

New Names on the Moon

WHEN the International Astronomical Union met in Sydney, Australia, last August, the delegates saw on display the first parts of a new, extremely detailed lunar map on the enormous scale of 1:250,000. It is being prepared by the Defense Mapping Agency Topographic Center, Washington, D. C., from photographs obtained by Apollo spacecraft. Known as the NASA Lunar Topographic Orthophotomaps (LTO), this atlas of the moon will, if completed, consist of about 2,300 sheets — more than 700 square yards of paper.

The standard practice of government cartographers is to label each sheet of a map with the name of some prominent feature within it — ordinarily a crater in the case of the moon. However, the lunar area covered by each LTO sheet is so small that many sheets will not contain a single one of the approximately 1,000 primary named craters.

Hence, in a first step to conform to this cartographic convention, the IAU has adopted about 50 new names for craters. The actual selection was made by a small working group on lunar nomenclature, formed of members of IAU Commission 17 (The Moon). This same group had chosen the 500 or so names of far-side features adopted by the IAU in 1970.

Listed in the large table are 43 new designations for near-side craters. For the most part, they honor recently deceased astronomers, for example Ira S. Bowen and Harlow Shapley, who were the directors of Hale Observatories and Harvard Observatory, respectively. One crater name commemorates John Tebbutt, the famous amateur of Windsor, New South Wales, whose story was told in this magazine for October, 1972, page 236. There are also several physicists of astronomical importance, such as Frederick Brackett, who discovered the Brackett series of lines in the hydrogen spectrum, and F. G. Houtermans, who as early as 1929 discussed nuclear reactions as the source of stellar energy.

One departure is the inclusion of many new crater names from the biological sciences, such as Sigmund Freud, Galen, and Sir Frederick Banting, the discoverer of insulin. Thomas Huxley is now on the moon, joining his fellow evolutionists Charles Darwin and Alfred Wallace. This broadening of crater nomenclature is part of a newly adopted IAU policy, which permits the assignment of the names not only of scientists of all kinds but also writers, painters, composers, and other contributors to human culture and knowledge. Excluded, however, are political, military, and religious figures, as well as modern philosophers.

This expansion has been prompted by the need for new names to replace the "Mädler

designations" now used for approximately 10,000 smaller near-side craters. These designations are of the form Plato A, Plato B, and so on, for lesser craters near Plato; similarly, Clavius CA and Clavius CB are small neighbors of Clavius C. The Mädler system, which is embodied in all previous large-scale maps of the moon, was officially sanctioned by the IAU as recently as 1964, and the decision to abandon it aroused much controversy.

Retention of the Mädler system had been strongly recommended by the late Gerard P. Kuiper of the Lunar and Planetary Laboratory in Arizona, a major center for mapping the moon and cataloging its craters. But Dr. Kuiper, who was the vice-president of the IAU lunar commission, suffered a heart attack shortly before he was to go to Sydney and could not participate in the final deliberations.

Regardless of any arguments for and against the new names, crater labels like Macrobius A will probably continue to be used for a long time by both professional and amateur astronomers, simply for convenience.

The Apollo missions brought a new problem to lunar nomenclature, as areas surrounding the landing points were explored. From the many informal names assigned to small features by mission planners and the astronauts, the IAU has approved 78 as official. Thus, for the Apollo 12 site, Snowman has been adopted for the cluster of five tiny craterlets surrounding the larger craterlet within which Surveyor 3 had landed.

Near the Apollo 15 landing site, the craterlet Rhysling commemorates the blind poet in *The Green Hills of Earth*, a science-fiction story by Robert Heinlein. Similarly, Earthlight is a crater called after Arthur C. Clarke's novel of the same name.

Out of the 67 names given by astronauts in the area of the Apollo 17 landing site, 29 were adopted, including North Massif,

NAMES OF CRATERS ON THE MOON'S NEAR SIDE ADOPTED BY THE IAU AT SYDNEY, 1973

Crater	Old Name	Long.	Lat.	Personality
Abbot	Apollonius K	+54.7	+6.0	U. S. solar physicist (1872-1973)
Banting	Linné E	+16.4	+26.5	Canadian endocrinologist (1891-1941)
Bowen	Manilius A	+9.0	+17.6	U. S. astronomer (1898-1973)
Brackett		+23.6	+18.0	U. S. physicist (1896-1972)
Cajal	Jansen F	+31.0	+12.7	Spanish histologist (1852-1934)
Cameron	Taruntius C	+45.9	+6.3	U. S. astronomer (1925-72)
Carmichael	Macrobius A	+40.3	+19.6	U. S. psychologist (1898-1973)
Clerke	Littrow B	+29.2	+21.8	U. K. astronomy historian (1842-1907)
Curtis		+56.5	+15.6	U. S. astronomer (1872-1942)
Daly	Apollonius A	+56.8	+5.0	U. S. geologist (1871-1957)
Daubrée	Menelaus S	+14.8	+15.7	French geochemist (1814-96)
Eckert		+58.4	+17.8	U. S. astronomer (1902-71)
Franck	Römer K	+35.6	+22.7	Ger.- U. S. physicist (1882-1964)
Freud		-52.3	+25.8	Austrian neurologist (1856-1939)
Galen	Aratus A	+5.1	+22.0	Greek physician (2nd cent. A.D.)
Hadley	Hadley C	+2.9	+25.4	U. K. astronomer (?-1744)
Haldane		+84.0	-1.7	U. K. physiologist (1860-1936)
Hill	Macrobius B	+40.8	+21.2	U. S. astronomer (1838-1914)
Hornsbey	Aratus CB	+12.4	+23.8	U. K. astronomer (1733-1810)
Houtermans		+87.0	-9.3	Ger.- Swiss physicist (1902-66)
Humason	Lichtenberg G	-56.7	+30.7	U. S. astronomer (1891-1972)
Huxley	Wallace B	-4.6	+20.2	U. K. zoologist (1825-95)
Joy	Hadley A	+6.6	+25.1	U. S. astronomer (1882-1973)
Kiess		+84.0	-6.3	U. S. spectroscopist (1887-1967)
Knox-Shaw		+80.3	+5.3	U. K. astronomer (1885-1970)
Kreiken		+84.5	-9.0	Netherlands astronomer (1896-1964)
Lawrence	Taruntius M	+43.3	+7.6	U. S. physicist (1901-58)
Lucian	Maraldi B	+36.8	+14.6	Greek author (2nd cent. A.D.)
Nielsen	Wollaston C	-51.9	+31.8	Danish astronomer (1902-70)
Peek		+87.1	+2.8	U. K. amateur astronomer (1891-1965)
Runge		+86.8	-2.3	Ger. mathematician, physicist (1856-1927)
Sarabhai	Bessel A	+21.0	+24.7	Indian physicist (20th cent.)
Shapley	Picard H	+56.8	+9.9	U. S. astronomer (1885-1972)
Spurr	Archimedes M	-3.2	+26.1	U. S. geologist, selenologist (1870-1950)
Tacchini	Neper K	+86.1	+5.2	Italian astronomer (1838-1905)
Tebbutt	Picard G	+53.5	+9.5	Australian amateur astronomer (1834-1916)
Theophrastus	Maraldi M	+39.1	+17.5	Greek philosopher (4th cent. B.C.)
Väisälä	Aristarchus A	-47.8	+25.9	Finnish astronomer, geodesist (1891-1971)
Very	le Monnier B	+25.3	+25.7	U. S. astrophysicist (1852-1927)
Watts	Taruntius D	+46.3	+9.0	U. S. astronomer (1889-1971)
Widmannstätten		+85.5	-6.0	Austrian meteoriticist (c. 1753-1849)
Yangel'	Manilius F	+4.7	+17.0	Soviet space scientist (d. 1971)
Zinner	Schiaparelli B	-58.7	+26.7	German astronomy historian (1886-1970)

South Massif, and Sculptured Hills. Craters Emory and Powell honor William H. Emory and John Wesley Powell, two explorers of the American West. Also retained is Taurus-Littrow Valley, for the general area of the Apollo 17 landing.

Occasionally, a landing-site name has been retained even if already applied elsewhere on the moon. Thus, Nansen-Apollo is the second sampling station of the Apollo 17 astronauts; the suffix Apollo distinguishes it from the previously named large crater Nansen in latitude 81° north, longitude 95° east.

Hitherto, the word *rima* (Latin for rille) has been used in lunar cartography for a variety of features that are generically very different. This situation has now been corrected by the IAU. *Rima* (plural *rimae*) is retained for rilles that are irregular cracks or fissures, such as those often noted inside large craters. The relatively straight graben are now more accurately labeled *fossa* (plural *fossae*), the Latin word for a trench or ditch. The sinuous rilles may be designated *anguis* (plural *angues*), literally, a snake. Crater chains, often indistinguishable from rimae except those seen on Orbiter or Apollo photographs, are now designated *catena* (plural *catenae*), meaning chain. For example, the remarkable string of craterlets across the floor of Davy Y (pictured on page 356 of SKY AND TELESCOPE for June, 1971) presumably becomes Catena Davy instead of Rima Davy I.

Two other kinds of lunar features now receive group designations for the first time. Sinuous ridges, such as the great Serpentine Ridge on Mare Serenitatis, are henceforth to be called *dorsum* (plural *dorsa*), while lunar landslides carry the label *ruina* (plural *ruinae*).

The chairman of the IAU working group on lunar nomenclature is Donald H. Menzel, former director of Harvard Observatory, and the vice-chairman is Audouin Dollfus of Paris Observatory. The other members for 1973-77 are S. K. Runcorn (United Kingdom), H. Masursky and F. El-Baz (United States), together with a Soviet astronomer whose name has not yet been announced.

J.A.

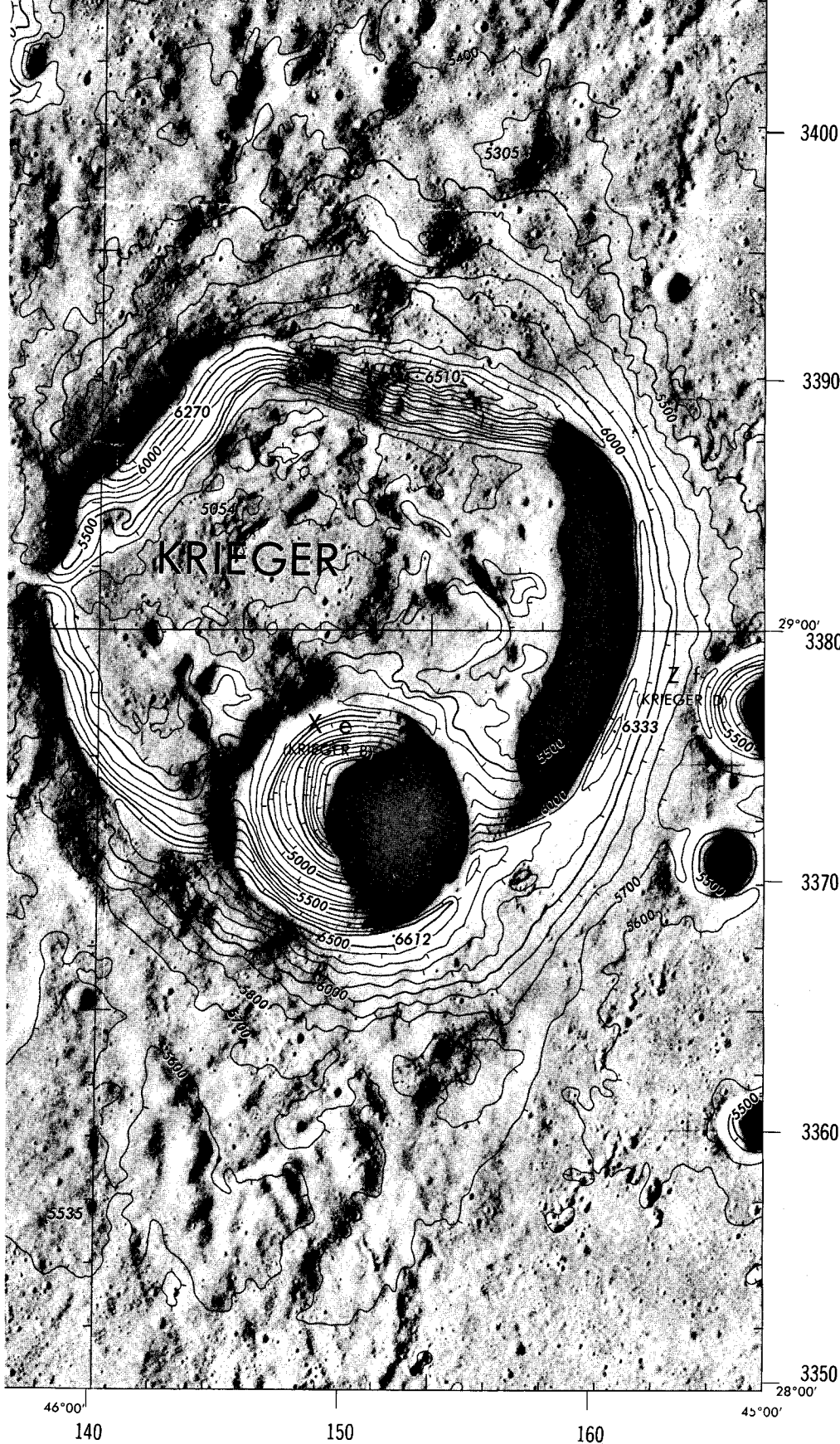
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Reproduced here at full scale is a corner of one of the first sheets of the new 1:250,000 NASA Lunar Topographic Orthophotomap (LTO), which when completed is to cover the entire moon in about 2,300 sections. This sample is dominated by the crater Krieger, about 23 kilometers in diameter, with its southern wall interrupted by the deep 10-kilometer Krieger B. The contour lines, at 100-meter intervals, show elevations above an arbitrary level 1,730 kilometers from the moon's center. Actually, the point labeled 6,270 on the northwest rim of Krieger is about 900 meters higher than the neighboring plain. Along the edges of the map, west longitude and north latitude are marked, together with a rectangular grid labeled at 10,000-meter intervals. Professional inquiries about these LTO maps should be directed to Lunar Programs Office, NASA Headquarters, Washington, D. C. 20546.