

especially numerous individuals of the three-toed horse, *Hipparion*.

For many years Dr. G. E. Pilgrim has studied the Pontian and later fossil mammals in India, and he is at present preparing a descriptive catalogue of the large collections of similar fossils from Pikermi, the island of Samos, and other European localities, which are brought together in the British Museum. The first volume, on the Bovidae, was published in 1928, and the second volume, on the Carnivora, is now before us.

Dr. Pilgrim's descriptions, of course, are entirely technical, but they are extended by many interesting comparisons which help to make the new facts useful for science. They are illustrated by some good text-figures and two plates. The first section relates to the primitive forerunners of the dogs and bears, which are important among the fossils from Pikermi. The next long section is on the mustelines and otters, which are less differentiated in the Pontian fauna than they are at the present day. Then follow more annectant

forms between viverrines and hyænas, besides both ancestral hyænas and true hyænas. The well-known *Hyæna eximia*, from Pikermi and Samos, is represented by many fine specimens, which seem to show that it belongs to the same genus as the spotted hyæna, usually named *Crocuta*. This genus is now known to have ranged as far as eastern China, and it is difficult to determine where it originated. True cats of the genus *Felis* occur, and with them are remains of *Machærodus* and other members of the sabre-toothed group.

Dr. Pilgrim's valuable catalogue is unfortunately marred a little by inadequate editing. There are more misprints than might be expected in a publication of the British Museum; and the statement on p. 142 that in 1857 the Bavarian Academy published its *Abhandlungen* in Vienna is inaccurate. There are several ungrammatical and inelegant expressions, and the text would have been much improved by the omission of redundant words and circumlocutions.

A. S. W.

Short Reviews

The Theory of Knowledge and Existence. By Dr. W. T. Stace. Pp. xii + 456. (Oxford: Clarendon Press; London: Oxford University Press, 1932.) 18s. net.

THIS comprehensive attempt to determine the characteristics and purpose of knowledge deserves careful reading. We believe that the author is right in stressing the empirical value of epistemology, though we fail to see why transcendental issues are altogether outside the horizon of the theory of knowledge proper. Adopting the well-known method of building up the world with some primitive elements, Dr. Stace characterises first the universe of the solitary mind, then gives shape to the external world, and finally describes what happens when the solitary mind discovers other minds. After concluding this part of his inquiry, he discusses space-time, mathematics, logic, the categories, and scientific knowledge. Though he purposely avoids the technicalities of these subjects, the author has many pertinent reflections about the issues they imply. To give but one example, in discussing the epistemological aspect of the new theories of matter, he points out that the earlier concept of the nuclear atom, though beyond any possible perception, is not itself unreal, as we can make a logical model of it by means of data supplied from other sources of perceptual knowledge. But the new concept of the 'wavicle' which purports to combine the characteristics of a particle with those of a wave, cannot possibly have any sort of existence, as it possesses contradictory properties. Also, he

rightly assumes that when any type of knowledge clashes with logic, it is not logic but our scientific assumptions which must be changed somehow.

The author's views on the character of mathematics are of a more controversial character; for him, mathematical propositions are a necessity derived from logic. The truth or falsity of mathematics means something more than self-consistency; it refers them to reality outside mathematics; and therefore mathematics cannot exist in a world of its own, cut off from concrete things. Mathematics, like all other kinds of knowledge, is tied by the 'given'.
T. G.

Pétroles naturels et artificiels. Par J.-J. Chartrou. (Collection Armand Colin: Section de Chimie, No. 124.) Pp. 206. (Paris: Armand Colin, 1931.) 10.50 francs.

IN view of the rapidly growing importance of petroleum in modern life, M. Chartrou attempts to acquaint the public with the main features of the technique of the industry, which in France has only recently come into prominence. An interesting and readable account is given of the composition and properties of the natural deposits, the character of the soil and geological strata in which they occur, theories as to their origin, methods used in the exploitation, storage, transport, refining and analysis of the different products, their application to industry, together with brief summaries of geographical distribution, regulations imposed by different governments and the