using NASA's Kepler spacecraft, astronomers are beginning to find Earth-sized planets orbiting distant stars. A new analysis of Kepler data shows that about 17 percent of stars have an Earth-sized planet in an orbit closer than Mercury. Since the Milky Way has about 100 billion stars, there are at least **17 billion Earth-sized worlds out there.**

Francois Fressin, of the Harvard-Smithsonian Center for Astrophysics (CfA), presented the analysis today in a press conference at a meeting of the AAS in Long Beach, Calif. A paper detailing the research has been accepted for publication in *The Astrophysical Journal*.

Kepler detects planetary candidates using the transit method, watching for a planet to cross its star and create a mini-eclipse that dims the star slightly. The first 16 months of the survey identified about 2,400 candidates. Astronomers then asked, how many of those signals are real, and how many planets did Kepler miss?

By simulating the Kepler survey, Fressin and his colleagues were able to correct both the impurity and the incompleteness of this list of candidates to recover the true occurrence of planets orbiting other stars, down to the size of Earth.

"There is a list of astrophysical configurations that can mimic planet signals, but altogether, they can only account for one-tenth of the huge number of Kepler candidates. All the other signals are bona-fide planets," says Fressin.

Most sun-like stars have planets

Altogether, the researchers found that 50 percent of stars have a planet of Earth-size or larger in a close orbit. By adding larger planets, which have been detected in wider orbits up to the orbital distance of the Earth, this number reaches 70 percent.

Extrapolating from Kepler's currently ongoing observations and results from other detection techniques, it looks like practically all Sun-like stars have planets. See chart.

Smaller planets aren't picky

The researchers also asked whether certain sizes of planets are more or less common around certain types of stars. They found that for every planet size except gas giants, the type of star doesn't matter. Neptunes are found just as frequently around red dwarfs as they are around Sun-like stars. The same is true for smaller worlds. This contradicts previous findings.

"Earths and super-Earths aren't picky. We're finding them in all kinds of neighborhoods," says co-author Guillermo Torres of CfA.

Planets closer to their stars are easier to find because they transit more frequently. As more data are gathered, planets in larger orbits will come to light. In particular, Kepler's extended mission should allow it to spot Earth-sized planets at greater distances, including Earth-like orbits in the habitable zone.

For more information, contact:

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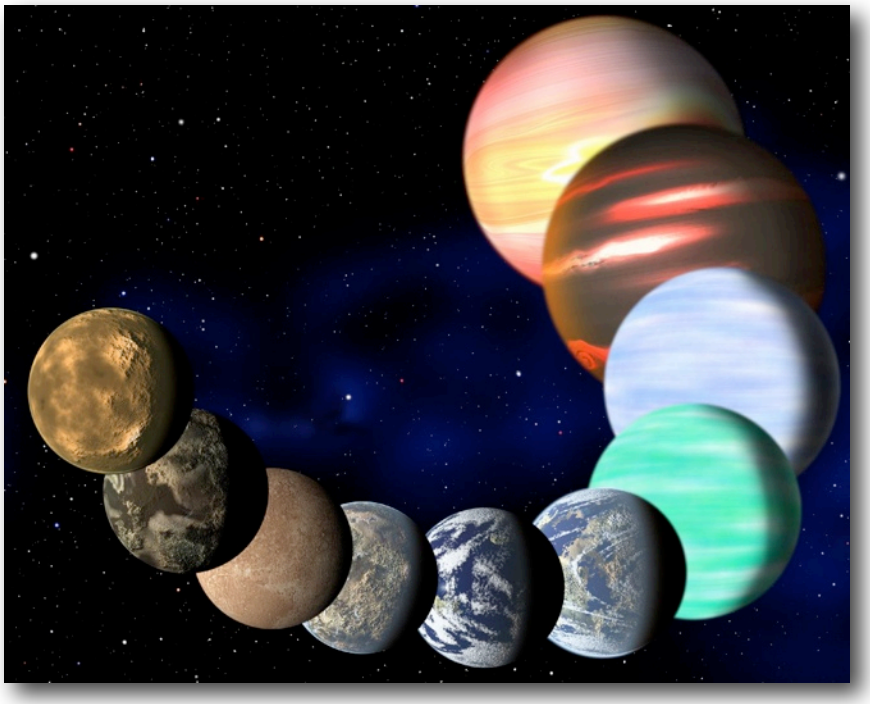
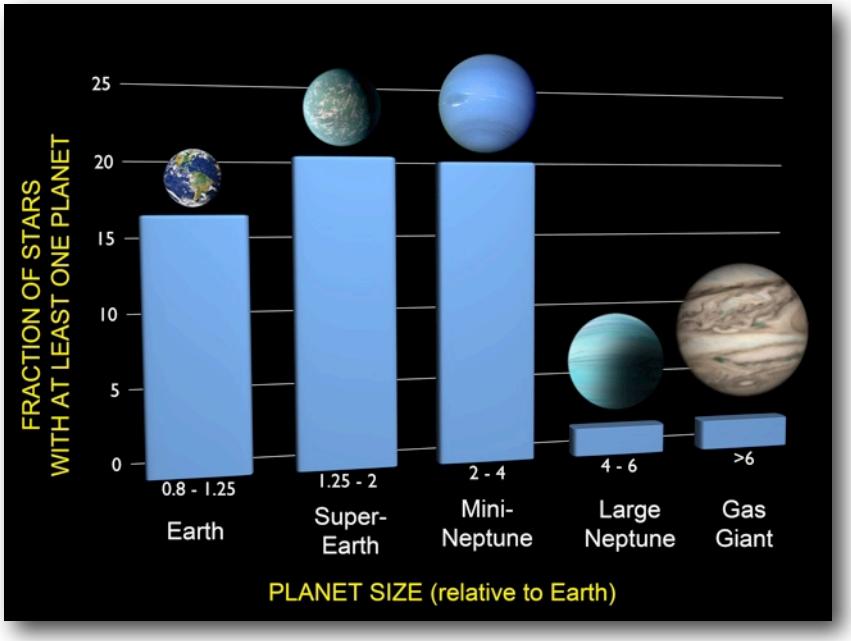


This artist's illustration represents the variety of planets being detected by NASA's Kepler spacecraft. A new analysis has determined the frequencies of planets of all sizes, from Earths up to gas giants. Key findings include the fact that one in six stars hosts an Earth-sized planet in an orbit of 85 days or less, and that almost all sun-like stars have a planetary system of some sort. (Hat tip to Robert Hurt for inspiring this illustration.)
Credit: C. Pulliam & D. Aguilar (CfA)



A new analysis examined the frequencies of planets of different sizes based on findings from NASA's Kepler spacecraft, correcting for both incompleteness and false positives. The results show that one in six stars has an Earth-sized planet in a tight orbit. About a fourth of all stars in the Milky Way have a super-Earth, and the same fraction have a mini-Neptune. Only about 3 percent of stars have a large Neptune, and only 5 percent a gas giant at the orbital distances studied.
Credit: F. Fressin (CfA)

"There is no better high than Discovery"

E.O. Wilson

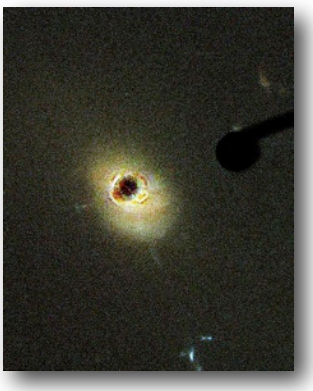
Award Winning Harvard Environmentalist and Entomologist

It was just before 1:00 AM on March 27th, 2012, when I captured a 2 minute image of the famous Quasar, 3C 273. Paula and I were staying at our hacienda at Arizona Sky Village, located near Portal, AZ, and the night was perfect for astrophotography. I was imaging through my Takahashi TOA150, using an SBIG STL11K camera chilled to -20C. The whole optical train was supported on the Takahashi EM 400 equatorial mount and, for such a short exposure, no guiding was required. For most amateur astronomers, Quasar 3C 273 is the most distant object they can observe through their telescopes. It is an amazing 2.44 billion light years distant! It is cool to see something that distant with your own eyes and I certainly had no trouble seeing its' 12.9 magnitude stellar disc in my 6 inch refractor. Check your star maps. It is located in the constellation Virgo, at the coordinates, RA12h 29 min 6.7 s and Dec + 2° 3 min 9 s. My image is shown at right. I inverted the black and white colors, cropped the photo, identified 3C 273 by adding an arrow, and added labels using comparison magnitudes I obtained from an AAVSO Chart.

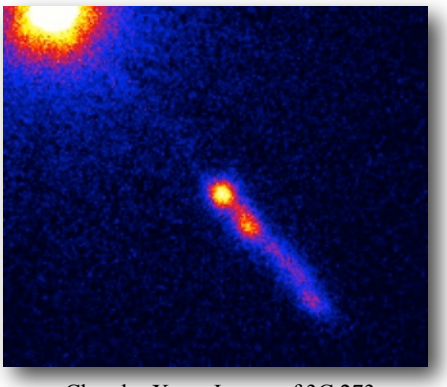
"Quasars", or "QSOs", are "quasi-stellar radio sources" and are now understood to be very energetic and distant galactic nuclei powered by immense black holes. They represent some of the most enigmatic objects in the universe and their discovery makes for one fascinating story. The first quasars were discovered with radio telescopes in the late 1950's. By 1960, hundreds of these objects had been catalogued and published in "The Third Cambridge Catalogue (3C)" of radio sources. Their actual location posed a problem. The small angular size of these sources coupled with the poor resolution of the radio telescopes meant they could not be correlated with any visible astronomical object! Finally, in 1960, one of these sources (3C 48) was tied to a faint, blue, 16.2 magnitude star in Triangulum, which appeared to be pouring out radio waves. The famous astronomer, Alan Sandage, took the spectrum of this object and it had the "weirdest spectrum" he had ever seen from a star. It had broad emission lines that couldn't be identified with any known chemical element. Very strange!

Astronomers simply needed a larger sample of QSO spectra and, for that, they needed to know the locations of other quasars. Enter Cyril Hazard, a Jodrell Bank radio astronomer, who pioneered a novel method of determining the location of some of these quasars. He used the idea of lunar occultations to determine some quasar locations. The idea is simple enough. Let the Moon, in its easterly motion about the Earth cover up, or occult the quasar. By knowing the Moon's exact position when it occulted the radio signal from the quasar it would then be possible to determine its' position. Hazard had calculated a date when the Moon would occult 3C 273, and the Parkes' Radio Telescope in Australia (called the Dish) was ideally sited to observe this occultation. It was fortunate that Cyril had left Jodrell Bank to take a position in the Physics Department of the University of Sydney, and, now in Australia, he arranged with the Parkes' Director, John Bolton, to observe the lunar occultation of 3C 273.

The occultation was due on August 5th, 1962 but unfortunately for Hazard, on the day of the occultation, he boarded the wrong train from Sydney and missed the whole event! Lucky for him, John Bolton, along with M.B. MacKay, and A.J. Shimmins, took charge of the observations. Because the quasar was low on the horizon the astronomers cut down some of the horizon trees. They then removed some of the radio telescope's safety bolts so that it could be tilted toward the horizon. Success! The lunar occultation identified the location of quasar 3C 273 with a 12.9 magnitude star.



HSTVisible Light Image of 3C273



Chandra X-ray Image of 3C 273

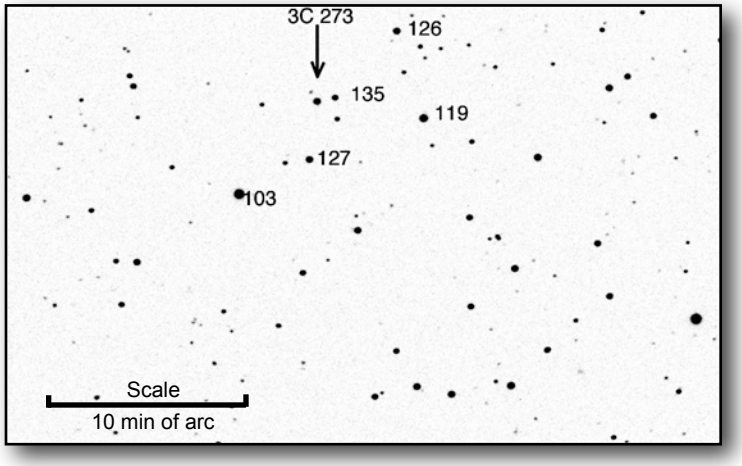


Image of 3C273 with magnitudes of surrounding stars, i.e. 126 =12.6 Doug Cunningham, SBIG STL11K camera, Takahashi TOA 150 mm refractor, f/7.3 (1100 mm fl) exp=120 s, T=-20C [quasar mag = 12.9]

The position of 3C 273 was communicated to Cal Tech astronomer, Maarten Schmidt. On December 27th, 1962, on his 33rd birthday, Schmidt, using the 200 inch Palomar telescope, recorded its spectrum. Like quasar 3C 48 before, it had wide, bright emission lines that could not be easily identified with any element! Then, on February 5th, 1963, while writing up his results for a Nature publication, Maarten realized that those wide emission lines were simply the Balmer emission lines of hydrogen shifted 16% out of place towards the red part of the spectrum! There could be only one interpretation. Quasar 3C 273 was receding at nearly 37% of the speed of light! To be receding at that speed the quasar had to be far away, at cosmological distances. To be visible at all, at such a distance, the quasar had to have a powerful energy source and nuclear fusion reactions would not be adequate! Only matter falling into a "black hole" could provide such scales of energy.

Since 1963 over 200,000 quasars have been discovered and they all display spectra that are significantly red-shifted. This implies that quasars are receding and are extremely distant objects, objects created in the early Universe. Quasar 3C 273 is the closest, at a 2.44 billion LY distance, and provides the best case to build a physical model. Two supporting images are shown below, both of 3C 273. One, taken in visible light by the HST, shows the quasar embedded in a 16th magnitude elliptical galaxy. The other, taken by the Chandra X-Ray telescope, shows an energetic jet emanating from the galactic nucleus. The evidence supports the idea that a quasar's energy source comes from matter from an orbiting accretion disk falling into a supermassive black hole at the center of a galaxy. We think the accretion disk results from galaxy collisions in the early Universe.

So, the quasars tell a fascinating story. We live in an expanding, evolving Universe and the past was a different place than the present. Indeed, those distant quasars are ancient fossils and they open a window into galaxy formation in the early Universe. On that March 27th morning in Arizona, I opened that window for a brief 2 minute look.

Lepus (Lep)

α Leporis - Arneb β Leporis - Nihal

Lepus is located at the feet of Orion, the Hunter; its four brightest stars all of the 3rd magnitude, form an easily identified trapezoidal figure. Four smaller stars in a rough rectangle (λ, k, ι and ν-Leporis) represent the long ears of the hare. γ-Leporis is a fieldglass double.

DOUBLE STARS [Note: two digits in bold mean negative Decl.]

	Mag.	Sep (s)	Location	Remarks
α	2.7-12.0	36	053**18**	Yellow-Grey.
β	2.8-9.4	3	052**21**	
γ	3.8-6.4	95	054**22**	Yellow-Garnet.
k	4.5-7.5	2.5	051**13**	Yellow-Blue.
H3752	5.5-6.7-9.0	3-59	052**25**	Triple.
H3780	--	--	053**18**	Beautiful multiple star; v. fine in small scopes

MESSIER OBJECTS

	Mag	Location	Remarks
M79	7.9	052**25**	Globular Cluster, fairly bright, very beautiful

Other Objects of Interest in Lepus

R Leporis - Hind's "Crimson Star," a long period var. (436 days), magnitude range 6-11. Observe at maximum; it appears blood-red in a telescope. Location 045**15**.

Puppis (Pup)

Puppis is a part of the ancient constellation Argo Navis (the ship) which is no longer recognized as a single constellation. Puppis is not visible in its entirety from the latitudes of [Canada and] the United States. ζ-Puppis, a 2nd magnitude star, and its companion in the sky, γ-Velae are two of the hottest stars known.

DOUBLE STARS

	Mag.	Sep (s)	Location
σ	3.3-9.4	22	072**43**

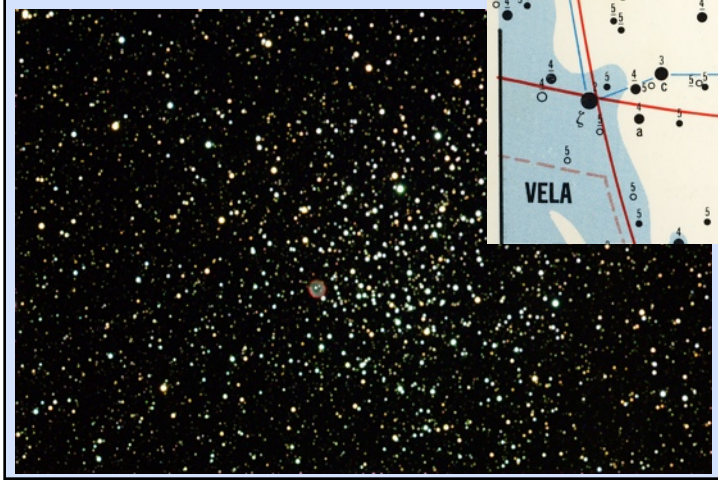
MESSIER OBJECTS

	Mag	Location	Remarks
M46	6.0	074**15**	Open Cl.
M47	---	075**21**5	Open Cl.
M93	6.0	074**24**	Open Cl.

Other Objects of Interest in Puppis

NGC2440 -Planetary Nebula mag 11, Location 074**18**

[NGC2438 -Planetary Nebula mag 10, is superimposed on M46. Neat combination of objects. A must see, image below. -ed]



Canis Major (CMa)

β Canis Majoris - Murzim
γ Canis Majoris - Muliphen
δ Canis Majoris - Wezen

α Canis Majoris - Sirius
ε Canis Majoris - Adara
ζ Canis Majoris - Furud
η Canis Majoris - Aludra

Sirius, the brightest star in the sky (magnitude -1.47), is the most conspicuous star in this constellation. It is easily located by following downward the line connecting the three stars in the Belt of Orion. Sirius is the nearest star to the sun visible to the naked eye in the northern latitudes, being but 8.7 light years distant. It has a white dwarf companion, a star so dense that one cubic inch weighs a ton. M 41 is an open cluster visible to the naked eye and is a fine sight in binoculars. Also observe with binoculars the fine field of stars between δ and o_1 Canis Majoris; look for a very red star in this field.

DOUBLE STARS [Note: two digits in bold mean negative Decl.]

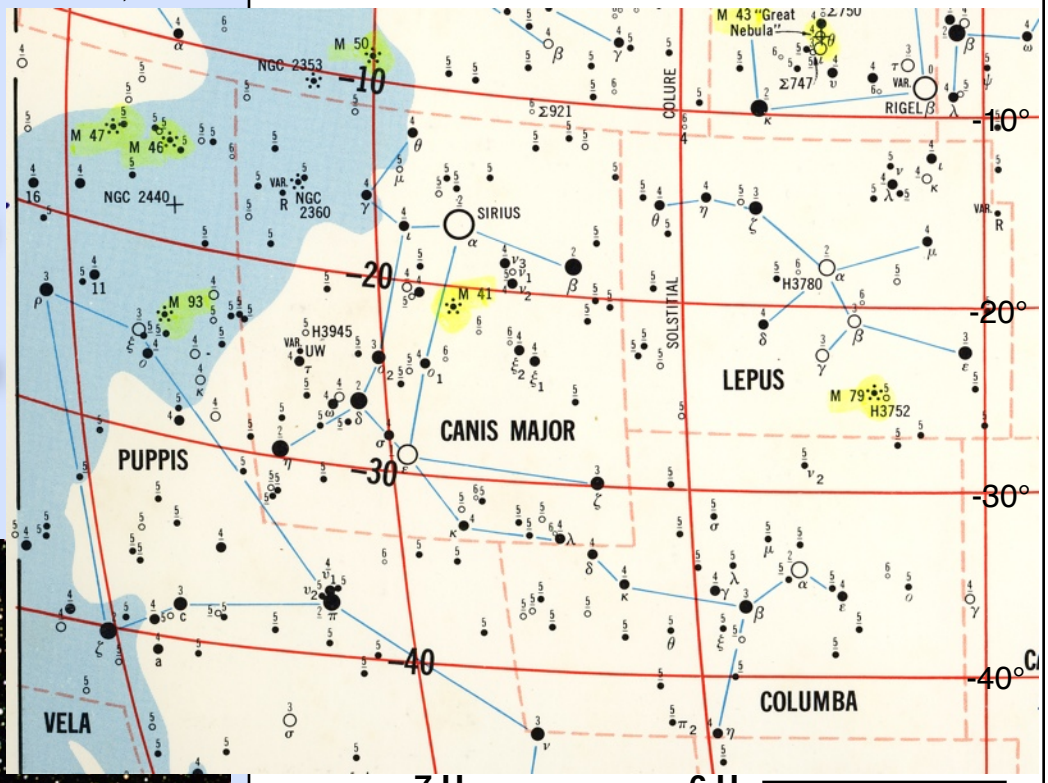
	Mag.	Sep (s)	Location	Remarks
α	-1.47-8.4	11	064**17**	
ε	1.6-9.0	8	065**29**	Good contrast.
μ	5.2-8.0	3	065**14**	White-Blue.
ν1	5.8-7.9	17	063**19**	
H3945	5.0-7.0	27	071**23**	Orange-Pale Blue; beautiful

MESSIER OBJECTS

	Mag	Location	Remarks
M 41	4.6	064**21**	Open Cluster. Beautiful in small scope, red star in centre.

Other Objects of Interest in Canis Major

NGC 2360 - Open Cluster. Location 073**14**.
R Canis Majoris - A short period (1d 3h 15 min) variable, magnitude range 5.9-6.7. Location 071**16**.



Star magnitudes are labeled as numerical values above (or near) the star. Underlined values are half magnitudes. Larger star dots denote brighter stars.

Chart Legend
- Star Location
- Double Stars
- \+ Nebulae
- ✶ Clusters
- Variable Stars Var

M46 image by Paul and Liz Dowding
www.paulandliz.org/

Feb 1 **Spica 0.3° N of Moon, occultation (not vis in N.America)**
Feb 3 Saturn 3° N of Moon
Last Quarter Moon rises at 1:05 am EST
Feb 4 Mars 0.4° S of Neptune
Feb 8 **Mercury 0.3° N of Mars**
Feb 10 **New Moon rises at 7:16 am EST**
Feb 11 Mars 6° S of Moon
Mercury 5° S of Moon
Feb 15 **Close pass of asteroid 2012 DA14**
Feb 16 Mercury greatest elongation E (18°)
Feb 17 **First Quarter Moon rises at 10:53 am EST**
Look for Lunar "X" tonight -see page 6
Feb 18 **Jupiter 0.9° N of Moon, occultation (not vis in N.America)**
Vesta 0.3° N of Moon, occultation (also not vis)
Feb 25 **Full Moon (Snow Moon) rises at 5:14 pm EST**
Feb 27 **Zodiacal light W, after even. twilight next 2 wk.**

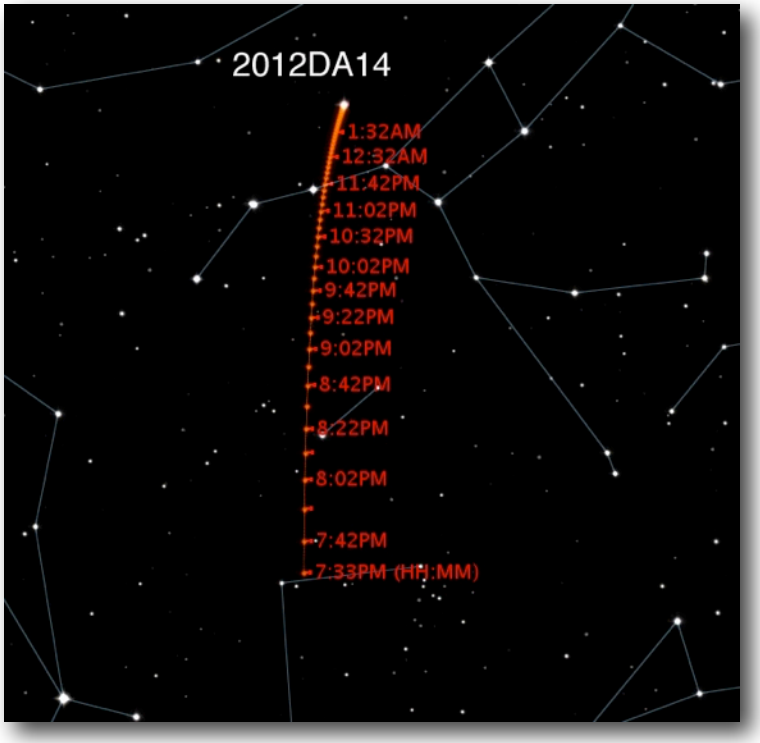
BAS Events

No February meeting of BAS. Next meeting is March 6, 2013 at Grey Roots Museum. Have a happy holiday with clear skies until we meet again!

Special Events

2012 DA14 buzzes Earth

A former student of mine, Josh G. alerted me to the fact that an asteroid discovered last year was due to pass very close to Earth on Feb 15. Even though 2012 DA14 is less than 50 m across, it is predicted to be visible in small scopes or binoculars for a few hours centered on its closest approach. By the time it rises above our northern horizon at 7:30 pm Feb 15, it will have passed its maximum brightness of 7.5 or so and be fading, but it still should be visible as a rapidly moving point through Canis Venatici and Ursa Major. If it's a clear night, it is worth going out for a look.

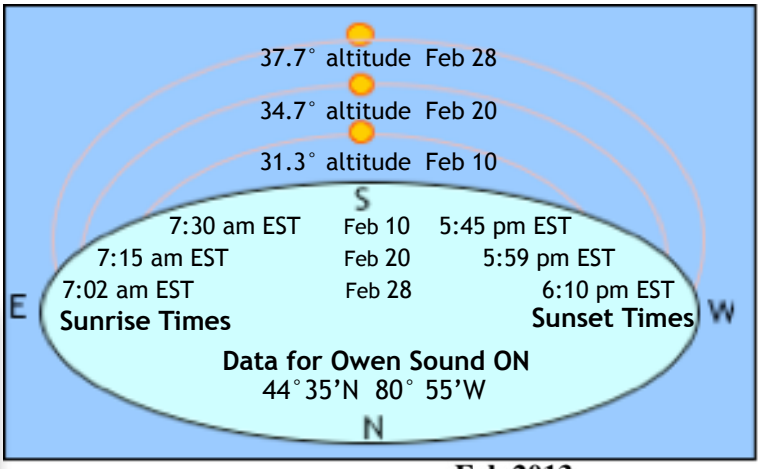


The orbital elements of 2012DA14 were obtained from the Minor Planet Center (http://www.minorplanetcenter.net/) and entered into SN 6 Pro to plot the path of the asteroid from its rising in the north on Feb 15 to about 1:30 am Feb 16. A flat northern horizon would be needed to give you a chance of success. Good luck and please let SGN know how you make out.

Planets

MERCURY, becomes bright (-1.0) and well-placed for viewing in Feb. Best time is around the middle of the month after it has its close pass to Mars on the 8th. **VENUS**, (-3.9), a dawn planet closing on the Sun pretty much disappears in the twilight by month-end. **MARS** (1.2), similarly becomes too close to the Sun for viewing by the end of February. **JUPITER**, (-2.4) is up at dark and crosses the meridian (highest in the sky) before midnight. By month-end it is slightly lower in the SW sky and still a prime target for viewing. **SATURN**, (mag 0.5), is located in Libra and rises around midnight. Ring tilt is still 18°or so. **URANUS**, (5.7) is visible only for an hour or two after sunset this month. **NEPTUNE**, (7.8) is near Mars and similarly disappears into the glare of the Sun by the end of Feb. Finder charts are available on S&T website in their Observing section. Also there, you will find charts for an **asteroid, Vesta (7.8)** and **dwarf planet**, **Ceres (8.1)**. Ceres is near Elnath, the right horn of Taurus in February and Vesta is closer to the Hyades. **PLUTO** (mag. 14) is a dawn planet and only 15 degrees high at the start of morning twilight.

The diagram below gives the sunrise/sunset times and the sun's altitude on three dates this month. The sun continues climbing in elevation this month. The moon calendar below the sun chart shows lunar phases for the month. Times of moonrise for NM, FQ, FM and LQ are in the Sky Calendar listing at left. Although we are now on EST, we change to DST soon, i.e. March 10.



Feb 2013

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3 LQ	4	5	6	7	8	9
10 NM	11	12	13	14	15	16
17 FQ	18	19	20	21	22	23
24	25 FM	26	27	28		

By permission University of Texas McDonald Observatory

BAS Member Loaner Scopes

Solar H-alpha scope now available!

Our Lunt solar scope is now available for loan by BAS members! You need to provide a mount like a heavy-duty tripod, or a regular equatorial or azimuth mount. A short training session will be provided on pickup.

BOTH 12-inch Dobs now available.

BOTH 12-inch telescopes are now available for the winter, and we have at least one **8-inch dobsonian** for free member loan. Contact Brett T. or John H. if you are interested.

Scopes come in and out periodically so keep checking with Brett or John if you are interested in a loaner.

SGN Classified Ads Section

FOR SALE: Canon EOS 50D DSLR
(body only)

15.1 Mp Excellent noise reduction features for night photos. Includes spare batteries and charger, 120V adapter, strap, software and manual.
Asking $ 600. John H. 519 371-0670 **stargazer@wightman.ca**
Information about the 50D can be found here:
http://en.wikipedia.org/wiki/Canon_EOS_50D
and here: http://www.imaging-resource.com/PRODS/E50D/E50DA.HTM

FOR SALE: Televue Pronto

2 element E.D. Refractor, 2.7" / 70mm diameter. f.l. 480mm, f/6.8. with 1-1/4" Star Diagonal, with 45 degree Prism diagonal (for terrestrial viewing), with TeleVue Red dot finder, complete with TeleVue Soft Case. Asking $ 700.-- Firm Anton VanDijk 519 376-9912
ravand@rogers.com

FREE STUFF:
Andreas Gada has donated back issues of **Sky & Telescope and Astronomy magazines**
These are free to pick up at the ES Fox Observatory
Next time you are there, HELP YOURSELF !

MORE FREE STUFF:
We are accumulating several small refractors and other equipment that we cannot use.

Check out the FREEBIE SCOPE BIN at the ES Fox Observatory
Next time you are there, HELP YOURSELF !

What They Said **After** Doomsday...

A Harry Potter fan called **@_Snape_** tweeted to remind everyone that NASA had confirmed that the sky would become very dark late in the evening on December 21. "***This is a phenomenon called 'Night',"*** he explained.

"Whether the final blow comes from flesh eating zombies, demonic hell beasts or from the total triumph of K-pop, if you know one thing about me it is this: I will always fight for you to the very end." **Australian Prime Minister Julia Gillard**

From Shanghai: *"I am still alive, because the stocks haven't risen!"*

From Beijing: *"I am still alive, because I haven't received my salary!"*

Anonymous: *"I've yet to actually see a person who believes in that nonsense to begin with. I'm beginning to wonder if they exist."*

People wouldn't believe in such ridiculous things if the media didn't deliberately play to their fears. Stop calling it "Doomsday" and stop trying to sell papers by playing to the fears of the dimmest among us. **-Anonymous**

Over 35 million travelers arrived at airports near Mayan sites this year. *"The Mayas had no idea they were giving us a marketing tool when they stopped writing their calendar,"*:**Eduardo Rivadeneyra,** a public relations director for Mexican airline Asur.

"They can believe whatever they want,-they just have to stay off the ruins." **Rover Scout guarding Chichen Itza**

"I've been trying this new energy collection technique with this Mayan teacher I'd seen on YouTube," says ***Dred (Wordell)***. *"Gotta admit I've gotten pretty dizzy from all the spinning."*

"I don't want to sound like I am bragging or anything , but this is the 6th end of the world that I have survived." **-anon**

If it's true that our species is alone in the universe, then I'd have to say the universe aimed rather low and settled for very little. *George Carlin*

"Told you so!": **NASA**