**Shapley’s Scientific Record**

In 1920 a debate on “The Scale of the Universe” took place between two astronomers, the older and respected Heber D. Curtis, and the young and ambitious, but little known, Harlow Shapley.[(1)](http://www.varchive.org/ce/shapley.htm" \l "f_1) Curtis argued that the many spirals and nebulae visible through telescopes are galaxies or universes outside the Milky Way, which with its billions of stars is but another nebula to a viewer from a distant galaxy. Shapley argued that the solar system is located in an off-center position in the Milky Way, but that the Milky Way is the only galaxy in the entire universe, the spirals and nebulae being some nebular formations on its periphery.

A. Pannekoek described the position taken by these two astronomers in this way:

Curtis held that they [spiral nebulae] were ‘island universes’, separate stellar systems outside and comparable to the galactic system. . . . Shapley on the other hand, pointing to the accumulation of the spirals at the galactic poles, considered them not as distant galaxies but as belonging to our galactic system, itself regarded as larger, a ‘continent universe’. The fact that no stars were visible in these not very distant nebulae, though the spectrum was continuous, he ascribed to strongly scattering nebulous matter within them; and he held as a tentative hypothesis that the ‘spirals’ are not composed of typical stars at all but are truly ‘nebulous objects’. His chief argument, however—their accumulation at the poles and their absence in the Milky Way—lost its validity when it was found to be only an appearance produced by the absorption in the galactic plane.[(2)](http://www.varchive.org/ce/shapley.htm" \l "f_2)

It is known today that there are many billions of galaxies in the Universe, not just the one galaxy of the Milky Way, as Shapley argued. He also grossly overestimated the size of the Milky Way, assessing it at 100,000 parsecs. “The figure is certainly too large,”[(3)](http://www.varchive.org/ce/shapley.htm" \l "f_3) as Pannekoek notes.

Forty years later Otto Struve concluded an article describing that debate thus:

To summarize the historic debate, I believe it correct to state that our present picture of the universe’s structure is a blend of the ideas of Shapley and Curtis. Shapley had correctly concluded that our solar system is located far from the center of our galaxy, and that the latter is considerably larger than previously believed. Curtis was correct in advocating that the spirals are other Milky Ways, comparable with our own galaxy.[(4)](http://www.varchive.org/ce/shapley.htm" \l "f_4)

This seems to be said with tongue in cheek, because hardly anyone would justly evaluate the outcome of the debate as a draw. Shapley’s claim that there exists only one galaxy, the Milky Way, whereas it is known that billions or hundreds of billions of galaxies like the Milky Way exist, is a much greater deviation from the truth than Curtis’ misjudging of the non-central position of the solar system in the Milky Way. Nevertheless, exploiting the fact that Curtis soon died, Shapley was left to claim the victory for himself and the story was worked up to his having been a second Copernicus: as Copernicus had demonstrated that this world of ours is not in the center of the solar system, so Shapley was said to have demonstrated that our solar system is not located in the center of the galaxy, but more toward the periphery. Several times I read and heard this proclamation being made on Shapley’s behalf. Once it was on television, said so in his presence, and he basked in the halo of a genius before the multitudes of viewers.

The actual picture that emerges from this debate is a far cry from the story familiar from books, articles, radio and television, which repeats the same theme that while Copernicus discovered that the Earth is not in the center of the solar system, Shapley discovered that the Solar System is not positioned in the center of the Milky Way. Such a story gives Shapley credit for a discovery—and victory in the debate—both of which were undeserved.

Not even the claim that the solar system is located off-center in the Milky Way can be credited to Shapley. Immanuel Kant in his *Universal Natural History and Theory of the Heavens* (1755) wrote: “But perhaps it is reserved for future times to discover hereafter the region at least where is to be found the centre of the system of the fixed stars to which our sun belongs. . . .”[(5)](http://www.varchive.org/ce/shapley.htm" \l "f_5)

Kant observed that “the zone of the Milky Way is broadest in the part that lies between the constellations of the Swan and Sagittarius,”[(6)](http://www.varchive.org/ce/shapley.htm" \l "f_6) and offered the surmise that “this will be the side where the place of our sun is nearest the outermost periphery of the circular system.”[(7)](http://www.varchive.org/ce/shapley.htm" \l "f_7)

Moreover, Kant realized that the Milky Way is not the only galaxy. He wrote:

It is far more natural and conceivable to regard them [“nebulous stars” ] as being not such enormous single stars but systems of many stars, whose distance presents them in such a narrow space that the light which is individually imperceptible from each of them, reaches us, on account of their immense multitude, in a uniform pale glimmer. Their analogy with the stellar system in which we find ourselves, their shape, which is just what it ought to be according to our theory, the feebleness of their light which demands a pre-supposed infinite distance: all this is in perfect harmony with the view that these elliptical figures are just universes and, so to speak, Milky Ways . . . .[(8)](http://www.varchive.org/ce/shapley.htm" \l "f_8)

Kant cited as a source for some of these views Mr. Wright of Durham, an Englishman.

As for Shapley, in the years following his debate with Curtis, he did not produce any work of importance, and this was also pointed out in the literature. Forty-five years later he persistently claimed this great “discovery” as his own accomplishment and triumph.[(9)](http://www.varchive.org/ce/shapley.htm" \l "f_9)

**References**

1. Their papers were published in *Bulletin of the National Research Council,* Vol. II, pt. 3 (May, 1921), 171-217.
2. *A History of Astronomy* (New York: Interscience Publishers, 1961), p. 485.
3. *Loc. cit.*
4. “A Historic Debate About the Universe,” *Sky and Telescope* (May, 1960), 401.
5. Immanuel Kant, *Universal Natural History and Theory of the Heavens,* New Introduction by Milton K. Munitz (Ann Arbor: University of Michigan Press, 1969), p. 164.
6. *Loc. cit.*
7. *Loc. cit.*
8. *Ibid., p. 63.*
9. [In the last several years astronomers have found that the solar system is not nearly as far from the center of the galaxy as Shapley had estimated.]