OCEAN FLOOR

Why Uniform Sediments?

from our Geomagnetism Correspondent

THERE is no doubt that the principal source of the sediment in the Atlantic is the continents—so much may be thought to be obvious, although there is good scientific backing for it as well. But how are such sediments transported to their resting places? Biscaye (*Bull. Geol. Soc. Amer.*, **76**, 803; 1965), for example, deduced that the topography of the mid-Atlantic Ridge controlled the distribution of clay minerals and thus concluded that they were transported there by bottom currents. Windom (*ibid.*, **80**, 761; 1969), on the other hand, came up with the less orthodox suggestion that anything from 25 per cent to 75 per cent of the sediment in the central Atlantic came there by way of atmospheric fallout. Either way, changes in the clay mineralogy with geological time might be expected because of likely changes in the winds or ocean bottom currents and even the sources.

But the surprising result of an examination of six cores from the Atlantic (19° N–23° N, 34° W–57° W) carried out by Murray (*Earth Planet. Sci. Lett.*, **10**, 39; 1971) is that, whatever the climatic or other changes over the past 200,000 years, they have had no significant effect on the clay mineralogy of Atlantic sediments. To be more specific, clay mineral abundances in the upper 2 m of the six cores were uniform within the limits of experimental error (10 per cent); and calculations of sedimentation rates showed the 2 m lengths to cover time spans of from 64,000 to 200,000 years. In other words, over a 20° longitude traverse of the Atlantic which includes the mid-Atlantic Ridge there is no evidence of clay mineral variations in spite of the fact that the minerals were partly deposited during the fluctuations in climate and sea level in the Pleistocene. Nor is there any evidence to suggest that the mid-Atlantic Ridge acts as a sediment barrier. At present, all this remains a surprise with no apparent explanation.

One of the six cores, however, was from the median valley of the mid-Atlantic Ridge and, though still uniform within the limits of experimental error, the clay mineral distribution in this core fluctuated more widely than in the other five samples. There were also other differences. There was, for example, an alternation of amorphous and crystalline material; and the amorphous layers were associated with silt-sized volcanic glass. Murray's view is that the amorphous layers are "the weathered products of volcanic glass layers whose original composition was similar to average ridge basalts". In other words, these glassy amorphous

layers seem to be related in some way to the intermittent volcanic activity in the area rather than to any continental source.

In fact, this is not the only evidence that some oceanic sediments are derived locally rather than from the erosion of continental material. For example, when Siever and Kastner (*J. Mar. Res.*, **25**, 263; 1967) discovered poorly crystalline montmorillonite in the median valley of the mid-Atlantic Ridge at 23° N, they concluded that they had found the low-temperature oxidation product of volcanic ash recently deposited. Then again, Bostram and Peterson (*Mar. Geol.*, **7**, 427; 1969) interpreted the chemistry of the East Pacific Rise sediments partly as precipitates from volcanic material derived from the rise crest. And Sayles (quoted by Murray) has found large amounts of poorly crystalline iron and manganese-iron rich sediments near the East Pacific Rise which seem to be of local origin.

FISH LARVAE

Giant Leptocephalus

by our Marine Vertebrate Correspondent

EEL larvae are strikingly dissimilar to the adults of the same species, for they are laterally flattened, shaped like an elongate willow leaf, and quite transparent. It is now a matter of history that at one time the larvae were recognized as a distinct group of fishes and given the generic name *Leptocephalus*,

although this name has lingered on as a general label for this type of elongate fish larva. A catch-all name of this kind has been very useful because few of the known larvae are certainly referable to their adult forms, and it is now known that a number of other fish orders have leptocephalus larvae.

In January 1930, the Danish Dana Expedition captured a leptocephalus on the Agulhas Bank, south of Africa, which was 184 cm long. This specimen has earned a place in the mythology of marine biology, for although Å. V. Tåning, who first reported its capture, merely claimed it to be the largest larval form within the animal kingdom, later authors seized on its length and, comparing it with the 90 mm maximum of the common eel (*Anguilla anguilla*) larva, produced a figure of 30 m for the estimated length of the adult!

Recent re-examination of this Dana specimen by Jørgen G. Neilsen and Verner Larsen (*Vidensk. Medd. Dansk Naturh. Foren.*, **133**, 149; 1970) shows that this larval putative giant sea serpent is morphologically very similar to a form described in 1959 as *Leptocephalus giganteus* from off New Zealand. The New Zealand specimen was relatively modest in size (893 mm), but careful comparison shows it to be otherwise identical with the larger specimen (although this is now in poor condition and measures only 1,330 m, having dried out while on loan from Copenhagen). *Leptocephalus giganteus* have also been found offshore of Florida, and D. G. Smith (*Copeia*, **1**;

Further Evidence for Fe³⁺ in Interstellar Dust

P. G. MANNING has come up with some more support for the view that minerals containing the Fe³⁺ ion make up a significant fraction of the interstellar solid material. Writing in next Monday's *Nature Physical Science*, Manning describes an analysis of the spectrum of the supernova which appeared in NGC 3003 in 1961, and attributes some of the features in the spectrum to transitions in Fe³⁺ ions. The chances that iron is one of the many components of interstellar dust must be high—iron will be manufactured by many stars and released into space—but whether the features indicated by Manning in the supernova spectrum are indeed attributable to Fe³⁺ could, however, still be an area for considerable debate.

Partly, this will be because of uncertainties about the genuineness of the bands which Manning is discussing, although, to be fair, their existence is virtually certain. More likely, people will ask whether the bands can be

accounted for in any other way, because one of the hazards of this kind of work is that it is notoriously simple to manipulate the proportions of the ingredients of interstellar dust to simulate a variety of spectra.

In next week's report, Manning attributes three bands in the ultraviolet part of the supernova spectrum and one in the visible part to Fe³⁺ ions in octahedral sites. The spectrum of the supernova in NGC 3003 is odd in that it is the only spectrum in the Type IV classification suggested by Zwicky, but from Manning's work it seems just as feasible to explain the absorption bands in this spectrum by Fe³⁺ ions as it has already proved to explain the spectrum of Type I spectra in this way. What the Fe³⁺-bearing minerals are is not known, but Manning points out that garnets are still a possibility. Work on laboratory spectra of minerals in simulated space environments might help to throw some light on this aspect of the problem.