A Man of Many Works

Joseph Priestley. Revolutions of the Eighteenth Century. F. W. GIBBS. Doubleday, Garden City, N.Y., 1967. xii + 258 pp., illus. $6.

This short biography is one in a series entitled British Men of Science, under the general editorship of Sir Gavin de Beer. It appeared first in Britain, in 1965, with the slightly different title *Joseph Priestley: Adventurer in Science and Champion of Truth*. The two subtitles are equally unfortunate, and both fail to give an indication of the contents of the book. The author indicates in his preface that he has departed from the general plan of the series in order to give a broad outline of Priestley's multifarious activities in education, religion, politics, and science. This decision to attempt a comprehensive survey of Priestley's life in such a compact format was an unfortunate one. The result is a superficial biography, crowded with a baffling array of minor figures who are introduced with frequently nothing more than the statement that they were acquaintances or correspondents of Priestley. Even more regrettable is the fact that the aspect of Priestley's life which has suffered most from this treatment is the scientific. Chapters on his contributions to electricity, light, physiology, and chemistry are inserted at appropriate chronological points; but little attempt is made to demonstrate the relation of these contributions to his other interests. And yet, as the author points out, Priestley's science was rooted in his religious and political dissent: it provided him with yet another base from which he could attack usurped authority and pretentious posturing in his search for unencumbered truth and the better welfare of mankind.

Priestley's most notable scientific achievement was his contribution to the chemistry of gases: his isolation and researches on the oxides of nitrogen, ammonia, hydrogen chloride, silicon tetrafluoride, sulfur dioxide, and oxygen displayed considerable manipulative resourcefulness and were in large part dependent on his skillful deployment of the pneumatic trough. This systematic exploitation of a new technique, rather than any planned theoretical objective, seems to provide the unifying theme in Priestley's chemical studies. Gibbs, however, devotes little space to the development of the pneumatic trough—he gives sole credit to William Brownrigg—and does not discuss Priestley's refinement of this very important technique. Nor does the reader derive any estimate of Priestley's overall position and importance in the history of chemistry. In spite of the subtitle of the American edition, hardly any space is devoted to Priestley's contribution to Lavoisier's Chemical Revolution; the combustion question is dismissed in a half-page section entitled "Phlogiston." Interestingly, however, we learn that the French gave Priestley chief credit for their preeminence in the art of ballooning. The author throws some oblique light on the question of why Priestley so combatively adhered to the phlogiston theory until his death in 1804—a seemingly uncomfortable posture for a revolutionary figure. In discussing Priestley's opposition to James Keir's suggestion that the word *gas* be adopted instead of *air* for all elastic fluids, Gibbs suggests that the former's adherence to tradition sprang from his deep historical commitment. This commitment is further reflected in Priestley's grand design to publish a series of "histories" of the various branches of natural philosophy, of which only the volumes on electricity (1767) and light (1772) appeared. Also, as with most would-be religious reformers, Priestley's reformation was not evolutionary but was based on a return to the supposed pristine simplicity of primitive Christianity. Priestley the revolutionary was, in a sense, a man marching forward with his gaze fixed steadily over his left shoulder.

There can be no doubt of the author's sympathy for his subject as a religious and political figure; but, to this reader at least, he has not conveyed the basis of his admiration. Instead, Priestley emerges as a somewhat smug bourgeois who did not know where to draw the line in controversy. The overall impression is that Priestley wrote too much and thought too little. The most pungent and terse commentary on him in the book occurs in a reproduced contemporary cartoon which depicts the dissenting triumvirate of Priestley, Price, and Lindsey haranguing a motley assembly on the Repeal of the Test Act from a pulpit. While Lindsey tears up a copy of the Thirty-Nine Articles and Price addresses sage words to the congregation, Priestley spews volumes of hot air out the window.

Priestley's last years, which he spent in Northumberland, Pennsylvania, were clouded by financial pressures, personal sorrows, intellectual isolation—he found Philadelphia climatically inhospitable and too expensive—and political disillusionment. An ardent supporter of the American cause while in Britain, he now felt that the Adams administration had betrayed the American ideal, and as usual did not hesitate to say so. His own pugnaciousness and the malevolent activities of William Cobbett almost secured his deportation under the aliens and sedition acts of 1798, but Adams demurred with the comment that "his influence is not an atom in the world." Poor Priestley, what a reward for all that writer's cramp.

Any biographer of Priestley is due some sympathy on account of the mass of raw literary material with which he has to deal; but it might fairly have been expected that Gibbs would have distilled a more penetrating essence than this. It is unfortunate that this book should have been Gibbs's last work in the history of science; he was a much better historian than this contribution would indicate.

There is a brief, highly selective bibliography at the back of the book, and footnotes pointing out "the less familiar sources" are included on the appropriate pages. The book is well illustrated with plates and drawings, and there is an index.

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Biochemical Energetics

Energy Changes in Biochemical Reactions. IRVING M. KLOTZ. Academic Press, New York, 1967. x + 108 pp., illus. $5.95.

This is an expanded edition of the earlier book *Energetics in Biochemical Reactions*. The present version covers more ground but has lost some of the bounce of the shorter one. The author's reluctance to adopt the terminology of biochemists has receded in the ten years intervening between the two books, although it still seems necessary to him to introduce high-energy bonds enclosed between quotation marks; these disappear in the later discussion, however, and even the use of phosphate bond energy creeps in rather naturally.

A welcome addition is a comparative discussion of proton, electron, and group transfer, followed by a para-