Book Reviews

Trans-Pacific Migration

Archaeology of Easter Island. vol. 1. Reports of the Norwegian Archaeological Expedition to Easter Island and the East Pacific. Contributions by Thor Heyerdahl, Edwin N. Ferdon, Jr., William Mulloy, Arne Skjölsvold, and Carlyle S. Smith. Thor Heyerdahl and Edwin N. Ferdon, Jr., Eds. Rand McNally, New York, 1961. xi + 559 pp. Illus. Plates. $25.

This handsomely printed volume of 570 quarto pages of text has 127 illustrations in the text, 95 full pages of plates, and 10 folding maps, and it weighs nearly 7 pounds. It marks a significant advance in Polynesian archeology by adding to our knowledge of Easter Island the results of 5 months of field investigation by four professional archeologists. These are Ferdon from the Museum of New Mexico, Mulloy from the University of Wyoming, Skjölsvold from Stavanger Museum (Norway), and Smith from the University of Kansas. They have provided excellent, objective reports on the field surveys, site excavations, and stone statues. Heyerdahl himself summarizes previous research, gives a full account of the geography and history of the island, and writes the section on surface artifacts and the general discussion.

The work shows that Thor Heyerdahl performed a prodigious task in planning, organizing, and carrying out the Norwegian Expedition, and then made plans for the immediate preparation and publication of reports. Heyerdahl's handling and interpretation of the present evidence are inevitably affected by his long-standing conviction that Polynesia was first settled by people from the Americas. This belief is based on his acceptance of certain legends as fact, the many parallels that he sees between American Indian and Polynesian cultures, and his idea that prevailing winds and currents would block migration from the west and would facilitate migration from the east. Thus, having "fully accepted the unanimously held conclusion that the Polynesian stock for geographical reasons must have been very late in its arrival to this extreme outpost," he sees in the earliest radiocarbon date obtained, A.D. 386, a substantiation of his theory that the first inhabitants must have come from South America. The date is from charcoal associated with the digging of an interrupted ditch across the neck of Poike headland. The ditch is considered to be a defensive structure on the basis of a local legend that it was filled with grass and branches which were burned in roasting the defeated Long-Ears in a battle which took place about A.D. 1680. Heyerdahl identifies the Long-Ears as descendants of the pre-Polynesian population.

In my opinion the ditch had no defensive value but served as an area providing moist soil and protection for growing bananas, sugar cane, and taro, similar to the fosses dug by the Tuamotuans to the west. If anything, the ditch would seem to testify to the presence of Polynesian culture at this time, for such soil would not be necessary for growing the sweet potato, the only food plant of the Easter Islanders which could be attributed to the Peruvians. The custom of destroying trees and crops in war raids would account for the zone of intensive burning found in the ditch sections and the radiocarbon date of A.D. 1676, which was derived from "crop cuttings and wood."

The archeology of Easter Island, on the basis of the sequence of architectural features of the ceremonial platforms called *ahu*, is divided by the authors into Early, Middle, and Late periods. In the Early Period the *ahu* were carefully constructed of fitted masonry and faced rectangular courts. In the Middle Period, the *ahu* were more loosely constructed, and gigantic stone images were placed upon them. In the Late Period, beginning about A.D. 1680, the images were toppled in intertribal warfare, and the *ahu* were modified into semipyramids. On the basis of radiocarbon dates, the end of the Early Period is placed about A.D. 1100. Although the earliest date obtained for any of the *ahu* is A.D. 852 (± 100 years), the date for the beginning of the Early Period, which is characterized by a certain type of *ahu*, is arbitrarily extended back in time to before A.D. 400, in order to accommodate the date obtained in association with the construction of Poike ditch. However, the great platforms of fitted stones, which parallel the construction of early masonry in the Andean area of Peru and which so strongly suggest Peruvian influence, would not have been erected by the first settlers until a large population had been created. Heyerdahl recognizes a problem and concludes that the Andean parallel indicates "an introduction in the first settlement period." It would seem, therefore, that a First Settlement Period should have been set apart from the period when this masonry appears, in order to clearly approach the problem that Heyerdahl makes the most important issue of Easter Island archeology: whether or not the first settlers were from Peru.

The evidence which can be deduced from the language and which introduces a most important time perspective is unfortunately not given due consideration. The Easter Island language is a branch of the East Polynesian family of languages. It obviously broke away from central East Polynesia earlier than the Hawaiian or the Maori of New Zealand, because it retained a proto-Polynesian consonant, a glottal, which has been lost by the others but which is still used in Tonga and other parts of West Polynesia. This dates the settlement of Easter Island by the Polynesian-speaking people at a time prior to their settlement of Hawaii, which from radiocarbon dates is certain to have occurred before A.D. 750.

As I have pointed out, the earliest dated feature of Easter Island, the Poike ditch, was in all probability created to maintain the plants introduced by the Polynesians. If the date A.D. 386 (± 100 years) for the digging of this ditch can be relied upon, we have an idea of the extent to which Polynesians, seeking new homes, were roaming the eastern

Pacific at this very early time. That tiny Easter Island, surrounded by the vastness of the empty ocean, was reached by a Polynesian craft from the west is remarkable. If it seems unlikely that one craft would reach Easter Island, it seems more unlikely that the island would be reached twice, and the same holds for a drifting Peruvian raft.

Archeological evidence revealed by the Norwegian Expedition of the sudden appearance, toward the end of the Early Period, of great *ahu* platforms of remarkably fitted, Andean-like masonry, followed by a period of intensive activity in making and erecting huge stone images upon the *ahu*, indicates the introduction of a powerful influence that could well have been exerted by a strong chief from the Andean area of Peru. Although the archeologists of the expedition point out some traits that might possibly be of South American origin, they cautiously nowhere claim in their summaries that they have discovered a substratum of Andean culture underlying and preceding the Polynesian.

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Interpretative Essays

This is Life. Essays in modern biology. Willis H. Johnson and William C. Steere, Eds. Holt, Rinehart, and Winston, New York, 1962. xii + 354 pp. Illus. Paper, $3.95.

Frontiers of Modern Biology. Twenty lectures originally broadcast over the Voice of America. Coordinated by Gairdner B. Moment. Houghton Mifflin, Boston, 1962. xv + 192 pp. Paper, $1.95.

How to interpret science to the educated layman is impressively demonstrated, at least for biological science, in these recent paperbacks. Each volume consists of a collection of essays on particular aspects of modern biology. Each essay is written by a scientist active in the subject field. *This is Life* is intended for the beginning student of college biology, and the essays are more detailed and demanding than those in *Frontiers of Modern Biology*, which were originally delivered as lectures in the Forum Series on the Biological Sciences, prepared by the Voice of America in cooperation with the American Institute of Biological Sciences. Each collection, however, is admirably adapted to its audience, and each presents the spirit and challenge of biology forcefully. One paramount characteristic of the two volumes is the fascinating insight into the scientific method which each author so skillfully provides. Biology comes alive between the covers of these two volumes.

It is interesting, but not of great importance, that the essays in both volumes are arranged according to the general concept of levels of organization, but the books begin at opposite ends of the biological spectrum; they agree only in placing the origin of life in the last chapter. The 12 essays included in *This is Life* are: "Photosynthesis" by C. S. French, "Energy release and utilization" by A. C. Giese, "Ultrastructure of cells in relation to function" by R. V. Dippell, "Nutrition of protists" by S. H. Hutner, "Viruses: Reproduction and heredity" by A. Siegel, "Bacteria: Reproduction and heredity" by H. R. Garner, "Structure of the genetic material and concept of the gene" by G. W. Beadle, "Plant growth and plant hormones" by F. W. Went, "Plant morphogenesis" by I. M. Sussex, "Animal morphogenesis" by M. V. Edds, Jr., "The role of hybridization in evolution" by E. Anderson, "The origin of life" by S. L. Miller. The volume is well illustrated and has a 10-page index. At the end of each chapter there is a carefully selected bibliography. Perhaps in its treatment of modern biology, the volume is overbalanced toward molecular and cellular considerations to the extent that new and exciting advances in other areas are omitted.

In *Frontiers of Modern Biology*, the 20 essays are: "Biological science today" by G. B. Moment, "Historical studies" by J. M. Oppenheimer, "Animal populations" by E. S. Deevey, "The timing of spring migration and reproduction in birds" by A. Wolfson, "Newer paths in taxonomy" by J. O. Corliss, "Instinctive behavior" by W. G. Van der Kloot, "The development of visual behavior" by L. S. Stone, "Biological clocks" by V. G. Bruce, "Plant photoperiods" by H. A. Borthwick, "The biochemistry of human heredity" by H. B. Glass, "Tissue transplantation" by J. B. Ebert, "Chemical control of cell growth and cell division: An aspect of growth and morphogenesis" by F. C. Steward, "Human chromosomes and tissue culture" by T. T. Puck, "Modern aspects of cell division" by W. R. Duryee, "Fertilization" by C. B. Metz, "Regulation of enzyme-catalyzed reactions" by DeWitt Stetten, Jr., "Photosynthesis as an energy conversion process" by D. I. Arnon, "Nucleic acids and the physical basis of inheritance" by A. Rich, "Energy and life" by W. D. McElroy, "Theories of the origin of life" by G. Wald. Regrettably, the lectures are published without illustrations, bibliographies, or an index. Nevertheless, once begun, this book is hard to put down. I hope we will see more books like this one.

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Economic Anthropology

Economic Development and Social Change in South India. T. S. Epstein. University of Manchester Press, Manchester, England; Humanities Press, New York, 1962. 369 pp. $8.50.

More than two-thirds of the world's population is in underdeveloped countries, and in these countries most people live in rural villages where the technology, the economy, and the social and political relationships partake more of traditional than of modern culture forms. But the winds of change are blowing on these villages. With no significant exceptions that I can think of, the less-developed nations are now seeking to move toward technological and economic modernization. They are being aided by the United States, the U.S.S.R., other nations in both camps, and by the United Nations and its specialized agencies, such as the Food and Agriculture Organization and the World Bank. All over the world, development programs are bringing to the villages such powerful instruments of change as roads, irrigation, fertilizers, agricultural extension agents, and schools; to nearby towns they often also bring factories, movie houses, hospitals, and specialized training centers. What will be the nature of the effects on traditional village societies? This is a question of major significance in today's world, and one on which social science research should be able to throw light. The book under review does so. It is a first-rate contribution—a field study,