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Technical Memorandum No. 33-72

Lunar Reference Coordinates

C. F. Campen, Jr.

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PASADENA, CALIFORNIA

December 29, 1961

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*Technical Memorandum No. 33-72*

## Lunar Reference Coordinates

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## LUNAR REFERENCE COORDINATES

During the several hundred years' interval between the invention of the telescope and the development of spacecraft, astronomers have, in depicting the Moon and planets other than Earth, used a set of conventions at variance with those used in depicting the Earth. This deviation by astronomers from accepted cartographic conventions was heretofore of little consequence. However, with the advent of plans for exploration of the solar system and the subsequent need for astronomical charts, it has become necessary to define two nonconflicting conventions, one suitable for astronomical and one for astronomical purposes.

Recognizing this need, the International Astronomical Union at its Eleventh General Assembly during August, 1961, adopted appropriate resolutions. Two distinct sets of conventions regarding pictorial or chart representations of the Moon and planets were thereby defined according to their intended use and were accepted by all nations represented. These are the Astronomical Convention and the Astronautical (or Cartographic) Convention.

The newly adopted Astronomical Convention will retain the inversion of north and south on astronomical photography but will

not utilize the designations "east" and "west": the designations "right" and "left" or "leading edge" and "trailing edge" will be substituted for them. This Astronomical Convention is given in Fig. 1.

The Astronautical (or Cartographic) Convention as defined by the IAU, and which is to be adhered to for all future astronomical charts, is shown applied to the Moon in Fig. 2. This orientation of the Moon, designation of east and west directions, and longitude/latitude division is to be used for all future representations of position and direction on the surface of the Moon for astronomical purposes. The metric system has been adopted by the IAU for all specifications of linear dimensions on such charts.

The Moon constantly presents a slightly different face to the Earth because of its librations in latitude, longitude, and those caused by the daily difference in the observed angle from the Earth at moonrise and moonset. Figure 2 is oriented so as to correspond to the appearance of the Moon at mean libration.

In Fig. 2, the lunar point of  $0^\circ$  latitude and longitude is the center of the visible portion of the Moon as seen from the Earth at the time of mean libration. This places the "Z" axis of the Moon directly along the Moon-Earth line at the time of

mean libration. Selenographic longitudes are to be measured positive in the direction toward Mare Crisium; selenographic latitudes are to be positive in the hemisphere including Mare Serenitatis.

The 1961 edition, and previous editions, of the American Ephemeris and Nautical Almanac use the old astronomical designation of west toward Mare Crisium, but in tabulation of longitudes and latitudes, positive and negative designations are consistent with the astronomical convention.



Fig. 1. Astronomical Convention for Moon

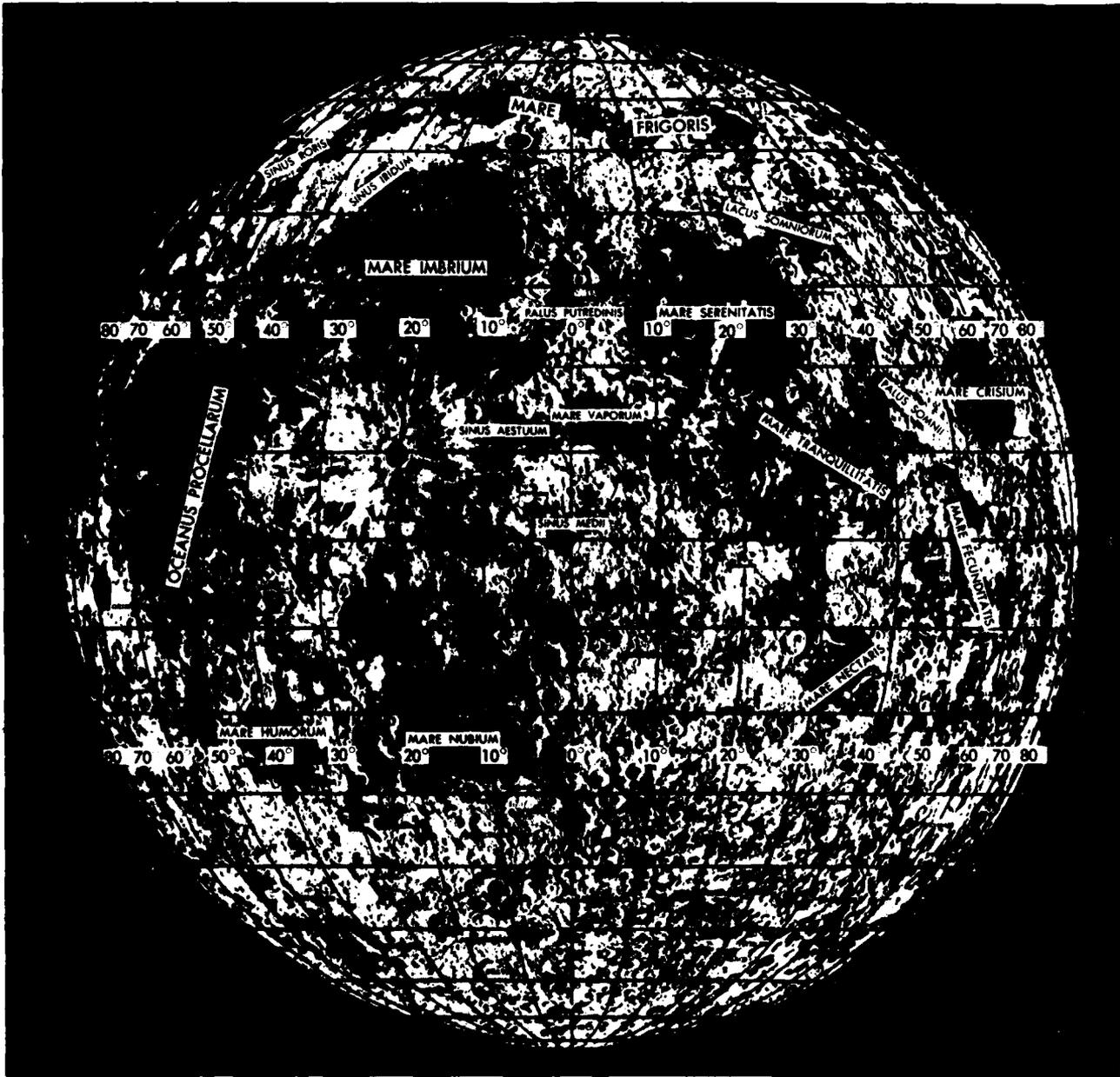


Fig. 2. Astronautical Convention for Moon