Biological Interplays

Darwinism and Social Darwinism in Imperial Germany. The Contribution of the Cell Biologist Oscar Hertwig (1849–1922). PAUL JULIAN WEINDLING. Fischer, Stuttgart, 1991 (U.S. distributor, VCH, New York). 355 pp., illus. $115 or DM 148. Forschungen zur neueren Medizin- und Biologiegeschichte, vol. 3.

Darwinism, Mendelism, and the social consequences of biology have been the major fixation of historians of modern biology. Paul Weindling makes contributions on all three themes in this book by focusing on the career of the Berlin cytologist Oscar Hertwig. The work is the first full-scale study in English of Hertwig, who for half a century was regarded as one of the most important and controversial biologists of the day. It is also the first book-length study in any language of Hertwig's scientific contributions and social commentaries since a short hagiographic sketch by Richard Weissenberg, one of Hertwig's students.

Weindling, however, has not written a conventional biography. He is more concerned with scientific concepts and social values than with the full life and career of an individual, and he has found in Hertwig a convenient vehicle for exploring the interplay between the two. He has given us a book that is covertly structured in two parts. The first consists of chapters on Hertwig's notable biological contributions: on his discovery of the union of the nuclei of the egg and spermatozoon in the fertilization process, which led to a nuclear theory of inheritance; on his extensive examination of the germ layer doctrine and the nervous system of medusae with subsequent challenges to Ernst Haeckel's Gastraea theory and notorious biogenetic law; on his plunge into experimental embryology along with Wilhelm Roux and Gustav Born in the early 1880s; and on his reaction to the rediscovery of Mendel after the turn of the century and his exploration of the effects of radiation on adaptive organic change. The second part consists of chapters on Hertwig's institutional trajectory from being one of Haeckel's protégés to becoming a leading professor in Berlin and on Hertwig's social ideology, which remained liberal and engaged at a time when most of the professorate of Wilhelmine Germany turned conservative and politically aloof.

The "sinews of scientific discourse" connecting the two parts consist of Hertwig's conception of the cell. Instead of adopting Haeckel's view that the primal cell was a mass of protoplas and that the egg of each generation recapitulated this hypothesized anucleate mass, Hertwig argued that the whole complex cell—walls, cytoplasm, nucleus, *et al.*—constituted the basic unit of form, function, and organic integration. Hertwig, the argument goes, broke away from the Darwinian tradition, which explained the organism in terms of its history and material composition, and accepted the organism as an integrated polity of cells, each with its individual tasks but all subservient to the requirements of the whole. Hertwig became one of the leading exponents of the organicist philosophy, which, according to Weindling, struck a middle ground between the mechanistic, often reductionistic, Darwinian world view and the vitalistic philosophy of Hans Driesch and Henri Bergson. This organicism "was to form the basis of a distinctive philosophy of the social organism" (p. 137).

This is a challenging book and broadens our picture of turn-of-the-century biology. It emphasizes that the evolutionary and hereditary sciences also influenced the social thought of the time in directions other than those of the often discussed examples of eugenics and racism. Weindling has exploited archival sources throughout Germany and has drawn upon the recollections of Hertwig's daughter Paula Hertwig, who was also a noted biologist.

The book, however, has its faults. It is cumbersome in its exposition of technical material. It is thin in its recognition of developments in biology beyond Hertwig's own accomplishments. One gets the impression, for example, that only Hertwig and the organicist tradition broke from Haeckel's understanding of the cell and evolution, whereas in fact most biologists, including Hertwig's neo-Darwinian opponents, did so. On occasion Weindling mentions Hertwig's brother Richard, who cooperated with Oscar on many projects and in time became an equally influential biologist at the head of an institute in Munich. The intellectual and emotional interaction between them is left unexamined. The two, in fact, provide the historian with an ideal control, for they intimately shared the same education and research program in their early days and yet diverged completely in their biological and social views in later life. Any formative conclusions about one brother may be tested by an extended comparison with the other. Weindling often intimates having uncovered a social construction of scientific ideas, yet his book is a better demonstration of the biological construction of social values. If he intends to indicate a complex interplay between the two, he has not articulated it succinctly. This is a valuable, at times stimulating book for the specialist; it needs to be used with caution by the generalist.

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Vignettes: Rebuttals

It is simply a logical fallacy to go from the observation that science is a social process to the conclusion that the final product, our scientific theories, is what it is because of the social and historical forces acting in this process. A party of mountain climbers may argue over the best path to the peak, and these arguments may be conditioned by the history and social structure of the expedition, but in the end either they find a good path to the peak or they do not, and when they get there they know it.

—*Steven Weinberg*, in *Dreams of a Final Theory* (Pantheon)

Mary Shelley's Dr. Frankenstein, H. G. Wells's Dr. Moreau and Aldous Huxley's *Brave New World* . . . are evidence of a powerfully emotive anti-science movement. Science is dangerous, so the message goes—it dehumanizes; it takes away free will; it is materialistic and arrogant. It removes magic from the world and makes it prosaic. But note where these ideas come from—not from the evidence of history, but from creative artists who have moulded science by their own imagination.

—*Lewis Wolpert*, in *The Unnatural Nature of Science* (Harvard University Press)