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VIII INTERNATIONAL CARTOGRAPHIC CONFERENCE

USSR, MOSCOW, AUGUST, 1976

Shingareva K. B., Zargaryan T. G., Kondratskaya K. I.,
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MARS OUTLINE MAP COMPILATION

(USSR National Cartographers' Committee)

Moscow, 1976

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Progress of cartographic support for space research contributes to solution of a great number of scientific and applied problems. In particular, at the reconnaissance stage in the study of the planet of Mars by space facilities the compilation of maps for varying purposes and to different scales has become a matter of great urgency.

Experience in compiling the "Moon Outline Map"/1/ which has been widely used both for compiling all kinds of chart-schemes carrying one or other reference information and for bringing together topical cartography data has revealed the practicability of compiling such types of maps for other celestial bodies too.

Compiled at the Institute of Space Research, USSR Academy of Sciences, in cooperation with the Moscow Institute of Engineers for Geodesy, Aerial Survey and Cartography, the "Mars Outline Map" is a map of the planet's hemispheres drawn to 1 : 20 000 000 scale (fig.1). The map has been drawn in the transverse azimuthal equidistant Postel's projection. Postel's projection was preferred because it secures similar-order distortions both for areas and angles /2/ and this is quite important in compiling maps different as to contents. The 1 : 20 000 000 scale happens to be the largest one for table scientific-reference maps of Mars. The chosen projection is similar to the one used in compiling the "Moon Outline Map" and this must facilitate in the future a comparison of thematic maps compiled on a unitive basis with regard to comparative-planetologic aspects.

Shown on the map are the largest elements of relief.

Conventional signs, worked out specially for this map, are used to indicate chasma, planitia, fessa, catena, patera, tholus, montes, dorsum, isolated summits. The forms of relief occupying large spaces - vastitas, platau, mensae - are indicated by their names.

The Latin version for classification of Martian relief forms was adopted by the International Astronomical Union (IAU) at the XV General Assembly (Sydney, 1973). It comprised 14 terms which have furnished a basis for classification of the most eminent forms of relief. Relief details not considered by IAU's Working Group are designated as lineaments and their outlines are conveyed in continuous thin lines. The map's legend, apart from conventional signs and ^{examples of} inscriptions made in different types, contains also explanations to geologic-morphologic terms.

Similarly as in the "Moon Outline Map", the Mars map shows two categories of craters: those expressed sharply and weakly in the relief. The difference between the two is conveyed by conventional symbols. In the first case the crater ridge is drawn in continuous line, in the second case, by intermittent line. The minimal diameter of represented craters is 50 km. However, craters of such diameter are shown mainly on the plains essentially poor in craters that could be reflected on the 1 : 20 000 000 scale. Craters of 100 km and larger diameter have inscriptions in a bigger type, as compared to within 100 km diameter craters.

Apart from relief elements, the map shows the so-called polar caps, i.e. areas occupied by snow-glacial formations. Indicated, moreover, are the boundaries of minimum and maximum

spreading of these formations, the latter being subject to seasonal variations.

The general background of the map is that corresponding to the regions with average albedo values. Identified at this background are regions with maximum and minimum albedo values. The various albedo values are rendered in a yellow-brown gamut.

The map's legend contains a Latin and Russian versions of geomorphologic terminology. The Russian version has been agreed upon by the Comparative Planetology Laboratory, Vernadsky Institute of Geochemistry and Analytical Chemistry, and by the Department of Geographical Names, Central Research Institute of Geodesy, Aerial Photography and Cartography. The Russian equivalents mostly correspond to their translations from the Latin. This is true for such terms as vallis, chasma, platau, mons, tholus, fossa, mensae. On the other hand, for terms catena (a chain of craters), patera (an irregularly-shaped crater), labyrinthus (a combination of intersecting valleys) it is suggested that transcriptions should be used, because the Russian equivalents in these cases happen to be too complicated for use as names in the map. "Vastitas" means in translation "a desert". However, geomorphologically an equivalent of this term is, in fact, "a vast plain". Accordingly, to identify the only "vastitas" occupying a large space in the Northern circumpolar region it is suggested that "Great Northern Plain" should be used as its name.

On the whole, at the XV General Assembly of IAU names have been given to 9 planitia, 1 labyrinthus, 12 vallis,

3 regions characterized by accumulations of mensae, 13 fossa, 1 dorsum, 5 mountain chains, 5 individual summits, 11 tholus, 13 chasma, 9 patera, 3 catena, 7 planum, and about 180 craters identified in the map by conventional signs are usually the elements of relief, whose names have been approved by IAU. As already noted, the rest of the relief elements are conveyed as lineaments.

In translation and transcription of the names of relief elements some special difficulties were encountered with respect to the names of valleys. Selected for 11 out of 12 valleys (except for the "Mariners' Valley") by IAU's Working Group were names corresponding to those of planet Mars in 11 non-European languages. Unfortunately, further publications of the Working Group /3/ failed to mention these languages. Only through a series of long consultations it was made clear that, for instance, "Nirgal" stood for "Mars" in Ancient Babylon, "Mangala" in Sanskrit, "Kasei" in Japanese, etc.

On the whole, translated were only most well-known, traditionally attached names, for instance, Mount Olympus, Mountains Nereid, etc. The little known names borrowed from mythology or ancient geography were preferably transcribed. This kind of approach coincided with that of the members of the Department of Geographical Names, Central Research Institute of Geodesy, Aerial Photography and Cartography, and Transcription Department, Great Soviet Encyclopedia.

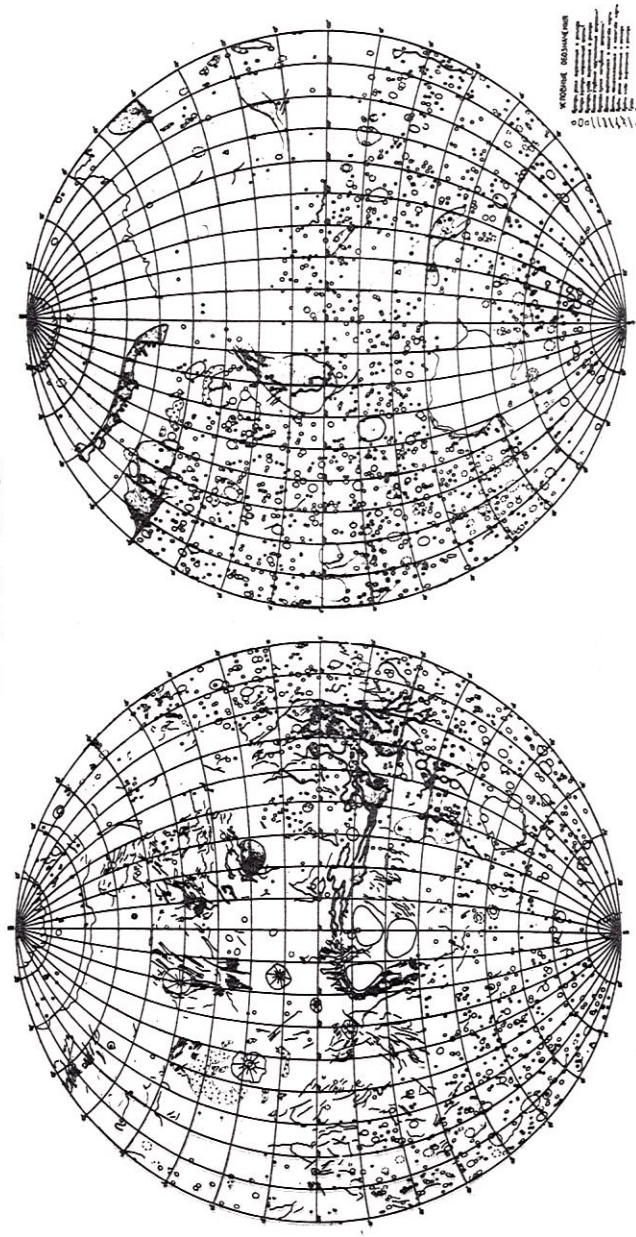
As for the names of craters, those given in the map are

the names (with very rare exception) that duplicate the names of lunar craters found in the "Complete Map of the Moon" which was published in 1969 (2nd edition). The names of about 30 craters could not yet be transcribed, because the IAU publications give only the initials of the scientists, in whose honour the names have been given, whilst their national belonging and field of scientific activities are omitted /3/. The map's marginal representation comprises, apart from the legend, a chart-scheme showing Martian provinces (fig.2). As decided by the IAU (1973), the entire surface of Mars is subdivided into 30 provinces (trapezoids) corresponding to the montage of the Mars map compiled on 30 sheets to 1:5 000 000 scale. Used as the names of the provinces are the most prominent details of albedo, as observable from the Earth. Translation and transcription of the names into Russian were first made by D.Ya.Martynov /4/. The given version contains certain specifications which have been introduced after consultations with the Department of Geographic Names, Central Research Institute of Geodesy, Aerial Photography and Cartography.

In conclusion it should be emphasized that the proposed version of "Mars Outline Map" is an experimental one and calls for all-round further discussion and specification. This is true, above all, for classification lineaments, specification of individual details either with respect to coordinate fixation or deciphering. Furthermore, lists of names of relief details need to be supplemented and specified.

It is expected that a supplemented and specified version of the map will be able to serve as a basis for thematic cartography of Mars and for compiling various kinds of chart-schemes.

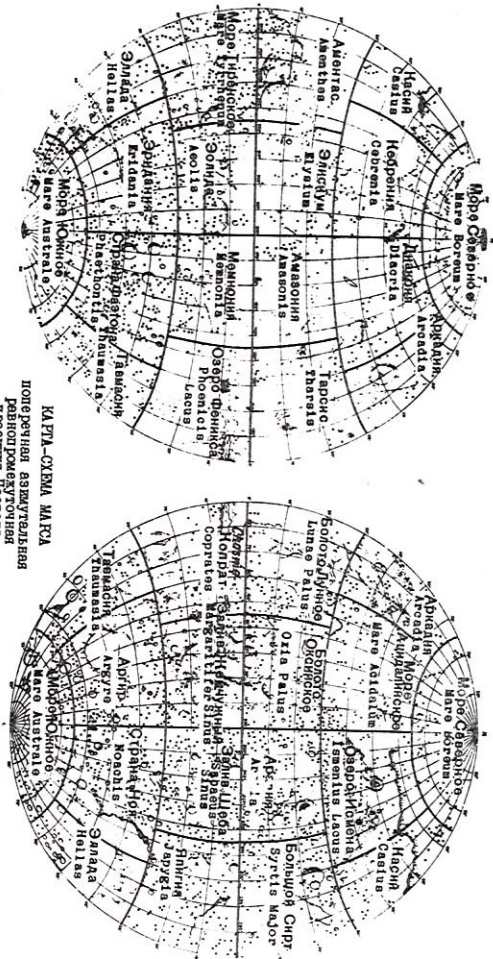
БЛАНКОВАЯ КАРТА МАРСА



МАШШТАБ : 1:2000000
ОДЕЛЪ НАС НАВООПРЕДЕЛЕНА АСМАННАТА И РЕЛЪЕФА НА ПЛОСКОСТ

Fig.1 Mars Outline Map

ПРИМЕРЫ МАРСИАНСКОЙ НОМЕНКЛАТУРЫ



КАТЯ-СЫМА МАРТА
НОМЕРНЫЕ АЗУРТАЛЫНА
РАЙОНДЖАКЪХЪ
И ПОЯСЪА ЛЮРЪА
1:20 000 000

Fig. 2 Chart-scheme of Martian provinces

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