of 3 g. of β-phthalylpropiophenone, 12 cc. of glacial acetic acid, and 10 cc. of conc. hydrochloric acid (previously saturated at 0° with dry hydrogen chloride) were placed in a sealed tube and the contents heated at 145–50° for one hour. The reaction mixture, removed from the tube, was evaporated to a small volume (but not to dryness) upon a steam bath. The syrup was now taken up in 25 cc. of water and filtered from the insoluble phthalic acid. The filtrate was then allowed to evaporate slowly to dryness in a current of air and at a temperature not exceeding 60°. For final purification the β-aminopropiophenone hydrochloride was crystallized from absolute alcohol. The melting point is 128° exactly as reported by Gabriel[1] and the yield is 95% of the theoretical. As no analysis is to be found in the literature we determined these values.

Calc. for $C_9H_{11}ON.HCl$: C, 58.43; H, 6.47; N, 7.55. Found: C, 58.18; H, 6.56; N, 7.35.

ANN ARBOR, MICH.

NEW BOOKS.

Chemistry of Food and Nutrition. Second edition, rewritten and enlarged. By HENRY C. SHERMAN, PH.D., Professor in Columbia University. MacMillan Co. New York: $2.00.

The rewritten and enlarged edition of Professor Sherman's work brings the chemistry of foods and nutrition up to 1918 in a form easily accessible.

In the preface the author states the present work is the outgrowth of several years of teaching the subject and is published principally to meet the needs in teaching college classes. It is a work of far greater application. Its style is such that it can be readily comprehended by one who is not a chemist. It is a book that will be of great value to the teacher of dietetic and economic science and especially to physicians. The lack of exact knowledge of the science of dietetics is perhaps nowhere more greatly to be regretted than in the case of the physician, who, not very well trained in dietetics in his college course, has failed to keep pace with advancing knowledge.

The word "food" might very well be dropped from the title for the book is essentially an up to date treatise on the chemistry and physiology of nutrition.

Chapters that are especially opportune are those on the classification and general properties of enzymes and the activities of these ferments in digestion. "The Fate of the Foodstuffs in Metabolism" is a story of absorbing interest and well told. The chapter on proteins and their digestion products exposes in a systematic method the modern theories of the reduction of proteins to amino-acids prior to their assimilation. The chapters on the fuel value of foods and the methods of determining it are instructive and to the point.

[1] *Loc. cit.*

The matters to which particular attention are to be called are found in Chapter VIII on the factors determining the protein requirement. The author has displayed great skill in steering his nutrition barque between the Scylla of Chittenden and the Charybdis of Rubner. As a result of comparing all the data which are available the author is inclined to put the protein requirement at a minimum of 10% of the calory intake. In general he inclines to the view of the low protein protagonists that increased muscular exercise does not necessarily mean any great change in the amount or the character of the protein metabolism. The author also adheres to the view that if we start with a diet which maintains protein equilibrium at rest and in case of muscular activity the total food is increased sufficiently to provide for the muscular work, any reasonable combination of food materials may be depended upon to supply plenty of protein to meet any possible increase in the protein requirement.

According to the theory of Chittenden, as quoted by the author, the total amount of nitrogen per kg. of body per day varies from 0.10 to 0.12 g., provided a sufficient quantity of non-nitrogenous foods is taken to meet the energy requirements of the body. This would correspond to from 44 to 53 g. of protein per day for a man weighing 154 lbs. In view of the differences in age and size in families the author is of the opinion that it is justifiable a practice to allow sufficient protein in the diet to make the total amount from 10 to 15% of the total energy of the diet. In this connection the author calls particular attention to the fact that the protein of milk seems to be better suited than any other form of protein to nourish the body. The proportion of other proteins therefore ingested should be greater than the protein content of human milk, which is in round numbers 10% of its energy value. The milk of the cow furnishes a very considerably larger proportion, namely, 20% of the energy value. Attention is also called to the fact that in age there is a diminished protein requirement. It is advisable in the dietary of the aged that the protein be reduced at least to as great extent as the calories.

In view of the fact that the protein consumption of the average American is very much higher than that indicated as necessary by Sherman, it is advisable that the teachers of nutrition should be particularly attentive to the facts above outlined.

The chapters on the metabolism of the mineral elements of our foods show the extreme importance to health of giving attention to this subject. Tables are given showing the relative amounts of minerals in common food materials. In the case of iron it is pointed out that the newborn infant has a relatively high content of iron which makes it possible to be fed on milk without hurt, although milk contains a very low content of iron. Attention is called to the fact that at birth the percentage of iron in the body of the child is about three times greater than at maturity.

Unless the iron is replaced by the milk it is evident that the percentage of iron in the body of the child would be reduced to about the same it is at maturity when the child reaches a weight three times that at birth, a condition which is reached at a little over one year. The author claims that from 10 to 12 mg. of iron in the food is sufficient for the maintenance of iron equilibrium in the average man under favorable conditions. It is pointed out that iron in combination with protein is found in cereals but the greater part of it is in the germ and bran and so is rejected in the manufacture of patent flour, polished rice and new process corn meal. The same loss in phosphorus is due to a like cause. When rats were fed upon white bread and bran bread there was a gain of weight of fourfold and a gain in hemoglobin of 30% in the bran fed rats.

In regard to the phosphorus required, the author fixes the average intake at 1.5 g., equivalent to 3.3 g. of phosphoric anhydride per day. The required amount of phosphorus accordingly is more likely to fall below the average than the required amount of protein.

Sherman reaches the conclusion that the fluids of the body, especially the blood, are not really alkaline in the ordinary sense of the word, but are maintained in almost a neutral condition. At the same time he calls attention to the fact that the benefit to health which generally results from a free use of milk, vegetables and fruits may be attributed in part to the fact that these foods yield alkaline residues when oxidized in the body. This is not the only value which comes from the consumption of such foods, for in them are found notable mineral supplies and vitamines.

The antiscorbutic properties of foods is the subject of Chapter XII. The effect of cooking on the antiscorbutic properties shows that cabbage was not greatly injured after cooking for an hour but carrots were. Cauliflower was still a good antiscorbutic after cooking for half an hour but suffered after longer cooking. Potatoes still maintained their good properties after half an hour's cooking, likewise turnips and kohlrabi. The conflicting views respecting antiscorbutic properties held by different authors are given proper recognition.

The antineuritic properties of foods also receive proper attention and a historical résumé of the causes of beriberi is given. The author calls attention to the fact that in the improvement of the Army ration for the Philippine Scouts in addition to supplying unpolished rice to the soldiers an important change could have been made by substituting some whole grain product for the white flour. It is now well known that a diet consisting too largely of white flour may in itself be responsible for beriberi. The author fails to call attention to the very illuminating experiments of the Public Health Service on this important question, especially Reprints No. 333 and No. 471 by Voegtlin, Lake and Myers. They probably were issued too late in 1918 to be cited in this work.

The reviewer regrets that space will not permit him to cite many other portions of the book, which is full of valuable information presented in a most accessible manner. This volume of Sherman's is a particularly welcome addition to the library of school books relating to health.

H. W. WILEY.

Methods of Measuring Temperature. By EZER GRIFFITHS, D.Sc. (National Physical Laboratory) with an Introduction by Principal E. H. GRIFFITHS, F.R.S. Griffin & Co., Ltd., London, 1918. 176 pp. 16 × 23 cm. $2.25.

"The present volume is written for those concerned with the measurement of temperature, whether in scientific investigations or in the control of industrial operations. Attention has been devoted chiefly to the experimental basis of the methods in general use, the calibration of the instruments, and the precautions which must be observed in practice."

Following this plan, the author devotes his first chapter to the principles and fundamental experiments on which the commonly accepted scale of temperatures is based. Succeeding chapters take up the mercurial thermometer, the resistance thermometer, the thermocouple, the total radiation pyrometer, and the optical pyrometer. The final chapter discusses the melting points of the refractory oxides and higher-melting metals, the boiling points of metals, and other problems concerned with temperatures above 1500°. An appendix gives boiling-point tables for water and sulfur, and tables for the platinum resistance thermometer. A useful feature of the book is the selected list of references following each chapter.

The treatment is necessarily very brief, and the emphasis is placed on experimental results, procedures, and precautions. The chapter on the fundamental scale is the merest sketch, yet it covers the ground very comprehensively. Exception might be taken to the statement in the introduction, by E. H. Griffiths, concerning the accuracy of Callendar and Griffiths' original value of 444.53° for the sulfur boiling point: "—various observers, both here and in the United States, have since redetermined the boiling point of sulfur under varied conditions, and their investigations have but the more firmly established the conclusions we arrived at, and, as stated on page 8, *infra*, the value 444.53° is at the present time the generally accepted value of the boiling point of sulfur on the thermodynamic scale." Now, Callendar and Griffiths' value of 444.53° was on the Centigrade constant-pressure air scale at 760 mm. pressure, which differs from the Centigrade thermodynamic scale at this point by 0.38°. The above statement, therefore, reads very much like citing the fact that the freezing point of mercury on the Centigrade scale is —38.7°, and on the Fahrenheit scale, —37.7°, as evidence that the original Fahrenheit determination was accurate to 1.0°. The author's intention is clear to those familiar with these researches, but there is, nevertheless, for the

average reader, a possibility of confusion here in interpreting from the literature temperature data which have been based on the sulfur point as a standard.

The book contains many useful and concise tables of the kind that must be painfully searched out of the literature until a well-summarized book of this sort comes to the aid of the investigator. A regrettable omission, however, in view of the wide use of thermo-elements, is the lack of any detailed tables of thermoelectric data, corresponding to the resistance thermometer tables given in the Appendix. Another important omission, in connection with thermo-elements, is the absence of any reference to the compact and useful portable potentiometers which are now available, and which are far more reliable than any indicating instrument of the millivoltmeter type.

The author accepts the high-temperature scale of Day and Sosman (on which the palladium melting point is 1549°) as his standard above 1100°. It should be mentioned here that several American investigations of recent date, using radiation and optical methods, have tended to raise the palladium point by amounts varying from 2° to 5°. It is very necessary, in settling questions such as this, that the fundamental experimental basis on which our realizable (as distinguished from our ideal) temperature scale is based should be kept clearly in view, because the measurable quantity which we call "temperature," related as it is to entropy, energy, and thermal capacity, is peculiarly subject to the kind of reasoning that goes in a circle or proves one assumption by means of another. The whole subject is ripe for international study and agreement, to the end that generally accepted standards may supplant the existing anarchy.

ROBERT B. SOSMAN.

The New Science of the Fundamental Physics. By W. W. STRONG, PH.D. S. I. E. M. Co., Mechanicsburg, Pa. pp. xii + 107. 1918.

In the preface the author says: "There has been in the writer's and there is probably among all of us an intense longing for the fundamentals in life. . . . The unsophisticated might be awed into believing that surely the pages of our select journals and books of science written by the inspired disciples direct from the research fields of nature, would contain in them part of the real philosopher's stone; and this I sincerely believe is true. Those of us who have been in those fields of research also know that they are indeed stony—stony even unto becoming a wilderness of doubt; and that while sojourning there we must subsist upon the manna of our optimism, else the promised fundamentals beyond the Jordan become clouded by the fleshpots of our Egypt of selfish 'what's-the-use' philosophy, and that we may still be in pursuit of the fundamentals when every citizen possesses a heart enriched by the experiences of Gethsemane,

and whose mind has been trained by years of fruitful research in the fields of knowledge."

The chapters are entitled: the goal of the new science; the disappearance and conservation of energy, electric charge and mass; ionization phenomena; the gateways of knowledge and the growth of science; some problems in physics; the directed elements; the entity systems of the universe; the atomic structure of matter and the equipartition of energy in the Newtonian world; the disintegration of atoms by radioactivity and the nature of our system of matter elements; some models or atoms and atomic nuclei; the Ritzian atom, the magneton and the neutron; the corpuscular theory of light; Huygens' secondary wavelet centers; the electromagnetic theory of radiation, the theory of gravitation and the equipartition of energy; the electric nature of the ether, the hypothesis of the electroethons and radions; some of the universal constants of nature; the fundamental definitions and units and the Ceer theory; the elementarquanta theory; the relativity theory.

The author is sometimes difficult to understand (p. 30), "The mental world then, is pictured as an ensemble of the fundamental elements of the natural world directed by angel elements of which we, as individuals, are entity systems. We may assume that angels may posses as fine-grained a structure as the natural entities, and that the angel elements are as certainly conserved and non-disappearing, though as subject to transformation, as are the elements of the natural world. Should we care to do so, the electrical attributes of the positive and negative could be assigned to the mental elements as they have been to ordinary matter and the ether thus making a complete parallelism in this triune ensemble."

When the author adopts a humorous view he is at least intelligible (p. 40), "The operation of illy defined forces to produce entity systems is illustrated in the university. A man must be either a chemist or a psychologist or some other type of entitist or else he finds himself alone, ostracized and running little chance of securing a stable position in the satellite electrons that are drawn to the nucleus president and board of trustees by the financial forces. The brilliancy of illuminating knowledge to the surrounding spaces of ignorance and the reception of all the hard blows is the function of the satellite electron teachers while all the force of the system is held by the central nucleus. And if the system is subjected to outside criticism the divine rights of the complacent powers complacently permits of the ejection of one or more of the outer electrons. So we perceive the faint echoes of the elementary material systems resounding in the clash and din of the far removed entities in the realms of life, even in the sacred institutions of learning."

This kind of book is always printed privately.

WILDER D. BANCROFT.

Lecithin and Allied Substances, the Lipines. By HUGH MACLEAN, M.D., D.Sc. Longmans, Green and Co., London, 1918. Price, $2.25 net.

This work is another of the splendid series of "Monographs on Biochemistry" from the pens of English and American Biochemists during the last few years.

The subject is particularly difficult to present because the illy-defined chemical characteristics of this group of substances have caused many investigators to designate various mixtures as individuals. This has resulted in a literature peculiarly involved and difficult to carry in mind unless one is an active worker in this field. The author's presentation of the chemistry of these substances is clear and excellent. The nomenclature adopted is probably the best at the present time. The author distinguishes between "lecithin" which he regards as a mixture of lecithin and kephalin and "true lecithin" which thus far has not been isolated with certainty.

What the author means by the term "Lipolytic Lipase" is not clear. The biological aspect of the lipins receives but scant treatment. The author states that on account of war duties he was unable to present this phase of the subject as fully as he desired without indefinitely delaying publication. Not the least valuable part of the work is the extensive bibliography. The author is very modest in presenting his own work and very fair apparently in his treatment of other investigators.

The monograph is up to the high standard of excellence which its predecessors established. A. S. LOEVENHART.

A History of Chemistry. By F. J. MOORE, PH.D., Professor of Chemistry in The Massachusetts Institute of Technology. McGraw-Hill Book Company, New York, 1918. xiv + 292 pp. Price, $2.50.

This volume is the outgrowth of a series of lectures given by the author for several years to members of the senior classes who were specializing in chemistry in the Massachusetts Institute of Technology, and is therefore addressed immediately to the advanced student in chemistry; but the treatment is of such a character and the presentation so lucid and readable that the belief expressed in the Preface "that few portions of the book will present serious difficulties to the general reader" seems justified.

Instead of a formal and detailed survey of the growth of the science from its earliest beginnings, "the aim has been to emphasize only those facts and influences which have contributed to make the science what it is today." The history of alchemy is very briefly outlined, and "the claim of a topic for consideration has not been its practical but its historical importance. It has been asked, not whether the work was itself of value, but did it contribute a new fundamental idea."

The result is very satisfactory. In less than 300 pages Dr. Moore has given a clear and well-proportioned sketch of the most important steps in the development of the science, with genial comment on the personalities of the chief actors and effective exposition of the parts they played. Some 70 illustrations—more than half of them portraits—embellish the text.

The book is a very well worth while contribution to the historical literature of chemistry. JOHN L. STODDARD.