

descended from both of them; or, if not, our descendants (should we have them) will be.

Genealogies are not, as Professor Brooks states, 'represented by a slender thread of very few strands,' but by the branching tree to which he objects, except that there are many trees whose branches interlace and anastomose.

J. MCKEEN CATTELL.

COLUMBIA UNIVERSITY.

#### SCIENTIFIC LITERATURE.

##### RECENT BOOKS ON PHYSICS.

*Modes of Motion.* By A. E. DOLBEAR. Boston, Mass., Lee & Shepard. 12mo. 120 pp.

The second title of Professor Dolbear's little book is 'Mechanical Conceptions of Physical Phenomena.' It is essentially a popular presentation of the fundamental properties of matter as contrasted with those which the author assumes the ether to possess. Matter is contrasted with ether in reference to a series of twenty-two of its commonly recognized attributes, in none of which are the two found identical, and in the great majority of cases they are declared to be directly opposed to each other. Indeed the author makes special effort to demonstrate the absolute dissimilarity of matter and ether, and in so doing even goes so far as to declare that the latter in no way affects the senses. But he evidently believes in the possibility of transforming ether into matter and matter into ether and the indestructibility of matter or the impossibility of transmitting the elements he regards as tentative assumptions. A few sentences are devoted to a consideration of the origin of the ether itself, but the author finds quick refuge in the easy 'assumption that it was in some way and at some time created,' this being, he declares, more rational than to assume that it always existed. The book will be found readable and interesting by students of physical science.

*Deductive Physics.* By FREDERICK J. ROGERS, M.S. Ithaca, New York, Andrews & Church. 8vo. 250 pp.

This book deserves consideration by all who are seeking a satisfactory college text-book of physics. It is in many respects different from any of the almost innumerable candidates for this distinction that have appeared during the

past decade. Of these nearly every one has its merits and all have faults, but the variety is so great that the special necessities of almost every situation can be satisfied. There has been, however, a regrettable tendency in two directions. On the one hand, there have appeared several treatises very complete, very well prepared, but so large as to be really formidable and quite impossible of mastery in the time usually allotted to this subject in the college curriculum. The use of these compelled the adoption of the plan of omitting or 'skipping' many pages or even chapters, which is by no means to be commended under all circumstances. On the other hand, many college text-books are offered in which laboratory exercises are made so prominent as to seriously interfere with and often absolutely prevent a proper appreciation of the 'theory of physics.' Within a few years a few books have made their appearance in which both of these evils have been largely avoided and in which it has been attempted, as in the volume under consideration, 'to present, in compact though logically complete form, the principal facts, laws, definitions and formulas of the science of physics.' In the present instance the author has enjoyed a large measure of success. His definitions of fundamental terms and principles are, in the main, sound and discriminating. Although the discussions are generally concise, they are generally satisfactory, and no important phase of the subject has been entirely omitted. The illustrations are diagrammatic and clear and the leading propositions are illustrated and enforced by well-selected problems. No attention is given to experimental or laboratory exercises, but it is assumed that these accompany the use of the book whenever possible. In the opinion of the writer the author has made a mistake, unfortunately not an extremely uncommon one, in introducing several unauthorized and not generally recognized names for derived units, such as *kin*, *gramkin*, *spoud*, etc. This tendency towards multiplication of unit names has little to commend it and there is serious objection to it. It was the unanimous decision of the Chamber of Delegates of the International Electric Congress of 1893 that in electricity and magnetism

it was unwise to increase unit names beyond the small number then well fixed in actual use. The subject has been much discussed and it is believed that the weight of authority is against it. The student of physics and mechanics often loses sight of the thing and its derivation when a distinctive name is given to it, and while it is extremely convenient to distinguish by names a few of the fundamental and most important units of measure the number should be kept at the lowest possible limit.

*Problems in Elementary Physics.* By E. DANA PIERCE. New York, Henry Holt & Co. 12mo. 200 pp.

This book is intended for use in secondary schools along with some suitable text-book and with laboratory exercises. It contains a tolerably extensive series of problems illustrative of the quantitative character of the science and the exactness of its conclusions. They are, in the main, well selected and properly distributed. Occasional definitions, formulæ or brief explanations are inserted, intended to be suggestive of the principles involved in the solution of the problems. Some of the problems and statements are open to a criticism applicable to nearly all text-books of this class. They are mostly written by teachers in preparatory schools who have never themselves (it must be inferred) enjoyed a very thorough training in physics. This is shown in the common failure to recognize the *limitations* to which almost all laws are necessarily subject, or the restrictions which must guard their enunciation. It is impossible, of course, to assume that the teacher of elementary physics should know all of these, as it is impossible for the college professor, who is a specialist in the subject, to know them, but it is not impossible to avoid some of the more common errors of statement, and it would be of enormous value if both teacher and pupil could know and never forget that most of the simple statements of physical laws, either by word or by formula, imply a simplicity of condition which never actually exists in nature. It requires some knowledge, but not much extra time and trouble to guard instruction in this line and the result is worth many times the cost. The lack

of this is shown in a certain 'cocksureness' in elementary text-books and laboratory guides, as to what will or will not happen if you do so and so, and because the thoughtful and careful student is very likely to find that if things do *not* happen as described he is in danger of losing both confidence and interest. Nearly all books of the class under consideration abound in examples of this sort of thing. Instruction in physics in the secondary schools under the newer or laboratory methods is by no means the success that it is represented as being by those who have been its most active propagandists and the difficulty is not so much that lack of accurate scholarship has made a rigorous presentation of principles impossible, but rather that the great underlying philosophy of inductive science has continued unknown to both teacher and pupil. M.

*Insect Life.* An introduction to nature-study and a guide for teachers, students and others interested in out-of-door life. By JOHN HENRY COMSTOCK, Professor of Entomology in Cornell University and Leland Stanford Junior University. With many original illustrations, engraved by Anna Botsford Comstock, member of the Society of American Wood Engravers. New York, D. Appleton & Co. 1897.

In the college education of the present time nearly all science teachers are agreed that the introduction to natural history studies should begin in the lower schools, that instruction in biology should be as much a matter of requirement in the preparation for college as the study of foreign language. Many instructors of science in the colleges, while thoroughly believing that the principle is an excellent one, are not at all enthusiastic in the enforcement of such requirements, since natural history instruction in the preparatory schools is, as a rule, lamentably bad. A few perfunctory lessons in plant analysis, with neither enthusiasm nor knowledge on the part of the teacher, and much book work by rote is the rule rather than the exception, at least in the Western schools. It hardly matters what the boy or girl studies, so long as it is living organisms, if studied in the right way, and the right way is nature

itself. The training of the observational faculties is what the college instructor in natural history more especially desires in the preparation for higher work, and it matters little whether that training has been obtained in the study of botany, zoology, physiology or geology.

In the little work that has recently been published by Professor and Mrs. Comstock another step in the right direction has been made. The material for instruction in entomology is everywhere at hand, summer and winter, and for its abundance, diversity and instructiveness is unexcelled in any department of elementary biology; and 'Insect Life' has made the way plain for this elementary instruction in high schools and the higher grades of the grammar school under intelligent teachers. The work is an introduction to the study of animal life, calling for direct observation on the part of both teacher and pupil, and it is a better text-book for elementary instruction than any general work on botany or zoology can be, for classification is only an incidental part of the book. Excepting a few elementary chapters on the anatomy, metamorphoses and classification of insects, nearly the whole book is devoted to nature-study of the more familiar insects in their own haunts and in the laboratory. The concluding chapters tell in simple language how to prepare and preserve specimens for the cabinet. The pupil is encouraged to make a special study of some branch, and there can be no question but that such special study will do more to quicken his powers of observation and his enthusiasm than any amount of generalizations. The book fills a unique place in entomological literature and is to be highly commended. It is written simply and is fully and admirably illustrated by Mrs. Comstock.

S. W. W.

#### SOCIETIES AND ACADEMIES.

BIOLOGICAL SOCIETY OF WASHINGTON. 279TH MEETING, SATURDAY, OCTOBER 9TH.

MR. L. O. HOWARD exhibited a specimen of the Giant Water Beetle of Cuba.

MR. R. T. HILL, under the title 'Notes on Antillean Faunas, Past and Present,' gave a résumé of his studies on the geology of the region, describing the various upheavals and subsi-

dences that had taken place and their effects on the fauna of the West Indies and particularly of Jamaica. He stated that communication between the Pacific and the Gulf of Mexico was cut off much earlier than had been generally supposed.

Professor Barton W. Evermann spoke of 'The Catfish of Louisiana,' stating that few were aware of the extent of the fishery, 2,000,000 pounds being shipped annually. Two species were taken, *Ictalurus furcatus* and *I. nigricans*, the latter species having for some time been regarded as belonging to the genus *Amiurus*. During low water the fishes were taken in the bayous by means of extremely long trout lines, but during high water they were taken in the flooded woods, mostly on single lines.

Dr. Theo. Gill discussed 'The Inadequacy of the Order Bunotheria,' stating that the group was not a natural one.

F. A. LUCAS,  
Secretary.

NEW YORK ACADEMY OF SCIENCES, SECTION OF GEOLOGY, OCTOBER 18, 1897.

THE first meeting of the Section for the autumn was largely devoted to accounts by various members of the scientific meetings of interest held during the summer. President Stevenson spoke briefly of the work of the International Congress of Geologists at St. Petersburg. The Secretary spoke of the work of the Geographical Section of the British Association for the Advancement of Science, at Toronto, and Professor Martin gave a similar account of the work of the Geological Section at the same meeting. The principal paper of the evening, apart from these descriptions, was by Mr. Charles Bullman, who gave a descriptive account of the location and character of the auriferous gravels of the State of Colombia, illustrated by many specimens. In the opinion of the speaker, the auriferous gravels are of wide distribution and thickness, and of exceeding value, and much more extensively distributed than stated by Mr. F. C. Nicholas, who gave a paper before the Academy on the same topic at one of the spring meetings. The speaker believes that the gold deposits are still being laid down with consider-