Timothy Bayliss-Smith and Richard Feachem, eds. *Subsistence and Survival: Rural Ecology in the Pacific.* London: Academic Press, 1977. Pp. 428, references, index.

For all practical purposes, research in the field of human ecology has just begun, and Bayliss-Smith and Feachem's book well illustrates the problems of unravelling the complexities of human/land relationships. Using Papua New Guinea as the field site, investigators from the disciplines of cultural geography, social anthropology, human biology, environmental medicine and nutrition, and tropical plant ecology worked with indigenous peoples that inhabit the glaciated uplands of Papua New Guinea, the montane forests and grasslands of the Highlands, the jungles along the coast, and even the smaller atolls and islands of southwest Pacific. The book's aim is to pull together several decades of research on human ecology in the Pacific, to illustrate the value of human ecological data for governments of newly independent countries of the region, and to raise the broader issues of human subsistence and survival for future researchers.

The book is divided into five parts and fourteen chapters. Part One on "Human Ecology: Theory and Practice" looks at the general field of human ecology (Richard G. A. Feachem) and its application to problems of

change in island populations (Timothy P. Bayliss-Smith). Part Two on "Environments and the Human Organism" opens with Richard W. Hornabrook's review of the International Biological Programme in New Guinea and its biomedical implications; Peter F. Sinnett discusses nutritional adaptation among the Enga peoples; Margaret McArthur raises questions regarding Roy Rappaport's classic study of the Tsembaga; and Richard G. A. Feachem elaborates on environmental health engineering as it applies to human ecology in New Guinea. Part Three, "Environmental Change and Human Activity," looks at human impact upon New Guinea mountain ecosystems (Jeremy M. B. Smith) and tropical agro-ecosystems (Harley I. Manner). In Part Four, "Environmental Exploitation and Human Subsistence," Mark D. Dornstrech looks at tropical subsistence patterns; George E. B. Morren discusses energy flow changes when a society evolves from hunters to herders; and Timothy P. Bayliss-Smith looks at energy use and economic development. Finally, Part Five on "Environment and Man: Policy, Perception and Prospect" concludes with three articles that look at the wider issues of human ecology: (1) the relevance of self-subsistence communities to world systems of resource management (William G. Clarke); (2) ecological perspectives (Roy Wagner); and (3) identification of environmental problems (Andrew P. Vayda and Bonnie J. McCay).

On the whole, the book is an excellent addition to the body of data on human ecology in the Pacific; no Pacific researcher should be without it. Its authors are some of the most well-known and respected investigators in the field of human ecology and Pacific studies, and their insights must not be overlooked. Minor aspects that make the book attractive: (1) a chapter outline that precedes each chapter; (2) carefully executed maps and diagrams; (3) interesting and useful photographs; and (4) an excellent reference section that follows each chapter--a very handy tool for future research pursuits.

No book, however, is perfect, and the following criticisms are meant to merely inform its readers rather than necessarily downgrade the book. Although there is an obvious effort on the part of the editors to bring unity to the book (the subject matter of human ecology; the theme of rural ecology; the geographical laboratory of New Guinea and adjacent islands), many of the articles seem unrelated and could benefit from introductory comments by the editors. One also wonders why certain articles were chosen when their findings were so minuscule and their research effort purely exercises in academic futility (the editors, themselves, raise the question about their own book--"Who will read it apart from fellow academics and students? Will it be of any real value to the people

of the rural tropics or will it merely serve to preserve and promote the discipline and thereby reduce the chances that the authors of the various chapters will be unemployed?"). The reader walks away with the sense that the editors pushed forward with the book's publication, despite their apparent awareness of this weakness. And, with any multi-authored work, some authors have an ability to write unintelligibly but sound as if they have something to say (Roy Wagner's "Scientific and Indigenous Papuan Conceptualization of the Innate: A Semiotic Critique of the Ecological Perspective") while others write clearly but have very little to say, especially for a concluding chapter to a book (Andrew P. Vayda and Bonnie J. McCay's "Problems in the Identification of Environmental Problems).

The real gem, of which I would have liked to have seen as the philosophical foundation and scope of the book, was William C. Clarke's "The Structure of Permanence: The Relevance of Self-subsistence Communities for World Ecosystem Management," for it is here that the important questions lay: What makes a society ecologically stable and thus permanent? What economic systems lend themselves to permanence? What ecological lessons can be learned from the "primitive"? How can these lessons be integrated into larger regions and worldwide socio-economic processes? How can research in human ecology help? I could not agree more with Clarke that geographers and anthropologists, who more than other scientists have studied human ecology at the micro-scale level, must try more to apply their findings to the world's ecological crises.

For example, Clarke identifies seven major principles of permanence: (1) a "palaeotechnic" agricultural base (one that is not dependent on energy subsidy or extra-system nutrient sources); (2) an agricultural behavior that is not self-poisoning (no toxic flow, and waste products are promptly assimilated; (3) a positive net energy yield (more energy is gotten out of an agricultural system than put in); (4) an agricultural system that utilizes the products of "bound time" (small scale, self-maintaining artificial ecosystems more closely attuned to natural ecosystems); (5) an even spread of energy throughout the community (equal distribution and control of resources and a production method that is predominantly labor intensive); (6) a belief system wherein resources are perceived as something to be cherished, conserved, and/or preserved (preservation of resources for future generations); (7) a subsistence based on polyculture (biotic diversification--variety of plants, animals, and open space).

The first step from the micro-scale level of the Maring tribesmen in New Guinea to the macro-scale of complex industrial societies is one of the mind--not a technological fix, Clarke contends, and I couldn't agree

more. He says it so simply: "A new world must begin with a new mind; if the image is strong enough, our successors will be able to work out the details as they go." According to Clarke, the necessities of a "para-primitive society" (the best of both possible worlds--the advantages of primitive group structure with those of modern western technology) are as follows: (1) a lower material standard of living than that of industrial nations (emphasis on life *quality*--clean air, water; not life *quantity*--environmental degrading and often unnecessary material possessions); (2) a slower rate of technological change (selective control of innovations to avoid possible negative environmental impacts); (3) decentralization (movement toward smaller and more manageable communities that are at a human scale); (4) educational change (a new emphasis on teaching how humans can live in harmony within ecosystems rather than how humans can best exploit the environment; note: "Economics," not "Environmental Studies," is the subject most often chosen by university curriculum committees as required courses for a liberal arts education; (5) limitation on population growth; (6) palaeotechnic agriculture (polyculture = diversification = complexity = stability = longevity = survival of the species = permanence); and (7) biome preservation (maintenance and deliberate creation of varied environments--balanced biomes and biotas).

The primary fault with *Subsistence and Survival: Rural Ecology in the Pacific* is that it is just one more book at the "micro-scale level"-- *the* major criticism that human ecologists bemoan about their own field. If Smith and Feachem began their book with Clarke's chapter and used other follow-up articles to apply his "principles of permanence" to illustrate how human ecological research can build ecological stability in human-dominated ecosystems, these two editors would have made a vastly more important contribution to human ecological literature.

Gary A. Klee
San Jose State University