equator[4] contain seasonal freeze-thaw wedge structures in permafrost regolith that indicate marked seasonal changes of temperature[3,4].

The 'snowball Earth' hypothesis for low-latitude glaciation[5] is difficult to simulate[6,7] and conflicts with geological evidence. The late Neoproterozoic stratigraphic record[8] shows no sign of the drastic lowering of sea level that would accompany global glaciation. Moreover, seasonal freeze-thaw structures could not form near the Equator on a snowball Earth because the very low global temperatures would inhibit seasonal variation[9].

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Denmark lacks coherent policy on basic research

Sir — Recent months have seen a lively, and at times bitter, debate in the Danish media on the future direction of scientific research. Much has been made by the government of the need to shift towards more applied research to maximize the short-term benefits of public investment. However, we would suggest that more critical problems exist that must be addressed immediately to ensure the long-term health of Danish science. Chief among these are a poorly funded and misdirected policy on basic research funding, and conditions of employment that restrict the research opportunities of young scientists.

Danish science is moderately well funded[1]. We have modern facilities, an excellent level of technical support and a buoyant biotechnology sector[2]. What is sorely lacking is a coherent policy on the funding and nurturing of basic research. Entry-level appointments (assistant professor) have a heavy teaching load and no support for scientific staff. Young scientists cannot improve their situation by writing grant applications, since the funding available to the research councils allows little, if any, support for salary components. Such restrictions are making assistant professorships increasingly unattractive, with limited long-term prospects. This situation is only alleviated by the benefaction of senior scientists and charitable foundations, and occasional directives in selected areas which allow young scientists to develop independent research.

Further obstacles exist in the recruitment process: new positions are often focused on narrow research areas and only advertised locally (in Danish). Recent well-intentioned legislative changes have not fully addressed these problems.

Such an inflexible system (which often obliges scientists to spend their entire career in the same institute) is ill-equipped to adapt to the rapid development of new areas in basic research. The only surprise is that Danish science has remained so competitive for so long. How long this will continue to be the case is unclear when there is little to attract young scientists. Without a competitive basic research component, the ability to foster novel applied research (so beloved of the present government) will be severely eroded.

Similar criticisms have been levelled at Sweden. In its case at least some of these criticisms are now being taken to heart, as can be seen by the establishment of openly competitive, well funded, junior faculty positions at the new Centre for Molecular Medicine in Umea. We hope that similar initiatives will be taken in Denmark.

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Green revolution still too green

Sir — L. E. Drinkwater *et al.*[1] report promising isolated studies on environmental quality and productivity in crop production. But these studies should not be used to discredit high-yield crop production technologies globally.

We do not dispute David Tilman's call, in his News and Views article[2] accompanying the paper by Drinkwater *et al.*, for a greener agriculture based on ecological principles. But we do not think that as things stand we have the ability to cope with the probable doubling in global food demand in the twenty-first century with only organic nutrient inputs.

The organic nitrogen production schemes investigated by Drinkwater *et al.* used essentially twice the land area of their 'conventional' system to produce equivalent amounts of grain. But the best arable land is already used for crop production. Therefore expansion of agriculture to produce the required organic nitrogen would necessitate use of marginal land or further encroachment on natural ecosystems, resulting in soil degradation and loss of biological diversity.

Additionally, agronomic technology has advanced considerably beyond the 'conventional' practices used by Drinkwater *et al.* In industrialized countries, the mould-board plough has been largely replaced by no-till and conservation tillage practices. Single applications of fertilizer are being replaced by multiple applications with amounts and timing matched to crop requirements. These practices result in improved soil conservation and quality; greater efficiency in fertilizer use; higher and more stable yields; and they also minimize the land area required for crop production.

Progress towards a 'greener' agriculture will come from continued improvements in modern high-yield crop-production methods combined with sophisticated use of both inorganic and organic nutrient sources, water, crop germplasm, pest management and beneficial organisms.

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Fertile grounds for a lively debate

Sir — I am not surprised that Hermann Bondi[1] was puzzled by my correspondence with Roger Short[2,3], which concerned the relative importance of fertility and agriculture in the population explosion.

I myself was puzzled by Short's response, because I was not arguing that fertility is influenced by nutrition; in fact I had been naively unaware that this is the subject of a lively controversy.

I simply meant that an increase in fertility (from whatever cause) could not by itself have resulted in population growth because the additional babies would have starved. Without the agricultural advances of this century, the world population would not now be approaching six billion, no matter what the fertility rates were.

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