

reviews

New ecology exhibition at BM

Peter D. Moore

Introducing Ecology. British Museum (Natural History) Exhibition. *Nature at Work*. By British Museum (Natural History). Pp. 96. (Cambridge University Press: Cambridge, 1978.) Hardback £6.50; paperback £2.50.

AFTER about fifty years of conceptual evolution, the idea of the ecosystem, involving close relationships between the living and non-living world, is finally having an impact at the level of elementary biology teaching. This is very welcome, for it may result in a more precise understanding of the fundamental basis of modern ecology and restore some meaning to the very term. The exhibition recently launched at the British Museum (Natural History), together with the associated book, will certainly serve to encourage this laudable trend.

The exhibition and the book concentrate on the energy relationships of ecosystems, which has the advantage of providing a unifying theme for the concepts portrayed but which inevitably results in the neglect of other interesting aspects of ecosystem study. Unity and flow, however, are vital if the interest of a visitor is to be maintained and this is certainly achieved. But energy is not easily conceived; an early display tries to overcome this by encouraging the observer to turn a wheel on the exhibit with sufficient gusto to generate the electricity for lighting the panels. Great fun for young children, but I wonder whether it really helps with their thermodynamics?

Energy movement through ecosystems as a theme also generates the problem of how to explain photosynthesis, the primary level of energy conversion. Here the exhibition and the book are at their weakest, and understandably so. One is left with two options: either you try to explain the complex mechanism of photophosphorylation or you leave photosynthesis as a black box with sunlight going in and energy-rich foodstuffs coming out. In fact the former course was chosen. Chloroplast structure is explained in some detail and the production of ATP and NADH is mentioned, but chlorophyll itself remains something of a black box. It is rather strange that this degree of biochemical

detail is used at this stage when no equivalent account is given of respiration, a process just as vital to an understanding of energy flow. Also, as the emphasis throughout is on the presentation of concepts in a simple, pictorial fashion, is there any need to introduce such technical terms as autotrophs, heterotrophs, or even carbohydrates? Many of the weaker brethren may stumble needlessly at this first hurdle.

One of the unfortunate consequences of the energy flow concept from the botanical point of view is that the plant is reduced to the level of an energy conversion and storage system on which the rest of the (far more interesting) organisms depend. When photosynthesis has been dealt with, plants can be set on one side. Admittedly, some attempt is made to show the influence of climate and soil conditions on plant growth, but this display is difficult to follow because of its complexity.

From this point onwards, the quality of both exhibition and book begin to rise. The ways in which consumer organisms make a living are described and attention is drawn to the energy which their way of life demands in such activities as seeking food. Two habitats are considered in detail: an oak woodland (in which some taxonomic confusion over the species of oak involved is evident) and a rocky seashore (in which *Fucus serratus* is found above *Pelvetia canaliculata*). In dioramas of these habitats, the student is presented with such problems as working out food webs. In the book the answers are supplied at the end, but in the exhibition electronic links can be made between different organisms which results in a red or green light appearing, depending on the likelihood of one consuming the other. Observations on secondary school children operating this display suggested that many were unaware of the implications of the red or green light but this, I suppose, is one of the problems which educationists have to face.

Decomposition is tackled in a novel and effective way using animated flicker cartoons which are operated by the observer. The consequent recycling of elements is not fully dealt with at present, but I gather that a display of

the carbon cycle will be added to the exhibition later.

Perhaps the most ambitious and, in my view, the most successful aspect of energy flow to be considered is the energy pyramid and ecological efficiency. Those students who have worked their way this far without losing the thread are presented with such fascinating questions as why carnivores may be more efficient than herbivores, and why the pyramid of biomass in aquatic systems is an inversion of that found on land.

Watching children in the exhibition one soon comes to the conclusion that the most popular exhibits are those with which they can interact, where questions are asked, choices made and buttons pressed. In this respect a new dimension is attained at this exhibition. Having completed the exhibition circuit, the student meets a computer console and screen with which he can tackle an ecological question. A problem is set up by the computer, such as what factors control winter moth caterpillars in oakwoods. Several alternative solutions are presented and the operator makes a choice which results in the presentation of data either supporting or negating the selection. Rejection of that hypothesis then returns the student to the initial choices. The game provides a unique opportunity for a student to work his way through an ecological problem in a systematic and scientific fashion.

Presentation of material in both exhibition and book is clear, graphic and caricatured, sometimes to the extent of being bizarre. This will offend the purist. But whatever the dusty academic may think of this venture, the fact remains that on the one hand a seven year old child may find the demonstrations rivetting in their overt appeal and on the other there are questions raised here which still occupy the minds of research workers. The potential spectrum of interest is vast and the message is clear and basic, that ecology has moved beyond natural history and has become a unified science through the development of such concepts as energy flow. □

Peter D. Moore is Senior Lecturer in Ecology at King's College, University of London, UK.