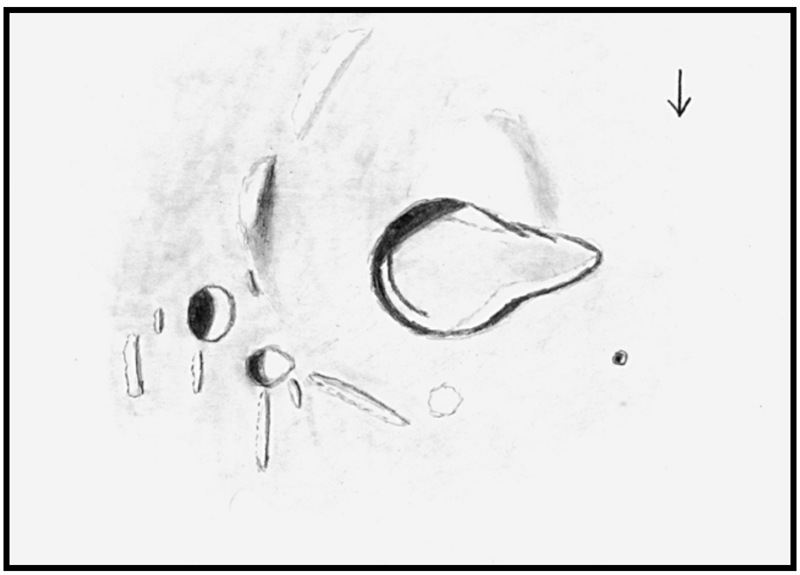
THE LUNAR OBSERVER

A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.
EDITED BY: Wayne Bailey wayne.bailey@alpo-astronomy.org
17 Autumn Lane, Sewell, NJ 08080

RECENT BACK ISSUES: http://moon.scopesandscapes.com/tlo_back.html

FEATURE OF THE MONTH – JANUARY 2010

TORRICELLI



Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
May 31, 2009 02:38-02:44, 02:51-03:13 UT
15 cm refl, 170x, seeing 5-7

I sketched this crater and vicinity on the evening of May 30/31, 2009 while watching the moon hide three faint stars. This crater is north of Theophilius in the strait between Mares Tranquillitatis and Nectaris. This crater is obviously the result of at least two impacts. The larger east end appears oval, elongated east-west, and the whole crater is extended westward by a tapering depression that comes to a blunt point at the west end. Torricelli's interior shadow indicates a relatively high southeast rim, and terracing farther north. The westward extension has a complete north rim, but there may be two small gaps in its south rim. Its floor appears very smooth. The westward extension does not have a letter designation, but Torricelli A is the largest crater to the east. The smaller, elongated crater north of A is Torricelli F, while Torricelli T is the small pit to the northwest. A round shadowless bright spot is north of Torricelli, and a low, ill-defined swelling abuts the south side of Torricelli. A series of ridges arcing around the east side of Torricelli may be part of an old ring; it is indicated as such on the Lunar Quadrant Map. A few more short ridges, oriented north-south, lie north and east of Torricelli A and F.

****

LUNAR CALENDAR

JANUARY-FEBRUARY 2010 (UT)

Jan. 01	20:37	Moon at Perigee (358,682 km - 222,875 miles)
Jan. 03	06:00	Moon 6.3 Degrees SSW of Mars
Jan. 06	13:00	Moon 7.4 Degrees SSW of Saturn
Jan. 07	10:41	Last Quarter
Jan. 12	08:30	Extreme South Declination
Jan. 13	19:00	Moon 4.6 Degrees SSE of Mercury
Jan. 15	07:00	Moon 1.5 Degrees NW of Venus
Jan. 15	07:12	New Moon (Start of Lunation 1077)
Jan. 17	01:41	Moon at Apogee (406,433km - 252,546 miles)
Jan. 17	21:00	Moon 3.4 Degrees NNW of Neptune
Jan. 18	04:00	Moon 4.3 Degrees NNW of Jupiter
Jan. 20	04:00	Moon 5.5 Degrees NNW of Uranus
Jan. 23	10:53	First Quarter
Jan. 26	21:06	Extreme North Declination
Jan. 30	03:00	Moon 6.2 Degrees SSW of Mars
Jan. 30	06:18	Full Moon
Jan. 30	09:04	Moon at Perigee (356,592 km - 221,576 miles)
Feb. 02	21:00	Moon 7.5 Degrees SSW of Saturn
Feb. 05	23:50	Last Quarter
Feb. 08	14:30	Extreme South Declination
Feb. 12	03:00	Moon 2.3 Degrees NW of Mercury
Feb. 13	02:07	Moon at Apogee (406,541 km - 252,613 miles)
Feb. 14	02:52	New Moon (Start of Lunation 1078)
Feb. 14	03:00	Moon 3.5 Degrees NW of Neptune
Feb. 14	21:00	Moon 5.0 Degrees NNW of Venus
Feb. 15	01:00	Moon 4.6 Degrees NNW of Jupiter
Feb. 16	15:00	Moon 5.4 Degrees NNW of Uranus
Feb. 22	00:42	First Quarter
Feb. 23	06:00	Extreme North Declination
Feb. 26	02:00	Moon 5.1 Degrees SSW of Mars
Feb. 27	21:41	Moon at Perigee (357,831 km - 222,346 miles)
Feb. 28	16:37	Full Moon

AN INVITATION TO JOIN THE A.L.P.O.

The Lunar Observer is a publication of the Association of Lunar and Planetary Observers that is available for access and participation by non-members free of charge, but there is more to the A.L.P.O. than a monthly lunar newsletter. If you are a non-member you are invited to join our organization for its many other advantages.

We have sections devoted to the observation of all types of bodies found in our solar system. Section coordinators collect and study members' observations, correspond with observers, encourage beginners, and contribute reports to our Journal at appropriate intervals.

Our quarterly journal, **The Strolling Astronomer**, contains the results of the many observing programs which we sponsor including the drawings and images produced by individual amateurs. Additional information about the A.L.P.O. and its Journal can be found on-line at: **http://www.alpo-astronomy.org/index.htm** I invite you to spend a few minutes browsing the Section Pages to learn more about the fine work being done by your fellow amateur astronomers.

To learn more about membership in the A.L.P.O. go to: **http://www.alpo-astronomy.org/main/member.html** which now also provides links so that you can enroll and pay your membership dues online.

Note: The published images now contain links to the original, full resolution images. Clicking on an image while connected to the internet, will download the original image, which in some cases is significantly higher resolution than the published version.

When submitting observations to the A.L.P.O. Lunar Section

In addition to information specifically related to the observing program being addressed, the following data should always be included:

- Name and location of observer
- Name of feature
- Date and time (UT) of observation
- Size and type of telescope used
- Orientation of image: (North/South - East/West)
- Seeing: 1 to 10 (1-Worst 10-Best)
- Transparency: 1 to 6
- Magnification (for sketches)
- Medium employed (for photos and electronic images)

CALL FOR OBSERVATIONS: FOCUS ON: Snellius-Furnerius

Focus on is a bi-monthly series of articles which includes observations received for a specific feature or class of features. The subject for the **March 2010** edition will be the Snellius-Furnerius area. Observations of all kinds (electronic or film based images, drawings, etc.) are welcomed and invited. Keep in mind that observations do not have to be recent ones, so search your files and/or add this complex region to your observing list and send your favorites to:

Wayne Bailey - wayne.bailey@alpo-astronomy.org

Deadline for inclusion in the Snellius-Furnerius article is February 20, 2010

FUTURE FOCUS ON ARTICLES:

In order to provide more lead time for potential contributors the following targets have been selected:

Ray Craters (at all Phases)	**TLO Issue: May 2010**	**Deadline: Apr. 20, 2010**
Dark-Haloed Craters	**TLO Issue: July 2010**	**Deadline: June 20, 2010**

A list of some ray craters is available at: http://moon.scopesandscapes.com/alpo-rays-table.pdf.
A list of some dark haloed craters is in Appendix A of the Selected Areas Program Handbook, available at: http://moon.scopesandscapes.com/sap-hdbk-5.pdf.

FOCUS ON: Atlas - Hercules

By Wayne Bailey
Acting Coordinator: Lunar Topographical Studies

Atlas and Hercules are a conspicuous pair of craters in the northeast quadrant of the moon (Figure 1), just southeast of Mare Frigoris and beyond Lacus Somniorum northeast of Mare Serenitatis. They are close enough to the limb that their appearance changes significantly with libration (compare Figures 1 & 2).

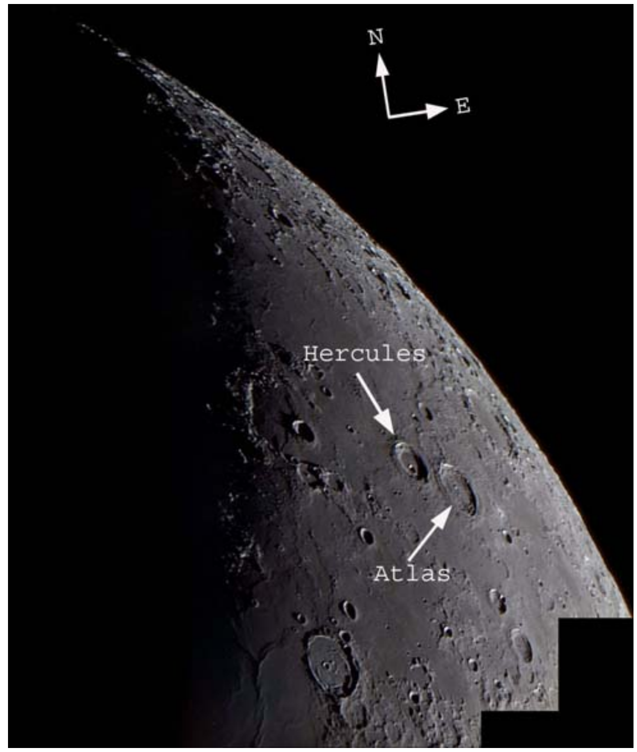


Figure 1: **ATLAS-HERCULES** - Maurice Collins - Palmerston North, New Zealand, December 22, 2009 08:20-08:30 UT. Colongitude 337.5º. C8, 2x barlow, LPI.

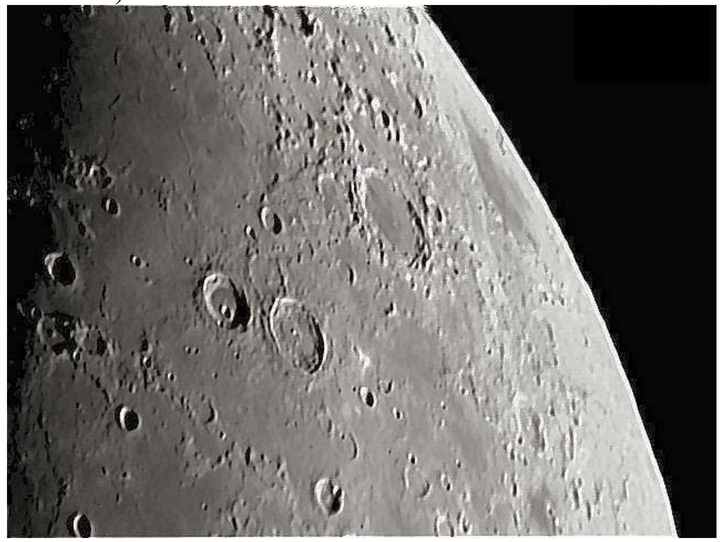
Both names come from Greek mythology. Atlas was one of the Titans, holding the sky on his shoulder at the western end of the earth. Hercules was a hero who had super-human strength. Rukl (2004) reports that, according to Riccioli, Atlas was a Moroccan king about 1580 BC who was interested in astronomy, and Hercules was an astronomer around 1560 BC.

Atlas (87 km diameter) is slightly larger than Hercules (69 km diameter). Their rims are separated by 30 km. A short, low ridge separates their outer glacis (Figure 3). Atlas' rim averages about 3 km above the lowest point on its floor, ranging from 2750 to 3500 m. Instead of a single central peak, a ring of small hills that give the impression of being peaks on the rim of a buried crater (Figure 4). The floor is rough with numerous small craters and rilles (Figure 5). The most obvious rille runs just east of the central hills towards the south rim. Numerous other rilles criss-cross the floor (Figure 6).

Figure 2: **Atlas & Hercules** - William M. Dembowski, FRAS, Elton Moonshine Observatory,. June 28, 2009, 02:08 UT. Colongitude 336.2º, seeing 3/10. Celestron 8", f/10 SCT, DMK41.

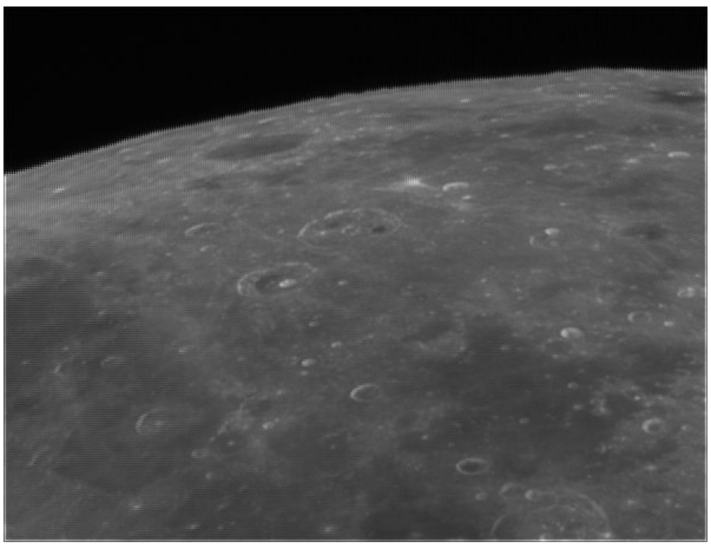
At full moon, two round dark regions (each about 10 km diameter) and a bright spot appear prominently on the floor of Atlas, and the rim is bright, easily visible, which assists in locating the region (Figures 4 & 7). The dark spots appear to be associated with sinuous rilles that branch out from them across the floor.

Hercules has a much smoother floor than Atlas. One large crater (Hercules G) is located on its floor, and another crater is perched on its southwest rim (Hercules E). Both Atlas and Hercules show extensive terracing on their interior walls. Hercules' wall seems to be more degraded than Atlas'. There are also massive landslips visible on the inner wall of Hercules, especially on the eastern side, which may have been triggered by the impact that formed Atlas (Figure 8).



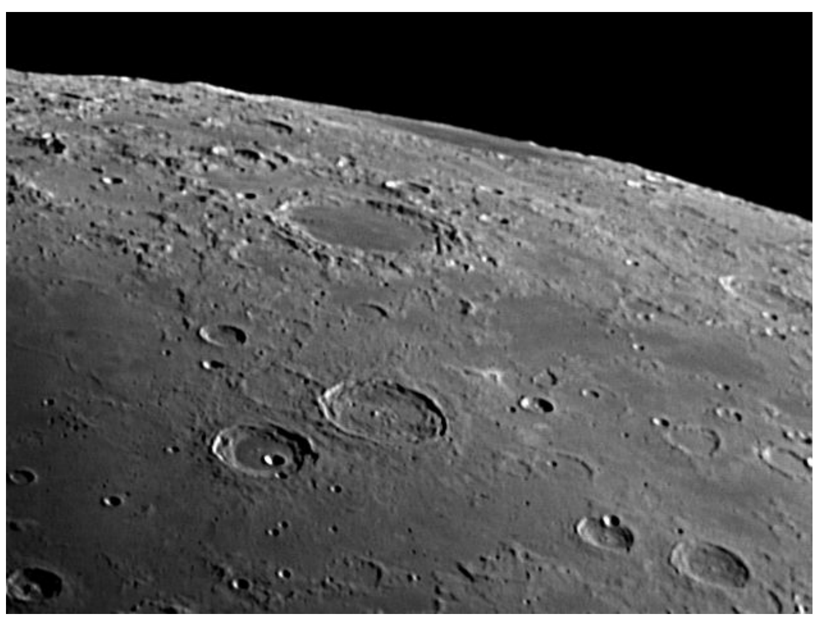
<u>Figure 3:</u> Atlas-Hercules Region - Ed Crandall – Lewisville, North Carolina, USA. December 6, 2005 23:06 UT. 110 mm f/13 APO, Toucam.

The floor of Hercules is darkest in the north and west, with lighter material in the east and between the central hills and Hercules G. The central hills consist of two small, smooth bumps that may be central peaks buried by the lava that covered the floor.



<u>Figure 4:</u> Atlas–Hercules Under High Sun – Ken Boquist –Rock Island, Illinois, USA. November 29, 2009 00:36 UT. Seeing 5/10, Transparency 1. 9.25" f/10 SCT, DBK21.

It's difficult to determine the relative ages of Atlas and Hercules. The more degraded appearance of Hercules rim and the existence of 3 significant impact craters on it indicate it is older than Atlas. If the slumping within Hercules is due to the Atlas impact, that would also indicate Atlas is the younger of the two. However, USGS mappers interpreted strings of small craters within Atlas as secondary craters from the formation of Hercules, which would require Atlas to be the older of the pair.



<u>Figure 5:</u> Atlas-Hercules Region – Peter Lloyd – Bedfordshire, UK. June 2, 2006 21:35 UT. LX200 SCT, Toucam, IR-pass filter.

The surrounding area also has several interesting features (Figure 9). The area is not within a sea, but it also is not typical highland terrain. Ejecta from Atlas and Hercules cover the terrain, much of

which has been flooded by lavas that area lighter than typical mare. There is no distinct division between mare and highlands in this area.

Figure 6: **Atlas-Hercules** – Wayne Bailey, Sewell, New Jersey, USA. August 19, 2008. 04:50 UT. Colongitude 122.9º, Seeing 4/10, Transparency 4/6. Celestron 11", f/10 SCT, 2x barlow, Lumenera Skynyx 2-1M, Schuler IR72 filter.

The somewhat rectangular appearing structure extending from the north rim of Atlas is Atlas E. This ruined crater may have been similar to Hercules, but now is most notable for the dramatic linear structures radiating across its floor from Atlas (Figure 8).

An un-named bright spot, between Atlas and Lacus Temporis to its east, is prominent under high sun conditions. A bright streak extends south towards Atlas A and Chevalier. Atlas A is nice, young appearing, bowl shaped crater, while Chevalier is almost completely flooded with a newer crater on its floor.

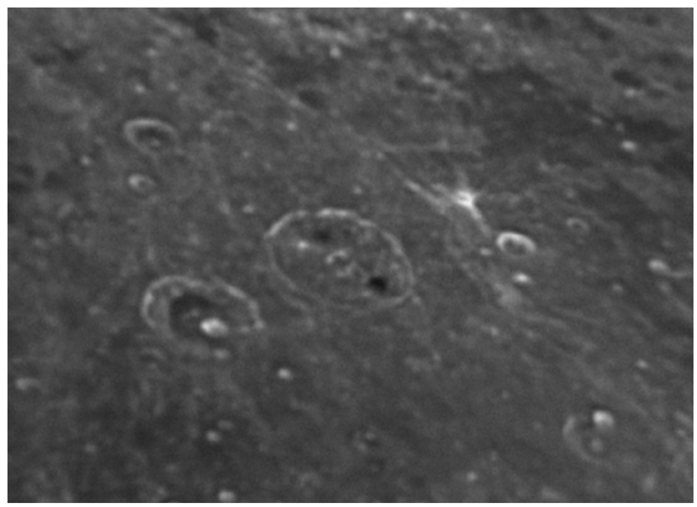


Figure 7: **Atlas-Hercules under High Sun** - Wayne Bailey, Sewell, New Jersey, USA. June 16, 2008. 03:09 UT. Colongitude 60.1º, Seeing 3/10, Transparency 4/6. Celestron 11", f/10 SCT, 2x barlow, Lumenera Skynyx 2-1M, Schuler IR72 filter.

Burg is prominently displayed on the dark lava of Lacus Mortis to the West, and Lacus Somniorum lies to the southwest, connecting to Mare Serenitatis through the wide gap west of Posidonius. Large, dark floored Endymion lies to the northeast, just beyond the north edge of Lacus Temporis. Mare Frigoris lies to the northwest and appears to connect with Lacus Mortis through the passage between Keldysh and Baily.

This is an area that is easy to locate at all phases with the help of the distinctive appearance of the Atlas-Hercules pair, and has interesting features to examine at any time.

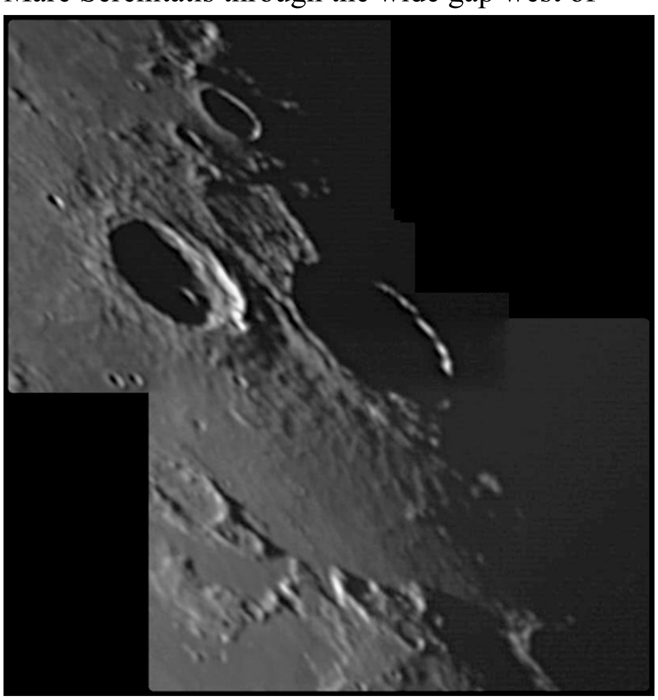


Figure 8: **Sunset at Atlas-Hercules** – Richard Hill, Tucson, Arizona, USA. September 30, 2007. 06:38 UT. Seeing 6/10. Celestron 14", SCT, 1.6x barlow, SPC900NC, UV/IR blocking filter.

Albedo features are easiest to recognize under high angle illumination, near full moon, but their changing appearance throughout the lunation rewards careful observation. This is one reason that the floor-fractured crater Atlas was included in the ALPO Selected Areas Program (http://moon.scopesandscapes.com/alpo-sap.htm). Wood (2003) has pointed out that spectral observations of the dark spots in Atlas show that they are caused by volcanic glass and lava fragments from explosive volcanic events and asks why explosive volcanism occurred in Atlas but not in adjacent, and fairly similar, Hercules.

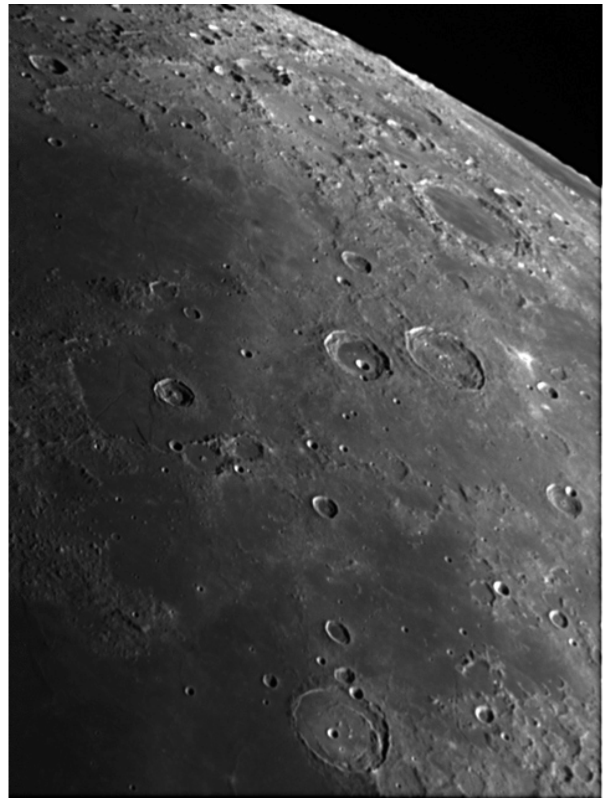


Figure 9: **Atlas-Hercules Region** – Howard Eskildsen, Ocala, Florida, USA. October 26, 2009 00:17 UT. Seeing 6/10, Transparency 5/6. Meade 6" f/8 Refractor, 2x barlow, DMK 41AU02AS, W-15 Yellow & IR-block filters.

The topography of the terrain is best viewed under low angle illumination when shadows make low relief, low contrast, features more visible. This is the time to view the ejecta blankets, terracing of walls, linear grooves, and the rilles,

However, there are exceptions to everything, so don't neglect observations just because the lighting isn't what is considered best. Rilles are sometimes visible under high sun, different lava flows are often more easily distinguished by differences of hue than by topographical features, and the higher albedo of more recently exposed material often identifies landslides more obviously than topographical relief.

This fascinating pair of craters include features that combine all of the reasons for observing them whenever they're visible.

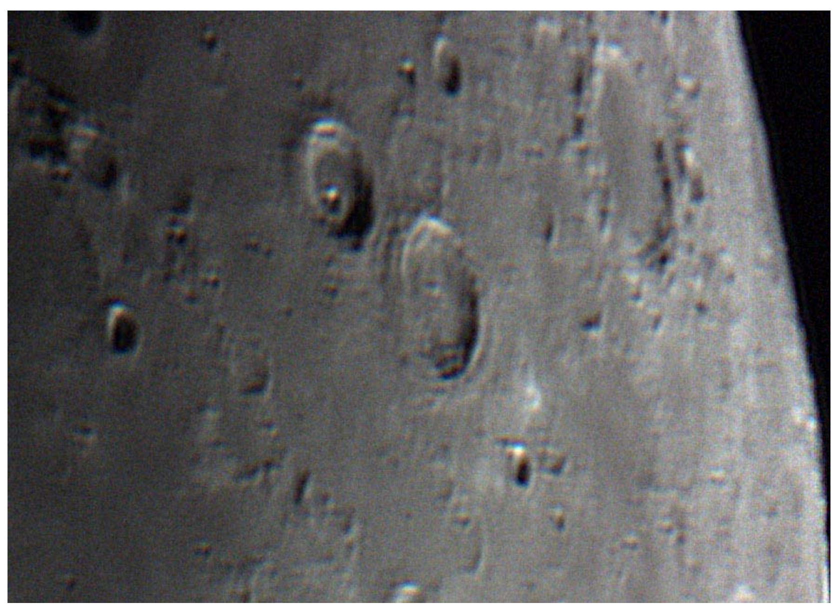
ADDITIONAL READING

Bussey, Ben & Paul Spudis. 2004. The Clementine Atlas of the Moon. Cambridge University Press, New York.
Byrne, Charles. 2005. Lunar Orbiter Photographic Atlas of the Near Side of the Moon. Springer-Verlag, London.
Grego, Peter. 2005. The Moon and How to Observe It. Springer-Verlag, London.
North, Gerald. 2000. Observing the Moon, Cambridge University Press, Cambridge.
Rukl, Antonin. 2004. Atlas of the Moon, revised updated edition, ed. Gary Seronik, Sky Publishing Corp., Cambridge.
Wlasuk, Peter. 2000. Observing the Moon. Springer-Verlag, London.
Wood, Charles. 2003. The Moon: A Personal View. Sky Publishing Corp. Cambridge.

ADDITIONAL ATLAS-HERCULES OBSERVATIONS

ATLAS-HERCULES REGION – David Hall, Eureka, Missouri, USA. November 23, 2009 01:00 UT. Seeing 8/10, Transparency 5/6, SV102ED, f/6.95 Refractor, 2.5x barlow. Meade DSI.

ATLAS-HERCULES – John Duchek – St. Louis, Missouri, USA. November 23, 2009 03:15 UT. Seeing 4/10, Transparency 2/6. 8" f/6 Newtonian. DFK 31AU03.AS with internal IR filter.



****

BANDS IN ARCHIMEDES

Antonius J Schalken
'Luar' Observatory, Melbourne, Victoria, Australia

The floor of the crater Archimedes (Fig.1, and Rükl-plate 12/22) shows a number of alternating light and dark bands in a West-East orientation.

For comparative purposes, figure 2 shows the prominent bands in Archimedes compared with the un-marked floor of Plato (b). Both images were obtained within minutes of each other.

Fig. 1: Crater Archimedes (arrowed) and the craters Autolycus and Aristillus (both to the right). Antonius J Schalken – 'Luar' Observatory, Melbourne, Victoria, Australia. March 30, 2005 20:13 UT. Colongitude: 155.4°. Maksutov 6" f/10, Philips TouCam Pro II 740K, red filter (Wratten 23A).

Though this (31 March 2005) hadn't been the first time I looked at Archimedes and the surrounding terrain, it is one of the few occasions when the bands became so evident. From my experience, when viewing Archimedes lit from the east, one cannot see the bands. Even when the Sun is west of Archimedes, not always will the bands be visible. I have found that a red filter) enhances the appearance of bright rays, by increasing contrast.

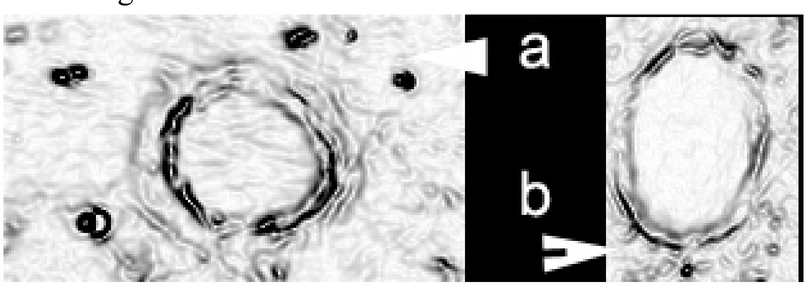


Fig. 2: Archimedes (a) and Plato (b).

Whilst the floor of Mare Imbrium, near the Apennine Mountains, is criss-crossed by numerous bright rays (from Copernicus, Aristothenes, Timocharis, Aristillus etc), Charles Wood argues for the source of the bands of bright ejecta material in Archimedes originating from the relatively young crater Autolicus (Wood, 2003). The orientation of the bands in an easterly-westerly direction would indicate a source in this orientation; Autolicus meets the requirements.

References

1. Wood, Charles.A (2003): The Modern Moon: a personal view. Sky Publishing Corp. Cambridge, MA, USA
2. Rükl, A. (1993): Atlas de la Lune. Librarie Grund, Paris.

LUNAR TOPOGRAPHICAL STUDIES

Coordinator – Wayne Bailey - wayne.bailey@alpo-astronomy.org

Assistant Coordinator – William Dembowski - dembowski@zone-vx.com

Website: http://moon.scopesandscapes.com/

OBSERVATIONS RECEIVED

KEN BOQUIST – ROCK ISLAND, ILLINOIS, USA Digital imagse of Atlas-Hercules (2).

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND Digital images of 5, 6, 7, 9 day moon, 1st Quarter Moon, Boussingault, Northern Mosaic, Southern Mosaic, and Theophilus.

ANTHONY COOK - NEWTOWN, POWYS, WALES, UK. Digital image of Tycho region during eclipse.

JOHN DUCHEK – ST. LOUIS, MISSOURI, USA Digital image of Atlas-Hercules.

HOWARD ESKILDSEN - OCALA, FLORIDA, USA Banded crater reports for Agatharchides A, Aristarchus, Bessarian, Brayley & Kepler. Digital images of Aristarchus(2), Bailly, Casatus, Davy, Gutenberg, Hansteen, Herigonius, Mare Humorum, Mare Nectaris, Marius, Markov, Mersenius, Moretus, Pytheas, Rumker, Schickard, Sersalis, Schiller-Zucchius basin, Stevinius-Gutenberg & Wargentin.

HOWARD ESKILDSEN & MATTHEW D'AURIA - OCALA, FLORIDA, USA Digital images of Ariardaeus, Aristillus, Conon, Dawes, Mädler.

DAVID HALL – EUREKA, MISSOURI, USA Digital image of Atlas-Hercules.

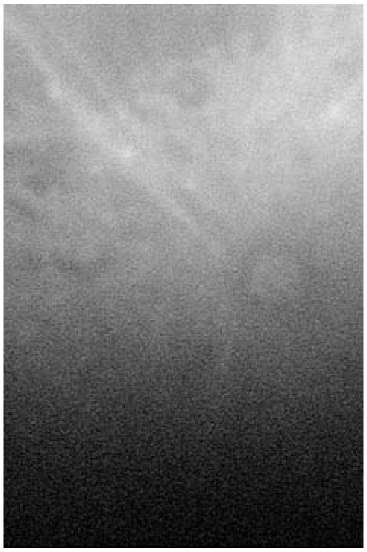
ROBERT HAYS – WORTH, ILLINOIS, USA Drawings of Lalande & Madler.

TONY SCHALKEN – MELBOURNE, AUSTRALIA Digital image of Archimedes.

ROBERT WLODARCZYK – CZESTOCHOWA, POLAND Drawings of Fabricius-Metius & Moretus-Gruemberger.

****

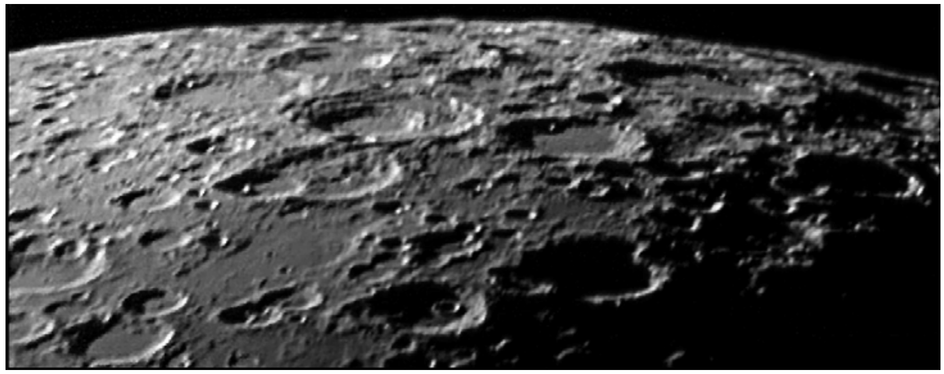
ECLIPSE OBSERVATONS

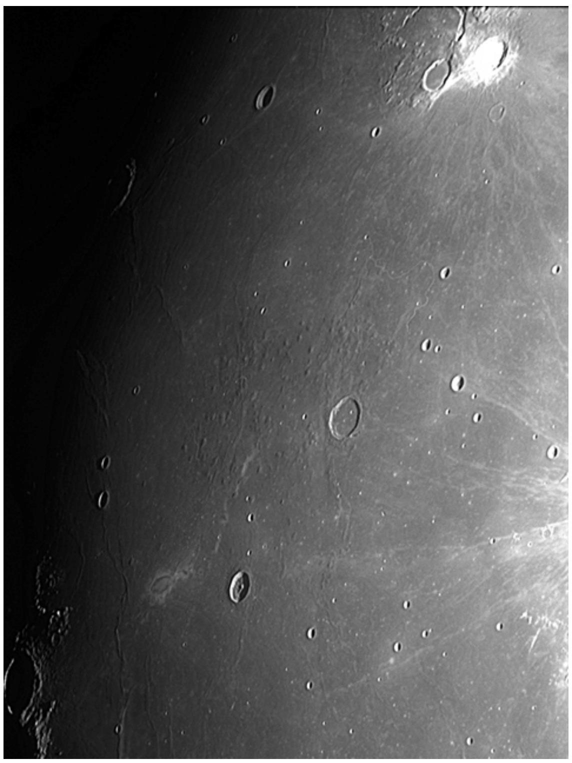


PARTIAL ECLIPSE NEAR TYCHO – Anthony Cook- Newtown, Powys, Wales, UK. December 31, 2009 18:49 UT. 20 cm Newtonian, f/5. 2X Barlow, Watec 902HS CCTV camera, 10nm FWHM filter centered on Na D 589nm.

RECENT TOPOGRAPHICAL OBSERVATIONS

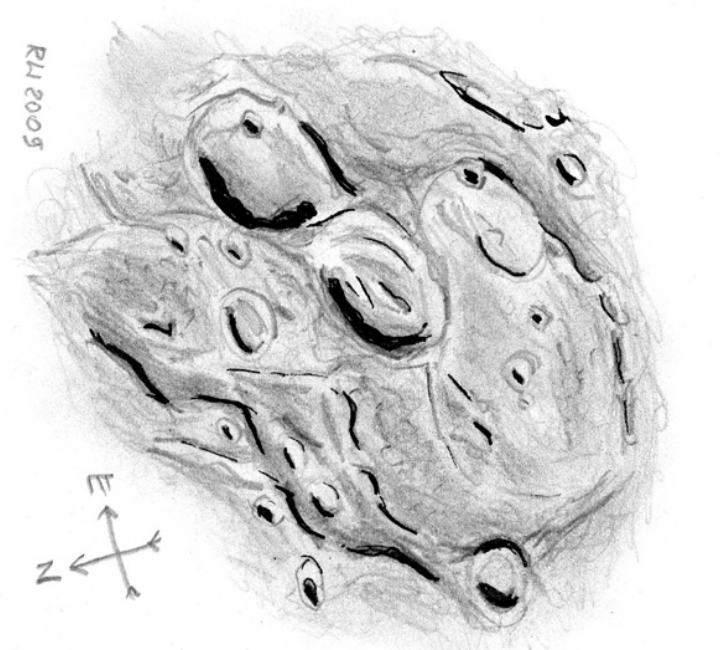
BOUSSINGAULT - Maurice Collins - Palmerston North, New Zealand, December 22, 2009 08:55 UT. C8, 3x barlow, LPI.



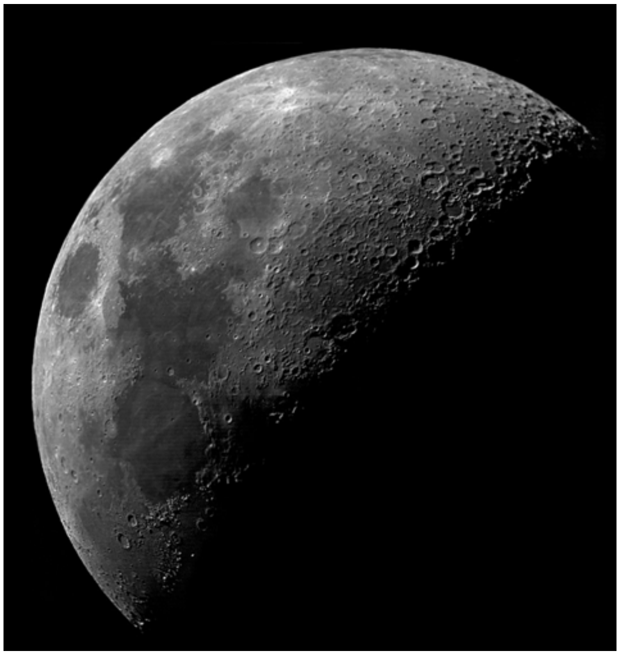


MARIUS – Howard Eskildsen - Ocala, Florida, USA. November 30, 2009 01:50 UT. Seeing 8/10, Transparency 4/6.   Meade, 6" f/8 Refractor, 2x barlow, DMK 41AU02AS.
Editor's note: notice the variety of different features visible in this image in addition to the obvious craters; the Marius Hills north & west of Marius sprinkling the mare with isolated hills, rays from Kepler & Aristarchus, Rimae Marius & Seuss, wrinkle ridges and enigmatic Reiner Gamma.

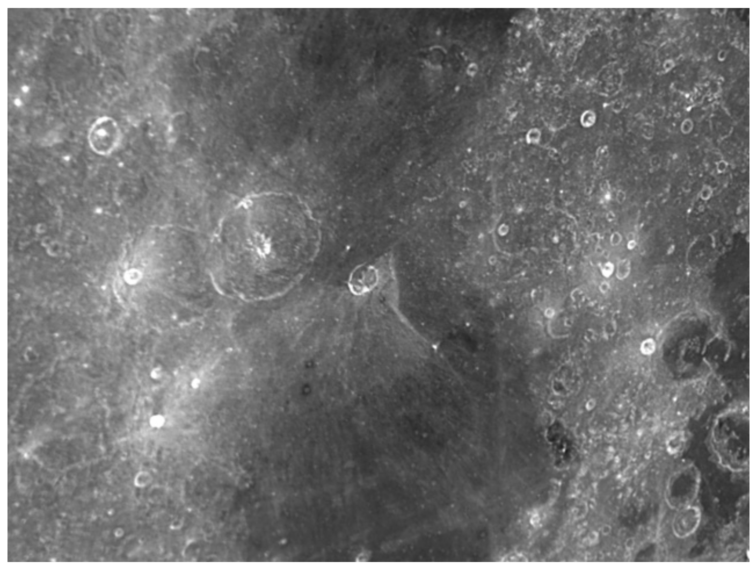
FABRICIUS, METIUS & ENVIRONS – Robert Wlodarczyk - Czestochowa, Poland. August 8, 2009 23:45 UT. Seeing 4/10, Transparency 4/6. 12 cm Newtonian, f/7.5, 160x.



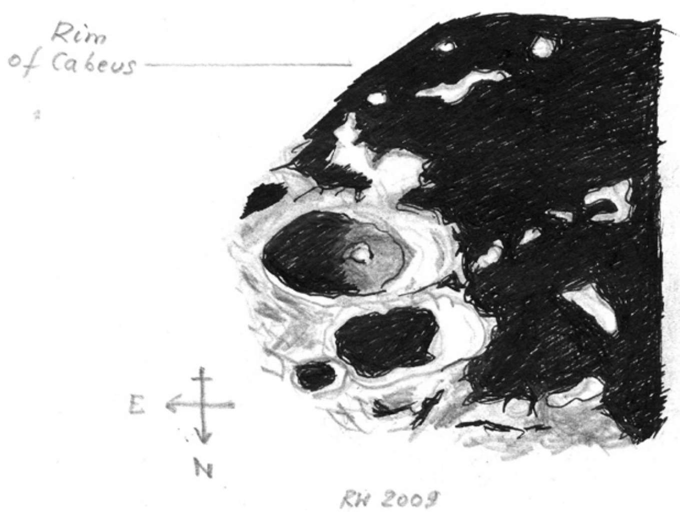
ADDITIONAL TOPOGRAPHICAL OBSERVATIONS



FIRST QUARTER MOON - Maurice Collins - Palmerston North, New Zealand, December 24, 2009 04:09-04:26 UT. C8, LPI.
Editor's note: Note that the images for this mosaic were taken in daylight. Proper exposure and the linearity of ccd's can overcome significant difficulties.



MÄDLER – Howard Eskildsen & Matthew D'Auria - Ocala, Florida, USA. October 31, 2009 00:30 UT. Seeing 6/10, Transparency 5/6. Meade, 14" f/10 SCT, DMK 41AU02AS.
Editor's note: Note the two prominent dark-haloed craters south of Mädler.



MORETUS GRUEMBERGER – Robert Wlodarczyk - Czestochowa, Poland. November 25, 2009 16:00 UT. Seeing 5/10, Transparency 3/6. 12 cm Newtonian, f/7.5, 160x.

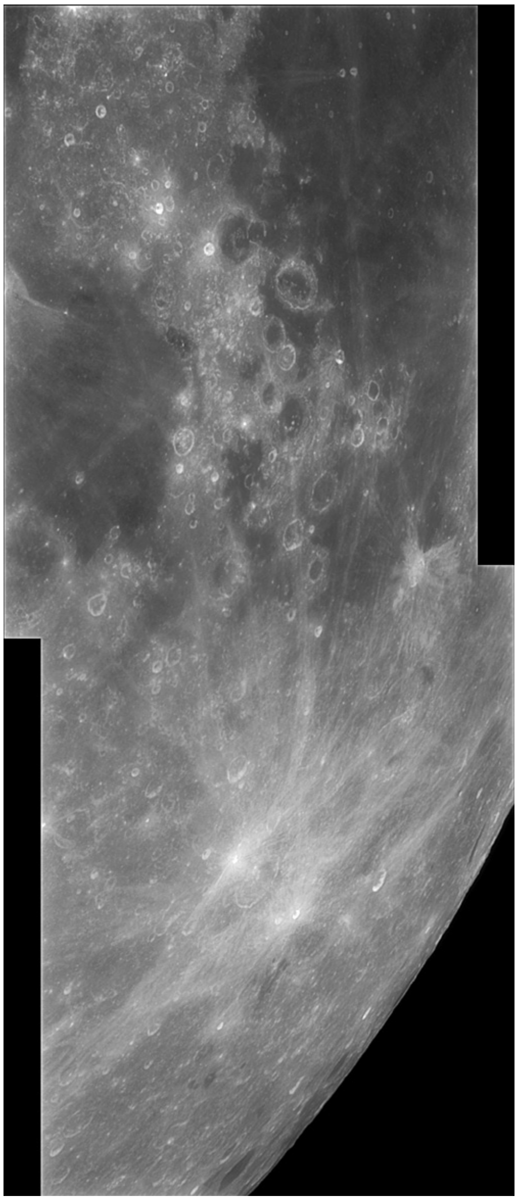
BRIGHT LUNAR RAYS PROJECT

Coordinator – Wayne Bailey – wayne.bailey@alpo-astronomy.org

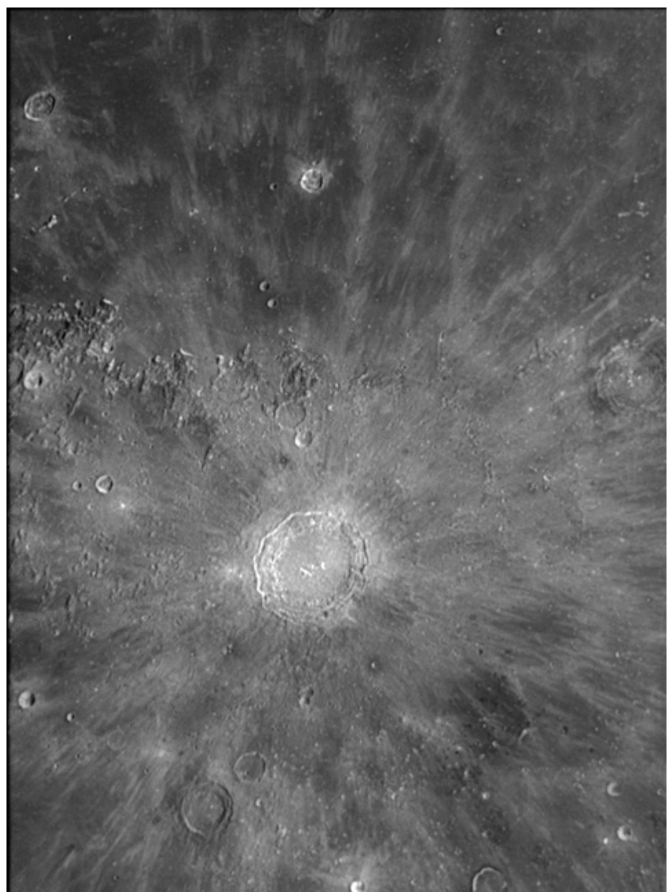
Assistant Coordinator – William Dembowski – dembowski@zone-vx.com

Bright Lunar Rays Website: http://moon.scopesandscapes.com/alpo-rays.html

RECENT RAY OBSERVATIONS



STEVINIUS RAYS – Howard Eskildsen - Ocala, Florida, USA. November 30, 2009 02:08 UT. Seeing 8/10, Transparency 5/6. Meade, 6" f/8 Refractor, 2x barlow, DMK 41AU02AS.



COPERNICUS RAYS & PYTHEAS - Howard Eskildsen - Ocala, Florida, USA. November 30, 2009 01:59 UT. Seeing 8/10, Transparency 4/6. Meade, 6" f/8 Refractor, 2x barlow, DMK 41AU02AS.

BANDED CRATERS PROGRAM

Coordinator – Wayne Bailey – wayne.bailey@alpo-astronomy.org

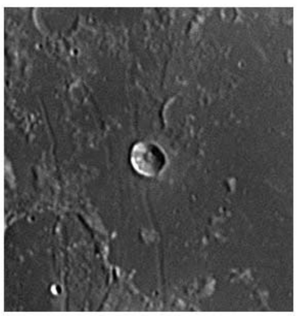
Assistant Coordinator – William Dembowski - dembowski@zone-vx.com

Banded Craters Program Website: http://moon.scopesandscapes.com/alpo-bcp.html

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Agatharchides A
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: P.O. Box 830415, Ocala, Florida, 34483
Telescope: Meade Refractor 15.2 cm f/8
Imaging: DMK 41AU02.AS, 2X Barlow Filters: None
Seeing: 8/10 Transparency: 5/6
Date (UT): 2009/11/29 Time (UT): 02:01
Colongitude: 57°
Position of crater: Selen. Long. 2.4° West Selen. Lat. 6.7° North
Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

Image (north up):



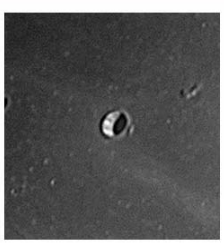
Comments:

Dark, broad band crosses the western rim from the crest to the central peak. Multiple bright markings inside the rim appear to be either slight terracing or other slumped material.

A.L.P.O. Lunar Section: Selected Areas Program Banded Craters Observing Form

Crater Observed: Brayley
Observer: Howard Eskildsen Observing Station: Ocala, Florida
Mailing Address: P.O. Box 830415, Ocala, Florida, 34483
Telescope: Meade Refractor 15.2 cm f/8
Imaging: DMK 41 AU02.AS, 2X Barlow Filters: None
Seeing: 8/10 Transparency: 5/6
Date (UT): 2009/11/29 Time (UT): 02:07
Colongitude: 57°
Position of crater: Selen. Long. 36.9° West Selen. Lat. 20.9° North
Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

Image (north up):



Comments:

Three dark bands cross the bright western rim of the crater. A curious small ridge appears to abut the eastern rim external to the crater.

LUNAR TRANSIENT PHENOMENA

Coordinator – Dr. Anthony Cook – atc@aber.ac.uk
Assistant Coordinator – David O. Darling - DOD121252@aol.com

LTP NEWSLETTER – JANUARY 2010

Dr. Anthony Cook - Coordinator

I think that 2009 must have been one of the cloudiest and wettest years that I can remember, anyway here's to wishing you better luck with observing in 2010. Observations for Nov 2009 were received from the following observers: Paul Abel (Selsey, UK), Jay Albert (Lakeworth, FL, USA), Clive Brook (Plymouth, UK), Maurice Collins (Palmerston North, New Zealand), myself (Aberystwyth University, robotic telescope and at Newtown, UK), Marie Cook (Mundesley, UK), Alan Heath (Long Eaton, UK), Bill Leatherbarrow (Sheffield, UK), Raffaello Lena (Italy), Trevor Little (Selsey, UK), Richard McKim (Peterborough, UK), Brendan Shaw (UK), and Mike White (New Zealand).

LTP reports: Only one LTP report was received for November, concerning Eratosthenes on the 25th of November, however it is quite an interesting set of observations. To the credit of the observers, who suspected the LTP originally, they performed excellently and conducted several tests to check for spurious color. However as you will read, although the LTP effect was confirmed locally, this was not the case nationally or internationally. Below is the time line of the event as it unfolded, followed by a preliminary discussion:

UT (after 17:00 up until some time before Paul Abel observers) – Clive Brook (2" refractor, x25, weather: scudding cloud) notes nothing unusual in Eratosthenes, or elsewhere on the Moon

UT18:15 – Bill Leatherbarrow (Sheffield, UK, 9.25" SCT) captures an image that includes Eratosthenes crater in Astronomik red filter.

UT18:40 - Paul Abel and Trevor Little (using Sir Patrick Moore's 15" reflector at Selsey, UK, seeing Antoniadi II-III, transparency very good, default magnification x200) Eratosthenes looked normal and no color seen.

UT18:42 – Paul Abel sees a strong brown color appear on the NW wall. Different eyepieces were used and the color remained. None of the nearby mountains, or indeed anywhere else in Eratosthenes, showed this brown color effect.

UT18:48 Trevor Little captures a monochromatic image of Eratosthenes.

UT18:50 Trevor Little captures a monochromatic image of Eratosthenes.

UT18:53 Trevor Little captures a monochromatic image of Eratosthenes.

UT18:57 Trevor Little captures a monochromatic image of Eratosthenes.

UT~19:00-1905 – Seeing worsened so Paul phones the LTP coordinator (me). I receive the call but am on a train somewhere between North Wales and Shrewsbury (UK). Before I can alert other observers, my telephone battery dies. I eventually need to change trains at Shrewsbury Station, and end up shoveling coins into a British Telecom coin operated phone box and manage to alert two observers.

UT19:05 Marie Cook (Mundesley, UK, 90mm Questar scope, x80-130, seeing III and transparency good, with some clear patches and cloud on the horizon) starts observing, making a routine white light check on Eratosthenes as it was matching the repeat illumination conditions from Bartlett's 1969 Nov 18 LTP observation. No flashes of light seen – so repeat of Bartlett's LTP effect.

UT19:08 Trevor Little captures a monochromatic image of Eratosthenes.

UT19:15 Marie Cook makes a simple sketch and notes a dark band on the western wall, the floor was in shadow with the central peak being seen occasionally (comes and goes, but is not bright). No color seen in the crater.

UT19:19 Trevor Little captures a red Astronomik filter image of Eratosthenes.

UT19:20 Trevor Little captures a red Astronomik filter image of Eratosthenes.

UT19:21 Trevor Little captures a monochromatic image of Eratosthenes.

UT19:23 Trevor Little captures a monochromatic image of Eratosthenes.

UT19:23 Paul Abel notes that the brownish LTP is still present and easier to see with the seeing improving. In addition he notes that the whole NW wall of the crater brightens periodically.

UT19:25 Trevor Little captures a green Astronomik filter image of Eratosthenes.

UT19:27 Chris North (same telescope at Selsey) suspects brown coloration on certain features on the NW wall. In other words we have a 3rd person confirming the LTP.

UT19:28 Trevor Little captures a green Astronomik filter image of Eratosthenes.

UT19:30 Marie Cook checks the crater for color, but none seen.

UT19:30 Brendan Shaw (Southern UK, 8x50 Leica binoculars, main telescope could not get the Moon) in response to my hasty telephone alert, observed nothing unusual, but image scale poor, although there was some false color on the lower limb of the Moon.

UT19:35 Bill Leatherbarrow (Sheffield, UK, 9.25" SCT, x261-336) receives alert phone call from Paul Abel.

UT19:37 Richard McKim (Peterborough, UK, 70mm refractor, x100, winds too strong to open up main observatory) receives LTP phone alert from Paul Abel

UT19:40 Bill Leatherbarrow visually checks Eratosthenes and confirmed the presence of orange-brown color at the edge of the interior shadow NW of the central peak. However he also saw similar color on two illuminated peaks W of Eratosthenes where these met the shadow cast by the exterior wall of the crater. Similar effects seen where the interior shadow of Timocharis met the bright inner wall.

UT19:40-19:50 Richard McKim observed that the crater looked crisp and sharp (as did other features along the terminator) and there was no sign of color, spurious or otherwise. Nothing unusual seen.

UT19:45 Marie Cook sees no color on the crater, but local transparency now makes the Moon look fuzzy, so stops observing.

UT19:47 Trevor Little captures a monochromatic image of Eratosthenes.

UT19:55 Bill Leatherbarrow captures a monochromatic image of Eratosthenes

UT19:58 Bill Leatherbarrow captures an Astronomik red filter image of Eratosthenes

UT20:11 Paul Abel checks the crater Timocharis, essentially under the same illumination as Eratosthenes, and similar in appearance, but no color effect seen here!

UT20:15 Bill Leatherbarrow notes the color effect in Eratosthenes and the other locations was sill present, but seeing made further observations impossible.

UT20:16 I eventually get home (Newtown, UK) and put out an alert on Twitter, followed by a mixture of phone and email alerts over the next few tens of minutes, whilst setting up my own telescope (8" reflector, seeing Antoniadi V and transparency poor-very poor).

UT20:18 Paul Abel finishes a sketch (Fig 2) that was started earlier. Trevor and Paul can still see the brown color. However the Moon is now at a lower altitude (32 degrees) and seeing has worsened. Spurious color now noticed on other craters, however this is quite different to the brownish effect seen in Eratosthenes.

UT20:35 Paul Abel records that the brown color effect has almost completely gone. Seeing has improved, but clouds are coming.

UT20:43 I managed to see the Moon through a slightly hazy hole in the cloud, but with seeing at Antoniadi V, I am really not surprised at seeing brown on the east rim, red on the central peak, and hoards of spurious color elsewhere on the Moon. My conditions are much worse than down in Selsey, and so doubt the value of my report.

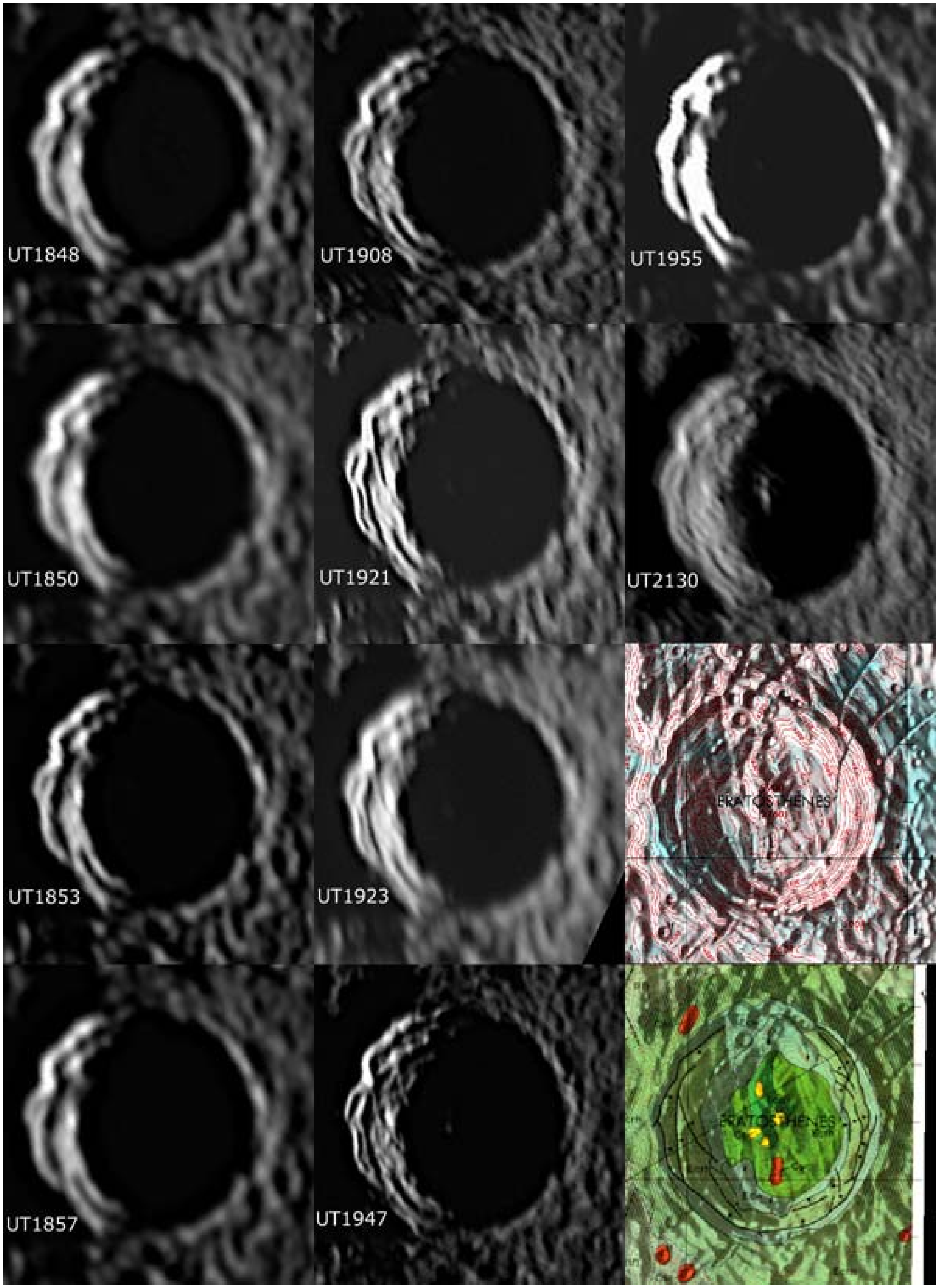


Fig 1. Time sequence of monochromatic images from several observers, using various instruments, under different conditions. See UT notes above and below to credit who took which image. For comparison a NASA Lunar Aeronautical Chart, and a USGS geological map are also included – bottom right. North is at the top in all cases.

UT20:55 I managed to see the Moon again through a now thicker hazy hole in the cloud. Same signs of spurious color, but now the central peak is twinkling. I can also see some flashes inside the shadow (possibly some terraces starting to emerge into sun light, but being made visible only part of the time by seeing variations. Decide to bring the telescope in doors before it rains.

UT21:03 Paul Abel reports that the brown color effect has gone!

UT21:30 Raffaello Lena (GLR, Italy) captures while light(?) image of Eratosthenes crater

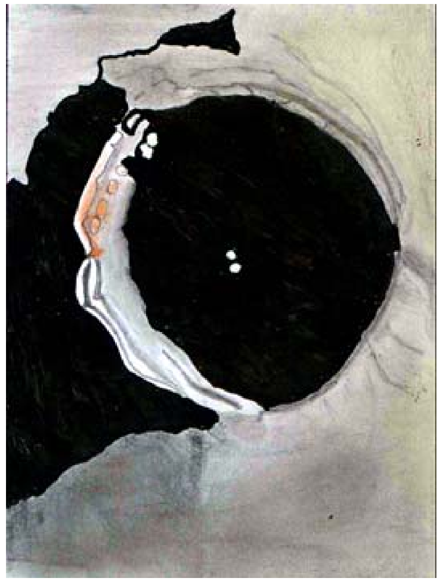


Fig 2. Paul Abel's sketch of Eratoshenes. Colors have been enhanced. North is at the top.

The following observers reported being clouded out, or did not receive the email until well after the event: Jay Albert, Raffaello Braga, Tony Buick, Bill Dembowski, Peter Grego, Nigel Longshaw, Phil Morgan, and Gerald North.

A Preliminary Analysis: Firstly, I am very grateful for all the careful observations and checks that were undertaken by all observers concerned. I put together a time sequence of the monochromatic images as can be seen in figure 1. This still needs some work in order to normalize the images in brightness with respect to each other. Once done this can be used to see if Paul's comment about brightness changes on the NW rim were recorded electronically too. I made an attempt at a color composite image (using Trevor Little's images) with red in the red channel, green in the green channel, and a repeat of green in the blue channel (see Fig 3). If any color was captured by the CCD, this should show up? This does not appear to be the case, although parts of the rim are saturated in brightness making analysis slightly difficult.

So presently we have the following lines of evidence…

1) Three observers all saw independently a brown color on the NW rim, albeit they used the same 15" reflector.
2) Paul Abel changed eyepieces and looked for spurious color elsewhere – none was seen until much later.
3) I have attempted modeling of atmospheric spectral dispersion, but cannot reproduce the observed color in the correct place - so far.
4) Most other observers were using smaller telescopes, but under poorer conditions, and did not see the color.
5) Bill Leatherbarrow did see color in the correct place but suspected spurious color as it was seen elsewhere.

6) The CCD images from Selsey do not show the color in the suspected area, but there is some image saturation present. I am presently improving the registration of the filter images to see if this has any effect.

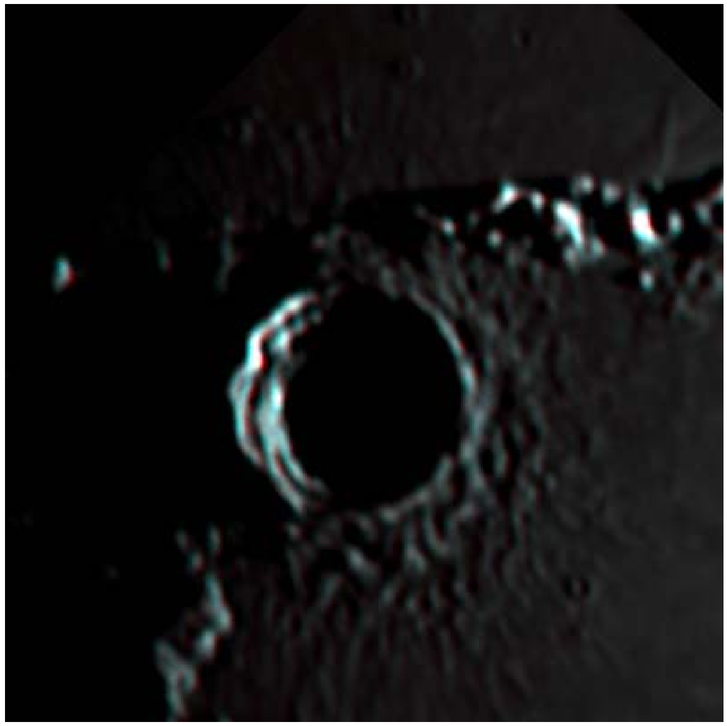


Fig 3. Color composite from around UT 19:19 (red) and 19:25 (green) images by Trevor Little. North is at the top.

So this reported LTP presents us with a paradox because some of the evidence, and underlying assumptions, contradict! If this had been just a visual report by the Selsey observers, then I might have been tempted to give a high weight of 4, however the lack of positive confirmation by other observers (albeit using smaller scopes, or under worse observing conditions) and lack of color in the preliminary CCD color composite suggests that I hold off on assigning a weight just until I understand the problem more clearly. Please watch out for next month's article, where I will have hopefully completed my analysis on the CCD images. Incidentally I have checked past observations at a similar colongitude and have found the following:

2003 Jan 11 UT 18:23-18:30, 18:46-18:54, 21:35-21:55, 22:20, and 22:55 : Marie Cook
2006 Feb 7 UT 01:20 : Howard Eskildsen's image published in TLO 2006 March, p8.
2008 Dec 18 UT 01:45-03:30 : Jay Albert

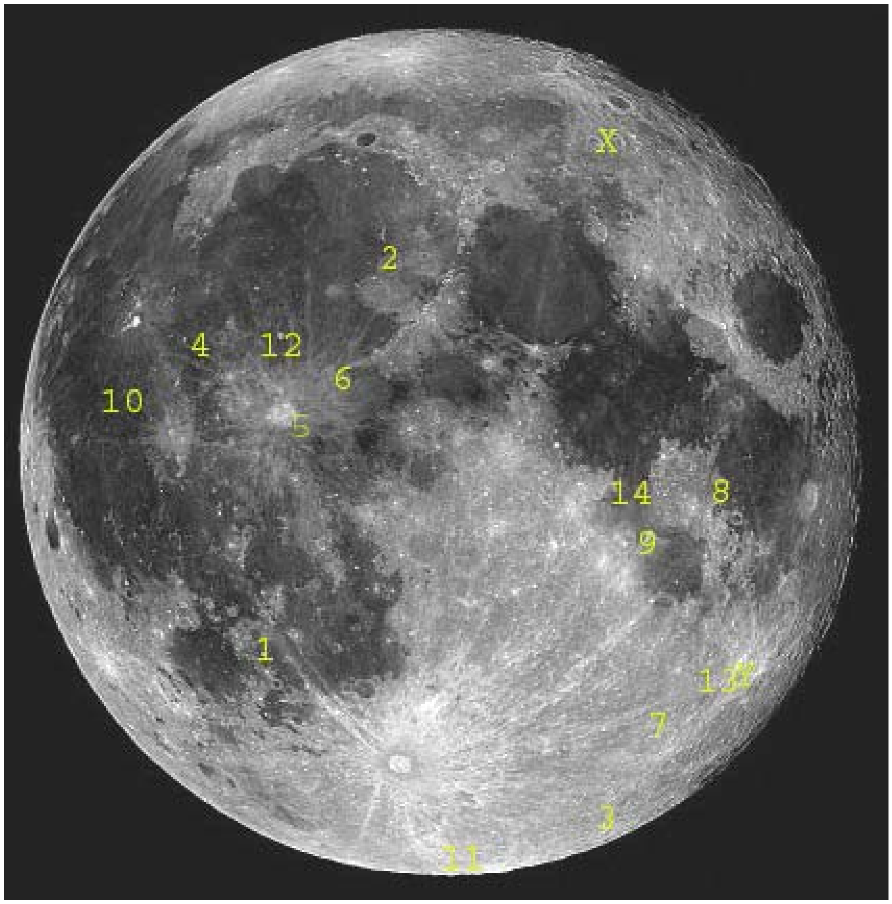
… however none of these past visual reports mention color and the printed Eskildsen image is monochrome but it agrees closely with Fig 1 appearances.

For repeat illumination LTP predictions for the coming month, these can be found on the following web site: http://users.aber.ac.uk/atc/tlp/tlp.htm . For members who do not have access to the internet, please drop me a line and I will post predictions to you. If you would like to join the LTP telephone alert team , please let me know your phone No. and how late you wish to be contacted. If in the unlikely event you see a LTP, please give me a call on my cell phone: +44 (0)798 505 5681 and I will alert other observers. Note when telephoning from outside the UK you must not use the (0). When phoning from within the UK please do not use the +44! Twitter LTP alerts can be accessed on http://twitter.com/lunarnaut.

Dr Anthony Cook, Institute of Mathematical and Physical Sciences, University of Wales Aberystwyth, Penglais, Aberystwyth, Ceredigion, SY23 3BZ, WALES, UNITED KINGDOM. Email: atc @ aber.ac.uk

KEY TO IMAGES IN THIS ISSUE

1. **Agatharchides A**
2. **Archimedes**
3. **Boussingault**
4. **Brayley**
5. **Copernicus**
6. **Eratosthenes**
7. **Fabricuis**
8. **Gutenberg**
9. **Mädler**
10. **Marius**
11. **Moretus**
12. **Pytheas**
13. **Stevinius**
14. **Torricelli**



FOCUS ON targets

X = Atlas & Hercules (January)
Y = Snellius & Furnerius (March)
Ray Craters (May)
Dark-Haloed Craters (July)