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ON THE NAMING OF EXTRA - TERRESTRIAL FEATURES \*

Paper prepared by the International Astronomical Union

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\* prepared by Donald H. Menzel, Chairman Working Group on Lunar Nomenclature, International Astronomical Union.

## ON THE NAMING OF EXTRA - TERRESTRIAL FEATURES

by

Donald H. Menzel, Chairman  
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With the photography of the far side of the moon, first by the Soviet Union and second by the United States of America, the need for assigning identifying names to various lunar features became urgent. At the General Assembly of the International Astronomical Union, held in Prague in August, 1967, a Working Group was established within Commission 17, The Moon, for the purpose of lunar nomenclature. The group consisted of Prof. A. Mikhailov of the Soviet Union, Prof. M. Minnaert of the Netherlands, and Prof. Donald H. Menzel of the United States of America as Chairman. Prof. A. Dollfus of France, newly elected President of Commission 17, was also a member, ex officio, of the new Working Group.

A few names had already been assigned to far-side features and approved by the Union in 1961, at the General Assembly held in Berkeley, California. These assignments were based on the Pioneer photographs taken by Soviet scientists.

Features on the near side of the moon have traditionally been named for distinguished people, chiefly scientists, with a few features named for terrestrial objects, such as the mountain ranges, the Alps, the Apennines, etc.

The Working Group decided that the assignments of names should be as international as possible. To this end, as Chairman of the Group, I drafted a letter for the signature of Prof. Fred Seitz, President of the National Academy of Sciences of the U.S.A., which was sent to all of the recognized academies of science or equivalent organizations throughout the world. The letter requested suggestions for the names of lunar craters and other features. I specifically requested that each nation provide me with a list of its most distinguished, deceased scientists for our consideration.

The response to this request was excellent. The data so furnished, coupled with our own studies of the scientific literature provided us with a card catalogue of potential candidates numbering in excess of 2000 individuals. The Working Group held a number of sessions, one in New York, several in Paris, and one in Moscow. Prof. B. Levin of the Soviet Union replaced Prof. A. Mikhailov as a member of the Working Group.

As a first objective, we decided to assign approximately 500 or 600 names, so that the density of named craters would be approximately the same on the far side as on the near side.

The selection of these names was not an easy process. However we finally arrived at a satisfactory list, for which we had prepared short, identifying biographies.

There was considerable discussion concerning the way in which we would assign the names to the features. We seriously considered, for example, starting with the A's near the North Pole and distributing the alphabet systematically in strips of latitude ten or so degrees in width, alphabetically in longitude from west to east toward the south pole. This procedure would have greatly facilitated the finding of various names, without a catalogue of latitudes and longitudes. Many people with whom we conferred, however, strongly objected. The cartographers, especially, thought that a large-scale map of the moon where most of the craters had names beginning with the same letter would not be artistic. We finally gave up the idea and decided on more or less random placement.

Another difficulty that we encountered arose from the objections of a few cartographers against using names that conceivably might be confused orally. As a result, we assigned a crater to Neils Bohr but denied one to Max Born. Similarly, H. A. Lorentz received a crater, whereas E. O. Lawrence did not. We denied one to Sir Ernest Rutherford because of a crater named Rutherford already on the moon's near side. And so on. There were other similar injustices.

I have the feeling, from discussion with other cartographers, that this limitation was far too strict. At the very worst, we could put the conflicting names on, if we separated some at some distance from the other crater. These are points that we shall wish to reconsider and certainly would like to have the advice of other cartographers.

In this same general area, we have encountered some problems because of the pronunciations given to various names by individuals speaking different languages. For example, the last name of Percival Lowell is pronounced, among various German-speaking countries and in the USSR, as Lovell, a pronunciation very different from that in England or the USA. Even so, we did assign craters to the American astronomer and also to Lovell, one of the U.S. astronauts.

We divided the names into five groups, of which group 1 was most distinguished, two in the next category, and so on to group 5 which consisted of the least distinguished. Thus we assigned the largest craters to names in group 1, and so on down the line. To ensure the fairness of our choice, we used a computer to assign random numbers to the names. ACIC (The Aeronautical Chart and Information Center, U.S. Air Force) had already prepared large-scale maps of the moon, on which craters were identified by numbers. In this fashion, with a few exceptions, we assigned names at random, irrespective of national origin, later identifying the crater by means of its latitude and longitude.

The two major exceptions concerned recognition of the space studies of the Soviet Union and the United States of America. These were specially commemorated by Mare Moscoviensis and a large crater complex called Apollo, both on the far side of the moon. In these respective areas, smaller craters have been assigned to astronauts of the respective nations. A special crater was assigned to Gagarin, the first cosmonaut to achieve earth orbit. A few living astronauts and cosmonauts were similarly honored, the only exception made to the traditional rule that an individual should be deceased prior to his installation on the moon.

We presented our list at the General Assembly of the International Astronomical Union, held in Brighton, England, in 1970. Except for several minor objections, the list was unanimously approved, first by Commission 17 and later by the entire General Assembly. The objections that were raised related to the fact that we had questioned the reality of several features, whose names had previously been assigned and approved at an earlier General Assembly. We made these corrections in the published list.

About two months after the General Assembly, Professor Minnaert who had worked hard and actively on the Working Group, died. We therefore provisionally assigned one of the larger craters, which had become vacant in the final shuffling, to the name of Minnaert. This name is included in the published list, even though it had not received the official sanction of the Union.

Our Committee recognizes that there are still many problems connected with lunar nomenclature. On the near side, smaller, satellite craters have generally been designated by the name of the major crater, followed by the letters A, B, C, .....

One of the major problems facing the continuing Working Group will be the development of methods for identifying and for naming smaller features. This is important for selenodesy. There will be an increasing need to identify and locate many of the smaller features. A number of suggestions have been made, such as dividing the moon into tesserae bounded by specified meridians and parallels of latitude.

There are a number of other features, such as the lunar rilles, which are becoming more important for study. NASA has specifically asked that these be classified according to their degree of sinuosity. The traditional method of naming a rille for its associated crater does not hold for this new class, since there often are no obvious craters with which we can associate the longer of these rilles. A search of the record indicates that perhaps 50 or 60 rilles should be named and identified.

The various Apollo astronauts, in connection with their operational work, have often assigned provisional names to various craters. These are for navigational purposes, identification, and so on. The Working Group, in consultation with NASA officials, must determine whether any of these should be kept, perhaps as mementoes of the successful Apollo operation.

In addition to the moon, there will be many other problems of extra-terrestrial nomenclature. Chief of these will be that of the planet Mars, as a result of the various Mariner photographs, especially those taken by Mariner 9. These show details with a precision hundreds of times greater than can be achieved with any terrestrial telescope. And when the results have been tabulated, and maps have been prepared of the explored areas, it will certainly be necessary to expand greatly the current system of Martian nomenclature.

It has not been decided as yet whether our Working Group should be assigned the task of naming Martian features. However, I am currently in touch with several of the individuals presently most involved in the Mariner program.

There is still one additional area where some naming is desirable. There are, for example, seven of Jupiter's satellites not yet named. They are still designated by roman numerals. Our Working Group has begun to study this question and may have some specific recommendations at a later date.

The opinion of those in the International Astronomical Union with whom I have discussed the question is that the UN Special Working Group should be satisfied to delegate the problem of the nomination of lunar and possibly other extra-terrestrial features to the International Astronomical Union and its Working Group or Working Groups. As far as the moon is concerned, this Committee should be enlarged to include someone from the International Union of Geodesy and Geophysics, and possibly other members or consultants. However, the total number of official members should be kept small, in the interest of efficiency.

We feel that a proliferation of working groups on extra-terrestrial nomenclature would serve no useful purpose. Furthermore, I feel that the UN Special Working Group should agree to accept the recommendations approved by the International Astronomical Union in this particular area. To divide the responsibility among other commissions, other nations, and other unions would only produce chaos.

Let me conclude with one final observation of the LAU Working Group on Lunar Nomenclature. We have noticed a tendency on the part of popular

writers and even, to a certain extent, among cartographers to provide literal translations of the official Latin designations of the various maria into various languages. This practice has led to such meaningless designations as "Sea of Moisture", "Ocean of Storms", "Sea of Rain", and so on. We feel that cartographers should encourage the use of official names wherever possible.

