

CATASTROPHISM VERSUS UNIFORMITARIANISM

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Theories concerning the origin of the earth can be divided into two groups—those of the cataclysmic or catastrophic class, and those of the uniformitarian class. Cataclysmists ascribe the present state of the universe to sudden and abrupt events, stupendous and violent dislocations. Those of the uniformitarian school believe that the present is a key to the past—that the world came to its present form by a series of events, by processes which are still going on incessantly.

An example of the former class is Buffon's theory (1749) that the planets resulted from the collision of a comet with the sun. This collision sent up great spatters of gas from the sun, which later condensed into planets. The "hypothesis of dynamic encounter" of Chamberlin and Moulton (1905) was also a cataclysmic theory. It assumed that our sun was once without planets. Another sun happened to pass very near. The two bodies swung around each other and separated again, but the gravitational force of the second sun pulled off large quantities of matter from our sun. Some of this matter probably continued off into space while some of it fell back into the sun. But part of it formed planets which, under the combined forces of inertia and attraction to the sun, continued to circulate around the sun in elliptical orbits. The tidal theory of Jeans and Jeffreys (1916) is similar in some respects. Other theories require a binary sun to start with (i.e., our sun had a companion sun, and the two suns revolved around each other. These pairs of suns are not uncommon in the universe). The planets resulted from the approach of a third sun near enough to the sun's companion that its gravitational force pulled off material to form the planets and sent the companion sun off into space.

An example of the uniformitarian class of theories is the Nebular Hypothesis proposed by Kant (1755) and developed by Laplace (1796). This theory presupposes a slowly rotating mass (or nebula) of gas and dust which gradually cooled and contracted because of its own gravitation. This contraction resulted in an increased rate of rotation until centrifugal force overcame gravity and a ring of matter became detached at its equator. As the central mass continued to shrink it produced several rings, each of which

somehow collected into a single body or planet, while the remaining central mass formed the sun.

Swedenborg's theory of creation, as expounded in his *Principia*, clearly puts him among the uniformitarians. "Originally there was a universal chaotic condition common to the sun and planets in which the origins of all things were latent [i.e., the material out of which the sun and planets were to be formed was in a chaotic condition. M. H.], and which by various changes, contingents, and infinite modes ultimately produced a long and multiplex series; that is to say, series which filled and adorned this globe of land and water with elements and minerals of the most diversified natures, and also with trees and living things" (*Principia*, Part III, Ch. iv). In Swedenborg's theory planets resulted from the breaking up of a crust which had formed around the primitive sun. This breaking up might appear to be a cataclysmic event when viewed as an isolated phenomenon, but it was the consequence of a long series of developments beginning with the first natural point. Each step was a direct result of the preceding step. Each followed in an orderly progression toward the goal of the creation of planets on which men could live. Since this was the case, the creation of planets in *our* solar system was by no means a unique or even a random phenomenon. The same causes were, and still are, operating toward the same ends throughout the universe, producing suns and planets from these suns in a uniform manner. "The world subsists by the same series by which it exists. . . . If effects are to continue, so must causes. . . . In each elementary particle we see the whole process of its creation evident and manifest, resembling the world, both as it exists and subsists; that is to say, in every particle nature may contemplate her first and her intermediate destinations" (*Principia*, Part III, Ch. ii: 2). "Our own first principles must continue their chain of connection down to the lowest and last things of earth" (*Principia*, Part III, Ch. iii).

Now regardless of whether or not we accept the details of Swedenborg's *Principia* theory of creation, it seems evident that we who believe in the doctrines of the New Church must at least ally ourselves with the uniformitarians. We must believe that creation has followed and is following laws of order. We know that the end and purpose of creation is that there may be a heaven from the human race. Planets with their suns are a means to this end.

Thus the birth of planets must be an integral part of the plan of creation, not a cataclysmic accident resulting from some star or comet flying around at random and happening by chance to come near a sun.

It could be argued that God uses instrumental causes to achieve His ends, and that perhaps stray comets or stars might be used as instruments in the creation of planets. However, in view of the fact that scientists are not agreed even as to any general theory concerning the origin of planets (each theory does not satisfy mathematical or physical laws in some respects), we may as well incline toward those theories that seem to show order and purposefulness in the universe rather than toward those that depend on what appear to be freaks and accidents for the achievement of God's will.

"The philosopher naturally embraces the opinion which seems to him to be the most agreeable to reason, the most resembling visible nature, and which presents the least difficulties. . . . The mind naturally chooses the least difficult path, which it pursues like a traveller in the dark who gropes his way in the direction in which he meets with fewest obstacles" (*Principia*, Part III, Ch. iv).

SOME ASPECTS OF MODERN SCIENCE

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As some of you know, people able in other respects to do so are having difficulty in finding the time to make the studies required to produce articles for the *NEW PHILOSOPHY*. Yet it can hardly be maintained that either the potential writer or readers are not interested. Within the last two weeks several people have come to me with articles from newspapers and magazines indicating a considerable popular interest in activities going on behind the scenes in science. This is not only an interest in applications of science on every hand but in deeper things that affect the philosophical approach to science.

Specific questions have had to do with the nature of space and time, and what science really teaches about the existence of the ether. Articles referred to are "Science in Review—New Discovery in Physics Promises Light on the Great Paradox of the Cos-