

the concepts used in this book ("symmetric spaces," "vector bundles," and "Iwasawa decomposition," for example) are quite adapted to physical situations and concepts and will be very useful. What physicists mainly need, however, are explicit calculations of the representations of specific groups of their problems rather than general theorems, a need not met in this book, nor in any other book.

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Individual Adaptation

Since antiquity adaptation has been recognized as the central problem of understanding and explaining organisms. Final cause, in the Aristotelian sense, only evaded the question and must be either radically redefined or altogether abandoned in scientific pursuit of the subject. That pursuit has shown the concept of adaptation to be extremely complex, to such a point that the word out of context is hopelessly ambiguous. "Adaptation" may mean the process of acquiring a characteristic that is an adaptation. The process may be genetic, in the evolution of populations that are adapted as such, that is, as reproductive continua. In the case of mankind, the process and its adaptive outcome may be cultural, also a phenomenon of populations as reproductive continua and related to genetic evolution because the capacity for culture is genetic and has evolved. Those two interacting aspects of human adaptation were treated with great skill by Th. Dobzhansky in his Silliman lectures at Yale, published as *Mankind Evolving* [reviewed in *Science* **136**, 142 (1962)].

Another aspect of adaptation in general and human adaptation in particular is that individuals adapt. That was the subject of another outstanding series of Silliman lectures by René Dubos, now published as *Man Adapting* (Yale University Press, New Haven, Conn., 1965. 549 pp., \$10). This book was prepared as a companion volume to Dobzhansky's, and a simple expression of judgment of both is that they are worthy of their subjects and of each other. It is not necessary to read one to profit by the other, but the profit is more than doubled if both are studied. There is

virtually no repetition, but there are complementarity and connection. The genetics of the individual are fixed at conception (for all usual cases), but the capacity for individual adaptation is genetically determined and results from the evolution of mankind collectively and not individually. Furthermore, individual adaptation has two inseparable but different aspects, one biological and the other cultural, just as does populational adaptation. The two also involve both static or homeostatic adaptation to a given environment and dynamic adaptation by changing response to environmental variables and new stresses. Dubos has treated all aspects of individual adaptation with thoroughness, skill, and authority.

For the rest, Dubos's book is so rich in detail and so extensive in coverage that its contents must be indicated rather than reviewed. It starts with man as a product of evolution, a unique product because man's nature is not only biological but also social, his mentality not only reactive but also manipulative of symbols. The individual with these group characteristics develops under his particular influences, pre- and postnatal. He lives in a physical world, reacting rhythmically to its cyclic forces and variously to its climates and other characteristics. Individual responses to nutrition and malnutrition are especially noticeable, and especially modifiable by cultural means.

Discussion of biological synecology and the human social environment introduces a series of chapters on physiological derangement and adaptation, fascinating in depth and with some astonishing tidbits: the indigenous microbiota (absence of an intestinal biota can produce radical anatomical abnormality); nutrition and infection (a surprise here is that dental caries is discussed without mention of fluorides); evolution of microbial diseases (modern medicine has not conquered them; "the morbidity rates of infection have not decreased significantly and in some cases have actually increased"); changing patterns of disease (increase in population density is a possible accelerating cause of disease). In spite of that last bit, the next chapter, "Adaptation and its dangers," points out that mankind has proved to be extraordinarily adaptable and that the general state of health has in fact improved in the thoroughly unnatural conditions of crowded cities. Neverthe-

less the adaptability of populations is paid for by maladaptation in some individuals, and adaptability itself is a threat if it involves the ability to accept or to produce the destruction of "the values most characteristic of human life."

The topic of population density and human life is familiar enough, but here is a summary free of extremism. (Even though I personally am repelled by the opinion that establishment of permanent settlements all over the earth is inevitable and does not imply true overpopulation to the extent that it occupies "new territories," eliminating jungle, desert, or all open space.)

The final five chapters (of 16 in all) may be of somewhat less general interest, being devoted to the practice of medicine, which nevertheless has its own fascination for the practitioners and for their clients, who are all of us. I shall only list the chapter titles: "Hippocrates in modern dress"; "Man meets his environment"; "Eradication versus control"; "The control of disease"; and "Medicine adapting."

This is an altogether fine book, one that cannot fail to interest any intelligent reader.

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Levant Geology

M. A. Avnimelech has been associated with the Department of Geology of the Hebrew University of Jerusalem since 1930. He prepared this volume, *Bibliography of Levant Geology: Including Cyprus, Hatay, Israel, Jordania, Lebanon, Sinai, and Syria* (Israel Program for Scientific Translations, Jerusalem; Davey, New York, 1965. 204 pp., \$6), a 22 by 27½ cm, double-column, offset-printed book to fill a void in bibliographic information. He plans to augment these data by supplements.

The introduction (pp. vii to x) contains a short synoptic history of geological research in the Levant countries. The book is divided into four parts: Bibliography (pp. 1 to 104), Chronological index (pp. 107 to 135), Analytical subject index (pp. 139 to 184), and List of quoted periodicals and serials (pp. 187 to 192). The frontispiece, an outline map, delimits the geographic scope. "Hatay," not labeled on this map, is that part of Turkey between the