mentioned that a few of those plastic figures are somewhat unclear, apparently due to a failure in the execution of the original drawing.

The arrangement of the contents is very convenient. We find in the first part, according to the generally accepted plan, the description of the ovum, maturation, fertilization, cleavage, formation of the germlayers and the fundamental processes in development of the embryonic body, and finally the fœtal membranes. The following chapter contains an exhaustive and very useful account of the growth and external development of the human fœtus, especially during the first two months, together with some data on measurement and the determination of age.

The second part of the book deals with the development of the *special organs*. In arranging this material the author follows the customary method of systematic anatomy, describing first the development of the skeleton and the muscular system, and then going on with that of the intestinal tract, the circulatory apparatus, the nervous system, and finally the skin and the sensory organs. Such an arrangement has many advantages and is obviously adapted especially for medical students. Scattered through the descriptive text we find also some theoretical discussions which are usually marked off from the main text by smaller type. These discussions touch upon questions of special interest for a better appreciation of certain points in human ontogenesis.

In criticising the treatment of the material in Professor Kollmann's text-book one deficiency in the reviewer's opinion seems to be rather serious—that is, the almost absolute neglect of the *histological* differentiation of the tissues in general as well as of the different organs, together with a lack of figures illustrating these processes. These processes are not only of interest for the professional embryologist, but also to a high degree for the medical student, in so far as an adequate knowledge of them is of preeminent importance for a satisfactory understanding of so many physiological and pathological processes of the organs. Hence it seems to the reviewer that in a modern text-book of embryology this important part of development should not be entirely omitted, all the more as recent investigations have thrown more light upon these very complicated processes, and as the field of *cellular* embryology will be more and more cultivated.

These deficiencies, however, in Kollmann's text-book do not interfere with its peculiar excellence, which lies in the exact *anatomical* treatment of the developing organism, together with the elucidation of the text by numerous very instructive illustrations. It is in this especially that the book forms a valuable addition to our embryological literature and deserves to be highly recommended. The different chapters are in general well balanced. The text is concise and clear. Print and reproduction of illustrations are according to the high reputation of the publisher.

Alfred Schaper.

A Primer of Psychology. By Edward Bradford Titchener. New York and London, The Macmillan Co. 1898. Pp. xvi + 314, Price, $1.

As the scientific claims of psychology are more widely recognized, there is an increasing demand for elementary text-books on the subject. Professor Titchener has in mind the difficulties of the beginner, and while there is more science and less glitter in this *Primer* than is common in courses of 'science made easy' it can scarcely fail to interest the novice as well as instruct him. The fundamental concepts are defined with unusual clearness, and every difficult point, as soon as it comes up, is carefully explained, often with the help of illustrations taken from literature or the physical sciencese

The *Primer* is not intended primarily as a course in experimental psychology. The body of the text is rather analytic, although the chief results of experimental research, such as Weber's Law, are given much space. As would be expected in a work by Professor Titchener, the whole treatment of the subject is largely influenced by this branch. Among the many practical exercises found at the end of each chapter, as much in the way of experimental demonstration is included as is practicable for classes with only a limited supply of apparatus at command. When on debated ground the author generally adheres to the theories

most widely accepted among leading psychologists, in preference to his own as expounded elsewhere. For example, he does not attempt to treat the *idea* as a centrally initiated sensation, but allows it a separate place in the analysis.

The arrangement of chapters is certainly logical, though it will probably not appear so to the beginner. The complexity of the subject is not adequately set forth, and (except on the active side) no analysis is given, such as would show the successive degrees of complexity. Thus the pupil is led, first through sensation, feeling and attention, then to perception, idea, emotion and simple action, and finally to memory, thought, sentiment and complex action. Unless his attention be specially called to the matter, he may easily fail to notice the close relation existing between sensation, perception and thought, or that between feeling, emotion and sentiment. A general scheme of these relations would have done much to clear up the subject in the mind of the novice.

The psychology of action is admirably treated, considering the difficulty of the subject. In the prominence given to attention, and the rejection of innervation feelings, Professor Titchener follows the trend of recent discussion. The question of the exact relation of action to consciousness is very properly avoided. On the other hand, impulse, reflex movement, instinctive action, etc., are thoroughly discussed, and this prepares the way for a scientific treatment of selective action and volition in a later chapter. The problem of the freedom of the will, which could scarcely be avoided in a volume of this character, is clearly set forth, and the discussion limited to its psychological aspect.

Perhaps the most noticeable departure from the accepted mode of treatment is found in the chapter on thought. The author makes judgment the primary thought-process. But he apparently limits the term 'judgment' to the first instance in which any particular judgment (as ordinarily defined) is made. "Judging," he says, "is a process of rare occurrence in consciousness. * * * Every generation receives a heritage of judgments from the preceding generations. * * * Even if we wish to judge for ourselves, there are so many past judgments on record in books, and so many others to be had for the asking from our elders, that independent thought is difficult—it follows from all this that propositions like 'The grass is green' are not judgments at all; they do not express results which we have gained laboriously by active attention. That they have the form of judgment may be due either to the fact that they were judgments once, generations ago, or merely to the fact that we cannot utter more than one word at a time, and must, therefore, give the parts of our idea successively. It is only when * * * a total idea is actively divided up that true judgment occurs." (P. 217.) "The 'material' which is worked over and divided up by the attention in judgment" is the "*aggregate idea.*" "A predicate which is common to several judgments is termed a *concept.* * * * The concept is always a word." (Pp. 218–219.) Again, he says: "Thinking is active imagination carried on in words." (P. 213.) Throughout the discussion one feels that too great emphasis is laid on words. Professor Titchener distinguishes sharply between imagination (imaging in kind) and thought and conception (symbolization in words); whereas the general position of psychological text-books would make it appear that the image is closely associated with the word, and accompanies it, as a 'fringe,' at least, in every process. This is not the place to discuss the theory, but it may properly be noted that the author departs here from his own rule that the generally accepted views should be adhered to in an elementary text-book.

The chapter on abnormal psychology includes sleep and dreams, hypnotism and insanity. The chief matters of interest to the beginner in these departments are well summed up; it would be impossible to give more than a summary in twenty pages. In the concluding chapter the province and methods of child psychology, comparative psychology, etc., are pointed out, and the relation of psychology to ethics, logic and pedagogy touched upon. At the end of each chapter throughout the volume are references to passages in other general works where fuller treatment of the topics can be found, while references in the body of the text to physiological and physical works enable

the reader to supplement the necessarily brief discussion of such topics. The apparatus for experimental work is well selected, and gives opportunity for typical demonstrations on almost every problem, with a minimum of cost, while many additional exercises are given, for which no special apparatus is needed.

H. C. Warren.

SCIENTIFIC JOURNALS.

Journal of Physical Chemistry, May. 'The Transference Number of Hydrogen:' by Douglas McIntosh. An attempt to determine the transference number for hydrogen in different circles by the Helmholtz method, using gas electrodes, but it was found that the method is not applicable to gas cells, probably owing to the solubility of the electrode in the electrolytic solution. 'Single Differences of Potential:' by Hector R. Carveth. The conclusion is drawn that the values given by drop electrodes does not give true single differences of potential. 'Acetonechloroform:' by Frank K. Cameron and H. A. Holly. A study of the camphor-like substance discovered by Willgerodt formed by adding potassium hydroxid to a mixture of acetone and chloroform. From the formula of the substance it would appear to be a simple addition-product, but this is shown not to be the case, and it cannot be resolved into its constituents by direct means. While the substance contains water, it is present not as a hydrate, but apparently in a solid solution. Notes on new books, including an excellent review of the last edition of Mendeléef's Principles of Chemistry; Journal Reviews.

The *Astrophysical Journal* for May, completing the seventh volume, opens with an article by Professor J. Wilsing, of the Potsdam Astrophysical Observatory, which argues that the results obtained by Messrs. Humphreys and Mohler on the influence of pressure on the wave-length of lines in the spectra of the metals can be explained as an effect of damping of the vibrations to which the emission of light is due. Mr. R. H. Tucker, of the Lick Observatory, follows with an article on 'The Correspondence of the Photographic Durchmusterung with the Visual.' Mr. C. W. Crockett, of the Rensselaer Polytechnic Institute, reviews in two articles the caustic of the right parabolic cylinder and the parabolic mirror. Mr. Frank McClean contributes a paper read before the Royal Society on a comparison of oxygen with the extra lines in the spectra of the helium stars, as also a summary of the spectra of southern stars, and Professor H. A. Rowland and Mr. C. N. Harrison contribute the final article on 'Arc Spectra of Zirconium and Lanthanum.'

The sixteenth volume of the *Educational Review* commenced with the June number, which includes the following articles: 'Harris' Psychologic Foundations of Education,' by John Dewey: 'Scope and Function of Secondary Education,' by Nicholas Murray Butler; 'Teaching European History in College,' by James H. Robinson; Religious Periods of Child-growth,' by Oscar Chrisman; 'Better Training for Law and Medicine,' by Charles F. Thwing; The Key to Rousseau's Emile,' by Samuel Weir, and 'Attitude of Massachusetts School Authorties toward a Science of Education,' by John G. Thompson.

SOCIETIES AND ACADEMIES.

THE CHEMICAL SOCIETY OF WASHINGTON.

The regular meeting was held on April 14th.

The first paper of the evening was read by Dr. Hillebrand and was entitled 'The Volumetric Estimation of Vanadium in the Presence of small Amounts of Chromium, with especial Reference to the Analysis of Rocks and Ores.' When chromium has been estimated colorimetrically, as detailed in a previous paper, the vanadium can, in many instances, be estimated without separation from the chromium by the well-known method of titration with $KMnO_4$. With considerable chromium present the error is increased by the difficulty of getting sharp end reaction, due to the color of the chromic salt and to the oxidizability of Cr_2O_3 in hot solutions, but the author shows how to ascertain and apply a proper correction within certain limits.

The method is especially applicable to rocks, iron ores, clays, coals, etc., in which chromium is seldom an important constituent quantitatively.