THE LUNAR OBSERVER

RECENT BACK ISSUES: http://www.zone-vx.com/tlo_back.html

A PUBLICATION OF THE LUNAR SECTION OF THE A.L.P.O.
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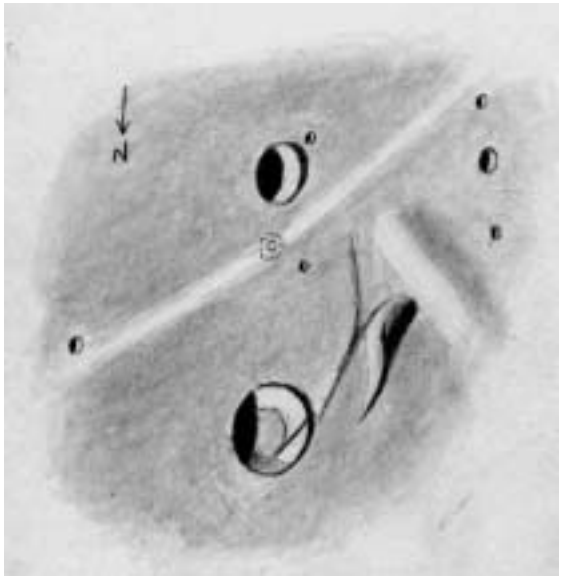
FEATURE OF THE MONTH - DEC. 2006



DESLISLE & DIOPHANTUS

Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA
June 8, 2006 - 03:42 to 04:06 UT
15cm Newtonian - 170x - Seeing 6-7/10

I sketched these craters and vicinity on the evening of June 7/8, 2006. They are in northwestern Oceanus Procellarum, east of Aristarchus. Delisle is the northern and larger of this pair. Diophantus is smaller, but appears to be deeper. Neither has a central peak, but Delisle may have some interior terracing. The large, drop-shaped peak is Delisle beta. This feature has a strip of shadow cutting well into its middle, and is definitely duskier at its wide southern end. There are narrow strips of shadow between Delisle beta and the two large craters. Just to the southwest of Delisle beta is a low, ill-defined elevation which is probably too conspicuous on the sketch. Farther to the southwest is a north-south row of three small craters. Diophantus A in the middle is the largest one. Diophantus C is just southwest of Diophantus, while Diophantus B is to the east. A tiny pit is between the two large craters, and a bright, shadowless spot is between this pit and Diophantus. A narrow ray runs from near Diophantus B to south of Diophantus A and D. This ray has a slight bend at the bright spot.

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. Several copies of recent journals can be found on-line at: **http://www.justfurfun.org/djalpo/** Look for the issues marked FREE, they are not password protected. Additional information about the A.L.P.O. can be found at our website: **http://www.lpl.arizona.edu/alpo/** 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.lpl.arizona.edu/~rhill/alpo/member.html** which now also provides links so that you can enroll and pay your membership dues online.

LUNAR CALENDAR - December 2006 (UT)

03 . . . . . 07:00 . . . . . Moon 0.48 Degrees NW of asteroid Iris

05 . . . . . 00:24 . . . . . Full Moon

10 . . . . . 12:00 . . . . . Moon 1.1 Degrees NNE of Saturn

12 . . . . . 14:32 . . . . . Last Quarter

13 . . . . . 19:00 . . . . . Moon at Apogee (404,418 km - 251,294 miles)

18 . . . . . 19:00 . . . . . Moon 5.5 Degrees S of Jupiter

19 . . . . . 02:00 . . . . . Moon 4.7 Degrees S of Mars

19 . . . . . 18:00 . . . . . Moon 4.7 Degrees S of Mercury

20 . . . . . 14:00 . . . . . New Moon (Start of Lunation 1039)

21 . . . . . 17:00 . . . . . Moon 3.5 Degrees S of Venus

24 . . . . . 05:00 . . . . . Moon 2.4 Degrees SSE of Neptune

25 . . . . . 22:00 . . . . . Moon 0.26 Degrees NE of Uranus

27 . . . . . 14:48 . . . . . First Quarter

28 . . . . . 03:00 . . . . . Moon at Perigee (370,323 km - 230,180 miles)

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)

Following are several excerpts from the Selected Areas Program (SAP) Handbook by Dr. Julius Benton. Although written specifically for the SAP, they are applicable to all phases of serious lunar observation. The Elger Albedo Scale is of particular importance since it is vital to the study of not only the Selected Areas themselves (more on this in future issues), but of Banded Craters, Dark Haloed Craters, and Bright Lunar Rays.

OBSERVATIONAL AND INSTRUMENTAL NOTES

Dr. Julius Benton, Jr.

The success of the A.L.P.O. Lunar Selected Areas Program (SAP) is dependent upon long-term systematic observations of specific lunar features not only throughout a given lunation, but also from lunation to lunation for many years. Such regular and careful monitoring will familiarize one with the normal, yet often complex, changes in appearance that many features undergo from lunar sunrise to sunset, and it will be possible for the individual to recognize anomalous phenomena more readily from one lunation to the next, should they occur. Special inherent talents for drawing lunar features, although definitely helpful, are not necessary, nor is exceptional visual acuity. The most fundamental and essential prerequisite for participation in the Selected Areas Program is the willingness to follow the Moon and the chosen feature(s) for many consecutive lunations, year after year.

Scientific objectivity is mandatory, whereby the observer must develop a constant practice of recording precisely what is seen at the eyepiece, not what one might expect to see (as may be derived from one's previous observations or from studies of published reports from other individuals). Should there be any doubt whatsoever about what is perceived, the observer must routinely note such uncertainties. The resulting data will be far more reliable and of lasting value.

While initial efforts to detect rather delicate details on the lunar surface may result in some disappointment, persistent observations will bring about the reward of eventual successful scrutiny (training of the eye) of subtle features at the threshold of vision. The joy of recording phenomena or details hitherto unrecognized is reserved largely for the person who has maintained the perseverance to observe the Moon on numerous occasions.

Although no inflexible minimum size telescope need be specified for active participation in the A.L.P.O. Selected Areas Program (SAP), most experienced observers are in agreement that the largest aperture available, which can be employed with the existing seeing and transparency conditions, should be used. Even so, a good 10.2cm.(4.Oin.) refractor or 20.0cm.(8.0in.) reflector will deliver sufficient resolution of lunar detail for full participation in nearly all aspects of the observing program. No attempt here is made to address the various pros and cons of instrument type or design, and the driving factors in choosing a telescope should be the reliability of the manufacturer, optical and mechanical excellence (giving high-contrast, relatively bright, and crisp images), and reasonable portability.

ASTRONOMICAL SEEING AND TRANSPARENCY

Dr. Julius Benton, Jr.

The state of the Earth's atmosphere is a critical factor to appraise when one attempts lunar and planetary observations. Astronomical seeing is the result of a number of very slight differences in the refractive index of air from one point to another, and such variations are directly related to density differences, normally associated with temperature gradients, from one location to another. The observed effect of such random atmospheric fluctuations is an irregular distortion and motion of the image. At one time, the seeing may be evaluated as excellent, whereby no gross image variations are noted over a fairly long interval. At another time, the seeing might be poor, with the image appearing as though it is "boiling" or as if it is being seen through a layer of a moving fluid.

It is important for the individual to estimate as precisely and as objectively as possible the quality of the seeing at the time of observation. When the seeing is poor (when the atmosphere is in a highly turbulent state), it becomes impossible for one to achieve optimum resolution with the given aperture. One is usually forced to await better conditions to do anything useful.

The Standard A.L.P.O. Seeing Scale is a numerical sequence ranging from 0.0 (worst possible seeing) to 10.0 (absolutely perfect seeing), from which the observer assigns a numerical value to correctly represent the condition of the atmosphere at the time of observation. The altitude of the Moon should be greater than about 25° above the horizon to avoid adverse low-altitude atmospheric dispersion effects.

Transparency of the atmosphere may be determined on a given night of observation by estimating as accurately as possible (using a good star atlas for reference) the visual magnitude of the faintest star that can be detected by the unaided eye. It will be noted, however, that the Moon contributes sufficient scattered light, more or less due to the phase, to obliterate the dimmest stars. So, the observer is tasked with designating the faintest star that might otherwise be seen on the same night without the influence of the scattered light of the Moon. Estimates of the faintest star can usually be extrapolated by reference to some other attribute of the sky prior to beginning observation, such as twilight blueness, overall clarity of the sky near the Moon prior to and after sunset, etc. Estimates of transparency should always be made in the direction and proximity of the Moon, as should all appraisals of seeing.

Space is provided on the standard observing forms for entering seeing and transparency estimates on the night of observation.

Scale of seeing by William H. Pickering based on the diffraction rings of a star as seen in a 5-inch refractor. On this scale 1 to 3 is considered very bad, 4 to 5 poor, 6 to 7 good, and 8 to 10 excellent.

1. Star image is usually twice the diameter of the 3rd diffraction ring if the ring could be seen; star image 13" in diameter.
2. Image occasionally twice the diameter of the third ring (13").
3. Image about the same diameter as the third ring (6.7"), and brighter at the center.
4. The central Airy diffraction disk often visible; arcs of diffraction rings sometimes seen on brighter stars.
5. Airy disk always visible; arcs frequently seen on brighter stars.
6. Airy disk always visible; short arcs constantly seen.
7. Disk sometimes sharply defined; diffraction rings seen as long arcs or complete circles.
8. Disk always sharply defined; rings seen as long arcs or complete circles, but always in motion.
9. The inner diffraction ring is stationary. Outer rings momentarily stationary.
10. The complete diffraction pattern is stationary.

ELGER'S ALBEDO SCALE

Numerical Value	Lunar Features as Examples
0.0	Black Shadows
1.0	Darkest parts of Grimaldi, Riccioli
1.5	Interiors of Billy, Boscovich, Zupus
2.0	Floors of Endymion, LeMonnier, Julius Caesar, Cruger, Fournier
2.5	Interiors of Azout, Vitruvius, Pitatus, Hippalus, Marius
3.0	Interiors of Taruntius, Plinius, Theophilus, Parrot, Flamsteed, Mercator
3.5	Interiors of Hansen, Archimedes, Mersenius
4.0	Interiors of Manilius, Ptolemaeus, Guericke
4.5	Surface around Aristillus and Sinus Medii
5.0	Walls of Arago, Lansberg, Bullialdus; surfaces around Kepler and Aristarchus
5.5	Walls of Picard and Timocharis; rays of Copernicus
6.0	Walls ofMacrobius, Kant, Bessel, Mosting, Flamsteed
6.5	Walls of Langrenus, Thaetetus, and LaHire
7.0	Theon, Ariadeus, Bode B, Kepler, Wichmann
7.5	Ukert, Hortensius, Euclides
8.0	Walls of Godin, Bode, Copernicus
8.5	Walls of Proclus, Bode A, Hipparchus C
9.0	Censorinus, Dionysius, Mosting A, Mersenius B and C
9.5	Interior of Aristarchus and LaPyrouse
10.0	Central peak of Aristarchus

UNIQUE CONTRIBUTIONS

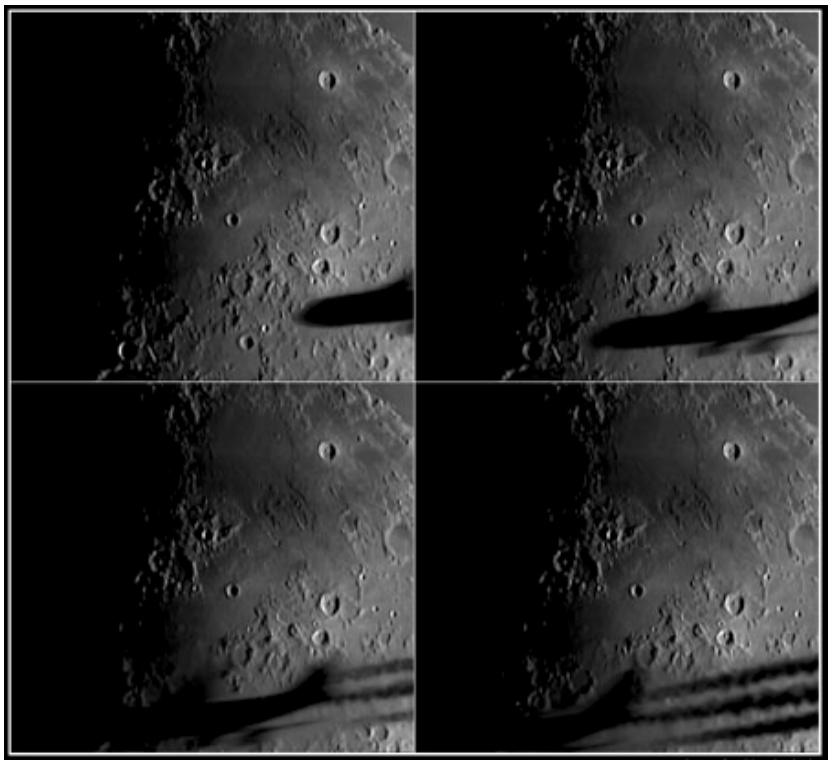
Because of space limitations and the range of our readers' downloading capabilities, it is usually necessary to reduce the size and resolution of images submitted for publication in TLO. There are, however, occasions when the images must be viewed at full size to be fully appreciated. One such case is that of **Paolo Lazzarotti (Massa, Italy)** who provided us with a link to his webpage for a spectacular 10 Mpixel mosaic of the Appennine Mountains.

http://www.lazzarotti-hires.com/images/moon/appennines20061012.jpg

Mardi Clark ( )has done the amateur lunar observing community a great service by modifying several Bowker & Hughes Lunar Orbiter Atlas scaled images to create a Calibrated Sequence of Craters. These images are a convenient way to determine the size of craters that your visual or photographic set-up can resolve.

http://www.cityastronomy.com/crater-sequence.htm

Alexander Vandenbohede (Ghent, Belgium) submitted the following: "Sunday evening, I was imaging the Moon using a 20 cm F10 Celestron C8 and webcam in prime focus. Seeing was very bad because the Moon was low above the horizon, about 10°. When imaging the Triesnecker-Hyginus region, a plane crossed the Moon. The Triesnecker-Hyginus background image is a result of a combination of 2 images, each consists of a stack of about 150 pictures. From the movie with the plane, individual frames were selected and added to the background image. Although the image is not good because the bad seeing conditions, the plane adds a nice 'extra'."



LUNAR TOPOGRAPHICAL STUDIES

Coordinator - William M. Dembowski, FRAS
dembowski@zone-vx.com

OBSERVATIONS RECEIVED

MICHAEL AMATO - WEST HAVEN, CONNECTICUT, USA
Raymaps of Messier, Aristarchus
Sketch of unnamed feature near Janssen

WAYNE BAILEY - SEWELL, NEW JERSEY, USA
Digital images of Kepler & Milichius & Bessarion (4), Aristarchus & Brayley & Bessarion (3), Aristillus & Theaetetus (5), Nicollet & Birt, Bode (3), Burg & Maury (2), Ross, Proclus (4), Menelaus & Dawes & Silberschlag (4), Pytheas, Silberschlag, Bode & Silberschlag, Burg & Atlas (2), Tycho, Mare Humorum, Tycho & Clavius, Pytheas * Lambert & Euler, Brayley, Milichius & Copernicus

ED CRANDALL - WINSTON-SALEM, NORTH CAROLINA, USA
Digital images of Eudoxus, Schickard

HOWARD ESKILDSEN - OCALA, FLORIDA, USA
Digital images of Aristillus (5), Burg, Dawes, Menelaus, Catena & Albufeda, Conon, Descartes & Atlas, Sacrobosco, Lycetus & Deluc, Pytheas & Lambert, Pytheas (2)

GUILHERME GRASSMANN - AMERICANA, BRASIL
Digital images of Theophillus, Dorsa Smirnov, Metius & Fabricius, Plinius

PAULO LAZZAROTTI - MASSA, ITALY
Digital images of Rupes Altai, Montes Apenninus, Tycho, Abulfeda & Almanon & Geber

GERARDO SBARUFATTI - CASELLE LANDI, ITALY
Digital images of Aristillus, Bessarion, Pytheas, Milichius

ALEXANDER VANDENBOHEDE - GHENT, BELGIUM
Digital images of Aristarchus (2), Copernicus, Schickard & Schiller, Reiner gamma, Ptolemaeus Chain, Grimaldi & Oceanus Procellarum, Tycho, Mare Serenitatis

RECENT TOPOGRAPHICAL OBSERVATIONS

FEATURE NEAR JANSEN
Line drawing by Michael Amato - West Haven, Connecticut, USA
September 9, 2006 - 23:30 UT - 6 inch Dobsonian

OBSERVING NOTES: Seeing good and transparency fair. I observed this formation in Mare Tranquillitatis on 9/29/06 at 23:30 UT. This formation is located next to worn out crater Jansen which is located at 29E and 14N. This feature contains ridges and high points that may or may not be lunar domes. There is also a small crater embedded in the lunar formation. This formation can be best seen when the Moon is one day before First Quarter.

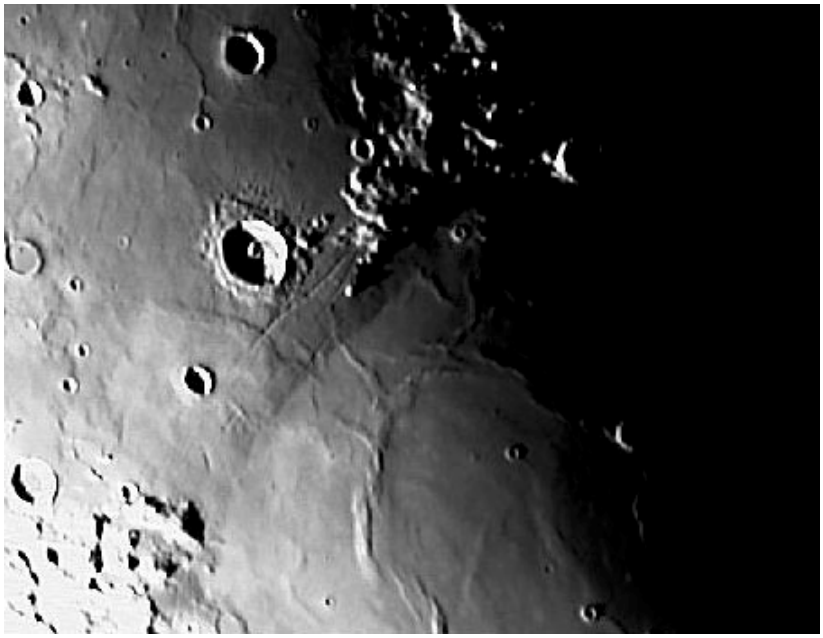
MARE HUMORUM
Digital image by Wayne Bailey - Sewell, New Jersey, USA
November 3, 2006 - 03:11 UT - Colong: 57.6 - Seeing 5/10 - Trans: 3/6
11 inch f/10 SCT - Lumenera Skynyx 2-1M - Schuler IR72 Filter

RECENT TOPOGRAPHICAL OBSERVATIONS

SCHICKARD & ENVIRONS
Digital image by Ed Crandall - Winston-Salem, North Carolina, USA
November 4, 2006 - 02:05 UT - Seeing 5-6/10
110mm f/6.5 APO Refractor - 3x Barlow - Phillips Toucam

CATENA ALBUFEDA
Digital image by Howard Eskildsin - Ocala, Florida, USA
October 30, 2006 - 00:56 UT - Seeing 6/10 - Trans: 6/6
Meade 6" f/8 Refractor - IR Block Filter - Neximage Camera

RECENT TOPOGRAPHICAL OBSERVATIONS



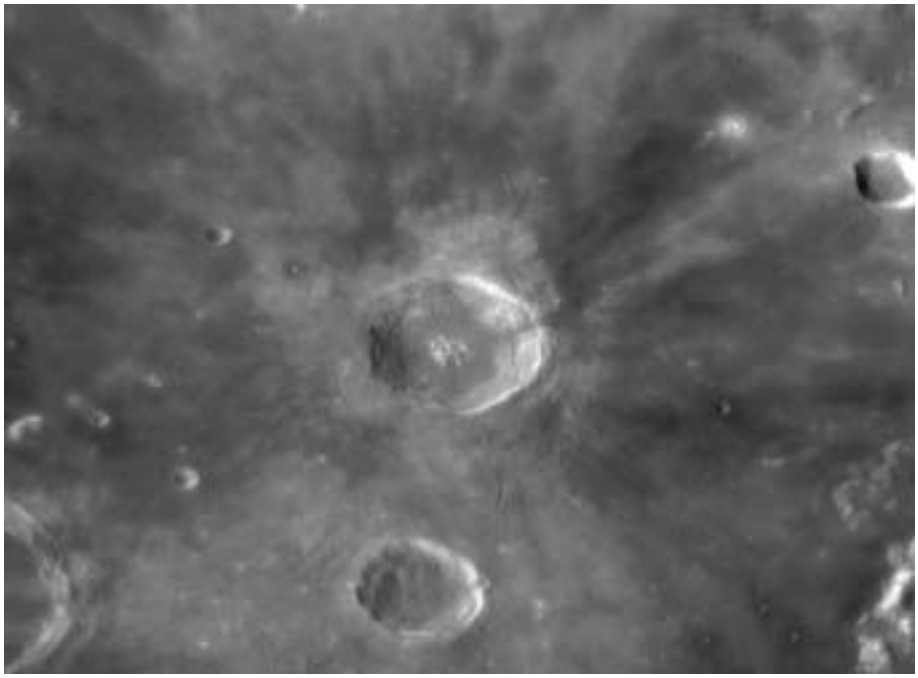
PLINIUS (RIMAE PLINIUS & DORSA LISTER)
Digital image by Guilherme Grassmann - Americana, Brasil
October 27, 2006 - 23:10 UT - Seeing 8/10 - Trans: 5/6
10 inch f/10 SCT - No Filter - Phillips Toucam Pro - Registax

RUPES ALTAI
Digital mosaic by Paolo Lazzarotti
Tatti, Grosseto, Italy
October 12, 2006 - 05:49/05:53 UT
(Sun 4-5 degrees above the horizon)
Seeing 2-6/10 - Trans: 1-2/5

Gladio 315 Lazzarotti Opt. Scope
Lumenera Infinity 2-1M Camera
Edmund Optics R+IR Filter

0.12 arcsec/pixel image scale
120/2000 Frames
55 msec Exposure

RECENT TOPOGRAPHICAL OBSERVATIONS



ARISTILLUS
Digital image by Gerardo Sbarufatti, Caselle Landi, Italy
October 10, 2006 - 02:24 UT - Seeing: Ant.III - Trans: 4/5
Celestron 8 SCT - 2x Barlow - Feq: 7.500mm - Red filter
KamPro02 Camera - Mpeg2 100 sec. at 25fps - 1,500 Best frames

MARE SERENITATIS
Color digital image by Alexander Vandenbohede - Ghent, Belgium
November 4, 2006 - Celestron C8 f/10 SCT

BRIGHT LUNAR RAYS PROJECT

Coordinator - Willliam M. Dembowski, FRAS

RECENT RAY OBSERVATIONS

ARISTARCHUS

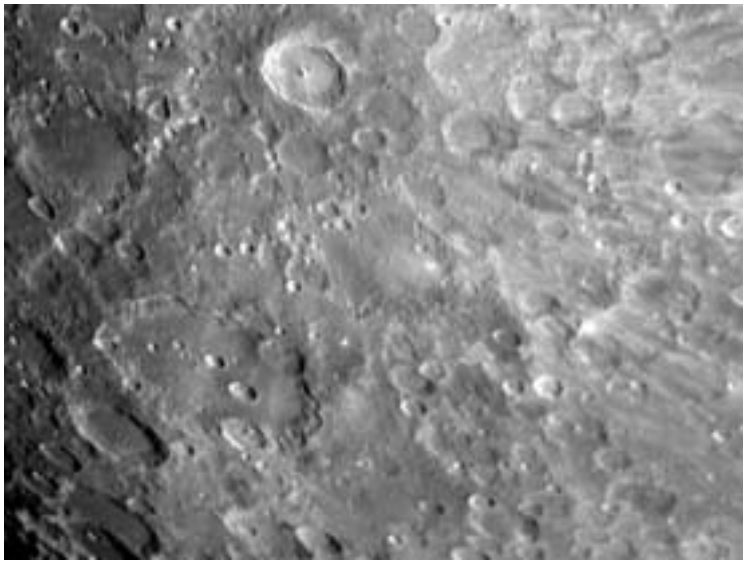
Ray map by Michael Amato - West Haven, Connecticut, USA
October 4, 2006 - 00:45 UT
127mm Maksutov-Cassegrain - 123x

OBSERVING NOTES: I observed Aristarchus' Lunar Ray at lunar sunrise. Even though the terminator went through the lunar ray, I was still able to see Aristarchus' Lunar Ray with no difficulty. I estimate the lunar ray is about 50% as bright at lunar sunrise as it is when the Sun is high.

TYCHO

Color digital image by Alexander Vandenbohede - Ghent, Belgium
November 4, 2006 - Celestron C8 f/10 SCT

RECENT RAY OBSERVATIONS



TYCHO
Digital image by Wayne Bailey - Sewell, New Jersey, USA
November 3, 2006 - 03:08 UT - Colong: 57.6 - Seeing 5/10 - Trans: 3/6
11 inch f/10 SCT - Lumenera Skynyx 2-1M - Schuler IR72 Filter

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LUNAR TRANSIENT PHENOMENA

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LTP NEWSLETTER - DECEMBER 2006

Dr. Anthony Cook - Coordinator

Observations were received from the following observers for October: Jay Albert (FL, USA), Michael Amato (CT, USA), myself (Nottingham, UK), Marie Cook (Mundesley, UK), Dr Franck Gobet (France), Gerald North (Narborough, UK), and Marnix Praet (Belgium). Observational reports for November will appear next month.

Dr Franck Gobet, CESTAS (France), took an image (2006 Oct 01, UT 19:21) of Copernicus to see if he could detect the blob between the central peak and the NE rim, that Geoff Burt draw in his sketch on 2006 Jun 5th. The illumination was very similar, within 0.05deg in solar altitude terms to Rony De Laet's sketch from Jun 5th, just before Geoff Burt's observation, but alas does not show the blob. Consequently Geoff's blob still remains a mystery. I would like to thank Jim Mosher for pointing out two typographical errors in the predictions for repeat illuminations for Copernicus in the coming months – these were in the Sep Newsletter and the 2006 Oct 31 UT 08:45 one should have read 08:54 and the 2007 May 26 UT 06:45 should have read 06:54.

Jay Albert attempted to check out the central peaks of Alphonsus on Oct 31st, as the illumination matched Clive Brook's LTP report from 2004 Feb 29th, but found everything normal this time around. He then checked Tycho to see if he could see "luminous marks in shadow…" as the 1978 NASA catalog describes Walter Haas reporting at 02:00(?) on 1940 Jul 14th, but Jay found the shadow to be totally black. Next he checked Copernicus to see if he could verify Firsoff's 1955 Jul 28th description of "great brilliance of the terraces in E(IAU?) wall system…", but Jay reports: "Exterior of E wall well lit and very detailed. Interior of crater completely filled with shadow except for parts of top rim of W wall which were lit. Did not see "specular reflection" on E or W walls. A little more of the interior top rim of the W wall was lit when viewed again at 02:18. W wall rim now brighter than exterior of E wall…". All of Jay's observations could not verify what the original LTP observers had seen and so may lend some support to these LTPs as being genuine although one has to be careful, for example what did Firsoff mean by "great brilliance" back in 1955? There lies one of the dilemmas of interpreting past LTP reports, some of the statements are not very quantitative – if one says "great brilliance", then in comparison to what? – hopefully modern day observers can do better.

Some of you may have read by now that Prof. Peter Shultz and two co-authors have published a letter to Nature citing the unusual Ina formation to be as a result of recent volcanic activity, potentially as young as 10 million years ago – this is practically "today" on a time scale of lunar geological history. He and his co-authors based this assertion (they discussed this idea also at a Lunar and Planetary Science Conference back in 2000) on it's geomorphology, and the fact that it has one of the lowest cumulative crater counts per km2 anywhere on the Moon. Also a color plot of Clementine UVVIS camera 1 micron / 750nm Vs 750nm reflectance shows a comparative blueness, that elsewhere on the Moon infers freshly disturbed soil. Ina is a D-shaped depression (18.6N, 5.3E) of chaotic terrain about 3 km across (some have interpreted as a lunar caldera) that sits on a 15 km diameter dome. The letter to Nature suggests that the Ina feature may still be forming, and so we should keep a watch on this and other Ina like features e.g. near Rima Hyginus, and near Arago for episodic gas releases. Indeed there

are 6 interesting LTP reports associated with the Rima Hyginus area from 1877 up until 1966. So I would like to ask our observers to keep an eye on these areas, especially if they have the capability to take high resolution CCD imaging in different wavebands, or to attempt slit spectroscopy across these areas.

Next, readers will be very pleased to know that Dr Winifred Cameron has provided ALPO a copy of her most recent analysis of LTP events from 557AD to 1994 (82 pages long), and also she has given us an extension to her 1978 NASA NSSDC/WDC-A-R&S Lunar Transient Phenomena Catalog. The extension covers additional LTP reports that she has found up until 1995. She was helped in the production of this catalog by Jerry Stuart, son of the famous Leon Stuart who photographed a flash on the Moon in 1953, and runs to some 153 pages. You can access PDF files of both the analysis paper, and the catalog extension, by going to the following web site: http://www.lpl.arizona.edu/~rhill/alpo/lunarstuff/ltp.html. I would like to thank Winifred Cameron, Jerry Stuart and David Darling for all the hard work and for helping to arrange this. I am sure that these will be very useful on-line resources in the years to come for both amateurs and lunar mission scientists.

Finally, please support Brian Cudnik of ALPO in looking out for Geminid impact flashes on the Moon during 2006 Dec 13-15 and ideally Dec 14 close to 05:34UT. You should look on the east limb to the center of the Earth-lit hemisphere. Suggested observing times for different geographical localities in the world are given in the web site at the bottom of this newsletter.

Further predictions, including the more numerous illumination only events can be found on the following web site: http://www.lpl.arizona.edu/~rhill/alpo/lunarstuff/ltp.html. 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!

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THE MOON IN THE NEWS

Guide to Lunar Orbiter Photographs:
http://astrogeology.usgs.gov/Projects/HistoricalDocuments/Books/NASASP242_GuideToLunarOrbiterPhotographs.pdf

Reiner gamma as a product of lunar magnetism:
http://www.space.com/scienceastronomy/061114_reiner_gamma.html

Evidence of escaping gases on the Moon?
http://www.moontoday.net/news/viewpr.html?pid=21253

Article by Paul Spudis on the lunar ice controversy.
http://www.thespacereview.com/article/740/1

Mascons and how they affect the orbits of lunar satellites:
http://www.physorg.com/news82133123.html