

# Progress requires scientific thinking at all levels

This underpins the core values of a moderate society and must not be limited to an élite.

*Sir*— As a medical student and a Pakistani, I was encouraged to read the Commentary by Atta-ur-Rahman and Anwar Nasim, “Time for ‘enlightened moderation’” (*Nature* **432**, 273; 2004). Students would be the first to benefit from the development of a scientific culture across the Islamic world. On the other hand, increasing spending on higher scientific education (by funding PhDs and establishing research centres, as the authors suggest) would not be an effective way to develop a moderate, mature and tolerant Islamic society.

Instead of offering narrow solutions that largely benefit those within the scientific community, we would do better to encourage

scientific thinking across all segments of society, so that intellectual rigour and open-mindedness become core social values.

Scientific thinking is characterized by scepticism, objectivity, an appreciation of uncertainty and the flexibility to alter one’s beliefs in the face of conclusive evidence. Within the scientific community, these values stimulate open debate and ensure rigorous analysis of data and hypotheses.

However, if public interest in science is underdeveloped and the values underlying scientific thinking remain alien to large portions of the populace, scientists will be unable to effect any real change in social attitudes.

To develop a moderate, enlightened society, the values that underpin scientific thinking should be cultivated among secondary-school students, by improving the quality and availability of scientific education for everyone.

I do not doubt the importance of an active, productive scientific community for the intellectual and economic well-being of a nation. But I do not believe that expending resources to advance the scientific education of a few will bring enlightenment to a whole society.

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## Meyer paper: don’t hang the Soc. Wash. out to dry

*Sir*— As a systematist I was dismayed to read Vladimir Svetlov’s comments in Correspondence (*Nature* **431**, 897; 2004). Svetlov addresses the unfortunate publication of S. C. Meyer’s ‘intelligent design’ (ID) paper (*Proc. Biol. Soc. Wash.* **117**, 213–239; 2004). However, instead of directing criticism at that paper, he makes scathing claims about low-impact journals in general and the *Proceedings* in particular.

Svetlov describes the *Proceedings* as a journal that “enjoyed much-deserved obscurity”. This characterization is not accurate. A cursory review of authorship in the *Proceedings* throughout its 122-year history reveals a list of everyone who’s anyone among systematic biologists, including scores of notable past and current scientists from the Smithsonian Institution.

Journals that primarily publish taxonomic descriptions (such as the *Proceedings*) generally have low impact factors, but the relevance of such papers is often long-lasting relative to those in high-impact journals, as they are cited across decades and centuries rather than over a period of a few years (a search of *Nature*’s website shows that *Proceedings* articles have been cited in at least three Letters to *Nature* since 2002). Such papers are hardly “inconsequential”.

Svetlov says: “The editors and reviewers of many low-impact journals cannot provide the quality reviewing process one gets with *Nature*, *Science*, *Cell* and a few (very few indeed) other established magazines.” My own experience is that a journal’s impact factor does not reflect the quality of the review process per se. Submissions to low-impact periodicals are

often reviewed by sticklers who examine mundane conclusions with the same caution that a reviewer for *Nature* would use in evaluating more grandiose scientific claims. Indeed, the same experts commonly evaluate papers in both high-impact journals such as *Nature* and low-impact specialist journals. This is why Svetlov should perhaps not be “surprised it took so long” for a paper such as Meyer’s to appear in the peer-reviewed literature.

Given the *Proceedings*’ taxonomic focus, Meyer’s ID paper is clearly out of place. Its publication represents a lapse of the journal’s usual editorial policies, and has been swiftly repudiated ([www.biosocwash.org](http://www.biosocwash.org)). However, although the publication of Meyer’s paper is lamentable, it need not be used to trivialize the *Proceedings*’ long, respectable and ongoing tradition of cataloguing global biodiversity.

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## Meyer publication worse than just bad science

*Sir*— Vladimir Svetlov makes some interesting points, in Correspondence, about the proliferation of peer-reviewed journals and the publication of flawed papers (*Nature* **431**, 897; 2004). But he does not take the recent publication of an ‘intelligent design’ (ID) paper (*Nature* **431**, 114; 2004) seriously enough.

We agree that the paper presented no new arguments and appeared in a relatively obscure journal. For such reasons it is unlikely to influence scientists. However,

this does little to diminish its usefulness to ID proponents, who wish to influence public rather than scientific opinion.

The point is that, before it was withdrawn, this ‘peer-reviewed publication’ could be used by ID supporters in the United States to lend apparent legitimacy to their efforts to convince legislators and state and local education boards that ID is science and should be taught alongside darwinian evolution in public schools.

Such efforts are, alarmingly, bearing fruit in many US states — including Ohio (see [www.ncseweb.org/resources/news/2004/OH/832\\_critical\\_analysis\\_of\\_evolutio\\_3\\_10\\_2004.asp](http://www.ncseweb.org/resources/news/2004/OH/832_critical_analysis_of_evolutio_3_10_2004.asp)), where Svetlov himself is currently based.

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## Let’s see what happens if I press this button...

*Sir*— I simply cannot free my mind of the marvellous dreamscape inspired by the Correspondence letter “US rules on tech transfer to foreign nationals” from Peter Lichtenbaum of the US Department of Commerce (*Nature* **432**, 15; 2004).

I, the humble foreign-national visitor, enter the generous host laboratory and start twiddling the knobs on their latest \$1-million gizmo, perhaps with disastrous results for its integrity.

But the resident expert technician cannot approach me with advice because that’s ‘training’, and requires a licence!

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