

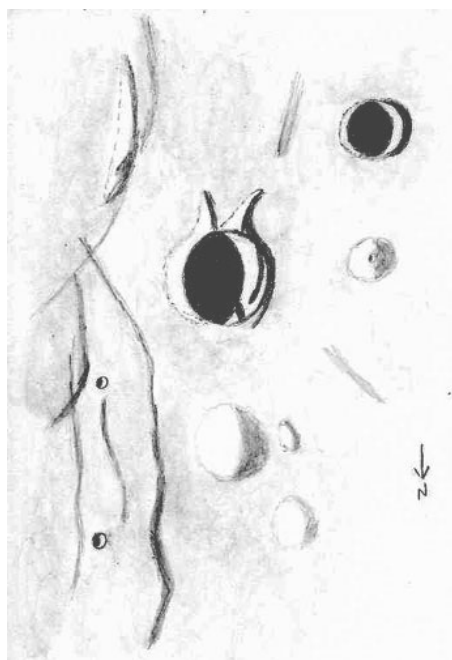


# THE LUNAR OBSERVER

RECENT BACK ISSUES: [http://www.zone-vx.com/tlo\\_back.html](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 - OCT. 2007



### ARAGO & MANNERS

Sketch and text by Robert H. Hays, Jr. - Worth, Illinois, USA

May 23, 2007 - 01:48 to 02:16 UT

15cm Newtonian - 170x - Seeing 8/10

I observed the area around these two craters on the evening of May 22/23, 2007 while watching the moon hide two faint stars. These craters lie in southwest Mare Tranquillitatis, and were fairly near the center of the visible disk that night due to longitude libration. Arago shows some evidence of terracing inside its west rim, and an odd strip of shadow near its north rim. The shadow of its rim is also detached to the northwest. Two ridges protrude from the south rim of Arago giving the appearance of horns. Manners is southwest of Arago, and cast a pronounced shadow with its west rim, but its shadowing overall was more symmetrical than that of Arago. Arago D is the pit northeast of Arago, and Arago E is the larger crater north of D. There are several wrinkles running approximately north-south near Arago D

and E, and more wrinkling and a low ridge southeast of Arago. This low ridge may be associated with the ghost ring Lamont. Of particular interest are nearby domes. Arago alpha is the large dome north of Arago. This dome is nearly round, but it has a blunt corner toward the northwest. There appears to be a smaller dome just west of Arago alpha, and a very low dome to the north. This feature is not much smaller than alpha, but its shading was very subtle. It may be too conspicuous on the sketch. These two domes both appeared elongated northwest to southeast Arago beta is west of Arago and north of Manners. It is smaller than alpha, and about the size of the very low dome to the north. Arago beta is elongated east-west, and at times I could glimpse what may be its summit craterlet. (I could not do that with alpha.)

### **LUNAR CALENDAR - October (UT)**

Oct. 02	20:00	Moon 4.7 Degrees N of Mars
Oct. 03	10:07	Last Quarter
Oct. 07	06:00	Moon 3.1 Degrees NNE of Venus
Oct. 07	15:00	Moon 1.1 Degrees SSW of Saturn
Oct. 11	05:01	New Moon (Start of Lunation 1049)
Oct. 13	00:00	Moon 1.2 Degrees SSW of Mercury
Oct. 13	09:54	Moon at Apogee (406489 km - 252581 miles)
Oct. 16	05:00	Moon 5.3 Degrees S of Jupiter
Oct. 19	08:33	First Quarter
Oct. 23	01:00	Moon 1.6 Degrees NNW of Uranus
Oct. 26	04:52	Full Moon
Oct. 26	11:52	Moon at Perigee (356754 km - 221677 miles)
Oct. 30	20:00	Moon 3.2 Degrees N of Mars

### **ALPO HAS A NEW WEBSITE**

The ALPO website has moved to a new domain and with the new domain comes a new look and a new web manager, Larry Owens. Rik Hill has for many years done a splendid job of creating and maintaining the old site and he will be sorely missed in that capacity. Rik will continue, however, to contribute his many talents to the ALPO in other areas.

**You are urged to visit the new website often to keep abreast of all the ALPO Sections and their activities: <http://www.alpo-astronomy.org/>**

## 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.

## **CALL FOR OBSERVATIONS** **FOCUS ON: Copernicus**

*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 **November 2007** edition will be the crater **Copernicus**. 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 fascinating crater to your observing list and email your favorites to [Dembowski@zone-vx.com](mailto:Dembowski@zone-vx.com) or send to the postal address shown in the banner on Page One of this newsletter.

**Deadline for inclusion in the Copernicus article is October 20, 2007**

**Be sure to check the September issue of TLO (Pages 3 & 4)**  
**for information on Copernicus LTP observations:**  
<http://www.zone-vx.com/TLO200709.pdf>

## **A.L.P.O. LUNAR COORDINATORS**

Dr. Anthony Cook – Coordinator, Transient Lunar Phenomena  
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Brian Cudnik – Coordinator, Lunar Meteoritic Impact Search  
[cudnik@sbcglobal.net](mailto:cudnik@sbcglobal.net)

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William M. Dembowski – Coordinator, Lunar Topographical Studies  
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Marvin W. Huddleston – Coordinator, Lunar Dome Survey  
[kc5lei@comcast.net](mailto:kc5lei@comcast.net)

# **Introduction to the Selected Areas Program**

**By Julius Benton, Jr.**

**The Selected Areas Program (SAP) previously coordinated by Dr. Julius Benton, Jr. is now a part of the Lunar Topographical Studies Section. The SAP provides for the formal monitoring of seven specific areas of the Moon for albedo changes during a lunation and from one lunation to the next.**

**The following is an introduction to the Selected Areas Program prepared by Dr. Benton for the Lunar SAP Handbook (Nov. 2002). Anyone interested in participating in the SAP should contact the new coordinator, William Dembowski, at [dembowski@zone-vx.com](mailto:dembowski@zone-vx.com)**

The missions of Apollo transformed our nearest celestial neighbor from a virtually unknown and inaccessible object into a relatively familiar world. Including the unprecedented historical events of July 20, 1969, twelve astronauts from Earth have set foot upon the Moon's surface, collecting and returning to Earth some 380 kg. of rocks and debris from six Apollo ventures. Of course, in mentioning any lunar explorations from Earth, we cannot omit the small but no less important 130 gm. of rocks gathered during the unmanned Russian Luna-16 and Luna-20 missions.

Apart from the vast collection of photographs, supplementing previous data from missions such as Surveyor and Orbiter, the Apollo program enabled equipment to be set up on the lunar surface to monitor moonquakes, meteoric impacts, thermal characteristics of the lunar surface material, and alleged magnetic phenomena. Adding to the wealth of accumulated data that now exists has been the massive collection of photographs of the entire lunar surface made in unprecedented detail in 1994 by the orbiting Clementine spacecraft. It will be many years, no doubt, before all of this information will be thoroughly assimilated and developed into a realistic account of the Moon and its cosmic history.

For the amateur astronomer, the Moon has always been a favorite subject for his telescopes, and until the first really energetic space efforts, he in large part dominated the field of selenography. Now, with the impact of a great multitude of photographs taken at close-hand, with precise measurements of the Moon's complex chemical composition, radioactivity, and seismic profile, and following sophisticated petrographic investigations of lunar materials, one might quickly assume that the work of the amateur astronomer has been relegated to redundancy or insignificance from our fixed vantage point in space. Too many people have gotten the idea that no awe and mystery remains about our "Queen of the Night."

The activities by Apollo astronauts on the Moon and close-range photographic surveys by lunar orbiting spacecraft are obviously out of the domain of the amateur astronomer. Yet, it must be emphasized that there are areas of lunar observation that still remain the forte of the amateur astronomer, fields that may be pursued without an imminent threat of obsolescence by the onslaught of imposing professional equipment. Unlike the professional specialist, the amateur is often blessed with the freedom to scan a lunar feature of his choice for extended periods of time in hopes of drawing or capturing photographic or CCD images of low-sun shadows of minor relief features, varying tonal patterns exhibited in lunar environments exposed to a high sun, and other possible long-term or transient events.

Any observing program, for its results to be scientifically useful, requires of its participants a suitable blend of preparation, skill, patience, and tenacity. Because of the large image size and brightness of the Moon, lunar studies are especially suited for amateur astronomers using small to moderate apertures. More importantly, there have been numerous instances when professional astronomers, in trying to resolve some observational query by relying solely on existing spacecraft photographs, have enlisted the services of amateur astronomers. For example, by a fortuitous improper positioning of the spacecraft camera or as a result of unfavorable solar illumination, an optimum view was not afforded of the morphology of a particular lunar crater or other feature. Fortunately, amateur observers were able to come to the rescue by monitoring the specific region of the Moon under the conditions sought by professional astronomers. In a few cases, needed data already existed in amateur observational archives. Such cooperative efforts clearly demonstrate how meaningful amateur observations of the Moon can be.

### **Lunar Transient Phenomena (LTP)**

There are many areas of lunar research in which the skillful and imaginative amateur astronomer can find worthwhile observational opportunities. One example of a very interesting research program is the monitoring of Lunar Transient Phenomena (LTP). The LTP represent alleged variations at the lunar surface that are typically of ephemeral or instantaneous nature and usually are quite unpredictable. Systematic, simultaneous studies by a team of regular observers using top-quality instrumentation is especially worthwhile, since under optimum conditions LTP events might be glimpsed for only a few seconds to some twenty minutes or so. What is of greatest importance within the scope of such a program is to try to observationally differentiate between LTP "reports" and bona fide LTP events.

No more than a cursory perusal of the available literature will turn up historical accounts of LTP, and while reports of most activity turn out to be dubious, there are growing numbers of undisputedly authentic LTP phenomena from analytical evaluations of available data. Some events have been observed simultaneously by distant and independent observers. As investigative procedures have been refined and improved over the years, it has been possible to confirm some LTP events photographically or with CCD techniques.

Of the more than 1,500 LTP reports and events catalogued since A.D. 557, perhaps the widely publicized Alphonsus spectrograms of Kozyrev in 1958, the observations of Greenacre and Barr of Aristarchus in 1962, and the Moon-Blink reports of the mid-1960's and early 1970's, are the most familiar. Observers are generally more prone to study areas on the lunar surface which are known to have generated LTP reports and events, giving the data sample to date a somewhat lopsided appearance, but it has become evident that LTP events may take place elsewhere on the Moon and not just in the aforementioned "preferential" areas. There are many regions on the lunar surface, indeed, which have been suspected of LTP events, although most of the lesser-known features have never been adequately followed observationally.

Rare and elusive as they may seem, LTP events do appear to fall within roughly defined categories. Small, temporary reddish or pinkish patches, presumably due to fluorescence or incandescent gaseous substances, have been noted shortly after lunar sunrise, while glows lacking any distinct hue have been noticed, sometimes seen on the night hemisphere of the Moon. Emerging quite instantaneously or lasting for several minutes have been bright points of light near the lunar terminator or on the darkened hemisphere of the Moon, while rapid fluctuations in the brilliance of a specific area have been occasionally recorded, again most often in the early lunar morning. Obscurations, visible directly as "fog" or "mist," or indirectly by concealing or obliterating known surface features, are also curiously

associated with times of lunar sunrise, but not always so. Any number of variations may sometimes be reported in Earthshine conditions or in conjunction with partial or total lunar eclipses.

From the analytical information to date, it might be concluded that LTP events are probably of random internal origin and are only weakly attributable to external influences. As noted here, the phenomena seem to be of several kinds and involve possible gas or gas/dust mixtures, luminescence of these gaseous substances, and possible luminescence of surface materials.

Perhaps many causative factors operate together to give strong sunrise correlations found in many of the LTP events. Supporting this tentative conclusion of an internal origin of the LTP is the distribution and association of many LTP sites with volcanic maria, dark-haloed craters, sinuous rills, and lunar domes.

### **The Lunar Selected Areas Program (SAP)**

Well over a decade ago, the Lunar Transient Phenomena (LTP) Patrol was introduced as a new program for the A.L.P.O. Lunar Section, and the major thrust of the endeavor was to visually monitor the supposed transient variations at the lunar surface just discussed. In addition to looking for short-lived events, individuals were asked to supplement their observations with a monitoring of certain selected lunar features suspected or historically known to exhibit "seasonal" or long-term phenomena. For example, a variation in the tone or hue of a given area, which cannot be attributed to varying solar illumination and which does not repeat systematically from lunation to lunation, has been seen in certain areas. Principally, these tonal changes occur where dark radial bands or dark haloes are seen within or around some craters, or where darker regions or patches exist on the lunar surface in limited environments. Unusual changes in the apparent morphology, pertaining to overall size and shape, have been detected in conjunction with tonal or color fluctuations in many, but not all, cases. Thus, the intensive studies of specific features such as Alphonsus, Aristarchus, Eratosthenes, Herodotus, Kepler, Messier-Pickering, and Plato, have occurred, and as data were accumulated and reports on specific regions published, new areas were then added to the list (e.g., Atlas, Ross D, Hell, Pico, Piton, Colombo, etc.).

By 1971, the A.L.P.O. Lunar Recorders decided to segregate the study of LTP from the study of long-term or "seasonal" events, forming the LTP Survey for strictly transient lunar events and the Selected Areas Program (SAP) to deal with long-term variations, each area of concentration headed by a dedicated Recorder. In the years that followed this change, observational data were collected by each program, catalogued, reduced, and published in the Journal of the A.L.P.O., and the results of both programs showed real promise. There were quite a few instances of LTP events and recognized "seasonal" variations apparent in the accumulated data sample.

Indeed, the Selected Areas Program (SAP) and LTP Survey represent meaningful enterprises at the fundamental level of amateur observational astronomy. A major goal of organizations like the A.L.P.O., these are pursuits that are largely concerned with long-term visual monitoring of variable phenomena at the surface of the Moon. The scope of such work has definitely not been rendered obsolete by spacecraft gathering such a great wealth of information about our satellite. Persistent, patient observers, participating in the A.L.P.O. LTP Survey and Selected Areas Program (SAP) can successfully and vitally supplement the findings of space missions and other ongoing professional research, increasing our overall knowledge about the Moon.

Today, the A.L.P.O. Selected Areas Program (SAP) and LTP Survey exist as somewhat separate endeavors, although both programs have achieved greater significance through emerging cooperative

ventures of data exchange and comparison. This trend will continue to insure a steady flow of meaningful, scientific data for the future.

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 perception (i.e., through 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 regularly.

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. (4.0in.) 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.

The percentage of sunlight reflected by the surface of the Moon, as we have seen, varies as the phase angle,  $g$ , changes throughout the lunar month. Taken a step further, observers are well aware that one area of the Moon reflects more light (e.g., a crater rim or central peak) than another region (e.g., the maria), regardless of the phase angle, and these areas in turn vary in appearance as the illumination changes. These differences in tone are generally more conspicuous at Full Moon ( $g = 0^\circ$ ), and the investigation of light and dark areas of the Moon is an interesting observational endeavor.

While there is a definite requirement to know how various lunar features change their normal appearance throughout a lunation in response to variations in phase angle, even more intriguing are those lunar features that behave in an unusual, sometimes unpredictable, and non-repeating manner as solar illumination changes. The A.L.P.O. Lunar Selected Areas Program (SAP) is chiefly concerned with systematically monitoring regular and cyclical long-term variations during many lunations of specifically designated, or "selected," areas on the Moon. The SAP is designed to intensively study and document for each of these features the normal albedo changes in response to conditions of varying solar illumination. The program is equally concerned with the following possible anomalous phenomena:

1. Tonal and/or Color Variations. These are variations in tone or color, or in the size and shape of a region of tone or color, that is not related to changing illumination (i.e., the phenomenon does not exactly repeat from lunation to lunation). Areas in lunar features most subject to such anomalous behavior are radial bands, dark patches, and nimbi or haloes.



2. Shape and Size Changes. These are variations in the appearance and morphology of a feature that cannot be traced to changing solar illumination or libration.
3. Shadow Anomalies. These are deviations of lunar shadows away from the theoretical normal absolute black condition, or a shadow with an anomalous shape or hue, in most cases not attributable to changing phase angle.
4. Appearance or Disappearance of Features. Although exceedingly improbable and controversial, these are features that seem to be present now, but appear to be absent on earlier maps or photographs; or, features that are no longer visible today but which are clearly indicated on earlier maps or photographs.
5. Features Exposed to Earthshine. These are any anomalous tonal or albedo phenomena (any of the categories listed here) that occur under the conditions of Earthshine.
6. Eclipse-Induced Phenomena. These are features that exhibit anomalous characteristics (categories 1 through 4 above) during and after an eclipse, compared with previous eclipses when the same areas were monitored.

Most of the phenomena listed above are related to anomalous variations in morphology, tone (albedo), or color, which cannot be attributed to changing solar angle (phase angle) or libration, and which clearly do not repeat systematically from lunation to lunation. As stated earlier, however, it is essential in our program to establish a record of both the normal and abnormal behavior of suspect lunar areas under all conditions of illumination.

Generally, the SAP has retained some of the methods pioneered years ago by past Lunar Recorders, but a few significant changes have been necessary as the SAP evolved with time. Several areas had been selected in the past for inclusion in the SAP, and while massive files exist on many of these regions, there has been no reason to simply abandon study of these areas. A few published reports appeared in the JOURNAL OF THE A.L.P.O., and some very interesting data resulted, but further investigations are needed to establish a long-term record of normal and any abnormal albedo variances. The lunar features that are currently designated as the official lunar formations that are being monitored as part of the SAP appear below.

<b>SAP Feature</b>	<b>Selenographic Latitude</b>	<b>Selenographic Longitude</b>
Alphonsus	4°W	13°S
Aristarchus	47 W	23 N
Atlas	43 E	46 N
Copernicus	20 W	9 N
Plato	9 W	51 N
Theophilus	26 E	11 S
Tycho	11 W	42 S

**NOTE: The nearby Herodotus, and its environs, is also considered a part of the program.**

All of the areas listed above were chosen because they are relatively easy to find, convenient to observe, and have historically shown numerous instances of suspected anomalies. Complete outline charts and observing forms are available from the A.L.P.O. Lunar Section for each of the features noted.

The standard SAP procedure is to visually monitor as many of the selected lunar features as possible throughout successive lunations, employing established systematic, objective methods of observation. It has already been stressed earlier in our discussions how important the quality of the instrument being used is, and individuals should be familiar with their telescopes and accessories, how to recognize scattered or reflected light, irradiation, as well as aberrations caused by the eye, the instrument, and the atmosphere.

Thus, observations of the Moon that are specific to the Lunar Selected Areas Program may be summarized as:

1. Visual photometry of specific lunar features, defining their normal albedo profiles throughout a lunation as a function of changing solar illumination.
2. Visual photometry of specific lunar features, monitoring variances from their normal albedo that are not simply a result of changing solar illumination.
3. Drawings of specific lunar features throughout a lunation and from lunation-to-lunation in conjunction with visual photometry.
4. Routine photography, CCD imaging, photoelectric photometry, and videography of specific lunar features to supplement visual photometry programs throughout a lunation and from lunation-to-lunation.
5. Comparative analysis of lunar features and albedo profiles.

### **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)

# Report on August 28, 2007 Total Lunar Eclipse

**By Robert H. Hays, Jr. - Worth, Illinois, USA**

I watched the early part of the August 28 lunar eclipse from home. This was a very promising night and the weather radio reported clear skies throughout the area at 2 am. However, some unexpected clouds moved in very slowly from the northwest after observing began. These hindered and eventually cut off observing before totality began. I used my 6-inch reflector at 58x for most visual observing, and a 5-inch Celestron was set up nearby for photography.

I first noted the penumbral shading with both the 6-inch and 10x50 binoculars at 8:23 UT. I watched the grayish penumbral shading become more and more conspicuous until first umbral contact which I timed at 8:50:55 UT. The moon was still in the clear, but little 'popcorn' clouds were appearing, and more extensive clouds were low in the north and west.

I timed four crater entrances in the next 20 minutes; these are listed in the accompanying table along with a sketch. The timings were made simply by listening to WWV signals while watching the umbra's edge pass over the craters. (For Grimaldi, I noted the beginning and end of immersion.) Their estimated accuracy is about 10-15 seconds. I tried timing the entrances of Copernicus and Plato shortly afterward, but early clouds prevented satisfactory views of them. I was not able to time any more crater entrances, but I was able to catch the occultation of 8th-magnitude ZC 3282 in a lucky hole. This would have been a bright eclipse. There was already a dull red limb as early as 9:03 UT, and by 9:25, there was substantial orange-red coloration with a grayish umbra edge. Some short views between 9:40 and 9:50 showed most of the moon to be a bright orange-red.

These clouds were cumuliform types that often form on warm, humid afternoons, but this was near dawn! They were usually heaviest toward the west, though they eventually spread over most of the sky. The moon's low altitude did not help. I felt snakebit to some extent because satellite images seen later showed that these clouds were not very extensive, but when they appeared, it was too late to shift location.

## **Timings made near start of Lunar Eclipse August 28, 2007 (Times: UT)**

Contact I ----- 08:50:55

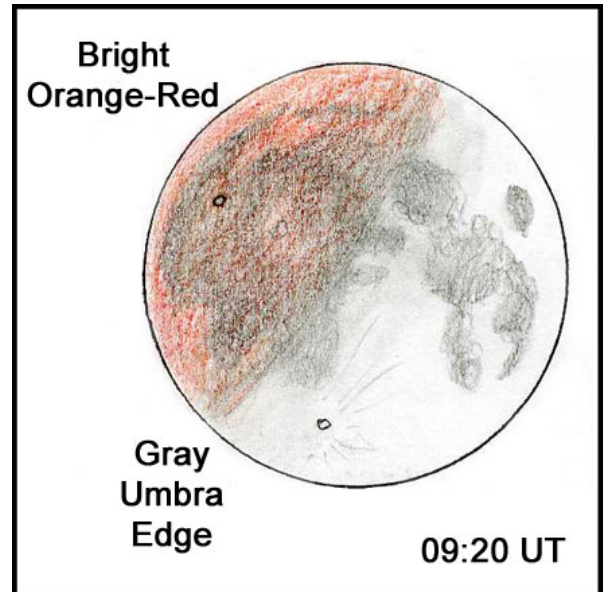
### **CRATER ENTRANCES**

Grimaldi ----- 08:57:40

Aristarchus ----- 08:59:05

Kepler ----- 09:03:45

Pytheas ----- 09:09:40



# **Report on August 28, 2007 Total Lunar Eclipse**

## **By Maurice Collins - Palmerston North, New Zealand**

Last night, August 28, 2007, we had our first total lunar eclipse since 2000. The weather had been changeable all day, with cloudy, fine spells and heavy rain up to early evening. There were clouds covering the Moon during the beginning stages of the umbra's advance, then it all cleared for totality. I watched it until the umbra left the eastern limb just before 12:30am this morning.

The colour of the eclipsed Moon was yellow-orange-red. On the Dajon scale, I would rate it about  $L=3.5$ . Of course the limb of the Moon closest to the shadow centre - north especially - was darker than the southern limb. There are reports that it was a darker eclipse than the one in 2000, which is possible. It was hard to make out many craters, I mainly could just see the maria. I could not detect Aristarchus, but Tycho was visible.

The speed of advance of the shadow across the lunar surface was noticeable. As was how much larger the Earth is compared to the Moon as seen from the larger curvature of the Earth's shadow on the Moon. I was able to image up until the beginning of totality, after that it became a bit too faint to hand hold the camera for the long exposures. I did capture the eclipse on video, so plan to see how that comes out over the coming weeks. There were quite a few stars visible behind the Moon, but not quite as rich a star field as in 2000 if I recall. No occultation's were seen, though that doesn't mean there were none, I was just observing the Moon not the stars most of the time, and if there were any they passed unnoticed by me. I also did not observe any Helion meteor impacts or any TLP events during the eclipse unfortunately.

Below are some of my images of the eclipse taken just before, at the start of totality, and at mid-eclipse. It was a really enjoyable event to watch and attempt to image, just so glad it was clear! We don't get to see many lunar eclipses on this side of the world, it will be another seven years before the next in 2014.



# **LUNAR CHALLENGE:** **Rectangular Patch in Oceanus Procellarum**

The Full Moon (based upon a binocular observation on 30 July 2007 at 01:00 UT)



**“The albedo feature highlighted on the right was striking when viewed through 15x70 binoculars. I find no reference to this ‘patch’ in the literature.” (Peter Grego)**

In a recent exchange of personal emails, Peter Grego (Rednal, Birmingham, England) related his “discovery” of a peculiar albedo feature bounded diagonally by the craters Aristarchus & Copernicus, and an area within the Kepler Ray System. Above is a representation of the feature furnished by Peter.

Have any readers previously sketched, imaged, or found any references to this odd patch? If so, please send the information to the editor: [dembowski@zone-vx.com](mailto:dembowski@zone-vx.com)

## **NOTE:**

Peter Grego is Coordinator of Lunar Topographic Studies for the British Astronomical Association and Lunar Section Director of the Society for Popular Astronomy

# **LUNAR TOPOGRAPHICAL STUDIES**

Coordinator - William M. Dembowski, FRAS

[dembowski@zone-vx.com](mailto:dembowski@zone-vx.com)

## **OBSERVATIONS RECEIVED**

MIKE BOSCHAT - HALIFAX, NOVA SCOTIA, CANADA

Digital image of Copernicus

MAURICE COLLINS - PALMERSTON NORTH, NEW ZEALAND

Digital images of Aristarchus, Clavius, Eratosthenes & Copernicus (2), Mare Serenitatis (2), Mare Humorum, 7-day Moon, 9-day Moon (2), 10-day Moon, 12-day Moon, 13-day Moon (2), 14-day Moon, Plato, Terminator 7-day Moon, Tycho (2), Alphonsus, Mare Crisium, Gassendi, Grimaldi, Copernicus (2), Southern Highlands,

Report of August 28 lunar eclipse including 6 images

ED CRANDALL - WINSTON-SALEM, NORTH CAROLINA, USA

Digital images of Clavius region, Copernicus, Theophilus region

HOWARD ESKILDSEN - OCALA, FLORIDA, USA

Digital images of Descartes, Thales, Vlacq, Kepler & Copernicus, Birt, Dembowski region

Banded crater report forms with images of Burg, Messier, Proclus, Aristillus, Birt, Kepler, Pytheas, Aristarchus, Menelaus, Conon,

CHRIS HARVEY - S.DEVON, UK

Digital image of Copernicus region

ROBERT H. HAYS, JR. - WORTH, ILLINOIS, USA

Report of August 28 lunar eclipse including crater timings and one drawing

RIK HILL - TUCSON, ARIZONA, USA

Digital image of Arzachel to Oppoluzer

DAN MONTAGANO - MONTREAL, CANADA

Digital image of Copernicus

BOB O'CONNELL - KEYSTONE HEIGHTS, FLORIDA, USA

Digital image of Copernicus

## RECENT TOPOGRAPHICAL OBSERVATIONS



### ERATOSTHENES

**Digital image by Maurice Collins - Palmerston North, New Zealand  
August 22, 2007 - 08:26 UT  
Meade ETX90 - Fuji A800 (Movie Mode)**



### CLAVIUS AND ENVIRONS

**Digital image by Ed Crandall - Winston-Salem, North Carolina, USA  
September 4, 2007 - 11:12 UT - Colong: 179 - Seeing: 6-7/10  
110mm f/6.5 APO Refractor - 3x Barlow - Philips Toucam**

## RECENT TOPOGRAPHICAL OBSERVATIONS



### ARZACHEL TO OPPOLUZER

Digital image by Rik Hill

Tucson, Arizona, USA

August 21, 2007 - 03:19 UT

Celestron C14 SCT

SPC900NC Camera - 1.6x Barlow

PROCLUS  
Digital image by Howard Eskildsen  
Ocala, Florida, USA  
August 21, 2007 - 00:49 UT  
Meade 6 inch Refractor  
2x Barlow - Orion StarShoot II





# **BANDED CRATERS PROGRAM**

**Coordinator - William M. Dembowski, FRAS**

**Banded Craters Program Website: <http://www.zone-vx.com/alpo-bcp.html>**

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

Crater Observed: Aristarchus

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: Orion StarShoot II, 5X Barlow, Filters:

Seeing: 6/10            Transparency: 4/6

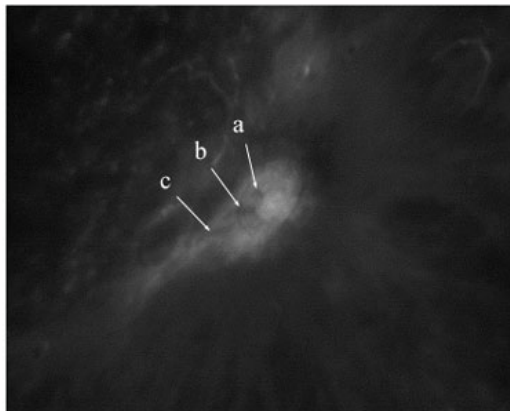
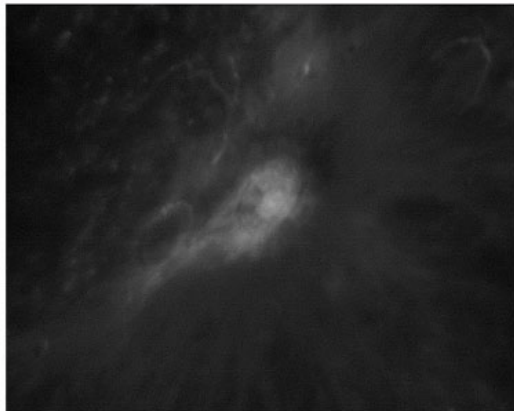
Date (UT): 2007/08/05                      Time (UT): 10:17

Colongitude: 173.8°

Position of crater:	Selen. Long.	Selen. Lat.
	47.4° West	23.7° North

Lunar Atlas Used as Reference: Virtual Moon Atlas Expert Version 2.1 2004-11-07

Image (north up):



Images reduced to 55% of original size for clarity.

Comments:

Strange swirls from the brightest portion of Aristarchus' rays leave three dark bands. The first, "a," is totally inside the crater. Next "b" stretches from the floor of the crater, over the rim to the outlying area. "c" lies totally outside the crater. What causes the contrast? Are they gaps in the bright material or did something cause differential darkening? This is truly an unusual feature.

A.L.P.O. Lunar Section - Banded Craters Observing Form

Crater Observed: Menelaus

Observer: William M. Dembowski Observing Station: Elton Moonshine Observatory

Mailing Address: 219 Old Bedford Pike, Windber, PA 15963

Telescope: Celestron SCT 20 cm f/10

Imaging: Celestron NexImage Filters:

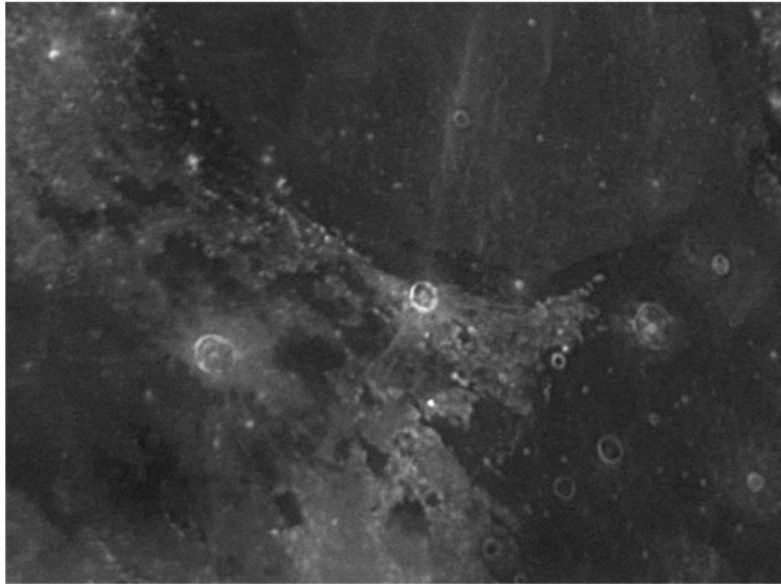
Seeing: 3/10 Transparency: 3/6

Date (UT): 2007/09/24 Time (UT): 00:12

Colongitude: 58.3

Image: (North up) (East right )

Comments:



# **LUNAR TRANSIENT PHENOMENA**

Coordinator – Dr. Anthony Cook – [atc@aber.ac.uk](mailto:atc@aber.ac.uk)

Assistant Coordinator – David O. Darling - [DOD121252@aol.com](mailto:DOD121252@aol.com)

## **LTP NEWSLETTER - OCTOBER 2007**

Dr. Anthony Cook - Coordinator

Observations were received from several observers during August and Maurice Collins (New Zealand) reports that he saw the lunar eclipse on Aug 28th down under in New Zealand.

This month I thought I would discuss Prof Arlin Crott's paper No. 2, on which he has a co-author: Cameron Hummels. Again I would just like to stress that as far as I am aware these series of papers have not been past the referee stage in the Icarus and Astrophysics journals and made it into print yet.

However they are available for all to read on the following web site:

<http://www.astro.columbia.edu/~arlin/LTP/> at Columbia University in the US. So my summary is based upon these pre-published versions. Paper 2 is concerned with how gas inside the Moon leaks into and interacts with the lunar regolith. The paper starts by estimating how much gas leaks from the lunar surface, as measured by Apollo instruments. Depending upon the type of gas detector experiment used, this ranges from 0.1 to 60 grams of gas per second, spread out over the entire lunar surface. So I guess from this that you can imagine how much pollution the Apollo missions contributed to the lunar atmosphere, albeit the effect was transient! Another component of gas is introduced from comets and meteorites and the authors reference earlier papers that suggest this contribution to the lunar atmosphere is tons to tens of tons of gas per year. By contrast they point out that gasses and ions introduced by the solar wind, apart from hydrogen, make an insignificant contribution.

The paper then categorizes 6 different types of emission through the regolith: (1) an impermeable dam, (2) slow seepage, (3) gas fluidization through microscopic bubbles, (4) periodic belching that has enough energy to kick up some regolith, (5) explosive release of gas, (6) a lengthy release of gas in the form of a jet. It then describes the more violent mechanisms that might create a change that could be visible from Earth. This would necessitate gas build up faster than the normal seepage through the regolith to the surface, resulting in the ability to lift part of the regolith (or some sort of surface covering) into a temporary cloud. From Earth, the extra scattering of light from suspended particles would cause an apparent transient brightening. They assume a standard thickness of the regolith of 15m, assume a density and model the disturbed regolith as a 45 deg from vertical cone above the point of explosive release of the gas. Based upon the above, they deduce that a cloud of 5km diameter could be produced and seen. Presumably explosive releases of gas from deeper regolith would make larger diameter clouds, although would require larger explosions to break through? The smaller particles in the cloud get buoyed by the released gas mixed in with the dust and can remain present for several minutes. The larger particles settle in a few seconds. Earlier researchers had experimented with fluidizing lunar regolith and found that it increased its reflectivity by up to 50% and so the authors speculate that this should enhance the detectability of LTP from Earth. In order to facilitate an explosive release, of gas, the authors suggest that the presence of a very small quantity of water may be needed as this has just the properties needed to freeze and form a permeable mix that enables a gas buildup to take place. Other liquids could also be considered but water is the best candidate, and there is increasing evidence through

computer models, and careful analysis of returned lunar soils, that miniscule quantities of water may be present inside lunar rocks. The appendix of the paper goes into the effects of gas molecules and particles mixing together and what spectral emission line effects would be expected. But if you want to see the physical mechanism for a LTP, this paper is our best current guess/ I will cover the remaining papers in the next couple of months.

Finally, I just thought that I would mention that I will be moving to a new country, Wales, by the time you receive this to start a research lectureship. My new address is at the bottom of this article. The robotic telescopes at Nottingham will be moving too, and so will probably be out of commission for a few months before being re-installed under a darker sky.

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!

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](mailto:atc@aber.ac.uk)

## KEY TO IMAGES IN THIS ISSUE

1. Arago
2. Aristarchus
3. Arzachel
4. Clavius
5. Eratosthenes
6. Menelaus
7. Proclus

**X = Copernicus**  
(Subject of next *Focus On*)

