Professor Barr has placed within reach of the teachers of the subject a concise, yet, within its range, very complete and a very admirably planned and well-written, treatise on kinematics. The book is the outcome of a number of years experience in the methods of instruction adopted, and, privately printed, has been kept under revision until it was thought sufficiently well settled as to form and extent to justify its more general use. These years of experience in class-room work before publication insure the elimination of probably substantially all those inevitable errors of omission and of commission which mark a first edition of practically all works not thus first well pruned out in advance. The substance of the book consists of a clear and concise presentation of those main principles which find most frequent and general application in the work of the designing mechanical engineer; it is a work of application rather than an attempt at complete and purely scientific development.

The systems of treatment and application are standard with the engineer and follow the best authorities wherever practicable, and credit is frankly given to Willis, Rankine, Reuleaux, Kennedy and others, in all departments.

The discussions of fundamental concepts, methods of transmission of motion, gearing, cams, linkwork and wrapping connectors, are all excellent and the treatise gives internal evidence of preparation by an author practically as well as theoretically familiar with his subject. There is presented just such a combination of the purely scientific with the applied science of kinematics in mechanical engineering as is now in most general demand among the technical departments of our colleges and universities. At its close is appended a very useful collection of exercises and problems in illustration and application of the principles enunciated in the body of the text. Such a collection of examples has been much needed in this subject and its preparation reflects great credit upon Professor Brügel, who supplied the greater part of this division of the work, and entitles the author of the book to hardly less credit for his good judgment in making use of them.

The illustrations are well-chosen, well-made and well-printed, and the book, as a whole, is a very excellent piece of book-making and a credit alike to author and publishers.

R. H. Thurston.

Darwinism and Lamarckism, Old and New. By Frederick W. Hutton, F.R.S., etc. New York, G. P. Putnam's Sons.

This book embodies some four lectures, in which are discussed the general subject of evolution and, as indicated in the title, its Darwinian and Lamarckian aspects. Delivered at rather widely separated intervals from 1882 to 1898, they naturally lack somewhat in that continuity of thought and treatment desirable in a series of consecutive chapters. The author's apology for "adding to the already voluminous literature on Darwinism is that the subject is always advancing, and any attempt to convey that knowledge in simple language can hardly fail to do good, provided it be sufficiently clear to be understood at first reading, and sufficiently short to discourage skipping." His purpose is confessedly that of the expositor, and his treatment of the subject is generally directed to that end. At times, however, he assumes the attitude of the advocate, sparing no pains in using favorable evidence to the best possible advantage, and discounting that of an opposite character in corresponding measure.

A brief introductory chapter is devoted to the correction of certain misconceptions of Darwinism and answering objections urged against it, which, though old, are constantly being reiterated, as, for instance, the strictures of Lord Salisbury in his presidential address before the British Association in 1894. He also refers to evident advances which have taken place in biological thought within recent years, following his earlier lectures on the subject, notably the discussion of acquired characters, and to a less extent concerning social evolution. The concluding pages of this chapter he devotes to a discussion of 'The Objects of Evolution,' in which there are apparent certain teleological aspects and tendencies of a somewhat antiquated type; as, for instance, when he undertakes to show special design in the presence of gold, silver, lead, zinc, etc., which, but for the presence of man, could have had no place in the economy of nature! To say that "not only

were these made for man, but they appear to have been made as rewards for the exercise of his intellect," may satisfy the inquisitions of the author, but it may be quite an open question as to its conclusiveness to the intellect of the average Darwinian. Similarly, when he proceeds to say "There are other substances, such as the rarer elements of which no use seems ever likely to be made, except the important one of stimulating inquiry"; he can hardly be said to materially contribute to the elucidation of Darwinism or Lamarckism, *new* or *old*.

The first lecture on Darwinism, while a fair summary of the general subject, is less a critical exposition of the essentials of his subject than a comparison with the main points in the theory of Lamarck, and of limitations to the theory. The second lecture, purporting to set forth the distinctive features of the 'The New Darwinism' is, however, very unfortunate in that it strangely confuses Neo-Darwinism with those special contributions made by Gulick and Romanes, the factors of isolation and physiological selection. For example, on page 84 the author says: "The Neo-Darwinians accept Darwin's teachings, and supplement the theory of natural selection with methods of isolation, which had been either overlooked or had not been brought into sufficient prominence by Mr. Darwin." It certainly can hardly comport with clearness of exposition to confuse these contributions, valuable as they may be, with those of Wallace, Weismann and others, which have given rise to the phrase Neo-Darwinism, and established it as an integral element of recent Darwinian literature. This oversight can hardly be attributed to any lack of acquaintance with the subject, for he makes frequent reference to it. It is, however, none the less unfortunate, and renders the entire lecture more or less misleading to the class of readers to whom it is specially directed.

In the chapter devoted to 'The New Lamarckism' the author is more fortunate in this respect, properly distinguishing the principles and representatives, and their special contributions to the subject. Upon the whole the discussion is good, though, as elsewhere suggested, he at times assumes the position of the advocate rather than the expositor. And yet, strangely enough, his final summary would seem to commit him to at least a quasi indorsement of the very principles he has been so ardently criticizing. For example, on page 215 he says: "It is generally allowed that children sometimes have the habits of their parents. This may occasionally be due to imitation, but I think not always. The jerking movements of the tails of many birds, and the side movements in that of the wagtails, are probably inherited habits, for they do not appear to be of any use. * * * If habits and instincts which have certainly been acquired can be transmitted, it is probable that physical characters can be transmitted also. The best instance of this is, I think, the eyes of flatfish, already mentioned; and until some better explanation can be found, we must assume that this is a case of use-inheritance."

Speaking of the "difficulty of explaining how great changes took place in the first pelagic organisms, notwithstanding the uniformity under which they existed," the author proposes, "as a possible way out of the difficulty, that the first variations were due to different organisms assimilating different substances with their food. * * * However this may be, we know nothing capable of initiating organic changes, except the action of external forces on protoplasm." So far from discrediting Neo-Lamarckism, these conclusions, in certain of their aspects, are just such as Neo-Lamarckians have urged in support of their theory.

In a chapter devoted to the discussion of 'Darwinism in Human Affairs,' the author undertakes to point out some more or less apparent analogies between natural selection and forms of selection seen in various human institutions. While emphasizing the operation of both physical and physiological factors in social and intellectual life, he suggests a significant caution against carrying such analogies beyond the warrant of facts. "The term 'social organism' is not, in fact, a happy one, because it is misleading. What, for instance, in the organization of an animal answers to the professions of law, medicine or theology? What to prisons or reformatories?"

As a series of lectures addressed to mixed audiences, and intended as popular expositions of Darwinian doctrine, they may serve in some

measure to extend interest and prompt further inquiry. But as a serious contribution to 'the already voluminous literature on Darwinism,' their value may be seriously doubted.

CHAS. W. HARGITT.

The Growth of Cities in the Nineteenth Century: A Study in Statistics. By ADNA FERRIN WEBER, Ph.D., Deputy Commissioner of Labor Statistics of New York. (Studies in History, Economics and Public Law, Columbia University.) New York, The Macmillan Company. 1899. Pp. xvi + 495.

It is one thing to know in a general way that a certain movement is in progress, and quite another to know its causes, rate of progress and full significance. That a remarkable concentration of population in cities has taken place during the present century is well known by all; that this change in the character of the population is a momentous one is appreciated by those who give thought to the matter; but the various causes that have given rise to this movement, and the full extent and influence of the change, are known to but few if any. This information Dr. Weber has attempted, and in the main attempted successfully, to supply in the present detailed statistical study.

With a remarkable command of authorities, both foreign and American, the author carefully traces the increasing concentration of population in large cities in all the important countries of the world. Successive chapters treat of the general phases of the movement and the methods adopted for its measurement, the history and statistics of urban growth in each country separately, the causes of the concentration shown, migration as a factor, the structure of city populations as regards sex, age, nationality and occupation, birth, death and marriage rates as affecting urban growth, a comparison of the physical and moral health of cities and country, the economic, political and social effect of urban concentration upon population, and finally a consideration of certain tendencies and remedies for evils to which the growth of cities has given rise.

The work abounds in statistical tables. One cannot but admire the painstaking way in which the problem has been considered in all its phases. At the same time the very detail with which this has been done is confusing. A proper discrimination has not always been exercised. Statistical tables have been inserted wherever the slightest opportunity offered, and many are of so slight importance that they could have been omitted without loss, or their results have been better stated in the body of the text. This is especially true where they are inserted merely for the purpose of illustrating collateral facts. The same criticism applies to the bibliographical references. While the constant reference to authorities and the insertion of bibliographical notes add materially to the value of the work, many of them are entirely unnecessary or foreign to the subject matter of the book.

Generally then, this monograph is a presentation of facts and bibliographical references concerning cities that will be of the greatest assistance to all persons wishing to study almost any problem connected with urban life. Its very exhaustiveness, however, makes it difficult for the ordinary reader to discriminate between the important and unimportant, or to learn what are the really significant results of this comprehensive study.

W. F. WILLOUGHBY.

J. N. BASKETT'S 'STORY OF THE FISHES.'

A RECENT book published by the Appleton's for their 'Home Reading Series' is 'The Story of the Fishes,' by J. N. Baskett. This is an attempt to popularize the anatomy and classification of the fishes, and gives as a separate 'Talk' an interesting account of the methods of fishing. The book is attractively presented for one of its kind: its figures are unusually good and it will prove a useful aid to a beginner—who is not fastidious in matters of scientific fact. The critical reader will find much to reprehend, for there are many inaccuracies and a deal of unbased theorizing. It is scarcely necessary to consider these shortcomings in detail, although a few should be noticed. In a pictorial phylogenetic tree the type of the ganoid is given as the 'gar-pike,' intended, of course, for *Lepidosteus*, but, unfortunately, the writer inserts the picture of a *gar-fish, Belone*, which is a well known and highly specialized