about 2,000 cards of standard library size would be printed annually. The issue would be fortnightly. Each card would contain the author's name; the title; the date and place of publication; the abstract; the name of the expert writing the abstract; two cross-references, each with reference numbers according to the Dewey system; and, finally, the special data required by the mailing law. Composed in linotype brevier, a clear, easily read type, the space available for the text of the abstract would hold about 225 words. The average length of abstracts in the *Centralblatt für Physiologie* is about 200 words. Where the abstract is too long to be printed on one card, a second, or a third, would be used. A thousand cards will "bulk" nine inches.

The regular issue would consist of an original and two duplicate sets. The original set could be arranged alphabetically by the names of authors. The duplicates could be arranged by subjects, with the aid of the cross-references or the Dewey numbers. Suitably printed guide cards, and filing boxes of stout cardboard, the corners strengthened with metal, would be furnished. The price per year, *i. e.*, for about 6,000 cards, with sufficient printed guides and filing boxes, would be ten dollars, postage free, to subscribers in the United States and Canada, and twelve dollars and a half to foreign subscribers, the additional charge being the excess of foreign over domestic postage.

It is agreed that no charge would be made for editorial and business management, that the remuneration of the writers of abstracts would be merely nominal, and that any excess of receipts over expenditures would be applied toward increasing the value or diminishing the price of the publication to the subscriber. Scientists are obliged to collect all the literature of their special subjects. It is believed that the additional labor of putting these gleanings in shape for publication will be repayed in large part by the general saving of time and trouble which the new publication would undoubtedly effect. Besides, the work is a public service.

It has already been said that the Trustees of the Boston Public Library have not yet acted finally upon this proposition. In the event of their deciding that the Library shall not increase its usefulness in this particular direction, it is hoped that means will be found of printing elsewhere. The success of this undertaking in physiology would mean the issue of similar publications in other sciences and the saving of much valuable time now wasted in unprofitable rummaging.

WILLIAM TOWNSEND PORTER.
HARVARD MEDICAL SCHOOL, September 7th.

SCIENTIFIC BOOKS.

The Soluble Ferments and Fermentation. By J. REYNOLDS GREEN. Cambridge. 1899. Pp. 438. [From the Biological Series of Cambridge Natural Science Manuals.]

Enzymology, or the science of the soluble ferments, is a rapidly growing branch of physiological science. Numerous observations bearing upon it are so widely scattered through chemical, botanical, bacteriological, physiological and other journals that it is somewhat difficult to follow its progress and make a systematic summary of the subject. The books thus far published do not treat the entire subject from a physiological aspect. The work of Gamgee, published in 1893, on the chemistry of digestion, is intended especially for the *physician* and treats very ably the enzymes of the animal body, while the work of Effront, *Les enzymes et leur applications*, published in 1896, has especially the *technical* side in view, although it does not neglect the purely chemical details of recent investigations. Reynolds's book attempts more; it undertakes not only to give a detailed description of the enzymes and their actions, but also to bring before us all the physiological relations in plants and animals. It is divided into twenty-four chapters. The first treats of the nature of fermentation and

its relation to enzymes. Chapters I. to IX. treat of enzymes acting upon various carbohydrates; they comprise diastase, maltase, inulase, cytase and others. Chapter X. considers the glucoside-splitting enzymes, as emulsin, myrosin, rhamnase and others. Chapters XI., XII. and XIII. treat of proteolytic enzymes, as pepsin, trypsin, papain, bromelin, etc. Chapter XIV. describes the fat-splitting enzymes, and the following three chapters the clotting enzymes, rennet, thrombase and pectase. Then follows urease and hystozym. Chapter XIX. is devoted to the oxidizing enzymes, and Chapter XX. to the alcoholic fermentation. Chapter XXI. treats of the fermentative power of protoplasm, Chapter XXII. of the secretion of enzymes, Chapter XXIII. of the constitution of enzymes, and Chapter XXIV. of the theories of fermentation.

In the preface and first chapter the author defines his own position in regard to views on fermentation. He lays stress on the relations between "fermentation in the broad sense and the general metabolic phenomena of living organisms." Recent discoveries "have shown more and more plainly what a prominent part is played by enzymes in intracellular metabolism, till it has become clear that the distinction drawn between organized and unorganized ferments is based upon an incomplete acquaintance with the metabolic processes in both higher and lower organisms, and must now be abandoned entirely in the light of fuller knowledge." He defines consequently fermentation to be the "decomposition of complex organic material into substances of simpler composition by the agency either of protoplasm itself or of a secretion prepared by it."

While this general view hardly requires any further comment, grave doubts may be expressed as to the correctness of his general view on the characteristics of protoplasm. The author adopts the views of Pflüger and Detmer, and believes in its "continually undergoing decomposition and reconstruction." This decomposition can, however, continue for only a short time, as otherwise death would result before reconstruction could take place. To explain the principles of life as a perpetual destruction and reconstruction of protoplasm shows very erroneous conceptions. The material destroyed in the process of life consists of 99 per cent. of carbohydrates, fats and passive proteids of the food, but not of the living matter itself. The general descriptions in Green's book of enzymes and their physiological relations correspond to the relations of the plant physiologist. We find in Green's book excellent paragraphs on diastase of secretion and diastase of translocation; on the condition of secretion of diastase and the condition of the action of diastase; on cellulose, dissolving enzymes, and on vegetable trypsins. But wherever the progress of modern *chemistry* comes into play the physiological chemist will hardly be satisfied. The author ignores the principle of chemical *lability* of the proteids of living matter and in enzymes, by which property heat can be converted into mechanical energy.

The author has overlooked further certain points in recent chemical literature; otherwise he would not have mentioned (p. 168) antipeptone as a chemical substance. Recent investigations have placed beyond doubt the fact that the so-called anti-peptone is no peptone at all, but essentially a mixture of several bases, viz., arginin, lysin, histidin.

Further, Green mentions on page 174 the artificial production of an albumin from peptone by acetic anhydride, although it was shown several years ago that in this way merely an acetyl peptone, but no true albumin, is obtained.

In regard to the preparation of diastase Green describes several methods, but not without making various errors. In the first place he calls the method which makes use of basic acetate of lead for the isolation of enzyme Loew's method, while it was Wurtz who applied this method first and with great success in the isolation and purification of another enzyme papain.*

In the second place Green calls this method untrustworthy, although he did not control it by a single experiment, but merely relied upon the judgment of a young chemist, who in the first investigation he had ever published failed to obtain a powerful diastase. This was, however, due to the fact that he had not yet ac-

* *Comptes Rendus*, 90, 1379 and 91, 787

quired the necessary skill and had disregarded necessary precautions for the treatment of such a delicate substance as diastase. In the third place Green gives a detailed account of Loew's method for the preparation of diastase which is totally *erroneous*, since neither calcium salts nor caustic soda nor acetic acid mentioned in that description has ever been used in this method. Further, the diastase was not obtained from the precipitate produced by basic lead acetate, as Green states, but from the filtrate of that precipitate. Those readers who wish to compare the method in question with Green's remarkable translation are kindly referred to Pflüger's Archiv, Vol. 27, p. 206.

Another erroneous statement is found on page 113. We read there: "Invertase has been described by Atkinson and by Kellner, Mori and Nagaoka as existing in rice and in Koji, a peculiar preparation of that cereal which is much used by the Chinese in the preparation of fermented liquids." The statement that the authors noted had found invertase in *rice* is incorrect. They have found it in Koji, which consists of a growth of *Aspergillus oryzæ* on *boiled* rice, and, as these authors have proved, it is that fungus which contains the invertase, and not the rice in which this enzyme could hardly have been suspected. Further, it might be mentioned that the Japanese make relatively as much use of Koji as the Chinese.

As to the names adopted for new enzymes it may be mentioned that in Chapter IX. the name *glucase* is used for the enzyme which splits maltose into two molecules of glucose. Various chemists, however, have agreed that for the sake of uniformity the new enzymes should be named after the compound acted upon and not after the compounds resulting from this action. Consequently, the name *maltase* and not *glucase* is now in universal use with physiological chemists, which name, however, is only once mentioned in parenthesis in Green's book. In the chapter on the oxidizing enzymes we find detailed accounts of various investigations on laccase, tyrosinase, oenoxidase and animal oxidases. One very essential point, however, has been overlooked by Green, namely the distinction between oxidases and peroxidases, the former yielding *directly* a blue color with dilute guaiac tincture* in presence of air, the latter only in presence of hydrogen peroxide. The former are, therefore, to be considered as the more powerful, since the rather *indifferent* oxygen of the air can be brought into action by them, while the peroxidases want, at least in their action upon guaiaconic acid and some other compounds, —oxygen in *statu nascendi*, *i. e.*, oxygen in a state of motion or charged with kinetic chemical energy. That hydrogen peroxides is generally decomposed by enzymes with liberation of oxygen is known and this oxygen in *statu nascendi* is more powerful than the common oxygen of the air.

In the very ably treated chapter on the secretion of enzymes we miss the investigations of Bruno Hofer, who was the first who demonstrated the direct connection of the nucleus with the formation of the enzymes.

On page 370 an erroneous conception is ascribed to Nägeli. He never entertained the opinion that the chemical powers of the enzymes are essentially different from those of the fermenting organisms. He supposed also in the enzymes certain motions (although less energetic ones) to be the cause of their actions, and defended this view against Kunkel.† The quoting of Fischer by Green is entirely unjustifiable in this connection.

In the interest of a future edition of Green's book, which would gain by a little less bias we mention the following typographical errors:

On page 49, line 32 for Grüber, read Gruber.
" " 87, " 16 " Ganz " Gans.
" " 100, " 22 " " " "
" " 113, " 22 " Nagaoko " Nagaoka.
" " 273, " 17 " Mallevre " Mallvère.
" " 288, " 28 " Schmiedeburg read Schmiedeberg.
On page 340, line 15 for Pfluger read Pflüger.
" " 177, " 37 " Loew's method read Wurtz's method.

Notwithstanding some unjustifiable remarks and some erroneous chemical statements, the

* Guaiac tincture is a very valuable reagent in the hands of a cautious chemist who discriminates and controls. It is unreliable only in the hands of untrained persons. Above all, it has to be frequently renewed and to be kept cool in the dark.

† Sitzungsberichte der Bayrischen Akademie der Wissenschaften, 1880, p. 385.

book is a valuable contribution to the scientific literature of the subject. It can be well recommended to students of physiological science. Teachers will find in the practical arrangement of the book and in the summaries of views only to be found in widely scattered publications, a welcome guide for arranging their lectures on this subject. Investigators, however, will always prefer to consult original contributions rather than text-books or handbooks.

Oscar Loew.
U. S. Department of Agriculture.

Annals of the South African Museum. Volume I. Part 2. March, 1899.

The first of the papers (V. in the series) in this volume is 'On the Species of Opisthophthalamus in the Collection of the South African Museum, with Descriptions of Some New Forms,' by W. F. Purcell. The treatment of the genus is brought to a conclusion, three new forms are described, and the localities and local peculiarities of the specimens, numerous in the collection, are given at some length. In conclusion, the synopsis of all species known to the author, begun in a previous paper, is brought to completion. Article VI. is a 'Descriptive List of the Rodents of South Africa,' by W. L. Sclater, and is published as preliminary to a greater work on South African mammals. The genera are arranged according to the list published by Oldfield Thomas in the *Proc. Zool. Soc.* for 1896, and 62 species are mentioned, one *Malacothrix pentonyx* being new.

Article VII.—'Fifth Contribution to the South African Coleopterous Fauna,' by L. Péringuey, is devoted to the description of new Coleoptera, mostly in the collection of the museum.

Article VIII.—'On the South African Species of Peripatidæ in the Collection of the South African Museum,' by W. F. Purcell, gives full descriptions of the external systematic characters of three out of the four previously described species, with descriptions of four new species. These are *Peripatopsis leonina, P. sedgwicki, P. clavigera* and *Opisthopatus cinctipes.*

Article IX.—(by a misprint given as X.), 'A Contribution to the Knowledge of South African Mutillidæ,' by F. Péringuey, describes 26 new species. This brings the number of South African species of this family to 169, but the number of which both sexes are definitely known is only 16.

The final paper X.—'Description of a New Genus of Perciform Fishes from the Cape of Good Hope,' by G. A. Boulenger, describes and figures *Atyposoma gurneyi.*

F. A. Lucas.

A Catalogue of Scientific and Technical Periodicals, 1665–1895. Henry Carrington Bolton. City of Washington, Smithsonian Institution, 1897. Second edition, pp. vii + 1247.

The first edition of Dr. Bolton's catalogue, issued in 1885, has been a great aid to scientific men and to scientific research, and a second edition, with many additional titles and much revision, is very welcome. The former edition contained the titles of 4,954 periodicals, and the present edition adds about 3,600 new titles, and gives further information in regard to many of the periodicals described in the first edition. Regarding all these journals full details are given—the date of establishment, the number of volumes issued, the place of publication, the editors, etc., including a history of the vicissitudes undergone by so many scientific journals. Over 200 pages are added, giving chronological tables, a subject index, and a check-list, showing in what American libraries the more important periodicals may be found.

The first part of the alphabetical catalogue is reprinted from the plates of the first edition with certain corrections. Then in the second part are the additions that could not be inserted in the plates and the new titles. This double alphabetical index is very inconvenient. It may indeed be reasonably claimed on various grounds that stereotyping is an invention for the retardation of science. The volume appears to be remarkably free from typographical errors in spite of the difficult proof reading, but it is not free from errors in compilation. Thus if we take the three leading American journals of general science, we find it said (referring to 1895), that the *American Journal of Science* is edited by 'James D. and E. S. Dana and B. Sillimann.' The *American Naturalist* is said to