Book Reviews

Ambitious Projects

California Water. A Study in Resource Management. DAVID SECKLER, Ed. University of California Press, Berkeley, 1971. xiv, 354 pp. + maps. $15.

The Water Hustlers. ROBERT H. BOYLE, JOHN GRAVES, and T. H. WATKINS. Sierra Club, San Francisco, 1971. 254 pp., illus. $7.95.

Several years ago the National Academy of Sciences Committee on Water recommended that all organizations engaged in planning for the use of water should give increased attention to alternative approaches and courses of action, to the appraisal of social costs and benefits, and to the use of research as one of the means by which new effective solutions could be reached. These two books indicate progress in that direction by diverse groups. The introduction to *California Water* points out that recent advances in technology provide an impressive array of alternative means of supply for meeting whatever demands arise and thus introduce a new era in water-resource management; a footnote states that after the book was in galley proof the California Department of Water Resources issued a bulletin (subtitled "The California Water Plan Outlook in 1970") which "reflects a basic change in the Department's thinking, a change much more in accord with the thinking in this book." In its treatise *The Water Hustlers* the Sierra Club pays tribute to *California Water* as by far the single most useful source in determining the present and future prospects of the California Water Project. Thus the leaders of thought among water planners and environmentalists are espousing similar objectives.

The California Water Plan, proposed in 1957 as a flexible long-range and comprehensive plan, has been implemented chiefly by construction of dams to create surface storage reservoirs and of aqueducts to transport the water to consumers—the "big dams and ditches" that cause hackles to rise in the Sierra Club. By now there is practically a generation gap between new demands and new capabilities on the one hand and old commitments, established programs, proved techniques, on the other; and that is chiefly what these two books are about.

California Water has 16 chapters by 19 authors, most of them professors of the University of California at Berkeley, Davis, or Riverside. The first part of the book outlines the past, present, and future expectations of the California Water Plan and reviews some of the major points of criticism regarding it. Part 2, Water Use, surveys aspects of agricultural and urban demand for water, its value in a natural setting, and the demand for water as an element in the ecology of the San Francisco Bay and Delta region. Part 3, The Technology of Water Supply, covers various alternatives—desalting, water reclamation, conjunctive use of groundwater and surface-water supplies, and geothermal steam—and the use of water in the production of electrical energy; some of these chapters are textbooky and some are retreads of papers presented elsewhere. The most glowing chapter is on geothermal resources, by Robert Rex, who does mention the inadequacy of scientific knowledge and some other obstacles to development in Imperial Valley, but sees the potential so enthusiastically that he comes up with a beautiful prospectus. I agree that the possibility of obtaining both desalted water and energy from the superheated brine would justify substantial investment in research and development, although I would classify the venture as high risk.

Part 4, The Political Economy of Water Resources, begins with a chapter on the problem of decision-making under uncertainty. Then comes a discussion of the "160-acre law," which has been called archaic by Governor Reagan and ridiculous by a vice president of the Bank of America; but which was inspired by Roosevelt I and upheld by the U.S. Supreme Court in 1958 (*Ivanhoe Irrigation District* v. *McCracken*) to insure that the public expenditure for reclamation will not go in disproportionate share to a few individuals with large land holdings; and which remains one of the most influential laws in the history of water-resource management. This is followed by a chapter on the legal aspects of conjunctive use of groundwater and surface water, including storage in surface and subsurface reservoirs and imports from remote areas, and a chapter on the evaluation procedures of the Army Corps of Engineers in the Dos Rios project. The final chapter, an overview of the problems of evaluation and decision-making in water resources generally, concludes with the statement that the political system is the only means we have of making social choices in a "multi-dimensional welfare set" and if the political system does not perform well we must either repair the system itself or kick the rascals out.

Knowing of the Sierra Club's long experience in swaying political systems and the rascals ensconced therein, one might expect some bias in *The Water Hustlers*. The authors make no secret of their personal preferences and they sound like witnesses for the defense—of nature against man's depredations, or public interest against special interest, or individual against system—but their articles indicate painstaking research and honest reporting and handling of scientific data (give or take an occasional hyperbole or wayward statistic). They write colorfully and include the historical background of each problem area, chiefly for non-scientific readers.

The book is in three parts, sampling the western, southern, and eastern states. In California Watkins sees the "water imperialists" as "new Romans," monolithic in their "concrete dreams." His criticism of current and future water-development programs and his presentation of alternative methods of providing water supplies are similar to those in *California Water*. In Texas, as in California, most of the state has a climate of perennial water deficiency: the average annual precipitation is less than the potential evapotranspiration. But unlike those of California, the areas of perennial surplus and runoff are downhill from the arid regions. The 1968 Texas Water Plan calls for moving vast quantities of water uphill to the arid lands, presumably all the way from the mouth of the Mississippi. The plan, requiring a $3.5-billion bond issue, was defeated by Texas voters in

1969, and Graves devotes much of his article to discussing alternatives and the need for flexibility in long-range planning. The New York metropolitan area is an area of perennial water surplus and runoff and, as Boyle notes, there is no shortage of water, just a shortage of clean water because of long-continued waste and pollution. To make proper use of what the region has to offer, he lists such alternatives as universal metering of water and elimination of leaks in mains in New York City, and reclaiming and reusing sewage and industrial waste water—but these would ruin the concept of water as a free good.

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Biological Psychiatry

The Genetics of Mental Disorders. ELIOT SLATER and VALERIE COWIE. Oxford University Press, New York, 1971. viii, 414 pp., illus. $25. Oxford Monographs on Medical Genetics.

That genes affect behavior is now a widely accepted fact. Much of the supporting evidence derives from animal experiments carried out under laboratory conditions. Although not as unambiguous, the evidence in man is nonetheless substantial. The evidence bearing on the role of heredity in the etiology of the psychoses, personality disorders, senile and presenile dementias, epilepsy, and mental subnormality comprises a vast literature, much of it inaccessible to the English reader. In this volume, the authors present a critical review of a considerable portion of this evidence. They do so with authority and scholarship, although sometimes in difficult literary style.

The authors intend their book primarily for the clinical psychiatrist, but it is doubtful whether American clinicians will receive it with much enthusiasm. A considerable portion of it is devoted to topics which in this country have only peripheral relevance to the practice of psychiatry. Moreover, American psychiatrists have become wary of one-sided approaches to behavioral phenomena, and this book strongly reflects the predominantly biological bias of European (particularly German) psychiatry. The literature on interpersonal, familial, social, and other experiential factors gets little attention in it, and that little is mostly of a disparaging kind.

The authors show a strong preference for traditional genetical interpretations and methods. In their discussion of the vulnerability to schizophrenia, they review the pros and cons of the monogenic and polygenic hypotheses and admit that the bulk of the evidence is not incompatible with a threshold-polygenic model. However, in the final analysis they retreat to a monogenic theory resembling one advanced by Slater more than a decade ago. They do so purely on intuitive grounds and because they feel more comfortable with its familiarity and seeming simplicity. Unfortunately, it has become apparent that the "simple" models are neither parsimonious nor compatible with what we know of the genetic determination of complex behavior from animal research. Where traditional research styles come into conflict with modern ones, they prefer the former. Thus, although few current investigators would attempt to carry out a study without double-blind procedures and other safeguards against subjective bias, these authors are skeptical of the need for such elaborate precautions.

The research on monozygotic and dizygotic twin groups is the mainstay of the genetic evidence in the behavioral disorders. Although these studies receive considerable discussion in the book, at no point is the disturbing question raised of their validity in demonstrating the operation of heredity in behavioral and psychological traits; higher rates of concordance among monozygotic twins than among dizygotic twins have been used to support both biogenic and psychogenic positions. Where alternative research designs are available, as for example in the important studies of schizophrenia in adopted children, recently carried out in Copenhagen by Kety, Rosenthal, and their colleagues, they do not receive the attention they deserve. These particular studies are barely mentioned in the book. Where the genetic evidence is at best ambiguous, as in the personality disorders, the authors prefer biological explanations to other plausible possibilities. Thus they ascribe the differential rate of criminality in the two sexes to chromosomal and other biological factors, not mentioning the possibility that the differences might be due largely to sex-role differentiation and other cultural factors.

Half the volume is given over to a review of the numerous metabolic and chromosomal disorders underlying mental subnormality. A comprehensive discussion of these data has long been overdue. The authors accept some of the evidence too uncritically, however. For example, in their discussion of the chromosomal anomalies, the purported association between an extra Y-chromosome and "severely disturbed aggressive behaviour" is presented as though it were firmly established. When the pertinent data are reviewed, it is clear that this conclusion is not warranted, being based on a small, biased sample of institutionalized individuals who have not been shown to differ psychologically in any major way from similarly institutionalized males without the chromosomal anomaly.

The strengths of the book lie in its scholarship and in the broad range of the material reviewed, for which it will be welcomed by human and medical geneticists as a reference book and text. Students of human behavior, however, will find that it does not provide a full picture of the multidimensional character of human behavioral variation. Its greatest shortcoming is in its perspective; the book looks backward rather than forward, giving the reader a sense of the past achievements rather than of the future promise of psychiatric genetics research.

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Social Insects

Army Ants. A Study in Social Organization. T. C. SCHNEIRLA. Howard R. Topoff, Ed. Freeman, San Francisco, 1971. xxii, 350 pp. + plates. $12.

The spectacular raids and emigrations of the Dorylinae, or army ants, have attracted the attention (and defensive behavior) of numerous biologists, but T. C. Schneirla was the first person to study the behavior of these ants systematically and intensively. Schneirla began to study Neotropical army ants in 1932, following his graduate training in psychology and his classic studies of maze learning in ants, and during the following 36 years he expanded his research to include related species in the southwestern United States and the Philippines. Although Schneirla published in other areas of comparative psychology, army