

response on Earth occurs in this region, because the huge Eurasian landmass is very sensitive to seasonal changes in precession forcing.

A comparison (*b* and *d*) of modelled low-latitude and high-latitude responses over the last glacial cycle indicates a great deal of similarity. The precipitation curve is phase-shifted with respect to temperature, because the effect of ice sheets has been included in the former² but not the latter. Even though the simulated temperature curve is for a largely ice-free region⁸, timing of temperature variations could also be shifted somewhat in this area as a result of downwind influence from ice sheets.

It therefore seems that northern wetlands could also be the source of changes in methane during the ice age. It may not be possible to use climate models to discriminate between low- and high-latitude methane sources, but methane isotope studies may in future shed light on the problem, as low- and high-latitude wetland methane sources differ

in their carbon-isotope signatures by about 12 parts per thousand (for example, ref. 9).

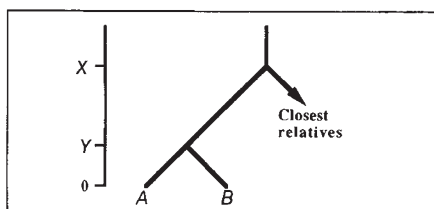
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Bird community structure

SIR — A recent paper from our research group¹ pointed out that the correlation between abundance and body size among species within tribes of British birds is frequently positive, particularly when a tribe has no close phylogenetic relatives in Britain. Our investigations of a similar pattern occurring in local, single-habitat communities suggest that the date at which a tribe radiated, rather than the



A tribe of birds consisting of two extant species (*A* and *B*) shared their most recent common ancestor with each other *Y* time units ago and their most recent common ancestor with other birds *X* time units ago. The measure *Y* is a better predictor than is *X* of the correlation between population density and body size within tribes.

date at which it originated, is a better predictor of the correlation between abundance and body size. In other words, the date *X* in the figure may have been a surrogate for date *Y* (or some measure closely correlated with *Y*). Any explanation of the original result will need to take account of this finding.

We have examined data from 90 bird communities sampled from small areas (10–100 ha) of defined habitat throughout the world². Nee *et al.* used a measure of the time at which members of a tribe last shared a common ancestor with

members of other tribes: the date of origin of the tribe (*X*). We have also obtained an estimate of the time when all members of a tribe last shared a common ancestor with each other: the date of radiation of the tribe (*Y*) (ref. 4). We normalized all data using Table 20 of ref. 3. Those tribes which have no close relatives in the world (those for which *X* is large) tend to show positive body-size abundance relationships more frequently than those with close relatives ($r=0.36$, $n=30$, $P=0.05$). This is also true of tribes which radiated later (those for which *Y* is large) ($r=0.61$, $n=30$, $P=0.0003$).

When we control for the date of radiation (*Y*) in a partial correlation, the date of origin (*X*) is not a significant predictor of how frequently a tribe of birds shows a positive relationship between abundance and body size ($r=0.10$, $n=30$, $P=0.56$). However, when we control for the date of origin, the date of radiation is a significant predictor of the frequency with which the relationship between abundance and body size is positive ($r=0.54$, $n=30$, $P=0.002$). We find similar results with the British bird data used by Nee *et al.*, who suggested that the date of origin of a tribe may relate to

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ecological guild structure. Whether the date of radiation might be interpreted in like manner remains a subject for investigation. We shall describe elsewhere how body-size abundance patterns differ when we compare (1) a tribe's relatedness to the other tribes in its community rather than to other tribes in the world; and (2) single-habitat communities with geopolitical regions, such as Britain or Sweden.

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Iron still comes from above

SIR — Sunda *et al.*¹ report that open ocean phytoplankton require very little iron indeed; less than 10% of the minimum amounts thought necessary to meet the metabolic needs of plant cells for growth based on iron enzymatic requirements for photosynthesis, respiration and NO₃ reduction². They suggest that we should reassess our conclusion that amounts of dissolved iron in open ocean upwelling water are too low, and that this essential element must be supplied from atmospheric deposition.

We recently measured³ dissolved iron in the equatorial Pacific (0°; 140° W), and we were unable to detect (< 0.02 nmol kg⁻¹) this essential element at 60 m, the depth of maximum upwelling⁴. Assuming that the iron concentration is about 0.01 nmol kg⁻¹, this would be enough to permit the phytoplankton to produce only 5 μmol carbon based on the very high 500,000 C/1 Fe ratio reported by Sunda *et al.*¹. On the other hand, the NO₃ at 60m, 8.1 μmol kg⁻¹, would support the production of 20 times more carbon based on the redfieldian ratio of 6.6 C/1N. The situation is worse south of the Equator (3°S; 140° W). Here, dissolved Fe concentrations do not begin to increase systematically beyond 0.04 nmol kg⁻¹ until a depth of 150 m is exceeded. I still believe that open ocean 'diatomic' iron comes from above, not from below. In areas like the equatorial Pacific, where little or none comes from above, a deficiency of this element limits phytoplankton growth.

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