



UNITED NATIONS
ECONOMIC
AND
SOCIAL COUNCIL



Distr.
LIMITED

E/CONF.61/L.41
19 April 1972

ORIGINAL: ENGLISH

SECOND UNITED NATIONS CONFERENCE ON THE
STANDARDIZATION OF GEOGRAPHICAL NAMES
London, 10-31 May 1972
Item 14 (d) of the provisional agenda

DRAFT REPORT OF THE WORKING GROUP ON THE NAMES
OF EXTRATERRESTRIAL TOPOGRAPHIC FEATURES*

* Prepared by A.M. Komkov, Chairman of the Working Group. Members of the Working Group were: A.M. Komkov (Union of Soviet Socialist Republics), H.A.G. Lewis (United Kingdom of Great Britain and Northern Ireland) and M.F. Burrill (United States of America).

In accordance with the recommendations of the United Nations Secretariat the problem of names of extraterrestrial topographic features was included as a special item on the agenda of the second session of the Ad Hoc Group of Experts on Geographical Names held in New York on 10-20 March 1970. As was pointed out in the report of the second session, the Group of Experts "first considered whether its competence covered the consideration of extraterrestrial topographic nomenclature. The proposition was advanced that such names are not geographical and that they fall more properly within the field of the astronomer, but the majority opinion was that changing technology in space matters was placing it within the purview of both the cartographer and the geographer". 1/

A special Working Group composed of M. F. Burrill (United States of America); A. M. Komkov (USSR), H. A. G. Lewis (United Kingdom) was formed for the further study of the problem. A. M. Komkov was nominated as Chairman of the Working Group and in the period between the second and the third sessions of the Group of Experts he prepared, on the basis of preliminary examination of the material, a report concerning the names of extraterrestrial topographic features. 2/

The paper was discussed at the meeting of the Working Group on 5 February 1971, and was adopted as background material. The members of the Working Group agreed that the nomenclature system of major lunar formations approved by the International Astronomical Union (IAU) should be maintained as the standard, but it was pointed out that the system had proved to be inadequate for designating numerous small topographic features, the mapping of which had lately become possible owing to new means of space investigation.

The Working Group recommended continued study of the problem and the development of adequate systems of designating extraterrestrial topographic features, particularly systems based on the use of selenographic co-ordinates. The Working Group noted that such work should be carried out by astronomers, geodesists and cartographers, in conjunction with the United Nations Ad Hoc Group of Experts on Geographical Names. These recommendations became the basis of the final report of the Working Group for the London Conference which was drafted by the Chairman. 3/

1/ Report of the Ad Hoc Group of Experts on Geographical Names on its second session from 10 to 20 March 1970 (ESA/RT/C/GN/I) p. 11.

2/ Third session of the Ad Hoc Group of Experts on Geographical Names, 2-12 February 1971, Information Paper No. 23.

3/ Report of the Ad Hoc Group of Experts on Geographical Names on its third session, April 1971 (ESA/RT/C/GN/2) annex Y, pp. 18-19.

In connexion with the commission an exchange of information took place with the IAU representatives immediately interested in the problem.* The data received were used in the preparation of the present report. Since not all the participants in the Conference have previously confronted the problems involved in naming extraterrestrial features, a short historical survey is given below.

* *
*

1. The present system of naming extraterrestrial features, including lunar surface formations, goes back to the middle of the seventeenth century. About 300 features on the Moon's surface were first assigned names on the maps compiled and published by the astronomers Langrenus, Hevelius and Riccioli in the period 1645-1651. Terminology for larger formations of the lunar surface, based on their outward resemblance to the forms of terrestrial relief, such as continents, seas, gulfs, lakes, marshes, mountain ranges and craters, also first appeared in that period and have been preserved.

Terrestrial place-names were borrowed for lunar mountain ranges: the Alps, the Appenines, the Caucasus and others. Lunar "seas" were assigned abstract symbolic names: "Mare Crisium", "Mare Tranquillitatis" and the like. Craters, the most numerous group of lunar surface formations, were assigned names, at first commemorating outstanding astronomers, later on other scientists of antiquity up to the present. In the course of time a need arose to designate a constantly increasing number of features on maps and in catalogues. The largest of them continued to be assigned proper names, but for the designation of smaller features a system of letter indices added to the known names was brought into use at the end of the eighteenth century.

The tradition of writing lunar names in Latin has been preserved since mediaeval times.

2. Taking into account the progress of scientific investigation and the danger in naming the same extraterrestrial feature on maps, charts and in catalogues published in different countries, the IAU displayed useful initiative in accepting responsibility for the international normalization of extraterrestrial nomenclature. The Vth General Assembly of the IAU (Cambridge, Massachusetts, United States of America, 1932) approved, for the first time, the list of names of 672 major formations on the visible side of the Moon. ^{4/} In the following

* Professor A. Dollfus, (France), Convener of the Inter-Union Commission on Lunar Studies, President of the IAU Commission 17 (The Moon), member of the IAU Working Group on Lunar and Martian nomenclature.

Professor B. Yu. Levin (USSR), Vice-President of the IAU Commission 17 (The Moon), member of the Working Group on Lunar nomenclature.

Professor D. Menzel (United States), Chairman of the Working Group on Lunar nomenclature.

^{4/} M. A. Blagg and K. Müller, Named Lunar Formations (London, 1935).

years the list was completed with only a few proper names of large features, but it was substantially widened owing to a great number of relatively small features designated by additional letter indices attached to the named large features.

Photographs of the Moon's far side, first taken by the Soviet automatic station Luna 3 in 1959 and after that by Zond 3 and the American spacecraft Orbiter, have opened a new chapter in exploration of the Moon. New features became known, and it was necessary to assign them names. This was first done in the atlas of the far side of the Moon, compiled in the Soviet Union and the terminology was approved by the XIth General Assembly of the IAU (held at Berkeley, California, 1961). The Assembly also reaffirmed approval of previous rules, with several additions, for designating lunar surface features. 5/

In accordance with these rules the Working Group on Lunar Nomenclature of IAU Commission 17, formed in 1967 with the participation of national organizations, prepared a list of personal names for 513 craters of the Moon's far side. The list was approved, with a few corrections, at the XIVth General Assembly of the IAU and was published in 1971 in Space Scientific Review. 6/

Thus, the names of about 1,200 of the most prominent surface features on the visible and reverse side of the Moon have at present been established in conformity with the rules adopted by the IAU. Besides these, several thousands of minor topographic features have been designated on published maps with letter indices attaching them to the names of major features.

3. The IAU Commission 16 (Physical Study of the Planets) is responsible for the naming of topographic features of various planets, especially Mars, because excepting the Moon, the greatest number of topographic formations needing designations have been identified on the surface of Mars.

The Xth General Assembly of the IAU (Moscow, 1958) revised the Martian nomenclature system formed by that time, and following the "Principles of guidelines" 7/ worked out by the subcommission on Martian nomenclature, approved the list containing 125 names of major formations on Mars. According to these principles, such formations "were designated each by a name drawn from mythology, in accordance with the former classical system"; the use of planetographic co-ordinates to designate minor features was recommended.

A great increase in the amount of Martian data during recent years, due to application of research spacecraft, led to the necessity of revising the "Principles of guidelines" adopted in 1958. During the XIVth General Assembly (Brighton, 1970), Commission 16 adopted new proposals of the subcommission on

5/ Transactions of the International Astronomical Union, Vol XIB, (London and New York, 1962) p. 266.

6/ Space Scientific Review, N 2 (1971) pp. 136-186.

7/ Transactions of the IAU, vol. X (Moscow, 1960) pp. 259-263.

Martian nomenclature. According to these proposals "the hundred or so largest and most prominent craters on Mars are to receive names of deceased persons whose work had relation to the planet Mars". 8/ Regarding the names adopted in 1958 it was recommended they be used as names of provinces or subprovinces, abbreviated by four-letter or two-letter symbols, likewise by three-letter abbreviations of constellations.

A Working Group was appointed, under the chairmanship of Professor de Vaucouleurs, charged with the following tasks, to be completed before the next General Assembly of the IAU in 1973: (a) to substantially define the province boundaries; (b) to elaborate the principles of naming topographic features in the regions explored with the help of spacecraft; (c) to propose appropriate names for certain prominent Martian topographic features.

It is evident that the system of designating Martian topographic features is still in the process of exploration and formation and is progressing irrespective of the development of the lunar nomenclature.

Regarding Venus, Mercury and other planets, science has not yet accumulated sufficient data for nominating their topographic features. But in the next five or 10 years such data will undoubtedly be obtained and the problem of designating the surface features of distant planets will also demand solution.

4. The rules adopted by the IAU and the systems of designating extraterrestrial topographic features based on them, in spite of some defects, have won recognition and were used in many countries. Their application proved their value, and gave rise to no difficulties in the compiling and utilization of extraterrestrial maps, charts and catalogues as long as the place-names of only a few very prominent features sufficed.

However, the situation has substantially changed. Outstanding achievements in space studies now permit the production of large-scale maps showing numerous topographic details. Especially in the mapping of the Moon the principles and procedures formerly applied by the IAU for establishing names or other designations for extraterrestrial topographic features prove to be inefficient. Difficulties arise not only in large-scale mapping but also in drawing maps at scale 1:1,000,000. For each feature having a proper name, there are several dozen rather large nameless features. According to the data presented by A. A. Furstein and K. B. Shingareya (scientists connected with the Institute of Space Research of the USSR Academy of Science), even on the visible side of the Moon, about 300 craters with a diameter of 50 km and over have no names at all, that is, they appear to be "dumb".

The system adopted by the IAU of additional letter indices was meant to provide the possibility of designating all the features of the lunar surface down to the smallest detail; but in practical applications the system has proved to be limited, since it lacks the necessary strictness and unambiguity and supplies too

8/ Ibid., vol. XIV B (London, 1971) p. 129.

complicated and bulky designations for minor features. It is not by chance that the authors of many maps, charts and atlases do not apply it; for example, the authors of the well-known Photographic Lunar Atlas (Chicago, 1960).

Critical evaluations of the applied systems of designating lunar formations have been expressed by many authors, in particular by H. Kenny, 9/ C. Borkowski, 10/ D. W. G. Arthur and others. 11/

5. The necessity of processing a large amount of lunar information and of drawing lunar maps at constantly augmenting scales obliges those facing these problems to devise more adequate systems of designating topographic features.

One such system has been submitted to the IAU for consideration by A. A. Gurstein and K. B. Shingareva. 12/ It may be called the "block-numerical" system, and it is recommended by the authors for the designation of craters only.

The point of this system is as follows. The representation of the lunar surface is divided by meridians and parallels into parcels (blocks) in such a way that no less than one named crater falls within the limits of each block. If there are several craters in a block, the one situated in the centre gives its name to the block. The craters are divided into groups (according to a special scale in conformity with their dimensions) and those which fall into a block are indicated with corresponding numerical indices conveying some additional information in comparison with the IAU system of letter designations.

An original system "Lunese I", described as a microlanguage for labelling topographic features of lunar surface, has been elaborated by Casimir Borkowski (Department of Computer Science, Graduate School of Library and Information Sciences, The Knowledge Availability Systems Center, University of Pittsburgh). The system is based on the transfer of numerical value of co-ordinates of named features into an artificial language form in accordance with a special code. According to this system the names of lunar surface features appear as chains of syllables, every one of which corresponds to a digit of co-ordinates (latitude and longitude) of a given feature. The transfer of the feature designations from numerical (co-ordinate) form into artificial language form and vice versa may be carried out with the help of electronic computers and, in the author's opinion, it will allow for automatic processing and retrieval of lunar information.

9/ H. Kenny, "Place-names on the Moon: report", Names vol. 12, No. 2 (1964).

10/ C. Borkowski, "Syntax and semantics of Lunese I, a microlanguage for labelling topographical features of the lunar surface", Proceedings of the Xth International Congress of Onomastic Science, vol. II, (Vienna, 1969).

11/ D. W. G. Arthur, A. P. Agniery, "The system of lunar craters, quadrant I", Comm. LPL, vol. 2, No. 30 (University of Arizona, 1963).

12/ A. A. Gurstein, K. B. Shingareva, "To the problem concerning the lunar crater designation system" (Materials of the IAU, 1970).

6. Simultaneously with the search for new ways and methods of designating extraterrestrial topographic features, the countries carrying out large-scale mapping of the Moon continue using either the IAU "classical system" of names and letter designations or the methods of terrestrial topography. It is of great interest to analyse the informal names given by the crew of Apollo 15 to 80 minor topographic features of the lunar surface in the region of strike of the spacecraft. The list of these names 13/ demonstrates that the astronauts, having inspected the area on 26 June 1971, followed the example of surveyors mapping a monotonous uninhabited desert territory for the first time.

Without evaluating these names, some of which are more and others less felicitous, it should be noted that the direct transfer of method of naming terrestrial topographic features to extraterrestrial ones, especially when mapping large areas of lunar surface, can hardly have a satisfactory outcome, as the conditions of formation of terrestrial and extraterrestrial features are quite different.

Out of a great number of natural phenomena on the Earth connected with the life and activity of people and their surroundings (giving origin to an infinite variety of toponyms), only a few can be reflected in the extraterrestrial feature-names - cosmonyms. Therefore the choice of names acceptable for surface topographic features of the Moon or Mars still remains limited. The possibility of designating extraterrestrial topographic features with the help of planetographic co-ordinates are also limited. The accuracy of their determination, even for the Moon, is lower than is necessary for representing smaller features on a large-scale map.

7. The necessity for consolidating separate efforts in a comprehensive study of the problem of designating extraterrestrial topographic features and the development of a co-ordinated system for international use has become evident. Such a system should meet the following general requirements: (a) it should not violate the historically traditional IAU nomenclature for the most prominent formations; (b) it should be based on general principles applicable to designation of not only lunar surface features but also those of Mars and other planets; (c) it should be applicable to the designation of not only large features but also small ones.

Developing such a system is a complicated problem which has scientific and technical as well as legal aspects. The former aspects are connected with the necessity of studying and developing scientific principles and technical rules regulating the designation of different kinds and categories of extraterrestrial topographic features; the latter, with the necessity of establishing international procedures for registration, consideration and approval of the designations proposed, as well as for the dissemination of information about approved designations recommended for international use.

13/ "Informal names for surface features in the Apollo 15 area"
(Aeronautical Chart and Information Center, St. Louis, 4 October 1971).

8. The programme of research and development of scientific principles and technical rules for designating extraterrestrial topographic features should include the study and determination of the following main points:

(a) General characteristics and peculiarities of designating surface features of different planets;

(b) Kinds and categories of topographic features to be designated on maps, charts and in catalogues; morphological and morphometrical characteristics of the features;

(c) Possible means of designation of topographic features: generic terms, specific names (including the ones borrowed from terrestrial features such as memorial, descriptive, conventional and symbolic names), letter or figure indices, co-ordinates and others;

(d) Rules determining which means of designation should be applied for certain kinds and categories of features and in what cases;

(e) Rules of original spelling of names and methods of rendering them from one language or writing system into others.

9. While working out problems of designating extraterrestrial topographic features in their legal aspect it is necessary to determine the following:

(a) What national or international organizations or private persons may recommend names or other designations;

(b) What data facilitating the identification of the feature and substantiating the proposal should be supplied;

(c) What representative international body should register, consider, and co-ordinate recommended names with national organizations and approve them as compulsory for international use;

(d) Whether this body should be periodical or permanent, taking into consideration unceasing studies and mapping of the Moon, Mars and other planets;

(e) Who should disseminate the information about adopted decisions and by what means.

The points listed under the items 8 and 9 do not cover all possible questions to be studied, and any additions and corrections are welcome.

10. In conclusion it is necessary to dwell on ways of organizing international collaboration in this matter. It seems expedient that the International Astronomical Union and its working groups on lunar and Martian nomenclature would remain as the leading organization in studying scientific and technical problems.

At present one representative from the International Geographical Union (IGU) and one from the International Union of Geological Sciences (IUGS) are to be introduced into the Working Group on Lunar Nomenclature, pursuant to a recommendation of the International Commission on Lunar Studies formed by the International Council of Scientific Unions (ICSU). This is believed to be insufficient, as not only astronomers but representatives of other sciences - geodesists, geophysicists, geomorphologists, cartographers, photogrammetrists and others - take part in studying and mapping the Moon and other planets. It would be expedient to enlarge the circle of experts to include in the Working Groups on Lunar and Martian Nomenclature those who deal immediately with map production.

Taking into consideration that IAU is an international scientific organization with no permanent scientific staff, the appropriate national organizations should probably be charged with elaborating specific problems connected with scientific and technical experiments and producing tentative maps, and the results of such works should be subsequently discussed at the meetings of appropriate commissions of the IAU or at international symposia.

As regards the legal aspects of the problem, the United Nations is the most competent and representative body for pursuing their solution. The names of many features, terrestrial, marine or extraterrestrial, that are situated beyond the jurisdiction of the countries, can be approved only through an international intergovernmental organization functioning on the basis of a special international convention if such names are to come into common use in all countries.
