



**NOTES ON BASE**

Lunar Base Chart prepared by USAF AIC with advisory assistance from Dr. C. P. Elger and his collaborators, D. W. G. Arthur and E. A. Whitaker.

**CONTROL**

The position of features on this chart was determined through the use of stereographic control established primarily from the measurements of J. France and S. A. Swisher. A collated listing of this control was published under the auspices of the International Astronomical Union in 1955. (Named Lunar Formations—Bilgic and Miller)

**VERTICAL DATUM**

Vertical datum is based on an assumed spheroidal figure of the moon and a lunar radius of 1738 kilometers. The datum plane was astronomically related to 2.8 kilometers below the surface described by the 1978 spheroid radius to minimize the effect of lunar surface of minor elevation values. Gradients of lunar surface elevations were established by interpolating Schuvalov-Rachetovskii computations of J. France's measurements of 150-meter contours. The probable error of comparative elevation values is estimated of 200 meters. Vertical datum, as established, is considered herein and will be related as soon as an accurate figure of the moon is determined.

**ELEVATIONS**

All elevations are shown in meters. The relative heights of crater rims and other prominent features were determined through photogrammetric measurements using the 2-Kaplan and G. F. Fidler Shadow Projection Technique. Relative heights that established have been referred to the assumed vertical datum and have integrated with the gradients of the surface undulations. The probable error of the localized relative heights is 100 meters. Inherent with measuring technique used, relative height determinations in general 1-W direction are more accurate than in the N-S direction. Spot Elevation (referenced to datum) 1100. Crater Elevations (referenced to datum) 300. Depth of crater (rim to floor) 1400.

**CONTOURS**

All contours are approximate. Contour interval is 200 meters. Supplementary 150-meter contours are shown in low relief areas.

**NAMES**

The feature names selected were adopted from the 1975 International Astronomical Union nomenclature system with minor changes introduced in the 1990 edition of the USAF Lunar Atlas. The following designations have been added to the I.A.U. lunar nomenclature, using the criterion suggested by Bilgic and Miller:

- Flamsteed CA
- Flamsteed FA
- Flamsteed FB
- Flamsteed FC
- Flamsteed FD
- Hergonius EA
- Hergonius EB
- Hergonius EC
- Lomborg FA
- Lomborg FB
- Lomborg FC
- Lomborg FD
- Letronne AA
- Letronne AB
- Letronne AC
- Letronne AD
- Letronne AE
- Letronne AF
- Letronne AG
- Letronne AH
- Letronne AI
- Letronne AJ
- Letronne AK
- Letronne AL
- Letronne AM
- Letronne AN
- Letronne AO
- Letronne AP
- Letronne AQ
- Letronne AR
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- Letronne CA
- Letronne CB
- Letronne CC
- Letronne CD
- Letronne CE
- Letronne CF
- Letronne CG
- Letronne CH
- Letronne CI
- Letronne CJ
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- Letronne EU
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- Letronne EY
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- Letronne IH
- Letronne II
- Letronne IJ
- Letronne IK
- Letronne IL
- Letronne IM
- Letronne IN
- Letronne IO
- Letronne IP
- Letronne IQ
- Letronne IR
- Letronne IS
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- Letronne IV
- Letronne IW
- Letronne IX
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- Letronne JB
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**RELIEF PORTRAIT**

The configurations of the relief features and background coloration shown on this chart were integrated from photographic data of Lick, McDonald, Pic Du Midi, Mount Wilson and Yerkes Observatories, and published in the USAF Lunar Atlas, and unpublished photographs supplied by Yerkes and Pic Du Midi Observatories. Visual observations made with the 40-inch Navy reflecting telescope of the Naval Observatory, Flagstaff, Arizona and the 24-inch Lowell reflecting telescope have also been used to add and clarify details. The pictorial portrayal of relief forms was developed using an assumed illumination.

All relief features have been portrayed on this chart as they would appear when illuminated by an idealized light source located in the near direction and at an angle where the lunar horizon is approximately equal to the angle of slope of the features. This means that the absolute of the light source would appear to change between the steep and gradual sloping features.

**EXPLANATION**

Material exposed on the surface of the Moon is heterogeneous. In albedo and most other physical characteristics that have been determined with the use of optical and radio telescopes the material varies from one part of the Moon to another, and the variations are partially correlated with differences in topography. Discontinuities are present in the areal variation which permit the surface material to be divided into map units, each exhibiting a limited range of photometric properties associated with a limited range of topographic characteristics. Each map unit is further characterized by a distinctive pattern of distribution, and the patterns of certain units are in places superimposed on the patterns of other units. From the relations of superposition it is possible to determine the relative ages of the units or the sequence in which they were formed.

For the purpose of geologic mapping a classification has been adopted in which map units are grouped according to sequence or relative age. The major subdivisions of this classification are called systems (Shoemaker, 1961; Shoemaker and Hackman, in press) and subdivisions of the systems are called series. The systems and series are arranged below in the order of their relative ages, the youngest at the top and the oldest at the bottom.

The boundaries or contacts and photometric and topographic characteristics of the map units have been determined by a combination of visual examination of photographs, telescopic observation, and traversing of the surface. Relative reflectivity is described for full moon illumination. The photometric properties observed are those only of the material exposed at the surface. The distribution of certain units that are concealed or partly concealed by superimposed material has been inferred from topographic characteristics.

Certain elements of the lunar topography suggest the presence of a variety of structural features in the Moon's crust. Their positions are indicated on the map with specific symbols.

Each map unit and each type of probable structure has been given a descriptive name. A genetic name, where warranted, is given in parentheses beneath the descriptive name for certain map units and for probable structural features as well. A more detailed genetic interpretation follows the description of each unit.

References cited: Shoemaker, E. M., 1961. Interpretation of lunar craters, in Keel, J. G., ed., *Physics and Astronomy of the Moon*. London, Academic Press, p. 283-338. Shoemaker, E. M., and Hackman, H. A., in press. Stratigraphic basis for a lunar time scale. Internat. Astron. Union, Symposium 14. The Moon, Proc. London, Academic Press.

**Ray material**  
Telesopic characteristics: Reflectivity generally high but grades to that of surrounding material. Local contrast in reflectivity generally large. Lateral variations locally abrupt; characterized by bright patches and streaks. Ray material is superimposed on parts of all other units except dark halo material. Except for satellite craters, topography controlled by underlying units.  
Interpretation: Probably chiefly crushed rock. Forms thin patchy layers, in most places probably not more than a meter thick.

**Crater rim material (Ejecta blanket)**  
Telesopic characteristics: Reflectivity moderate to very high. Local contrast in reflectivity moderate to large; lateral variations commonly abrupt. Topography around large craters is hummocky near crest of rim and includes low hummocks or low subradial ridges on rim flanks. Around small craters topography is smooth.  
Interpretation: Probably chiefly crushed rock with large blocks. Forms hummocky layers ranging from about a meter to about 200 meters in thickness.

**Crater floor material (Breccia?)**  
Telesopic characteristics: Reflectivity low to moderate. Local contrast in reflectivity small to moderate; lateral variations generally gradual. Topography around large craters is hummocky near crest of rim and includes low hummocks or low subradial ridges on rim flanks. Around small craters topography is smooth.  
Interpretation: Probably chiefly crushed rock with large blocks. Forms hummocky layers ranging from about a meter to 100 meters in thickness.

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Telesopic characteristics: Reflectivity low to moderate. Local contrast in reflectivity small to moderate; lateral variations generally gradual. Topography around large craters is hummocky near crest of rim and includes low hummocks or low subradial ridges on rim flanks. Around small craters topography is smooth.  
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**Regional material (Ejecta blanket?)**  
Telesopic characteristics: Reflectivity ranges from very low to moderate with generally moderate local contrast and gradual lateral variations. Topography characteristically numerous hills and depressions less than four kilometers across.  
Interpretation: Probably chiefly crushed rock and great blocks derived mainly from the region of Mare Imbrium. Forms a layer probably ranging from a few meters to about 500 meters in thickness. Layer is probably heterogeneous in composition. Areas where Argentinian layer may be generally very thin and pre-Imbrian material locally exposed are shown with ruled pattern.

**Crater rim material (Ejecta blanket)**  
Telesopic characteristics: Reflectivity low to moderate. Local contrast in reflectivity small to moderate; lateral variations generally gradual. Topography around large craters is hummocky near crest of rim and includes low hummocks or low subradial ridges on rim flanks. Around small craters topography is smooth.  
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Telesopic characteristics: Reflectivity low to moderate. Local contrast in reflectivity small to moderate; lateral variations generally gradual. Topography around large craters is hummocky near crest of rim and includes low hummocks or low subradial ridges on rim flanks. Around small craters topography is smooth.  
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