

the natural world on which technology intrudes". . . "Since the environmental crisis is the result of the social mismanagement of the world's resources, then it can be resolved, and man can survive in a humane condition when the social organization of man is brought into harmony with the ecosphere".

Commoner's book is primarily concerned with the situation in the highly industrialized countries. He does, indeed, devote a chapter to the problems in developing countries, in particular their population. He points out that there are almost certainly tendencies towards the regulation of human populations, acting by a reduction of birth rate when a high enough standard of living has reduced both the overall death rate and in particular the infant mortality rates. He seems to be more optimistic than many authors in feeling that these factors can come into operation early enough to prevent there being major problems of over-population in most of the developing countries. He is probably too single-minded in refusing to allow the population problem to divert him from his main thesis—the valuable partial truth that several major recent technologies do greater harm to the environment than is warranted by their increased efficiency. It is a good point—but far—very far—from being the whole of the problem we face in trying to work our way into the twenty-first century.

C. H. WADDINGTON

Feral into Farm Species

The Origin of the Domestic Animals of Africa. By H. Epstein. Revised in collaboration with I. L. Mason. Vol. 1. Pp. xi + 573. Vol. 2. Pp. xi + 712. (Africana Publishing: New York, London and Munich, December 1971.) \$85; £35.50 two volumes.

IN the log-book of Vasco da Gama's first voyage in 1497 the cattle of the Hottentots at what is now called Mossel Bay are described as "very big like the Alemtejo cattle, very fat, reddish of colour and very wild". A hundred and fifty years later Jan van Herwaerdens found "numerous cattle which were much bigger than those in the homeland where we had never seen cattle of such size". Many of these large animals had a prominent cervico-thoracic hump, and their prevailing colour was red, although others were known. The Dutch East India Company began breeding cattle in 1673 to provision their numerous ships which revictualled at the Cape; war had broken out between the Dutch and their cattle suppliers, the Cochoqua

Hottentots, who had sold the Cape Peninsula to the Company the previous year. The herds taken from the defeated Cochoqua, who never regained them, became the sole or principal ancestors of the famed Africander breed of draft oxen. These cattle formed the beautiful spans of the transport riders before the days of railways, and made possible the Great Trek.

In 1927 Professor Epstein took up stock farming in the western Transvaal and became interested in the history of the Africander breed which, after two centuries as trek-oxen, was being improved for beef production. At that time very little was known on the subject and he found it difficult to gather the few scattered facts. "It soon became apparent that to trace the path of the ancestral stock of the Africander cattle and of the Hottentots, their former breeders, it was necessary also to pay attention to the other domestic animals of the Hottentots. And since the origin of the animals of the Hottentots could not be fully understood without a comparison of their racial characteristics with those of the domestic breeds of the Bantu, the theme gradually expanded until it finally embraced the various types and breeds of domestic animals throughout the whole of Africa".

More than forty years of research have gone to the making of this encyclopaedic work, which is based on the author's direct experience of breeding and handling livestock in Africa, Asia, Europe and America. To this he has added years of close study of agriculture and archaeology, animal husbandry and zoology, natural and human history and prehistory. The result is a book that will be the standard for many years to come, and brings such a vast mass of scattered information together that everyone interested in the subject will make it the starting point for any further researches.

Volume 1 deals with the dogs, cattle and buffalo of Africa, and volume 2 with the sheep, goat, pig, ass, horse and camel. Each chapter opens with a survey of the wild species from which the domestic breeds may have descended, and this is followed by detailed descriptions of the morphological, physiological, taxonomic and distributional characters of the African breeds and varieties. The author then traces back the historical and prehistorical record to the place of origin of the various animals in Asia, Europe or Africa. He attempts, by this close attention to descent, to establish not only the relationships of the domestic breeds to the wild species and to extinct domestic forms, but also to each other and to the domestic breeds of other continents.

Professor Epstein presents an enor-

mous gathering of facts and theories in words and pictures, which show that the attempt to unravel the threads woven into the tapestry depicting the origin of the domestic breeds of Africa is indeed a task to try the patience of a Penelope. Some broad conclusions can be drawn, but such is the complexity of the matter that any detailed understanding seems to be beyond achievement. Man has been stirring the gene pool of his domestic animals for five or six millenia, not understanding what he did, and now it seems to be too late to know exactly what happened during the brew.

These fascinating volumes are copiously illustrated, have an extensive bibliography, and three indexes. Professor Epstein pays generous tribute to his able collaborator and critic, I. L. Mason. It is not surprising that no ordinary publisher could be found to bring out this book, for the returns from publishing a book on this scale without wide popular appeal are meagre. In spite of subsidies from the South African Council for Scientific and Industrial Research, and from the South African Friends of the Hebrew University of Jerusalem, its price puts it beyond the reach of all but the most enthusiastic workers on the subject, and even librarians will hesitate before adding it to their shelves. This is a pity because it deserves to be widely available.

L. HARRISON MATTHEWS

History of Aether

Nineteenth-Century Aether Theories. By Kenneth F. Schaffner. (The Commonwealth and International Library of Science, Technology, Engineering and Liberal Studies: Selected Readings in Physics.) Pp. ix + 278. (Pergamon: Oxford and New York, January 1972.) £3.25.

THIS book contains reprints from the writings on theories of the aether by a number of nineteenth century physicists, including texts drawn from the works of Fresnel, Stokes, Green, MacCullagh, Kelvin, Fitzgerald, Larmor and Lorentz. Inevitably one can quarrel with the selection—the omission of Maxwell seems odd—but Professor Schaffner has chosen an interesting selection of sources. The book includes a historical essay on theories of the aether in nineteenth century physics, and the references to this commentary serve as a guide to further primary and some recent secondary sources.

Any historical work on this subject is inevitably indebted to E. T. Whittaker's *History of the Theories of Aether and Electricity: The Classical Theories* (1951), and Schaffner fully