more detailed account of the natural distribution in Europe and Western Asia of the principal German trees and the development, prehistoric and historical, of German forests. This section concludes with an account of the present distribution of forests in Germany, with their chief component species.

The second section contains a discussion of climatic and edaphic factors in relation to tree growth, and touches on the question of local races. A summary is given of the results of work on forest soils carried out in recent years by various investigators. An interesting diagram, based on the work of Hartmann, shows the range of hydrogen ion concentration of a number of common herbaceous and shrubby forest plants: this demonstrates, for example, the intolerance to acid conditions of *Geranium Robertianum*, *Brachypodium silvaticum*, and *Dactylis glomerata*, the acid tolerance of *Vaccinium Myrtillus* and *V. Vitis idœa*, and the wide range of tolerance of *Hypnum Schreberi* and *H. purum*. A short account of the physiological life-history of the forest completes the volume.

The scope of this work is mainly limited to German conditions, and the literature cited is almost entirely that of German-speaking countries; nevertheless, the book should prove of value to students of the fundamental principles of sylviculture in other countries.

The Geological Age of *Pithecanthropus*

The Age of Pithecanthropus. By Dr. Ir. L. J. C. van Es. Pp. xii + 142 + 4 plates. (The Hague: Martinus Nijhoff, 1931.) 8 guilders.

LITTLE is known about the exact geological age of the oldest fossil human remains hitherto discovered, and every contribution to the subject is welcome. The age especially of the most primitive ancestral man, *Pithecanthropus*, found by Prof. Dubois in a river deposit in Java, has already been much discussed without any definite conclusion. We are, therefore, glad to receive a most valuable small volume on the Tertiary geology of Java by Dr. L. J. C. van Es, who seems to prove that this remarkable fossil dates back to the Lower Pleistocene period. Dr. van Es bases his work on the researches of Prof. E. Dubois, K. Martin, and G. A. F. Molengraaff, to whom he dedicates his publication. He has studied thoroughly the geology of Java, and he illustrates his description by a series of sections and maps, which have been prepared with the help of the Chief of the Geological Survey of the Netherlands Indies.

Since the beginning of the Upper Miocene period at least, there has always been much volcanic activity in the region of Java, and extensive volcanic breccias and tuffs are associated with the deposits containing corals and marine shells, up to those of the Middle Pliocene. They then occur also with lake and river deposits of Upper Pliocene, Pleistocene, and more recent date. There have indeed been many alterations in the level of the land and sea, and there seems to have been a connexion with the Asiatic continent, through Sumatra, in the Upper Pliocene, when land mammals, such as the primitive elephants *Mastodon* and *Stegodon*, *Hippopotamus* and *Cervus*, first invaded Java. The successive marine deposits which now form part of the land are marked by an increasing percentage of existing species of shells among the fossils, as might be expected. It is thus possible to identify them even when they are not seen directly superposed.

The river deposit at Trinil, in which *Pithecanthropus* was discovered, rests unconformably on a marine formation, which is shown by its fossils to be of Middle Pliocene age. The gap in the geological series indicated by the unconformity is filled in other districts by marine deposits, which contain 66-70 per cent of existing species of shells and are therefore Upper Pliocene. Hence the conclusion, that if a marine formation equivalent in age to the Trinil river deposit were found, it would contain more than seventy per cent of existing species of shells and must be regarded as Pleistocene. The percentage of existing species of freshwater shells in the Trinil deposit itself supports this conclusion, and as the associated land mammals (*Stegodon*, *Hippopotamus*, etc.) are much like those in the Lower Pleistocene Narbada river deposits of India, *Pithecanthropus* evidently dates back to the beginning of the Pleistocene period. A. S. W.

Nature and Man in Arabia

Arabia Felix: Across the Empty Quarter of Arabia. By Bertram Thomas. With a Foreword by T. E. Lawrence and Appendix by Sir Arthur Keith. Pp. xxix + 397 + 48 plates. (London and Toronto: Jonathan Cape, 1932). 25*s*. net.

THIS book embodies so many important contributions to the common stock of scientific knowledge that the reader marvels that one man should have been able, within the period of twelve months, unaided by public funds or private beneficence, to accomplish so much. Mr. Bertram Thomas, who crossed the great empty quarter of