the recent excavation of an Iron Age settlement some 120 miles from Dobe puts pastoralists in easy reach for at least the past 1000 years (*6*).

Thus, whereas Lee is inclined to concentrate on a particularistic view of !Kung existence, the broader perspective suggested by the findings outlined above replaces his evolutionist sense of the !Kung struggling across a threshold of farming and herding (p. 116) or poised on the brink of the "Neolithic Great Leap Forward" into settled life (p. 432) with an image of them dancing between two "modes," nimble opportunists in the wider African world.

This brings us to a rather subtle implication of the view of San as persistent foragers in that that view may be seen to have rendered them somewhat less than what they really are. Emerging more as ideal than real people, they appear anachronistic in the sociopolitical theater of modern Africa. Lee's impression of the San as unwitting innocents lured into the service of cruel and ruthless Boers (p. 431) has a paternalistic cast if only because all other signs identify this alliance as one of many such opportunistic strategies that have apparently served the San well in the past. "Innocent victim" is a mere hairsbreadth from "noble savage," and given the pressures that are being applied to people like the San today it does them no great service to be rendered thus. A political scientist analyzing the present situation of Australian Aborigines at the second international conference on hunting and gathering societies (Quebec, September 1980) suggested that their current predicament is due in part to the fact that white Australians do not regard them fully as people of account, as a force to be reckoned with, in short, as *menschen*. Though it is easy to trace such attitudes back to old-fashioned anthropological writers, at the back of my mind is the persistent call, "We have met the enemy and he is us." Unwittingly victims of rigid concepts and evolutionist categories, we, the modern anthropologists, continually promulgate this view. Lee's ethnography is far too insightful and comprehensive to stay locked into a framework of economic boxes and Marxist "modes." Discarding these constraints will reveal the subject in a more realistic light and serve to free his altruism and basic love of these people from those intellectual bonds that we all share.

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Social Psychology

Social Exchange. Advances in Theory and Research. KENNETH J. GERGEN, MARTIN S. GREENBERG, and RICHARD H. WILLIS, Eds. Plenum, New York, 1980. xviii, 306 pp. $24.50.

Social Exchange contains 12 chapters, all related in some way to the social exchange models of Thibaut and Kelley, Homans, Blau, and others. However, major topics of social exchange research and theory, such as bargaining, cooperation and competition, and social power, receive almost no attention. In the preface, the editors state that their aims in compiling the book were to present "new voices in the arena" of social exchange theory, to act as a catalyst by bringing together work from different disciplines, and to show that exchange theory can provide a unified conceptual view of diverse phenomena. Unfortunately, none of these aims is fulfilled particularly well.

The voices in the volume are, for the most part, not new. Almost all the material has appeared previously. There are, however, some notable exceptions. Although most of a chapter on equity theory by Leventhal is drawn from earlier papers, Leventhal does present an expanded analysis of procedural fairness (in contrast to the distributive fairness of equity theory). Levinger and Huesmann, after repeating material from a previous paper on incremental exchange theory, do offer some revisions to the theory. In analyzing the patterns of outcome matrixes for heterosexual dyads, Willis and Frieze present stimulating new theoretical ideas.

Investigations from different disciplines are not brought together in the book to any great extent. Eight of the chapters are by social psychologists. There are two chapters on anthropological approaches (one co-authored by an economist), one chapter on organizations, and one chapter on operant-conditioning research on animals. Work outside of psychology, such as by political scientists, economists, or macrolevel sociologists, receives little attention. Social psychologists will probably find the two anthropological chapters provocative. In one, Befu calls for an integration of the anthropologist's interest in describing the rules of exchange in a given society with the social psychologist's interest in analyzing the strategy of social exchange. A chapter by Pryor and Graburn on "the myth of reciprocity" demonstrates what might might be learned from this. The authors investigated whether reciprocity actually occurred in an Eskimo village and concluded that it was violated to a considerable extent. The conclusion is important for social psychology. In the usual laboratory situation, people are forced to make allocation decisions or to respond immediately to the allocations of others. Outside the laboratory, long time intervals may pass before an opportunity for reciprocity or restoration of equity occurs. Furthermore, in the frequent give and take of ongoing social relationships, keeping score in order to maintain reciprocity or equity may be difficult. Consequently, equity may be achieved mainly by cognitive adjustments, a mechanism postulated by equity theory that has received rather little attention.

The book does not show how diverse phenomena could be brought under the umbrella of exchange theory. In fact, the reader is likely to conclude that nothing much is gained by relating such topics as leadership and uniqueness to exchange theory. The chapters on those two topics would lose nothing by the dropping of any reference to exchange theory.

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Radiobiology

Radiation Effects on Aquatic Organisms. Papers from a symposium, Zushi Beach, Kanagawa, Japan, May 1979. NOBUO EGAMI, Ed. Japan Scientific Societies Press, Tokyo, and University Park Press, Baltimore, 1980. xiv, 292 pp., illus. $44.50.

The hazards associated with the disposal of radioactive wastes in marine and freshwater environments have generally been considered from the human viewpoint. However, the controlled release of radionuclides to lakes, rivers, or seas also subjects populations of aquatic organisms to increased irradiation, and

more attention has been given to this aspect of the problem in recent years.

For both human and aquatic populations the greatest uncertainty in assessment of the possible effects of the prolonged, very low-level exposures that typically follow from environmental contamination arises from the extended extrapolations that must often be made from experimental results obtained at high doses and dose rates.

This difficulty is neatly underlined by the first of the 30 papers that make up this volume. Templeton has assembled the available information concerning the dose rates to aquatic organisms from the transuranic radionuclides in contaminated environments and finds that they are comparable to those to be expected from the natural background. In laboratory studies of the response of developing fish embryos to the α-radiation from uranium-232 and plutonium-238 no damaging effects were noted until the estimated dose rates were many orders of magnitude greater. This does not necessarily mean that there are no detrimental effects in contaminated environments; it may mean that the criteria of effect are either inappropriate or insufficiently sensitive.

There are, however, some welcome signs that the dose rates employed in laboratory experiments are moving down toward values that might be termed environmentally relevant, that is $\lesssim$ 1 rad per day. Hyodo-Taguchi describes effects on the spermatogonial cell population, gonadosomatic index, and fecundity of fish at dose rates below 10 rads per day from both accumulated tritium and an external cesium-137 γ-ray source. Higuchi *et al.* report finding the fecundity of brine shrimp to be affected at a dose rate of 27 rads per day from accumulated tritium at the lowest concentration used. Several other papers describing the effects of both short- and long-term irradiation provide additional evidence that damage to the developing and mature gonad and the consequences for fertility and fecundity may be the most significant effect for populations of aquatic organisms in contaminated environments.

A natural extension of these studies that is of particular interest is the continuing field investigation at the Oak Ridge National Laboratory of a natural population of mosquito fish in a contaminated lake. It has been concluded that radiation-induced recessive lethal mutations in the population are responsible for the increased production of nonviable embryos relative to controls (Blaylock and Frank). Schröder reports studies of the mutagenic effects of parental irradiation on quantitative traits in fish that are under polygenic control. He presents evidence for a greater radiosensitivity than has been found for the qualitative traits determined by specific loci. If confirmed, these results will be of significance in a wider context than contaminated aquatic environments.

The many typographical errors, which may be more than a nuisance to readers for whom English is not the mother tongue, detract from an otherwise well-produced book.

Perhaps inevitably in a collection of this nature, the quality of the papers is variable, but there is sufficient material of interest to make the book a worthwhile acquisition for those professionally concerned with the effects of radiation in aquatic environments.

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The book review editor is attempting to make a collection of writings about the reviewing of scholarly books, and particularly scientific ones. Any references readers can provide to such writings would be appreciated.

Carbon Dioxide

Biophysics and Physiology of Carbon Dioxide. Papers from a symposium, Regensburg, Germany, Apr. 1979. C. BAUER, G. GROS, and H. BARTELS, Eds. Springer-Verlag, New York, 1980. xiv, 456 pp., illus. $43.70. Proceedings in Life Sciences.

This volume, which contains the 51 papers (but not the ensuing discussions) presented at a symposium, provides an excellent representative cross section of current investigations of and ideas about the molecule that Roughton once spoke of as the "junior partner of oxygen."

The book begins with a review of the physical properties of CO_2 and its reaction with water and a description of the pressure-jump technique for studying the kinetics of such reactions. This is followed by discussions of mechanisms involved in and the importance of carbonic anhydrase to the facilitated transport of CO_2 and H^+ in various artificial systems and presentation of evidence that facilitated diffusion does indeed occur in muscle. It appears that facilitated diffusion is mainly translational, with HCO_3^- and mobile buffers as carriers for CO_2 and H^+ respectively, and that carbonic anhydrase is essential to the process.

The second section of the book is devoted mainly to the chemistry and physiological significance of the carbamate reaction of CO_2 with hemoglobin and other biomolecules. The reaction occurs not only with proteins but also with the peptides—angiotensin, bradykinin, and glucagon—and it is suggested that this reaction may play a regulatory role in the hormonal activity of these substances.

About three-quarters of the book deals with carbonic anhydrase—its structure, its chemistry, and its physiology. The several isozymes of carbonic anhydrase are being studied by x-ray diffraction, nuclear magnetic resonance, and amino acid sequencing. Some of the studies have been enhanced by the fact that the Zn^{2+} of this metalloenzyme can be replaced by a number of other divalent metal ions, which are spectroscopically or magnetically useful. Only with Co^{2+}, however, is enzymatic activity largely retained, although some activity remains with Cd^{2+} and Mn^{2+}.

Questions remain about the active site and exact mechanism of the catalytic hydration of CO_2, but the basic steps include binding by the enzyme of CO_2 and H_2O, breaking the O-H bond in water, formation of an O-C bond, dissociation of HCO_3^-, and dissociation of H^+. That the rate of the last step is dependent on buffer concentration can be demonstrated by measuring the exchange of ^{18}O between CO_2 and H_2O. This exchange reaction is also used to study carbonic anhydrase activity within red blood cells. Although both the hydration and dehydration reactions are rapid when catalyzed by carbonic anhydrase, they probably never come to complete equilibrium during the normal residence time in a mammalian capillary. Factors suggested to account for this delay are the time required for Cl^--HCO_3 exchange between red cells and plasma, the lack of carbonic anhydrase in plasma, and the time required for carbamino reaction.

Carbonic anhydrase has been demonstrated to exist not only in red cells, where it was originally discovered, but in a wide variety of tissues, such as lung, striated muscle, renal tubules, brain, osteoclasts, and chorioallantoic membrane. Histochemical methods for the localization of carbonic anhydrase include cobalt precipitation, autoradiography with ^3H acetazolamide, and immunocytochemistry. Most of what we know