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FECHNER ON THE ORIGIN OF LIFE

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ABSTRACT

While Gustav Fechner is known for his many contributions to psychophysics and metaphysics, one of his lesser-known works is Some Ideas on the Origin and Evolutionary History of Organisms, in which he discusses his views on evolution and the relationship between the organic and inorganic. The paper discusses Fechner's differences with Darwinism and some of his conflicts with biologists.

FECHNER ON THE ORIGIN OF LIFE

Gustav Theodor Fechner (1801-1877) had an eclectic career. Beginning his professional life as a physicist-chemist, he went through semi-retirement to a period of metaphysical interests, eventually producing an integration of observation and commentary on the momentous events taking place in his world. As he entered the last decade and a half of his life, he developed a mature perspective which provides us with a fuller measure of his intellectual depth. Aside from the establishment of psychophysics, his best known work is the Dayview (1879), designed to synthesize the arguments of his metaphysics; but nearly as well known is the Introduction to Aesthetics (1876). Considerably less known is the small (108 pages), but very significant work, Some Ideas on the Origin and Evolutionary History of Organisms (1873), which contains Fechner's reactions to some of his principal questions about the "pure" science of his day. The reading of this volume provides a perspective of Fechner, the scientist, that has been in the shadows for too long.

THE CONFLICT WITH SCHLEIDEN

Much of common perception regarding Fechner and biology is based on an unfortunate exchange with M. J. Schleiden (1804-1861), an eminent botanist and co-founder of the cell theory. Coincident with recovery of his sight, Fechner received a "revelation" about the "inner light" of plants. Never shy about communicating his ideas, he produced the well-known Nanna (1848). When Schleiden read this book, he was incensed and wrote a scathing attack on Fechner's understanding of plants (1855). The sad part, as I have pointed out elsewhere (Fitzpatrick, in press), is that he completely misread the book. It was intended to be metaphysical, not botanical.

However, an examination of Fechner's life, career, and attitudes in viewing the world--especially as seen in his more mature writings--strongly contradicts the idea that he was only a "metaphysical dreamer." Although the relationship between subjective and objective reality was the underlying thesis of all of Fechner's work, he always remained a scientist, dedicated to the value of empirical data.

Despite contrary current popular attitudes, accurately expressed by Robinson (1983), Fechner was quite capable of unemotional, analytical evaluation of empirical data when they were convincingly presented. This is illustrated by his total acceptance of the atomic theory of matter (1855), a progressive position not shared by many of the "leading scientists" of his day. He came solidly into agreement with the atomic concept, rejecting Idealism and putting aside his own philosophical inclinations.

What then, was Nanna? And what was the crux of the Fechner-Schleiden exchange? The book was an attempt to find the fundamental truth or truths by which the universe operates. Fechner did not believe it possible to separate "science" from its philosophical underpinnings, and he was not alone. Even today, two leading scholars with unimpeachable scientific credentials write, "We therefore cannot accept the view that philosophy must (or can) be excluded from science" (Levins & Lewontin, 1985, p. 165). Eventually he offered in Some Ideas his concept of the unifying thesis in what he called the "Principle of the Tendency toward Stability" (pp. 25-35), which he argued connects casual and teleological principles. Although the use of teleology in a scientific argument has repeatedly served as an excuse to refute that argument, Nagel (1979, especially pp. 49-63, 275-316) presented cogent arguments to support its use as we try to convey explanations (as distinguished from statements by him) of the fundamental roles of biological phenomena. So even here, Fechner is not as digressive as many would believe.

Fechner's reply to Schleiden (1856) was stinging and satirical. The latter technique was probably a mistake, for it allowed detractors to dismiss the strength of his rebuttal. He defined his terms differently than did Schleiden, and proceeded to demonstrate that Nanna was an exercise in metaphysics and theism.

FECHNER AND DARWINISM

As the exchange with Schleiden was occurring, a revolution was sweeping Europe from across the North Sea. In 1859 Darwin published The Origin of Species, and the biological world heaved. On the continent, France, despite heavy commitment to Cuver's catastrophism, held differing views--such as those of Lamarck (1744-1829)--and better absorbed the

shock (Stebbins, 1974). In Germany it was a different story. Naturphilosophie and Idealism (the group with which Fechner is most closely allied) were strong, especially among the older, more established scholars. More significant then than now, this "establishment" united with religious leaders to form an opposition. The situation was further complicated by anti-theistic and anti-Christian attitudes found among many of Darwin's outspoken adherents.

In addition, the word chosen by the proponents of evolution to oppose the teleological Bildungstrieb (creative force) of the Idealists was mechanistisch (mechanistic). People like Heinrich Bronn (1800-1862), who were not theists or spontaneous creationists, were repulsed. The powerful and persuasive voice of Haeckel, among others, was lost. Not anti-evolutionists or uncompromising Idealists, these men sought some unifying plan or force, functioning by purely natural means, to achieve the evolutionary progression of species. Consequently, Bronn wrote a critical afterward to the first German edition of Origin and an uncritical, unabridged German edition was delayed until 1866 (Montgomery, 1974; Mayr, 1982, pp. 387-393).

Fechner's personality was such that he was not reluctant to express his opinions, and he entered the fray with total commitment. There is no doubt he opposed Darwinism. But did he oppose evolution? The words are not necessarily synonyms; the concept of evolution--progressive change over time--is almost as old as history itself, and the modern use with regard to organisms occurred no later than Lamarck's Philosophie zoologique of 1809. Darwin provided a mechanism, "Natural Selection," to explain the process by which "evolution" was accomplished.

The purely mechanistic principles of Darwin's theory created the problem for most German opponents, including Fechner. The "metaphysical" objections to their comments wane in the light of Popper's condemnation of Darwinism as "a metaphysical research programme," "not scientifically testable" (1976, p. 168). Two current schools in opposition to Darwinism, Cladistics and Punctuated Equilibria, are led by outstanding evolutionary scholars (Hennig, 1950; Eldridge & Gould, 1972). Fechner initially questioned Darwin, but accepted change.

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Support of this contention is formed in Some Ideas. As a true scientist, Fechner admitted his initial opposition to Darwin, but facts converted him. His comments begin with a discussion of the relationships between organic and inorganic matter and lead to a statement of his Principle of the Tendency toward Stability. He took issue with the principle of isolation as used by many

Darwinists and was not far from recognizing the lack of creativity in Natural Selection; evolution can work only on what already exists.

Then, in a culmination of his biological ideas he wrote:

> This dense mess of [primordial] slime was interconnected from the beginning. By the first living contraction of this, however, the inorganic substance was excreted, and because the contractions of the mass occurred on an irregular basis due to the local differences of the inner constitution of that mass and because regularly different external conditions were added, the entire organic mass split and differentiated itself into larger and smaller creatures, which in turn split and differentiated themselves still further. And these remained in the form of shelled animals, corals, plants or the forbearers of such organisms. They remained tied in a closer or less close manner with the previously excreted inorganic matter, and they found supplemental conditions according to the Principle of Relative Differentiation. Each creature, thus, was related to the other parts of the inorganic realm. (1873, pp. 86-87)

This is hardly the statement of an anti-evolutionist or an opponent of the principle of adaptation. He saw the importance of developing an origin for life from molecules of primordial solutions, beginning and developing as a result of differences of the several environments.

In summary, despite idiosyncracy and frequent error, Fechner can be judged favorably, especially when one considers the paucity of knowledge available to him: organic chemistry was in its infancy, genetics appeared 13 years after his death, etc. In short, Fechner's mind was one of great versatility and incipient genius. He has left us a lode of material which can be mined for a better understanding of how an exceptional and original mind operates--a fitting legacy for a founder of modern psychology.

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