'traditional' review (as in post-publication commentary, rapid replies and the like) or by developing a 'definitive' text by consensus before publication. Language experts have been investigating readers' reactions to texts for many years; it is time for editors and publishers in the 'harder' sciences to use their methods to extract useful experimental data from these reactions.

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Journals: impact factors are too highly valued

Sir — Linda Butler in Correspondence (*Nature* **419,** 877; 2002) shows that researchers in Australia are publishing more papers since the number of publications was introduced as a performance indicator for research. Butler points out there is now "little incentive to strive for placement in a prestigious journal. Whether a publication is a groundbreaking piece in *Nature* or a pedestrian piece in a low-impact journal, the rewards are identical".

The point is well-made, but her phrase highlights another growing problem in measuring performance which, if unchecked, threatens to have a major impact on science policy and progress. The problem is an over-reliance on journal impact factors to judge the worth of scientists.

It is increasingly common to hear scientists making snap judgements about the quality of others' work simply by perusing the names of the journals in which they publish, with no actual attempt to read their papers. This is a dangerous habit, for quite brilliant work can appear in a 'lesser' journal, either because its subject is not currently fashionable or because its author has special reasons for preferring a specialist forum. The habit is also dangerous because it erodes the capacity of the research community to determine its own direction.

An ex-colleague of mine, for example, liked to publish his excellent work on nerve regeneration, which could have been published anywhere, in a very specialist surgical journal because that is where he thought it would be most likely to inspire immediate clinical use.

The professional editorial staff of very high-impact journals such as *Nature* have a primary responsibility to the success of their journal: circulation, advertising, impact statistics and reputation. Deluged with submissions from authors hopeful of publishing in a journal that will give them bench-credibility in a world of instant judgements, these editors must screen submitted papers to see if they meet the journal's needs before sending them out for peer review. Therefore, most submissions are rejected for reasons other than flawed scientific reasoning.

I have no criticism of this approach: it makes sense in the commercial world of journal production. The problem arises when scientists and administrators of science use the placement of papers to judge the worth of researchers, the worth of institutions, the best places to award grant money and the best places to fund fellowships. The more we couple allocation of resources to publication in 'top' journals, the more we are effectively handing over the direction of research to a small group of professional editors, who never sought this responsibility and who (excellent at their intended jobs though they may be) are unlikely to be the best people to bear it.

Most of us are, at least sometimes, the judges as well as the judged. If we do not consistently take the trouble to judge papers by their content rather than by their location, the direction of science will come to be determined, however unintentionally, by an editorial élite. We shall have only ourselves to blame.

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Bright students enjoy correcting the textbooks

Sir — Students aged 16–17 have been doing chemistry research at Westminster School for the past five years (see the News feature "Put your lab in a different class", *Nature* **420,** 12–14; 2002). Our projects all have their origins in the normal curriculum, as many points of quite elementary chemistry have not been investigated for half a century or more. With modern techniques we can amplify (and often correct) what is written in the standard textbooks.

Our first paper, on the addition of hydrogen halides to alkenes, has now been published (*J. Chem. Soc., Perkin Trans. 2*, 810–813; 2002), and other work is nearing completion. Students gain by having to think about a problem for a year or more, and experiencing the disappointments as well as the satisfaction inherent in original work.

Too often, bright pupils are put off from studying science because they think they will be asked nothing more demanding than to reproduce received wisdom. I hope that the presence of active research groups in high schools may help to correct this misconception.

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Animal research needs organized defence

Sir — Your Opinion article "Promoting animal research" (*Nature* **420,** 447; 2002) delivers a much-needed message.

Ten years ago, I volunteered to join a National Institutes of Health programme to educate young people about the need for intact animals in biomedical research. Local high schools and colleges were sufficiently receptive to encourage me to continue.

In the past four or five years, however, my approach to the education authorities has fallen on deaf ears, although all of the teachers, and many of the students, voiced praise for the programme early on. One teacher told me that they did not want to run into problems with animal activists by allowing me to speak. Most of the population is disappointingly uneducated about science and a significant percentage is anti-science.

Next month, I will send approximately 30 letters to local colleges and high schools in an attempt to rekindle the interest. I believe that major biomedical and medical societies, and journals, should constantly urge an educational campaign to deliver our message to the public.

People like myself are very willing to volunteer to speak, design handouts, and so on, but a central focus group is needed.

Charles G. Smith
Address supplied

DNA discrepancy

Sir — We should be able to trust any author, whether or not a scientist, to deliver an accurate description of the past. Indeed, your final editorial of 2002 exhorts scientists to work to retain the public trust (*Nature* **420,** 719; 2002). Thus, it is even more unfortunate that *Naturejobs* states in the same issue (*Naturejobs* 3; 19/26 December 2001) that Rosalind Franklin and Maurice Wilkins worked on DNA structure at the University of Cambridge: they were famously, of course, at King's College London.

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