Darwin's Thinking Reexamined

The Development of Darwin's Theory. Natural History, Natural Theology, and Natural Selection, 1838–1859. Dov OSPOVAT. Cambridge University Press, New York, 1981. xii, 302 pp. $39.50.

Dov Ospovat was a member of the group of younger historians of science making use of Darwin's unpublished papers to reconstruct the development of the selection theory. This book completes his reinterpretation of that development, and its originality is an indication of the loss that his untimely death represents to the academic community. Its purpose is to argue that, contrary to popular belief, Darwin's theory underwent a radical change between its first formulation in the late 1830's and its eventual publication in the *Origin of Species*. Furthermore, this change is correlated with a parallel development taking place in the general biology of the time, showing that Darwin was anything but a scientific recluse.

Ospovat begins by defining what he calls the "teleological" approach to nature characteristic of the first quarter of the 19th century, according to which each species is perfectly adapted to its environment, and this fact is sufficient to explain its entire structure. Cuvier and the British followers of Paley's natural theology all accepted this view and used it to explain the sequence of fossil populations in terms of changing geological conditions. Ospovat argues that the original form of Darwin's selection theory (including that of the 1844 essay) retained a strong element of this philosophy. It still presented species as perfectly adapted and assumed that in this state there was little individual variation. Selection took place only when geological forces produced a change in the physical environment, thus stimulating variation. Natural selection was an episodic process, called in from time to time so that the species could adjust to changes in its environment. Darwin still believed that the process was part of an overall divine plan.

In the second quarter of the century, a number of biologists began to argue that development could not be explained in terms of adaptation but that the laws of growth first expounded in K. E. von Baer's embryology must be taken into account. Henri Milne Edwards, W. B. Carpenter, and Richard Owen all suggested that classification should be based on the degree to which the individual embryo differentiates itself from the archetypical form, thus explaining the "unity of type" by means of the laws of development. Owen and Carpenter went on in the 1850's to show that a corresponding process of branching and specialization could be observed in the fossil record. Historians have been aware of this movement for some time, but Ospovat provides a more detailed description of it and then argues that Darwin himself was forced to adjust his views to the new approach. He now had to turn selection into a theory of development, rather than of adaptation, and he did this by proposing a new explanation of how selection promotes increasing diversity of structure. At the same time, he was forced to recognize that adaptation could be measured only in relative terms and that the constantly changing ecology of an area would require selection to be a continuously operating process. To retain his faith in an overall purpose for the system, Darwin adopted the view that constant specialization is a sign of progress, thus linking his theory more closely with the progressionist philosophy than most historians have realized.

Others have noted Darwin's concern for theological issues, but Ospovat gives this approach some real substance by using it to explain the significance of perfect adaptation and progress. His account of the changes within the selection theory will, in any case, force many historians of evolutionism to rethink their positions. By demonstrating how Darwin was influenced by contemporary developments in natural history, Ospovat has shown that Darwinism was, to some extent, part of a more general movement. It has long been recognized that the theory's success depended partly upon its ability to assimilate and reinterpret existing knowledge. Now we can explain this by noting that the final version of the theory was actually shaped by the need to accommodate advances in morphology. On this point, however, a word of caution is necessary. Although Ospovat does suggest that the branching view of development encouraged some naturalists to think in terms of transmutation, he is not really implying that Darwinism was somehow "in the air" at the time. Those who pioneered this viewpoint were still working within the traditional framework of design and thus were unprepared for the radically naturalistic explanation of the process that Darwin had synthesized.

One weakness of Ospovat's approach is its narrow, utilitarian definition of teleology and its exclusive concentration on the move from perfect adaptation to branching development. Up to a point, this could be justified by the fact that it parallels the development of Darwin's own theory, but it does mean that important questions are evaded. Surely, branching represented an even greater challenge to the old, linear concept of development that was von Baer's original target. Ospovat lists Louis Agassiz as one of those who recognized trends in the fossil record, without exploring the significance of the fact that Agassiz retained an interest in the law of parallelism and the old, hierarchical image of development. It was Agassiz's disciples in the "American school" who most successfully resisted the Darwinian view of evolution by retaining the concept of linear development modeled on embryological growth *within* each major branch of the "tree of life." Ernst Haeckel's concept of a progressive ascent through the hierarchy of forms toward man—again based on the recapitulation theory—represents an even more obvious attempt to retain the image of linear development within an evolutionary framework. Darwin himself may have identified specialization with progress, but this was by no means the general feeling of his contemporaries. Ospovat's thesis represents an important advance in our understanding of how Darwinism was created, but it needs to be evaluated more carefully in the light of broader questions concerning the relationship between evolutionism and the hierarchical view of nature in the 19th century. The tragedy is that Ospovat is no longer with us to participate in the discussions his book will stimulate.

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