

2. *Barker On Simplicity in Historical Geology*

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In the literature of the philosophy of science the principle of simplicity is usually analyzed by reference to examples taken from mathematics and the abstract physical sciences. Thus Mario Bunge, in the *Panel Discussion of Simplicity of Scientific Theories*, which was conducted at the 1960 meetings of the American Association for the Advancement of Science in New York City, chose four of his six basic examples from physics and astrophysics. These were the Copernican and Ptolemaic theories, the gravitational theory of Einstein and others, the beta-decay theory, and Newton's and Hamilton's formulation of dynamics.² At this same symposium, however, Stephen Barker broke with tradition and selected a geological example upon which to base his analysis of simplicity.³

"During the 19th Century," Barker states, "people had examined geologic strata beneath the surface of the earth and there had found fossils of plants and animals of kinds not now living. . . . What hypothesis should we invoke as an explanation of these findings?"⁴

Remaining in the mental climate of the early 19th Century, two hypothesis are proposed for consideration. The first, a scientific one, states that the fossils are remains of organisms. "This hypothesis provides a possible explanation, which makes a great many seemingly disparate facts fit together into a connected pattern."⁵ The second hypothesis, metaphysical in nature, is that the fossils are artifacts of the Creator. "This hypothesis is also perfectly consistent with the observed facts, even though it is a queerer hypothesis. Moreover, this hypothesis enables us to make predictions which we can verify."⁶

Barker maintains that the second hypothesis cannot be disregarded simply because of its supernatural aspects. "Although not a scienti-

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² Bunge, M., 1961, The weight of simplicity in the construction and assaying of scientific theories: *Philosophy of Science*, vol. 28, pp. 120-149.

³ Barker, S., 1961, On simplicity in empirical hypothesis: *Philosophy of Science*, vol. 28, pp. 162-171.

⁴ *Ibid.*, p. 164.

⁵ *Ibid.*

⁶ *Ibid.*, p. 165.

fically acceptable hypothesis, this hypothesis of creation may have distinct implications about the power of prayer, the resurrection of the dead and the Second Coming."⁷ It would be improper, he asserts, to make a choice between the two hypothesis solely on the basis of agreement with the observed facts. But with the aid of the principle of simplicity, the scientific hypothesis may be preferred above the supernatural one. The kind of simplicity involved cannot be expressed in mathematical terms, but the scientific hypothesis is simpler since "the overall picture of the earth's history it gives is smoother and less extravagant."⁸ Because no Being of extraordinary powers has been directly responsible for any phenomenon directly observable by 19th Century man, and because there is no other independent evidence to favor the intervention of such a Being, "we obtain a simpler theory of history by supposing that there have existed and acted in the past only causes more or less similar to what we now observe in the world about us. Here the hypothesis which in the light of the total evidence is the simpler would be the hypothesis which would be more reasonable to accept."⁹

Has Barker's criterion of simplicity been employed previously by geologists? His statement to the effect that the overall picture of the earth's history provided by the scientific hypothesis is smoother and less extravagant, does indeed bring to mind the doctrine of uniformitarianism as advocated by Charles Lyell. Lyell believed that all former changes of the organic and inorganic creation are referable to one uninterrupted succession of physical events, governed by the laws of nature now in operation.¹⁰ Moreover, he thought that the forces formerly employed to remodel the crust of the earth were the same in kind and energy as those now acting.¹¹

Is uniformitarianism, then, the principle of simplicity applied to geologic causes? Hooykaas evidently believed so when he wrote:

The principle of uniformity is not a law, not a rule established after the comparison of facts, but a methodological principle, preceding the observation of facts. It is the logical principle of parsimony of causes and of economy of scientific notions. By explaining past changes by analogy with present

⁷ Ibid.

⁸ Ibid.

⁹ Ibid. However, Barker's criterion appears not to correspond with any of Rudner's classifications of simplicity. See R. S. Rudner, 1961, *An Introduction to simplicity: Philosophy of Science*, vol. 28, pp. 109-112.

¹⁰ Lyell, C., 1837, *Principles of Geology*: Philadelphia, James Kay, vol. I, p. 148.

¹¹ Ibid., vol. I, p. xi.

phenomena, a limit is set to conjecture, for there is only one way in which two things are equal, but there are an infinity of ways in which they could be supposed different.¹²

But, if uniformity is a corollary of simplicity, how is it that staunch advocates of simplicity disparage the postulate of uniformity? Thus Nelson Goodman, who believes that simplicity is a fundamental principle of science, has nothing good to say for the principle of uniformity of Nature.

A typical writer agrees that to justify predictions we need some resounding universal law of uniformity of Nature and hence assumes one or goes on to devise some subtle justification for it. This easier course of accepting an unsubstantiated and even dubious assumption much more sweeping than any actual predictions we make, seems an odd and expensive way of justifying them.¹³

If Lyellian uniformitarianism is a species of simplicity, how is it to be classified according to the scheme introduced by Rudner and others? If it be a kind of notational simplicity, does it not then become trivial?

¹² Hooykaas, R., 1959, *Natural Law and Divine Miracle*: Leiden, E. J. Brill, p. 38.

¹³ Goodman, N., 1955, *Fact, Fiction and Forecast*: Cambridge, Harvard Univ. Press, p. 65.