

This is perhaps not quite so forcible a presentation of Berkeley as the Germans give; but it is thought out by the author for himself, and presents the subject in the fresh light of a new morning.

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Essays in Historical Chemistry.

By T. E. Thorpe, Professor of Chemistry in the Royal College of Science, South Kensington. Macmillan & Co. 1894.

Attributed to Peirce by Fisch in *First Supplement* (internal evidence). Peirce definitely reviewed the later edition of this book at 75 (21 August 1902) 153-154. Peirce was a Boyle enthusiast. This piece is unassigned in Haskell's *Index to The Nation*, vol. 1.

Sir Thomas Edward Thorpe (1845-1925) was a distinguished British scientist and educator. He held the post of professor of chemistry at Andersonian College, Glasgow, from 1870 until 1874, at which time he went to Yorkshire College of Science, Leeds. In 1885, Thorpe began an association with the Royal College of Science at South Kensington which continued for several years. He was knighted in 1909.

In this volume Prof. Thorpe has collected ten addresses and lectures which he has delivered at various times, and to audiences of very different type, during the past eighteen or twenty years, and three articles which have appeared in as many different periodicals. Making no pretension to be a history of chemistry, even during the period covered by its narratives, the book presents a series of biographical sketches which are "put together with the object of showing how the labors of some of the greatest masters of chemical science have contributed to its development." The essays are arranged in historical sequence, beginning with a lecture on Robert Boyle, continuing with sketches of Priestley, Scheele, Cavendish, Lavoisier, Faraday, Graham, Wöhler, Dumas, Kopp, and Mendeleeff, and concluding with an address on the "Rise and Development of Synthetical Chemistry."

The great variety of occasion for which these essays were originally prepared has left its mark upon them; the discussion of details of chemical accomplishment which forms the principal part of the longer essays on Graham and Kopp being in striking contrast with the more popular treatment which renders most of the others so readable. The chemist will not quarrel with the essayist on this account, however, but will rather be grateful to him for so full and adequate a summary of the labors of these eminent investigators. In reading these admirable and scholarly essays one is unavoidably impressed with their resemblance, in ease and clearness, to the felicitous biographical sketches which Hofmann gave us from time to time as memorials of the scientific worthies of the Continent. Prof. Thorpe has in most instances well preserved the human interest in his treatment. The men appear not merely as chemists and investigators, but also as citizens of the world. The estimate of their work is, on the whole, discriminating and just.

In the "Honorable Robert Boyle, seventh son of the Great Earl of Cork," born in 1626, the year of Bacon's death, the "sceptical, inquiring, reforming spirit" of the age found its expression in the domain of natural science. Under the title of the 'Sceptical Chymist; or Chemic-Physical Doubts and Paradoxes touching the Experiments, whereby vulgar Spagyrist are wont to endeavour to evince their

Salt, Sulphur, and Mercury to be the true Principles of Things,' Boyle published anonymously in 1661 a book which attracted immediate and eager attention not only in England, but on the Continent, where no less than ten Latin editions of it appeared. "In its revolt against mere authority, in its disdain of old-world notions, and in its ill-concealed contempt for the schoolmen, it so exactly caught and expressed the spirit of the time that it instantly arrested the attention of the learned world, and . . . of that infinitely larger public of thinking men who felt a growing impatience of the dogmas of the schools." Boyle, with his disciples Hooke and Mayow, founded the first school of scientific chemistry, and was a member of the so-called "Invisible College, an assembly of learned and curious gentlemen who applied themselves to the study of experimental science," out of which grew the Royal Society of London, incorporated by Charles II. in 1663. "The growth of the new philosophy excited the jealousy and anger of those who affected to see in the ascendancy of the Baconian method the subversion of everything that was orderly and of good repute. . . . Bishops anathematised; Hobbes . . . thundered; Butler lampooned." But in spite of rough usage the Society continued to grow and prosper, and science even became fashionable.

Prof. Thorpe closes his summary of the 'Sceptical Chymist' by saying: "I have purposely quoted very largely from it, for I wished to show you, in Boyle's own words, how wonderfully near much of the philosophy of the seventeenth century is to that which we are too apt to regard as the outcome of the nineteenth. It is impossible to exaggerate the importance of Boyle's labors. . . . The work exhibits in an eminent degree Boyle's character as an investigator," his strength and his weakness. "But to say that Boyle is only inferior to Bacon and Newton is to assign him one of the first niches in the Walhalla of the heroes of science." "The 'Sceptical Chymist' sealed the fate of the doctrine of the *tria prima*, and before the close of the century the Paracelsians were as much out of date as a Phlogistian would be to-day."

Priestley, theologian and chemist, the "Father of Pneumatic Chemistry," the keen and forcible controversialist, is a notable figure in the history of chemistry. Indefatigable and successful in his experimental work, he failed to see the important bearing of his chief discovery.

"The discovery of oxygen was the death-blow to Phlogiston. Here was the thing which had been groped for for years and which many men had even stumbled over in the searching, but had never grasped."

"The knowledge which Priestley . . . imparted to the French chemists was used by them with crushing effect against his favorite theory. . . . Priestley, however, never surrendered. . . . When age compelled him to leave his laboratory, he continued to serve the old cause in his study, and almost his last publication was his 'Doctrine of Phlogiston Established.' His own life, indeed, affords an exemplification of the truth of his own words, that 'we may take a maxim so strongly for granted that the plainest evidence of sense will not entirely change, and often hardly modify, our persuasions; the more ingenious a man is, the more effectually he is entangled in his errors, his ingenuity only helping him to deceive himself by evading the force of truth.' "

"That he was content to rest in the faith of Stahl's great generalization . . . is the more remarkable when we recall the absolute sincerity of the man, his extraordinary receptivity, and, as he says of himself, his proneness 'to embrace what is generally called the heterodox side of almost every question.' "

Of Scheele, Prof. Thorpe says:

"An obscure apothecary, living . . . in a small town on the shore of a Scandinavian lake, hampered by poverty and harassed by debt, hypochondriacal, and, at times, the victim of the most depressing melancholy, he yet succeeded, by the sheer force of his genius as an experimentalist, and under the influence of a passion which defied difficulty and triumphed over despair, in changing the entire aspect of a science. No man ever served chemistry . . . with more interested devotion than Scheele. 'Diese edel Wissenschaft,' he wrote to his friend Gahn, 'ist mein Auge.' . . . When every legitimate deduction has been made, Scheele's work . . . stamps him as the greatest chemical discoverer of his age."

"Cavendish, a scion of a great house, was cold, retiring, reticent, passively selfish, a confirmed misogynist, a hater of noise and bustle. It was said of him that he probably uttered fewer words in the course of his fourscore years than any man who ever lived so long—not even excepting the monks of La Trappe. . . . Mr. Cavendish rarely did violence to his love of solitude by asking any one to his house. If a friend chanced to dine with him, he was invariably treated to a leg of mutton, and nothing else. We are told that on one occasion, three or four guests being expected, he was asked what was to be got for dinner. He replied with the customary formula, 'A leg of mutton.' 'But,' said the servant, 'that will not be enough for five.' 'Then get two legs,' was his answer."

These few extracts will serve to show something of the quality of these essays, which many besides chemists will find very interesting and enjoyable reading.

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—The last number of the Proceedings of the Psychological Research Society contains, in its report of the Committee on the "Census of Hallucination," the solidest and heaviest piece of work which it has yet published; and if dryness and dullness can make a thing scientific, then these 400 pages are as scientific as the most fastidious intellect can desire. Stories of apparitions, however flesh-curdling they may be when told singly in the twilight, are terribly monotonous when cast into the form of printed depositions and taken in bulk. The Census of Hallucinations was, as is well known, an idea of the late Edmund Gurney, who thought that the proportion of frequency of apparitions-coinciding-with-death to other apparitions might decide whether the former were or were not something more than accidental coincidences. The present committee has had 17,000 persons interrogated as to whether they have had, when awake, etc., an hallucination or not. Of these, 1,684 answered yes, and the details of the experiences form a body of data which the committee go over and discuss in every possible way. As regards the main