REVIEW

MORE IN SORROW THAN IN ANGER


The Ecological Society’s basic stand, from which the paper develops, is made in the foreword:

We believe that national and international reports on economic planning, migration, population and the like should be augmented by statements relating them to the fundamental ecological principles that ultimately govern human affairs. Our reason is quite simple: only by appreciating the principles of ecosystem functioning can one see the common factor in apparently unrelated issues such as polluted lakes, starvation, clean air, energy shortages and recycling of metals. From the knowledge of the demography of many species of animals and plants and their environmental relationships, we are convinced that ecologists can comment usefully on human populations.

It is worth tracing the history of the paper. An explanatory letter stated that “the elements of it form the Society’s response to the Prime Minister’s request for public submissions on population policy”. The foreword informs us that in December 1971 a Population Sub-committee was established within the Society, in view of the Council’s concern over the lack of information and research to provide a basis for a population policy. A reference (65) indicates that submissions duly reached the Targets Advisory Committee of the National Development Council, and that these were revised to produce the paper in its present form. Final publication has taken place in U.N. Population Year.

Twenty workers are named as contributing material, most of these being from Government departments and concerned directly with ecology. The actual compilation was done at Massey University, and the eight who were named as having read and criticized drafts were mostly from that university and predominantly concerned with social and agricultural sciences.

The venture was ambitious, and very bold. To achieve a satisfactory synthesis and to present it coherently was a formidable task. To speak as a purely scientific body required objectivity, and yet there was a need to be interesting and provocative. To be convincing required manifest accuracy, which needed to be sustained over an enormous range of topics. The paper was clearly intended for a wide and non-specialist readership, so the Society was incurring a heavy responsibility to avoid statements which were inaccurate or open to misinterpretation, particularly as “ecology” had become an emotive topic.
To consider the form of the paper, a foreword is followed by five sections which are virtually background essays, and these lead to the Statements and Recommendations. The 126 references vary widely in accessibility and authoritativeness, but the reader must beware of some slips in the referencing. There are 14 notes, although these cannot be distinguished from references without referring to the back of the booklet. There are two short appendixes.

The Introduction begins with the question of the relationship between population size and the quality of life, and then points out how the traditional economic criterion of standard of living is being increasingly queried, what with pollution, population pressures, etc. It is stated that all these problems are ecological ones, and the proposition is introduced that Man is contravening certain ecological laws which are better defined and understood than those of politics or economics. However, the penultimate sentence is an aside which is neither necessary nor valid.

The Section “Functioning of Ecosystems” introduces certain basic ecological principles. It defines the concept of the ecosystem, and then introduces the reader to the energy cycle and food webs, leading on to the significance of carnivores in an ecosystem. Productivity of an ecosystem is defined, and it is pointed out that ecosystems containing large numbers of species tend to be stable, while the simpler but highly productive ecosystems represented by many crops are unstable and can be maintained only with considerable effort. Nutrient cycling and the role of micro-organisms are reviewed, and finally the hydrological cycle is covered, together with how it interacts with conservation of soil and nutrients.

The principles are developed to illustrate how human intervention may have far-reaching consequences, such as the effects of introducing cumulative poisons, or of removing carnivores.

The general idea of this section is excellent. For the uninitiated it is potentially an admirable introduction to the principles. Even for those with past training in ecology it is useful, since it clearly indicates present thinking, which is concerned less with demarcation between plants and animals, with descriptive associations and with successions, and more with current interactions and energy transfers between different organisms.

The execution, however, is in certain respects disastrous. As was first noted by some colleagues, two of the figures could mislead very seriously. Figure 2 is used to illustrate how the nutrients of a soil can be concentrated in the litter and topsoil (together with the implications of this fact), but it can give a grossly exaggerated picture of the significance of a litter layer. It is not made clear how the low bulk density of litter means that, in the given example, this layer contains only a very small fraction of the nutrients potentially available. Nor is it made clear that the soil nutrients as indicated are exchangeable ions, and not total nutrient reserves. And a reader could be forgiven for concluding that the disappearance of a litter layer would automatically involve removal of
its nutrient content from the system. Less important, but still open to question is the composting of several soil profiles.

Figure 3 quotes the much-publicised Hubbard Brook study in U.S.A. Anybody but a very wary and well-informed reader could automatically interpret this figure as illustrating a dramatic increase in nutrient loss associated with ordinary clearcutting. In fact there was continued suppression of all vegetation by means of herbicides, which represents a vastly more drastic regime, and the study now stands as a notorious case of misinterpretation of scientific data. Indeed, the Project Leader has had to issue at least one disclaimer (American Forests, August, 1969, p. 62) to remind people of what the experiment was about.

A further impression of sloppiness was given by a check of the source of a suspiciously precise figure for the weight of water drawn from the soil per weight of dry matter production; the value as quoted was too low by a factor of five. Moreover, Fig. 1 fails to convey clearly that only a very small percentage of energy intercepted by the ecosystem goes into primary production.

The section “Man’s Impact on the Ecosystems of New Zealand” is written under the headings Altered Ecosystems, Maintenance of Altered Ecosystems, Exploitation of Marine Resources, Pollution, and Loss of Ecosystems. It is duly mentioned how erosion is aggravated by deliberate clearing of native vegetation, by introducing mammals and by plain bad management. But one can scarcely attribute a high rate of natural erosion largely to glacial and volcanic activity, without even mentioning present climate or parent rock characteristics. Since the growing of crops (“altered ecosystems”) involves much intervention which includes large inputs of energy, it is suggested that a search be made for systems which require lower energy inputs. This suggestion, however, is marred by phrasing which smacks vaguely of a call for abandonment of intensive systems of primary production.

The problems arising from the use of poisonous chemicals, heavy application of fertilizers, improvident exploitation of marine resources, and pollution are generally summarized very well. There is, however, a dubious usage of “accumulate” in respect of DDT residues, while it is implied that the condition of Lake Rotomau derives entirely from pollution rather than accelerated eutrophication.

Examples are cited of the loss of ecosystems. These include the spread of pines in the volcanic plateau, yet a more disturbing case is perhaps the spread of heather in Tongariro National Park, in ecosystems which were relatively stable in themselves and which were specifically reserved for preservation.

A first reading of this section suggests an attitude that, in New Zealand, ecosystems should be left as Man first found them. But New Zealand is a place for Man to live in, while many ecosystems were bound to change anyway. Nor is it only the undesirable species that spread naturally. To be fair, a closer reading partly dispelled the initial impression. Never-
theless, despite the undoubted agonies of redrafting, the formulation does slightly less than justice to the content.

The section "Regulation of Population Size" starts by reminding us that in all other organisms populations get held or reduced to certain upper limits. The processes of regulation are varied, but are generally more intricate and subtle than simple starvation. In Man, however, they are not operating, but this cannot continue forever.

"Population in New Zealand" starts with the present rate of increase, and then outlines the range of alternative projections. Population growth in New Zealand essentially represents urban expansion, and the present complacency over the resulting loss of land with special agricultural values is questioned. A discussion of the social aspects really relates more to the problem of unwanted births and the "big city syndrome" than to outright overpopulation. Finally, the case for better forward planning is discussed. This section, however, does not fully relate to the preceding one, because any problems of population growth in New Zealand are of an altogether lesser order than the global problem.

A brief "Conclusion" forcefully restates that, although Man can use his knowledge to buy time, he must ultimately be governed by the laws of population ecology that apply to all other organisms. And New Zealand cannot consider itself in isolation from events in the rest of the world.

The four Statements are on Population Growth, Land Use, The Economy and International Considerations. Each of the five Recommendations leads from a Statement. The Statements provide the meeting point between the earlier material and concrete decisions facing the Government. Overall, they are very good, and free of the slightly stilted tone which occasionally appears in earlier sections.

The Recommendations are:

(1) That the Government should consider urgently establishing a permanent interdisciplinary "Centre for Population Research", funded to undertake research and to advise the Government on the status of the population of New Zealand in relation to local resources and the environment and to the world population and resources.

(2) That the Government should increase educational effort to make the public aware of the effect each child has upon the whole community and its resources.

(3) That the Government should accelerate its review of existing land-use policies so as to formulate a comprehensive Land and Resource Use Plan. This plan should recognize the need for both natural and managed ecosystems and ensure the protection of valuable productive land from urban growth.

(4) That the Government should modify its economic policy so that ecologically desirable recycling and pollution control are economically attractive to the public and to industry.
(5) That because the problems of population growth and the use of resources are global and cannot be considered solely at a national level, the Government should participate actively in any international discussions aimed at solving these problems.

The first Statement actually contains a firmer conclusion that the discreet moves should begin now towards an eventual stabilization of population. Also, there is a valuable and optimistic discussion on escaping from an economic system that has depended on population growth. As suggested (Appendix 2) the “Centre for Population Research” would be highly autonomous, but one might ask if a better move would not be to strengthen some existing machinery of government — e.g., Statistics Department.

Overall, the paper contains much excellent and thought-provoking material. It has given a fresh slant on the situation, and even the parts which contain nothing new contribute towards a complete picture. The Society has not altogether succeeded in achieving the Grand Synthesis, because despite some overlap between sections the paper does not establish a really satisfying set of logical interconnections. This, however, does not prevent the paper from being an extremely important document; after all, elegance should not be at the expense of truth.

Where the effort is spoiled is in some unseemly lapses. Were it not for these lapses one could strongly recommend the paper to a very wide readership, but as it is there must be serious reservations. Somehow, in the preparation, there has been a failure of the normal process of self-policing in the scientific community. We can only speculate on the possible reasons, but the Institute of Foresters should take very careful note of this case, because in future it could face a similar undertaking. There is, of course, much of common interest to the Institute and the Ecological Society, and one lesson is surely that there should be better communication. Such communication should undoubtedly exist at the official level, and perhaps through more individuals playing active roles in both bodies.

R.D.B.