

## Book Reviews

Crell's *Annalen* prospered. By 1789, it had attained a circulation of over seven hundred, and Crell had been elected to more than twenty societies. In 1789, German chemists began to accept Lavoisier's antiphlogistic theory, and Hufbauer gives us the first full account of the controversy that divided them during the next four years. By 1793, only a handful were still phlogistians; among them was Crell, who found himself almost excluded from the community he had served so well.

Hufbauer's narrative fills only half the book. The rest contains concise but extremely well-documented and informative biographies of sixty-four chemists and histories of fifty-five institutions. Crell's *Annalen* had more than a hundred subscribers outside Germany, showing that there was a truly international chemical community by the end of the century. This book is therefore recommended to all historians of eighteenth-century chemistry and not merely to those with a special interest in Germany.

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JOHN FARLEY, *Gametes and spores. Ideas about sexual reproduction 1750–1914*, Baltimore, Md., and London, Johns Hopkins University Press, 1982, 8vo, pp. x, 299, £24.50.

Professor Farley has written an absorbing sequel to his earlier *The spontaneous generation controversy from Descartes to Oparin*. In ten closely-referenced chapters he follows the growth of our understanding of sexual reproduction from Linnaeus in the 1750s to Thomas Hunt Morgan's 1913 *Heredity and sex* and Frank Lillie's 1914 paper on fertilization.

It is salutary to look back over the long tide of history and recognize how very difficult it has been to establish what is now taken for granted in every school textbook of biology. John Farley leads us far away from parochial concerns with human sexual reproduction. He shows that the scientific arguments were lost and won on the farther shores of cryptogamic botany and invertebrate zoology. It was through researches on these still somewhat disregarded organisms that our modern understanding of sexual reproduction and its biological significance was ultimately gained. But medical readers should be warned: *Homo sapiens* does not figure largely in this book.

But Farley does more than merely recount the internal history of the discovery of gametes and spores. He also sets the evolving science in its social context. In one of his most interesting chapters, he examines the effect eighteenth- and nineteenth-century social attitudes had on the biological study and interpretation of reproduction. He also follows families of scientific investigators, showing how personal influences spread from laboratory to laboratory and from land to land. He is especially interesting on the spread of the experimental method in botany and how this eventually reached Cambridge in the 1870s, where the science was "moribund in the summer and actually dead in the winter", and also on the complex story of the tardy and patchy take-up of Mendel's work by cytologists and physiologists in the early 1900s.

After reading Farley's book, one is forcibly reminded of Newton's famous observation that if he had seen further than others it was because he had stood upon the shoulders of giants and, perhaps even more forcibly, of his other remark in which he likens himself to a child collecting shells on the beach with the ocean of truth still undiscovered before him. For after leading us through the tangled web of nearly two centuries of research and controversy, after describing the discoveries and mistakes of innumerable investigators, both famous and obscure, Farley ends with a postscript in which he argues that "sex remains almost as complete an enigma today as it was three hundred years ago when Dutch microscopists discovered minute 'animalcules' swimming about in human seminal fluid".

*Gametes and Spores* is a book which widens and deepens one's understanding of contemporary biology as well as recording its history. If the past has anything to teach the present, it is that only painstaking detailed research and controversy are capable of answering the questions that confront us. We still have far to go. Professor Farley has provided us with a book, well referenced, illustrated, and indexed, which will help us on that journey.

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