

BOOK REVIEWS

Energetical Significance of the Annelids and Arthropods in a Swedish Grassland Soil. Persson, T. and Lohm, U. Ecological Bulletins 23. 211 pp. Swedish Natural Science Research Council (NFR) 1977.

This monograph is a major contribution to the Productivity of Terrestrial Ecosystems Section of the International Biological Programme (IBP/PT). The project deals with the seasonal abundance, biomass and respiratory metabolism of the *ca.* 250 species of annelids and arthropods in the fauna of an abandoned ('old') field situated 25 km north west of Uppsala, Sweden. The authors segregated the ecosystem into primary producers (largely *Agropyron repens* (L.)) and the various trophic levels encompassed by the invertebrate meio- and macro-fauna. They have described the flow of energy through the system from the point of view of the individual, the major taxa and the "feeding categories". This has been presented in one volume, organised so that the reader can digest the overall picture as well as the finer details of technique etc.

The authors concentrated upon estimating population density, distribution and biomass of the animals they were studying and, commendably, attached a standard error to each mean to indicate the amount of variation in the data. The metabolic energy expended by the various categories was either calculated from the data of other researchers working on similar species or by combining the biomass and temperature data with the usual power equation, $Q = aW^b$ (where Q = oxygen consumption rate at weight W and a and b are constants) and an estimation of the respiratory quotient and Q^{10} . This approach is prone to errors, the most important being that the nominally precise methods of the physiologist, that have in the main been adopted by energeticists, provide an underestimate of what happens in the field. This leads to a strange omission. They discuss biomass as weight per unit area. As they relied on derived data for Respiration it would have been logical to go one step further and use published data to convert biomass to Production in kcal/m² by means of energy equivalents. This would enable the reader to compare their estimates of Respiration, quoted in kcal/m², with the Production of the various groups.

These are my only criticisms. This major undertaking was obviously well planned and has been equally well presented. I should like to see a similarly thorough project carried out in New Zealand modelled on this study. A warning though,

this work was published in 1977, six years after the field work was completed, and a dozen or more co-workers contributed to the planning, identification of animals, statistical analyses and presentation. In other words, the collection and extraction of samples were the easy parts.

John Wightman

The Unsteady State, Environmental Problems, Growth and Culture. Kenneth E. F. Watt, Leslie F. Molloy, C. K. Varshney, Dudley Weeks, Soetjipto Wirosardjono. An East-West Centre Book, Hawaii, 1977. 287 pp.

Ten years ago a new genus of books appeared whose main *raison d'être* was the description of eco-catastrophes and doom scenarios. Viewed in a retrospective context, these books contributed to the re-awakening of environmental consciousness and a broader awareness of the mess so many cultures had made of their environments. We might regard Ehrlich's "The Population Bomb" as a suitable type specimen and convenient reference point. Since then speciation within the genus has been rapid. Current titles (with their higher price labels) reflect greater diversity of material and more penetrating and sophisticated analyses than did their predecessors. The title under review is a good case in point.

The message from the authors of "The Unsteady State" is as urgent in tone as was Ehrlich's and consequently some critics might argue that another book saying that "we're in a mess!" is hardly news. What I found interesting was the approach, style, and data base the authors have used to make their points. It must have been an extremely difficult book to write. For five men from different cultures and disciplines, in a very limited time (as Senior Fellows at the East-West Center), the task of attempting to study the relationship between culture and environment would be trying enough in itself. The difficulties of synthesising such diverse inputs and opinions into a coherent book must have been considerable. By and large they have succeeded. When the treatment does occasionally become uneven then the reader is compensated by the diversity of material and some stimulating ideas.

While the circumstances of writing were difficult, the task the authors had set themselves was equally daunting. They wish to demonstrate how global

environmental and social problems have their causes in the erroneous cultural myths that guide the behaviour of "technoculture countries". A prime culprit, as might be expected, are the growth-oriented economic models that use profit-margins and efficiency as yardsticks for decision making. Soil fertility, environmental stability, long-term resource supply, and a host of social problems are usually "externalities" to these economic development models. Instead of the more usual static approach of presenting tables showing the dwindling supply of resources, the authors have tested and probed the "technoculture" by examining the dynamics of how various components interact.

The treatment is wide-ranging, impressive and sometimes intriguing. The calculation of Indices of National Unrealism and a ranking of countries on their deviance from the expected level struck me as a particularly novel approach that could be developed further. Concepts of ecological stability are usefully applied to agroecosystems, natural ecosystems, and economic systems and several warnings given regarding danger signs pointing to future instabilities. Crime and wealth, unemployment versus energy costs, impact of resource shortage on buying power, murder rates versus GNP levels, urbanisation, and correlates with economic health are all grist for the mill. The obvious success with which these factors are used to challenge the collective cultural myths of the "technoculture benefits" (which are usefully summarised in Chapter 2) paradoxically expose some weaknesses. The interesting correlations between sociological/psychological factors with economic indices are treated rather superficially. Greater expertise in the social sciences, including political science, would have benefited these sections. Nonetheless, there is an excellent treatment of the problem of equity and its more pervasive face, inequity. The book is sprinkled with flow charts which most effectively summarise the complexities under discussion.

In summary, it is a stimulating and impressive publication. There is much of interest to ecologists, who tend to omit the complex cultural and economic parameters in their analysis of environmental problems. It would be especially instructive for the policy makers who are happiest with single cause-and-effect linear models. It won't help them to sleep more easily, but a careful reading of "The Unsteady State" would give them a more realistic view of our troubled future.

Wren Green

New Zealand Freshwater Fishes---a guide and natural history. McDowall, R. M. Heinemann Educational Books (NZ) Ltd., Auckland. 232 pp. Retail Price \$NZ 24.75.

This handsome and refreshingly readable book manages, in 230 pages, to fulfil the publishers' claim that it gathers together all the known data on New Zealand's freshwater fish, both native and introduced, in a form equally acceptable to the intelligent layman and the specialist academic. How is it done?

In his preface Bob McDowall protests at the neglect of our native freshwater fish in conservation-oriented legislation, in national parks publications, and in the minds of those responsible for land development from swamps. His book is aimed at the full range of readership in the hope that an understanding can be gained of almost fifty freshwater species, of which fewer than thirty are native species that spend a significant part of their lives in freshwater. Following a general introduction, the first chapter instructs readers in the basic terminology of fish studies, then describes the scope of family and species accounts which are subsequently given, family by family, in the next seventeen chapters. The final three parts of this first chapter are invaluable. There is a short section on observing, collecting and preserving fishes, a glossary of technical and / or descriptive terms used in the book and an excellent illustrated key to the families of fish in New Zealand freshwaters.

For each family of fish there is first a more detailed key, then species descriptions. These are kept to a specific and scientific level, with excellent line drawings of each species (both sexes are illustrated where they differ), a locality map, an habitat photo and, for 37 species of fish, an explicit colour photograph. (This must be responsible for the price). The writing is very concise, fluent and consistent. Despite the quantity of material compressed into these pages there is no sense of rush and no confusion. McDowall's taxonomic training and wide experience of New Zealand fish and fisheries are clearly great assets here.

The last four chapters enrich this book further. Common diseases and parasites are described and illustrated. Under the heading of fish and fisheries in New Zealand there is a wealth of interest-Maori knowledge of freshwater fishes, early European reactions and knowledge, freshwater fisheries, and the history of fish culture in New Zealand, and finally problems of interpretation and administration of the rights of native fish.

The chapter on zoogeography is a major section. The relationships and derivation of the New Zealand

fish fauna are described and life history and distribution patterns are examined. Concise as it is, this section enhances the material given in the systematic chapters and the overall result is a chance for the public to be well-informed on our freshwater fish at last. The ecological consequences of environmental development are referred to in the epilogue. No one could read this book and remain unconcerned about the future of our fauna.

Overall, then, from cover to cover, this is a well-balanced, well-written and illustrated, interesting reading and reference work which will be an asset to any bookshelf. Anglers will have to buy it.

Vivienne Burrows

The Famine Business. Colin Tudge (Faber and Faber, London.)

This is an interesting little book which, however, does not quite live up to the expectations aroused by the reading of the first chapter. The Chapter "Is there a world fund problem?" is a masterly summary of the current situation.

Tudge's thesis is that to use energy to abet husbandry-and a tractor can plough what a horse cannot-is useful; but to use it to replace husbandry is to squander it. Much of the book then is concerned with husbandry. He points out that much of our good land, which could grow food to feed the hungry, is given over to 'cash crops' like coffee, tea and cocoa, which may have little or no nutritional value, and that much of what does have nutritional value, in particular cereals and beans, is fed to livestock. He advances the viewpoints that the West does not provide a suitable model for the world in that it is wedded to a world farm concept; that most of our aid programmes have been mistaken and have done little to redress the balance between the affluent western nations and the impoverished dependent developing countries; and that western economic development has been a unique and unrepeatable phenomenon.

What, then, does he advocate in his blueprint for the future? Firstly, he proposes national self reliance in agriculture for all countries as the only way to solve the world's food problems. This he terms 'rational agriculture'-an agriculture designed to provide self-sufficiency in food for each country. The essence is land husbandry and the provision of a large proportion of protein intake from plant protein. He sees no need to search for new sources of protein and waxes eloquent on the virtues of the

neglected potato as a source of protein. Rational agriculture would provide a staple of potatoes and cereals, complemented by beans, modest but significant amounts of *lean* meat, plenty of fresh vegetables and as much alcohol as we can reasonably produce after we have produced the basics.

Secondly, there is a need to develop an appropriate economic and political framework to put the above into effect. Tudge considers that the present capitalistic economy does not provide the necessary pattern and perceives virtues in the Chinese model. The section advocating the changes that would be necessary for the implementation of rational agriculture I found the least convincing. The problems, economic, political and sociological, that would be involved in such a change were glossed over. Questions were posed but no real solutions advanced, only a plan for a political and economic framework in which it is realistic to do simple things well. Tudge considers that not only have we delegated power to expert elites, but that we have made the elite of big business the guardian of our concept of democracy. He states that a Marxist economy would suit the needs of rational agriculture. One has the feeling that while he considers that capitalism as it is presently constituted must go, he has no clear idea of what should replace it.

Tudge is highly critical of the food-processing industry, especially of the increase in 'convenience foods', the use of additives, the extent of packaging, the reduction in the variety and the loss of flavour. He points out that at the end of the nineteenth century there were 100 varieties of apples and 40 of pears that were grown in British orchards; today, two varieties of apples dominate the market. The commercial imperative demands added value, the turning of cheap raw material into something more expensive.

His solutions would require not only considerable changes in economic and political systems but also in food habits. This is not impossible and he highlights instances of the comparatively rapid changes that have occurred in the past. A striking example is the replacement in many Third World countries of breast-feeding of babies by bottle-feeding. In Chile 20 years ago, 95 percent of children were breast-fed for one year; now only 20 per cent are breast-fed. A Nigerian woman could provide herself with enough extra local food for adequate lactation for 21p a week. Using the cheapest kind of artificial food costs 32p in foreign exchange.

In such a book I would have liked to have seen discussion of the ecological consequences of modern agriculture and how the rational agriculture that is advocated equates with the promotion of the long

term stability of the biosphere. A more compelling case could be made if an holistic systems approach to agriculture practices (the understanding of agroecosystems) were coupled with the analysis of food problems and the policies designed to cope with them..

The book can be recommended as one that advances some interesting concepts but which provides a somewhat simplistic and incomplete analysis of the problems involved.

G. A. Knox