

## BOOK REVIEWS

*Environment, Power, and Society.* By Howard T. Odum. Wiley-Interscience, New York, 1971, 331 pp., \$9.95 (cloth), \$5.95 (paper).

The author of this book is very consistent in representing human activities in terms of energy flows. He conscientiously delineates the sources of energy and the various controls which limit or guide flows of energy. At the outset he develops a system of symbols which are used again and again in the many energy flow diagrams which he presents. Once these symbols are mastered, it is quite easy to follow the energy flows described by the author. However, numbers are frequently attached to many of the flows indicating their magnitude and a reader will not always find a lucid or detailed explanation of how the size of these flows was determined.

In the author's view, dramatic changes occurred once men began using fossil fuels as a major source of energy. Thanks to these fuels, innovations in transportation were facilitated and the productive patterns of numerous basic industries were altered. Petrochemical advances, for instance, allowed very substantial rises in agricultural output. Occurring simultaneously was a high jump in the Earth's population. Not only has the population grown but also it has placed new and greater demands upon the ecosystem. In Odum's judgment, the current expansion of population and technology may, in short order, destroy many vital parts of the environment, disrupt balanced ecosystems, and thereby produce catastrophe. After that, if there are survivors, they may have to revert to a very primitive standard of living.

Odum suggests that for a long period of time prior to the widespread consumption of fossil fuels, man's social systems were, in some sense, congruent with his ecosystem. Men were unable to destroy themselves or to devastate their environment. This has changed and men are now in the process of ravaging their ecosystem more rapidly and more seriously than ever before.

There is almost universal agreement that many current practices are destructive of the environment and that alterations should be made immediately. Some experts see population control as the panacea while economists may contend that an appropriate costing of goods would be the remedy. Odum mentions these and suggests the need for both population limitation and economic penalties for those who pollute. However, I believe he takes a broader view than most

current protagonists by arguing that man is but one part of a large ecosystem and that the entire ecosystem must be considered. Odum proposes a two-stage approach to our contemporary problems. First, scientists will need to learn more about the ecosystem and its functioning. Second, once this knowledge is popularized, men will have to develop social, political, and religious systems which are in accord with the ecosystem. Preservation of the environment must be rewarded; destruction of it punished.

The author proceeds to spell out, in excessive detail, the political and religious systems which, he believes, ought to emerge. I suspect many readers may accept his general views but will reject his specific recommendations. For instance, he favors a world organization such as the United Nations but, in his view, voting power should correspond to a nation's high-grade energy flows. Allocated in this fashion, Brazil's votes would be eleven times as weighty as those of Japan. He proposes a new decalogue beginning with "1. Thou shall not waste potential energy." and ending with "10. Thou must find in thy religion, stability over growth, organization over competition, diversity over uniformity, system over self, and survival process over individual peace." Toward the end of the book, the author stresses the need for a new religion with new prophets who will annunciate new revelations about the ecosystem's and man's role.

In brief, the book summarizes energy flows in an orderly and informative manner. The author does not, however, provide any new or basically different insights into the question of how social and belief systems develop, and how they are articulated with man's environment. Nor does he present any evidence to convince the reader that the political and religious creeds he favors would, indeed, preserve the environment.

It has been over 15 years since Fred Cottrell's *Energy and Society* was published, a book which is now out of print. Odum's volume deals with many of the same topics which Cottrell described. It has the advantage of being up-to-date and much more systematic and quantitative in displaying energy flows. However, the level of presentation is quite different and Odum's book may be somewhat less useful than Cottrell's in an undergraduate or introductory course.

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*The Ecological Context.* By John McHale. George Braziller, New York, 1970, 188 pp., 78 figures and charts, \$7.95.

Ecology is evidently going to be of future concern to a rapidly increasing

number of professionals, most of whom will have had little formal training in the subject. These people will quickly discover that in order to have a balanced overview of our environmental problems, it is necessary to have some degree of familiarity with a very wide variety of subject matter areas. This raises the necessity of discovering some means of gaining this familiarity fairly quickly. It will soon be discovered that much of the recent spate of literature about ecology in fact has very low information content, and is relatively useless as a means of gaining the necessary overview. The present book by McHale is one of a relatively small number of volumes which collate an immense amount of information in the attempt to present an ecological gestalt. For anyone just beginning to learn about the environment, this book would be an unusually useful introduction to the central issues, and would be a very time-saving guide to the vast amounts of information now in libraries.

The book is organized around these topics: man in the biosphere, population and food, energy, materials, ecological redesign, and selected reading lists. A very high proportion of the most important ecological overview type of publication of the last several years is referred to in the reading list.

This is not by any means a doomsday book. The style is extremely matter-of-fact, and if anything, there is an implied degree of optimism which this reviewer thinks is somewhat at odds with the facts, particularly with regard to nuclear energy, which has a very rocky road ahead unless there are some remarkable breakthroughs in widespread application of breeder and fusion reactors in the next three decades.

A large number of points are made in the book, of which six seem most important to this reviewer.

No matter how one measures it, we live in a period of staggering and unprecedented rates of change. This is true for rates of use of all resources, but also for rates of invention and speed with which new discoveries are applied. One measure: the world use of nitrogenous fertilizer doubled from 1960 to 1966!

A virtual explosion is occurring with respect to rate of increase in use of energy. Unless a major breakthrough occurs in use of nuclear or solar energy or both, this startling growth in energy consumption per unit time per capita will prove to be an extremely ephemeral phase in the long sweep of human history.

The reason for this is that fossil fuels are being depleted extraordinarily rapidly with respect to the time it took to form them. Oil reserve estimates are only forty times the world total consumption figures for 1960, but the consumption figures are doubling every 10 years.

An interesting point made in this book and other writings by McHale is that our entire life style with respect to energy is undergoing remarkably rapid change. As recently as 1850, about 43% of world fuel consumption was in the form of wood. Just one century later, coal had reached its peak use (about 53% of world fuel consumption) and was beginning a steep decline in use in the face

of competition from crude oil and natural gas. They in turn will have run their course very shortly and will be declining in the face of replacement by nuclear energy by about the year 2000. One frightening feature of this succession is that it has an irreversible feature: we couldn't go back to dependence on muscle, wood, oil, or natural gas in the year 2020, if we wanted to, or if we had to!

A fifth point is made by McHale almost as an aside, yet it is very important, and embarrassing. McHale notes "...highly specialized and developed areas tending toward a latent parasitism on the lesser developed..."

Finally, McHale points out a fact which may have important implications. Man's image of the world in which he lives is shrinking. A few years ago, almost no one actually travelled right around the world, and the world seemed vast to almost everyone. Consequently, the notion that the world was small and fragile relative to the power of our species seemed foolish. However, now large numbers of people have seen still or moving pictures of our planet taken from space, and it seems much smaller, more vulnerable. It is possible to fly right around the world on relatively convenient commercial airline schedules in five days and nights or less. An increasing number of the world's people are doing this, and having their images of the planet shrunk thereby. This may save us: if large numbers of people come to perceive the planet as small and vulnerable, we may just come to our senses before lethal doses of DDT, mercury, or some other poison have accumulated in all living tissues, or some other malfunction of the ecological system has done us all in.

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*Culture and Population: A Collection of Current Studies.* Edited by Steven Polgar, Monograph 9, Carolina Population Center, University of North Carolina, Chapel Hill (distributed by the Schenkman Publishing Co., Inc., Cambridge, Mass.), 1971, vi + 195 pp., \$8.95 (cloth).

This collection contains a series of papers, most delivered at professional meetings, grouped in relation to three topical foci: human ecology and demographic change, family structure and child spacing, and the cultural aspects of family planning programs. There is a brief introductory essay by the editor entitled "Culture History and Population Dynamics" and an epilogue by Margaret Mead, reprinted from a pamphlet of the Planned Parenthood Federation of America, Inc.

Most of the contributors to the volume are anthropologists, but the range

of issues covered should ensure reader interest well beyond the confines of the discipline of anthropology. In short, all those who are interested in population variables will find something here whether their focus is contemporary America or some other part of the world. There are too few collections of population and demographic studies such as this.

Perhaps the major point made by Polgar in his introductory essay is that the "...voluntary reduction of family size seems a cultural pattern of very great antiquity, and the high population growth rates in developing countries today do not simply result from encrusted 'motivations' for high natality. They are, instead, partly derived from the direct and indirect birth-promoting effects of Western expansion and colonialism during the last 400 years" (p. 6). This controverts the widely held belief that among "nonliterate," "preindustrial" or "non-Western" peoples cultural practices have the net effect of maintaining high natality to compensate for high mortality. The impact of Western expansion and colonialism in terms of spreading diseases, increasing warfare, slavery, and so on has long been evident. Polgar, however, suggests that the "most pervasive demographic influence" of colonialism has resulted from Western economic dominance. He deplors those who would reduce the desires for large numbers of births by coercion if necessary, and instead suggests that planners utilize those cultural patterns, in any given instance, that can aid in the voluntary acceptance of birth control matters. For those who operate on the policy level, Polgar offers the observation that "...people do not accept 'family size limitation' as an abstract desirable goal; what they are adopting are specific new means to space children and to terminate reproduction" (pp. 6-7).

In the first section of papers, *Human Ecology and Population Dynamics*, Bowers' contribution deals with montane New Guinea, where, she contends, population declined following early contact with Europeans but that, in one valley at least, there has been a rapid population increase over the past 100 years, probably following the adaptation of the sweet potato as a field crop. Estimates of population size in the past are made on the basis of the analysis of traditions, vegetation patterns, and the number of dance grounds. Bowers concludes that further rapid population increase will continue in the future. The late Donald Bender's article, "Population and Productivity in Tropical Forest Bush Fallow Agriculture," is one of the best. He concludes that "...growth of population up to the limit of the environmental conditions seldom, if ever, occurs in tropical forest areas exploited by the bush fallow cultivation of root crop staples. What must be answered through further research is precisely what factors, other than the availability of good land, limit population" (pp. 39-40). This is good, reasoned criticism of the techno-environmental bias of many anthropologists. Peter Kunstadter contributes an article, "Natality, Mortality and Migration of Upland and Lowland Populations in Northwestern Thailand," which shows that hill populations are growing more rapidly and that out-migra-

tion from the hills will increase. James Bond's article on the regional ecosystem of Sertao do Sao Francisco (Pernambuco, Brazil) demonstrates how much can be done solely on the careful use of published materials.

The lead article in the second section, Family Structure and Child-spacing, is entitled "Extended Family Structure and Fertility: Some Conceptual and Methodological Issues." In it, Burch and Gendell begin by citing the "...striking contrast between the wide acceptance of the proposition that the extended family encourages high fertility (=natality) and the security of relevant empirical evidence" (p. 87). They review the relevant theoretical literature, cite illustrative empirical research, and consider the definition of key variables. In conclusion, they stress the need in future research to distinguish between individual and aggregate levels of analysis, between what most anthropologists regard as a household (residential group) and a family (descent group), to keep the time reference of fertility (cumulative/current) consistent with that of family type (longitudinal/cross-sectional) and so on. This is a most useful article. Moni Nag contributes an article entitled "The Influence of Conjugal Behavior, Migration, and Contraception on Natality in Barbados." Since 1920, natality on this island has been lower than that in many other non-industrial societies. Nag accounts for this in terms of high conjugal instability and an emigration pattern that persistently lowered the proportion of men to women in their reproductive years, and to induced abortions. Since 1962 there has been a rapid decline in birth rates owing to the increasing use of contraceptives. Two articles, "Natality in a Rural Village in Northern Chile" by Jennifer Oberg and "Childspacing in a Highland Guatemala Community" by Clifford Barnett, Jean Jackson, and Howard Cann, complete this section. The former is based upon questionnaires; the latter on data taken from the *Registro Civil* and subsequent interviews. Both present useful data on birth intervals and deal with the implications of their studies for population planning programs.

The final section, Cultural Aspects of Family Planning Programs, contains four useful contributions. In "Family Planning in Chingleput District, Madras, India," Joan Mencher concentrates on the social structural factors that hinder family planning programs in that area. She suggests that village social structure directly influences certain dominating attitudes and values there which are particularly relevant, namely, the need to enhance or at least maintain prestige and status, the fear of ostracism and the need to avoid anything that leads to disapproval, the need to avoid punishment by those with more power and prestige, and, finally, the need for power. She spells out, subsequently, the relevance of these needs. John Marshall deals with "Topics and Networks in Intra-Village Communication" as these relate to family planning programs. He stresses that there are many communication networks in a village (not just one, as is often assumed by those who have not worked intensively in a village) and that these exist, in part, as functions of the *topics* of communication. The differentiation

between the diffusion of *acceptance* of an innovation and of *information* about an innovation is tellingly made. The remaining articles, "The Role of Paramedical Personnel in Family Planning" by Pamela Peck and "The Traditional Birth Attendant in Metropolitan Cebu, The Philippines" by Arthur Rubel, William Liu, Mimi Trosdal, and Virginia Pato, are addressed toward the basic consideration of staffing family planning programs. Peck argues for the expanded use of *trained* paramedical staff and cites several studies from four countries documenting their past performance. Rubel *et al.* consider the social characteristics, counseling roles, hygienic practices, and knowledge (notions) of gestation and fetal development of the *mananabangs* of metropolitan Cebu. Since *mananabangs* will continue to assist at a high proportion of total births, it is suggested that public health officials take closer account of them and their beliefs.

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*Health and Disease in Chad: Epidemiology, Culture, and Environment in Five Villages.* By Alfred A. Buck, Robert I. Anderson, Tom T. Sasaki, and Kazuyoshi Kawata. The Johns Hopkins Press, Baltimore, 1970, 284 pp. and tables, \$9.50 (cloth).

This book, one of five in a projected series, and the second to be published, presents the results of a team survey of epidemiological-cultural factors in five villages of Chad. The authors' goal is to collect and analyze comparative ethnic, environmental, and ecological data from geographically and ethnically diverse countries and from different environmental zones within each country.

For this study, research was preceded by a pilot study in which numerous communities in all the major climatic zones of Chad were visited by an epidemiologist, a lab director, and a public health nurse of the Geographic Epidemiology Unit of the Johns Hopkins University. Six communities were selected as representative, but for various logistic reasons one had to be dropped completely from the study. In addition to climatic variations each village had its particular set of cultural factors which could differentially affect epidemiological patterns. One, Djimtilo, had extensive contact with the Cameroons and Fort Lamy, the capitol of Chad. Others were more isolated.

Five chapters present different areas of investigation and analysis. These include: (1) A too brief description of the communities with location, geography, household and family, social ranking, housing, educational, medical, and health services, and economic activities. These capsule ethnographies (56 pages!)

offer little detail and make fine-grain analysis impossible. (2) Environmental factors including natural items, such as water supply and snail vectors, and cultural items, such as housing, personal hygiene, food, sanitation, domestic animals, and disposal of excreta and refuse. (3) Arthropoda of medical importance. (4) Epidemiological features including nutrition, public health data, demographic features, and specific diseases encountered and their rates. (5) Material and methods.

An impressive amount and variety of epidemiological data are presented which allowed for some interesting comparisons. House location within the village, blood relationships, and occupational exposure all affected community disease rates. But while such factors as contact with other communities, the effects of economics on age pyramids, well and other water resource use, food habits, and methods of waste disposal are documented, the integration of anthropological, ecological, and epidemiological data is very sparse and unsystematic. Little attempt is made in this volume (it is promised in later publications) to analyze the reasons for differential levels of health in communities that obviously differ in economic level and in terms of integration into the national economic system. This is not to say that the authors failed to recognize the effect of economics on health, but this reviewer would have liked to see data on the reasons for these differences. Without a fuller macroeconomic analysis and more fine-grained internal cultural data, the dynamics of health and disease in Chad remain obscure.

In sum, this study represents part of an important first step in the formation of a comparative medical anthropology focusing on health and disease from an ecological point of view. The authors appear to be caught in the eternal paradox: quantity and detail versus a generalizing comparative focus. There is no easy way out of this dilemma, but overextension is certainly not the solution.

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*The Ecological Basis for Subsistence Change among the Sandawe of Tanzania.*

James L. Newman. National Academy of Sciences, Washington, D.C., 1970  
 199 pp., figures, maps, extensive graphs and tables, appendices, bibliography,  
 no index, \$10.95 (paper).

This brief, expensive, but useful report is an ecologically oriented study of the course of subsistence change among the little known Sandawe people of Central Tanzania. The report is based upon field work conducted between March 1965 and May 1966. Part I is a discussion of the general physical environment



and cultural setting. The subsection on the physical framework lists and records in some detail technical and descriptive data on rainfall, geology, physiography, vegetation, and soils. As is true of most of the book, Newman's notes and references in this section, as well as his data, provide useful, often rare source material for the specialist interested in agriculture and ecology in Africa. But missing in this section as throughout the book are analyses linking the mass of formal technical data more fully and explicitly to the dynamics of man's presence at the village and family level, which remains hazy in the reader's mind. It seems probable that this lack does not seriously detract from the author's sound general conclusions, in this particular case, but one still yearns for even rudimentary data on the availability and organization of labor, man-hours of work, land tenure and land use practices, crop yields on the various soils, and a more extended treatment of the carrying capacity of the land and the life span of bush gardens. A section of the human framework rounds out Part I. The Sandawe, who number some 28,000, have been one of the ethnographic puzzles of East Africa. Along with the hunting and gathering Hadza, some 80 miles away, they are sometimes classed as remnants of a once more widespread Bushmanoid-Hottentot population of hunters who occupied the area before the coming of the Bantu. Newman surveys the available evidence and fails to find any support for this, but does conclude that the Sandawe were essentially nomadic hunter-gatherers until the relatively recent past, when they gradually became settled husbandmen practising shifting hoe cultivation and began to keep domesticated livestock.

In Part II, Newman assesses current Sandawe subsistence activities in the light of their changeover to settled husbandry. He briefly reviews local oral traditions, including songs, which support the idea of an adaptive changeover and, in a discussion leaning toward technology and material culture, finds that hunting and gathering still make substantial contributions to the food supply, mainly as a "relish" eaten with the staple porridge usually found in much of Bantu Africa today. He then finds that the husbandry tradition is underdeveloped compared to what one might expect to find among a people who had long been highly dependent upon horticulture and animal husbandry. The Sandawe are considered to be poor farmers by other local people: timing of horticultural operations is irregular and poor, attitudes are apathetic, there is no elaborate system of land tenure but people move freely and seem to take up land where they find it, fields are not clearly bounded, land is not inherited, and there is no desire to accumulate it for wealth. Newman scores the Sandawe on all these counts and contrasts them unfavorably with surrounding peoples who seem to enjoy a slightly more favorable, if not lush, environment. Newman attributes all of this "disinterest" toward cultivation on the part of the Sandawe to their changeover from hunting and gathering and he makes a parallel argument about their "underdeveloped" animal husbandry practices. He may be partly right. But

it should be pointed out, firstly, that most if not all of the immediately surrounding peoples who are contrasted to the Sandawe are relative newcomers to the region who have generally taken up the more favorable tsetse-free ecological zones surrounding the less desirable Sandawe refuge area. These newer-comers have rather different cultural traditions which could probably account for many of the reported differences in subsistence behavior. Secondly, most if not all of the criticisms of Sandawe cultivation and animal husbandry practices could justifiably be made of a large number of Bantu groups, especially those occupying equally marginal habitats where, like the Sandawe, out-migration has become the established rule. The Valley Tonga and Goba peoples of the Zambezi Valley in Zambia are a good case in point [see Scudder, (1962): *The Ecology of the Gwembe Tonga*. Manchester University Press, Manchester]. Newman finds that Sandawe are still avid gatherers fond of the bush and attributes their catholic diet to their gathering past. But even here caution is needed. Valley Tonga cultivators in a harsh environment punctuated by recurrent droughts, just as the Sandawe experience, rely on a very wide range of wild foods to supplement their diets—more so than the hunting and gathering !Kung Bushmen of the Kalahari whose regular dependence on gathering has led them to develop a wild staple whose availability is reliable (T. Scudder and R. B. Lee, personal communications). Newman's individual propositions can thus all be questioned in the light of comparative ethnography, but taken as a whole, as they are meant to be taken, his argument that Sandawe subsistence behavior differs from local neighboring Bantu on culture-historical grounds seems acceptable enough, although a supporting ecological line of argument could have been developed as well.

Newman rightly decides that grappling with nice historical problems is not enough in a struggling new nation embarked upon the difficult process of planned change, so Part III is devoted to factors relevant for a discussion of the future. Here he assesses the resource potential of the environment and he finds that, as in so many parts of the poorer, less easily exploited hinterlands of the Third World avoided by colonialists (and in this case even by the Bantu), the subsistence sector, poor as it may be, must bear the brunt for local development just as it has in the past. Major topics considered here are crop production, livestock production, other means of subsistence, and population-land balance.

The author's well documented and realistic main conclusions are summarized very briefly in Part IV. The harsh Sandawe homeland is considered marginal for human habitation on any basis, and crop production clearly is a particularly shaky endeavor. Under these circumstances it would be unwise to direct limited national development capabilities toward extending crop production in this remote area, and Newman wisely turns to other alternatives. Nevertheless some practical and familiar suggestions are made for improving current practices, such as crop and field rotation, ox-plowing, central storage facilities, and ridging. The problem of water lies at the heart of crop production difficulties and even with

heavy capital investment no solution is in sight. Thus cash cropping has no future, even if a transportation network and a market were available. It is thought best to allow the present adaptive pattern of out-migration to continue. Though tsetse and water are a problem, livestock ranching has a somewhat better chance to succeed in certain suitable areas presently cleared for human exploitation. Chicken raising is also suggested. Under the circumstances Newman concludes that tsetse-infested bush areas are best left as is and given over to controlled hunting, or game cropping, where this is not competitive with livestock or horticulture.

In summary, those concerned with subsistence, ecology, economics, development, and area studies in Africa will be interested in this report, but fuller socioeconomic data would have augmented its utility for understanding the dynamics of the relations between the Sandawe and other components of their ecosystem.

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