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A NEW BOOK ON MAN.

Ethnology. By A. H. Keane. "Cambridge Geographical Series." Pp. xxx + 442. (Cambridge: University Press, 1896.)

A HANDY but comprehensive work on ethnology has long been required alike by the student and general reader, and it is with pleasure and interest that we welcome the appearance of a book which is claimed by the author to be a synthesis and a trustworthy guide.

Mr. Keane's book is divided into two parts: (1) Fundamental Ethnical Problems; and (2) The Primary Ethnical Groups. After a definition of terms, which is rather unsatisfactory, as is also the title of the book itself, the author deals with the physical evolution of man, and here as elsewhere the evolution doctrine is accepted. In this chapter, there is the inevitable phylogenetic tree; but in this instance it is furnished with a bunch of unexplained roots. Whatever truth this scheme may illustrate, we fail to see the conclusion that "from this diagram it is made evident that the ascent of the Hominidæ is in an independent line from some long extinct generalised form," &c. When will people learn that a phylogenetic tree does not *prove* anything! The treatment of the mental evolution of man in a short chapter is somewhat inadequate for that most important subject. The antiquity of man is dealt with in various chapters; in the prefatory general considerations, "Croll's last two glacial epochs" are "accepted in all their fulness," and the author decides in favour of interglacial man, who "specialised not less, probably much more, than half-a-million years ago." The chapters on Palæolithic and Neolithic man are useful summaries, but with several questionable statements. Geographers will scarcely admit that "the explanation," of the attractiveness of Denmark to Neolithic men, "lies in the physical and biological conditions of a region washed by the warm waters of the Gulf Stream." The argument for the specific unity of man will prove of service to many readers. It is strange that, though the meaning of the terms genus, species, and variety "is clearly defined in a way that gives rise to no misunderstandings," Mr. Keane attributes to Linnæus the erection of "four species" of the group *Homo sapiens* (p. 164), whereas these were evidently regarded as varieties of that species by the great Swedish naturalist. On p. 25 we find a paragraph commencing thus: "HOMINIDÆ. (Linné's Genus *Homo*), with no specific divisions, but four primary varieties"—a system of nomenclature that no biologist would recognise. Somehow or other, in spite of his statement that the meaning of the terms species, &c., is so fixed as to give rise to no misunderstanding, the author does not appreciate the rules for zoological nomenclature; apparently his view is that the single species of *Homo* differentiated in early times into four varieties, which he calls *Homo Æthiopicus*, *Homo Mongolicus*, *Homo Americanus*, and *Homo Caucasicus*, so that we now have four varieties in the genus, but no species.

In the chapter on the physical criteria of race, Mr. Keane gives an account of the data utilised in classifying the different groups of man, and a selection of the various

systems of classification that have been adopted; the ingenious system of Deniker deserves a more detailed description than is accorded to it. The remarkable statement on p. 171, that the greater abundance of pigment in the skin of the negro "seems due to the stimulating action of the solar heat combined with moisture and an excess of vegetable food, yielding more carbon than can be completely assimilated, the character being then fixed by heredity," must not pass unchallenged. It is true that Waitz adduces many examples to show that "hot and damp countries favour the darkening of the skin," and though this may be a factor, there are too many exceptions for it to be a sufficient cause; evidently this has also struck the author, but the fixation of black carbon through an excess of vegetable food is a theory that is decidedly comical, though it is doubtless offered in good faith. Mr. Keane devotes nearly the whole of the section on the mental criteria of race to a disquisition on the evolution of language. He asserts that monosyllabism is not the first but the last stage in the growth of a language; if this be true, then the German language must be in its infancy. Several of his views on linguistic evolution are, to say the least of it, heterodox, and will probably lead to further discussion.

The second part, which deals with the main divisions of mankind, is a most useful summary of a vast range of reading, and will prove of great utility to all interested in the subject, although there are many statements which will not approve themselves to every specialist. Mr. Keane argues in favour of the evolution of the pliocene precursor of man in the Indo-African Continent, which has replaced Sclater's Lemuria. This continent extended from South India to Africa and Madagascar, including the intermediate islands, and also was in biological relation to the hypothetical Austral Continent, which extended from New Guinea and Tasmania to the islets of St. Paul and Amsterdam. "Thus when the pliocene precursor, wherever evolved, began to spread abroad, he was free to move in all directions over the eastern hemisphere."

One or two examples will illustrate Mr. Keane's views on certain problems. Besides the Negroes who extended along Malaysia to New Guinea, there was a primitive population of Melanesian Papuans, who also spread over the whole of Oceania as far as Hawaii, Easter Island, and New Zealand. These were also the aborigines of Australia, who thence passed over into Tasmania; Australia also received a contingent of "Caucasian Melanochroi" (*i.e.* the Dravidian element in Australian ethnology), and also a Malay infusion, "while the Neanderthal characters persisting here and there would be traceable to the *Ur-Einwanderung* of the pliocene precursor from the Indo-Austral Continent."

"The Melanesian language [which Dr. Codrington has shown to be the most primitive existing form of the Malay-Polynesian group] is not indigenous in its present home, but must have been introduced and imposed upon the Papuan natives by some foreign people in remote prehistoric times. This people is none other than the Eastern Polynesians, a branch of the Caucasian division, who possibly in the Neolithic period migrated from the Asiatic mainland to Malaysia and thence eastwards to the remotest islands of the Pacific Ocean."

Mr. Keane, as we have seen, is not particularly happy

when attempting to explain the effect of environment on man, as the following extract will also prove.

"It has been shown that the precursor was most probably furry, with a woolly under and a sleek outer coat, and it is conceivable that in a volcanic environment like that of Java, it might have been advantageous to shed the wool and retain the sleek hair, together with all the other physical characters of the primitive Negrito."

The white race (*Homo Caucasicus*, as Mr. Keane delights to term it) is held by the author to have evolved in, and dispersed from, North Africa; but he strangely omits to refer to Dr. D. G. Brinton, who, in his "Races and Peoples" (1890), had already promulgated that view.

It is evident that Mr. Keane is a very diligent and widely-read literary man, but he is decidedly weak on the scientific aspects of his subject. Lastly we must criticise those figures which were copied from the author's "Types of the Races of Mankind," in Longmans' New Atlas. The process-blocks from these lithographs have a very coarse appearance, and offer a marked contrast to those taken from photographs. On the whole, the selection of the illustrations of racial types is well made.

Although there is a good deal of what may be termed contentious matter, besides numerous errors, in Mr. Keane's book, we can recommend it as a most useful introduction to a very complicated study; and as the author has brought together and abstracted a large number of references, the student can use the book as a point of departure, and thus it will serve as a base for a more extended or detailed survey of this really important branch of science.

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RIGID DYNAMICS.

An Elementary Treatise on Rigid Dynamics. By W. J. Loudon, B.A., Demonstrator in Physics in the University of Toronto. Demy 8vo, pp. ix + 236. (London: Macmillan and Co., 1896.)

THERE are few mathematicians who do not vividly recollect the difficulties they experienced when reading "Rigid Dynamics" for the first time. Mr. Loudon's treatise does much to smooth away these difficulties; and if it still leaves undone much that might have been done in simplifying the subject for beginners, it nevertheless fills a gap the existence of which has long been felt among teachers.

From a purely mathematical standpoint, we have none but praise to offer. As a digest of the earlier matter of Dr. Routh's treatise up to, but not including, Lagrange's generalised equations of motion, it will be welcomed by all students whose primary object is to master the equations of motion of a rigid body without diving too far into higher applications.

The order of treatment is essentially based on "Routh," with the exception that Mr. Loudon gives no separate chapters on "Motion in Two Dimensions," "Momentum," and "Vis Viva." Thus the first two chapters deal with "Moments of Inertia" and "Ellipsoids of Inertia," and are followed by chapters on "D'Alembert's Principle" and on "Motion about a Fixed Axis." After the latter problem has been considered both for finite and "impulsive" forces, the same is done for motion about a fixed point. In this connection, the equations of motion

of a top, and of a body moving under no forces, are discussed as far as they can adequately be treated without using elliptic functions. The book concludes with a chapter on the "Gyroscope," in which the experimental proof of the earth's rotation is figured and described at some length.

One very commendable feature is the large number of diagrams. To represent on paper three planes at right angles in a rigid body is a task which previous writers have shirked; but Mr. Loudon's large and bold figures will do much to assist the reader in forming a concrete idea of the motions he is dealing with. We might instance more especially Fig. 50, illustrating the motion of a top spinning on a horizontal plane, and Fig. 58, illustrating how the motion of a rigid body under no forces is completely represented by the rolling of the momental ellipsoid on a fixed plane.

To our mind the book's chief drawback, considered as an *elementary* treatise, lies in the author having, no doubt unconsciously, followed Dr. Routh's analytical methods too closely instead of striking out in simpler lines of treatment. That it is a useful exercise to start every problem by writing down the fundamental equations

$$\Sigma m \frac{d^2x}{dt^2} = X, \quad \Sigma m \left(y \frac{d^2z}{dt^2} - z \frac{d^2y}{dt^2} \right) = L$$

cannot be doubted, but the ordinary beginner often finds it hard to proceed from these equations to the final solution. What he now chiefly requires is a thorough grasp of the nature and significance of "angular momentum." We by no means wish to overrate the educational value of the familiar type of Tripos rider, whose solution merely involves writing down the equations of conservation of angular momentum and energy, and eliminating between the two; at the same time, we do think that much may be learnt from problems of this class, especially by the beginner. For a similar reason we are sorry not to find "Motion in Two Dimensions" treated earlier. Again, in deducing Euler's equations of motion, it seems a pity that the author has adopted Dr. Routh's laborious proof, a proof which is always found very hard to grasp. Its difficulty is largely due to the necessity of proving the relation

$$\frac{d\omega_1}{dt} = \frac{d\omega_x}{dt}$$

connecting the rates of change of the angular velocities about fixed and moving axes respectively. The author gives two proofs of this identity, occupying four pages of difficult mathematics; but the result is, after all, only a particular case of the general property of moving axes, which, when applied to any *other* vector quantity (angular momentum, for example), assumes the far more intelligible and suggestive form

$$\frac{dh_x}{dt} = \frac{dh_1}{dt} - h_1\omega_3 + h_3\omega_2$$

and thus leads to a far shorter proof of Euler's equations.

In a few respects the book slightly lacks in finish. A tyro might easily complete the chapter on "D'Alembert's Principle" without having his attention drawn to what that principle really is, or might even mislead himself into the impression that the principle consisted in the mere equations

$$\Sigma (f_1) = \Sigma (f_2) = \Sigma (f_3) = 0.$$