The Objective View

April 2006

Newsletter of the Northern Colorado Astronomical Society

Greg Halac, President, Web Editor 970 223 7210
pres@
Nate Perkins, Vice President 970 207 0863
vp@
Dave Chamness, Treasurer and AL Correspondent
treas@ 970 482 1794
Dan Laszlo, Secretary and Newsletter Editor
sec@ office 970 498 9226
add ncastro.org to complete email address

Next Meeting: April 6, 7:30 PM

Mars Reconnaissance Orbiter HiRISE Imager

Jim Bergstrom, Ball Aerospace

NCAS Business at 7:15 PM

Meeting directions Discovery Science Center
703 East Prospect Rd, Fort Collins
http://www.dcsm.org/index.html

In Fort Collins, from the intersection of College Ave and Prospect Rd, head East about 1/2 mile. See the Discovery Center sign to the South. Enter the West Wing at the NE corner. From I-25, take Exit 268, West to Lemay Ave, continue West 1/2 mile, see Discovery Center on the left.

Observatory Village Starwatch
3733 Galileo Drive, Fort Collins
April 1

Discovery Science Center Starwatch
703 E Prospect Road, Fort Collins
May 5 8:30 pm

NCAS Programs, Discovery Science Center
May 4 NCAS Members Show and Tell

Rocky Mtn Natl Park Starwatch, Upper Beaver Meadows
June 16, 30; July 14, 28; Aug 4, 18

Other Events

Little Thompson Observatory Star Night, Berthoud High Aud
April 21 7:30 pm Brian White, 3D Auroras
http://www.starkids.org

CSU Madison Macdonald Observatory Public Nights
On East Drive, north of Pitkin Street
Tuesdays 7:30-8:30 pm if clear, when class is in session

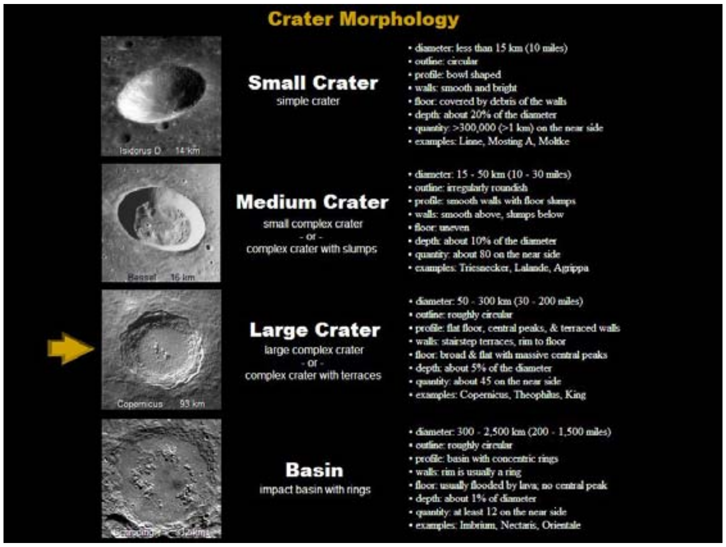
Cheyenne Astronomical Society, Cheyenne Botanical Garden
April 21 7 pm
http://home.bresnan.net/~curranm/

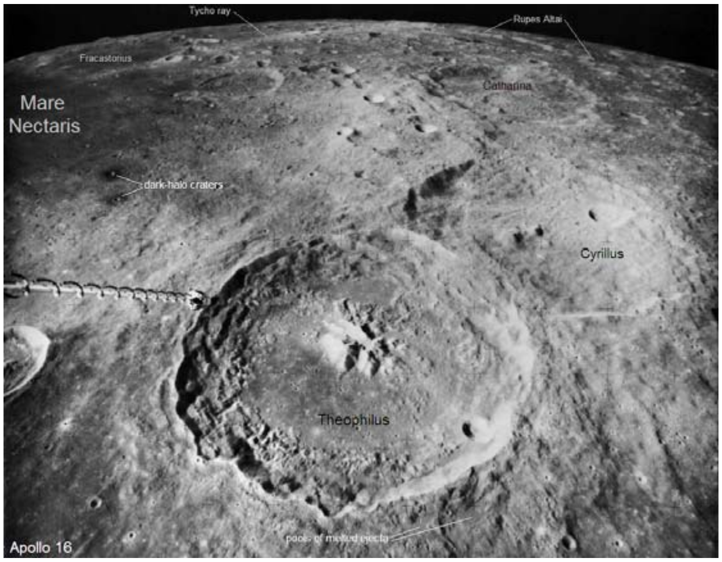
Chamberlin Observatory Open House, dusk to 10 pm
Apr 8, May 6, Jun 3, Jul 1, Aug 5, Sep 30, Oct 28, Dec 2, Dec 30 303 871 5172 http://www.du.edu/~rstencel/Chamberlin/

Longmont Astronomical Society
April 20 7 pm FRCC, 2121 Miller Rd
http://longmontastro.org/

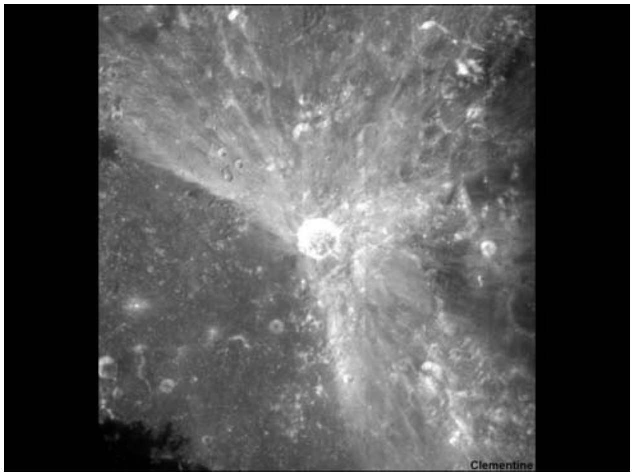
March 2 Program
Observing Charles Wood's Lunar 100, Part 1
Lee Gregory

In the April 2004 edition of Sky and Telescope magazine, lunar columnist Chuck Wood presented an observer's list of 100 lunar features: The Lunar 100 --- a selection of telescopic sights to ignite interest and enhance understanding. "Presented here is a selection of the Moon's 100 most interesting regions, craters, basins, mountains, rilles, and domes." Lee challenged observers to find and observe them all and, more important, to consider what each feature tells us about lunar and Earth history. He opened with a selection of exquisite images from Earth and spacecraft, amateurs and professionals. The best Earth-based atlas is the Consolidated Lunar Atlas. The boxed set of photos fetches $250,000. It provided Apollo planners views with different sun angles. The Lunar Orbiters were cleverly designed craft which made photographs on a long spool of film. The film was processed on board and scanned, and data transmitted to Earth. The images had their artifacts largely removed, and are available online and in print as one of the best detailed rescources for amateurs. The lunar far side was first imaged October 7 1959 by Luna 3, launched by USSR. The first US spacecraft to return lunar images was Ranger 7 in 1964. The first image of the Earth from lunar orbit was made by Lunar Orbiter 1 in 1966. The Clementine orbiter imaged the whole Moon at lunar noon, showing no relief but best for spectroscopy. It used a laser altimeter. Lee then illustrated the physical parameters of the Earth-Moon System. The barycenter is under Earth's surface, 0.73 Earth radius from its center. The L1 Lagrangian point is 90% of the Earth-Moon distance. Lunar maria comprise about 17% of the Moon's surface area, but cover almost 1/3 of the near side. Libration allows us to see 59% of the Moon from Earth. The near side of the Moon matches the surface area of the US and Canada within 5 percent. The Moon moves east in its orbit by about ½ degree per hour. The terminator also moves at about ½ degree/hour at the equator; across the width of Copernicus in 6.5 hours. Lee started detailing the Lunar 100 with the trio of craters Theophilus, Cyrillus, and Catharina. Theophilus is a large complex crater. It has terraced walls, flat floor and broad central peaks. Cyrillus shows traces of its walls and central peak. Catharina is overlain by 5 craters, and its wall and central peak are least preserved of the three.

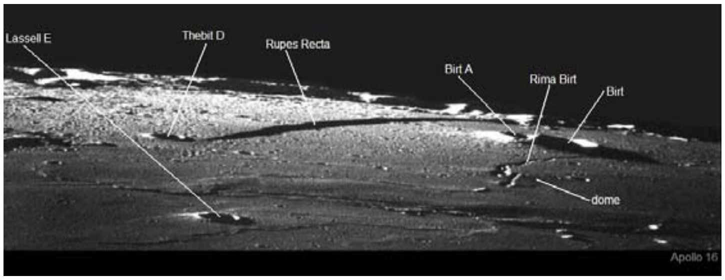


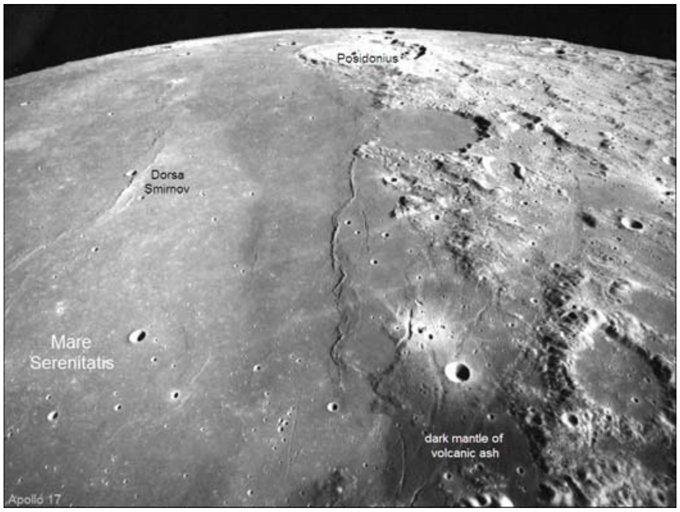


Proclus is one of the brightest and therefore youngest craters on the Moon. It is near Mare Criseum. The 140 degree gap in its ray pattern resulted from an oblique impact, between 5 and 15 degrees. Nearby is the site of O'Neill's Bridge, a 12 mile span discovered in 1953 which proved to be factitious.

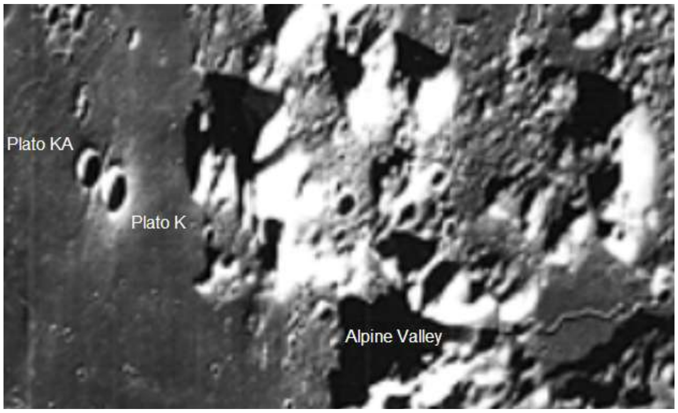


The Straight Wall, Rupes Recta, is the best example of a lunar fault. It is 68 miles long, 1000 feet high, and a slope of 15 to 20 degrees. A crater has flooded and its floor subsided, leading to the fault.



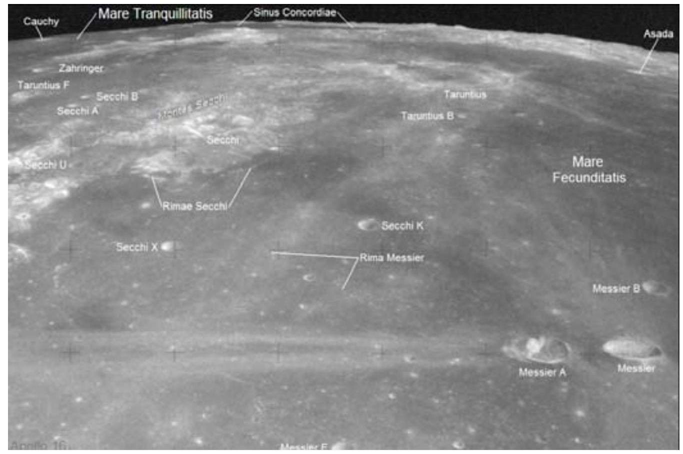


Mare Serenitatis illustrates differences in lava composition at its rim vs center. Central, lighter lavas date from 3.0 to 3.4 billion years old. The surrounding darker lavas sampled at the Apollo 17 site are 3.7 to 3.8 billion years old. The weight of lava fill in the mare caused subsidence of the center, which was filled with younger lavas. Images by Clementine and Galileo spacecraft highlight the differences.

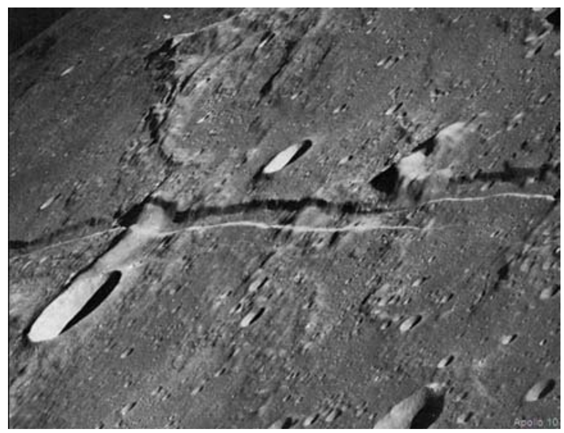


The Alpine Valley is a down-faulted block of crust with a central sinuous rille (lava channel). The rille is a challenge for a 6 to 8 inch telescope. The ridge between nearby Plato K and KA hints that the pair were created in a simultaneous impact.

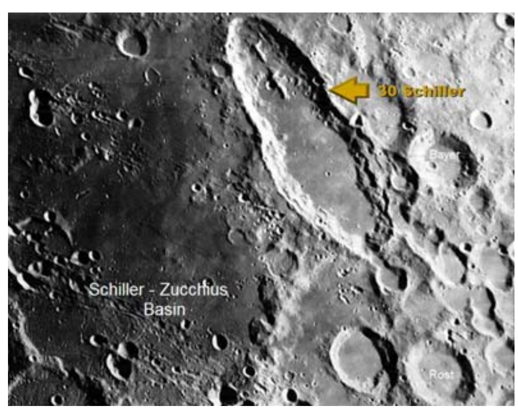
The Aristarchus Plateau is arguably the most unusual feature on the Moon. It is 2 km higher than the surrounding mare. The color is due to a 10 to 30 meter thick layer of glassy volcanic ash erupted from the Cobra Head, source of Schroter's Valley. It is the biggest rille on the Moon, 160 km long and up to 10 km wide. Is the plateau an outpouring of lava above a hotspot, or is it controlled by the conjunction of fractures? Aristarchus is the brightest large crater on the Moon. It is a mystery why its rays don't mark the plateau as well as the mare. The pair Messier and Messier A have accumulated creative explanations. The rays of Messier were artificial (18th century), Messier A was migrating east leaving a trail (1960s), a meteorite crashed through a ridge forming a tunnel.



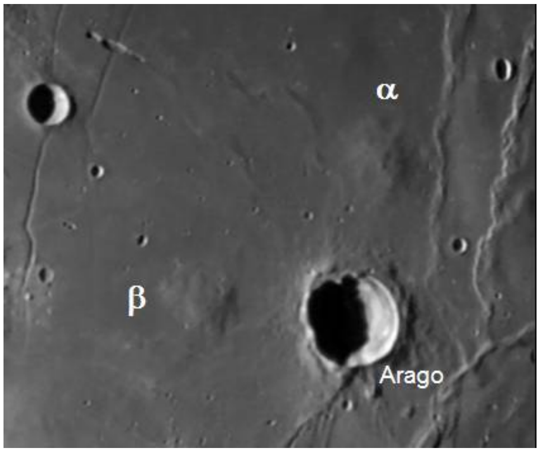
Laboratory experiments of low-angle impacts have reproduced their features. A grazing impact, angle less than 2 degrees, excavated Messier, and a part of the impactor ricocheted downrange to form Messier A and its long rays. The rays are bright because they are powdery mare material.



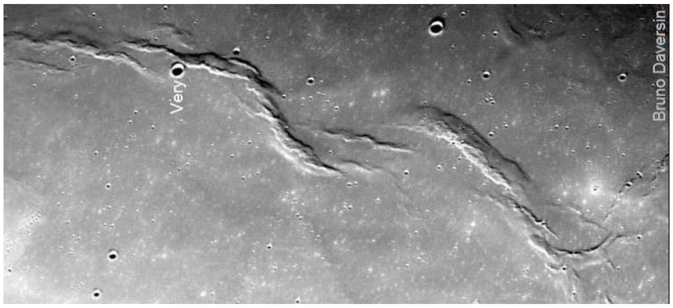
The Ariadaeus Rille is a 135-mile long, linear graben. A crustal block between parallel faults has dropped. The faults formed by tension. A third of linear rilles are associated with volcanic features, so intrusions of subsurface magma may provide the forces to pull the crust apart.



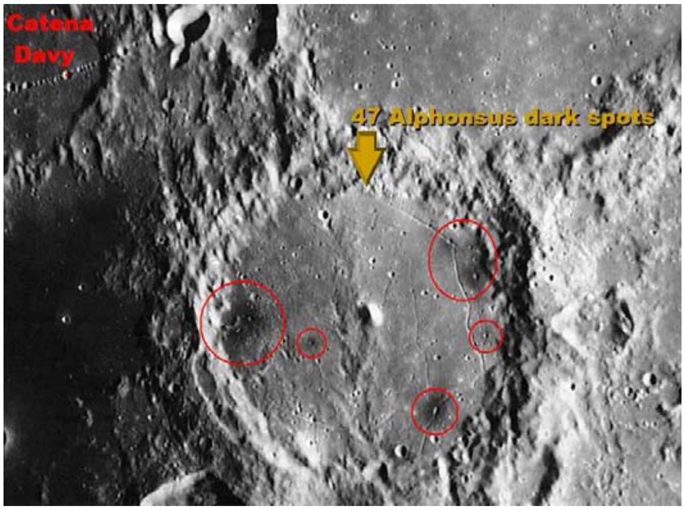
Schiller is another likely product of a glancing impact. The impactor may have been a satellite of the Moon that spiraled in. Modeling has reproduced the shape of this crater, including its linear central ridge. This is a Lunar Orbiter IV image.



Lunar domes are a subtle challenge for observers. Arago Alpha and Beta are two of the largest, steepest and most visible domes on the Moon. They are 9 to 12 miles wide and 1000 feet high. They are volcanic in origin. The slope of Alpha is 1.4 degrees.



Dorsa Smirnoff is a serpentine ridge. It plus Dorsa Lister extend 260 miles. After mare lava cools, subsidence in the center leads to fractures. Parallel to the fractures, compression raises the gentle ridges which are 300 to 1000 feet high. Ridges have broad, bulbous swelling and a narrow ridge crest.



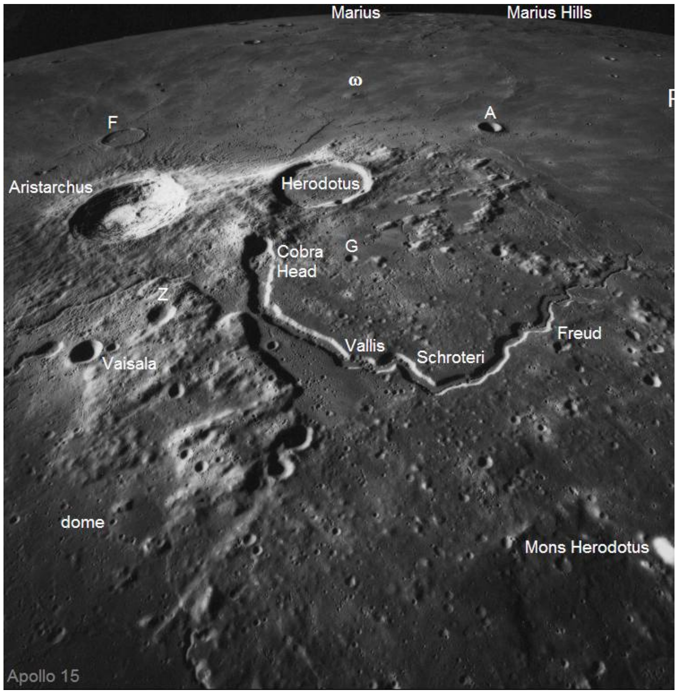
Alphonsus is home to dark-halo eruptions on its floor. The dark spots on the east side are connected by a rille. Each spot has a vent crater. They contain mare material, almost certainly deposits of black ash (glassy beads). Lunar Orbiter 4 image. Ranger 9 imaged Alphonsus and crashed on its floor.

Lee's talk was the product of hundreds of hours of study, in which he winnowed down thousands of images to ~200 of the best. We are grateful and look forward to future installments on lunar features.

NCAS Business
March 2 2006
President Greg Halac called the meeting to order. Public observing nights were announced at Discovery Science Center on March 3 and Observatory Village on April 1. NCAS programs were announced. Dates for starwatching at Rocky Mountain National Park will be released soon. The NCAS website has been revised by Greg Halac. Members may use the site for email and web space is available. Images are needed to illustrate the site.

Best Looks

Moon	By Mars 4/3; near Saturn 4/6 by Jupiter 4/14; by Venus 4/24
Mercury	Difficult at dawn around 4/8
Venus	Low in SE predawn
Mars	In W at dusk. By M35 on 4/17 By Epsilon Gem on 4/30
Jupiter	In S at early am hours
Saturn	High in evening. By Beehive cluster
Uranus	Near Venus predawn 4/18



From:
Daniel Laszlo
2001 S Shields St Building H
Fort Collins CO 80526

TO:

International Space Station Passes April 2006

Date	Mag	Starts Time	Alt	Az	Max. Altitude Time	Alt	Az	Ends Time	Alt	Az
05 Apr	2.4	04:09:56	15	ENE	04:09:56	15	ENE	04:10:30	10	ENE
05 Apr	1.2	05:41:21	12	WNW	05:43:03	18	NNW	05:45:10	10	NNE
06 Apr	1.3	04:32:47	24	NNE	04:32:47	24	NNE	04:34:16	10	NE
06 Apr	1.9	06:06:14	10	NW	06:07:19	12	NNW	06:08:23	10	N
07 Apr	1.3	04:55:33	18	NNW	04:55:36	18	NNW	04:57:42	10	NNE
09 Apr	2.3	04:09:32	13	NNE	04:09:32	13	NNE	04:10:09	10	NNE
13 Apr	2.1	05:43:08	10	NNW	05:44:52	15	NNE	05:46:36	10	NE
15 Apr	2.2	04:55:18	10	NNW	04:57:02	15	NNE	04:58:47	10	NE
16 Apr	1.2	05:18:25	10	NW	05:20:57	27	NNE	05:23:28	10	E
17 Apr	2.2	04:07:56	12	N	04:09:06	15	NNE	04:10:51	10	NE
17 Apr	-0.8	05:41:46	10	NW	05:44:37	81	NNE	05:47:29	10	SE
18 Apr	1.2	04:30:59	14	NNW	04:32:58	27	NNE	04:35:29	10	E
19 Apr	-0.9	04:54:22	15	NW	04:56:35	81	NNE	04:59:26	10	SE
20 Apr	2.2	03:46:43	15	E	03:46:43	15	E	03:47:24	10	E
20 Apr	0.1	05:18:13	15	W	05:19:59	27	SW	05:22:27	10	SSE
21 Apr	0.7	20:31:47	10	S	20:33:55	19	SE	20:35:16	14	E
21 Apr	2.0	22:06:09	10	WSW	22:06:49	15	W	22:06:49	15	W
22 Apr	-1.0	20:54:18	10	SW	20:57:09	66	SE	20:59:44	12	ENE
22 Apr	2.5	22:30:28	10	WNW	22:31:14	14	NW	22:31:14	14	NW
23 Apr	0.7	21:17:53	10	WSW	21:20:37	37	NNW	21:23:20	10	NE
24 Apr	2.1	21:42:09	10	WNW	21:44:14	18	NNW	21:46:19	10	NNE
25 Apr	0.8	20:29:31	10	WSW	20:32:11	37	NW	20:34:59	10	NE
26 Apr	2.0	20:53:43	10	WNW	20:55:49	18	NNW	20:57:55	10	NNE
29 Apr	2.5	20:29:53	10	NW	20:30:59	12	NNW	20:32:04	10	N
29 Apr	2.4	22:06:35	10	N	22:07:08	10	N	22:07:42	10	NNE
30 Apr	2.2	22:29:04	10	NNW	22:30:13	14	N	22:30:13	14	N