

Biological Sciences

Homo

The Roots of Mankind: The Story of Man and his Ancestors. By John Napier. Pp. 240. (George Allen and Unwin: London, October 1971.) Cloth £2.75; paper £1.75.

THE origin and beginning of man remains a subject for myth. Each new piece of evidence finds its place in a variety of world views, old and new, and *Australopithecus* has now joined Gilgamesh and Prometheus as a legendary figure whose past feats as "killer-ape" or social hunter are used to explain our present behaviour by the same magical logic as the feats of any other ancestor figure. John Napier rightly concerns himself almost entirely with the solid facts of anatomy and palaeontology, although the authorities he mentions in his readings on human behaviour are almost entirely confined to modern makers of myths.

The style throughout is determinedly cheerful, and, as a result, highly readable. It is presumably designed for a largely uninformed but genuinely interested undergraduate audience. My main criticism is that it does not distinguish clearly enough between two areas of controversy, both of which are its proper concern. The first is that of the evidence that man is an animal, and an animal extremely like a chimpanzee at that. The second is that of the causes of the evolution of the special features of man.

The arguments for man's animal origins still need to be put to non-biologists and they are given here conveniently and accurately, although I found it confusing that much of the presentation was centred around the difficulties of framing a satisfactory taxonomic definition of *Homo sapiens*. The description of the evolutionary lines of man, apes and old world monkeys is well-balanced, and picks its way expertly amongst the present dissensions over nomenclature and interpretation of the fossil data. Even when it comes to *Homo habilis* and other issues with which the author is professionally concerned, we are told both sides of the argument.

But it is the difference between human evolution and that of other lineages that is now of real interest. It was here that I was dissatisfied. Even in anatomy, where we are, for example, told very clearly what are the special features of the human foot and gait, I felt that it would have been better didactically if their uniqueness and early acquisition in the hominid line had been more stressed.

In areas other than anatomy and

taxonomy, the deficiencies are more important. The origin of human language is clearly one of the two main remaining problems of human evolution. (The other, the evolution of human intellectual abilities, is closely related.) Washoe and the Gardiners have demonstrated that chimpanzees can be taught to use a human symbolic language. Napier cites this fascinating study to show that there is no fundamental difference between man and animals even here. No doubt this needs saying to linguists: it will be interesting to see how well chimpanzees generate a deep structure of grammar in the absence of the genetic basis postulated for it in man by Chomsky.

The study should also be viewed in a quite different way, however. If chimpanzees could talk if they possessed a symbolic language, it makes it doubly significant that they do not. Indeed vocal language is not physically out of the question for non-human primates: I have isolated a full range of vowel sounds from baboon grunts. The special conditions which led to human language are not beyond investigation. The need to plan cooperative hunting was no doubt important. More primitively, vocal mimicry may have been crucial. This ability is widespread amongst birds, where it serves to allow communication with specific individuals (or classes of individual) at a distance.

It would be unfair to finish without stressing that it is only because this is an excellent book, which deals clearly with both fact and speculation within its self-imposed limits, that I have devoted so much space to critical comment. I have no doubt that future editions will allow extension and change.

R. J. ANDREW

Sea Science

Scientists and the Sea, 1650-1900: A Study of Marine Science. By Margaret Deacon. Pp. xvi+445. (Academic Press: London and New York, July 1971.) £5.50; \$16.

OCEANOGRAPHY, as Miss Deacon reminds us, is a descriptive and environmental science. It does not operate within a single paradigm, indeed it relies very much for its development upon advances made in the physical and biological sciences. Partly as a result, oceanography as a science has had something of an identity problem—a problem which only began to resolve itself in the period with which this particular study ends. Miss Deacon's book

therefore deals with marine science in its formative years, and the unity of her study derives, not from the discipline, dedication or research techniques of the scientists themselves, but from the age-old nature of the problems to be solved. Although this book is primarily concerned with the period 1650 to 1900, it wisely begins with an account of scientific thought about the sea in the ancient, mediaeval and renaissance worlds, and herein the problems are posed. What is the cause of the salinity of the oceans? What is the motive force behind the ebb and flow of the tides? What impulse generates the movement of waves? How deep are the oceans and does temperature vary with depth? Where do ocean currents have their origins? These questions perplexed Aristotle, Pliny and Strabo. In the nineteenth century, although the motive force of tides was fairly well understood, these were still the problems marine scientists were grappling with. It is these problems and their solutions which provide the themes of this book.

Interest in marine science, Miss Deacon points out, followed a cyclical pattern: a short burst of activity, and then a long period of stagnation in which much of the accumulated knowledge was lost or distorted. The first major period of activity accompanied the scientific revolution in the seventeenth century and was concentrated in the 1660s. Another came towards the end of the eighteenth century and a third after 1860. In each era a small corps of scientists would digress from their usual field of study to work on marine science. They in turn would interest a wider group of less talented individuals whose principal value was in the collection of statistical data on which reliable research depended. As interest and support for marine science waned, the scientists resignedly returned to their original disciplines, leaving much of their work unfinished.

One of the reasons for this fragmentary development was the obstacles in the way of collecting sufficient and accurate factual material. The development of reliable instruments for recording tidal variations, deep sea temperatures and currents lagged behind the needs of the scientists, and the sea was always a harsh and unreliable working environment. Even apparently quite simple operations such as taking soundings or temperatures were fraught with difficulties; in 1816 it took one hundred of the crew of HMS *Eurydice* an hour and twenty minutes to haul in 1,435 fathoms of line. The costs of collecting such data placed further barriers in the