on to acknowledge that the dying small community has nevertheless become "a persisting form of association in its own right." Moreover, they and Vidich concede that the small, homogeneous, spatially isolated community is to a large extent an ideal model, "a culturally remembered rather than real form of association." Richly distinctive in cultural and symbolic terms, the model's historic insubstantiality is apparently belied by its evocative power as a source of alienation, social criticism, and activism accompanying—and negatively reacting to—the emergence of industrial capitalism.

Gallaher draws attention to the unquestionably close association between the little community and the traditional subject matter of anthropology. "Anthropologists have always accepted the universality of the little community," he claims, "and in its complete forms have viewed it as the smallest unit to encompass the range of institutions necessary for a human group to ensure its sociocultural future." Consistent with this image of primal self-sufficiency, his understanding of "the concern of this volume" is that "there are situations in which the intrusion of external authority threatens the very basis for community identification." But the danger in so formulating the approach is that social units convenient for study in one or a few anthropological field seasons then gradually become merely assumed to be elemental units of relative constancy. This can lead, as Gallaher recognizes in principle but does not entirely avoid in practice, to a distorted emphasis on functionally interdependent parts of little communities at the expense of their multiple external linkages. External interrelations, the totality of "contextual" features affecting social groupings of any size, continuously redefine the nature and identity of the community itself. This was already partly apparent to Robert Redfield and Julian Steward, whose early work on the problem Gallaher cites, but in the last two decades or so the anthropological critique of the reification involved in concentrating so heavily upon the single community as an analytical unit has widened decisively.

The traditional anthropological approach, in any case, was directed largely toward primitive peoples in economically undeveloped settings. Only with some strain can this be employed in a symposium very largely concerned with how the networks of subjective as well as objective relationships adversely affecting little communities in the United States can be studied and perhaps modified. Padfield, in a sweeping and impassioned but impressive paper that combines a Neo-Marxian approach with the frontier hypothesis of Frederick Jackson Turner, supplies what is less a complementary than an alternative theoretical framework. While the safety valve of the frontier remained open, he argues, human habitats were "programmed to die" within a political system "geared fundamentally to protect the privileges of private capital." Of the values enduring after that era has ended, "the two that are least compatible are belief in 'progress' as essential to the good life and belief in the rural community as the ideal human environment. Of the many cultural contradictions creating acute stress in the national society, growth fundamentalism and rural fundamentalism are perhaps the most persistent and profound." To accommodate such tensions calls for a major effort at the "reconciliation of symbolic appearances and institutional realities," an effort Padfield harshly but effectively caricatures as American small-town boosterism. "In essence, this posture constitutes a mind set against cognition of the forces impinging upon it, like a denial of death in a dying patient."

While Gallaher's and Padfield's theoretical premises thus are oddly matched in origin, they are alike in viewing small communities as prevailingly powerless. For one, it is primarily intrusions of external authority that threaten an otherwise persistent and harmonious internal order. For the other, similarly, "the question of who controls agriculture, mining, or lumber in the West is more basic to community death and decay in that region than the question of 'location preference' of migrants, or how the unemployed cope, or how sacrifice is rationed among the underemployed." For them, as for Rohrer and Quantic and to a lesser extent for some of the other contributors, the only significant field of corrective action as well as explanation is not local but national.

Yet is this so? These authors join in implying that processes of community regeneration are uniformly few and weak in comparison with those of attrition. But meanwhile the balance of population movements in this country has begun to tilt decisively away not merely from cities but from metropolitan areas. And, as only Levin notes, proliferating new ethnic and quasi-ethnic movements surely are taking on some of the aspects of "culturally remembered" communities. What the coeditors at times come close to advocating is a struggle to preserve any and all communities, fossil-like and partly moribund though many may already have become. Perhaps, as Levin suggests in a rousing concluding chapter, "the most binding, vital, and healthy sense of community" can be generated through precisely such a struggle. But the urgency of the case for doing so rests ultimately on the untested assumption that our stock of communities cannot sustain itself, continuously replacing some with others that take on new and more adaptive forms.

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A Behavioral Commonality

Animal Tool Behavior. The Use and Manufacture of Tools by Animals. BENJAMIN B. BECK. Garland STPM Press, New York, 1980. xvi, 308 pp., illus. $24.50. Garland Series in Ethology.

In this book the leading expert on the use of tools by animals presents a sophisticated discussion of this kind of behavior. The treatment begins with a discussion of problems of definition, provides an interspecific comparison of performance and a consideration of underlying cognitive processes, and brings the understanding derived from the examination of animal tool behavior to bear on the evolution of human tool use. Written in a clear style, with careful summary statements after each section, the book is at the same time enlivened by a delightful but unobtrusive sense of humor.

At least half of the book is devoted to a definitive catalog of animal tool use and manufacture in groups ranging from invertebrates to the great apes. For each example the actual behavioral patterns observed and the context and possible utility of the behavior are carefully presented. The catalog is followed by a judicious discussion of borderline cases and best ways to make interspecific comparisons.

Beck then reviews the evidence concerning the ontogeny of tool-using behavior, clearly a critical feature in comparing adult performance between species. He argues that contexts that provide opportunities for play and exploratory manipulation greatly enhance the probability of invention of novel tool patterns—hence the unusual varieties of tool use, many of which have no counterpart in the wild, found among captive animals.

Beck also reviews evolutionary and ecological considerations bearing on tool use in animals and especially in the

higher primates. He endorses Parker and Gibson's hypothesis that extractive foraging, the procurement of embedded foods, predisposes toward tool use because it is facilitated by extension of reach and amplification of mechanical force, two major functions of tools. Beck then turns to two examples of extractive foraging: chimpanzees' fishing for termites with grass stems and herring gulls' predatory shell dropping. He concludes that tool use per se is not evidence for special cognition, since, in both cases the observable attributes of the performances can be equally well explained as extensions of such cognitive processes as concentration, purposefulness, selectivity, premeditation, imagery, plasticity with regard to subtle variations in environmental conditions, strategies, and play during ontogeny.

The final chapter discusses the relationship of tools to human evolution. Beck reviews the archeological evidence and suggests that the cutting and breaking-open functions of early stone tools fit with extractive foraging both for animal and plant foods. He concludes by arguing that human intelligence does not rest on tool use alone but on a socioeconomic complex involving extractive foraging, tool use, a hunting-and-gathering division of labor, and linguistic communication.

Beck's arguments are entirely convincing. Every generalization he makes is carefully formed and fully supported by the data. His documentation is thorough and informed. The book is valuable simply as an encyclopedia of knowledge about animal tool use, and the analyses of the data are often brilliant. I strongly recommend it as fascinating reading to readers interested in animal tool use, comparative psychology, and human evolution.

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Plant Biophysics

Photosynthesis. Physical Mechanisms and Chemical Patterns. RODERICK K. CLAYTON. Cambridge University Press, New York, 1981. xiv, 282 pp., illus. Cloth, $32.50; paper, $11.95. IUPAB Biophysics Series, 4.

Research on photosynthesis has gone through several stages in recent times. The development of radioactive tracer techniques in the late 1940's led to the application of this technology to the study of the mechanism of carbon dioxide fixation, which culminated in the elucidation of the reductive pentose phosphate cycle in the early 1950's. This was followed during the 1960's by what might be referred to as the biochemical stage, which resulted in a general picture of electron transport processes in photosynthetic membranes. What has followed in the 1970's could be referred to as the biophysical stage and has resulted in a detailed understanding of the photophysical aspects of photosynthesis including the nature of the interaction of light with pigments and the conversion of light energy into oxidized and reduced chemical products through the primary processes of photosynthesis.

R. K. Clayton's new volume considers in great detail this most recent stage of research, but the volume also includes numerous "digressions" that make it particularly suitable as a teaching vehicle. A major digression deals with the physics of spectroscopy, including a section on measurements with polarized light as applied to the photosynthetic membrane. The inclusion of such digressions tends to disrupt the flow of material in the volume, but it also will aid students who might be deficient in background in these subjects.

With respect to biophysical aspects of primary photochemistry, emphasis is placed on the results obtained with the bacterial reaction center, but Clayton stresses that in the more complicated oxygen-evolving system a similar mechanism of charge separation probably holds. The more rapid developments in the bacterial field are clearly linked to the availability of purified "reaction centers," and these entities and the processes that occur in them receive a great deal of attention. However, secondary electron transport processes and adenosine triphosphate synthesis involving chemiosmotic mechanisms are also considered, although in far less detail. To complete the coverage, Clayton includes a short chapter on carbon assimilation but does not attempt to make it comprehensive, since more detailed expositions of the subject are already available.

Clayton has taken the reader to the forefront in this field, and has presented a balanced view that indicates that not all questions are answered. Q-cycle models for electron transport in the cytochrome *b* and *c* region of photosynthetic bacteria could have been discussed more fully, since recent considerations of similar mechanisms in electron transfer reactions in chloroplasts are omitted. Such coverage would have again documented the striking similarity between the overall photosynthetic processes in these two cases. This is also a subject of interest to workers and students in the broader field of bioenergetics, particularly those concerned with mitochondrial energy transduction.

The volume succeeds in a most difficult task: it compiles and reviews a large amount of recent experimental work in a comprehensive and comprehensible manner. The level of presentation is suitable for advanced undergraduate or graduate students as well as for workers in the field. The work can therefore be recommended strongly both as a teaching volume and as a monograph for specialists.

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(Continued on page 1420)