

## Book Reviews

Medical chemistry must loom large as one of the earliest roots of chemical physiology, or biochemistry. Despite its importance today, chemistry was relegated to the very periphery of medical science until well into the nineteenth century. Analysis of body fluids yielded little of medical value until they could be fitted into a perspective of healthy metabolism. Rather, such information – if seen not only as an attempt to *diagnose* disease but also to *explain* it – could only represent a kind of appendix to pathological anatomy, “put there for the sake of symmetry, a painted window from a false edifice” (Pettenkofer to Liebig, 1849). Ludwig Thudichum, the chemically orientated clinician and founder of the ill-fated *Annals of Chemical Medicine* (1879, 1881), believed that no pathology was possible before a full analysis of all the body tissues in their healthy state had been achieved. His slow, but enormously detailed results, a molecular sieving of the body’s chemistry, were not enthusiastically received. Under attack in 1869, he wrote, “I feel myself in this position, put with an excellent needle-gun to take an armour-clad steam-vessel. Such is the proportion of my means to the problem to be solved.”

In the *History of clinical chemistry*, Professor Büttner has brought together an important collection of eight essays dealing with the subject’s development in the nineteenth and twentieth centuries. All the essays were previously published in the *Journal of Clinical Chemistry and Clinical Biochemistry*. The interplay of clinical chemistry and biochemistry is underlined in an excellent contribution by J. S. Fruton. As well as rewarding pieces on instrumentation and the evolution of clinical enzymology, there are additions to our biographical knowledge in Hans Simmer’s impressive article on Eugen von Gorup-Besanez (1817–1878), and in Büttner’s piece on J. J. von Scherer (1814–1869). Like all stimulating books, this makes one ask new questions, in the light of what one has read. Certainly what is needed now is a comparable account of clinical chemistry in the English and French medical contexts. (The essays confine themselves in the main to the German-speaking countries.) Another question opened up by this volume is the changing inter-relationship between clinical chemistry (chemical pathology) and bacteriology in the crucial decades of the 1880s and 1890s.

The book is a little spoiled by some typographical errors, but a more serious flaw is the lack of a useful index (“pupils of Liebig” under “P” and “contributions to physiological and pathological chemistry” under “C”, are examples of its quaintness).

In his Introduction, Büttner points out the unfortunate consequences for the history of science that flow from picturing “clinical chemistry” as simply a post-war specialization (First International Congress, 1954). I presume that Büttner prefers to see it as a member of what Robert Kohler has called “the timeless, extended family of biochemistries”, which has differentiated itself over time. In any case, Büttner’s aim of stimulating interest in the history of clinical chemistry and related areas will be furthered by this volume.

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KARL HUFBAUER, *The formation of the German chemical community (1720–1795)*, Berkeley, Los Angeles, and London, University of California Press, 1982, 8vo, pp. viii, 312, illus., £34.00 (£12.75 paperback).

Several of the independent states that constituted eighteenth-century Germany had academies or universities where chemistry flourished, particularly in medical faculties. German chemists have received inadequate attention from historians of the period, but Professor Karl Hufbauer now remedies this situation with a remarkable book that is an important contribution to both scientific and social history.

Chemistry received official support because of its utility in medicine and, to a lesser extent, mining and manufacture, and Hufbauer shows that between 1720 and 1780 the number of salaried posts for chemists in medical schools increased from six to twenty-eight. Most professors were doing research and publishing, though their patrons expected them only to teach, and they eventually formed a nationwide community.

In 1778, Lorenz Crell, professor at Helmstedt, realized that he could benefit this community and advance his own career by founding a specialized chemical journal. Under various titles

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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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