account of scientific discovery. But these personal idiosyncrasies do not hide a great deal of valuable behavioral observation, psychological insight, surgical competence, and complex experimentation based on already well-established techniques, including cerebral probing. Yet in being so frank about his early failures, his treatment of the dolphins, and his personal sacrifices, it may be questioned whether he has not done his cause a disservice. It may be noted that Kellogg has deliberately eschewed vivisection with his dolphins, preferring to work with the whole mammal.

A substantial part of both sets of investigations was based on training procedures similar to those which have been used with other animals, such as chimpanzees, dogs, rats, and fish. It seems that dolphins, like dogs and humans, have temperaments, and that account must be taken of these, as Pavlov did, when interpreting the results. Derivative support for the validity of their conclusions on sonar ranging and dolphin vocalization is sought by both authors in the large size of the eighth cranial nerve and the complexity of its central connections. Comparable though much simpler elaborations occur also in some fishes, for example, Triglidae and Mormyridae, and suggest that these may repay further study along these lines. Subjectively, the dolphin's vocalizations for finding and recognition in circumstances where visual localization is thought to be impossible are described as pings, clicks, or creaks. There is a further wide range of vocalizations which Lilly regards as a kind of "dolphinese" language. Kellogg confines himself to his rigid examination of the dolphin's sonar system, but Lilly goes into vivid speculation, expressed graphically and with extreme self-confidence, that these dolphins, through their language and because of the known great size and complexity of their brains, may be the first nonhumans with whom man may learn to communicate. Here his book is more reminiscent of Algernon Blackwood's imaginative fantasies than of legitimate scientific inference; but—to quote his own expression—he "sticks his neck out" so deliberately and provocatively that it would be a pity to harm it, and it should indeed be taken as a warning, though perhaps not in the sense he intends.

H. O. BULL
Dove Marine Laboratory,
King's College, University of Durham

Vistas of Anthropologists

They Studied Man. Abram Kardiner and Edward Preble. World, New York, 1961. 287 pp. $5.

Indeed, they studied man, and from different points of view. This diversity of viewpoint is considered very desirable in this day when interdisciplinary (not multidisciplinary) studies are being advocated. Here, however, we see these representatives of the several disciplines studying man in their own ways, and their efforts are described as seen through the professional eyes of two scholars trained in, and practicing, psychiatry.

The authors state that their interest is not historical but that they "have attempted to relate the seminal hypotheses of the few great innovators in the development of a 'science of man' to the ethos of the times and to the specific lives of these innovators." Their innovations are seen by Kardiner and Preble as cultural responses to "collective interests and needs," but also as "the products of idiosyncrasies and genius."

The word "They" in the book's title refers to the nine scholars Kardiner and Preble chose to discuss. These include Darwin, the evolution-minded naturalist, and Herbert Spencer, the English philosopher who championed such theories as that of orderly social evolution and social functionalism. Tylor, the "founder of modern anthropology," emphasized the psychic unity of man and the concept of animism in understanding primitive religions. In regard to Sir James Frazer, author of the monumental work, *The Golden Bough,* I am inclined to agree with the authors when they say "It is not easy to determine Frazer's reputation in the history of anthropology." The principal influence of the French sociologist, Emile Durkheim, was in terms of his basic functional approach in the study of culture and society. Franz Boas, trained as a physicist, "chose instead to study man." The authors point out, very correctly, that Boas' "methods and attitudes" have shaped the course of modern anthropology, particularly in the United States. Bronislaw Malinowski, also a functionalist, was a very controversial figure because he "did not simply disdain the usual customs and proprieties, he took a positive pleasure in violating them." Alfred Kroeber became, in fact, the dean of American anthropologists. He was an accomplished field ethnologist and an authority on the theoretical nature of culture and culture change. Ruth Benedict, at once a poet and a scientist, was basically a functionalist, who emphasized the cultural configuration approach. I feel it can be fairly said that the work of Sigmund Freud had little direct effect on cultural anthropology. Rather, there have been strong indirect influences based largely on the concepts of the basic personality and the relation of psychodynamics to culture.

The authors suggest that there may be disagreement regarding "our selection of anthropologists." While each one of the scholars discussed had a strong influence on the development of anthropology, they were not all anthropologists. I wonder why such men as Lewis H. Morgan and Radcliffe-Brown were omitted.

One excellent feature is the biographical sketch, given at the beginning of the discussion, of each of the scholars. The book will be valuable to those interested in the social sciences, both students and laymen.

HARRY T. GETTY
Department of Anthropology,
University of Arizona

Broad-Brush Picture

Pioneer Microbiologists of America. Paul F. Clark. University of Wisconsin Press, Madison, 1961. xiv + 369 pp. Illus. $6.

Pioneers consists of 18 chapters arranged in five sections—Foundations of Early Bacteriology (4 chapters); The Atlantic Seaboard (8); The Central Valley (2); Our Western Lands (2); and Perspective (2)—plus 23 pages of bibliographic notes and an index of almost 1100 entries. Photographs of 37 of the many bacteriologists discussed utilize ten pages; the photographs are the more interesting because the age of the individual at the time the photograph was taken is given. Thus, the eager boyishness of Novy at 35 contrasts with the maturity of Vaughan at 59—two individuals, Thom and Karl Meyer, are ageless. Following 79 pages on the beginnings of bacteriology (abroad and in America) and on epidemiology and epidemics, the author discusses pioneer bacteriology in the East, including the contributions made