

Topographic Nomenclature on Planetary Bodies

PETER M. MILLMAN

*National Research Council of Canada,
Ottawa, Canada*

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General guidelines are presented for International Astronomical Union decisions on nomenclature for surface features on the planets and their satellites.

This note is written to inform planetary scientists of the system set up by the International Astronomical Union (IAU) in 1973 to deal with the current requirements for nomenclature on the surfaces of the planets and their satellites, and to survey the types of problems we have had to contend with. As President of the IAU Working Group for Planetary System Nomenclature (WGPSN), I am not personally committed to any one viewpoint, but I am very anxious to see action taken to provide a useful nomenclature that is internationally approved and that satisfies the majority of those who have need to refer to planetary detail.

Before the days of interplanetary spacecraft the problems of extraterrestrial topographic nomenclature were confined primarily to the large amount of detail charted on the near side of the Moon and to the albedo features on Mars that had been identified with Earth-based telescopes. Prior to 1973 a Working Group for Lunar Nomenclature reported to the IAU through Commission 17, and a Working Group on Martian Nomenclature operated within Commission 16. These groups, among other activities, established successfully over 500 new names for features on the far side of the Moon (Menzel *et al.*, 1971), and named some 180 large craters on Mars, Phobos, and Deimos, as photographed by Mariner spacecraft (de Vaucouleurs *et al.*, 1975).

By the time of the Sydney IAU General Assembly in 1973 it had become evident that topographic nomenclature would be required within the next few decades for a considerable number of planetary bodies in the solar system. It is obvious that the nomenclature established for the various planets and satellites should be coordinated in some way. It is also desirable to have early decisions on the nomenclature of a newly investigated body, and this may require

rapid action. For example, various government agencies in the United States are now involved in the production of new map series for the Moon, Mars, and Mercury, and it is necessary to provide nomenclature data on a fairly short time scale so that printing schedules can be met.

To provide a more comprehensive system for dealing with planetary nomenclature, the IAU in Sydney established five nomenclature Task Groups, with responsibility for developing the required nomenclature for the surface features of the Moon, Mercury, Venus, Mars, and the outer solar system. These five Task Groups report, through their chairmen, to the WGPSN, which in turn reports directly to the Executive Committee of the IAU (Pettengill, 1974). Such an organization enables action on nomenclature to be taken in between General Assemblies, leaving only the formal ratification to be effected at the next following General Assembly of the IAU.

The following terms are convenient for indicating the four levels of action with the sequence outlined above:

Recommendations that have passed a Task Group are *proposed names* which can then be *certified* by the Working Group and, when passed by the Executive Committee become *provisional names*. Formal approval is given by the General Assembly and the names are then *approved by IAU*.

The Task Groups and the Working Group deal with all extraterrestrial topographic nomenclature on the solid surfaces of bodies in the solar system and also, when needed, with the naming of unnamed natural satellites. They are not concerned with the naming of asteroids, comets, and meteor streams, as well-established systems of nomenclature already exist in these cases.

Members of nomenclature groups today must

work with a much broader philosophy than they worked with in the past. Before the end of the 20th century up to 40 planetary bodies in the solar system alone may require topographic nomenclature. Disciplines other than astronomy are now directly involved—for example, geology, geophysics, and engineering, to mention only three of the more obvious. The United Nations has an active body, the "Group of Experts on Geographical Names," which coordinates and approves, on an international basis, the names for terrestrial topographic features. This Group of Experts has set up a Working Group on the Names of Extraterrestrial Topographic Features. The IAU/WGPSN has established lines of communication with this UN Working Group and with the UN Group of Experts. In this way we can assess the reaction of the nonscientist to nomenclature policy over a broad international spectrum, since the United Nations includes almost three times the number of nations represented in the IAU. United Nations' delegates from countries that do not adhere to the IAU can assist us greatly by providing for future use lists of suitable names for planetary bodies.

It is evident that people often become emotionally involved in nomenclature decisions. With a large number of individuals from various disciplines actively engaged in this field, it is clear that no one person can hope to see all his suggestions adopted. Compromise will inevitably be necessary in most cases. It is easy to find those who are ready to criticize what has already been done; it is much more difficult to find those who are prepared to devote many man-hours to working objectively on the solution of a nomenclature problem.

At its first meeting, held in Ottawa, Ontario, on June 27–28, 1974, the IAU/WGPSN listed the following seven basic principles for planetary system nomenclature, and these were later approved by the Executive Committee of the IAU.

1. Nomenclature is a tool and the first consideration shall be to make it simple, clear, and unambiguous.

2. The number of names chosen for each body should be kept to a minimum, and governed by the anticipated requirements of the scientific community.

3. Although there will be exceptions, duplication of the same name on two or more bodies should be avoided.

4. In general, individual names chosen should be single words, and expressed in the language of origin. Transliteration and pronunciation for various alphabets should be given, but there

will be no translation from one language to another.

5. Where possible, consideration should also be given to the traditional aspects of any nomenclature system, provided that this does not cause confusion.

6. Solar system nomenclature shall be international in its choice of names. Recommendations submitted by IAU National Committees will be considered. Final approval of any selection is the responsibility of the International Astronomical Union.

7. We must look to the future in general discussions of solar system nomenclature and attempt to lay the groundwork for future requirements that will result from the development of the space program.

One of the oft-recurring discussions in the field of nomenclature is whether to use letters and numbers for reference to a given feature or to assign a name. For accurate reference to a specific point we can always use an established coordinate system such as latitude and longitude. But where a feature is, or may be, frequently referred to, the majority opinion seems to favor a distinctive name. On Earth we travel on land from place to place by name rather than by number. During World War II, I served 6 years in the Royal Canadian Air Force as navigator, navigation instructor, and operational research officer. We lived with maps, day and night, and often our lives depended on them. Maps needed on a mission were selected by sheet name, even though they all were numbered as well. My practical experience would indicate that it is wise to have a distinctive name for each sheet in a given map series. For large-scale map series, however, it is not always necessary to assign sheet names until there is some prospect of the sheets in question being printed.

In special cases it may be advisable to have a double system of names for the sheets in a small-scale series. This has already happened in the cases of Mars and Mercury where the albedo features mapped from Earth-based observations have retained their classical names, while the largely independent craters and scarps photographed from Mariner spacecraft are given names from a different category.

Another area of discussion is whether to name features after people, living things, inanimate objects, or even abstract nouns. Up to now there has been a preference for naming distinctive surface markings, such as craters, on the terrestrial planets and the Moon after men and women of note. Except for a very few special exceptions the individuals commemorated must be deceased. It has also been agreed to prohibit

the assignment of the names of individuals "known primarily as religious leaders, or as military leaders, political leaders, and philosophers, of the 19th and 20th centuries."

For very-large-scale maps of unique and specific areas, such as landing sites on the Moon or Mars, names can be chosen without restricting their possible use on other map sheets. Examples of name banks of this type, already chosen on an international basis, are the first names of men and women for use on the Moon, and the names of small terrestrial villages for use on Mars.

It may be objected that, in choosing names, the popular emphasis of today will be reflected in the nomenclature selected for any given planet or satellite. This is very true and is unavoidable. However, strict adherence to Basic Principle No. 2 will leave plenty of room for future additions; and it is quite appropriate to have a flavor of the early decades of the space age retained in our planetary nomenclature.

There has been a desire, particularly among the nonscientists in the United Nations' groups, to lay out a very detailed plan of nomenclature at the present time for the entire solar system. Since, for example, we do not know in advance the types of surface features that may be discovered on the satellites of Jupiter and Saturn, it would be unwise to formulate detailed rules too hastily. The IAU/WGPSN will attempt to foresee the future needs for nomenclature as the program of interplanetary flights develops. Banks of names will be prepared in advance so that suitable nomenclature of a general basic system may be given to the cartographers without delay. We have already suggested a uniform set of descriptive Latin terms for types of topographic features. For any given planetary body, selections may be made from this set, to use with the assigned nomenclature. New Latin terms can be added as required.

In conclusion, I wish to emphasize that it is important for our nomenclature groups to receive suggestions and opinions from a wide range of individuals and nations. In particular we should like to hear the views of those who will be using planetary nomenclature in their scientific publications.

APPENDIX

Working Group for Planetary System Nomenclature. P. M. Millman, Ottawa, Ontario, Canada (President); B. Ju. Levin, Moscow, U.S.S.R.; C. H. Mayer, Washington, D.C., U.S.A.; D. D. Morrison, Honolulu, Hawaii, U.S.A.; T. C. Owen, Stony Brook, N.Y., U.S.A.; G. H.

Pettengill, Cambridge, Massachusetts, U.S.A.; S. K. Runcorn, Newcastle-upon-Tyne, U.K.; B. A. Smith, Tucson, Arizona, U.S.A.

Task Group for Lunar Nomenclature. P. M. Millman, Ottawa, Ontario, Canada (Acting Chairman); A. Dollfus, Paris, France; F. El-Baz, Washington, D.C., U.S.A.; K. P. Florenskij, Moscow, U.S.S.R.; H. Masursky, Flagstaff, Arizona, U.S.A.; D. H. Menzel, Cambridge, Massachusetts, U.S.A.; S. K. Runcorn, Newcastle-upon-Tyne, U.K.; V. V. Shevchenko, Moscow, U.S.S.R.

Task Group for Mercury Nomenclature. D. D. Morrison, Honolulu, Hawaii, U.S.A. (Chairman); M. E. Davies, Santa Monica, California, U.S.A.; A. Dollfus, Paris, France; O. J. Gingerich, Cambridge, Massachusetts, U.S.A.; R. M. Goldstein, Pasadena, California, U.S.A.; J. E. Guest, London, U.K.; Yu. N. Lipskij, Moscow, U.S.S.R.; B. A. Smith, Tucson, Arizona, U.S.A.

Task Group for Venus Nomenclature. G. H. Pettengill, Cambridge, Massachusetts, U.S.A. (Chairman); R. M. Goldstein, Pasadena, California, U.S.A.; M. Ya. Marov, Moscow, U.S.S.R.; H. Masursky, Flagstaff, Arizona, U.S.A.

Task Group for Mars Nomenclature. B. A. Smith, Tucson, Arizona, U.S.A. (Chairman); A. Dollfus, Paris, France; M. Ya. Marov, Moscow, U.S.S.R.; H. Masursky, Flagstaff, Arizona, U.S.A.; S. Miyamoto, Kyoto, Japan; A. V. Morozhenko, Kiev, Ukraine, U.S.S.R.; C. Sagan, Ithaca, New York, U.S.A.

Task Group for Outer Solar System Nomenclature. T. C. Owen, Stony Brook, N.Y., U.S.A. (Chairman); K. Aksnes, Cambridge, Massachusetts, U.S.A.; M. S. Bobrov, Moscow, U.S.S.R.; M. E. Davies, Santa Monica, California, U.S.A.; D. Gautier, Paris, France; B. A. Smith, Tucson, Arizona, U.S.A.; V. G. Tejfel', Alma-Ata, Kazakh S.S.R., U.S.S.R.

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