

units he has been introduced to, is it safe to bring another under his notice.

Many interesting cases of motion are well expounded and illustrated by diagrams, for example the motion of a pendulum with a gyrostat in its bob (a case of great importance in other branches of physics), and the precession of the equinoxes.

The statics and kinetics of fluids are next dealt with, and, as was to be expected, fluid motion is well attended to. Wave motion of a fluid and the principle of Huyghens are here discussed and well illustrated graphically. Then follows a wonderfully complete account, for the space devoted to it, of molecular phenomena of solids and fluids, including a sketch of the kinetic theory of gases.

The second half of the book, which deals with acoustics and optics, we have not space to speak of in any detail. Throughout we have clear description of phenomena, of apparatus, and of experimental processes, always with neat and truthfully-drawn diagrams. There is necessarily very little in the way of mathematical exposition of these subjects, but the results of mathematical and experimental investigation are clearly stated, and the book cannot but form an exceedingly useful introduction to an extended course of physical study, such as that for which one of the more elaborate Lehrbücher, which have lately appeared in Germany, might form a basis. It is very clearly printed, and, what is a great thing in a text-book, the numerous cuts have been very well engraved and printed.

A. GRAY.

TRAVELS AMONG THE HAUSA.

Hausaland, or Fifteen Hundred Miles through the Central Soudan. By Charles Henry Robinson, M.A. Pp. 304. Map and illustrations. (London: Sampson Low, Marston, and Co., 1896.)

MR. J. A. ROBINSON, the brother of the author of the book before us, died at Lokoja on the Niger in 1891, while engaged in the study of the Hausa language, and in his memory the Hausa Association was formed in the same year with a view to carry on the work. Mr. C. H. Robinson was selected by the Association as their first "Hausa Student," and he left England at the end of April 1893, to make acquaintance with the language, and also to learn Arabic. Instead of proceeding directly to the land of the Hausas, the climate of which at the best is very trying for Europeans, he went successively to Tripoli and Tunis, where he had opportunities of conversing with many of the Hausa pilgrims on their way from the interior of the Sudan to Mecca, and with any number of Hausa slaves.

Equipped by preliminary training in the language, and accompanied by two friends, Dr. T. J. Tonkin and Mr. John Bonner, Mr. Robinson reached Lokoja, at the confluence of the Niger and Benue, in August 1894; and, after wearisome delays in obtaining carriers, set out for Kano, the commercial capital of the Hausa states. They travelled up the Benue to Loko, then struck northwards by land through Kaffa and Zaria, and reached Kano on December 23. Here the party stayed for rather more than three months, engaged in diligent study, and then returned to the Niger and to Europe.

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Hausaland is not a defined geographical area, but a group of native states occupying the fertile region of the Western Sudan between the territory of the Royal Niger Company (to which they are tributary) and the Sahara desert. Sokoto is the predominant state, but the chief town of the Hausas is Kano, a trade-centre of such importance that Mr. Robinson does not hesitate to dub it the "Manchester of the Soudan." The town is described in some detail, and this description is perhaps the most important feature of the book, which in other parts suffers from "padding," including long extracts from various writers on non-essential subjects. Kano is estimated to contain about 100,000 inhabitants; it manufactures much cloth, which is largely exported, and may be purchased in Alexandria, Tunis, or Lagos, so widely are its qualities appreciated. The markets also contain European goods, which are still, for the most part, brought across the Sahara from Mediterranean ports. The Hausas are born traders, and having acquired Mohammedan education, are by no means to be viewed as savages. They are, however, inveterate slave-traders; and Mr. Robinson is of opinion that this trade cannot be seriously combated until a satisfactory currency and mechanical means of transport are introduced. At present slaves are the larger, and cowries the smaller, units of value; and as a slave is worth several hundred thousand cowries, the carriage of his value in these shells would tax the resources of any caravan. There is one coin which passes current through the whole of Northern Africa—perhaps the last in Europe which would occur to any one set to guess its nationality and date—the silver Austrian thaler coined in 1780 during the reign of Maria Theresa. Mr. Robinson urges a large importation of these coins as a measure to promote trade and discourage slavery. He has shown himself to be a diligent student and a good observer, although a somewhat diffuse writer, and the suggestion is worthy of consideration.

In the preface we are told that the Royal Geographical Society's system of spelling place-names has been followed; but this is only done in part. The French transliterations are used in some cases, and also other forms—as, for example, Abutshi, Bornou, Gandja, Soudan, Tchad; where the system referred to would require—Abuchai, Bornu, Ganja, Sudan, Chad.

It is to be hoped that the efforts of the Hausa Association will not be allowed to cease for want of money; for Mr. Robinson's linguistic work is of real value, and its importance will appear more fully when the facsimiles and translations of the Hausa MS. which he has brought home, together with his dictionary and grammar of the language, are published.

OUR BOOK SHELF.

Practical Mechanics, applied to the Requirements of the Sailor. By Thomas Mackenzie, Master Mariner, F.R.A.S., &c. Pp. xii + 175. (London: Charles Griffin and Co., Ltd., 1896.)

THIS book is one of a very useful series on nautical subjects, published in order to meet a desire on the part of the officers of the Mercantile Marine to obtain a more scientific insight into the principles of their profession.