Chinese universes

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Citation: Physics Today **25**, 7, 15 (1972); doi: 10.1063/1.3070923
View online: https://doi.org/10.1063/1.3070923
View Table of Contents: https://physicstoday.scitation.org/toc/pto/25/7
Published by the American Institute of Physics

letters

much monitoring was done after bomb tests for the alpha emitters that produce no measurable radiation to gamma detectors—such as unfissioned plutonium from the tests? I do not recall seeing any evaluation of unfissioned plutonium in various assessments of fallout from tests. Were, or are, the hazards from the nuclides, which may be ingested, as important as the hazards from gamma emitters outside the body? If so, despite the difficulty of measurement, should not discussion be directed to these rather than gammas?

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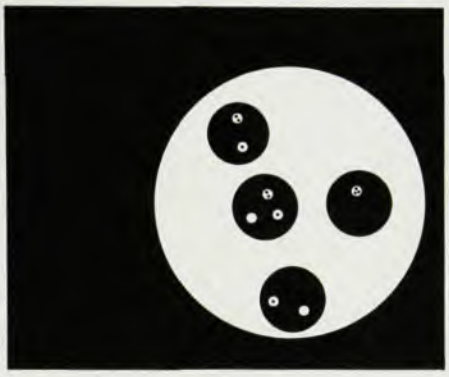
From the unreasonable assumption that change is impossible, Parminedes[1] inferred about 500 BC that the universe had no beginning, in itself a reasonable belief. In fact the notion that the universe came into existence either with a big bang or with a whimper might one day seem as absurd as that the earth rests on an elephant that stands on a tortoise. Any evidence that the universe had a beginning can be more reasonably interpreted by saying that some cataclysmic event occurred, perhaps some ten billion years ago, which completely transformed the observable universe. The speculative theory that I shall put forward is of this form.

According to General Relativity, a heavy enough body of given size cannot be communicated with from outside and becomes a "black hole" or "Schwarzschild singularity." I shall argue here that the whole of our *observable* universe is probably a black hole. For, on the assumption of continual creation, a galaxy eventually becomes so heavy that it collapses into a black hole, so, in infinite time, we are *certain* to be in a hole (with *physical* probability one). Therein the density of matter should be almost infinite, and this provides a feasible explanation for Dirac's concept of an ether of infinite negative density in which ordinary elementary particles are very small holes.[2] These small holes might be formed by a process of continual destruction, which can also be regarded as a process of continual creation of negative matter (not antimatter). The notion that there is continual destruction as well as continual creation is a familiar one especially emphasized by Reginald Kapp.[3] The expansion of the observable universe can be ascribed to the creation of more of the "ether" in Dirac's sense. Since, in this theory, the ether consists of tightly packed particles, the creation of new particles forces the expansion of the black hole. This black hole is embedded in a universe in which the ether again consists of tightly packed particles, but of the oppostie sign, and this larger universe can be regarded as a "white hole" in a yet larger universe. The "big-bang" origin of the "universe" is here interpreted as the transition of a heavy galaxy into a black (or white) hole within a larger universe. It even follows by this argument, with physical probability one, that we are inside an infinite sequence of holes, one within the other, like carved Chinese spheres, consisting alternately of ivory and ebony as depicted in the diagram. The notion



that an *elementary particle* might be a universe, combined with the notion of infinitely nested universes, is an old science-fiction idea. But the present theory interprets collapsed galaxies, *not* elementary particles, as subuniverses, and it is intended to resolve the conflict between the big-bang and steady-state theories of the origin of the universe. Although the theory seems grandiose, as far as I can see it is the only possible consistent interpretation of the steady-state concept, and it is not purely speculative since it gives a reasonable explanation for Dirac's "ether."

References

1. F. N. Magill (editor), *Masterpieces of World Philosophy*, George Allen and Unwin, London, (1963) pages 16–22.
2. P. A. M. Dirac, *The Principles of Quantum Mechanics* (3rd ed.), Oxford, U. P., Oxford (1947), page 273.
3. Reginald O. Kapp, *Towards a Unified Cosmology*, Humanities Press, New York, (1960).

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Correction

May, page 75, column 2—Mildred S. Dresselhaus was not appointed head, but rather associate head of the department of electrical engineering at Massachusetts Institute of Technology for electrical science and engineering. □