

There are no traces of man in Lower Egypt during the Pliocene period, when the northern part of the Nile valley formed an arm of the sea and the Faiyum depression did not exist. The earliest stone implements are of the Chellean type and occur with characteristic Acheulean implements in an extensively preserved river-terrace in the Nile valley at from 70 ft. to 85 ft. above the present level of the river. The Chellean implements are more or less water-worn, while those of Acheulean type are as sharp-edged as if freshly made, so the former seem to have been derived from some still older deposit. Next, there are Mousterian implements of a rather late form found abundantly in a terrace about 25 feet above the existing Nile alluvium. The later terraces in the Nile valley, presumably containing the implements of Upper Palæolithic and Neolithic man, are actually buried by this alluvium and thus inaccessible to study.

Drs. Sandford and Arkell have fortunately overcome this difficulty by discovering that the terrace with Mousterian implements passes from the Nile valley through the Hawara channel into the Faiyum depression. It sinks a little towards the Faiyum, and seems to prove that in Mousterian times the depression was completely filled with a great lake which received water from the Nile. The whole country was then fertile and it was not until later Palæolithic times that desert conditions began, and they may not have reached their present state until the Neolithic period. In these later times the Faiyum lake began to shrink, leaving a succession of beaches as terraces marking the several shores as it gradually diminished to its present extent. The beaches, of course, away from the Hawara channel, are not obscured by later alluvial deposits, and so can be searched for any implements they may contain. A beach about 20 feet below the Mousterian level yields late Palæolithic stone implements of a peculiar local group which Vignard has named the Sebilian. Then follow beaches with Neolithic implements which have already been well studied and described by Miss G. Caton-Thompson and Miss E. W. Gardner.

The evidence on which the various conclusions are based is recorded in a series of remarkably concise chapters, which are illustrated by diagrammatic sections of the deposits and effective sketches of the different types of implements. Actual photographs of the country are also given in the plates. Dr. Breasted contributes a useful foreword, and the authors themselves add a summary which, with the aid of a coloured geological map, makes the whole work readily understood. A. S. W.

Short Reviews.

The Dynamic Universe. By James Mackaye. Pp. x + 308. (London: Charles Scribner's Sons, 1931.) 10s. 6d. net.

THE complex structure of modern physics has caused many obscurities and inaccuracies to creep into the formulation of its epistemological pre-suppositions. Even the cosmological value of the principles and equations of relativity is difficult to extricate clearly from the mass of speculations, dimensional and non-dimensional, to which they have given rise. In undertaking a clarification of the confused conditions of theoretical physics, Prof. Mackaye has performed a very useful task; and this he does by providing critical answers to a number of pertinent questions such as the following: What is the cause of gravitation? Is matter a form of radiation? What is the cause of the Lorentz contraction? Why are not material bodies retarded in their motion through space? Has the theory of relativity superseded the law of causation? Is the acceleration of material bodies relative exclusively to other material bodies?

The variety of these questions shows the range and purpose of the author's inquiry. Yet, besides separating physics and metaphysics and explaining the one by the other, Prof. Mackaye has the ambition of presenting a cosmic theory dealing with the structure, and cause of change of motion, of material bodies. This attempt is based mainly on the radiation theory, which the author claims to fulfil the aspirations both of science and philosophy by reason of its unifying character. Although very suggestive, this portion of the book is less convincing, especially as the radiation theory in its present stage is a "rather blind groping for the truth". One might question also the author's final remark that "the explanation of nature's laws are physical, not metaphysical", in view of the fact that any explanation has to assume a number of constructive elements which are beyond the actual range of the particular theory seeking an explanation. The author, however, is himself fully aware of these difficulties, and the cautious presentation of his thesis should cause much useful thinking to philosophers and physicists alike.

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Rapid Methods for the Chemical Analysis of Special Steels, Steel-Making Alloys, their Ores, Graphites, and Bearing Metals. By Charles Morris Johnson. Fourth edition. Pp. xix + 729. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1930.) 37s. 6d. net.

In the fourth edition of this book, we are presented with detailed descriptions of the methods of analysis of steel, steel works materials, etc. Instead of re-setting the third edition, the author has incorporated new and improved methods in eighteen appendices occupying 176 pages rather more closely printed than the rest of the book. The only other material alteration made is in the chapter devoted to the determination of tungsten in low tungsten steel and the analysis of slags con-