

Of Timbuktu Dr. Lenz gives on the whole a satisfactory account. During his residence in the place from July 1 to July 18, 1880, he was hospitably entertained by the Kahia, a sort of "Burgomeister," or civil magistrate, who is mayor, aldermen, and town council all rolled into one, but who possesses no political authority whatsoever. Since its capture by the Fulahs in 1826, when the fortifications were razed, Timbuktu has been a purely commercial town, a general emporium for Western Sudan, open to all comers—that is, to all the "Faithful," but unfortunately a constant bone of contention between the rival Tuarik (Berber) and Fulah tribes of the surrounding lands. At the time of Dr. Lenz's visit, the Tuariks, under their "Sultan" Eg-Fandagumu, were in the ascendant, but, beyond levying dues on the imports and exports, neither they nor the Fulahs ever interfere in the local administration, which is left in the hands of the Kahia. This office itself is hereditary in the Moorish family of Er-Rami, originally from the South of Spain, hence known as "Andalusi," and settled in Timbuktu since the sixteenth century. The present Kahia affects the title of "amir," and is said to be aiming at the sovereign power by making himself independent of the Tuarik and Fulah factions. In this he appears to be encouraged by the French, who have lately reached the Niger at Segou, and who have quite recently induced him to send an "envoy" to Paris.

During the journey from Timbuktu to the Senegal Dr. Lenz saw a good deal of the Fulahs, who are now everywhere interspersed among the Negro populations from Wadai and Darfur to Senegambia, and to whom apparently belongs the future of Central and Western Sudan between the Niger and Wadai. Unfortunately, in discussing the origin of this mysterious race, he revives the now exploded theory of a "Nuba-Fulah" family, first suggested by Friedrich Müller, the learned but somewhat venturesome Viennese ethnologist. At least Dr. Lenz goes so far as to say that, "touching the ethnographic position of this people Friedrich Müller has probably hit the mark in grouping together the Nubas and the Fulahs, whom he collectively calls Nubas, and divides into a western and eastern section" (p. 261). This might not be in itself so surprising but for the fact that he further on refers to the writings of G. A. Krause on the subject. Now Krause distinctly separates the Fulahs from the Nubas, or rather ignores the connection altogether, and allies them to the Hamites, calling them "Ur- oder Protohamiten." It may be added that with the materials now available (Lepsius, Nachtigal, Faidherbe, Newman, Krause, Reinisch, &c.), it seems possible to determine the mutual relations of all these peoples with some show of probability. But in any case the Fulahs are certainly not Nubas, nor are the Nubas Hamites.¹ Whether Krause is right in affiliating the Fulahs to the Hamitic group, "mag dahingestellt werden," at least pending further information. The type is distinctly non-Negro, differing from it in almost every racial characteristic—cranial formation, complexion, texture of the hair, figure, proportion of members, mental qualities. Dr. Lenz, who had numerous opportunities of studying full-blood specimens, was amazed at their striking resemblance to Euro-

¹ On this point the reviewer must refer the reader to his "Egyptian Ethnology." Stanford, 1885.

peans, and describes them as of light complexion, with slightly arched nose, straight forehead, fiery glance, long black hair, shapely limbs, tall slim figures, great intelligence. At the same time, since their diffusion among the Sudanese populations the Fulahs have become much modified by crossings with the Negroes and Arabs. "No territory or state is now found exclusively inhabited by pure Fulahs, who are everywhere intermingled with Negro and Arab communities" (p. 259).

The work is illustrated with some good woodcuts and plates, mostly from photographs and sketches by the author, who has also added a general map of the region traversed, and as many as eight carefully prepared itineraries of its several sections. A. H. KEANE

OUR BOOK SHELF

Physical Arithmetic. By A. Macfarlane, D.Sc. (London: Macmillan and Co., 1885.)

THIS is a very thorough work, and one admirably adapted for the use of physical students: indeed, we think so well of it that we would recommend it for use in all schools and establishments where the subjects of which it treats are taught. There is a great amount of matter, tersely put and aptly illustrated by copious worked-out examples, and, in addition, there is good store of exercises to try the pupil's strength. Answers are appended, and a useful index crowns all.

What is its subject-matter? It treats, we should say, *de omni scibili*, and perhaps *de quibusdam aliis*. But to descend to particulars: there are nine chapters, and in these are discussed matters financial, geometrical, kinematical, dynamical, thermal, electrical, acoustical, optical, and chemical. Have we not rightly described its subject-matter above? Dr. Macfarlane has done much good work in other directions, and in this particular direction he gives us, not the result of two or three months' turning over of text-books, but what he has noted down since his student days; hence he speaks of what he does know. A diligent student, an original researcher, he has learned and assimilated methods arrived at by such masters in physics as Thomson, Maxwell, Tait, Everett, and Chrystal, and put them together here in orderly method. This method the author calls the *equivalence* method. "Each quantity is analysed into unit, numerical value, and, when necessary, descriptive phrase. The rate, or law, or condition, according to which one quantity depends on one or more quantities, is expressed by an equivalence. These equivalences are of two kinds—absolute and relative; the former expressing the equivalence of *dependence*, the latter the equivalence of *substitution* or *replacement*."

We cannot give a brick, but we feel sure that the edifice to which we liken the book will be found to be constructed on thoroughly sound principles, and that no student who buys it on our recommendation will regret having done so.

It would take a very long time to test the furniture (*i.e.* the examples); upon its suitability, we cannot now pronounce an opinion; moreover, each student will have his own particular room to explore: after a visit to all the rooms, each appears to be quite *comme il faut*.

Coordonnées parallèles et axiales. Méthode de Transformation géométrique et Procédé nouveau de Calcul graphique, déduits de la Considération des Coordonnées parallèles Par Maurice D'Ocagne. (Paris: Gauthiers-Villars, 1885.)

Two fixed points, *A, B*, called the *origin of co-ordinates*, are taken, and through them are drawn two parallel straight lines, *Au, Bv*; these are called *axes of co-ordinates* (or co-ordinate axes). Lengths, *AM, BN*, measured on