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ARE THE "SEAS" OF MARS LUNAR SEAS?

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M.A. Dauvillier

Translated from
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Ever since the work of Beer and Madler (1828) it has been accepted that the dark regions on Mars are — like those on Mercury — lunar-type maria, that is, vast quasi-circular dark depressions, of some kilometers' depth of subsidence. These abyssal plains with their little-accentuated relief contrast with the lighter "continental" regions, so-called, the relief of which attains heights of some kilometers.

But whereas there is no doubt that the elliptical, blackish Solitudo Atlantis on Mercury resembles, in every particular, Mare Crisium on the Moon, the dark regions of Mars are far from circular, and they resemble, on the contrary, the continental regions of the Moon. No doubt the photographing of Mercury from an orbiting observatory or lunar observatory will make it possible to verify the identical character of the relief of Mercury and the Moon, bodies identical in color, albedo, polarization and luminosity as a function of phase.

E. Antoniadi's map (1), and still better the International Astronomical Union's new map of Mars reproduced in "Astronomie" (2), show that the circular formations such as Electris, Eridania, Hellas, Argyre, Elysium, Amazonis, described as "continental deserts" on account of their flat, reddish and light-colored appearance, are the real Martian seas, almost devoid of relief. On the other hand the Martian dark regions called "seas" have all the characteristics of the continental regions of the Moon. Thus it is Syrtis Major and Mare Acidalium, with their shattered outlines, that are comparable to the lunar Caucasus and Apennines.

The dark polar regions, called "seas", in which the Martian pole-caps are located might already be thought to have an accentuated relief, from the fact that during their melting these pole-caps break up into islets corresponding to the said relief. But proof of this troublesome terminological inversion has been furnished by the photographs taken on the 14th of July 1965 by Mariner 4. The most beautiful photographs obtained, over an extent of 270 km and taken from 12,500 km altitude above Atlantis, between Mare Sirenum and Mare Cimmerium (170°W 30°S), indeed reveal an accentuated relief of cirques, scarps and central peaks, characteristic of the lunar continental regions. This "lunar" relief of Mars had been predicted by the paleovolcanic theory (3) of the relief of the terrestrial planets (Moon, Mercury, Mars, Triton and Pluto (4)). Another argument for this interpretation is that on Earth as on the Moon the area of seas amounts to two-thirds of the surface. The deserts of Mars, according to Antoniadi, take in five-eighths of the surface.

It is easy to show why the real Martian "seas" have become light-colored and reddish, while those on the Moon and Mercury have remained dark and greyish. The "lunar" seas on all the dwarf terrestrial planets have been inundated by very fluid Hawaiian-type lavas, dark and greenish, rich in iron silicates.

On the other hand the mass of Mercury is only 4.4 times that of the Moon, whereas that of Mars is 8.8 times as great. The gas kinetics and planetary escape theory (Johnstone Stoney, 1897) indicates that Mars retained for a longer time its high-temperature water vapor resulting from the paleovolcanic evolution of the lithosphere: water vapor which oxidized the ferrous silicates (FeO base) to ferric (Fe_2O_3 base), of reddish color. It was this juvenile water that produced our oceans and the Martian pole-caps.

Our Martian terminology is consecrated by use and could hardly be changed, but for correct interpretation of the planet's characteristics this inversion of terms must be kept constantly in mind.

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