The Progress of Ecology

Seventy-Five Years in Ecology. The British Ecological Society. JOHN SHEAIL. Blackwell Scientific, Palo Alto, CA, 1987. xiv, 301 pp. + plates. $65.95; paper, $28. British Ecological Society Special Publication.

Histories of scientific societies are not generally hilarious or gripping reading. Nevertheless the recent history of ecology is strange enough to make this painstaking account worth thinking about. It describes British ecology as beginning when a few strong personalities developed a joint concern with finding patterns in the distribution of plants in nature, in the face of opposition from plant physiologists and taxonomists. It traces the eventual development of an organization sponsoring journals and symposia, with a good advisory relation with government and enough fiscal stability even to sponsor some research on its own. The British Ecological Society emerges as an intellectually self-conscious and deeply respectable group of scientists who are entitled to pride in their devotion and accomplishments. Those familiar with American scientific societies will realize this is high praise indeed.

Forty years ago, when I first encountered it, ecology was hidden away in departments of zoology or botany. The field was so obscure in the early '50s that the humorist Stephen Potter suggested "oikology" (*sic*) as an ideally boring discussion subject to be used in terminating romantic relationships. It was that specialty which focused on biological organization on larger scales than the individual organism. Several of the problems urgent today were already apparent. For example, I was taught about the importance and inevitability of the greenhouse effect in a Yale ecology seminar in 1948. Since then ecology has become a distinct discipline, frequently with its own department or even school, and has entered public awareness and esteem to the extent that "ecologist" is considered a desirable cognomen by sewage managers, garbage collectors, a motley array of engineering consultants and computer programmers, and also politicians of the European "Green Parties." Sermons on life-style and morality, along with doomsday prophecies and religious rituals, are preached as ecology. Those who recall the early days often regret the present notoriety. The British Ecological Society has been very careful to avoid tub-thumping and has to some extent resisted popular pressures.

Ecology is still characterized by strong personalities and a pressure to maintain respectability in the eyes of scientists in other fields. Despite the enormous increment in awareness of the field and a consensus as to the importance of the questions at issue, the history of ecology seems curiously thin compared to that of genetics or biochemistry over the same interval. Papers in current ecological journals would surely be less opaque to pioneering ecologists than would the corresponding papers in genetics journals to genetics pioneers. On the other hand, the basic fascination of the questions of ecology remains.

Consider some questions from the early days of the British Ecological Society. Though each piece of landscape is obviously different in detail from all others, it seems obvious that landscapes can be classified either by their general appearance—marshes, forests, tundra, and so on—or by their component species—white oak forests, coconut groves, *Spartina* marshes, and so on. How objective and useful are such classifications? For example, aside from our general impression, is there a clear edge to forests and are there characteristic problems and solutions that are really different from the aggregate of problems associated with the individual trees? Why do some ecological systems have a rich diversity of relatively rare species while others have a smaller number of species but higher abundance of each? Is there a theoretical basis for explaining the species abundance distribution of a community? Are "natural" communities in some measurable way distinctively different from "disturbed" communities? How can one tell when one is confronted with a "natural" community? Are there general criteria for determining which natural populations are to be conserved? Will our understanding proceed more rapidly by focusing on these broad questions, or would it be better to focus on the ecological relationships of single species? Is the weakness of ecology due more to a lack of mathematical comprehension or to a lack of field and laboratory data? Each of these problems is discussed to some extent in the context of the history of the Society.

Perhaps the most interesting intellectual problem posed by this volume is why there has been a lack of clear progress in the analysis of fascinating questions despite the high level of physical and intellectual effort expended. The historic account creates the impression of a mass of people passionately convinced of the importance of making sense out of a difficult world but only succeeding in trying one metaphor after another without finding one that suddenly made the difficulties vanish.

There are several possible explanations for this. Most obvious is the fact that, at least in the United States, the structure of scientific funding works against ecology. Ecology is considered unrelated to human health and therefore not suitable for NIH funding. On the other hand, many of the most fascinating and important ecological problems are generated by practical problems and are therefore too applied and too particular in apparent scope to be funded by the NSF. When the Environmental Protection Agency was founded many of us hoped that its research function would do for ecology what the NIH did for the rest of biology. For reasons too complex to detail here, the EPA has not demonstrated intellectual leadership. Also the association between ecology, environmentalism, and liberal opinion has not helped during the past eight years in Washington. The net practical effects of this dereliction have been unfortunate, including a plethora of litigation and measurable deterioration both of environments and, occasionally, of human health and welfare.

In England there has been a somewhat more intelligent if not fiscally richer funding pattern. This is in part due to the freer movement of personnel between civil service and academic communities, so that fisheries, land reclamation, and conservation have attracted the attention of the best academic scientists, many of whom have been officers of the Ecological Society. A more subtle difference relates to the attitude toward nature of the educated people of the United Kingdom and Ireland. Almost anywhere in the British Isles one quickly goes from moor to limestone hills to rich agricultural land or moist forest. Also, particular hills or woods or streams and particular plants and animals figure prominently in a rich literary, patriotic, and artistic tradition. Citizens and statesmen, not only ecologists, are concerned with local natural history as if with friends and relatives. At an annual meeting of the British Ecological Society at Durham in the early '60s the passionate identification of ecolo-

gists with their subject matter was manifested during a symposium on population dynamics that focused heavily on Scottish seals and salmon. Students of salmon biology tended to neat tweeds, conservative politics, and pipe smoking whereas students of seals were kilted, bearded, and reddish. Out of intellect and passion there has developed a British, and generally Old World, tradition of painstaking, long-term, field investigation, which, though it may not have high prestige among the hot sciences of the universities, has enormous value.

At a deeper level, ecology is intractable in contrast with, say, traditional branches of physics, the epitome of intellectual tractability. Physics is free to decide what is or is not within its own domain. Meteorology and most nonlinear hydrodynamics were banished as non-physics for most of this century and permitted in only when a promising theoretical methodology became available. Sciences whose domains are defined by their capacities are tractable in a way that is impossible for sciences defined by a domain of subject matter. Ecology, geology, medicine, and other intractable sciences must wrestle with a preassigned subject matter as best they can, often by focusing on expensive test cases. But their subjects are ones of enormous importance. Major advances in intractable sciences can only be expected from new technologies, adequate funding, and intelligent administration, with constant reexamination of current state and pattern of progress. We cannot rely on rigid administration, proclamations, low funding, and the hope that somehow the problems will solve themselves.

We know that current applied ecology is mired in litigation and suffers a shortage of relevant data, at every scale from local water supplies to global wood supplies. We are not doing the obvious things that need doing. We know, for example, that satellites can provide ecologically important observations if their eyes are turned toward Earth and the resultant data are made generally available. This ought to be considered while NASA gropes for a post-shuttle mission. We know that ecotoxicology requires doing and isn't being done; and so on. Certainly scientific societies ought to be facing these various problems, and perhaps this volume can provide suggestions of how scientific societies can and cannot function. We must show better progress in the next 75 years, lest the problem becomes moot in the 75 years after that.

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Uses of Biology

Racial Hygiene. Medicine under the Nazis. ROBERT PROCTOR. Harvard University Press, Cambridge, MA, 1988. xii, 414 pp., illus. $34.95.

Since the Nazi period there have been a variety of books concerned with the so-called "roots," or at least background, of National Socialism. Proctor's intensively researched work is the most thoroughgoing yet with regard to the so-called scientific background of a movement that often declared itself to be "scientific" in the application of what it liked to call the "laws of life" to human affairs. It is a deeply disturbing book, concerned as it is with how fine scientific minds, many of which were at least formally committed to the practice of healing, not only "sold themselves to the devil" but, through their own theoretical musings and prejudice-tinctured social concerns, anticipated his arrival. It is an at times passionate exegesis on how "value-free" science is a disingenuous contradiction in terms and, more important, on how people who believe in so chimerical an enterprise could and can contribute to social pathology.

Proctor does not view the emergence of "racial hygiene" as an aberration. Indeed, one of the most valuable aspects of his work is his placement of this notion within the context of Western scientific traditions, the most important of which was that concerned with racial betterment. Here, Proctor points out that eugenics, not necessarily racist in nature or application, was a crucial concern not only of individuals who could be identified as "right-wing" in nature but of a panoply of left-wing or "progressive" thinkers as well as social reformers, including, among others, Margaret Sanger. Indeed, during the early years of the 20th century, individuals such as Alfred Ploetz, Wilhelm Schallmayer, and Ludwig Woltmann, who would later be seen as groundbreakers for the application of the Nazi scientific vision to human affairs, were "cautious advocates of certain forms of progressive social reform" (pp. 21–22). The application of presumably well-established biological laws (in part resulting from the overthrow of Lamarckian hypotheses by genetics) to social issues was part of the ideational environmental of Western civilization. Eugenics, and radical articulations of it such as forced sterilization of "defective" or "criminal" types, had found legal expres-