

throughout the country; in promoting technical education; in reference to national musical training; in regard to postal reforms; in the institution of public examinations for various purposes, and numerous other subjects of public interest.

In later years the "Cantor" and other lectures by eminent scientific men on all manner of subjects have more and more become one of the chief elements of the society's well-known usefulness.

This is made evident by the author, who also gives accounts of other of the society's manifold activities in various directions, which cannot here be mentioned for want of space.

It should be added that Lord Sanderson, G.C.B., chairman of the council of the society for the years 1911-1913, contributes an illuminating preface.

A. A. CAMPBELL SWINTON.

HOUSEHOLD SCIENCE.

Physics of the Household. By Prof. C. J. Lynde. Pp. xi+313. (New York. The Macmillan Co.; London: Macmillan and Co., Ltd., 1914.) Price 5s. 6d. net.

THE author of this book is professor of physics in the Macdonald College, an affiliated college of the McGill University, Montreal, where a school of household science is one of the branches of the institution, and it is for students of household science that the book is written. It presents the subject of physics in close relation to its domestic applications, and abounds in illustrations and examples of household appliances and processes. It should be of great use to science teachers, especially those who have to teach girls, in reminding them of the range of familiar things and topics of physical interest that lie in the home environment, and that often lie unheeded and unexplained.

The suitability of the book for students themselves is, perhaps, more open to discussion, and it is more than likely that it will come under the censure of teachers who are wedded to the conventional form of text-book. The chief ground of attack would no doubt be that so far as the general principles of physical science are concerned, the elucidation is cramped and obscured by the weight of illustrations of their practical application. To treat the subjects of mechanics, heat, electricity and magnetism, light and sound and their applications in three hundred pages has led to a certain breathlessness of style, and some topics are treated very vaguely.

The gaps in the knowledge of those in control of the household that are the most conspicuous and seem to call most loudly for repair, do not relate so much to the design and principles of construction of appliances, as to the conduct

of operations. An increased apprehension of the application of the lever principle or of the construction and *modus operandi* of an electric bell is all to the good, but it is not to be compared with a real live knowledge of the laws of heat and the capability of thinking and acting within them in the great field of household operations to which they apply. It is extraordinary to see the woodenness with which a woman armed with the conventional "heat" of the school or college text-book will face simple problems of heating or cooling as they arise in the household. This defect is not to be repaired merely by a rational account of the principles on which heating appliances are constructed. To instil real activity of mind it is necessary to teach in terms of problems with a wide range of experimental exercises.

For the reasons indicated above, it is fair to say that the value of Prof. Lynde's book to students must depend very largely on the laboratory work that accompanies it, and on the constant raising of questions and corollaries by the teacher. This, however, is true of most text-books, and it must not lead us to undervalue one that has so large an element of originality and is so likely to be useful.

A. S.

HOG-SPEARS AND FISHING-RODS.

(1) *Modern Pig-Sticking.* By Major A. E. Wardrop. Pp. xii+304. (London: Macmillan and Co., Ltd., 1914.) Price 10s. net.

(2) *Fishing and Philandering.* By A. Mainwaring. Pp. 254. (London: Heath, Granton and Ouseley, Ltd., n.d.) Price 6s. net.

(1) **W**HAT fox-hunting is to England, pig-sticking is to India, with the difference that the latter has that spice of personal danger from attacks on the part of the quarry which, to the regret of many sportsmen, is entirely lacking in the former. Both, too, have nowadays this in common, namely, that in their headquarters they depend to a greater or less degree on protection for their quarry—a fact which may come as a surprise to those unacquainted with India at the present day, and the great diminution in the numbers of its big game which has taken place in many districts. The headquarters of pig-sticking are the "khadirs," or river-valleys, of the Ganges and Jumna in the respective districts of Meerut and Muttra; and to old Anglo-Indians who have ridden or shot in the khadir, Major Wardrop's gossipy book will come as a delightful reminiscence of bygone days. To the newcomer in India it will serve as an incentive to rival the deeds of his predecessors in one of the most noble and exciting of all field-sports.

How well qualified is the author (aided by contributions from other hog-hunters) for his task may be inferred from the statement that he has been present, to the best of his belief, at the death of between seven hundred and eight hundred boars. To stay-at-home people such numbers may savour somewhat of exaggeration, but any such misgivings may be dispelled by reference to the final chapter of the book, where he will learn that the average annual bag of the Muttra tent-club alone is 210 head.

Major Wardrop gives his readers a glimpse of early pig-sticking by recalling the almost forgotten fact that for the first quarter of last century the universal weapon was the long throwing spear, and that the modern short "jobbing" spear did not come into use until 1830. In the penultimate chapter he discusses the paraphernalia and technique of the sport. For the contents of the intermediate chapters the reader must be referred to the book itself, which he will probably not leave until he has read it from cover to cover.

(2) An equally delightful volume is the second on our list, although it has to be confessed that its contents include more "philandering" than "fishing"; but since it teems with anecdotes which can scarcely fail to raise a hearty laugh, its appearance in these troublous times should be very welcome. Like the first, this volume will prove of interest to Anglo-Indians, as it contains a chapter of mahsir-fishing, coupled with the author's experiences among what he is pleased to denominate Indian trout. As regards the remainder of the book, perhaps the most valuable chapter to the practical angler is that dealing with the use of shrimps as a bait, as practised in Ireland, a considerable portion of which originally appeared in the *Field*. Like most anglers who have tried their hands on fish of many kinds, Mr. Mainwaring unhesitatingly awards the palm, from the point of view of sport, to the lordly salmon, although he confesses to be no adherent to the "dry fly" mode of catching his fish. The general scope of the volume is well indicated by its title, and the author does not even touch upon the natural history side of the subject.

R. L.

MATHEMATICAL TEXT-BOOKS.

- (1) *Elements of Algebra*. By G. St. L. Carson and Prof. D. E. Smith. Part i., pp. v+346. (London and Boston: Ginn and Co., 1914.) Price 3s.
- (2) *John Napier and the Invention of Logarithms, 1614*. A lecture by Prof. E. W. Hobson. Pp. 48. (Cambridge University Press, 1914.) Price 1s. 6d. net.

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- (3) *An Elementary Treatise on the Calculus for Engineering Students*. With numerous examples and problems worked out. By J. Graham. Fourth Edition. Pp. xi+355. (London: E. and F. N. Spon, Ltd., 1914.) Price 5s. net.
- (4) *Constructive Text-book of Practical Mathematics*. By H. W. Marsh. Vol. iv.: Technical Trigonometry. Pp. x+232. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1914.) Price 6s. 6d. net.
- (5) *Arithmetische Selbstständigkeit der europäischen Kultur*. Ein Beitrag zur Kulturgeschichte von Prof. N. Bubnow. Aus dem Russischen übersetzt von Prof. J. Lezius. Pp. viii+285. (Berlin: R. Friedländer und Sohn 1914.) Price 10s.

(1) THE teaching of algebra is still in the experimental stage, and is likely so to remain for many years to come. There are extremists in each camp. There are those who feel that no real progress can be made until considerable manipulative skill has been acquired, and those who hold that the real educational value consists in the absorption of certain general ideas which are largely independent of algebraic drill. The authors of this volume claim to steer a middle course. How far they have succeeded in solving the puzzling problem with which educationists are faced to-day can only be decided by trial. Certainly there are many good features in their book, which is based on the formula rather than the problem. But until an actual trial is made of their methods, it is impossible to pronounce with any certainty on the merits of their scheme, for the ramifications, affecting as they do the whole scheme of education of the non-specialist, are particularly intricate. We shall look forward with interest to the second volume.

(2) In view of the tercentenary celebration of the publication of John Napier's "Mirifici Logarithmorum Canonis Descriptio," under the auspices of the Royal Society of Edinburgh, the issue of this small volume comes at an opportune moment. Most schoolboys have heard of logarithms and realise their practical utility; but few of them are acquainted with their history, and fewer still with the form in which they originated. Dr. Hobson gives in a simple and very readable manner a comprehensive account of their discovery and evolution; an engraving of Napier and a reproduction in facsimile of a page of the Descriptio add to the attraction of a book that should find its way into every school library.

(3) The opening chapters of this text-book contain in outline such parts of algebra, trigono-