

Evolution, its critics and the historical development of science

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It has been a pleasure to read in the Newsbulletin the thoughtful and well written responses and counter responses engendered by Philip Johnson's Laboratory talk criticizing naturalism and evolution. However, some of the questions raised particularly those concerning naturalism and whether the talk was antiscientific transcend evolution and require, for adequate answers, consideration of the basic nature of the, whole scientific enterprise. Such discussion and such debate are in the intellectual tradition going back at least 2,500 years, yet remain germane to the policy decisions of a contemporary scientific laboratory. The historical provenance of science as well as what its goals have been and still are today are matters we should be dear on.

Before attempting to clarify these issues by putting modern science in its historical context, I would like to comment briefly on the chief criticisms of evolution raised by John Baumgardner (Feb. 10 Newsbulletin). Regrettably, the complexity of these issues precludes adequate discussion here, so I will just say that the three weaknesses he perceives the present absence of real understanding of the origin of life from nonlife, the development of novel structures and functions, and the incompleteness of the fossil record are much overstated by him; he ignores the "big picture" that makes evolution so uniquely powerful. For the principle of biological evolution is unique in the generality, scope and coherence of its explanatory power. Most of biology and much of several related sciences would make no overall sense without this overarching concept.

He also ignores DNA sequence mapping, which is not only a powerful new tool but actually constitutes a new dimension of evolutionary understanding. This new window on the past is affording deeper understanding of the very incompletenesses pointed to by Baumgardner. It also independently corroborates the fossil record and allows interpolation across some of the gaps in the post Cambrian record. Many of these new results probe surprisingly deep into the development of novel structures in the distant past and demonstrate an impressive conservatism in genome sequences. For an

authoritative and readable commentary on these exciting developments, see Stephen Jay Gould's article in *Natural History*, Dec. 1994, pages 10 through 20; also March 1995, pages 10 through 15.

Baumgardner also claims "incontrovertible evidence for a Superintelligence" that would direct whatever evolution there might happen to be. A large body of detailed knowledge is now available on a host of interrelated topics (such as embryonic recapitulation and the genome). This body of knowledge, along with that from fossil record branching showing the inordinate number of dead ends compared with the paucity of survivors, overwhelmingly provides evidence against a directing intelligence operative in evolution. One example will have to suffice: During the last quarter century, painstaking microscopic research has mapped the embryonic development at the cell by cell level of the tiny worm *C. elegans*.

Surprisingly, its development particularly that of its nervous system resembles nothing so much as an ad hoc patchwork palimpsest. It appears that certain pathways happened to work long ago, got locked in and were subsequently revised several times by partial genetic overwritings, which result today in an inefficient and wasteful embryogenesis. Similar examples, but usually with less detail, are widespread throughout biology. There is simply no indication of any design or planning or purpose anywhere in evolution.

My key question to Johnson and Baumgardner is this: What could you replace evolution with that would still remain scientific? For reasons I will outline very briefly below, I assert the correct answer has to be "nothing."

To better understand the goals of the enterprise we today call "science," it helps to put the development of science usually called "Natural Philosophy" until nearly the middle of the 19th century into historical perspective. Early on, animistic explanations of all things that move or grow, and many large things that don't, are inhabited by spirits or souls predominated and apparently constituted the basic world view of the known cultures. Later, by 6,000 to 9,000 years ago, this manifold of spirits had begun to condense into a much smaller number of more anthropomorphic ones not always tied to particular animals or objects.

By the time of the pre Platonic Greeks, the spiritual world had further depopulated, and some elements of what we would now call "naturalism" explaining natural phenomena in terms of other natural phenomena were beginning to appear. However, these were mostly confined to the practical arts without affecting the dominant supernatural world view much. Thus, most

people most of the time, whether ancient or contemporary, have always explained occurrences and phenomena over which they have little or no control in terms of the actions of supernatural agents.

Hence, viewed broadly over historical time and space, the world views and explanatory modes have been supernaturalistic, though of course varying in particulars from one locus to another. Then, half a millennium ago, into what might be thought of as a vast sea of supernaturalism, an island of thoroughly rational naturalism began slowly upthrusting. Such an island enduring, prevailing and growing apace was unique to all of human history. To be sure, most of the early natural philosophers kept their close ties to the sea, even as they were building and growing their island of naturalism, but this is understandable given the quite limited range of human experience that could be explained by early naturalism.

Over time, more and more land was reclaimed from the surrounding sea and the inhabitants of the island continent tended to become more independent of the surround. But, even today, there are still bothersome inlets and channels, the biggest of which we call Mind and Consciousness. An assault on this last bastion of the pervasive sea is now beginning, and already testable working hypotheses have been framed. Thus the early 21st century bids fair to see the beginning of a new science that I have elsewhere dubbed "experimental philosophy."

Given its history, it's dear that science quo science cannot allow even one supernatural explanation of natural phenomena it would then have to be called something quite different (Natural Theology?). Far worse yet, supernatural explanations, which are inherently untestable yet capable of rationalizing absolutely anything and everything, are supremely easy to concoct a child can do a couple while you wait and therefore would multiply like viruses and quickly kill science.

Thus, it's quite dear that Johnson and Baumgardner, both of whom advocate replacing naturalistic evolution with a supernatural explanation, are antiscientific in this crucial respect.