

erate threats to strategic stability that would better be headed off. Readers who wish to be informed themselves, and to contemplate why many of their fellow citizens have chosen to be otherwise, will do well to read the Wolfe and Panofsky books.

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Littoral Philosophy

The Outer Shores. From the Papers of EDWARD F. RICKETTS. Introduced and edited by Joel W. Hedgpeth. Mad River Press, Eureka, Calif., 1978. In two volumes. Part 1, Ed Ricketts and John Steinbeck Explore the Pacific Coast. xii, 128 pp., illus. Paper, \$7.95. Part 2, Breaking Through. x, 182 pp., illus. Paper, \$9.45. The two volumes, \$15.97.

James Boswell was one of the greatest biographers who ever lived, but his talents would have been largely wasted had not his friend the great lexicographer provided him with something to write about. A rather similar relationship holds between John Steinbeck and Edward F. Ricketts.

Ricketts is the culture hero of marine biology. He founded the modern study of intertidal zonation, and wrote, with Jack Calvin, a classic book on seashore life, *Between Pacific Tides*. Steinbeck and he collaborated on the equally celebrated *Sea of Cortez*. To the general reader he is known as "Doc," the hero of Steinbeck's *Cannery Row* and *Sweet Thursday*.

Unfortunately, Steinbeck's writings have tended to provide a distorted impression of what Ricketts was like and what he did. Hedgpeth has gone a long way toward rectifying this situation by publishing a series of manuscripts and letters interspersed with much helpful and entertaining commentary.

The documents show that Ricketts was a serious marine ecologist, in many ways ahead of his time. This is particularly evident in his communications to Steinbeck intended to serve as a basis for their projected book on the Queen Charlotte Islands. Of equal or even greater interest to many readers will be the exposition of Ricketts's philosophy, a curious mixture of Taoism, University of Chicago vitalism, and other doctrines, but dimly understood by Steinbeck. The choice document here is an early version of the essay on "non-teleological thinking" which Steinbeck adapted as a chapter for *Sea of Cortez*. Ricketts was con-

cerned with deep metaphysical issues, but it is what we would call his "philosophy of life" that has made the strongest impression on the public. Ricketts bears comparison with Thoreau in this respect.

Some might contend that Hedgpeth has allowed too much of his own personality to intrude into this work. Yet he too has become a semilegendary figure in marine biology, and he actively participated in the story he tells. Hedgpeth has rarely if ever minced a word, and he does not conceal his feelings about those in academia and the publishing trades who take it upon themselves to manage the truth. With a few apt remarks and choice quotations he makes the late W. K. Fisher of Stanford look like a complete fool for seeing to it that *Between Pacific Tides* was Bowdlerized. A letter from Steinbeck to the publisher of *Sea of Cortez* expresses, in the language of outraged indignation, a steadfast resistance to efforts to lie about who wrote that book. The account of how the book was reviewed should make anyone think twice before perpetrating the all too frequent vices of that genre.

One might suspect that Hedgpeth has had troubles of his own maneuvering this manuscript past the guardians of respect-

ability. But once the Backbites and Sneerwells have had their say, the work will be welcomed by those who want to read about good science and good literature. We have here a delightful and most unusual book about two great men. Even Old Jinglebollix would want to own a copy.

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Hunter-Gatherers Today

The Nutrition of Aborigines in Relation to the Ecosystem of Central Australia. Papers from a symposium, Canberra, Oct. 1976. B. S. HETZEL and H. J. FRITH, Eds. Commonwealth Scientific and Industrial Research Organisation, Melbourne, 1978 (U.S. distributor, ISBS, Forest Grove, Ore.). x, 150 pp., illus. Paper, \$5.95.

The Aborigines of Australia flourished, or at least survived, for more than 10,000 years in a difficult environment by hunting and gathering. At the time of European contact, the number of Aborigines is estimated to have been about 250,000. Early observers report a lean, fit, well-nourished population that maintained self-respect by ethnocentrism despite chronic hardships and occasional crises. The first century of contact was hard on the Aboriginal populations: conflict, disease, and out-marriage (of women, almost entirely) reduced the size of the Aboriginal group to 67,000 by the census of 1901. The Aboriginal experience is typical of 19th-century contact of hunter-gatherers with more "advanced" peoples. Extinction of the culture and absorption of the people into the dominant group (at the lowest social-class level) was predictable, and actually occurred in the case of the Tasmanians, some of the Khoisan groups of Africa, and many of the tribes of native peoples in North America. Since 1900, however, the typical process has changed to one of concentration into dense settlements, provision of welfare payments or charity to provide a scanty cash income, dependence on store-bought food, and eventually population growth from the continuation of relatively high fertility despite a level of disease higher than that prevalent in the dominant society. In Australia, by 1966, the census shows about 80,000 Aborigines living in towns and on rural "stations" parallel to the reservations of North America and the settlements found in Africa. Peterson reports that during the 1950's there were at



Edward F. Ricketts in front of his Cannery Row shop, July 1936. [Photograph by Ralph Buchsbaum, from *The Outer Shores*, part 1]

most a few hundred Aborigines living in the central desert out of contact with the dominant society and that there are none today. Yet just at a time when an independent way of life is about to become only a memory there is a new determination to preserve and rebuild an independent Aboriginal way of life. The book edited by Hetzel and Frith is a product of this revival.

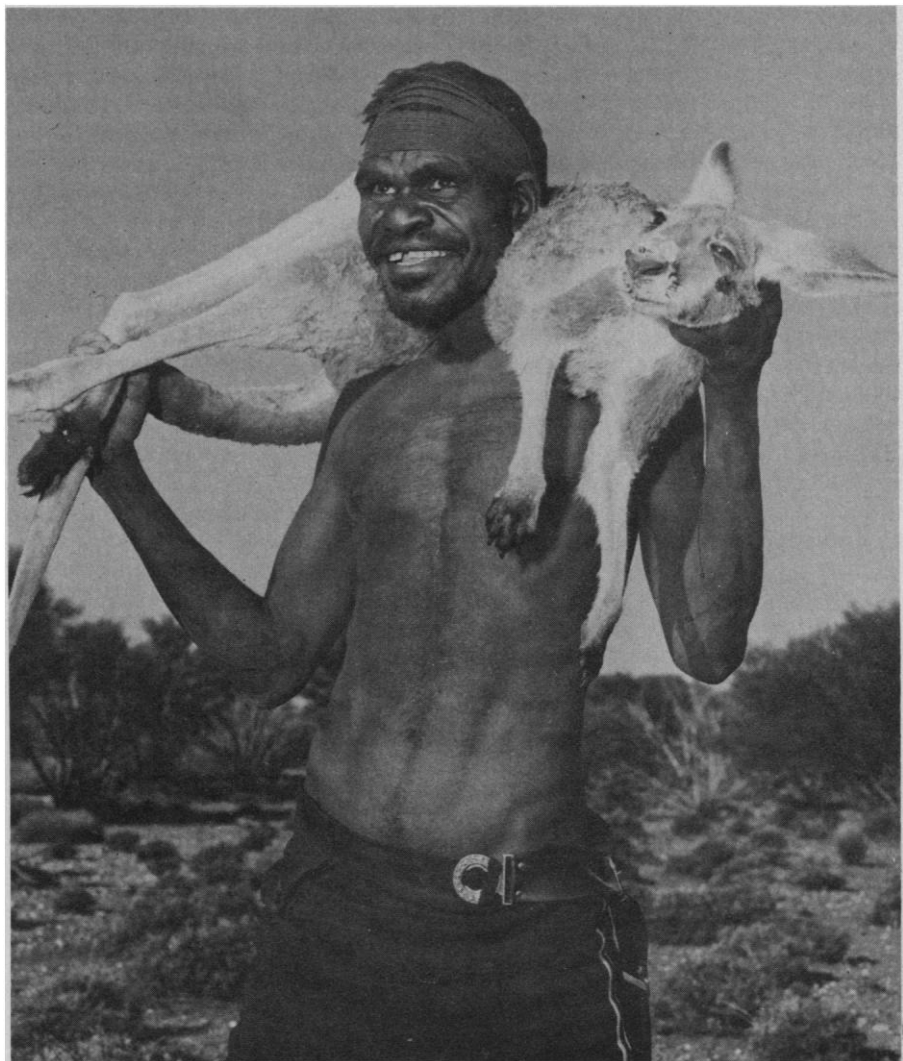
The book contains papers presented at a workshop sponsored by the Commonwealth Scientific and Industrial Research Organisation during 1976. The Central Australian Aboriginal Congress, organized in 1973, invited CSIRO to apply its expertise to problems of the Aboriginal people, specifically around the recent "outstation" movement. CSIRO interprets its charge as to evaluate need for the preservation movement as evidenced by nutritional, psychic, and economic problems of Aborigines who are not on outstations and to assess economic prospects for these "neotraditional" small communities.

Morice describes the formation and early development of one of these outstations, organized by two senior men, personal friends, from distinct but related tribes. To avoid the chronic drinking and fighting of the government station on which they had lived most of their lives, they recruited followers from among their own kin, selected a site that was important in the mythology of both tribes, and obtained government support for their plans. They moved about 100 people "to the bush," 130 kilometers from their original station, where they started collecting wild vegetable foods, witchetty grubs, goannas, and kangaroo, traditional foods of Aborigines long since depleted in the areas around the stations. Within 18 months the group had settled in, had greatly reduced drinking and fighting, improved nutritional status, and established a kind of council organization, hence recapturing what are seen as the strengths of the traditional (pre-contact) Aboriginal society. But this group is far from traditional: houses were constructed from corrugated iron and tarpaulins, trucked in by the government; flour and sugar from the distant store continued to be a mainstay of the diet; and hunting was done with guns. The community needed two trucks to make it viable, for carrying sick people to the clinic, transporting the groceries, and carrying the hunters to the kangaroos. The contradictions of the neotraditional way of life are glaring. The council cannot be permitted to impose Aboriginal tribal law when it conflicts with Australian law, and traditional pun-

ishments would constitute a violation of human rights. Economically, these decentralized communities must be expensive to provision and service to minimally acceptable standards, even though the wild foods are a valuable contribution to the diet. And not all Aborigines who came to the community liked it—about half the settlers returned to the government station during the first 18 months, and adolescents in particular are said to find the community isolating. But for those who stayed, Morice concludes that the outstation movement provided for reintegration of individual and group identity and for heightened self-esteem.

The challenge of providing useful information to Aborigines attempting to establish an independent, self-reliant way of life interacts, sometimes in unfortunate or at least confusing ways, with the ideology of the scientific consultants.

In a society in which jogging and natural foods, "soft" technology, and "small is beautiful" thinking are important new cultural themes, it is difficult to avoid urging these ideologies upon people for whom they probably have little relevance. And the history of schemes designed to improve the lives of hunter-gatherers around the world would make a long and comic story of well-intentioned but profoundly impractical suggestions. The scientists who provide the most informative contributions in this workshop—Peterson on traditional and modern diets, Macfarlane on physiological measurements and subsistence in two small communities, Miles and Maggs on prospects for horticulture in the region, and Till on technicalities of irrigation problems—restrict themselves to providing background information, leaving recommendations for action to the people involved. Hetzel, who devotes a sub-



"An Aborigine of the Rawlinson Ranges, Western Australia carrying home a red kangaroo *Megaleia rufa*. This animal, a source of traditional food would need active management programmes if populations are to support continuous hunting in the arid zone." [Australian News and Information Bureau; reproduced in *The Nutrition of Aborigines in Relation to the Ecosystem of Central Australia*]

stantial portion of his essay to expressing his personal guilt and regret at the treatment of the Aborigines by the European settlers, contributes a bit of misinformation and a more serious source of confusion to the debate. The misinformation concerns the diet of the !Kung hunter-gatherers of southern Africa, which Hetzel describes as composed largely of mongongo fruit porridge and ants, an unrecognizable representation of the varied foods of the !Kung. A more serious matter lies in Hetzel's association of precontact Aboriginal diet (good) with the mortality levels of the present-day Australian European population (also good), in contrast with the poor diet and mortality levels of present-day Aborigines living on government stations. It is almost surely the case that the mortality levels of precontact well-nourished Aborigines were worse than those of either the present-day European or Aboriginal populations, as distressing as the conclusion may be to those who romanticize the hunting and gathering way of life. It may be true that Aboriginal mortality will improve over current levels if traditional sources of protein and nutrients are returned to the diet, but only if the existing levels of public health and treatment medicine are maintained.

The papers in this book are clearly intended for working purposes more than for presentation to a non-Australian audience. Indeed, some are hardly more than lists of agenda topics with a few sentences of discussion of each, and the editors provide a minimum of integration and overview of the issues. But the problems raised are intrinsically interesting, and the volume is both a minor contribution to the solution of those difficult problems and a status report for the 1970's.

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Mathematical Physics

Fundamental Problems in Statistical Mechanics IV. Proceedings of a school, Jadwisin, Poland, Sept. 1977. E. G. D. COHEN, W. FISZDON, and A. PALCZEWSKI, Eds. Polish Academy of Sciences, Warsaw, 1978. 542 pp., illus. Zl 130.

Fundamental Problems in Statistical Mechanics IV is another valuable addition to the series edited by E. G. D. Cohen. As is characteristic of the series, the volume provides comprehensive cov-

erage of the currently active areas in statistical mechanics. While such fundamental and long-standing problems as those associated with the Boltzmann equation are treated (in chapters by Cercignani, Mika, and Fiszdon and Herczynski), there are many chapters about relatively recent developments in statistical mechanics. There is a chapter by Case on solitons and one by Kac on the inverse methods for nonlinear systems. Chapters by Ernst and by van Leeuwen deal with static and dynamic critical phenomena, including details for spin systems. Various applications for stochastic processes to the study of critical phenomena, chemical reactions, and plasmas are found in chapters by Mazur and van der Zwan, van Kampen, and Klimontovich. Chapters by Cohen and de Schepper, Piasecki, Résibois, and Sjölander on the kinetic theory of dense gases and fluids bring the reader up to date in this subject, which has figured prominently in all four volumes. There is also a chapter by Kuščer concerning gas-surface interactions, and chapters by Bogolubov and by Kurbatov on mathematical statistical mechanics and modeling. H. B. G. Casimir presents a tantalizing account of Nernst's theorem. Casimir writes in the opening paragraph, "The following considerations are quite elementary and in no way original. . . . There are two reasons to present them here. The first one is, that many textbooks, and even textbooks by reputable physicists, contain erroneous statements on the statistical basis of Nernst's theorem. The second one: I have a hunch that someone commanding the right kind of mathematics might be able to give a more general proof along the lines I indicate."

A chapter by Ernst is one of the highlights of the volume. It reviews static as well as dynamic aspects of critical phenomena. A review of classical ideas is followed by accounts of mode coupling theory, universality, the scaling hypothesis in both its static and its dynamic forms, the dynamic renormalization group approach, and stochastic kinetic equations for critical dynamics. Nonspecialists should find this chapter very useful.

It becomes clear from reading the book that modern statistical mechanics is a highly mathematical discipline and that the high quality of many practitioners' work is matched by their expository skills. The volume maintains a high standard of quality throughout.

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Books Received

Advances in Atomic and Molecular Physics. Vol. 14. D. R. Bates and Benjamin Bederson, Eds. Academic Press, New York, 1978. xii, 464 pp., illus. \$39.50.

Advances in Energy Systems and Technology. Vol. 1. Peter Auer, Ed. Academic Press, New York, 1978. x, 388 pp., illus. \$32.50.

Advances in Laser Chemistry. Proceedings of a conference, Pasadena, Calif., Mar. 1978. A. H. Zewail, Ed. Springer-Verlag, New York, 1978. x, 464 pp., illus. \$29.80. Springer Series in Chemical Physics, vol. 3.

Advances in Modern Toxicology. Vol. 1, New Concepts in Safety Evaluation, part 2. Myron A. Mehlman, Raymond E. Shapiro, and Herbert Blumenthal, Eds. Hemisphere, Washington, D.C., and Halsted (Wiley), New York, 1979. xvi, 192 pp., illus. \$24.50.

Advances in Nuclear Science and Technology. Vol. 11. Ernest J. Henley, Jeffery Lewins, and Martin Becker, Eds. Plenum, New York, 1979. x, 566 pp., illus. \$45.

Advances in Organometallic Chemistry. Vol. 17, Catalysis and Organic Syntheses. F. G. A. Stone and Robert West, Eds. Academic Press, New York, 1979. xii, 512 pp., illus. \$49.50.

Advances in Polymer Science. Vol. 28, Polymerization Reactions. Springer-Verlag, New York, 1978. iv, 158 pp., illus. \$39.60.

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Aspects of Biophysics. William Hughes. Wiley, New York, 1979. xiv, 362 pp., illus. \$18.95.

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Bessel Polynomials. Emil Grosswald. Springer-Verlag, New York, 1978. xiv, 182 pp. Paper, \$9.80. Lecture Notes in Mathematics, vol. 698.

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