preserved a few scales and fin rays. It is possible that it belongs to the same type of osteolepid.

These fishes are similar to the Middle Old Red Sandstone fishes of Scotland and suggest a Middle Devonian age for the shales which contain them. It is interesting that these shales have a very close lithologic resemblance to some of the beds of the Middle Old Red Sandstone, particularly of the Thurso Flagstone Group of Caithness, Scotland. The finding in India of osteolepids and dipterids, both typical families of fresh-water fishes, is of considerable palaeogeographical importance.

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Standard Cenozoic Stratigraphic Zonal Scheme

IN 1957 Bolli[1-3] published a detailed account of twenty-nine planktonic foraminiferal zones for the Trinidad Cenozoic. These zones have now been recognized and have been widely used in the stratigraphy of many other tropical and also to a lesser extent in the temperate regions[4-7]. I would like to comment briefly on a drastic revision and modification of Bolli's zonal scheme recently published in this journal[8].

One of the best documented evolutionary lineages in the Miocene planktonic Foraminifera was first described by Bolli[9] and is known as the *G. fohsi* lineage. Later, Banner and Blow[10] called it "the well known evolutionary lineage" and they provided considerable supporting evidence for the lineage in the form of excellent photomicrographs which demonstrated the development of the peripheral keel in the succeeding taxa. Banner and Blow[8] have now apparently revised the *G. fohsi* lineage to such an extent that none of Bolli's four original zones, based on the *G. fohsi* lineage taxa, appear in their revised zonal scheme.

In another communication[11] I have demonstrated to Banner, Blow and their colleagues that in the New Zealand Lower Miocene, *Globoquadrina dehiscens* appears stratigraphically lower than *Globorotalia kugleri*. A similar succession of species has also been reported by Wade[12] in South Australia. How then is it possible for "*G. dehiscens praedehiscens*" to evolve into "*G. dehiscens dehiscens*" after the extinction of *G. kugleri* in Zone N.5 as reported by Banner and Blow[8]? The co-authors[8] claimed to have examined Australian and New Zealand fossils, but they have obviously chosen to ignore well-documented published evidence of the stratigraphic succession of planktonic foraminiferal species from the Australasian region[13-15].

The use of *nomina nuda* in the zonal scheme proposed by Banner and Blow[8]? is bad taxonomic practice and the specific names do not appear to satisfy Article 13 of the International Code of Zoological Nomenclature.

One further point of criticism concerns the persistent placing by Banner and Blow of the *G. ampliapertura* and *G. opima* zones (or their now revised equivalent) in their so-called Miocene[8]. This is an integral part of the hypothesis of Eames, Banner, Blow and Clarke[16] that the "Oligocene" is missing in many parts of the world. The published evidence to the contrary and the opinion of most other workers is that the *G. ampliapertura* zone and part, if not the whole, of the succeeding *G. opima* zone form part of the Oligocene[17-20].

One of the best methods of appraisal of a new stratigraphic zonal subdivision is its usage and acceptance by other workers of the same discipline. Bolli's Trinidad zones have some drawbacks, as I have already noted elsewhere[21], but the zones have been workable units in the tropical areas. Berggren[22] made the following comment on Bolli's[1] Paleocene–lower Eocene zones: "This zonation has since (1957) found widespread utility and has served as a standard reference in the recognition of zones based on other pelagic groups, such as the nannoplankton". There is therefore considerable doubt in my mind as to the value and need for such a drastic change of Bolli's zonal scheme as that recently presented by Banner and Blow[8].

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METALLURGY

Fatigue—Generation of Vacancies

RECENTLY, it was reported that fatiguing (cyclic straining) at room temperature results in observable diffusion of silver into copper at that temperature[1]. This important effect was attributed to the athermal generation and the subsequent diffusion of vacancies which are greatly in excess of equilibrium.

We report here some preliminary results which are in agreement with the conclusions of Derrick Jones and Dover[1]: that large numbers of vacancies are generated by fatigue, and these vacancies can contribute to diffusive processes.

In the present instance, a precipitation reaction was used to study the influence of large numbers of vacancies. It is known that Guinier–Preston zones (clusters rich in solute) form at ambient temperatures at high rates owing to the supersaturation of vacancies which become frozen-in during the quench from the solution temperature[2]. The zones may be redissolved by heating above the ageing temperature for a short time—yet still within the two-phase region. This treatment is termed "reversion", and on recooling to the original ageing temperature, the zones form at a much lower rate owing to the smaller supersaturation of vacancies which are retained from the lower reversion temperature. In the experiments reported here, specimens in the reverted condition were cyclically strained and then aged.

Aluminium–4 wt. per cent copper was used. The treatment involved first quenching from 540° C to water, followed by ageing for 1 day at 30° C, then reverting at 200° C for 10 min, followed by acetone quenching. After the reversion treatment the specimens were mounted in a specially designed testing device and cycled at the temperature of liquid nitrogen[3]. The specimens were then