

Proposed Additions to the Cartographic Database of Mars

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Abstract

A comparison of the presently approved database of place names on Mars with maps of the late 19th and early 20th centuries reveals that although about 100 of the historical names have been recycled and applied to geographic features identified in spacecraft imagery, about 400 of the old names for albedo features have not been carried forward. Additionally, while many of the traditional albedo names had their origin in classical mythology and geography, the database of approved names typically merely lists "Classical albedo name" as the origin; it is suggested that more specific information be listed in the database, and that more of these classical names be applied to the surface features of Mars to preserve the system of nomenclature pioneered by Schiaparelli, Lowell, and Antoniadi. Additionally, there are about 200 names from science fiction that can be applied to Mars, and in many of these cases it is possible to derive their coordinates from the original literary work or from derivative works. This paper also proposes that craters in the region of Ius Chasma (the Canyon of Law) be reserved for distinguished authors in the field of international outer space law, and proposes an initial list of ten candidates. This paper further proposes that the tropic circles of Mars be named following Beer and Madler 1830. Finally, although a number of towns in Pacific island nations have craters named for them, the Kingdom of Tonga, where the authors currently reside, is not represented; this paper proposes the name of a Tongan town to be added to the approved list of names.

The Origins and Meanings of “Classical Albedo Names”

Many of the names in the current cartographic database of Mars are derived from traditional albedo names that had their origin in classical mythology and geography. Often, however, the database of approved names typically merely lists "Classical albedo name" as the origin (United States Geological Service 2013). One might as well list “Biographical name” for all of the craters that have been named for prominent scientists and authors, and list “Town on Earth” for all of the craters that have been named for these. In the interest of providing a comparable level of detail, as well as of satisfying intellectual curiosity, the classical albedo names deserve brief explanation in the database (see Tables 1 through 4).

The Lost Names of Classical Mars

A comparison of the presently approved database of place names on Mars with maps of the late 19th and early 20th centuries reveals that although about 100 of the classical albedo names have been recycled and applied to geographic features identified in spacecraft imagery, about 400 of them have not been carried forward. It is suggested that more of these classical names be applied to the surface features of Mars to preserve the system of nomenclature pioneered by Schiaparelli (1877; 1879; 1884; 1888), Lowell (1895; 1905), and Antoniadi (1896; 1901; 1909). Of these, 360 have identified origins and meanings (see Tables 5 through 9), while nearly 30 others remain unidentified and require further research (Table 10).

Returning to the more immediate project of resurrecting the approximately 400 names that have been dropped, if these are to be restored to the database, the problem of their feature types arises. It goes without saying that there are no canals, fountains, groves, oases, forests, et cetera, on

Mars, but stipulating that, these feature types can only have meaning as albedo feature subtypes. As such, it might be permissible to add these feature types to the database as provisional types, with specific names subject to eventual reassignment to actual physical features in that area (see Table 11).

Names From Martian Literature

There are about 200 names from science fiction that can be applied to Mars, and in many of these cases it is possible to derive their coordinates from the original literary work or from derivative works (see Table 12). Although some sources of the names are rather obscure, many come from well-known works and authors. It should be noted that some of the classical albedo names are derived from mythology, an ancient genre of fiction. The modern fiction of Mars should also be considered as a source of place names. Although some of them are whimsical, others are colorless, and still others are inappropriate in their political overtones (in particular, the names in Philip K. Dick's *Martian Time-Slip* [1964] are drawn largely from American New Deal politics of the 1930s and 1940s), nevertheless some are exotic and are unique to the Mars that has caught our curiosity for well over a century.

There is no evidence in his writings that Edgar Rice Burroughs meant for the Barsoomian coordinate system to be different from that which had been long-established by the scientific community; thus it reasonable to assume that the deserted city of Horz (the Barsoomian Greenwich) is located at 0, 0. From this it is possible to derive the position of many other Barsoomian locations based on descriptions of direction and distance (given in haads, a haad being equal to 593.6462 meters according to Burroughs, 100 haads being equal to a degree of

latitude) from Horz, Helium or another known position. (It is an interesting coincidence that one minute of latitude, the Martian analogue of a nautical mile, is nearly equal to one kilometer [985 meters]). Coordinates for locations on Leigh Brackett's Mars are derived from the maps that Margaret Howes contributed to the 1976 collection *The Best of Leigh Brackett*.

Many more names from science fiction remain to be found, especially from sources other than English-language. Meanwhile, it is noted that absent from the database are craters to honor prominent Martian fiction authors Leigh Brackett (1915–1978) and Philip K. Dick (1928–1982), although undoubtedly Ray Bradbury (1920–2012) and Arthur C. Clarke (1917–2008) will be assigned craters in due course.

As with restoring the 400 classical albedo names that have been dropped, provisional fictional feature subtypes would need to be added to the database (see Table 13), for as yet there are no cities on Mars. But, who is to say that a century or two from now there will not indeed be a Port Armstrong?

Ius Chasma and Scholars of Space Law

The physical and life sciences are well represented in the naming of craters for people of notable achievement throughout history. In contrast, the social and behavioral sciences are scarcely represented at all. No doubt that in part this is due to the more recent emergence of these sciences, but it is equally plausible that since Mars is part of “outer space” and there has been the traditional purview of astronomers and other physical scientists, and in recent decades has been the venue of the search for extraterrestrial life, there has been a bias toward honoring the bright

lights of these disciplines. Less obvious is a rationale for honoring social and behavioral scientists in a place where no people have ever been. However, a half-century of human spaceflight has demonstrated that wherever humans go, so must the study of human behavior and of human societies. As human space activity becomes of longer duration, venturing further from the earthly oasis into the deep deserts of space, and as these activities entail larger crews, building ultimately into communities, it becomes obvious that the human element cannot be “strapped on” to the mission design as being a simple interface. For the most part, the studies of human behavior and of human societies in space are scientific disciplines waiting to come into their own in the 21st century, but one discipline stands out as leading the way. The legal profession has anticipated the needs of human society in outer space, and the need for law has preceded the need for the application of other social and behavioral sciences in outer space because it can—and must—address the actions of government and juridical persons, not just the actions of natural persons, and because the vast majority of the agents of these actions are unmanned spacecraft rather than humans operating in outer space. Thus, an impressive body of scholarly literature has developed in the course of the past half-century in the field of outer space law, anticipating the structures that will be needed to govern and to regulate human activity. Being the first of the social and behavioral disciplines to launch itself into space, it is time to recognize and to honor the most notable contributors to this field. On Mars, the name of Ius Chasma (Law Canyon) suggests itself as the obvious region that ought to be reserved for distinguished authors in the field of international outer space law. Table 14 contains an initial list of ten candidates; however, it would be useful for entities such as the Institute for Air and Space

Law (McGill University) and the International Institute for Space Law (Leiden University) to submit more authoritative lists.

A Crater for Tonga

Although a number of towns in Pacific island nations have craters named for them (see Table 15), the Kingdom of Tonga, where the authors currently reside, is not represented. Ideally, the choice of a name to represent them on Mars should be left to the people of Tonga. Time constraints did not allow for the organization of a scientific poll of the Tongan population and for the results of such a poll to be reported in this paper. It is hope that such a poll can be undertaken in the future. In the interim, Table 16 gives a list of names from which one might be chosen.

The Tropics of Mars

On Earth, the tropic circles were named for the constellations in which the sun appeared during the solstices in antiquity; ninety degrees to either side of the first point of Aries are Cancer and Capricorn. When one of the authors proposed a calendar for Mars (Gangale 1986) and determined that the vernal (or northward crossing) equinox of Mars occurs in the constellation of Sagittarius, he suggested that the tropics circles of Mars be named for the constellations of the solstices, to wit, Tropicus Piscium in the northern hemisphere and Tropicus Virginis in the southern hemisphere. Gangale went on to discover that the idea of a Martian calendar preceded him by a century and during that time the idea was reproduced by many writers according to their individual inclinations (Gangale 1988; Gangale 1997), and even more Martian calendars have entered the literature since his initial work. Recently, he discovered that even his suggestion for naming the tropical circles of Mars was not an original one; Wilhelm Beer and Johann

Madler, two of the earliest Martian cartographers, suggested precisely the same names more than 150 years earlier (Beer and Madler 1830; 1831; 1834). Since the tropic circles are not physical features, there is no International Astronomical Union (IAU) category to accommodate such names; rather, cartographers are free to use these names on their own initiative.

The Naming of Names

In the naming of a thing, humans acknowledge its existence in a more formal sense than in nodding at it, and in so doing they give it a more definite character of reality; it becomes a thing to be remembered, a scrap of knowledge to be maintained for some future purpose. As each new spacecraft in orbit of Mars or on its surface returns imagery of increased resolution, certainly we are in no danger of running out of features to name. Fortunately, neither are we in danger of running out of names to apply to features. Aside from the 500 names that Schiaparelli, Lowell, and Antoniadi gleaned from the encyclopedia of mythology and the gazetteer of ancient geography, there are thousands more names from antiquity that are available to be applied to Mars, and sources for these have become available online in recent years (Hazlitt 1851); this larger body of names might be considered in the future for contributing to the preservation of the overall classical character that Schiaparelli, Lowell, and Antoniadi bestowed on Martian nomenclature. Nor should we restrict ourselves to Greco-Roman classical names; the ancient geography of India, China, and the pre-Columbian Americas should also be employed, as these too would add to the exotic aura of Martian nomenclature.

Some names have a greater pull than others on the imagination. The genius of the nomenclature system pioneered by Schiaparelli and furthered by Lowell and Antoniadi was that it was its

extraordinary poetry, drawing as it did from the ancient roots of European civilization; and if, as H. L. Mencken wrote, “Love is the triumph of imagination over intelligence,” it was Schiaparelli’s system, embellished by Lowell and Antoniadi, that sparked humankind’s Gaslight Age love affair with Mars. These three astronomers made Mars an ancient and magical place, a place simultaneously of the past and of the future, both alien and human, an otherworldly stage for which later imaginations wrote plays great and small. Although it is certainly appropriate to name things in honor those who have made notable contributions to knowledge, it must be remembered that Albert Einstein declared, “Imagination is more important than knowledge. For knowledge is limited to all we now know and understand, while imagination embraces the entire world, and all there ever will be to know and understand.” For this reason it is important to restore the 400 imaginative names from a century ago that have been put aside. That many of these names were given to things that existed only in the imaginations of those who drew them is no reason to discard them; rather, it is a reason to revive them, for each one is a testament to the pull that Mars had on the late 19th century imagination, an imagination that dared to hope that Contact with another civilization was near both in space and in time. As a body, these names truly invoke “all there ever will be to know and understand.”

Table 1: Classical Albedo Names From Ancient Geography

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table01.pdf

Table 2: Classical Albedo Names From Greek

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table02.pdf

Table 3: Classical Albedo Names From Latin

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table03.pdf

Table 4: Classical Albedo Names From Mythology

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table04.pdf

Table 5: Lost Names of Classical Mars From Ancient Geography

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table05.pdf

Table 6: Lost Names of Classical Mars From Greek

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table06.pdf

Table 7: Lost Names of Classical Mars From History

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table07.pdf

Table 8: Lost Names of Classical Mars From Latin

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table08.pdf

Table 9: Lost Names of Classical Mars From Mythology

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table09.pdf

Table 10: Lost Names of Classical Mars (Origin Undetermined)

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table10.pdf

Table 11: Albedo Feature Subtypes From Classical Mars

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table11.pdf

Table 12: Names From Martian Literature

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table12.pdf

Table 13: Fictional Feature Subtypes From Martian Literature

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table13.pdf

Table 14: Scholars of Space Law

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table14.pdf

Table 15: Craters Named for Towns in the Pacific Islands

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table15.pdf

Table 16: Candidate Names for a Tongan Crater

http://www.tongaintlacademy.org/publications/Gangale_Thomas/2013_MartianCartography_Table16.pdf

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