

examinations conducted by examiners at a distance fails and must necessarily fail to discriminate between two effects superficially and temporarily similar, but really and permanently different."

He adds: 'The natural antithesis to written examinations is a system of inspection.' He weighs the difficulties of inspection in a national provision for secondary education, and would find a formula for some form of consultative committee with the state—'neither to have too much state nor too little state.' "*Laissez-faire* is impossible in this period of rapid transition."

This last is true in America. What we do we must do quickly. A national system, meaning thereby governmental coordination and possible inspection in harmony with the voluntary cooperation of private institutions, like the accrediting systems now prevailing in many western states, concatenating secondary schools, colleges and universities, will give modern interstate educational privileges, long needed to keep up with interstate commerce and life and heightening national ideals and power.

The line of evolution is clear. The oral examination of the individual pupil by the separate college, the written examination in the same fashion, the combination of colleges for written examinations, the slight recognition of the preparatory teacher in the combination, the great recognition of the preparatory teacher and his examinations by the certificate plan, and the highest point of evolution, the examination by the combined colleges of the secondary school as a whole, and the accrediting of it organically, trusting it all in all or not at all.

The disappointed hearer who looked for a formal disputation in this paper may be still demanding a categorical answer to the question of our topic 'Which is better, etc.?'

Let him draw his own conclusions from

the testimony marshalled from the best representatives of the different systems.

As an evolutionist I see every system has a part to perform, and perceive certain principles at work which promise us not only a better system, but a national and best.

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SCIENTIFIC BOOKS.

Text-book of General Physics for High Schools and Colleges. By JOSEPH S. AMES, Ph.D., professor of physics and director of the physical laboratory in the Johns Hopkins University. New York, American Book Company. 1904. Pp. 768.

About eight years ago Professor Ames published his 'Theory of Physics' and established his reputation as a skillful writer of text-books. The present volume was initially undertaken as a revision of the former one, but the author soon found that it was more convenient to prepare a new book independently, with occasional inclusion of matter that had been previously put into such good form as to require but little modification. He believes now, as then, that to present the subject of physics to a class of students three things are necessary: a good text-book; experimental demonstrations and lectures, accompanied by recitations; and a series of laboratory exercises. This book is intended to state 'the theory of the subject in a clear and logical manner so that recitations can be held on it.'

The class-room presentation of any subject that requires frequent experimental illustration necessitates the abandonment of the text-book by the teacher while engaged in the work of exposition. The text-book becomes the basis for parallel study on the part of the auditor, and recitation days are most conveniently differentiated from exposition days. Presumably the present volume is the writing out of at least the greater part of the lectures given at Johns Hopkins University to the students of general physics, who are assumed not to possess at the outset any knowledge of advanced mathematics. It was probably for

this reason that on the title page the book is said to be 'for high schools and colleges.' The clause 'for high schools' is probably superfluous. If there are any high schools in which a book of this grade can be successfully employed they are quite exceptional.

Assuming that the book is exclusively for collegiate students, or others of equivalent maturity, it is very interesting and suggestive, well up to date, and abundantly worthy of cordial commendation. The first 212 pages are taken up with the mechanics of solids and fluids, each chapter being closed with a well-selected list of books of reference. About 100 pages are then devoted to the phenomena and laws of heat, including a brief chapter on thermodynamics. Vibrations and waves receive quite full treatment, 80 pages being devoted to this subject before that of sound is mentioned. The analysis of sound, musical instruments and musical compositions make up three short chapters, about 27 pages in all. To the subject of light 175 pages are given; and to magnetism and electricity, 167 pages. This may seem like a significant reaction against the popular demand for utilitarianism in physics, but it is not altogether surprising that emphasis should be laid upon the phenomena of heat and light in a laboratory where Rowland's influence in behalf of pure science was so long dominant. The theory of electricity is brought out with much clearness and in excellent style, while less than five pages are devoted to dynamos and the engineering applications of electricity to industry.

A distinct defect in this otherwise excellent book is the complete absence of illustrative problems. The author may, perhaps, prefer to avoid these as class-room tests, or he may use them spontaneously and prefer not printing problems, the solutions of which can be transmitted down from class to class. The majority of teachers are probably agreed that the use of problems is indispensable in the conveying of accurate ideas when the subject is such as necessarily to imply the application of mathematics, whether elementary or advanced.

Possibly a separate small volume of problems, as a supplement to the text-book, may be forthcoming in the near future. If so it will be welcomed by those who use this book either for reference or in the hands of their students. But, even as it stands, it is worthy of the welcome which it can not fail to receive.

W. LE CONTE STEVENS.

A Catalogue of North American Diptera. By J. M. ALDRICH. Smithsonian Miscellaneous Collections, Vol. XLVI., No. 1444. 1905. Pp. 1-680.

The long-expected catalogue of North American diptera by Professor Aldrich has at last appeared. It is the first work of its scope to be published since Baron Osten Sacken's catalogue which was issued by the Smithsonian in 1878. During the intervening quarter of a century the aspect of entomology in North America has greatly changed, more especially in the diptera, rendering the new catalogue most welcome.

The following remarks from Professor Aldrich's introduction show the relation which exists between the two works:

The great amount of work which has been done on North American Diptera within the quarter of a century has largely changed the face of the subject. Hence the reader will probably observe, especially at first, more of contrast than resemblance. The number of species has doubled; the number of references to previously known species has almost doubled; several families have been monographed or revised, with more or less change of nomenclature; along with this has gone the publication of a multitude of smaller papers, touching every family but one, and the larger part of the genera. Under these conditions it is inevitable that great changes should appear in the new catalogue.

The catalogue is rather unique among the present lists of American insects in several respects, all of them commendable. The faunal limits are not restricted to the countries north of the Mexican boundary, but are extended to include as far as Panama and the West Indies on the south. This gives a much more lasting value to the enumeration of species than is possible when the banks of the