

have preceded the earlier one (No. 9) on "The Elementary Nature of Chlorine," by Humphry Davy, the original of which bears the date 1810.

The first paper, by Scheele, "On Manganese and its Properties," is translated from the Transactions of the Royal Academy of Sciences of Stockholm, and shows his clear and remarkably correct views as to the nature of the substance accidentally obtained when treating black oxide of manganese with hydrochloric acid. Scheele writes concisely, using the language of the phlogistic theory, which forms a great contrast to that used by Berthollet in the second paper; Scheele's essay bristles with Latin terms, such as *acidum salis*, *spiritus salis ammoniaci*, and *alkali fixum*; Berthollet's essay shows the admirable influence on the language of chemistry exerted by the contemporaries of Lavoisier, and reads much more like a modern treatise.

A short extract from a Memoir on Nomenclature by de Morveau, is interesting since it introduces the word *radical*, not *radicle*, as some chemists would have it.

The Memoirs by Gay-Lussac and Thénard exhibit the share these chemical philosophers have in the investigation of "dephlogisticated marine acid," prior to the time of Davy. Davy, it must be remembered, demonstrated that the new gas contained no oxygen, and that it was of an elementary character; to him also is due the name chlorine.

H. CARRINGTON BOLTON.

AN OUTLINE OF THE THEORY OF SOLUTION AND ITS RESULTS. BY J. LIVINGSTON R. MORGAN, PH.D. Small 8vo. New York: John Wiley & Sons. 63 pp. Price \$1.00.

The period of unrest and debate in the modern theory of solution is, in the main, at an end. This theory has substituted for vague representations of isolated facts, clear and concise conceptions based on plausible hypotheses and stated with mathematical precision. Osmotic pressure, diffusion, lowering of freezing-point, and raising of boiling-point, etc.,—all these properties of solutions have been accounted for and brought into causal relationships, and "the hundred-year problem of the voltaic cell" has finally been solved.

A period of quiet but intense activity has now set in. Workers attracted by the brilliancy of the results thus far obtained,

are busy in clearing up obscure points and extending the field of inquiry.

Now, that this theory has been generally adopted by those whose work puts them in more immediate touch with it, a desire springs up in those whose interests are in more remote connection thereto to get some knowledge of its import and aspect. The author has responded in a most creditable manner to this demand. He gives in clear language the gist of the theory of solution, how it has arisen, and what it is to-day. The treatment and style is as non-mathematical as the nature of the subject permits, but it must be borne in mind that a criterion of the degree of advancement of a branch of science is the possibility of clothing its results in mathematical dress, and he who would keep up with the times must needs acquire at least the elements of higher analysis.

The chapter on analytical chemistry from the standpoint of electrolytic dissociation should be read and digested by every teacher and student of analytical chemistry as well as by every professional analyst; it is law and order introduced into empiricism.

Such a *résumé* is invaluable; it presents in compact and inviting form facts of great importance having a more or less direct bearing upon every branch of chemistry. Its perusal will show that the work of the physical chemists is not so abstruse and barren of practical results as it is too often supposed to be. The book cannot be too strongly recommended.

C. E. LINEBARGER.

THE PRINCIPLES OF MATHEMATICAL CHEMISTRY. THE ENERGETICS OF CHEMICAL PHENOMENA. BY DR. GEORG HELM. Authorized translation from the German by J. LIVINGSTON R. MORGAN, PH.D. Small 8vo. vi + 228 pp. New York: John Wiley & Sons. Price, \$1.50.

The impression the reviewer got from reading the original German of this work was that, while the subject-matter was excellent, the treatment was faulty, and he now feels that it is a pity that the translator did not edit rather than merely translate the book. While the author's purpose was "to collect the results, according to the deductive method, of the investigations in the realm of general chemistry," the translator's "desire to spread the knowledge of physical chemistry" would have un-