

Leopold thought at first that the Revolution would merely weaken France, reducing her, perhaps, to the rank of a second-rate Power. Despite the old alliance of the Seven Years' War and the recent marriage connection, he cared little for the political mishaps of Louis XVI. So long as government in France did not yield to anarchy, he could view with pleasure any weakening of the royal prestige. Moreover, he had not long before been the reforming Grand Duke of Tuscany, and looked with some favor upon moderate liberals. What Austria needed was peace. She joined in the Turkish war only to please Russia, and she would have welcomed the preservation of the *status quo* in Poland. Here her worst dread was that Prussia and Russia would annex fresh portions without giving her just compensation.

Leopold thus had strong motives for letting affairs work themselves out at Paris, unmolested by him. What led him, and eventually Kaunitz, to favor the declaration of war for which the Brissotins and the Comte de Narbonne also longed? Was it fear that France might encourage the Belgian revolution? Or that she would not act fairly towards the Elector of Trier and the Rhenish princes of the Empire? Or did the Comte d'Artois and the emigrants make an impression at Vienna? We feel confident that none of these partial motives can account for Leopold's change of front. Indeed, so far as the emigrants are concerned, he had a hearty dislike of them. The real causes of his final resolve to fight the Revolution were a growing dread of its doctrines, alarm for the safety of Marie Antoinette and her husband, a belief that the Legislative Assembly could easily be browbeaten, and the certainty of securing Frederick William II. for an ally.

Mr. Clapham's monograph contains comparatively few theories, but very many facts. He advances by short stages, keeping the Powers in touch with each other at each stage. The history of diplomatic negotiations requires great fulness of detail, and so many shifting interests were involved at every court that we have only attempted to say a word about Vienna. But we must express our pleasure at the just censure which Mr. Clapham metes out to Von Sybel for judging the political morality of Prussia by a far less rigorous standard than that which he applies to France. This is a valuable study, and we hope that it may add freshness to more than one university lecture.

The Theory of Electrolytic Dissociation, and Some of its Applications. By Harry C. Jones. Macmillan. 1900. 8vo, pp. 289.

The theory of electrolytic dissociation was originally proposed by the penetration of Clausius as far back as 1857, not as an hypothesis, but as a deduction from acknowledged facts. Clausius reasoned that since the smallest electromotive force suffices to decompose an electrolyte into its ions, without violation of Ohm's law, it followed that the current did not do the work of decomposing the molecules of the electrolyte into its ions. Whence it further followed that these molecules must be already decomposed; in other words, that in a solution of common salt, a part, small or large, of the molecules of chloride of sodium must be decomposed and be present as iso-

lated atoms (not ordinary molecules) of sodium and of chlorine. But this was such a startling idea—it seemed so incredible that an innocent solution of common salt should contain such powerful reagents as nascent sodium and chlorine—that the theory found no acceptance, especially as the proposition did not seem to lead to any further correlation of facts.

In 1877 the botanist Pfeffer published a book (translated in Harper's Science Series) in which he gave the results of numerous experiments by him upon a phenomenon first discovered long before by Traube, that of osmotic pressure. Namely, when a membrane forms a partition between a solution and a quantity of the pure solvent, if it happens that the solvent can pass through the membrane, while the dissolved substance cannot, then the pure solvent will flow into the solution, until a certain difference of pressure has been established, called the osmotic pressure. Now Pfeffer's experiments showed that for dilute solutions of any given substance the osmotic pressure was proportional to the quantity of that solvent in solution—a fact which, if it attracted his attention at all, probably appeared natural enough to him, and to which he attached no particular significance. But one day, as the physical chemist Van't Hoff was going home from his laboratory, he met a colleague who had been repeating some of Pfeffer's experiments, and who mentioned to him the proportionality of the osmotic pressure to the concentration of the solution. To Van't Hoff's trained mind, this meant no less than that the dissolved substance had a pressure proportional to its density, or, in other words, was in a quasi-gaseous condition.

To many a man familiar with the kinetical theory of gases, this analogy would have seemed strained, because he would have regarded it as the essential characteristic of gases, to which the law of Boyle is due, that the molecules have rectilinear paths. The exacter conception of Van't Hoff was that that law is the consequence, not of the rectilinear paths, but of the fact that the molecules are so far separated from one another that their mutual attractions and repulsions have no considerable effect. But now, according to the law of Avogadro, the pressure of a given gas must be the same as that of the same number of molecules of hydrogen in the same volume and at the same temperature. Was the osmotic pressure, then, of the right amount? After a preliminary inquiry into the applicability of the law of Charles, or Gay-Lussac, Van't Hoff succeeded in showing that this was precisely true for many substances in solution, while for many others it was not at all true, the osmotic pressure in these cases being always too great. At this point Arrhenius, whose pupil Van't Hoff had been, and who had privately been informed of his results before their publication, remarked that all the exceptions were electrolytes, and that excessive pressures in those cases would be required by the kinetical theory of gases, if the deduction of Clausius were admitted. That was in 1887, and from that moment the theory of ionic dissociation began to fulfill the function of correlating facts.

In the volume before us, Mr. Harry Jones, known by his contributions to this branch of chemistry, sets forth the evidences of the theory, and shows that it must be accepted as positively proved. Of course, we do not

know in what state the dissociated atoms may be. Possibly, for example, they may be combined with atoms of the ether, which may be of different chemical kinds. But it does seem that chemical physics is now upon a path which may probably bring us out to a clearer view of the nature of atoms and of molecules.

Mr. Jones's book is, in some respects, not unskillfully put together. His argument is clear, consecutive, and convincing. We think his readers will generally regret that he has not placed before them more extended synopses of the facts, in lieu of a few at each point that have been selected as being favorable to the theory. It may be doubted, too, whether the representation of the doctrine of electrolytic dissociation as the pivot upon which all the physical chemistry of the day turns, is quite accurate in its perspective. The non-electrolytes are of a good deal of importance.

About a third of the volume is occupied with applications of the theory to physics, chemistry, and physiology. The most interesting of these have been before the English reader for some years—as has, indeed, the whole subject, though it has not before been so well set forth.

BOOKS OF THE WEEK.

- Alleman, Julia S. Postmarked "Collma." Philadelphia: Lutheran Publication Society. \$1.25.
 Bain, R. Nisbet. The Daughter of Peter the Great. London: Archibald Constable & Co.; New York: E. P. Dutton & Co. \$4.
 Balfour, Marie C. Side Lights on the Reign of Terror: Being the Memoirs of Mlle. des Echerolles. John Lane.
 Bourroff, B. The Impending Crisis; Conditions Resulting from the Concentration of Wealth in the United States. Chicago: Midway Press Committee. 25c.
 Brownell, C. L. Tales from Tokio. New York: Warner & Brownell.
 Burke, E. The Sublime and Beautiful. Cassells. 10c.
 Carpenter, F. G. South America, Social, Industrial and Political. New York: The Sutherland Publishing Co.
 Chapman, Rev. J. W. Revivals and Missions. New York: Lentilhon & Co. 60c.
 Colquhoun, A. R. Russia against India: The Struggle for Asia. Harpers. \$1.50.
 Crane, W. B. Odd Tales. New York: M. Witmark & Sons.
 Davie, O. Methods in the Art of Taxidermy. Philadelphia: David McKay. \$2.50.
 Foley, J. P. The Jeffersonian Cyclopaedia: A Comprehensive Collection of the Views of Thomas Jefferson, Classified and Arranged in Alphabetical Order under Nine Thousand Titles. Funk & Wagnalls Co. \$7.50.
 Gould, Elizabeth P. Anne Gilchrist and Walt Whitman. Philadelphia: David McKay. \$1.
 Harper, W. H. "Restraint of Trade": Pros and Cons of Trusts in Facts and Principles. Chicago: The Author. 50c.
 Hewes, H. F. Anatomy, Physiology and Hygiene for High Schools. American Book Co. \$1.
 Hoadley, Prof. G. A. A Brief Course in General Physics, Experimental and Applied. American Book Co. \$1.20.
 Hoffman, F. L. History of the Prudential Insurance Company of America 1875-1900. The Prudential Press.
 Hopkins, J. H. A History of Political Parties in the United States. Putnam. \$2.50.
 Hoyt, J. C. Old Ocean's Ferry: The Log of the Modern Mariner. New York: Bonnell, Silver & Co. 50c.
 Killikelly, Sarah H. Curious Questions in History, Literature, Art, and Social Life; Designed as a Manual of General Information. Philadelphia: David McKay. Vol. III. \$2.
 Lane, C. H. All about Dogs: A Book for Doggy People. John Lane.
 Laugeloff, Prof. W. B. Seneca's (I.) Tranquillity of Mind. (II.) Providence. Putnam. \$1.
 Lauer, Ph. Le Règne de Louis IV. d'Outre-Mer. Paris: Emile Bouillon. 12 fr.
 Lee, S. Dictionary of National Biography. London: Smith, Elder & Co.; New York: Macmillan. Vol. LXIII.; Wordsworth-Zuyvestein. \$3.75. Also indexes to Vols. I. to XIV.
 Miller, Olive T. The First Book of Birds. Houghton, Mifflin & Co.
 Modern British Water-Color Drawings [Summer Number of "The Studio," 1900]. New York: "The Studio." 6s.
 Moorehead, W. K., and Others. Prehistoric Implements. A Reference Book. Cincinnati, O.: The Robert Clarke Co. \$2.30.
 Prentice, W. R. History of New York State, for the use of High Schools and Academies and for Supplementary Reading. Syracuse, N. Y.: C. W. Bardeen. \$1.50.
 Proceedings of the Massachusetts Historical Society. Second Series. Vol. XIII. 1899, 1900. Boston: Published by the Society.
 Webster, W. F. English Composition and Literature. Houghton, Mifflin & Co. 90c.

P 10741