son of their experience. As the list covers men in all lines of business and industry, it is no longer absolutely necessary to submit such questions to untrained jurors, or to judges without special fitness to pronounce upon them.—New York *Evening Post.*

SCIENTIFIC BOOKS

Life and Scientific Work of Peter Guthrie Tait. By DR. C. G. KNOTT. Cambridge University Press. 1911.

The volume before us supplements the two volumes of "Scientific Papers" published by the same press in 1898 and 1900, under the supervision of Tait himself. For the preparation of this volume Professor Knott was well qualified, having been a pupil, colleague and friend of Tait; and he has made excellent use of the material placed at his disposal, giving full and interesting information about the relations of Tait to the other great mathematicians and physicists of his time.

The author does not follow the chronological order, but divides his material with some logical redundance as follows: Chapter I., Memoir; II., Experimental Work; III., Mathematical Work; IV., Quaternions; V., Thomson and Tait's Natural Philosophy; VI., Other Books; VII., Addresses, Reviews and Correspondence; VIII., Popular Scientific Articles. Appended is a bibliography of Tait's writings.

In his early years Tait became enamored of pure science, and he clung to that ideal throughout life. He was a very brilliant pupil at the Edinburgh Academy, where he had Maxwell for schoolmate and special friend; he did not, like Maxwell, study at the University of Edinburgh, but went straight to the University of Cambridge, where he graduated as senior wrangler; he was for six years professor of mathematics at Belfast, and for forty years professor of natural philosophy at Edinburgh. His manner of life at Edinburgh was simple. During the winter term he was much occupied with lecturing, in which he was singularly clear and inspiring; during the summer term he devoted much time to experimental investigation in the laboratory; the long and the short vacations he spent at St. Andrews, where there is a famous golfing course; both summer and winter it was his custom to work to late hours in his library.

One of the most elegant of Tait's investigations, combining mathematical, experimental and technical skill, dealt with the phenomena of golf. I remember that when I was an instructor in the laboratory, American students used to describe the curves of a baseball and ask for the explanation; I doubt whether Professor Tait at that time could give an adequate explanation. But it is different now; his investigation of the path of the golf ball applies also to the phenomena of baseball and of tennis, and is full of interest to scientific players.

Tait's greatest contribution to mathematical analysis undoubtedly consists in his advocacy and development of the quaternion method invented by Hamilton. At the time when Hamilton was about to publish his "Lectures on Quaternions," his friend De Morgan suggested the names of a very few mathematicians on whom a presentation copy would not be thrown away; one of these was Professor Thomson, afterwards Lord Kelvin. Doubless the advice was acted on, but for some reason Thomson formed an unfavorable opinion, to which with his characteristic tenacity he clung ever afterwards. On the other hand, Tait, having just graduated, was curious enough to buy a copy, and on perusal became convinced that the method contained possibilities of highly useful application to mathematical physics. It was through Tait that Maxwell became an earnest student, and it is evident from the correspondence here printed that Maxwell was one of the first vector-analysts. The book before us throws much light on the relations of these three great Scotsmen to one another, and on the relation of Tait to Hamilton.

The fifth chapter gives authentic information about the preparation of the celebrated "Treatise on Natural Philosophy." The idea was due to Tait, and some advance in its realization had been made before Thomson

entered as partner. The plan then adopted contemplated four volumes, two to be written by each. Tait speedily wrote the first volume, and had the great benefit of Thomson's advice and revision; but Thomson did not immediately tackle the labor of writing the second volume, and after some years it was impossible for him to sit down to such a task on account of the other exacting labors which he had undertaken. As one of his most distinguished pupils said, Thomson was no writer of text-books. In consequence the other three volumes were never written. I believe that Thomson was to have written on Electricity and Magnetism, and Tait on Heat and Light. When a second edition of the first volume was called for the matter was extended into two separate parts, mainly from additions contributed by Thomson.

The remaining chapters show that Tait wielded the pen of a ready writer. His library was largely his workshop. Like Maxwell, he could turn out good verses. Much that he wrote was controversial in nature; and, being apt to take an extreme view, he was sometimes wanting in logical consistency. All the same, he was one of the very great mathematical physicists of the Victorian age; and the ultimate verdict of the future will, I believe, place him second only to Maxwell.

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Chemistry of Food and Nutrition. By Henry C. Sherman, Ph.D., Professor in Columbia University. New York, The Macmillan Co. Pp. viii + 355. 1911. Price $1.50.

In the preface to this volume the author makes the following statement: "The present work is the outgrowth of several years' experience in teaching the subject to collegiate and technical students who have represented a considerable diversity of previous training and points of view, and, while published primarily to meet the needs of the author's classes, it is hoped that it may also be of service to students and teachers elsewhere and to general readers whose main interests may lie in other fields but who appreciate the importance of food and nutrition as factors in hygiene and preventive medicine." The clear, thorough, modern and unbiased presentation of the fundamental facts and theories of nutrition, given in this text-book, should give it a necessary and permanently useful place in the instructional work of our American universities, and should also make it a valuable and convenient source of information to the general reader desiring accurate knowledge in this important and vital subject. This text might well be extensively used in our agricultural colleges as a prerequisite for the courses in animal nutrition that are as yet often inadequately taught to students in agricultural courses.

The eleven chapters of this book are devoted to the following subjects: the organic foodstuffs, the general composition of foods and action of ferments, the course of the food through the digestive tract, the fate of the foodstuffs in metabolism, the fuel value of food and the energy requirement of the body, conditions affecting the total food requirements, protein metabolism and the protein requirement, food habits and dietary standards, iron in food and its functions in nutrition, inorganic foodstuffs and the mineral metabolism, and criteria of nutritive value and economy of foods. The appendix contains tables showing (*a*) the edible organic nutrients and fuel value of foods, together with the weight in grams of the portion which would supply 100 calories; (*b*) the ash constituents of foods in percentage of the edible portion; and (*c*) the ash constituents of foods in grams per 100 calories of edible food material. The complete index to the text will materially aid the reader in finding what he wants, and the numerous references to the original literature will enable the advanced student to acquire a first-hand knowledge of the facts and theories of the science of nutrition.

The subject matter given in the chapters entitled the fuel value of food and the energy requirement of the body, conditions affecting the total food requirements, protein metabolism and the protein requirement, food hab-