solution (Mother Liquor 1) contained about 1% of the active amylase and 2.5% of the solids of the original pancreatin, or about 5% of the solids originally extracted.

3. When the alcohol-ether precipitate was dispersed in water and mixed with absolute alcohol, 25% of the solids originally extracted remained in the filtrate (Mother Liquor 2) but this filtrate showed no amylolytic activity.

4. From 10 to 20% of the amylolytic activity accounted for was found in the dialyzates.

5. In the purification experiments here described about 50% of the amylolytic activity was lost by the end of the dialysis, about 45% in the final precipitation and separation, and about 5% was found in the final precipitate. By the use of liquid-air cooling it has been possible in other experiments to diminish the losses in the later stages of the process and considerably increase the proportion of active amylase recovered in the final product.

6. The precipitate which forms in the inner solution during dialysis (Precipitate 3, "sac precipitate") shows very high proteolytic and little or no amylolytic activity. This material, which was originally extracted by 50% alcohol, now precipitates from this solvent. The explanation of this fact is probably to be found in the removal, through the intervening purification process, of some substance or substances whose presence interferes with the coagulation of the protease or stabilizes its dispersion.

We are greatly indebted to the Carnegie Institution of Washington for grants in aid of this investigation.

NEW YORK, N. Y.

NEW BOOKS.

Cours de Chimie a l'Usage des Etudiants P. C. N. et S. P. C. N. PAR R. DE FORCRAND. Deuxième Edition, Paris, Gauthier-Villars et Cie. 1918. Tome I, pp. VIII and 438; Tome II, pp. 528. 14 × 22 cm. Price of Vol. I, 15 francs.

The first edition of this book was reviewed in THIS JOURNAL, **27**, 790 (1905). The second edition has veen very considerably enlarged but retains the same general scope. The book is intended for use in the instruction of students who are candidates for the "Certificat d'études supèrieures de physique, chimie et sciences naturelles (or S.P.C.N.). It is intended to give the work covered, in 3 lessons a week for one academic year. If the material of this book is fairly mastered in that period it must represent far more intensive work than is done by American students. The first 75 pages give the fundamental principles, laws and nomenclature of the science. There are some advantages of such a method of approach, but a beginner would certainly find these pages difficult. About

200 pages are given to a detailed discussion of the metalloids and 150 to the metals, completing the first volume. In the second volume 326 pages are devoted to organic chemistry, 108 pages to qualitative and quantitative analysis, including organic analysis and gas analysis, and the last 90 pages to numerical problems.

Probably every text-book retains some errors and some survivals of points of view which have been outgrown in the progress of the science. On p. 101 we find Regnault's value for the weight of a cubic meter of hydrogen 89.5 g. instead of the more correct modern value, 89.87 g.

On p. 110 we find the surprising statement that up to a temperature of 180° there is a false equilibrium causing limited combination of oxygen and hydrogen such that at 180° 12/10,000 of the mixture appears as water. The combination increases above that temperature and at 900° it is complete and remains so to 1200°. Above that dissociation begins. Surely this does not agree with modern views. In several other places the author seems not to have very clear views with regard to the nature of chemical equilibrium.

The thermal relations of many chemical reactions are discussed throughout and while the author follows Berthelot too closely in many passages which imply that the heat of formation of a compound is a direct measure of the affinity of the elements of which it is composed, the emphasis placed upon thermochemical data constitutes one of the most valuable features of the book.

As an illustration of the tendency to consider thermal relations, the definition of an acid, p. 290, may be cited: After having stated that the heat evolved in the replacement of hydrogen by sodium is —2.3 calories for NaOH, 14.84 for NH_3, 22.3 for C_2H_2, 32.9 for H_2O, 69.3 for HCl, and 69.2 for HNO_3, an acid is defined as a compound which evolves more than 33 calories of heat when its hydrogen is replaced by sodium. The author calls attention, very properly, to the fact that such a definition is based on the convention that water is neutral and one might, if he preferred, call acetylene or hydrochloric acid as neutral. It might be of interest to consider whether the above definitions would coincide, practically, with the ordinary definition based on the hydrogen and hydroxyl ion content of an aqueous solution of the substance.

On page 298 we find the erroneous statement that pure water contains no ions. Closely connected with this error is the omission of any reference to the hydrolysis of salts of weak acids and weak bases.

The portion of the book devoted to organic chemistry is arranged logically, treating the hydrocarbons first, then of alcohols, phenols, aldehydes, ketones, acids, amines, etc. The selection of material is satisfactory.

While the point of view of the book as a whole is quite different from

that of most American and German text-books, this very fact would make it well worth reading, especially for students who wish to improve their knowledge of scientific French. There is no index. W. A. NOYES.

Die Welt der vernachlässigten Dimensionen. By WOLFGANG OSTWALD. Fourth Edition. Theodor Steinkopff, Dresden and Leipzig, 1920. xii + 222 pp. 15 × 23 cm. $1.00.

The book is based on a course of lectures given by the author in the United States during the winter of 1913–14. The first edition was translated by M. H. Fischer, appearing under a different title. The first chapter deals with the fundamental phenomena of colloid chemistry. The author points out that colloidal solutions are 2-phase systems and he gives some of the methods of preparing such solutions. The second chapter is devoted to a discussion of the way in which the properties of a colloidal solution vary with the degree of dispersity. This brings in red and blue gold, the Brownian movements, ultra-filtration, the Tyndall phenomenon, the ultra-microscope, and cataphoresis. The changes of state of colloids form the subject of the third chapter. Under this rather misleading heading the author discusses the formation and swelling of jellies, adsorption, rhythmic banding, viscosity, and coagulation. In the fourth chapter, under scientific applications of colloid chemistry, we find references to filtration, analysis with borax bead, tests for natural honey, photography, rubber, dyes, indicators, catalysis, radio-activity, meteorology, agriculture, geology, physiology, and pathology. In the fifth chapter the author points out that the technical and practical applications of colloid chemistry include about everything that is interesting: cellulose, adhesives, water-glass, textiles, coffee, tea, beer, ink, rubber, oildag, lamp filaments, colored glass, ultramarine, pigments, cement, pottery, plaster, carbon steels and alloy steels, leather, dyeing, artificial silk, bakelite, vulcanized rubber, soap, cooking, asphalt, smoke, and sewage.

The author showed a large number of excellent experiments in his lectures. WILDER D. BANCROFT

Catalysis in Theory and Practice. By ERIC K. RIDEAL AND HUGH S. TAYLOR. 496 and XV pages, 37 figures, 14 × 22 cm. MacMillan, Ltd., London, England, 1919. 19 shillings.

It is surprising how completely we have lacked any comprehensive treatise on catalysis, a phenomenon recognized now for nearly a hundred years, and known to be as important as it is universal. There have only been the compilations of Gertrud Woker, in German, encyclopedic rather than illuminating; chapters in the larger text-books of physical chemistry, the best of which is one by Mellor, in his "Chemical Statics and Dynamics;" the brilliant popular articles by the late Robert Kennedy Duncan,

and a number of special monographs on particular branches of the subject, particularly "Le Catalyse in Chimie Organique," by Sabatier.

The present volume is a long step toward a remedy of this deficiency. Its first 3 chapters of 74 pages contain an historical and theoretical introduction; the remaining 400-odd pages are devoted to the more important concrete instances of catalysis, classified under Oxidation, Hydrogenation, Dehydrogenation, Fixation of Nitrogen, Hydration and Hydrolysis, Dehydration, Organic Chemical Reactions, Ferments and Enzymes, Catalysis in Electrochemistry and in Analytical Chemistry, and Catalysis by Radiant Energy. The theoretical introduction is not as thorough or complete as might be wished; the discussion of induced reactions being particularly brief. This deficiency is certainly in part due to the unsatisfactory state of the subject itself, for which the authors can hardly be blamed, and in part to a wise limitation of the size of the book. Moreover, it is largely remedied by the thorough theoretical treatment accorded separately to each of the industrially important catalytic processes. The chapters on Hydrogenation, Fixation of Nitrogen, and Catalysis by Radiant Energy, are particularly good.

The wide scope of the subject is impressive. Devotees of colloid chemistry maintain that every branch of applied chemistry falls within their domain, but catalysis apparently has equally valid claims for universality. The authors have treated this wide and varied subject matter with clearness and perspicacity. Best of all, they have been able to master the separate subjects so well that the book is replete with suggestions for further research.

That, indeed, is the greatest profit which a scientific book can afford. When the facts in any particular field are gathered together, the gaps and loopholes in our knowledge become apparent and this stimulates investigation. Moreover, speaking chemically, to bring together significant facts within reacting distance is bound to accelerate the synthesis of generalizations. In such a sense, this book should prove to be one of the best examples of the phenomenon it describes. ARTHUR B. LAMB.