

the heron sailing gracefully at ease on p. 153, and the same bird after being stricken by the peregrine two pages later? It is, of course, a drawback that so many of the illustrations depict birds and other animals in postures of pain, but this is inseparable from the subject. While commending the illustrations as a whole, a few, like the one of the hobby, appear to have been printed from somewhat worn blocks.

To those not conversant with the sport, it may come as a matter of surprise that so many species of the *Falconidae* are trained in various countries for hawking; these ranging in size from the merlin and the hobby to the golden eagle, and their quarry from the snipe and the lark to the roe-deer, or even the wolf. As hawking with eagles is unknown in western Europe, the portion of Mr. Harting's work relating to that branch of the sport cannot fail to prove generally interesting. It would, of course, have been mere waste of space if the author had attempted to give full descriptions of all the various hawks and falcons employed in the sport; but as there is some considerable degree of confusion in regard to the species of eagles trained for hawking in Turkestan and other parts of the Russian empire, he has done well in giving a full discussion on the question. And here Mr. Harting, as usual, displays an intimate acquaintanceship with the zoology of the subject and the literature relating thereto. It appears from these observations that the bird commonly employed in Turkestan, where it is known as the berkut, is the golden eagle, but that other species, such as the Imperial eagle, are likewise trained; while it is stated that occasionally sea-eagles of two species are made use of.

Although it is by no means meant to displace the older and more bulky treatises, Mr. Harting's little volume ought to give the beginner all the information he requires for setting up a hawking establishment, either on a large or a small scale, and it will doubtless aid in maintaining interest in an ancient and exciting sport which ought by no means to be allowed to fall into neglect. R. L.

THE RUDIMENTS OF PHYSICS AND CHEMISTRY.

General Elementary Science. Edited by William Briggs, M.A., F.C.S., F.R.A.S. Pp. viii + 390. (London: W. B. Clive.)

Elementary General Science. By A. T. Simmons, B.Sc., and Lionel M. Jones, B.Sc. Pp. viii + 328. (London: Macmillan and Co., Ltd., 1898.)

THE new regulations for the matriculation examination of the University of London provide that on and after next January all candidates must present themselves for examination in the rudiments of physics and chemistry included in a syllabus under the head of "General Elementary Science." Following the "stream of tendency" of science teaching at the present time, the examiners announce in a note prefixed to their syllabus that the subjects "will be treated wherever possible from an experimental point of view. Candidates will be expected to have performed or witnessed simple experiments in illustration of the subjects mentioned in this

syllabus." By making this announcement, the University of London has shown its intention to encourage the introduction and extension of practical methods of science teaching into our secondary schools; and there can be no doubt that if the examiners insist upon the possession of knowledge gained by demonstration and experience, instead of the transient information acquired by reading, their action will be the means of greatly improving the character of the scientific instruction given in the smaller secondary schools. Hitherto, many schools of this character have trained candidates for matriculation without showing them a single scientific experiment; the new curriculum will, however, make this state of things impossible, and will therefore be the means of increasing the efficiency of secondary schools.

The two volumes under notice have both been prepared to meet the new requirements of the London University, and they exemplify the old saying that "there is a right and a wrong way to do everything." In the volume edited by Mr. Briggs little attempt has been made to produce a book in the spirit of the new syllabus. Neither the first section of the book dealing with mechanics, nor the second section dealing with heat, light and electricity, can be regarded in any way as likely to lead to a practical acquaintance with scientific facts; they both contain a large amount of information concisely expressed, but the information is of precisely the same kind as appears in books prepared for students working under the old matriculation regulations. In other words, more attention is paid to arithmetical gymnastics in the regions of mechanics and physics than to experiment. The section on chemistry is better done, nearly one hundred experiments being described in it; but it is unequal in treatment, and contains too many equations and formulæ for a beginner in chemistry to understand. As a whole, the book is unsatisfactory; it contains information to be read and learnt by the student instead of descriptions of experiments to be performed, and though it may be useful as a training in providing exercises in physical arithmetic, it has no educational value.

The book by Messrs. Simmons and Jones is of quite a different character from that compiled under Mr. Briggs's direction. It contains an admirable course of practical work covering all the principles of mechanics, physics, and chemistry included in the new subject for London matriculation. No less than 310 experiments are described, and they are not only practicable, but can also be performed with simple apparatus. Many of the experiments, such as the pin-methods of proving the laws of reflection and refraction of light, the simple experiments on voltaic cells, and the method for heating a solid in a closed volume of gas (p. 258), are distinctly good, while most of them furnish evidence that the authors are describing matters of personal experience, and not hypothetical arrangements. The experiments alone provide a valuable set of practical exercises in elementary physics and chemistry, and if the descriptive text is read in connection with them, the student will be given a sound basis of scientific knowledge. The volume contains an instructive course of work which will be of real assistance to both teachers and pupils in schools where elementary science is taught.