Ottawa Astronomy Workshop #19

My Favourite Astro Image or Video

11 Jan 2018

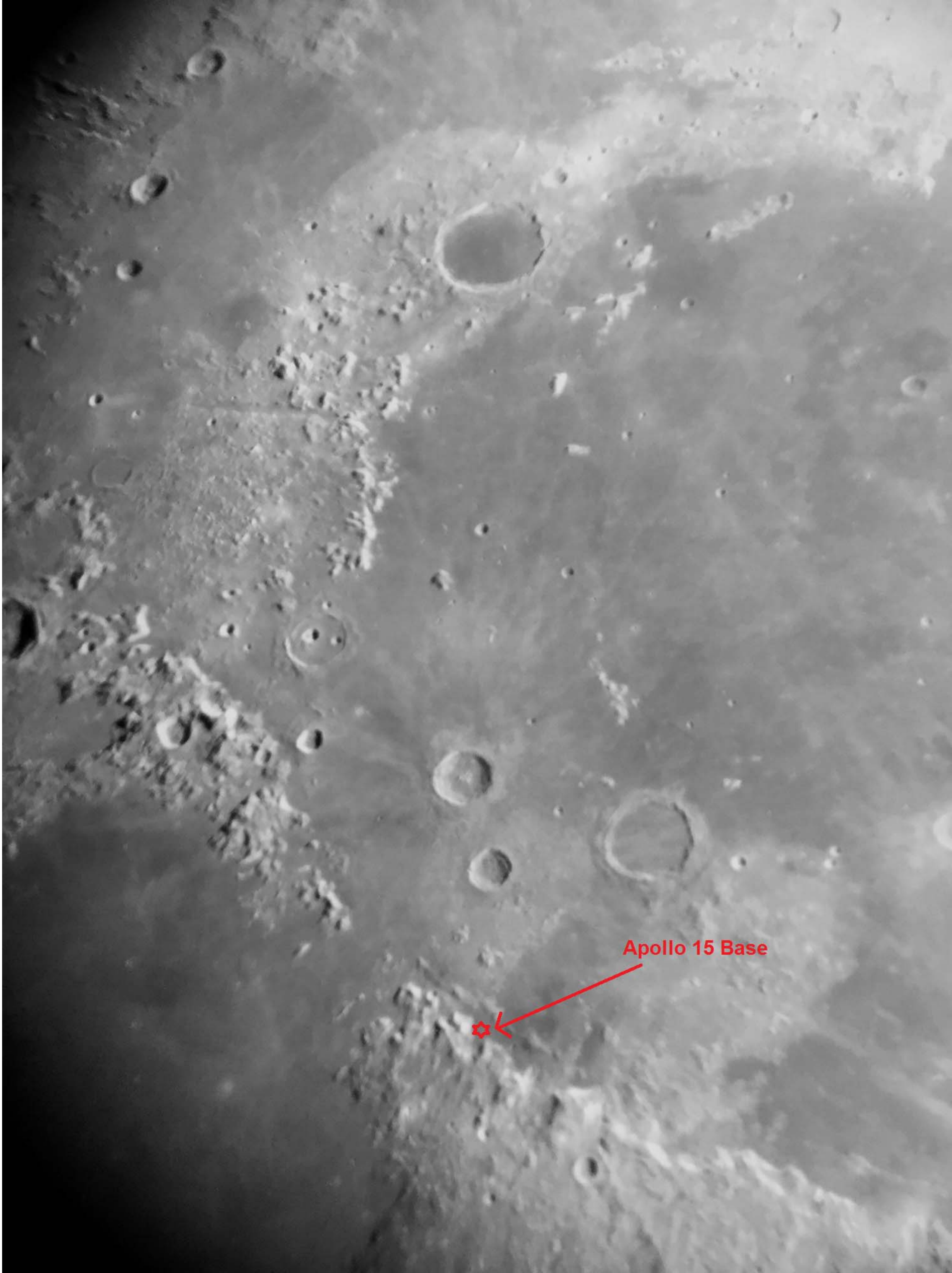
List of Presenters:

1. Jim Sofia
2. Robin Smid
3. Stephen McIntyre
4. Waldo Krolak
5. Jim Maxwell
6. Simon Hanmer
7. John Thompson
8. Jim Thompson

#1 - Jim Sophia

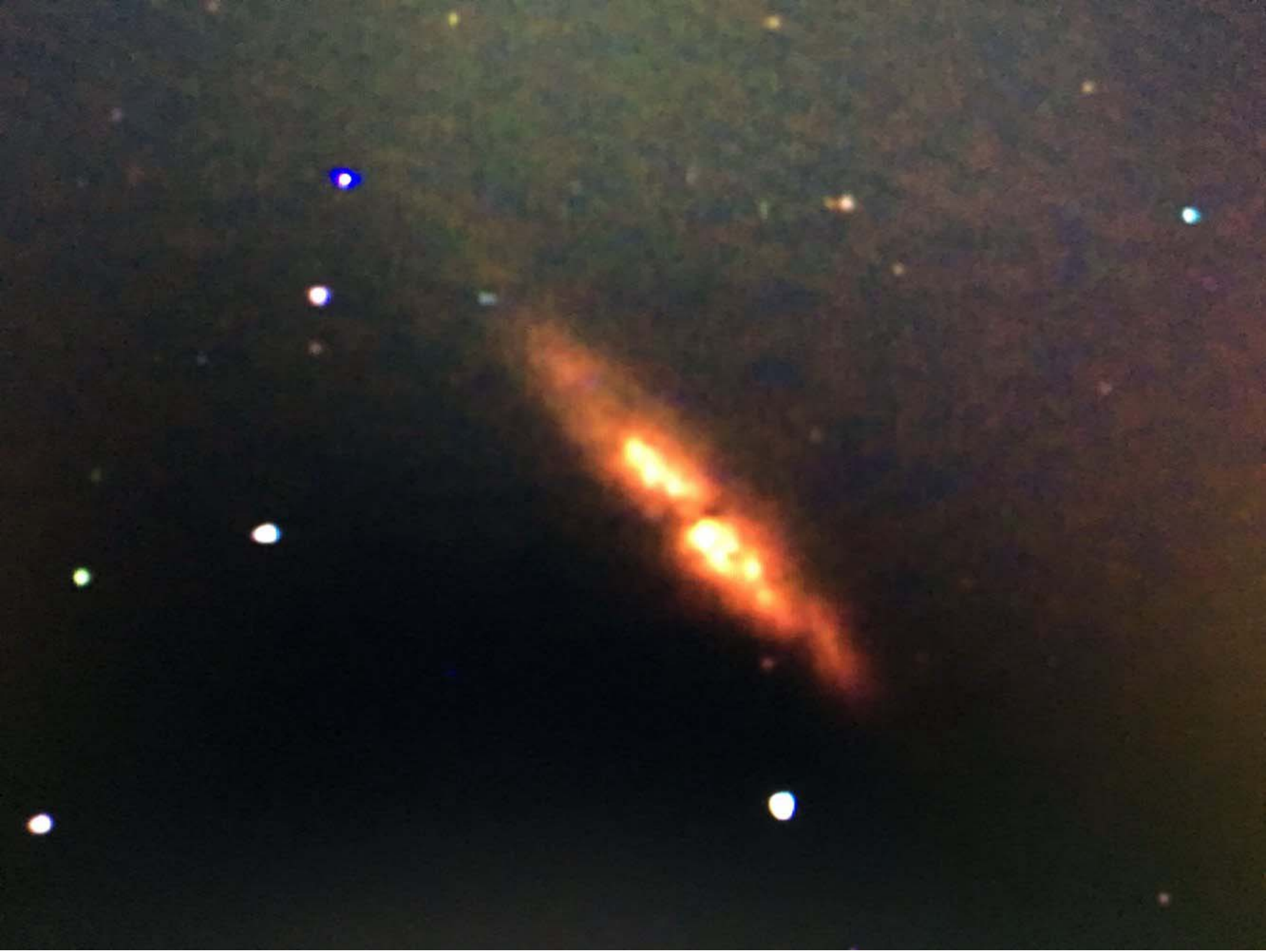
1. The Apennine Mountains on the moon taken with my SCT 8 and iPhone
2. The site of Apollo 15 base on the moon taken with my SCT 8 and iPhone
3. M27 with Mallincam Xterminator
4. M82 with Mallincam Xterminator along with a photo of the supernova at M82 I got from the Internet. I believe I have captured the supernova as well but would like verification from the group - therefore the comparison photos to examine. [consensus amongst group was that supernova was not captured in Jim's image]

Apennine Mts. SCT8 with iphone



Apollo 15 base marker

M27 Mallincam Sep 13, 2017



M82 Mallincam

M82 supernova shown

#2 - Robin Smid

1. First astrophoto - M31

M31 First Astro Photo

#3 - Stephen McIntyre

Actually to tell the story of why I like the image, I have three images that set the context.

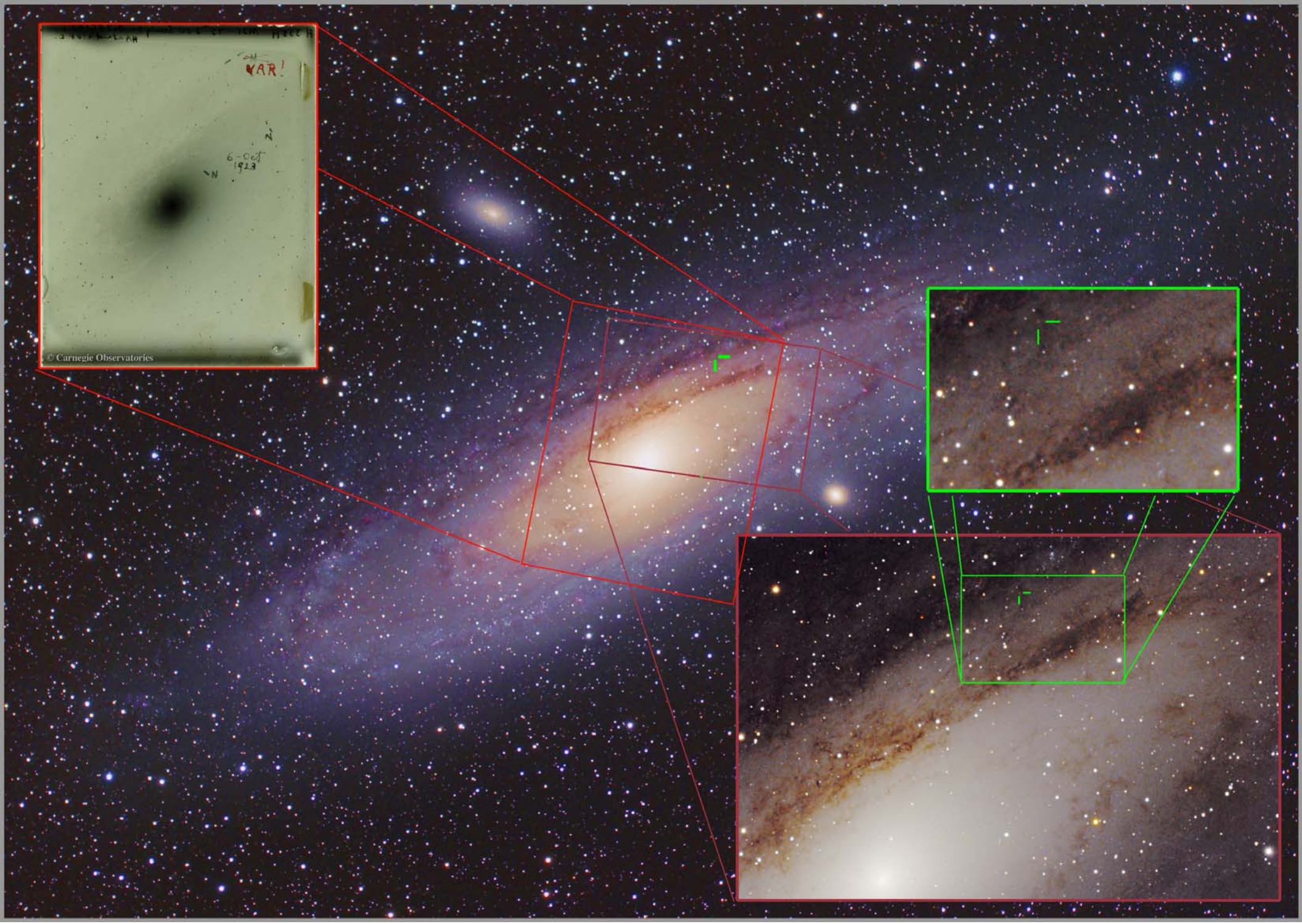
1. The first image of the 3 should be the finder which shows the whole of M31, the area of my close up and finder for m31_v1.
2. The main image, which should go 2nd, is the close up of M31 which captures Hubble's 1st Cepheid variable discovered in a "Spiral Nebula".
3. The 3rd image is a close crop of my image showing m31_v1 along side a scan of the original plate Hubble used to 1st identify the variable.

#3 - Stephen McIntyre, cont'd

In case you don't know the background, here is a link to my website which explains the importance of this variable star in determining the scale of the universe - at least as it was known in 1923.

http://denholmobservatory.ca/?p=1289

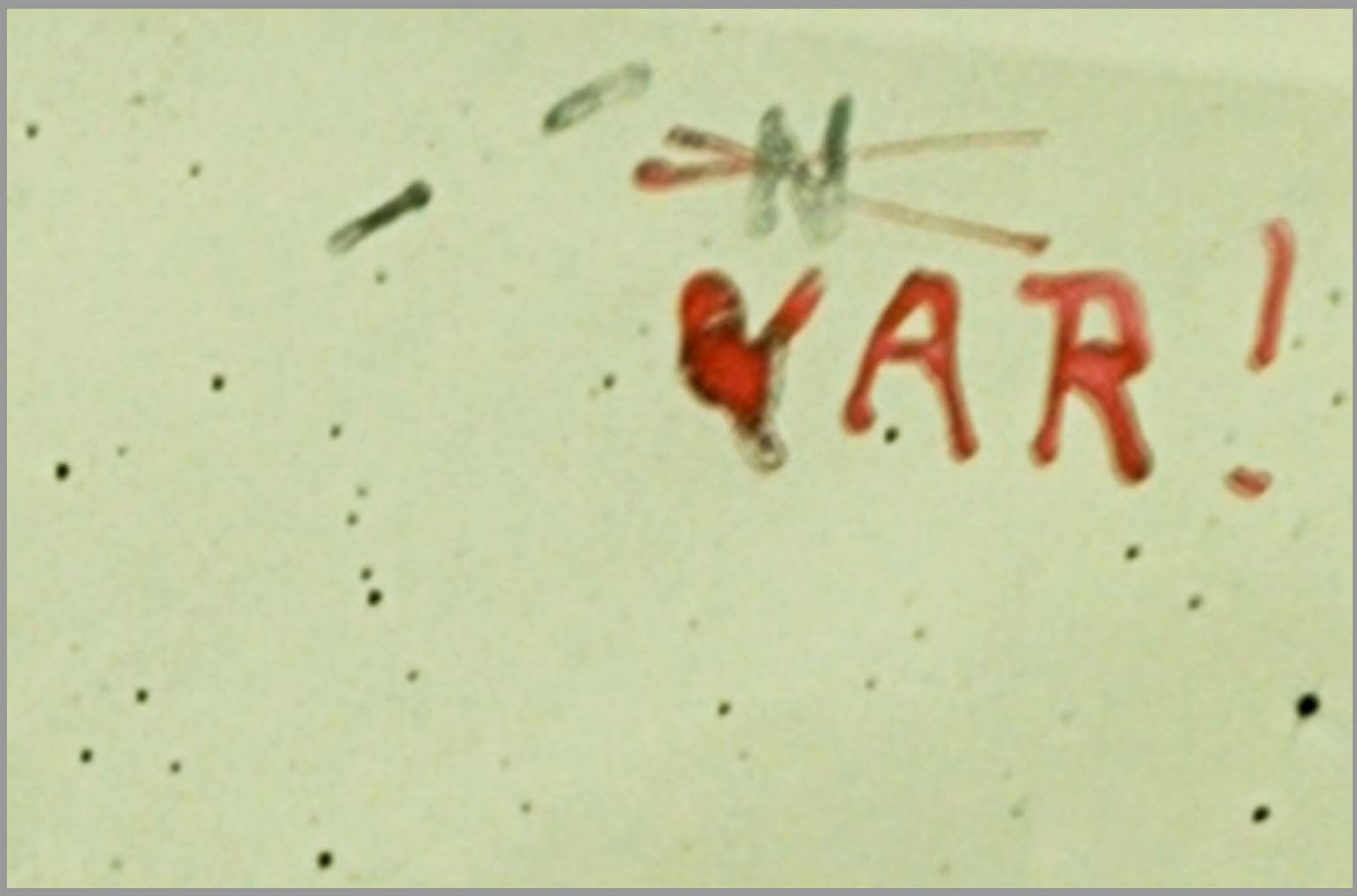
p.s. Later in the evening discussion of earliest images of the Moon was discussed. The 1863 image of the Moon by Draper was mentioned.

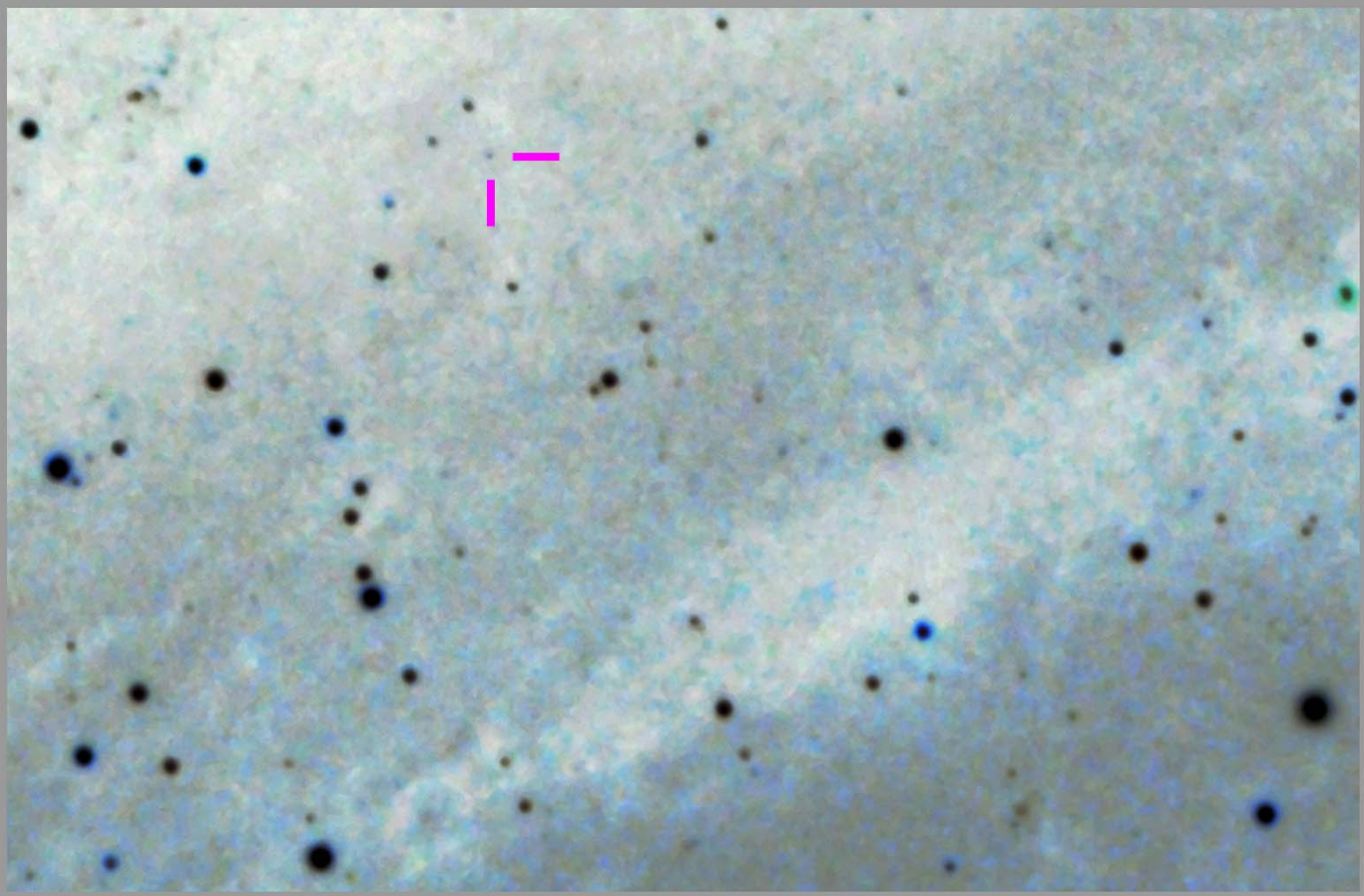


M31 Hubbles Cepheid Wide FIeld Locator v2

VAR!

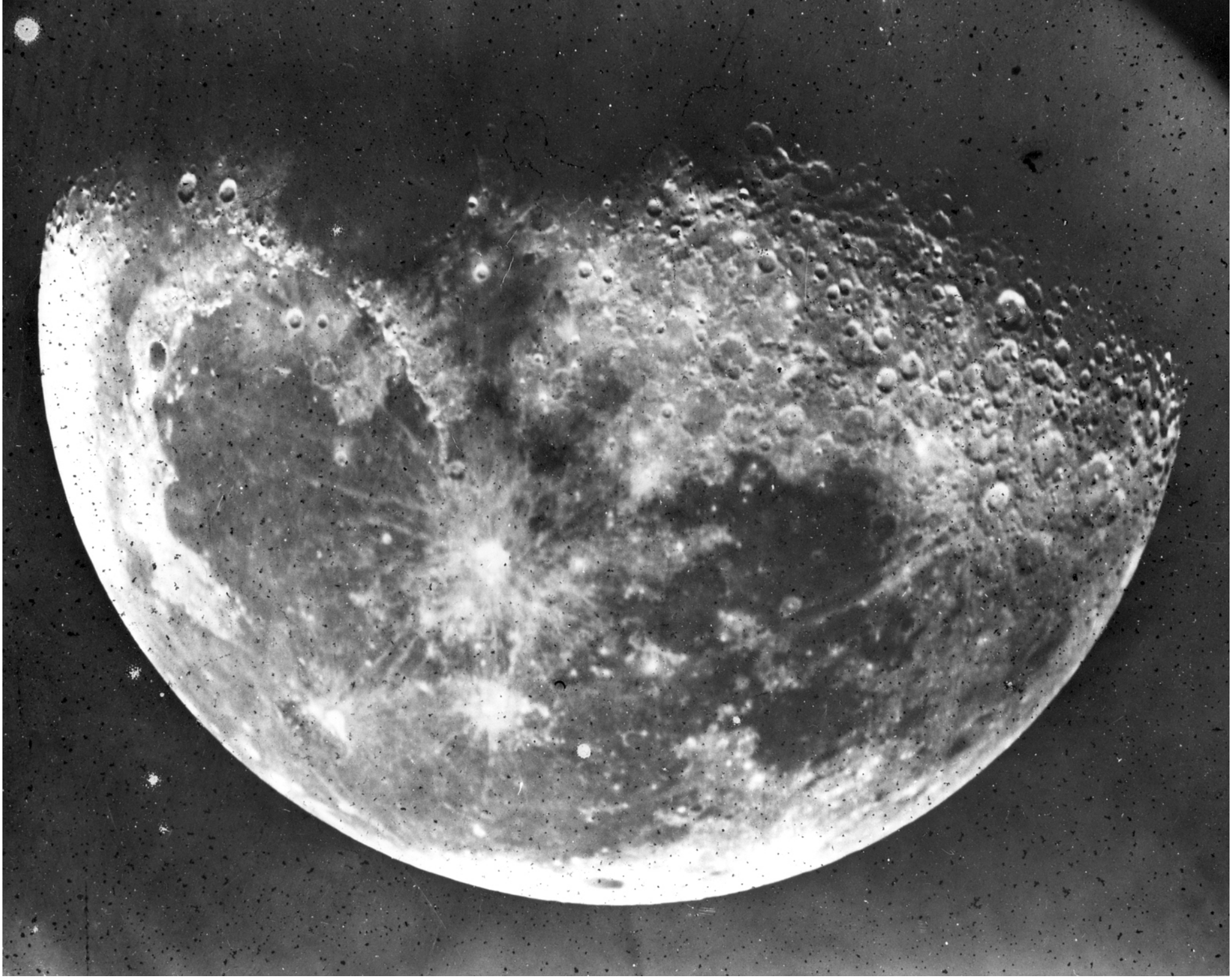
6-Oct
1923





IMG_0331

IMG_0003



Draper-moon 1863

#4 - Waldo Krolak

1. Assortment of photos captured using Canon 60D DSLR camera, showing progression from early photos to more recent.

M27 Stacked copy PS Adjusted

M57 Stacked and AdjustedFinal

M13 Stacked adlusted Final

M71 Stacked and Processed Final

NGC 40 Stacked and adjusted Final

Albireo 10 sec ISO 1600 Final

M82 Final Adjustment

M81 Final

Final Stacked M33 JPEG

M42 Final

M45 Stacked and Adjusted

M17 Swan Stacked and Adjusted Final

M8 Lagoon Adjusted CS5 Jpeg

IMG_0002

IMG_0023

IMG_0050

IMG_0068

IMG_0070

IMG_0072

IMG_0075

IMG_0076

IMG_0079

IMG_0083

IMG_0092

#5 - Jim Maxwell

1. Time lapse video of Smart Scope during the Mercury Transit of the Sun, May 2016. Captured with GoPro camera, with music track added. (20.4Mb)
   http://karmalimbo.com/aro/workshops/Mercury.wmv
2. Time lapse video of Moon rising over city in Spain. Captured with GoPro camera, with music track added. (19.4Mb)
   http://karmalimbo.com/aro/workshops/Moonrise1.mp4

#6 - Simon Hanmer

Discussion around graphic of how the Moon formed (build up for our next OAWS!), plus a series of links to videos online.

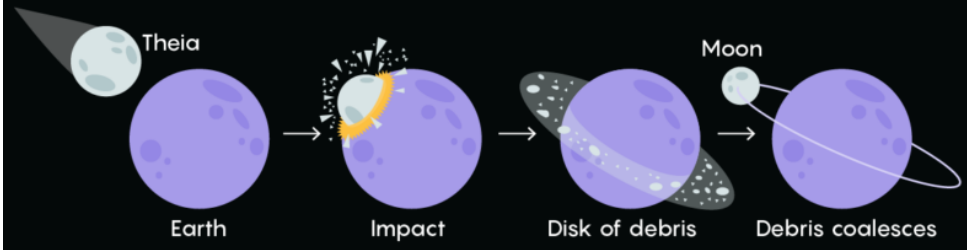
1. http://karmalimbo.com/aro/workshops/Solar_Prominence_2016_06_25_TLT_HD.mp4 ... Simon's own time lapse video of prominence activity
2. https://cosmosmagazine.com/physics/the-5-steps-of-a-solar-eruption?utm_source=Today+in+Cosmos+Magazine&utm_campaign=5c59a5f4a5-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-5c59a5f4a5-179978549
3. https://www.youtube.com/watch?v=Qurh_BZ-O2E … eruption solar filament
4. https://www.youtube.com/watch?v=YIHuk-vpdiI … Coronal rain
5. https://www.youtube.com/watch?v=g1fPhhTT2Oo … New Horizons simulated flyover of Pluto
6. https://www.youtube.com/watch?v=f0Q7O7TZ7Ks … New Horizons simulated flyover of Charon
7. https://www.youtube.com/watch?v=xmqDpuDLVYw … landing on Pluto
8. https://www.youtube.com/watch?v=NEdvyrKokX4 … Pluto terrains
9. https://www.youtube.com/watch?v=2iSZMv64wuU … LRO simulated flyover of the Moon

Four Ways to Make the Moon

As the leading theory for the moon's formation runs into problems, scientists have floated other ideas for how the moon came to be.

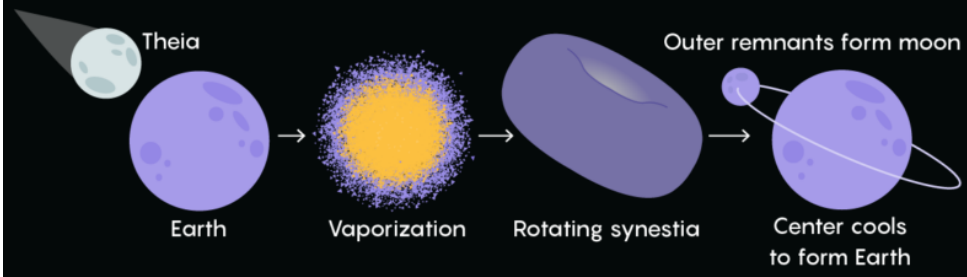
Giant Impact Model

This classic theory, developed in the 1970s, holds that a Mars-size rock called Theia smashed into the young Earth. The impact created a disk of debris that eventually coalesced into the moon. Yet recent studies have revealed a conflict: Computer simulations of the event suggest the moon should be made of mostly Theia-like material, while lunar geochemistry research suggests that the moon is made of Earth-like material.



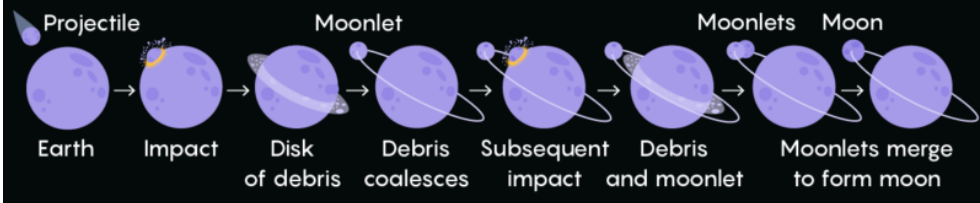
Synestia

Perhaps Theia struck the proto-Earth with enough energy to vaporize both objects, forming a new cosmic structure called a synestia. This rotating cloud of hot debris could have thoroughly mixed material from Theia and Earth, leading to a Earth-moon system with identical geochemistry.



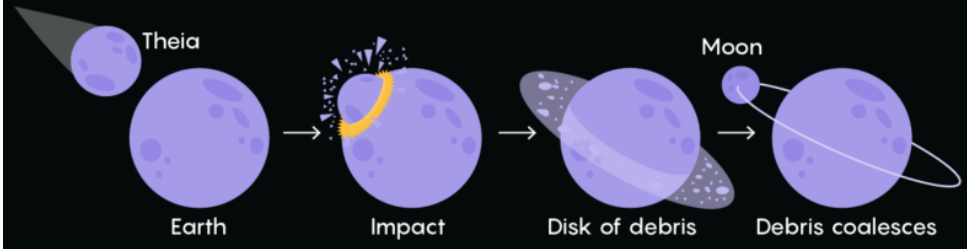
Moonlets

Instead of one giant impact, perhaps many smaller impacts created the moon. In this model, each moon-size impactor creates a debris disk that eventually coalesces into a moonlet. Successive impacts create additional moonlets that all eventually combine to form the moon.



Twin Collision

Perhaps the simplest alternative is that Theia was made of the same kind of material that the young Earth was. This possibility challenges much of what we know about the formation of planetary systems, however.



MoonMakers-795x1720

#7 - John Thompson

1. Wide field view of southern sky captured during trip to Atacama desert in 2014.
2. Same wide view with annotation added.
3. Close-up view of southern sky from Crux to Carina.

Sky from observing field 3

Sky from observing field 3 annotated large

Crux to Carina b

#8 - Jim Thompson

1. Favourite deepsky image - anniversary update to Pillars of Creation by HST. Detail and sense of scale from image is impressive. Object is 6500-7000 lyr away, left most pillar is ~ 4 lyr in length, finger like protrusions at top are roughly the size of our solar system.
2. Favourite planetary image - anything from Cassini probe that was just crashed into Saturn in September. Example image presented is of Saturn with rings.
3. Favourite topic of discussion at OAOG Gabfests #1 - Rosetta mission to comet 67P.
4. Update on Rosetta mission - image comparing before-after changes on surface of comet.
5. Favourite topic of discussion at OAOG Gabfests #2 - New Horizons at Pluto. Especially hot topic - glaciers on Pluto!
6. My first astro images - Moon and Jupiter captured in August 2010.

#8 - Jim Thompson, cont'd

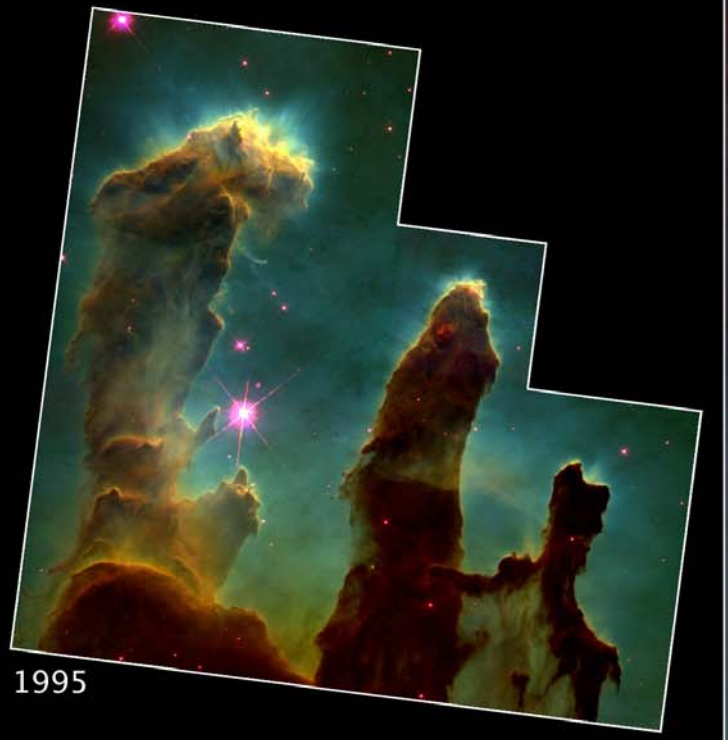
7. Sampling of my best planetary images to date. A struggle to get good images from inside the city
8. Most detailed image of a sunspot I've captured, AR2403 on August 23rd, 2015 using CaK filter.
9. Most recent cool capture of the Sun, a loop prominence time lapse video with coronal rain captured on 10-Sep-2018.
   http://karmalimbo.com/aro/workshops/B4-Sep10th_Coronal_Rain.mp4
10. Favourite astro memories - friends and family observing Venus transit June 2012.
11. Favourite astro memories - on Parliament Hill with RASC for Mercury Transit May 2016.
12. Favourite astro memories - Aug. 2017 Total Solar Eclipse from Casper, WY with my family.
13. Favourite astro memories - one of my lunar images published in May-June 2017 issue of SkyNews magazine.

#8 - Jim Thompson, cont'd

14. Sample lunar image from one of my best imaging nights, January 20th, 2013. Image of Apennine Mts & Hadley Rille...a segue into next series of images...
15. Image of Apollo 15 crew: David Scott, Alfred Worden, & James Irwin (all USAF)
16. Apollo 15 lifting off on July 26th, 1971.
17. Image of landing area captured from landing module window on approach. Paths of various EVA's annotated in red. Mission had just over 19hrs of EVA activities. Was the first mission to use the lunar rover.
18. Series of images giving panoramic view of Hadley Rille and Mt. Hadley.
19. Another series of images giving panoramic view.

#8 - Jim Thompson, cont'd

https://saturn.jpl.nasa.gov/galleries/images/ - homepage for Cassini mission photos
https://www.nasa.gov/mission_pages/newhorizons/main/index.html - homepage for New Horizons mission
http://www.esa.int/Our_Activities/Space_Science/Rosetta - homepage for Rosetta mission photos
http://wms.lroc.asu.edu/lroc - homepage for Lunar Reconnaissance Orbiter mission
http://www.apolloarchive.com/apollo_gallery.html - homepage for great archival Apollo mission images



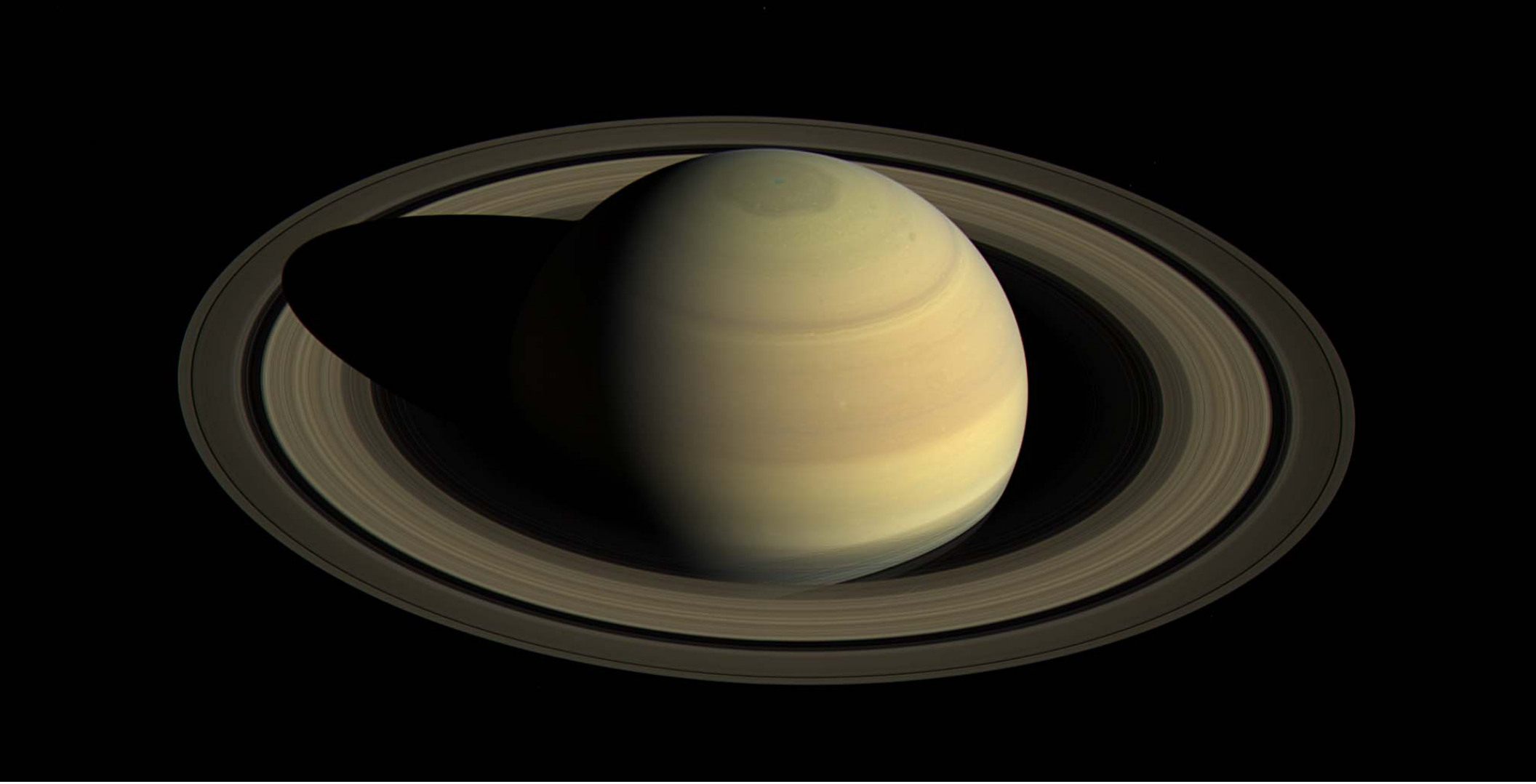
M16 ▪ Eagle Nebula

Hubble Space Telescope ▪ WFPC2 ▪ WFC3/UVIS

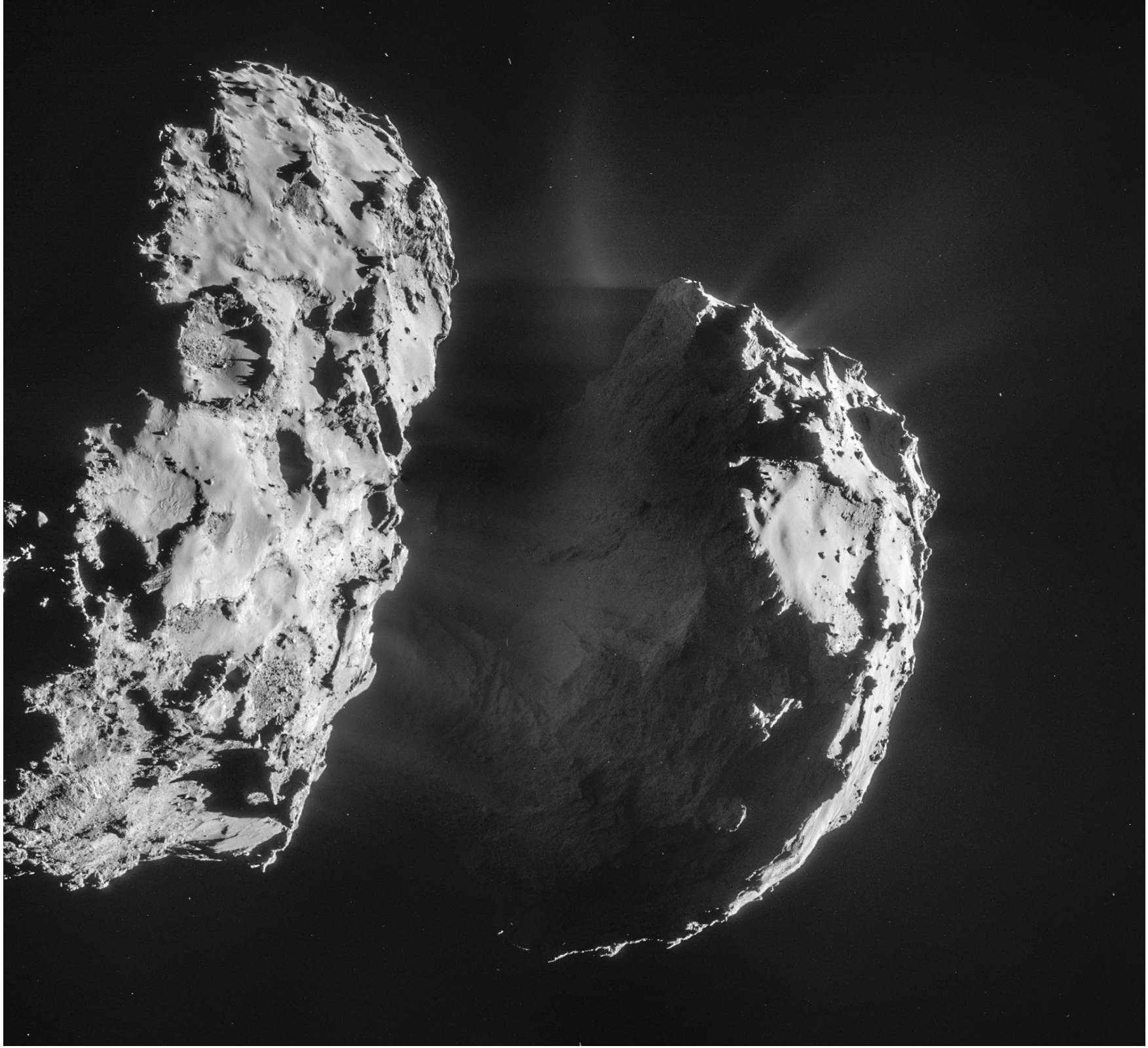
NASA and ESA

STScI-PRC15-01a

A1-Pillars of Creation

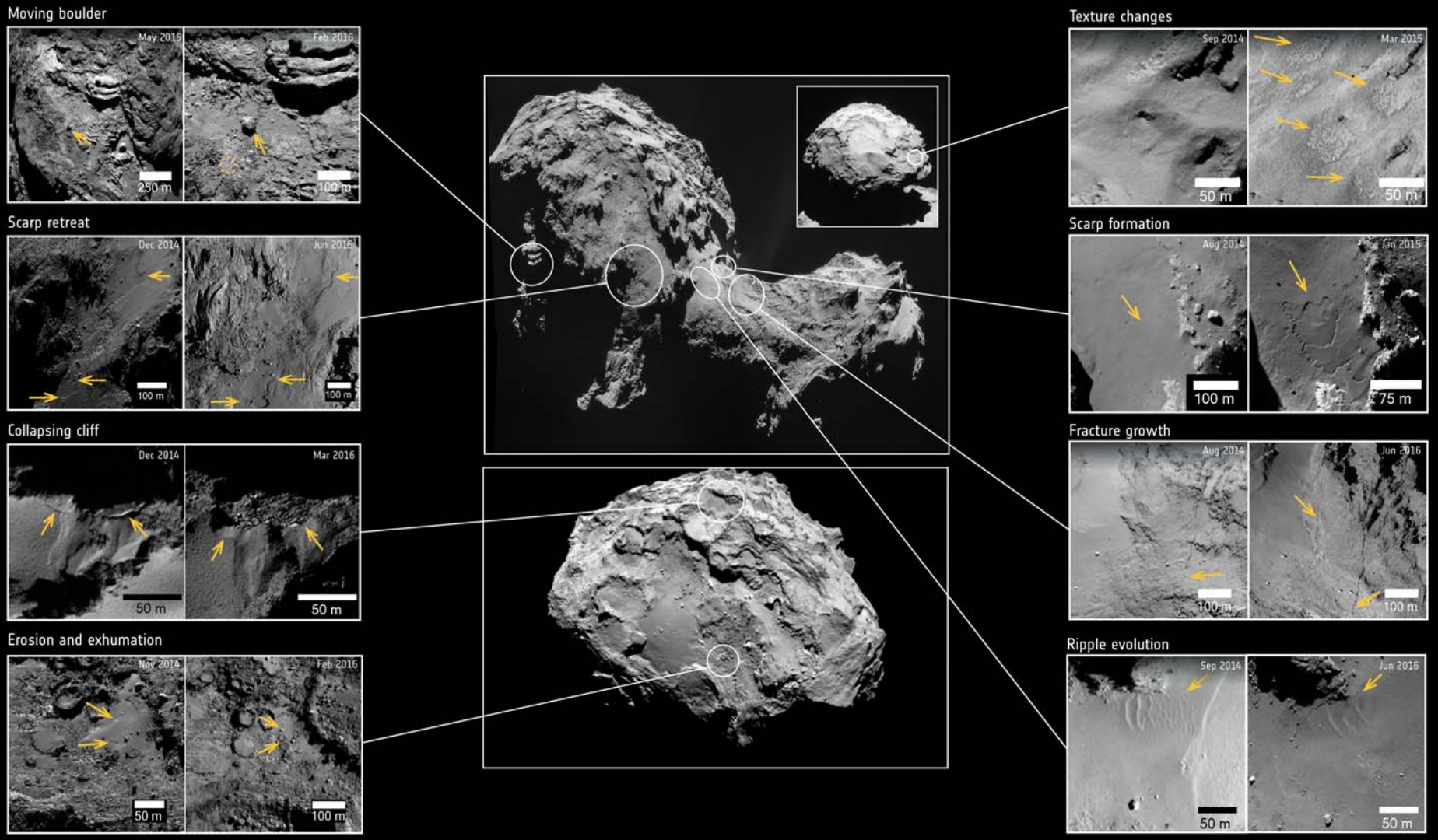


A2-Cassini at Saturn

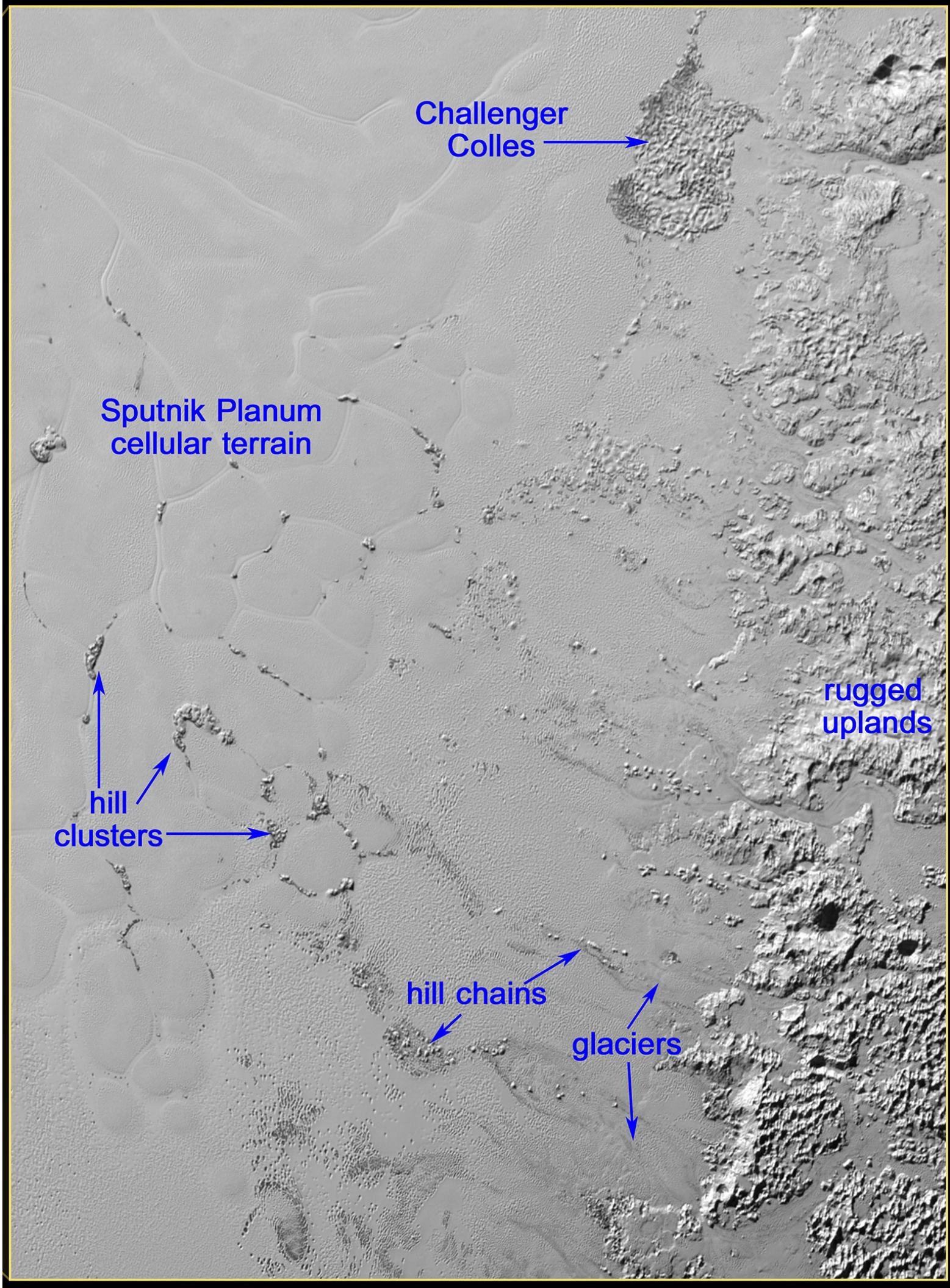


A3-Rosetta at Comet 67P

→ COMET CHANGES

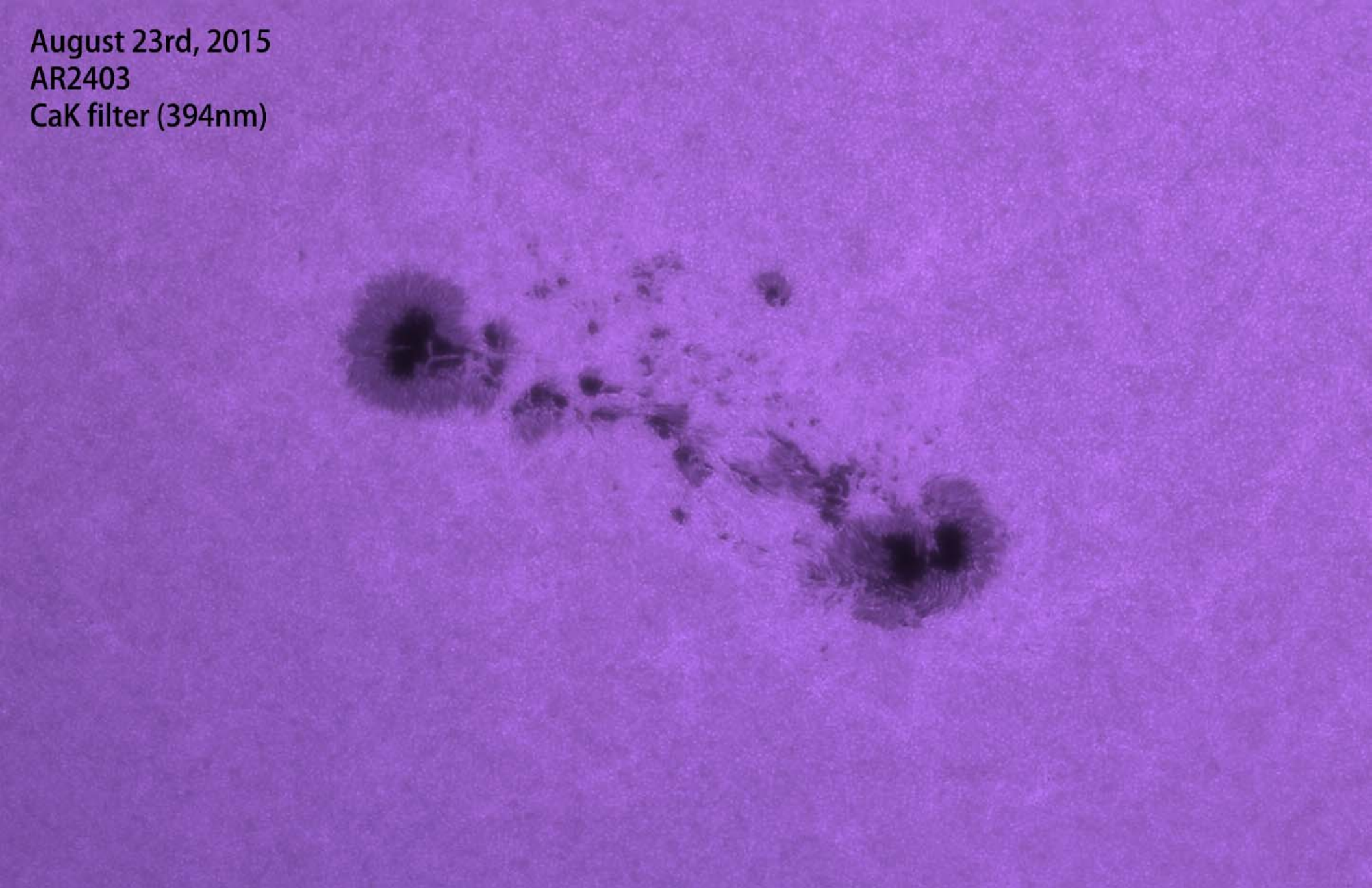


A4-Comet Changes


Challenger
Colles
Sputnik Planum
cellular terrain
rugged
uplands
hill
clusters
hill chains
glaciers

B1-First Astro Images

B2-Best Planetary Images

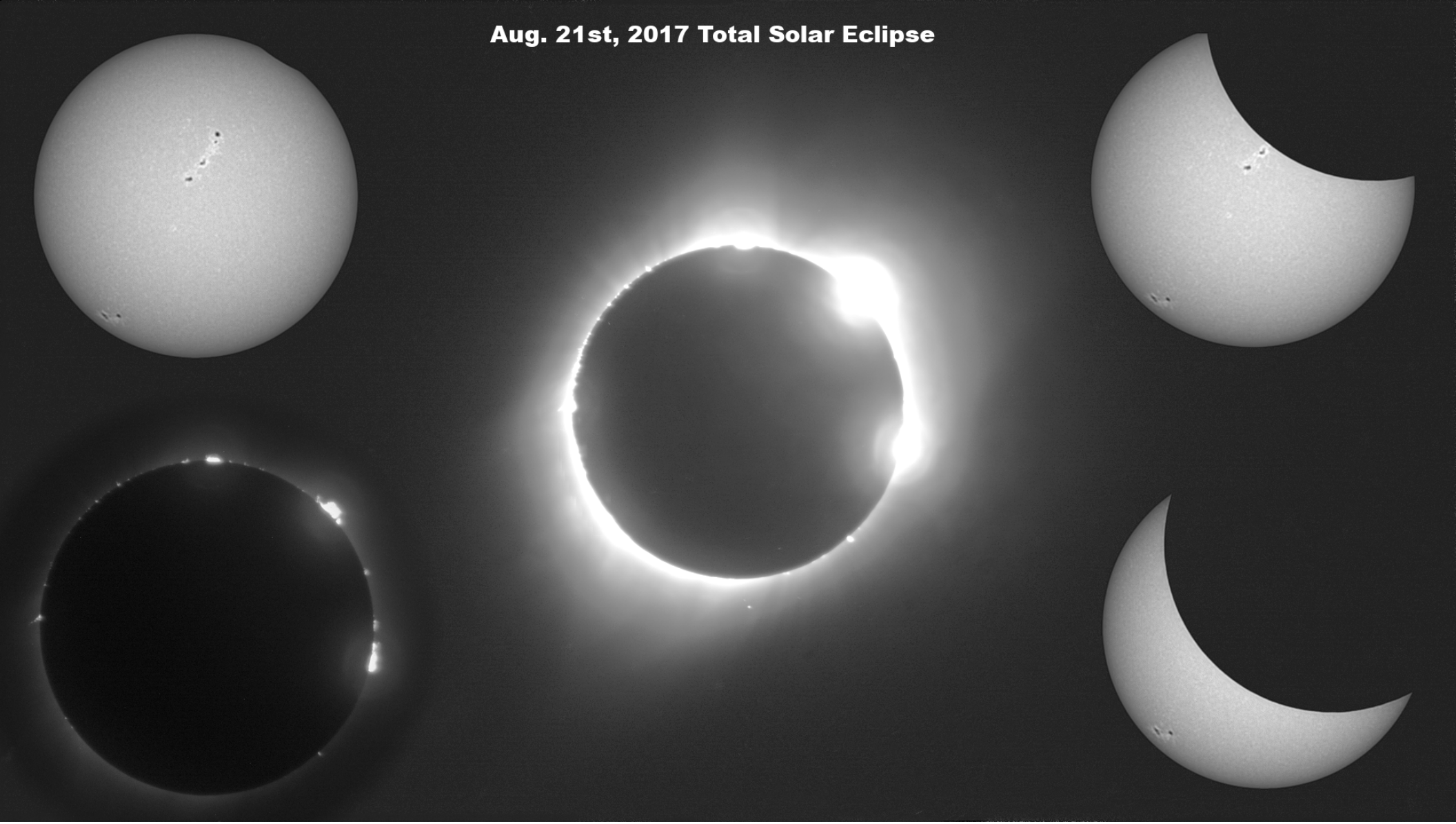


B3-Solar CaK

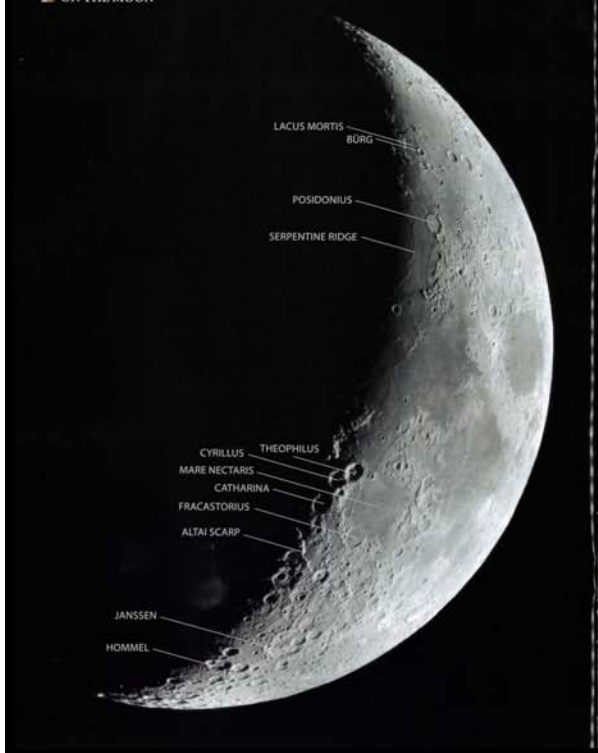
June 5th, 2012 Venus Transit w/ Friends

B5-Venus Transit

B6-Mercury Transit



B7-Total Solar Eclipse



by GARY SERONIK

A WALK ALONG THE TERMINATOR

The waxing crescent Moon is rich with fascinating features

AS I WROTE HERE in the March/April issue, spring is the ideal season for viewing a waxing lunar crescent. The Moon is positioned high in the evening sky and offers an inviting target for telescopic exploration.

The wonderfully detailed image presented on the facing page was captured by Jim Thompson of Ottawa, Ontario, with a 10-inch f/8 MallinCam VRC-10 Ritchey-Chrétien telescope and a ZWO ASI290MM monochrome video camera. Most of the features shown in Jim's photo can be viewed in a small telescope, and many can even be seen in tripod-mounted or image-stabilized binoculars. On April 1, May 1, May 30 and June 29, the Moon's phase will be similar to that depicted in the picture, but you can readily identify most of the highlighted items a night or two following these dates. Let's get exploring!

LACUS MORTIS This "lake" is a lava-flooded, 150-kilometre-wide crater that likely formed when the Moon was very young—sometime between 3.85 and 4.55 billion years ago. Slightly offset from the centre of Lacus Mortis is the 40-kilometre-diameter crater Bürg, a much younger formation that's probably less than one billion years old. (Clearly, youthfulness on the Moon is a relative thing.) If you have steady seeing conditions, boost your telescope's magnification and try to spot the fine rille called Rima Bürg. It extends 100 kilometres southwest from Bürg across Lacus Mortis (remember that east and west on the Moon are the opposite of sky directions).

POSIDONIUS One of the star attractions of the lunar northeast is this fascinatingly complex 95-kilometre-wide, floor-fractured crater. Under favourable illumination, you can easily spend an evening using high magnification in your scope to tease out fine details in and around Posidonius. The rilles on the crater floor are an intricate system of cracks that formed as the result of upward subsurface pressure.

SERPENTINE RIDGE When the Moon is full, big maria like Serenitatis seem smooth and featureless. But as this image shows, the reality is quite different. Snaking its way for hundreds of kilometres along the eastern edge of Mare Serenitatis is a wrinkle dubbed the Serpentine Ridge. It rises only a few hundred metres above the surrounding terrain, which is why it's difficult to notice except when the terminator is nearby.

THEOPHILUS, CYRILLUS AND CATHARINA This dramatic trio is one of the two "Big Three" crater groupings on the Moon (the other threesome consists of Ptolemaeus, Alphonsus and Arzachel). Although Theophilus, Cyrillus and Catharina are individually remarkable, their proximity to one another invites comparison. The northernmost crater,100-kilometre-wide Theophilus, is arguably the most eye-catching, with its complex central mountain peak (which reminds me of a clenched fist) and deeply terraced rim. Cyrillus is only a bit smaller (98 kilometres across) but appears more shallow and eroded than Theophilus—both aspects implying a greater age. And since the rim of Theophilus bites into the northeastern edge of Cyrillus, it's clear that the latter is older than the former. Most ancient of the three is Catharina. Although it's the same size as Ptolemaeus, it looks very different. Not only does it lack a central mountain peak, it's relatively shallow and sports a huge interior crater—46-kilometre-diameter Catharina P. The ravages of time have clearly taken their toll on poor ol' Catharina.

ALTAI SCARP Despite superficial similarities, Moon mountains are very different from their Earthly counterparts. Nowhere is that difference better illustrated than with the Altai Scarp—a 427-kilometre-long mountain range that is part of the Nectaris Basin rim. Only part of the southwestern rim appears in our photo, but even that small segment is impressive in telescopes. Don't be fooled by the jagged appearance of the Altai Scarp under stark lighting. These mountains are, in reality, gently rounded hills.

MARE NECTARIS After the Nectaris Basin was excavated by a tremendous impact some four billion years ago, lavas eventually seeped to the surface, filling the depression. The result is the 333-kilometre-wide "sea" known as Mare Nectaris. When the terminator is nearby, you can see that, as with Mare Serenitatis, the Nectaris surface isn't as perfectly smooth as it appears under high-Sun illumination.

FRACASTORIUS One of the biggest craters in the Nectaris region is Fracastorius, situated on the mare's southern shore. This crater is a survivor. Given its 112-kilometre-diameter size, you might expect to see a full complement of complex-crater features, such as a terraced rim and a prominent central mountain peak. But these details are mostly submerged under Nectaris lavas, which breached the crater's northern perimeter and flooded in.

JANSSEN Old craters tend to be large. They also tend to appear badly degraded, thanks to the pulverizing effects of subsequent impacts. Janssen is a good example. It spans (very) roughly 190 kilometres but is quite indistinct. The numerous smaller craters that pockmark Janssen give it a slightly out-of-round—almost hexagonal—shape.

HOMMEL The so-called Southern Highlands on the Moon are chockablock with craters. Perhaps nowhere is this overcrowding better illustrated than with Hommel, a battered crater 125 kilometres in diameter. So many impacts cut into its rim that Hommel itself can be difficult to discern. Among the intruders are several large craters that, were they located elsewhere, would be noteworthy. Take Hommel A, parked on Hommel's northeast edge. Hommel A is 51 kilometres across. In fact, it's big enough to sport a substantial crater within its own rim—13-kilometre-wide Hommel V. Chockablock, indeed! ✦

Gary Seronik is a dedicated lunaphile and this magazine's editor.

May-June 2017 Issue of SkyNews

B9-Lunar Image ROI

C1-Apollo 15 Crew

C2-Apollo 15 Liftoff

C3-Hadley Rille Landing Site

AS15-85-11422HR

AS15-85-11423HR

AS15-85-11424HR

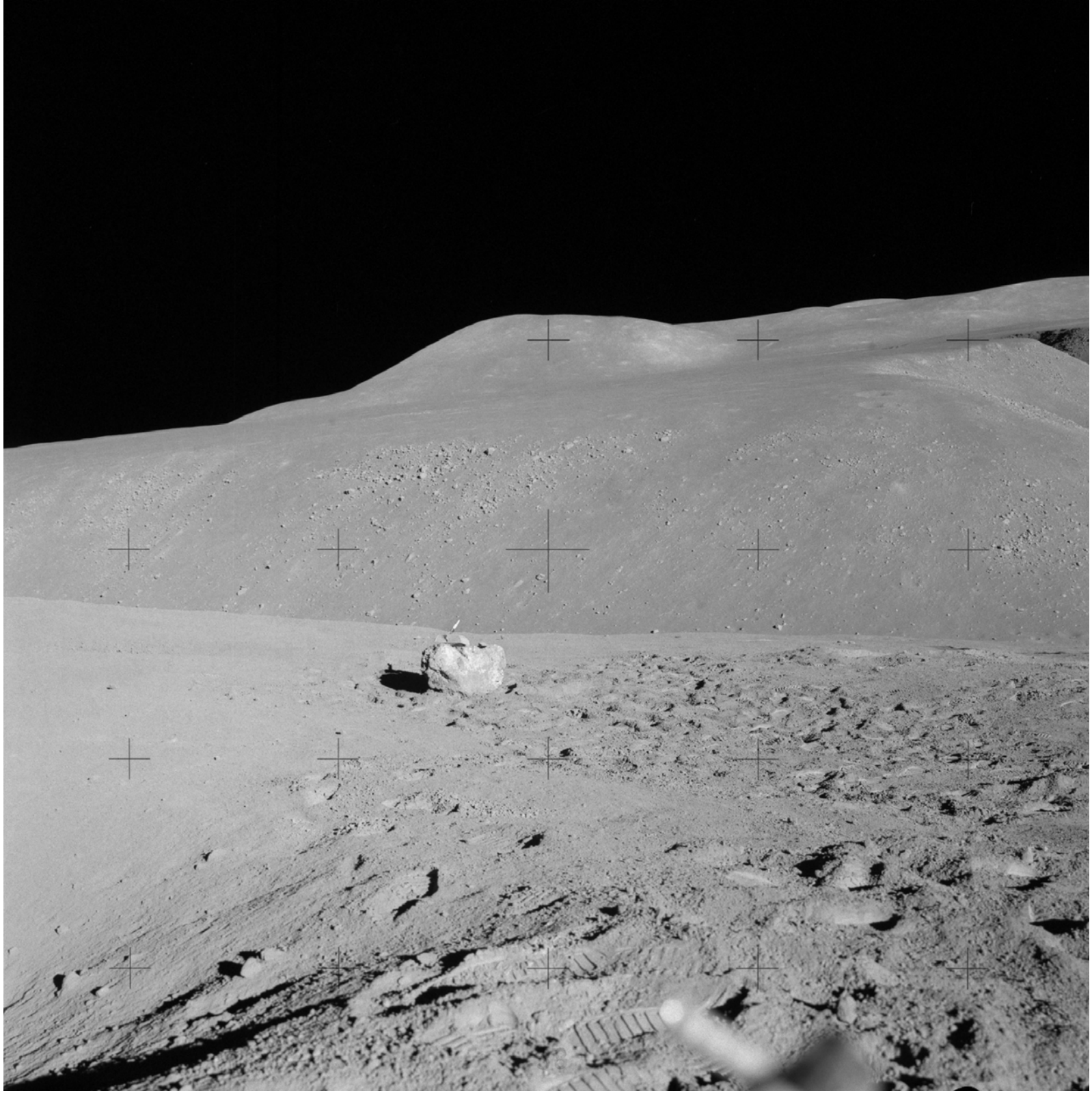
AS15-85-11425HR

AS15-85-11426HR

AS15-85-11428HR

AS15-85-11429HR

AS15-85-11447HR



AS15-85-11448HR

AS15-85-11449HR

AS15-85-11450HR

AS15-85-11451HR

AS15-85-11452HR

AS15-85-11453HR

AS15-85-11454HR