

On Solar System Nomenclature

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Arguments are presented for naming topographic features on other solar system objects after human beings other than astronomers; and to institute a more consistent scheme for Jovian satellite nomenclature.

Because of the great recent advances in space vehicle technology, a range of new features have been uncovered on planetary surfaces, and—following a several centuries-old astronomical tradition—astronomers have been naming them. There has been an understandable but irresistible tendency to name all new features after North American, Western European and Mediterranean astronomers and allusions to classical Western mythology. Some slight tendency to deparochialize these nomenclature schemes was made by the I.A.U. Commission on Martian Nomenclature (de Vaucouleurs *et al.*, 1975) who named a few major Martian craters after biologists, geologists, atmospheric physicists, and science fiction writers concerned with the lore of Mars; and the major sinuous channels on Mars after the name of Mars in a variety of other, largely non-IndoEuropean, languages. At the same time, there has been a trend towards naming lunar craters after human beings other than physicists and astronomers. However, because all of the large lunar craters have been spoken for, the great names in other fields would, if this scheme were adopted, be condemned to lunar craters of insignificant dimensions.

For this reason, I have advocated naming large craters on a crater-rich planet such as Mercury after great poets, authors, composers, and other scholarly or artistic figures who were not physical scientists. If we do not soon adopt this strategy, we will have a situation which undoubtedly will be considered quite bizarre from the perspective of a millenium hence; no features larger than a kilometer or so across will have been named after Shakespeare, Boticelli, Goya, Wren, Khayyam, Dostoyevsky, Mozart, Hammurabi, Dante, Galen, Bach, Vermeer, Homer, Champollion, Hiroshige, Dürer, Sophocles, Chaucer, Holbein, Cervantes, Locke, Leakey, Bacon, Hume, Wittgenstein, Veblen, Aquinas, Tacitus, Spinoza, Melville, William James, Cellini, Michelangelo, Shostakovich, Beethoven, Hiram Bingham, Keats, Aeschylus,

Shelley, Lorca, Leeuwenhoek, Montesquieu, Virgil, Milton, Sibelius, Matisse, Claude Bernard, Mark Twain, Thucydides, Breuil, Bertrand Russell, Rodin, John Donne, Brancusi, Dvorak, Eugene Dubois, William Blake, Rawlinson, T. S. Elliot, Tolstoy, Aristophanes, Stravinsky, van Gogh, Bronislaw Malinowski, Mill, Hals, Picasso, Pavlov, Hippocrates, Freud, Xenophanes, Kafka, Franz Boas, Phidias, Ingres, Ruth Benedict, Euripides, Schliemann, Orozco, Gaudi, Masaccio, Gregor Mendel, Tchaikowsky, Thomas Hunt Morgan, Henry Purcell, Herodotus, Bosch, Rabindrinath Tagore, Leonard Woolley, Guido of Arezzo, Haydn and Goethe, to name just a few. Such a list is necessarily biased by my own education; and many representatives of non-Western cultures could readily be added by others.

I find the argument very curious that these names could not be put on the planets because they are required for features one hundred meters or so in size on the Moon. Such lunar features are so small that they will occur only on the highest resolution maps; and never on globes and low resolution maps that will appear in school books and popular atlases. If we instead name features on Mercury after birds, say, we will have left the impression that we esteem birds highly, that we cherish the memory of scientists close to our own discipline, but that we care little or nothing for the greatest poets, musicians, historians, anthropologists, sculptors, archeologists, philosophers, and painters in human history. I cannot believe that this is the intention of anyone who views the nomenclature problem from a long perspective. Were there no human beings commemorated on the Moon, Mars and other places, there might be a tolerable case for naming features on each planet after a different phylum, family, genus or other biological taxon, or some quite different category; but since human beings have already been commemorated, it is important to make sure that the end result will be a nonprovincial distribution of

nationalities, epochs, and occupations—a distribution that our great-grandchildren can be proud of. It is just conceivable that some of them will be living on the places under discussion.

The Galilean satellites are named for four lovers or consorts of Zeus in Greek mythology. A recent recommendation to the I.A.U. Executive Committee by the Working Group for Planetary Nomenclature has proposed a set of names for Jupiter V-XIII (Marsden, 1975). A comparison of the old unofficial and proposed new nomenclature is given in the accompanying table. I was happy to see that the Jovian system nomenclature group had intended to continue the tradition of naming satellites after close friends of Zeus. The name Amalthea for Jupiter V actually does not follow this tradition since Amalthea was the goat which suckled the infant Zeus. But I suppose this is close enough to a love relation for an infant. Likewise, Leda was a prominent consort of Zeus in Greek mythology and seems quite appropriate. However, the names for Jupiter VI through XII do not seem to fit this scheme. They are in all cases obscure in Greek mythology, and some were not lovers of Zeus at all. Ananke, in fact, is (according to Plato in *The Republic*) the mother of the Fates, placed in judgment over the Olympian gods. As an index of obscurity, Karne, Himalia, Elara, Lysithea, and Carme cannot even be found listed in the latest edition of *Encyclopaedia Britannica*.

What I have found most surprising (as do academic classicists with whom I have discussed the problem) is that the most prominent remaining consorts of Zeus are not commemorated at all. These are: Maia, the mother of Hermes; Leto, the mother of Apollo and Artemis; Semele, the mother of Dionysius (Bacchus); Demeter, the mother of Persephone; Alcmene, the mother of Hercules; and, of course, Hera, Zeus' chief wife and the mother of Ares and Hephaestus. It would be an ultimate irony in Greek mythology if Hera, the wife so often scorned by Zeus, were not to be represented at all in the Jovian satellite nomenclature. In this respect the names of Column 2, Table I are slightly preferable to the I.A.U. Committee's. The idea of separating via nomenclature those satellites in direct orbits from those in retrograde

TABLE I
PROPOSED JOVIAN SATELLITE NOMENCLATURE

Satellite	Unofficial previous name	Proposed I.A.U. committee name	Alternative name suggested here
J V	Amalthea	Amalthea	Amalthea
VI	Hestia	Himalia	Maia
VII	Hera	Elara	Hera
VIII	Poseidon	Pasiphae	Alcmene
IX	Hades	Sinope	Leto
X	Demeter	Lysithea	Demeter
XI	Pan	Carme	Semele
XII	—	Anake	Danae
XIII	—	Leda	Leda
XIV	—	—	—

orbits is a nice one, but not at the risk of losing the unifying idea of Jupiter satellite nomenclature. In any case, Hera and Semele could be accommodated even to such a scheme. As a suggestion, I have listed in the last column of Table I a proposed solution which utilizes proposals from both previous lists but which consistently maintains the tradition of naming Jovian satellites after prominent consorts. If any of them are unsuitable, additional possibilities include Latona, Aegina, Pasiphae, Themis, Metis and Eurynome.

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REFERENCES

- DE VAUCOULEURS, G., BLUNCK, J., DAVIES, M., DOLLEUS, A., KOVAL, I. K., KUIPER, G. P., MASURSKY, H., MIYAMOTO, S., MOROZ, V. I., SAGAN, C., AND SMITH, B. (1975). The new Martian nomenclature of the International Astronomical Union. *Icarus* **26**, 85-98.
MARSDEN, B. G. (1975). Satellites of Jupiter. *I.A.U. Circular No. 2846*.