

as to merit illustration in any book of the history of museum display technique. It can be no surprise that the majority of the visitors to the museum had, as Dr Miles stated "learnt practically nothing". It is surely appropriate that the museum should attempt to inform, as well as interest, the throng of children and of scientifically uneducated adults who nowadays pack its halls.

Should we really expect that the prime responsibility for the new exhibition approach should rest with the scientific staff, already committed to programmes of research and curation? It is no secret that, in any museum, many research workers have little interest in the problems of the design of displays, even if they are of completely conservative and scholarly type. It is even more unlikely that many of them would wish to learn and to apply the theory and techniques of modern displays directed at those with no scientific qualifications. (This is not to say that the scientific staff should have no role in this, and many of those at the BM(NH) certainly seem to feel that they have not had sufficient opportunity to comment on the new policies, or to ensure that the scientific theories illustrated are appropriate and not merely those currently in vogue).

The balance of exhibits is a complex matter. I feel that it is only appropriate that the museum should attempt to let visitors understand themselves as human examples of the world of nature, and to educate them in the basic processes of ecology. (Not even the museum display staff would pretend that every exhibit in the Hall of Human Biology is an unqualified success, but even the BM(NH) must surely be allowed to make the occasional mistake). Furthermore, there can be no doubt that invertebrates and plants have in the past received a totally inadequate proportion of exhibition space. It was therefore inevitable, and only right, that the new exhibits should be at the expense of the great range of extensive (though mainly old-fashioned) displays of living and fossil vertebrates. It is natural for vertebrate zoologists to regret this, but we should surely be reassured by Dr Miles' statement that the new exhibits "will contain the vast majority of the material now on show in the museum".

Yours faithfully,

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Links with school

SIR.—As a teacher of biology, I would like to offer my views about the recent article entitled 'Whither the Natural History Museum?' by Dr B. Halstead.

My earliest recollections of the museum are those of my childhood, when I was taken on the usual tour of the museums on a trip to London. I remember, most of all, the dinosaurs but little else except endless rooms of glass cabinets full of bones and a lot of unpronounceable words.

Today, thankfully, the presentation of material in the museum is progressing and the two most prominent examples of this are the new exhibitions of human biology and ecology. These offer a new and very important dimension to the role of the museum—namely a vital resource which links important aspects of natural science with what is being taught at school.

I have been lucky enough to use the exhibition of human biology as part of my exam course in the fourth and fifth years.

The pupils concerned were taught how to use the exhibition and, as a result, were able to benefit from it in a way they could not by just relying on textbooks at school. I look forward to using the ecology exhibition in the same way with my second year groups next summer. The publications accompanying the two exhibitions also allow for follow-up work at school.

From Dr Miles' figures regarding visitors to the museum, it would appear that these exhibitions will benefit an age group whose presence is sadly missing from the museum.

I would like to say in conclusion that the museum should continue to present its rare and fascinating fossil exhibits, as it has done for years, thus fulfilling its role to the scholars; but also to continue with its new fresh approach and present more exhibitions which are of more use to schools and the less scholarly members of the general public.

Yours faithfully,

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Teachers need a say

SIR.—I am a teacher in the fourth year of a large multi-cultural East London primary school. I am prompted to write in response to the articles by Dr Miles and Dr Halstead on the future of the British Museum (Natural History).

Dr Miles says that to some extent the Natural History Museum is for children under the age of eleven. He points to the absence of secondary school pupils and university students from the public galleries. Without doubt the primary school children are impressed by the large dinosaurs and blue whales. They take a passing interest in one or two other galleries or individual exhibits but generally scurry through the remainder of the museum if given the opportunity. To the children many of the current displays seem unrelated to each other or to a wider theme. I am not surprised that the majority of younger visitors are not motivated to return for many years.

On the other hand the recent human biology exhibition is stimulating and dynamic and makes demands of the children. In my experience they take an active interest in the displays and are keen to seek answers to questions. Furthermore the exhibition is coherent and so more meaningful to them. Although many of the concepts explained are beyond the grasp of the average eleven year old, I anticipate that a higher proportion are likely to revisit and develop their understanding than would have done had the exhibition remained in the traditional layout. If other recommendations in the paper 'A Proposal for a New Approach to the Visiting Public' are implemented I feel that many teachers and pupils will benefit even more.

It is disquieting to hear of the rift between the Department of Public Services and scientific staff. Dr Halstead himself, however, refers to a false dichotomy, by discussing the former dinosaur gallery and its multi-level appeal. Surely the 'new style' exhibition can also be both stimulating and scholarly given the goodwill and collaboration of scientists and exhibition staff. After all Dr Miles does say that the exhibits to be displayed will contain the vast majority of the material on show.

Dr Halstead calls for the fullest possible

public discussion. Hopefully teachers at all levels will be given an opportunity to participate in this discussion which at the moment seems to be conducted at the level of the academic.

Yours faithfully,

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Arborescent animals and other colonoids

SIR.—Comparative biology is sometimes hindered by terms which have become misleading with the advance of knowledge. 'Individual' and 'colony' are such terms when they are used to refer to a single polyp and the entire organism of a reef coral, for instance. The organism responds as a unit in growth and physiology, and it is also the unit of individual selection. I therefore propose two new general terms to replace 'individual' and 'colony' in such cases. Specific terms are already available in some instances, but they vary from taxon to taxon.

Individuoids are parts of an organism which have the general structure of whole free-living individuals but which connect with each other to form a colonoid. A colonoid usually has the same genes throughout and functions as a single individual.

The concept of colonoid grades into that of colony or association, which may be restricted to a group of proximate but physiologically separate individuals, usually of one clone. Intermediate cases might be grass swards or diatom chains. The concept of a colonoid organism also grades into that of individual *sensu stricto*, in which case individuoids may resemble organs. Examples are rooting branches of mangroves, bryozoan aviculariae, or cyanophyte heterocysts. Slime mold colonoids are colonoids for only part of the life cycle and may form (sometimes necessarily so) from individuoids of different genotypes. Such fuzzy boundaries of concepts are necessary in the real world.

A diverse array of animals grow in a treelike form. Some but not all have apical meristems. Examples of arborescent growth occur among sponges, hydroids, alcyonarians, corals, bryozoans (including entoprocts¹), graptolites, pterobranchs, and probably elsewhere. Comparative studies of their growth and that of branched plants and protozoans, from both mechanistic and adaptive viewpoints, have always proved illuminating in my seminar course on the evolution of development and would undoubtedly be more illuminating if pursued more fully.

The study of plants and arborescent animals can thus be mutually beneficial, but such study presupposes that functionally corresponding units are identified beforehand. Studies of other phenomena, such as adaptive strategies, also need clear recognition of what units are appropriate. This has not always been done, perhaps because of the pervasive shadow of a purely morphologically based terminology, and the result is then biological nonsense.

Yours faithfully,

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¹Neilson, C. *Ophelia*, 9, 209-341; 1971.