

## CORRESPONDENCE

## Museum of errors

SIR — Two years ago (*Nature* 275, 683; 1978), I questioned the wisdom of what is happening at the Natural History Museum in South Kensington. If a national museum is concerned with aspects of social engineering, by promoting concepts that happen to be current in the present climate of opinion, are there not sinister implications? I was especially alarmed by the museum's new exhibition scheme, and asked that sufficient pressure should be brought to bear to "curb the activities of the Public Services Department and to ensure the survival of the museum's reputation for scholarship in its public galleries".

Since then, time has passed. It is no longer a question of raising the alarm but simply of reporting what has already happened.

Two areas of the museum's work have already succumbed: dinosaurs in 1979 and fossil man in 1980. Both the new exhibits are simply vehicles for the promotion of a system of working out relationships known as cladistics. The accompanying booklets *Dinosaurs and their living relatives* (1979) and *Man's place in evolution* (1980) explain with startling clarity the essence of cladistics. In both books the fundamental assumptions are spelled out unequivocally. "First we assume that new species arise when one species splits into two. This assumption allows us to test the relationship we suggest, because it means that every species must have a closest relative. Second we assume that none of the species we are considering is the ancestor of any of the others." It is axiomatic, therefore, that no species in the fossil record can be considered ancestral to any other nor can one species evolve directly into another.

With regard to both dinosaurs and fossil man, it is evident that the application of cladistics is quite inappropriate. The well attested sequence of human fossils representing samples of succeeding populations has, until the Natural History Museum's latest exercise, been taken as a classic example of the gradual evolution of a single gene pool. Certainly there is not any serious doubt about *Homo erectus* being directly ancestral to *Homo sapiens*.

Yet the concept of one species being directly ancestral to another is contrary to the rules of cladistics. So we read in the section on *Homo erectus* (under the heading "Not our direct ancestors"), that "The *Homo erectus* people were not quite like us. . . the *Homo erectus* skull has several characteristics that the modern skull does not share. Because of these special characteristics, we think that the *Homo erectus* people were not our direct ancestors".

But then on the opposite page is a photograph of the Petralona skull, from Greece, which the author considers an example of *Homo sapiens* or *Homo erectus* because of its mixture of features. This particular skull makes nonsense of the entire methodology being promoted in the books and exhibition. According to the stated assumptions of cladistics none of the fossil species can be ancestral by definition. This presents the public for the first time with the notion that there are no actual fossils directly antecedent to man. What the creationists have insisted on

for years is now being openly advertised by the Natural History Museum.

The scientists on the museum staff, be they experts on dinosaurs or on fossil man, have had their scientific judgement over-ridden by the Department of Public Services. What exactly is the cladistic framework to which the Public Services Department is so fervently dedicated? Why is there such a fanatical insistence that data should be presented within such a framework?

And why should there be a deliberate policy that involves the removal from the public gaze of important and scholarly exhibits in the museum such as the Insect Gallery and the Fossil Mammal Gallery? Is it because they provide too dramatic a contrast with the propaganda of the new-style exhibits?

The questions that should arise in everyone's mind are: what is this all about, what actually is going on and what is behind it all? The answers can be found by reading the literature of cladistics. The tenor of this is seen in its abuse of E. Mayr and G.G. Simpson, and indeed of Charles Darwin himself, because of their firm adherence to the concept of gradualism and to the idea that the processes that can be observed at the present day, when extrapolated into the past, are sufficient to explain changes observed in the fossil record. The synthesis of population genetics and palaeontology presented by Simpson in his two seminal works *Tempo and mode in evolution* (1944) and *The major features of evolution* (1953) is anathema to cladists.

The next question is why should the notion of gradualism arouse passions of such intensity? The answer to this is to be found in the political arena. There are basically two contrasting views with regard to human society and the process of change through time: one is the gradualist, reformist and the other is the revolutionary approach. The key tenet of dialectical materialism, the world outlook of the Marxist-Leninist party according to J.V. Stalin, is in the recognition of "a development in which the qualitative changes occur not gradually but rapidly and abruptly, taking the form of a leap from one state to another" (Engels). This is the recipe for revolution. If this is the observed rule in the history of life, when translated into human history and political action it would serve as the scientific justification for accentuating the inherent contradictions in society, so that the situation can be hurried towards its appropriate "nodal point" and a qualitative leap supervenes.

With regard to evolution and the fossil record, neither Engels nor Lenin, both of whom discussed the subject at length — to their great credit — insisted upon a pattern of such qualitative leaps, they were merely content to see in evolution and the fossil record evidence of change, albeit gradual.

This has always been a matter of some disquiet for Marxist theorists. If it could be established that the pattern of evolution was a saltatory one after all, then at long last the Marxists would indeed be able to claim that the theoretical basis of their approach was supported by scientific evidence. Just as there are "scientific" creationists seeking to falsify the concept of gradual change through time in favour of catastrophism, so too there are the Marxists who for different motives are equally

concerned to discredit gradualism.

What is going on at the Natural History Museum needs to be seen in this overall context. If the cladistic approach becomes established as the received wisdom, then a fundamentally Marxist view of the history of life will have been incorporated into a key element of the educational system of this country. Marxism will be able to call upon the scientific laws of history in its support, with a confidence that it has previously enjoyed.

This is the course of action to which the authorities of the Natural History Museum seem to have committed themselves either unwittingly or willingly.

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## Refrigerator brew

SIR—One of the problems associated with Legionnaires' disease lies in the tracking down of the source of infection. Air conditioning systems seem to be prime suspects. So far as I am aware, nobody has thought of looking behind refrigerators. Having had occasion to do this recently, I was taken aback to discover that a self-defrosting refrigerator may provide the ideal breeding ground for a wide range of microorganisms.

At the back of a self-defrosting refrigerator there is a reservoir to collect the water as it is discharged. This water remains stagnant, gradually evaporating until it is replenished by the next automatic defrosting. With some designs the cooling coil passes through this reservoir to hasten evaporation. The result is a warm broth ideally suited to the proliferation of microorganisms. After a year or two stood around in a hospital environment such reservoirs might well harbour some very interesting cultures indeed. Even the ordinary household must pick up some pretty virulent infectious agents from time to time.

I have now taken the precaution of adding a dash of disinfectant to the brew. Hospital authorities might care to adopt the same simple measure.

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## Frequency tripling

SIR — Your correspondent's comments on the US inertial-confinement fusion (ICF) programme contains a minor inaccuracy (*Nature* 16 October p.573). University of Rochester scientists have, in fact, frequency-tripled the output of their glass laser thus converting the 1.054  $\mu\text{m}$  light to 0.3513  $\mu\text{m}$  radiation at high efficiency. Experiments using frequency-doubled light, at 0.53  $\mu\text{m}$  have been done or are underway at many laboratories, notably the Science Research Council Rutherford Laboratory, the Centre d'Etudes de Limeil (France), GRECO-Interaction Laser Matière, Ecole Polytechnique (Palaiseau, France), KMS Fusion Inc., and the Lawrence Livermore National Laboratory. The Ecole Polytechnique group recently has reported on experiments using 0.26  $\mu\text{m}$  radiation, the 4th harmonic of 1.06  $\mu\text{m}$  light.

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