

cium is struck on steel or quartz is connected by Ohmann (*Ber.*, 39, 866) with "striking fire" in general. There is here a change of kinetic energy into heat, and accompanied often by change in state of aggregation. The phenomenon is particularly marked with those elements which soften easily by heat and have great affinity for oxygen. With calcium the action is more noticeable in an oxygen atmosphere. The phenomenon is particularly marked with lithium, and can be produced even with red phosphorus.

Lexington, Va., Jan. 1, 1907.

NEW BOOKS.

ELEMENTS OF GENERAL CHEMISTRY WITH EXPERIMENTS BY JOHN H. LONG, M. S., Sc. D, Fourth Edition. Philadelphia; P. Blackiston's Son & Co., 1906. Pages x + 443. Price \$1.50.

This is an admirable text-book for beginners in chemistry. It is clearly and concisely written and the student is not overburdened with a multiplicity of detail. The important principles and theories are introduced gradually and only after the student has had some experience with chemical work. Thus it is only after oxygen, hydrogen, water, hydrogen dioxide, chlorine and hydrochloric acid have been studied that definitions of elements and compounds are given. Then follow some brief statements in regard to atoms and molecules and it is not until page 82 that we find the first symbols and equations.

The directions for laboratory work are very clear and the experiments are well selected and illustrate the essential facts of descriptive chemistry. In the reviewer's opinion it would have been better not to tell the student in every case what he is expected to notice but rather make him observe for himself and then by a number of questions make him think and reason in regard to what he is doing. Students have a way of following directions mechanically in the laboratory without putting much thought upon their work and then in a short time forgetting all about it. It might have been well at page 80 to have stated the laws of definite, multiple and reciprocal proportions and to have added a few quantitative experiments that would have illustrated them.

In this new edition the facts have been brought well up-to-date, a chapter on theories of solution and mass action has been added, radium and its behavior, its change into helium, find mention.

There are almost no errors in the book and few criticisms to be made. On page 126 in experiment 94 the gas obtained is not nitrogen trioxide; as this compound does not exist at ordinary temperatures but is dissociated into nitric oxide and nitrogen tetroxide. On page 399, it might be inferred that radium had been obtained in free condition whereas only its compounds have been obtained. On page 409 the illustration of the iron blast furnace is of a rather old form and out of date.

But these are all very slight defects and on the other hand the chapter on atomic and molecular weights is a most excellent presentation of this subject. The important steps are here set forth in their historical order and so clearly that they cannot fail to interest both teacher and students.

This text-book has so many excellent points that it deserves to be very extensively used and can be most heartily recommended.

EDWARD H. KEISER.

LEITLINIEN DER CHEMIE. BY WILHELM OSTWALD. Leipzig: Akademische Verlagsgesellschaft m. b. H. 1906. V + 308 pp. Price, 6.60 Marks: Bound, 7.50 Marks.

In the Fall of 1905 Ostwald delivered a course of lectures at the Massachusetts Institute of Technology. The following January he gave the same course at Columbia University. He has now re-written the lectures and published them under the title given above. His intention was to present, briefly, the history of the development of the most important conceptions of scientific chemistry in such a way that the book might be available to all interested in natural science. The subjects of the lectures are: 1. The Elements. 2. Combining Weights and Atoms. 3. The Gas Laws and the Molecular Hypothesis. 4. Isomerism and Constitution. 5. Electrochemistry. 6. Affinity. 7. Chemical Dynamics.

The treatment of these topics, although brief, is eminently satisfactory. The historical facts are clearly brought out, but a great part of the interest felt by the reader is due to the illuminating comments of the author. It is instructive, to learn that in discussing isomerism and constitution, he finds himself compelled to make use of the atomic theory, although he hopes that an "hypothesis-free" representation of molecular structure may soon be given, and indicates, in a general way, a method for the solution of the problem. Ostwald justifies the appearance of the book on the ground that it gives greater prominence to the history of the formation and clarification of general concepts than to the discovery of the facts and their practical application. This is, in fact, its chief merit and it may be confidently recommended to chemists looking for a clear and succinct discussion of the topics previously mentioned. It is to be regretted that a table of contents and an index are lacking.

L. B. HALL.

A HISTORY OF CHEMICAL THEORIES AND LAWS, BY M. M. PATTERSON-MUIR. 8vo. pp. xx + 555. John Wiley & Sons, New York, 1907. Price \$4.00.

This is a suggestive book which will prove both interesting and profitable to the reader. And yet it is difficult to take an entirely favorable view of it as a history of the chemical theory. Professor Patterson-Muir is right in saying that "the methods, achievements and aims of the science can be realized only by him who has followed the gradual development of chemical ideas." And hence it is very necessary that the study of