he had explored the farther reaches of the Old World, much less the coasts of the New."

Because primitive watercraft were made of perishable material, a study of their origin, technology, and dispersal must begin with historic end products. In this study, the author has limited his investigations to watercraft used by the native people on the west coast of South America. Early historic accounts of the six basic types of watercraft employed at the time of European contact are carefully reported and analyzed, and the distribution of each craft is noted. Since reed-bundle floats, dugouts, and log rafts are still used in distinct areas, the author's 14-month trek along the coast from Panama to the Straits of Magellan pays off in clear descriptions of their construction, varieties, and present distribution. Of importance is Edwards' careful analysis of the historic changes that have taken place, some through contact with European vessels.

Among the more interesting items brought to light in this study is the strong evidence that log rafts were equipped with triangular sails at the time of European contact. The use of square sails on log rafts appears to have been a historic introduction, although the origin of the reed-float square sail used on Lake Titicaca remains somewhat in doubt. Historic records of coastal reed floats 20 feet long, with a beam of from 10 to 12 feet, that were capable of carrying horses and cattle when two such craft were lashed together, indicates their capacity for extended voyaging. These may have been firmer than previously suspected because Edwards found that modern south Peruvian reed floats hold up well for as much as a year. Padre Acosta's account of Indians of Ica and Arica claiming to have sailed inflated sealskin floats to islands far to the west reveals the possible seaworthiness of even this flimsy looking craft.

The author's conclusions are cautious and limited to the area involved. As to the broader questions, Edwards draws no conclusions, but succinctly remarks that "these data suggest that we cannot dogmatically restrict our most ancient travelers between continents to shank's mare."

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Agriculture: Economic Versus Social Aspects

Farmers, Workers, and Machines: Technological and Social Change in Farm Industries of Arizona (University of Arizona Press, Tucson, 1965. 339 pp., $7.50) is notable for its subject and its approach. The new and technologically advancing form of agriculture developing in Arizona is its subject. A union of cultural anthropology and agricultural economics through the collaboration of two authors, Harlan Padfield and William E. Martin, is its approach. The authors' intention is to avoid the polarized light produced frequently by extreme fragmentation of approach. "One type of social reality," they say, "will manifest itself through one method of analysis while another type of social reality which tends to emerge through another frame of social organization is obscured, obviated, or lost entirely" (p. 3).

Southwestern agriculture, notably in Arizona, represents a significant deviation from the repeatedly declared national ideal of agriculture conducted by landowning, laboring families. Conspicuous for its large-scale land operation and rapidly advancing technology, it depends on the intermittent services of numerous landless, migratory, disorganized seasonal workers. Economic "efficiency" viewed through the frame of formal management structure, exists side by side with deep social division, inequalities, massed poverty, and recurrent frictions during the annual production cycle. The authors' initial conclusions state this contrast: Arizona agriculture is an instrument "of social change working in the direction of upward occupational mobility," and also "of exploitation of unsophisticated, culturally unassimilated peoples" (p. 289).

It gives one confidence to discover how intimately and at firsthand both authors know Arizona agriculture, its organization, methods, problems, participants, and viewpoints, from management, on one side, to the varied groups of workers, on the other. They study first the organization and economics of the technologies of three industries —citrus, lettuce, and cotton production. They note the strong tendency "to use more capital and less labor" under pressure from the "profit motive" at the "basis of our free enterprise system." They also note that "the social results of this tendency are both good and bad." On the one hand, it brings "inexpensive, abundant food," and on the other hand, it leaves "certain unsophisticated segments of our population" (for example, Mexican-Americans, Anglo-isolates, Negroes, and Indians) caught between the alternatives of "simple, often seasonal labor" and "subsistence existence on welfare" (p. 111).

The authors state that "Arizona agriculture has never depended upon monopolistic institutions." Apparently land and water monopoly was overlooked. The National Reclamation Act of 1902, under which Arizona's waters have been developed, was designed to break land monopoly and to prevent water monopoly. Its purpose was to limit water deliveries to individuals, and so prevent the very structure in agriculture whose divisions and instability the authors have described so well. Its effectiveness has been paralyzed for a half-century by failure to enforce the law.

This book fortunately joins together what so long have been kept apart in most of our thinking—the "agricultural industry" and the "agricultural workers." It illuminates public policy, from current conflict over closing the bracero program to speculation on a prospect that "perhaps governmental management is the only answer to the full utilization of . . . labor resources. . . . We hope not" (p. 297).

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Botany

Flora of Japan (Smithsonian Institution, Washington, D.C., 1965. 1077 pp., $25), by Jisaburo Ohwi, includes treatments of all spontaneous vascular plants known from the country; it is designed primarily as a manual for students and others who require a reference work on the Japanese flora, and it is the only one available in the English language. Although the author adapted this edition from the Japanese version published in Tokyo in 1953, it is really an emended account and not merely a verbatim translation of the original work.

It should be noted that the pteridophytes were not included in the Japanese edition of 1953. Actually, Ohwi

prepared the present account of the ferns for the English edition, and then translated the account into Japanese and published it separately in 1957.

The English edition here reviewed was published by the Smithsonian Institution in September 1965. Prior to its publication, Ohwi had submitted a parallel Japanese version for publication, and this appeared in June 1965. Although nomenclatural priority is not important in a manual treatment of this sort, the earlier publication of the 1965 Japanese edition should be noted, because it contains an index validating the many new names that appear in the text. For the most part these are merely new combinations, although one is of a new species; such names are validly published as of June 1965, but this fact is not indicated in the English edition.

The author acknowledges contributions from his colleagues Tetsuo Koyama (for Araceae, Eriocaulaceae, and Juncaceae) and Siro Kitamura (for Compositae). Various specialists in the United States gave editorial assistance for certain families, and of course the editors of the English language edition, Frederick G. Meyer and Egbert H. Walker, critically reviewed the entire work for accuracy and style. However, all decisions of a taxonomic nature were made by the author, and the editors have wisely refrained from permitting their own viewpoints to be included where disagreement about taxonomic content might have been concerned.

This English edition incorporates the results of more than 30 years of study by its distinguished author. The synoptical keys to all taxa to the level of species appear to be clear, concise, and untechnical, as indeed are the descriptions. Consequently nonspecialists as well as botanists can use the work. Vernacular names are supplied for each taxon. Comprehensive indices are provided to authors' names, Japanese plant names, scientific names, and English family names.

As is customary in a manual of this sort, bibliographic references to taxa are omitted. Distributional notes concisely state both the intra- and extra-Japanese occurrence. A conservative interpretation is admittedly presented, and that such is the case will be noted by specialists. As a single example, the family Magnoliaceae includes elements now universally referred to three families; and the common Japanese *Illicium* is discussed under what is clearly a later synonym. These remarks are not made in criticism, as the author of a compendium cannot necessarily be expected to assess or to accept the conclusions of specialists. Indeed, any author of a *Flora* who did attempt to evaluate and reconcile all the monographic treatments would never complete his task.

The book is pleasingly printed and bound, with attractive maps serving as endpapers, and with 17 halftone plates and 17 full-page figures providing illustrations of high quality. The introductory phytogeographical essay and historical summary will be of particular value to students of temperate floras. The author, the editors, the Smithsonian Institution, and the National Science Foundation (which made the work possible through grants) all deserve to be congratulated on the completion and publication of a scholarly, indispensable work, one that will provide a firm link of understanding between Western and Japanese botanists and will serve as a model of the type of international cooperation required to bridge a language barrier.

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Physical Anthropology

Different distillates of the world's literature in physical anthropology for the year 1963 are represented in the two publications reviewed here. The **Yearbook of Physical Anthropology, 1963** [published for the American Association of Physical Anthropologists by the Instituto de Investigaciones Históricas, Universidad Nacional Autónoma de México, and the Instituto Nacional de Antropología e Historia, Mexico (and available from the latter), 1965. 310 pp., $4.50], edited by Jack Kelso, Gabriel W. Lasker, and Sheilagh T. Brooks, begins with an annotated bibliography in which Santiago Genovés covers 744 items and offers to supply an equal number of unannoted items on request (p. 3, footnote). On the other hand, **Biennial Review of Anthropology, 1965** [Stanford University Press, Stanford, Calif., 1965. 315 pp., $8.50], edited by Bernard J. Siegel, begins with an annotated bibliography in which Alice M. Brues and Clyde C. Snow cover 203 items (of which 117 were published in 1963). The *Yearbook* reprints in full 17 articles judged especially useful because of their broad scope and summary nature. That nine of the reprinted articles are not considered by Brues and Snow is evidence of the lack of unanimity about what is important enough to be reprinted or summarized.

The *Biennial Review* covers, of course, much more than physical anthropology: "African prehistory" by Creighton Gabel (193 items covering many years); "language" by John J. Gumperz (194 items, mainly 1962 to 1964); "economic anthropology" by Manning Nash (79 items, several years); "social organization" by Harumi Befu (167 items, mainly 1962 to 1964); "studies in peasant life" by Robert T. Anderson (240 items, mainly 1962 to 1964); "psychology and anthropology" by J. L. Fischer (228 items, mainly 1962 to 1964); and "cultural change" by Charles L. Lange (156 items, mainly 1962 to 1964).

In spite of the undoubted value of these several bibliographic efforts, the user will find his search for references handicapped by the way in which the material is coordinated or by the inadequate indexing. For example, in the *Yearbook* the bibliography is in two parts, each divided into 38 unindexed sections; the first section gives the annotation in essay style, and the second gives the corresponding references. Although the references are keyed in with the text by running numbers, each section is separately alphabetized. Thus, discussion of the section "Palaeoanthropology" begins on page 36, and the related references begin with No. 551 (Ankel, F.) on page 87. But one is not told on page 87 where the corresponding text is located. Also, if one is looking for a particular reference, the lack of an index makes it necessary to leaf through some 100 pages. Take, for instance, the anniversary volume in honor of Pedro Bosch-Gimpera edited by Genovés or Jane Goodall's "My life among wild chimpanzees"—Who would think of looking for either of them under "palaeoanthropology"!

The problem of finding a particular item is not so great in the case of the *Biennial Review*, because, although the plan is similar, there are only eight clearly listed sections, and the references under each of these sections are in a single alphabetized list. However, for 1460 bibliographic items a five-page index is inadequate for rapid consultation.

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