

## BOOK REVIEWS

**Image and Environment: Cognitive Mapping and Spatial Behavior.** Edited by Roger M. Downs and David Stea. Foreword by Kenneth E. Boulding. Aldin Publishing Company, Chicago, 1973, 439 pp., maps, diagrams, table bibliography, index, \$15.00 (cloth).

This book, edited by a geographer and a psychologist, with a foreword by a neorenaissance man in economist's clothing, is one of the relatively few for which the term "interdisciplinary" is neither pretentious nor inappropriate. The central questions of this collection of papers are how do humans learn about mental structure, and behave in their spatial environment? In recent years what Boulding refers to as an "invisible college" has surfaced in the literature of half a dozen disciplines, stimulated in part by his own speculations published in *The Image*. Dissatisfied with explanations of behavior based on psychoanalytic or economic models, scholars such as behavioral geographers, environmental psychologists, human ecologists, and environmental designers have been exploring the links between human environmental cognition and behavior. The products of this invisible college have been scattered in the journals of disparate disciplines. Thus *Image and Environment* is at the same time a welcome coalescence and a progress report.

What distinguishes this collection from others published in the area such as those of Ittelson (1973) and Proshansky *et al.* (1970) is that Downs and Stea concentrate on spatial, rather than more broadly environmental, cognition. The areal scale is also different. The preponderance of geographers among the authors is reflected in the concern with spatial cognition at world, continental, or city scales, rather than with hospital wards, libraries, or personal space.

*Image and Environment* is topically divided into six sections. Each is introduced by the editors, who provide context and indicate questions that remain unanswered. Half the papers were commissioned for the book and represent further developments of earlier research. Several of the book's 19 articles have been previously presented at professional meetings. Six have been published before, although several germinal articles originally appearing in relatively inaccessible sources are here made available to wider audiences. Examples are Gould's "On

Mental Maps," first published by the Michigan Inter-University Community of Mathematical Geographers, and Lee's "Psychology and Living Space," which appeared originally in the *Transactions of the Bartlett Society*.

In a field where much of the extant writing is empirical or speculative, the editors' effort to erect a preliminary theoretical framework for spatial knowledge is courageous – possibly even a little foolhardy. The editors provide, in a field fraught with terminological confusion, prerequisite semantic clarification, although the contributors to the volume do not always abide by the rules. The terms "cognition" and "perception," for instance, are used by different authors to describe the same process.

In several places, original pathbreaking papers are paired with subsequent work that they inspired, enabling the reader to assess developments in the field. For instance, Tolman's 1948 article on rats' spatial learning, which postulated the existence of cognitive maps in that species, is followed by a recent report by Stea and Blaut on ways in which such spatial models are built into the human mind through play in early childhood, and then by Kaplan's hypotheses concerning the importance of cognitive maps to human adaptation and survival. Part of Lynch's seminal work on urban imagery is reprinted, and his inspiration is clear in the study of the images of two Italian cities by Francescato and Mebane; this both validates and amplifies Lynch's methodology and interpretations. Orleans demonstrates that urban images differ among socioeconomic groups living in the same city and suggests alternative methods for eliciting cognitive cartography.

The book's weaknesses are more a reflection of the state of the art than of shortcomings of contributors or editors. Although the title and introduction promise explanations of spatial behavior, the elusive links between spatial cognition and behavior are assumed rather than illuminated. The cognitive map is defined as "an abstraction which refers to a cross section, at one point in time, of the environment as people believe it to be" (p. xiv). Furthermore, "human spatial behavior is dependent on the individual's cognitive maps of the spatial environment" (p. 9). But the reader is presumably required to subscribe to the editors' credo that "We believe that a cognitive map exists if an individual behaves as if a cognitive map exists" (p. 10). This is because the empirical research presented here is directed toward eliciting cognitive structures through introspection rather than by observing actual behavior. For instance, subjects register residential preference by rank-ordering a list of states in Gould's study, they draw maps of the world in Saarinen's, they sketch city maps and respond to verbal locational questions in Francescato and Mebane's, they estimate distances in Lowrey and Lundberg's, and they interpret aerial photographs in Stea and Blaut's. However, the editors urge us, in a postscript, not to miss the next episode. Perhaps by then clearer links between mental maps and spatial behavior and better predictive models will have emerged.

Inevitably, in such a collection there is some repetition. Even in the final chapter a review of conceptions of spatial location partially duplicates material appearing earlier in the book. The advantage is that each section can stand alone as a coherent statement. The volume is attractively produced, with intriguing dust jacket maps and an impressive bibliography. *Image and Environment* is highly recommended to academics, design practitioners, and the general reader as a stimulating and sometimes entertaining book.

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**Weather and Climate Modification.** Edited by Wilmont N. Hess. John Wiley and Sons, Interscience, New York, 1974, xii + 842 pp., tables, diagrams, photographs, charts, index, \$29.95 (cloth).

Less than a decade ago, weather modification was regarded in North America as little more than a matter of scientific curiosity. Today it is the focus of intense debate and public controversy. An expansion of weather modification activity is being vigorously promoted by a number of federal government agencies — notably the Bureau of Reclamation, Department of Agriculture, and the National Oceanic and Atmospheric Administration. They point out that severe weather events such as hurricanes, droughts, hail, and lightning cause immense annual losses of property and income, a single event occasionally being responsible for destruction in excess of a billion dollars. Occasionally weather is also responsible for large life losses, exemplified by the 1 million fatalities accompanying the November 1970 cyclonic storm that devastated coastal Bangladesh. Supporters of weather modification also note that increases in precipitation in arid regions would make possible the expansion of agriculture and an increase in crop yields in marginal areas. Other proponents have gone so far as to suggest that by “harnessing the rivers of the sky” the world’s food problem could be

solved. Persuaded by such arguments, Congress has dramatically increased appropriations for weather modification research in the past decade, from \$2.6 million in 1963 to \$26 million in 1973. In addition, considerable commercial cloud seeding is undertaken on behalf of farmers, hydroelectric power utilities, city water systems, and ski resort owners. Weather modification now takes place in almost every state in the United States.

Not everyone is enthusiastic about these developments. Many meteorologists remain skeptical about claims that precipitation has, in fact, been increased or that storms have been modified. There are concerns that the benefits of weather modification to one special interest group may be outweighed by the costs to society as a whole or other affected individuals. A rancher, for example, may desire increased precipitation, but an orchardist on adjoining property may have his entire crop ruined by it. Altering the track of a hurricane might save lives and property in Miami but only at the expense of losses in Georgetown, South Carolina. Fears concerning the potentially adverse effects of weather modifications have led to lawsuits and even to violence. As weather modification continues to expand, it may be expected that such reactions will also increase. A broadly based "technology assessment," therefore, seems in order.

*Weather and Climate Modification* thus appears at an opportune time. Designed to answer the question "What is the state of the art?" it is probably the best volume ever to appear in this field. Containing contributions from more than 34 eminent scientists, it presents an extremely articulate examination of the theory and practice of weather modification, particularly in the United States. It also examines experience in several other countries, notably the Soviet Union, Israel, and Australia. In-depth reviews of various types of atmospheric modification are included, notably precipitation management, alteration of severe storms, and air pollution. There is also an excellent discussion of global atmospheric modeling.

From the evidence presented, it seems that it is possible to stimulate increased precipitation from orographic clouds, amounting in some cases to as much as 20% above normal precipitation. Successes also seem to have been achieved in dispersing supercooled fogs, suppressing hail, and reducing the incidence of lightning. The control of severe storms, such as hurricanes and tornadoes, remains a distant prospect. The volume as a whole shows that while much has been learned from research undertaken in the past decade several critical questions remain unanswered. We still do not know, for example, what are the downwind effects of cloud seeding or whether severe weather might be produced by seeding a hurricane. There is also uncertainty as to the ecological effects of given types of weather modification.

For those interested in weather modification, this volume will undoubtedly remain a major source of information for some time to come. Profusely illustrated with excellent diagrams and photographs and buttressed with exhaus-

tive lists of current references, it provides some valuable insights into the state of the art. A major weakness, however, is the scant attention paid to the human and environmental dimensions of weather modification. The first 764 pages of this volume are devoted to the question "Can it be done?" Tucked away in the final 48 pages is a discussion of the question "Should it be done?" There is a valuable review of the legal aspects of this technology, and an in-depth examination of the sociological dimensions. But there is no discussion of economic or ecological aspects of weather modification and little advice as to directions which future policy in this field might take. As a consequence, the volume falls short of the broadened definition of a technology assessment.

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**The Classic Maya Collapse.** Edited by T. Patrick Culbert. University of New Mexico Press, Albuquerque, 1973, xx + 549 pp., maps, photographs, figures, tables, \$17.50 (cloth).

After decades of research, the specific factors leading to the collapse of the Lowland Maya Classic civilization are still unclear. In an attempt to clarify these factors, 11 of the foremost Mayan archeologists met in Santa Fe, New Mexico, in 1970 to discuss the collapse in light of data collected in recent years. *The Classic Maya Collapse* represents the papers and arguments presented at this conference (two papers were subsequently added). The volume is not devoted strictly to ecological interpretations of the collapse. However, sufficient consideration is given to such factors as population size and density, agricultural practices, human and crop diseases, and other aspects of man-land problems that the volume deserves the scrutiny of human and physical ecologists from various disciplines.

The text is divided into four sections. Part I consists of three introductory articles: the spatial and temporal background of the problem (T. Patrick Culbert), previous collapse theories (R. E. W. Adams), and major collapse themes (Jeremy Sabloff). Most of the arguments presented in the text differ in complexity, not substance, from previous explanations of the collapse.

Part II is composed of seven papers primarily concerned with evidence from specific archeological sites and regions in the lowlands. However, several of these papers venture briefly into various ecological aspects of the collapse. For instance, Culbert suggests (and I agree) that the population of Tikal, a major civic-temple center in Petén, was too large to have been supported solely by

swidden (slash-and-burn) agriculture. Also, E. Wyllys Andrews IV discusses the possibilities of environmental tampering, catastrophism, and diseases as collapse stimulants. For the most part, however, the papers in this section deal with specific chronological data and their interpretations.

Parts III and IV are by far the most interesting and important sections in terms of human ecology. The lead paper of the former section, "Models for the Downfall," is an argument by Demitri Shimkin for a more ecological approach to the investigation of the problem. He notes that physical-resource balances, disease burdens, and population dynamics may be significant to understanding the collapse. The other four papers of Part III are devoted to specific collapse interpretations. Frank Saul offers skeletal evidence from Altar de Sacrificios, a major civic-temple center in Petén, indicating that the Maya of this site had important health problems. Although disease previously has been suggested as a collapse factor, its significance has been largely dismissed by Mayan scholars so that specific field investigations on such topics have been limited. Saul's evidence indicates that more attention should be devoted to Classic Maya health problems.

Malcolm Webb and William Rathje present somewhat similar interpretations, positing that environmental constraints influenced the collapse. Webb suggests that the physical environment of the lowlands limited the Maya to swidden cultivation, necessitating a dispersed population. Thus the concentration of people in and around civic-temple centers was ill-suited to the lowland environment and, ultimately, not conducive to secular state development. Rathje argues that the lowlands, particularly the so-called core region centered in the northern Petén, placed severe resource, ecological, and locational constraints on its Classic occupants. He suggests that the core region lacked basic raw materials — salt, obsidian, hard rock (for *metates*) — and that this limited resource base eventually made the area peripheral to interregional trade. Without trade, the ecological constraint that limited the Maya to swidden cultivation, and the spatial constraint, the distance of the core region from sources of basic raw materials, led to depopulation and collapse.

At issue here is the resurrected view in anthropology and related disciplines that environments often determine cultural development. Although Webb and Rathje modify this environmental stance, both argue that the Classic Maya were limited to swidden agriculture by the physical environment of the lowlands. This premise has been accepted frequently among scholars of the Maya with little foundation. Physical environments offer constraints only within the context of a given technology. The key question, then, is what level of agricultural technology did the Classic Maya possess?

Recent evidence contradicts the swidden assumption, indicating that the Classic lowlanders manipulated various ecological zones in a variety of ways to obtain subsistence. The widespread presence of relic terraces and raised fields in

the lowlands suggests that the Classic Maya were not limited to swidden cultivation but pursued much more intensive agriculture (Siemens and Puleston, 1972; Turner, 1974; Olson, 1974). Based on this evidence, both Webb's and Rathje's interpretations of the collapse must be reevaluated.

William Sanders' contribution to the volume, "The Cultural Ecology of the Lowland Maya: A Reevaluation," is an update of an earlier work. Although the arguments presented are not new, they still deserve attention. Sanders includes such factors as Mayan settlement pattern, demography, subsistence activity, and social organization in an argument that the lowlanders may have stressed their ecosystems to the point of exhaustion. The problems of maintaining soil fertility and reducing soil erosion under increasing population pressures and, hence, increasing agricultural pressure are emphasized. He concludes that the Maya probably did not solve these problems and eventually suffered from a declining subsistence base. Sanders' assessments were largely based on scanty evidence of ancient erosion control and *bajo* (seasonally inundated depressions) cultivation in the lowlands. More recent research has produced more of this evidence in various sectors of the lowlands.

The summary article, Part IV, is a synthesis of the material and arguments presented in the text. Gordon Willey and Shimkin construct a model of the collapse including almost all of the collapse factors offered in the volume. It is of particular ecological interest that the authors postulate that agricultural pursuits reached a point where "managerial mistakes or natural disasters would have become increasingly serious. In brief, there was no margin of safety" (p. 487). This is a cogent argument, and it warrants further consideration and investigation. Willey and Shimkin also assert that Mayan agriculture probably never reached its productive capability. This improperly implies that the productive capability of Classic Maya agriculture is known. To the contrary, studies of prehistoric agriculture and other subsistence practices in the lowlands have just begun. Still unclear are such major issues as the areal extent and chronology of intensive agricultural activities, cultivation techniques and crops, soil and climatic factors, sources of protein, and other important aspects of lowland subsistence.

Herein lies the problem confronting ecological explanations of the collapse. Far too little research has been invested in studies of the prehistoric human ecology of the Classic Maya. This problem is not unique to the Maya but, as recently expounded by Butzer (1975), is endemic to most archeology. Fortunately, the problem has been recognized by scholars of the Maya, and current efforts are in progress to address topics of prehistoric cultural ecology in the Classic lowlands.

The Santa Fe conference did not resolve the collapse issue. It did, however, delimit the various sorts of data and types of research needed to fully understand the collapse. The need for ecological data and investigations was a

recurrent theme of the conference, and the papers presented offer a wealth of synthesized data and interpretations which are essential reading for students of the Maya and prehistory.

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**The Columbian Exchange: Biological and Cultural Consequences of 1492.** By Alfred W. Crosby, Jr. Greenwood Press, Westport, Connecticut, 1972, xv + 268 pp. Contributions in American Studies, Number 2, maps, bibliography, index, \$9.50 (cloth), \$2.95 (paper).

This is a general, historical account of the exchanges of diseases, plants, and people between the New World and the Old over the past 500 years. As is obvious from its scope, it is a work of synthesis, incorporating some of the author's own research but aiming essentially to bring together research by others in a great variety of different fields. As a historian and a Latin Americanist, Crosby carries some marks of his discipline. He gives Latin American aspects some special attention, and he keeps a light and easy style of writing that makes his work eminently readable. It is far more, however, than a convenient textbook to be assigned to students. It is synthesis in depth, which may not add very much to each specialist's knowledge of his own field, but is likely nevertheless to add to his knowledge over the whole range of historical human ecology.

The theme begins with the isolation of the American continent from significant contact with the diseases, men, plants, and animals of the Afro-Eurasian land mass. Crosby then traces the transatlantic exchanges that followed Columbus and his successors, and the results for human history on both sides of the ocean. In the first instance, it brought the westward passage of European, Asian, and African diseases to an American population that lacked all countervailing immunities. The result was to kill off most of the Indians within a few generations and to leave these continents open to easy conquest and occupation by people from Europe and Africa.



The new transatlantic contact also made possible an exchange of food crops and domestic animals. Potatoes, cassava, maize, pineapples, cacao, and many more passed from west to east, while cattle, horses, goats, sheep, wheat, and the whole range of European agriculture passed from east to west. Even though the unintended genocide by the Europeans reduced the American population, the exchange of crops made possible a remarkable growth in the population of all continents. That potential was not realized immediately, and historical demography has not yet produced the relevant studies that will make it possible to trace the changes in detail. Crosby is therefore forced to depend on partial results, but the main lines are clear enough and are not likely to be disputed.

Finally, having caused a potential increase in world population but an actual decrease in New World population, the Columbian exchange corrected the disequilibrium by the most massive intercontinental migration the world had seen up to that time. Perhaps 10 million Africans were transported to the Americas by the slave trade of the seventeenth, eighteenth, and early nineteenth centuries, followed by an even larger number of Europeans passing across the Atlantic in the nineteenth and twentieth centuries.

Given this scope, nothing can be treated in very much detail, but some things are treated in much greater detail than others. Crosby includes a rather anomalous chapter on the origins of syphilis, based on his own research. It is brief and convincing, showing that syphilis was indeed an American disease, as historians of medicine once thought and then questioned. Although a little out of place, this chapter does serve as a neat illustration of the transfer of disease.

A second curious element is the slightly moralistic tone of the conclusion. Crosby's final paragraph is this:

The Columbian exchange has left us with not a richer but a more impoverished genetic pool. We, all the life on this planet, are the less for Columbus, and the impoverishment will increase. (p. 219)

History used to be a discipline where moralizing about the past was fair game, and historians still have a tendency in that direction. But the Columbian exchange was basically a result of man's increasing technological capability, and that fact seems as far beyond the effective range of moral judgment as biological evolution or the structure of the atom. The assignment of personal responsibility to Columbus is no doubt merely a manner of speaking, since he was no more responsible than the first man to ride a rocket to the moon was responsible for the vehicle that carried him there. While the merit of the book as a whole remains, it seems a shame to have the suggestion of a great-man theory of history sneak in through the back door in a work that otherwise breaks so much new ground in its breadth and presentation.

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**Human Fertility in India: Social Components and Policy Perspectives.** By David G. Mandelbaum. University of California Press, Berkeley, 1974, ix + 132 pp., bibliography, \$6.00 (cloth).

In the concluding remarks of his book, Mandelbaum points to the basic problem in India's attempt to solve its population problem. The Indian government is faced with two dilemmas. "One of them . . . is that those babies who are a planner's worry are also a parent's hope and joy. Another principal dilemma is that the measures practicable in the short run are not sufficient to meet the nation's problem in the long run" (p. 110). This helps explain the criticism of those who correctly point out the inadequacy of present government efforts. On the other hand, planners and politicians are also correct in pointing to the practical limits of programs beyond family planning that may be implemented effectively under present conditions. If there are solutions to these dilemmas, they may be found in part through a better understanding of the cultural, social, and personal experiences of rural people that favor high fertility and the kinds of social changes that may be modifying traditional fertility behavior.

*Human Fertility in India* is the most comprehensive and systematic attempt thus far to bring together the anthropological and other literature bearing on the social components of Indian fertility as it may relate to policy formation. As the author of the pioneer textbook for the cultural anthropology of India, indeed for all social scientists concerned with South Asia (Mandelbaum, 1970), Mandelbaum is well qualified for the task.

*Human Fertility in India* is not a critical review of research. Rather it is an attempt to pull together findings from studies available to the author. For years, those of us who have done village research in India have been told that while our reports are interesting they are not typical of any other area and therefore can be safely ignored. While this may be true regarding specific societal characteristics, there remains a core of customs and beliefs shared by major groups of the Indian subcontinent. Mandelbaum's contribution is a first step in an attempt to point to commonalities that may have programmatic implications. I say a first step since his book makes it clear that although much is known, much remains to be understood if agents of planned change are to have the necessary information to design programs that have any chance whatever of meeting even the modest targets of the Indian government.

The book has six chapters. The first is a brief survey of the Indian family planning program. The second reviews the reasons people in India want to have many children and the circumstances under which they have traditionally limited fertility. The third chapter discusses the relation to fertility of some major social and cultural differences. The fourth chapter reviews traditional methods used to control birth. The fifth offers suggestions for immediate implementation using currently available resources. The last chapter suggests proposals for applying existing knowledge of the social and cultural components of fertility behavior to family planning programs for the long term.

The population problem becomes clear in the first chapter. At the 1961-1971 growth rate, there are projected to be 1 billion people in India by 1990. Even if the family planning program reaches its goal (and it is far short), it would mean only that the billion mark would be delayed by 10-15 years.

Since Mandelbaum completed the book, the economic and political situations both within and external to India have worsened. At the time of writing of this review, the question is whether the country will have the food and resources to catch up with present needs let alone handle projected births. As predicted by many, since it seems unlikely that the required decline in births will take place in the near future, the death rate will climb. But obviously the story does not end there. Whatever the conditions, Indian society will continue, and the nature of this society will affect the rest of the world, a point misunderstood by those who claim the subcontinent should be written off.

The last two chapters indicate the difficulty in making practical suggestions for program implementation, in part because our knowledge is so limited and because of the social, political, and economic limitations within which present programs must operate.

Mandelbaum summarizes the anthropological literature related to the traditional rewards for having a large family — including the lack of acceptable alternative roles to that of wife-mother. In addition, the social variables supporting high fertility values become clear.

Two motivations for controlling fertility are discussed: birth spacing for the health of the mother and child, and the generally held feeling of disgrace of pregnancy after one's children have their own children. Fertility reduction due to widowhood and a rise of age of nuptials is also discussed, the first playing only a minor role in fertility rates and the second probably effective only if age of marriage is significantly increased over what it is now.

The author covers the traditional methods of limiting fertility, but he does not mention infanticide and infant neglect, which may still be important. He points out that the single most important means of fertility control may have been abstinence, although survey statistics have given little indication of the effect on fertility rates. The main reason for long abstention has been the taboo on intercourse during lactation. However, abstention is also used at other times to avoid pregnancy. In addition to abstinence, factors limiting coital frequency include fear of loss of semen on the part of the husband, lack of opportunities for coitus, and the shame of becoming pregnant when a grandparent. Withdrawal seems to be used more among the educated, but it may be acceptable among villagers and seemingly has been important in curtailing fertility. For most researchers, it has been difficult to obtain evidence on abortions in India because village opinion seems to oppose the method. Still there are indications that abortions are frequently performed.

Mandelbaum suggests the need for greater stress on making abortion more available as well as making greater use of traditional practitioners. Incentive programs have resulted in massive adoption of vasectomy but, as with the IUD,

the programs have paid little attention to how the acceptor reacts to the method, and there has been widespread and rapidly communicated dissatisfaction. The stress on number of acceptors rather than on client satisfaction has been a major programmatic error.

For the long term, Mandelbaum sees an investment in girls' education as an important area for government input beyond family planning. This conclusion is based on the analysis of social and cultural differentials, where he finds minimal influence on fertility from such factors as the joint family and religion. Nor has the growth of cities had much effect. The evidence he finds points to higher income and education as the critical factors in lowering fertility. It is the belief of this reviewer, however, that, with our present knowledge, recommendations regarding education should be made with caution. Although an inverse relationship between years of schooling and fertility has been found throughout the world, the reasons are not clear. From a practical standpoint, vastly increasing educational opportunities for women would be costly and difficult, and the Indian government is already faced with immense problems with the current educational system. We do not yet know what the direct and indirect effects of schooling may be on fertility, but there is good reason to believe that the selective factor in those who go to school may account for most of the relationship between fertility and education. Schooling may at best reinforce conditions under which these girls would have fewer children.

More practical perhaps is Mandelbaum's emphasis regarding the need for change agents to learn to use the local social networks that influence each person's views and acts (p. 101). He says, "in the next stages of the program more emphasis should be given to the social conditions of particular groups and categories and not so much to nationwide targets and broadside, hard-sell campaigns. Women and men who are inclined toward fertility control for traditional reasons should receive special attention" (p. 109). It is along these lines that this reviewer believes further work will be most useful.

In view of the knowledge brought together by Mandelbaum, more information is needed for further program planning. Two related areas seem important to this reviewer for future research. While a greater understanding of the value of children and an understanding of methods used traditionally to avoid conception are useful, much more needs to be known about the costs of children. As Mandelbaum points out, "Extending knowledge about birth control methods and improving their feasibility and availability are two necessary parts of a population policy. But they are not sufficient to relieve the nation's population burden adequately because many men and women, particularly among the poorest half of the people, feel no compelling motivation to limit their fertility" (p. 84).

The review of the literature makes it clear that little is available on this point. Very large families have not generally been desired, and neither has fer-

tility reached the level it could. Methods of limitation have always been used, but more information is needed on *why* limitation has always taken place. There are ample data on why a large family is wanted, but when it comes to controlling fertility we have only situations influencing abstinence. There seem to be few data on social structure or cultural variables indicating the effects of children living beyond the numbers needed. Little research is available on how increasing population density may affect health and environmental quality, and how people may react over time to these changes. From a programmatic standpoint, we need to understand how these variables may feed back into the system and affect family style norms.

Another question still raised is the extent to which fertility behavior is "rational," with decisions made by couples thinking through the benefits and disadvantages of having children. For any who are still doubtful, the present volume makes clear the importance of culturally determined taboos and customs.

Yet within this cultural framework, which indeed sets the limits for individual decision making, do individuals and couples as well as extended family members become concerned about children in excess of the numbers they believe are needed, and do they make decisions to regulate fertility?

Mandelbaum has done a very real service in pointing out what is known of human fertility in India as well as indicating our need for further research.

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**Stalking the Wild Taboo.** By Garrett Hardin. William Kaufmann, Inc., Los Altos, California, 1973, 226 pp., \$8.95 (cloth).

It is always a refreshing intellectual experience to follow the highly literate odysseys of an articulate, rational, and creative mind — particularly that of a scientist. This is especially so when the author can juxtapose and relate ideas from diverse fields of thought, and can effortlessly salt his discussion with a renaissance scholar's broad range of analogies and examples from literature, legend, economics, and theology. In recent years, scientists have poured their

ideas and arguments in the form of essays, articles, or books into the interdisciplinary marketplace, particularly the now ubiquitous environmental marketplace. Many such ideas have been provided by scientists, whose information and insights have been clearly and carefully presented. However, there are woefully few in the United States today who stand out as true literary scientists. Professor Hardin is one of the few.

*Stalking the Wild Taboo* is in large part a collection of Hardin's recent published articles. Each is written with precision. The chapters are arranged under four topical headings: Abortion, Religion, Technology, and Competition. A valuable aspect of the book is that it brings together essays published in diverse journals or books. Readers who regularly peruse one or two of these journals will, in all likelihood, have missed complementary essays by Hardin in other publications. For example, Hardin examines the multifaceted nature of the abortion topic from biological, semantic, and legal perspectives. This provides provocative coverage, even if something less than full agreement.

The sections on Abortion and Competition are given the greatest attention. One could argue that abortion has been in the forefront of world discussions for several years, that many articles in scholarly journals and popular magazines have explored the topic, that speakers have discussed it in secondary schools, college, and public places, and that there is little more to discuss. Many state and national abortion laws have been liberalized and the general public, particularly in developed countries, is increasingly aware of the topic's urgency. But in spite of the attention and publicity many states and nations continue to vacillate (or are having second thoughts about their liberalized legislation), while others remain obstinate. Abortion as a means of reducing population growth and relieving the social costs of caring for rejected or physically and mentally deficient children will be long debated before any massive global acceptance and implementation can be realized. Hardin's discussions give dramatic impetus to the topic. He begins by discussing "Hardin's Law" – that it takes 5 years for a person's opinion to change after he has had all the facts about a controversial or "taboo" topic. Presumably zero time is when one actually becomes receptive and begins listening. One can contest the 5-year time span, but Hardin makes his point while relating "spatial distance" to "psychological distance" (p. 5). In "The Case for Legalized Abortion" he differentiates illegal killing (murder) from killing. His argument is given credence by recent interpretations of the related biblical commandment. He continues with discussions ranging from "semantic aspects of abortion" to the sacredness of "blueprints." In the last discussion, he questions the preciousness of DNA, asserting that it is expendable and can be reproduced inexpensively like reproducing "lost blueprints." The arbitrary point at which life becomes objectively valuable is discussed as a corollary of the DNA discussion.

The short introductory chapter to the section on Competition suggests the paucity of discussions on competition in introductory sociology texts. It seems a

trifle unjust to sociology to imply that competition (by whatever other name) is “taboo” in sociological circles. It seems more a ploy to tie the title of the book to the subject of competition. Actually, the title does not pervade all the chapters. This is admittedly difficult in a collection of previously published essays, although expanded introductory sectional discourses could have given the book a smoother continuity.

The remaining chapters on competition are classic. The discussion of the competitive exclusion principle and its application to genetics and economic theory leads into the next fine chapter on “The Cybernetics of Competition.” The chapter “Population, Biology, and the Law” covers voluntary population controls, the welfare state, absolute ethics vs. relative ethics, “the threat of tribalism,” and “technical aspects of population control.” The last deals with ideas such as the buying or selling fractional child rights. I think the author a trifle too dogmatic, on the basis of a single master’s thesis reference, to assert that “the children of philoprogenitive parents will themselves produce a large proportion of philoprogenitive parents in the next generation, who will then produce a still larger proportion” (p. 194). Given the changing attitudes of much of the present generation, and further alterations in attitude through social change and education, such an extrapolation can be questioned. The final chapter in the section on competition discusses the relation of population size to environmental disruption, the latter “a function of the state and use of technology.” Here, trenchant arguments ally this reader with Hardin, and against many demographers and Barry Commoner, who believe in the self-regulative ability of human populations.

The sections on Religion and Technology are short. The former is good intellectual entertainment. In the latter, the taboo against relying on anything but technology to solve global problems is discussed. A longer essay covers the relative predictability (and capriciousness) of earthquakes, and ends by asking “Why” we even want to predict them — given the complex events that would follow from unpredictable predictions!

It would have been interesting if the author had spent more time proposing creative educational approaches to some of the globally important topics he discusses. But the book is good. It deserves reading both for its seriousness and for its intellectual fun.

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