

letters

look into and for establishing certain overall impressions of times and events gone by, they are seldom, if ever, to be relied upon to establish particular facts or even interpretations of facts. The reconstruction of the history of science must ultimately rely as much on the data of the contemporary documents of history as the conclusions of the research physicist must conform to the "stubborn and brute facts" of nature.

References

1. Max Born, ed., Irene Born, trans., *The Born-Einstein Letters*, Walker, New York (1971).
2. W. Elsasser, "Bermerkungen zur Quantenmechanik Freier Elektronen," *Naturwiss.*, 13 (14 Aug. 1975), 711.

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2/16/78

Empty space in the galaxy?

In an admirable article on the 18th-century physicist J. H. Lambert that appeared in September (page 25), Stanley L. Jaki writes that Lambert "pictures the Milky Way as a disk composed of a large number of stellar systems, with an empty space in its central region," and speaks of Lambert's "ring-like model of the Milky Way."

The evidence for this supposed empty space rests, I believe, on the phrase 'inner Diameter' in Letter XIV of Lambert's *Cosmological Letters*. In this letter the author discusses the relationship between our star cluster and the other clusters that make up the Milky Way system, and in my opinion the phrase refers to the extent of the empty space immediately surrounding our cluster, before one comes to neighboring clusters. But even if Jaki is right in his interpretation, still the "inner diameter" of the Milky Way is no more than the space separating our cluster from its nearest neighbors (1500 Sirius-distances), so that the center of the Milky Way—far from being empty—is as packed with clusters as the rest of the Milky Way.

I develop this theme in a review of Jaki's translation of *Cosmological Letters*, to appear in the June issue of *Journal for the History of Astronomy*.

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THE AUTHOR REPLIES: That the center, or central area of the Milky Way, as conceived by Lambert, cannot be as densely packed with star clusters as are its more outlying parts is a consequence of the kind of hierarchical organization that he attributes to the world-edifice. As illus-

trated by a diagram in my article, in such an organization the distribution of no unit (be it a cluster, or local system of stars, which on the hierarchical ladder is four to six times subordinate to the Milky Way according to Lambert's speculations) is homogeneous. The chief reason for this is the increasingly more enormous mass of higher ranking central bodies (reagents), a circumstance which entails optical and gravitational consequences set forth by Lambert himself. A "ring" may not be the best word for conveying this situation, but is possibly no more inappropriate than the expression, "a disk with a large hole in its center." Only such a hole would justify the use of the term "inner diameter." It may also be of interest that the idea of a homogeneous distribution of stars throughout the Milky Way, including its central part, was advocated by Soldner in 1800 as he advanced arguments relating to gravitation against Lambert's idea of a central body in the Milky Way. Concerning this latter point, see my articles on Soldner's calculation in 1801 of the bending of light around a celestial body forthcoming in *Sky and Telescope* and in *Foundations of Physics*, a calculation to which he was led by considerations relating to Lambert's cosmology.

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RMP reviews

I wish to comment on a revision in the format of *Reviews of Modern Physics*. At present, this publication consists of selected, rather lengthy, comprehensive reviews, which are intended for those wishing to delve deeply into the particular field under examination. Part of the purpose of a physics review journal should be to inform the physics community continually of the relatively new advances and approaches in the many subdisciplines of physics. A single issue of such a journal should entail several short articles, each approximately five pages long, in various physics sub-fields, either instead of or in addition to the present format of fewer, longer reviews. These reviews would be technical, more so than articles published in *PHYSICS TODAY*, but both more convenient and thought-provoking for the general readership than, say, the various sections of *Physical Review*. The nature of the contributions to such a journal would be similar to those in *Accounts of Chemical Research*, published by the American Chemical Society.

The present format of the *Reviews of Modern Physics* does not accomplish its stated purpose. There does appear to be a need to make such shortened reviews available to the physics community. This could probably be best accomplished the

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