

BOOK REVIEWS

Malnutrition, Behavior, and Social Organization. Edited by Lawrence S. Greene. Academic Press, New York, 1977, xv + 298 pp., tables, figures, chapter references, index, \$19.50 (cloth).

This volume, resulting from a symposium held at the Annual Meeting of the American Association for the Advancement of Science in February 1976, and consisting of papers by anthropologists and nutritional scientists, is concerned with the effects of malnutrition on behavioral capacity and functioning and with the implications these effects have for "sociocultural dynamics and change" (p. xi). The book's 13 chapters include three at the end which are commentaries on the preceding papers, and the author of one of these, Katz, states that the papers "prove beyond all doubt that highly significant effects of nutrition on behavior and social organization regularly occur" (p. 258). Unfortunately, however, it is difficult to get from the book any clear notion of what those effects are.

On the whole, the papers by the nutritional scientists are more convincing because their conclusions are presented with appropriate qualifications and with no pretense of having definite answers where no adequate basis for them exists. Thus, Thomson and Pollitt note that the behavioral effects of severe protein-calorie malnutrition (PCM) in early childhood present no clear picture and that the validity of the findings to date remains questionable on methodological grounds (p. 29). Stanbury tells us that there are no satisfactory definitions of cretinism and no precise criteria for its diagnosis (p. 49). And Read, after concluding that "nutritional status is closely associated with work performance," suggests that the conclusion may not apply to populations other than those "subsisting on marginal intakes in which maximal work is required daily" (p. 104).

Some kinds and degrees of nutritional deprivation undeniably have behavioral effects. An example well described in papers by Stanbury and Greene is the retarded development and impaired functioning resulting from severe iodine deficiency. But Greene, an anthropologist, goes far beyond demonstrable behavioral effects in his paper. He argues that the persistence of an exploitative economic system in highland Ecuador results from the nutritional

deficiencies that have retarded the nervous system development and behavioral capacity of many poor Indians and have thus made them available as docile, easily exploitable, cheap laborers to white and *mestizo* landowners. This speculation is presented without reference to the hardly irrelevant complexities described and analyzed in the historical and social science literature on peasant economics and peasant rebellions.

Undue speculativeness mars several of the other anthropological papers as well. Thus, Buchbinder, in her Papua New Guinea case study, presents some interesting data on variations within the Maring people's total territory (incorrectly stated to be 100 rather than 190 square miles) in demography, health, diet, and behavior, but the data are hardly sufficient for her conclusions about the operation of positive feedback systems and density-dependent population control mechanisms.

The argument of d'Aquili and Mihalik's chapter on the effect of malnutrition on psychological development and cultural evolution is that severe PCM leads to a "lack of plasticity of neural functioning" and thus prevents individuals from appropriately transforming their cognitive structures in adaptation to environmental change. Among the "staggering" inferences that the authors draw is that widespread PCM in a society can stop its evolution and spell death for it. Not surprisingly, they have no evidence of the occurrence of this. Let us hope that such speculations are not what Katz had in mind in making the aforementioned reference to proved, regularly occurring, highly significant effects of nutrition on social organization. Unfortunately one gains no assurance about the standards of validation that Katz is using when, as coauthor of another chapter, he approvingly cites Whiting's far-fetched and tortuous argument that circumcision and other genital mutilations in certain tropical societies were caused by what was presumed — probably wrongly in some cases if we can judge by recent evidence from Papua New Guinea — to be chronic protein-calorie malnutrition.

Several of the papers, including those by the editor, are marred also by jargon. Opaque pronouncements are issued about viewing behavioral capacity as "the final common pathway of biological adaptation" (p. 57) and about understanding culture as "a system that often serves as a socially and sometimes physiologically adaptive interface between humans and their environment" (p. 219). The nadir is reached in Segraves' chapter, which achieves a parodistic quality by resorting to technical references and invocations of "system cybernetics" to support such simple points as that smaller bodies require less food (p. 201). Elsewhere in her chapter, Segraves uses incantatory prose about the "terrible clarity of the logic of natural systems" as a pseudoexplanation of the fact that the poor die first in famines. Before she writes another word, she should have a look at Berlinski's (1976) masterly deflation of systems theory.

Two chapters in the book save it from being a total embarrassment for the anthropologists. One is Montgomery's case study of nutrition and social structure in a rural settlement of almost 600 people in southern India. Detailed social, economic, clinical, anthropometric, biochemical, and dietary investigations of

this population were carried out during a 2-year period. The results show that there were both marked social differences and considerable variations in nutritional status within the study population. Contrary, however, to the assumptions made elsewhere in this volume as well as more generally, there was a remarkably impressive lack of relationship between the social and nutritional variables. This negative finding enables Montgomery to argue tellingly for more careful, detailed, and comprehensive treatment of social variables before conclusions are drawn about social determinants of nutritional status. He also notes that the variations in such status were strikingly manifest *within* families in the study population and that regularities in nutritional status vis-à-vis others in the family obtained with respect to only three categories of individuals, namely, infants and young adolescents, who were usually better off nutritionally, and the aged, who were usually worse off. No clear trend of advantage or disadvantage showed in other categories. Thus, in husband-wife comparisons, the chances for either spouse to be better off nutritionally than the other were about equal. The constructive point aptly made by Montgomery about these findings is that future investigations will need to focus more on intrafamilial food allocation and other factors that may contribute to variation in nutritional status within families.

The remaining valuable anthropological chapter consists of a commentary by the late Margaret Mead. In it, she makes an important point complementing Montgomery's emphasis on intrapopulation and intrafamilial variation. Noting that other contributors to the volume have focused almost entirely on individuals who have succumbed to nutritional and other stresses, she emphasizes that many individuals in populations living under adverse circumstances grow up without apparent physical, neurological, psychological, or intellectual impairment and, as adults, are quite successful either in their natal environments or elsewhere. Mead directs attention to this as an important subject for investigation. In other words, she is asking that we try to understand success as well as failure in harsh environments. This insightful, constructive, and hopeful point is a typical Margaret Mead contribution, and the failure of the other authors to have recognized it on their own underscores how much her uncommon wisdom was needed and will be missed.

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The Nomadic Alternative: Modes and Models of Interaction in the African-Asian Deserts and Steppes. Edited by Wolfgang Weissleder. Mouton Publishers, The Hague (distributed in the United States and Canada by Aldine, Chicago), 1978, xviii + 423 pp., chapter references, biographical notes, indexes, \$45.00 (cloth).

Somewhat misleadingly titled, this is a collection of 30 papers originally presented at the 9th International Congress of Anthropological and Ethnological Sciences (ICAES). Sixteen of these papers are by Soviet anthropologists, the rest by "Western" scholars. The concerns, methods, and theoretical frameworks of the two sets of scholars rarely coincide, and I shall therefore deal with them separately.

Of the 14 papers by Western anthropologists, nine deal with nomadic or pastoralist societies. (The remaining five do not and I will not discuss them further.) These nine are a bit disappointing, for only the paper by E. Marx attempts a major theoretical presentation. Marx seeks to redefine the concept of tribe in the Middle East; he argues that tribes are not primarily political organizations but are rather "territorial ecological organization(s)" (p. 50). By this, Marx appears to mean that large tribal confederations form so that they control a large and varied enough resource base to ensure their members adequate access to resources. He proposes the distinction between territorial/ecological and political organizations because "the largest tribal units do not necessarily have a leader" (p. 50). There is a problem with his formulation however, for, even in his own examples (Rwala, Basseri, Zullam, and Kababish) it appears that the determinants of the size and organizational structure of the tribal confederacies are the nature of their interactions with the nonpastoral world, particularly surrounding states, rather than strictly ecological considerations. Thus, regardless of their internal structures, it seems likely that tribes/confederations must be, at least partly, political structures. Marx seems alternately to recognize and ignore this point. As a result, he is unable to deal effectively with the important question he implicitly raises: How does the interaction of political and ecological pressures affect the nature of tribal structures in the Middle East?

This issue of tribe-state or nomad-settled relations arises in several other articles and is, in fact, the main focus of the book. C. Frantz performs a series of controlled comparisons of Fulani groups and suggests that the variations in social organization that he finds among them are more likely to be determined by "political . . . than physio-biotic features of the environment" (p. 115). W. Weissleder focuses on the effect of the penetration of the state on interethnic relations among nomadic Muslim Adal tribespeople, settled Christian Amhara, and settled, but Muslim, Argobba in east-central Ethiopia.

Unfortunately, Frantz's and Weissleder's essays are somewhat flawed. Frantz's is weakened by setting up as a straw man a model of environmental determinism that is so linear and crude that it is little more than a burlesque

of a "cultural ecological" approach. Weissleder places his material within the framework of Owen Lattimore's (1962) analysis of the Chinese-Mongol frontier. His choice seems less than perfect, for while there can be no doubt that there is a border/frontier between the Amhara and the Adal, there are vast differences between that situation and the Chinese case. Specifically, the differences of scale, of the nature of the nomadic threat to the settled society, and of the causes of the limitations of state control over the hinterland seem so great as to warrant great caution in using the Chinese model to account for the situation in Ethiopia.

Far more successful are the papers by N. Townsend, C. Pastner, and S. Pastner. Townsend presents an analysis of relations between Galla nomads and Pokomo agriculturalists in Somalia. He makes a strong case for the point that the traditional view of Galla domination over their settled neighbors was mistaken. Rather, he argues that the relationship was one of economic mutualism coupled with feelings of "social inferiority" on the part of those peoples who did not control significant herds of cattle. The papers by the Pastners deal with the effects of tribal-state interaction in Pakistani Baluchistan. S. Pastner traces the effects of a succession of external political forces, the Kalat Khanate, the British Raj, and the government of independent Pakistan, on the internal political organization of Baluchi tribesmen in Makran. C. Pastner focuses on differences in kinship terminology and marriage patterns among three different Baluchi groups and suggests that the differences she finds are caused by differences in their relations to external powers. Specifically, she argues that the absence of a strong patrilineal bias among the Yarahmadzai and Makrani Baluch arises from their domination by feudal overlords; in this they contrast with the expansionist, independent, and strongly patrilineal Marri Baluch.

Two additional papers (M. Gast and S. Smith) deal with Tuareg history and diet, respectively, while a third paper by J. Digard appears to be an extremely abbreviated synopsis of a complex argument about lineage systems and political organization.

The 16 papers by Soviet anthropologists may present a problem to a non-Soviet reader: the nature of the questions they ask, the methodologies they use, and the theoretical framework they apply are very different from those of Western anthropology. The major concerns expressed by the Soviet anthropologists are, first, the origins and history of the large "tribal" confederations of Central Asia; second, an analysis of tribal political and economic systems within a rather mechanical Marxist scheme; and third, an examination of the effects of "socialism" on tribal society.

Several striking contrasts with Western anthropology should be noted. Virtually all of the Soviet essays have an historical rather than an ethnographic focus. The destruction of traditional culture is looked on as a positive rather than a regrettable (if not negative) result of Soviet policy toward Central Asian nationalities. Finally, the Marxist model employed is a very simple one of unilinear cultural evolution [ignoring, for example, Karl Marx's own *Pre-Capitalist*

Economic Formations (1965)] into which the tribal data are fitted as into a Procrustean bed. This is unfortunate, for several of the articles (notably those by Abramzon and Dakhshleiger) contain data and insights that are somewhat obscured by their theoretical framework.

The book is thus a collection of 30 diverse papers, some of which are competent and interesting, but none of which breaks new ground. The volume suffers several production flaws. It is poorly indexed – the subject index contains tribal names and book titles but no references to such topics as marriage, bride-price, or kinship. It also badly needs a good map, and there are more than a few typographical errors; for \$45.00 one deserves more.

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Values and Choices in the Development of the Colorado River Basin. Edited by Dean F. Peterson and A. Berry Crawford. The University of Arizona Press, Tucson, 1978, xiv + 337 pp., illustrations, tables, appendixes, index, \$14.50 (cloth), \$7.50 (paper).

In early 1974 the Committee on Arid Lands of the American Association for the Advancement of Science sponsored a symposium at San Francisco to consider “how choices and the value commitments and trade-offs they embody have shaped the history of development in the Colorado River Basin and define options for the future” (p. 4). This book is the publication of the proceedings of that symposium. It consists of 15 chapters, the first five dealing with a “historical perspective” and the remainder with “future developments.” Five of the chapters are accompanied by discussion papers. Not too surprisingly for a symposium volume, its contributions vary in their pertinence to the subject. Most are right on the mark, although a few seem to have been hastily pulled together at the last minute.

Anyone unfamiliar with but interested in the development of the Colorado River Basin would do well to begin with this volume. It is a helpful guide to the manifold resources, intricate history of development, and complex issues of the basin. The chapters by Don Maughan, Ival Goslin, and Helen Ingram are ex-

ceptionally useful. Maughan provides the neophyte with capsule descriptions of the climate, geology, mineral resources, salinity sources, land resources, water supply, population trends, and history of water quality problems. Goslin, from the vantage point of 21 years of first-hand knowledge, leads the novice through a maze of negotiations, projects acts, litigations, compacts, and the like. Especially instructive is his section on the evolution of the "law of the river" from the Colorado River Compact of 1922 to the Colorado River Project Act of 1968. Yet the mere description of these instruments is insufficient for a full understanding of how things have really come about. Take, for example, the allocation of water. Ingram shows that decisions on water allocation in the basin have not come from within the basin but rather from Washington: Uncle Sam's grip has resulted in the playing out of a Greek tragedy in the basin. The "remorseless working of things" is expressed not only in a limitation in choice of alternatives but also in a loss of independent planning, decision-making, and open debate. Dean Mann extends this problem beyond the basin and beyond water allocations. Writing of the Southwest in general, he states: "Perhaps more than any region of the country, it is dependent on decisions made elsewhere" (p. 198). Thayer Scudder, in his discussion of Mann's chapter, similarly finds that the "development from above syndrome" occurs throughout tropical Africa, a conclusion that will probably be of little consolation to Southwesterners.

Delworth Gardner and Clyde Stewart analyze one of the most publicized problems of the Colorado: salinity. They follow a brief historical perspective with an economic model of saline return flows and a discussion of policy options. The problem is an international one. By the time the Colorado flows into Mexico, its saltiness has been greatly increased, primarily by irrigation return flows. Naturally, Mexico has been unhappy about this and has tried for improvement through negotiations with the United States. Myron Hurburt traces the history of these negotiations.

I found the chapter by Bahe Billy on Navajo Indian culture and lands to be the most interesting. Billy provides a primer that should be required reading for any non-Indian dealing with the Navajos. He proceeds from a history of the people, or *Dineh* as the Navajo call themselves, to descriptions of the natural resources of the Navajo Reservation, Navajo tribal government, the Navajo economic system, then to an evaluation of social conditions and the forces leading to the cultural differences between the Navajos and other people nearby, and finally to an account of the Navajo traditional system of land use.

The editors hoped that insights gained in this particular study would have value to the study of development of arid lands in general. Because of this, the positions taken by some of the authors may not have been particularly welcome. Mann, for instance, demolishes the notion that the basin is a homogeneous unit in terms of culture, economics, and politics; he believes that the entire Southwest is the proper focus of attention for these subjects. Lawrence Royer and John Hunt start their discussion of recreational problems of the basin from Donald

Meinig's (1971, 1972) positions that (1) the characteristics of the Southwest's metropolitan areas and the development of transportation and mining are not so much a response to aridity as to socioeconomic forces, and (2) for the larger West, west of the High Plains, social development is essentially independent of aridity. Royer and Hunt conclude that the recreational problems of the Colorado Basin are unique to arid areas. Taking the positions of Mann and of Royer and Hunt together, many of the concepts developed for the Colorado River Basin may not have application to arid lands in general.

There are other topics here that should interest readers of *Human Ecology*: employment changes, energy resource development, community development, aesthetic values, and prediction of future trends in the basin.

Although I recommend this book to those with an interest in the subject, there are several defects. Two sentences from page 170 are inserted in the middle of a paragraph of page 169 in place of a passage not found on either page. Some of the photographs are aesthetically pleasing but have little to do with the text. Many of the articles are plagued by complex sentence construction, an impersonal and manufactured tone, and an abundance of technical terms, cliches, and neologisms.

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Pre-Hispanic Maya Agriculture. Edited by Peter D. Harrison and B. L. Turner, II. University of New Mexico Press, Albuquerque, 1978, x + 414 pp., illustrations, references, index, \$20.00 (cloth).

This volume contains 17 chapters that evolved from papers presented at the 42nd International Congress of Americanists held in Paris, in September 1976. It measures up to the high standards set earlier by two related volumes also published by the University of New Mexico Press (Culbert, 1973; Adams, 1977). The list of 18 contributors reads like a who's who in Mayan subsistence studies and includes a gratifyingly large number of young investigators.

Two themes pervade almost every chapter. First, “the myth of the milpa is moribund” (Hammond, p. 34). The evidence is now overwhelmingly against the idea that high-density Mayan populations were supported exclusively by swidden maize agriculture. Second (and related), there can be no doubt that the ancient Mayans used a broad array of food production techniques, such as multiple cropping and intercropping, arboriculture, diverse kitchen gardens, and intensive cultivation of alluvium and colluvium; these were made possible by sophisticated engineering feats, including raised fields, terraces, and water-control structures. I was amused by the frequency with which reference was made to a third topic, almost as if it had been discovered only yesterday. This is the realization that the Mayan lowlands indeed encompass a wide variety of habitats that vary with respect to rainfall, topography, soil quality, and drainage. Perhaps the dedication of the volume to Cyrus Lundell represents an admission that, although everyone interested in Mayan environments and subsistence inevitably has cited his works, for the past 40 years no one has really paid much attention to what he had to say.

The chapters are of uneven quality, but all of them address issues relevant to the title. The editors provide two introductory chapters and a final chapter, and each contributes a mid-volume chapter: Turner (Chap. 9) makes a case for a variety of agricultural techniques on six of eight landscapes, and Harrison (Chap. 13) suggests that *bajos* contained raised fields (but Dennis Puleston [Chap. 12] suggests a geologic origin for the vegetation patterns reported by Harrison).

Two of the best chapters address specific studies or topics with broad implications. D. S. Rice (Chap. 4) presents data showing that the populations at his Yaxha-Sacnab study site could have been supported only by very intensive agriculture on all available sites or by food importation. Siemens (Chap. 6) discusses karst topography and its implications for Mayan subsistence. He investigates surface water, pulsing hydroperiods, and transportation; he makes geology useful, intelligible, and relevant to human ecologists.

The most provocative chapter was authored by Dennis Puleston, to whose memory the volume was co-dedicated. After discussing terraces and raised fields, he turns to the system of ramon-tree culture which, he was convinced, was so high-yielding as to constitute perhaps the single most important food production system for the Mayans. He reports yields of 2.7 metric tons per hectare, but errs when he compares the time required merely to harvest the ramon crop with the time required to produce (plant, weed, harvest, etc.) a maize crop. His astonishingly high value of 2.8 bushels/man-day is correct, but this represents a one-shot event. The Mayan farmer (or ramon gatherer) could not, unfortunately, multiply that output rate by any more days than there were in the limited fruit-fall period, so production efficiency on an annual basis would have been much lower.

The volume contains some disappointments. One is the inclusion of meaningless jargon: the use of "econiches," apparently as a synonym for habitats, for example. The authors of one five-page chapter use unconscionably old (1968 and 1974) climatological data to reach the trivial conclusion that areas which differ two-fold in annual rainfall may indeed exhibit differences in agriculture. The longest chapter (Wiseman, Chap. 5, 63 pp.) is, alas, one of the weakest. The simulation model he discusses sounds interesting, but it is not presented in enough detail to permit an evaluation. His minuscule data base is completely overwhelmed by massive doses of unjustifiable speculation; he has all of the answers, but none of the evidence.

This book's two penultimate chapters include a critique (by Harris) and a summation (by Willey). Both chapters add to the usefulness of the volume and serve to tie it together. The final chapter presents an interpretation of the implications of the arguments and evidence presented in the first 16 chapters. It is, however, an extremely biased interpretation. For example, the authors conclude that subsistence farmers optimize efficiency, apparently ignoring Harris' argument (p 318) that a balance between maximum output and lowered risk is more important. More serious is their contention that environmental degradation was unlikely. Their unwritten assumption seems to be that intensified agriculture is environmentally "good," and that extensive systems such as swidden are environmentally "bad": after all, Mayans who worked so hard to intensify their food production systems surely would not have allowed their environment to break down! I hope that Turner and Harrison will look at other densely populated limestone-derived soils — on Haiti, for example — before pushing further to replace the myth of the milpa with a new myth of a stable Mayan agricultural Utopia.

The reader who has time to absorb the broad messages this book has to offer, but not the time to digest all of the data, would do well to read Chapters 2, 3, 15, 16, and 17. The volume contains a single 29-page listing of references cited, a most sensible way to handle the bibliography. There are a few typographical errors, but these are more than offset by the book's modest price and the incredibly short time lag between the original conference and publication. This book will be welcomed into the library of every Mayanist, and it should make tasty fodder for interdisciplinary seminars in human ecology.

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The Pendulum and the Toxic Cloud: The Course of Dioxin Contamination.

By Thomas Whiteside. Yale University Press, New Haven, 1979, 205 pp., appendices, bibliography, index, \$15.00 (cloth), \$4.95 (paper).

The recent Harrisburg nuclear power plant accident captured the attention of the press and public, but the same groups generally are less concerned about possibly more serious health and safety threats of exposure to thousands of toxic chemical pollutants. *The Pendulum and the Toxic Cloud* attempts to emphasize the dangers of one such chemical, a pesticide.

About 55,000 different chemicals are used in the United States in houses, industry, government, and agriculture in quantities amounting to several billion tons each year. Pesticides are one of the largest groups of chemicals employed, with more than one billion pounds being applied annually throughout our environment. Reports from the Environmental Protection Agency (EPA) indicate an annual total of 45,000 human pesticide poisonings; an estimated 3,000 of these cases are hospitalized, and about 200 are fatal. In addition, pesticides have been associated with cancer and other illnesses.

Thomas Whiteside, a British-born journalist, is concerned about the dangers of 2, 4, 5-T, a herbicide, or chemical weed killer, used in large quantities throughout the world. Its primary use is to control unwanted shrubs and trees. Thus 2,4,5-T is applied by forest managers to destroy broadleaf trees and facilitate evergreen growth, and by ranchers to control chaparral and other unwanted brush. It is applied to vegetation along some roadways and railways as well as along rights of way for electric power lines. This same herbicide, in combination with 2, 4, -D, was the "agent orange" chemical applied in Vietnam to eliminate enemy hiding places in dense vegetation.

The major problem with 2, 4, 5-T is an associated contaminant compound called 2,3,7,8 Tetrachlorodibenzo-p-dioxin, commonly called dioxin, one of the most deadly chemicals known. Extremely small doses will not only kill, but will also cause serious chloroacne (a skin problem) and teratogenesis, or birth defects in the fetus. The author details these dangers. Unfortunately, the impression given is that coming in contact with a single molecule of dioxin is dangerous, which is an overstatement. Contact with one molecule cannot be compared, for instance, to exposure to a single plague organism that will multiply in the body.

The book focuses on the explosion that occurred in a chemical plant, producing 2, 4, 5-T, on July 10, 1976, in Seveso, Italy. The wind carried the resulting poisonous cloud south over the city where humans, livestock, crops, and natural biota were exposed to the herbicide, dioxin, and other chemicals that were released. The resulting devastation to livestock and other animals is reported in detail. The people in the exposed area were not moved away for a few days and so continued to be exposed. Pregnant women were warned about potential birth defects in their children, and nearly 30 women had therapeutic abortions despite opposition from the Catholic Church. Interestingly, the rate

of birth defects in infants born to those who refused abortions was no greater than usual for that city.

This apparently was not the case in Oregon, where according to the EPA 2,4,5-T has been used extensively for forest management. Oregon women exposed to 2,4,5-T have had significantly more birth defects and miscarriages than normally expected, a finding that prompted the EPA to suspend most uses of the herbicide.

Whiteside provides a helpful appendix of some 40 pages that includes published papers and other scientific evidence concerning the dangers of 2,4,5-T. The book is well written and is easily read. Certainly, one has to agree with the author that a careful analysis of the environmental and health costs of this pesticide is urgently needed. Apparently, the EPA also finally agrees.

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Social and Technological Management in Dry Lands: Past and Present, Indigenous and Imposed. Edited by Nancie L. Gonzalez. Westview Press, Boulder, Colorado, AAAS Selected Symposium 10, 1978, xvi + 199 pp., illustrations, chapter references, \$15.00 (cloth).

The purpose of this symposium, originally sponsored by the American Association for the Advancement of Science, was to examine traditional management techniques in arid lands with a view to assessing both their successes and failures. The main contributions are all by anthropologists, and it is this that gives the studies, which range over desert areas in both the New and Old Worlds and cover a wide time scale, a degree of consistency in approach if not of quality.

For the present writer M. E. Mosely's and W. H. Bedoian's papers are the two highlights of the collection. Mosely's paper on the Moche Valley in Peru perhaps comes closest to the objectives of the symposium by reason of its ability to analyze demographic, technological, and environmental factors, to see how these are integrated into social institutions, and to show how the resulting relationships evolved over time. The competence of this paper and the overview it gives of the rise and collapse of Moche hydraulic society demonstrate a real understanding of the subject. Bedoian's paper impresses because it is an enthusiastic, albeit somewhat verbose, attempt to measure, in terms of energy flows calculated during a set of representative years, the efficiency and self-sufficiency of agricultural production in southern Tunisia. He also considers

the production system's contribution to desertification, which he assesses in terms of the soil disturbances that result from spatial and temporal variation in the intensity of land use. It is perhaps worth noting that the quality of these two papers in part stems from their interdisciplinary approach. Mosely is basically interpreting archaeological data with the sorts of approaches used by anthropologists and geographers, while Bedoian's contribution stems from welding ecosystems techniques onto an anthropological approach.

The remaining papers are rather less ambitious. S. H. Lees draws on the experience of agricultural regions in Mexico, Peru, and Israel to emphasize the needs for communication and local-level involvement for agricultural development. F. S. Vidal looks at some old and new methods of runoff harvesting from Northwest Arabia. R. S. Felger and G. P. Nabhan present their research on species variety in the Sonoran Desert with the idea of reintroducing into modern desert agriculture the diversity that seems to have existed earlier in history. J. W. Bennet concludes with a super-model for assessing agricultural systems in terms of yield and efficiency, which is fine for those who like that kind of thing. For those who do not, there are two short encores: one, by S. E. Nicholson, was originally intended as an overall assessment of the symposium's contributions, but ended up simply as a brief warning from a climatologist to the anthropologists concerning environmental change; the other, by P. C. Reining, emphasizes both the human and the physical factors involved in desertification.

The production of the book, somewhat marred by the choice of type-written replica, loses the one great advantage of this system (i.e., elimination of typesetting errors) through poor editing. The editor's short comments are of little value and contain more spelling mistakes than do all the other contributions together. To quote an example from her introduction, "Vidal treats the delicate [sic] manipulation of scarce surface water by Bedouin herders in the extremely arid Arabian peninsular [sic] . . ." (p. 6).

Overall this is a fairly worthwhile addition to the literature on agricultural development, but I have reservations about the uneven quality of the contributions and give a bad mark to the editor.

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