

Editorial discretion and indiscretion

Towards the end of last year a paper, conservatively titled 'Transgenic DNA introgressed into traditional maize landraces in Oaxaca, Mexico' appeared in the literature (Quist, D. and Chapela, I. H., *Nature*, 2001, **414**, 541). A quick glance at the paper reveals illustrations and protocols characteristic of any contemporary paper in molecular biology; photographs of DNA gels, descriptions of polymerase chain reaction (PCR) procedures, nucleotide sequencing and the somewhat less widely used, inverse PCR reaction. To a casual reader, uninterested in transgenic crops only the uncommon words 'introgressed' and 'landraces' may have attracted attention. But the opening sentence is a giveaway: 'Concerns have been raised about the potential effects of transgenic introductions on the genetic diversity of crop landraces and wild relatives in the areas of crop origin and diversification, as this diversity is considered essential for global food security.' Towards the end of this rather terse communication is another carefully worded sentence: 'The intentional release of large amounts of commercial transgenic seed into the environment since the mid-1990s represents a unique opportunity to trace the flow of genetic material over biogeographical regions, as well as a major influence on the future genetics of the global food system.' But masked in the measured and at times, impenetrable language of the scientific paper was a clear message; the Quist–Chapela experiments suggested that 'transgenes' from genetically modified, industrially produced maize appeared to have integrated into the genomes of wild relatives in the neighbourhood. The authors concluded that there is a 'high level of gene flow' and raised questions on the origins of the 'introgressed DNA', since Mexico has had a moratorium on the planting of transgenic maize since 1998. Somewhat disturbingly, this study also suggested that in some samples 'the transgenic DNA construct seemed to have become re-assorted and introduced into different genomic backgrounds, possibly during transformation and recombination'. As *Science* noted in a sensationally titled news item 'Has GM corn "invaded" Mexico', 'a gene's behaviour depends on its place in the genome, the displaced DNA could be creating utterly unpredictable effects' (Mann, C. C., *Science*, 2002, **295**, 1617). The Quist–Chapela paper appeared to be providing clear scientific support for the vocal anti-GM crop groups, around the world. It also seemed to signal a setback for the powerful multinational companies, that would like to cash in on the ongoing revolution in agricultural biotechnology.

The formal counter-attack was not long in coming. In April this year two 'brief communications' appeared unambiguously entitled 'Suspect evidence of transgenic con-

tamination' and 'Maize transgene results in Mexico are artefacts' (Metz, M. and Fütterer, J., *Nature*, 2002, **416**, 601; Kaplinsky, N. *et al.*, *Nature*, 2002, **416**, 601). Their import was clear. The first communication emphatically stated that 'there is no evidence of transgenes fragmenting and scattering through genomes'. The second noted that 'transgenic corn may be being grown illegally in Mexico, but Quist and Chapela's claim that these transgenes have pervaded the entire native maize genome is unfounded'. The authors concluded that 'it is important for information about genetically modified organisms to be reliable and accurate, as important policy decisions are at stake'. These exchanges might have been dismissed as yet another example of the bitter differences between proponents and opponents of genetically modified crops, but for the appearance of an 'editorial note' in *Nature* (2002, **416**, 600), which 'concluded that the evidence available is not sufficient to justify publication of the original paper'. *Nature's* editors were publicly backtracking, although the Quist–Chapela paper had passed the journal's apparently rigorous peer review, and the authors had obtained further data and stood by their results. In similar situations the journal (and indeed most journals) would have maintained a discreet silence, allowing readers to judge the science, uninfluenced by editorial judgements. In the 27 June 2002 issue of *Nature*, the battle expanded with correspondents questioning the motives of both the journals and the critics of the Quist–Chapela paper. The fact that the authors of the two published critiques had 'part of their research funded by the Torrey Mesa Research Institute (TMRI), an offspring of the agricultural biotechnology company Novartis (now Syngenta)', was seen as a significant indicator of bias. The 'strategic alliance' between TMRI and the University of California, Berkeley, home to both Quist and Chapela and many of their critics, muddies the waters even more. Even more pointedly, the correspondents, many of whom are at Berkeley, note that the *Nature* Publishing Group actively integrates its interests with those of companies invested in agricultural and other biotechnology, such as Novartis, AstraZeneca and other 'sponsorship clients', soliciting them to 'promote their corporate image by aligning their brand with the highly respected *Nature* brand. In this growing controversy even the journal *Nature* seems to have left itself open to a charge that its editorial actions were driven by a 'partisan agenda' to promote commercial interests in agricultural biotechnology. There is an element of irony in this accusation against the journal; indeed *Nature's* publication of the note 'Transgenic pollen harms monarch larvae' in May 1999, triggered an upsurge of activity by the anti-GM

technology activists, with many observers questioning the journal's motivation in publishing an apparently preliminary report, whose interpretations were debatable.

The debate on genetically modified foods has left its imprint in other editorial offices. The publication by *Lancet* of a paper entitled 'Effects of diets containing genetically modified potatoes expressing *Galanthus nivalis* lectin on rat small intestine' (Ewen, S. W. B. and Pusztai, A., *Lancet*, 1999, **354**, 1353), unleashed a wave of anti-GM food attacks. A blue-ribbon Royal Society panel found the research flawed, but 'five out of six' reviewers for *Lancet* had approved publication of the paper. The *Lancet* editor's motives in promoting the Ewen-Pusztai manuscript were discussed and *Nature*, in a rare moment of introspection, worried about the 'dangers of over-dependence on peer-reviewed publication'. Few would argue with the conclusion: 'The journals should be expected to maintain their standards in publishing valid, if occasionally credibility stretching science. But the ever-increasing reliance on them for quality control has disadvantages that should be countered by adequate provision of time and resources for independent assessment and, in the midst of controversies, publicly funded agencies providing comprehensible, reliable and prompt complementary information over the networks' (*Nature*, 1999, **401**, 727).

Looking back on the 1999 controversy, *Lancet's* editor, Richard Horton noted that such 'arguments... threaten the fragile remnant of trust that remains between the public and scientists'. Horton is quick to point out the drawbacks of peer review, which may sound familiar to most authors of rejected manuscripts: '... the system of peer review is biased, unjust, unaccountable, incomplete, easily fixed, often insulting, usually ignorant, occasionally foolish and frequently wrong' (Horton, R., *The Medical Journal of Australia*, 2000, **172**, 148). But in reflecting on the GM food battle, Horton highlights the fact that the Royal Society claimed in its report that 'genetically modified food offers one solution to a projected global famine'. He counters by quoting Amartya Sen's conclusion that 'access to food depends far more on a complex mix of economic, social and political factors' and that, as we all know too well, 'a person may starve in the face of plenty'. Horton's conclusion is bound to raise many hackles when he says: 'seeking a technological food fix for world hunger may be not only the biggest scientific controversy of 1999, but also the most commercially malevolent wild goose chase of the new century'. While dependence on peer-reviewed publications may be an uncertain guide to formulating public policy, it is important to recognize that the conflicts of interest that sometimes arise in government and publicly funded agencies can be even more disturbing and dangerous.

The turmoil at editorial offices at the most prestigious scientific journals has not been restricted to the area of biotechnology. In March, *Science* published a paper entitled 'Evidence for nuclear emissions during acoustic cavitation' (Taleyarkhan, R. P. *et al.*, *Science*, 2002, **295**, 1868). Its claim was startling. The authors reported the detection of nuclear fusion in a table top experiment, raising the ghosts of the 'cold fusion' episode. While the jury still seems to be out on the experiment, the debate on whether *Science* should have published a paper, whose results were in doubt, has raged for several weeks. Commenting editorially on the controversy, the editor of *Science*, Donald Kennedy notes that the history of the paper

by Taleyarkhan *et al.* 'has exposed some of the more unusual challenges that can arise in the publication processes'. Pressure mounted on the journal not to publish the paper as physicists aware of its findings grew sceptical of the conclusions. Organizations like the American Physical Society seemed to publicly discredit the report even before its publication. At this stage, Kennedy correctly concluded that 'publication is the right option, even – and perhaps especially – when there is some controversy'. The journal's mandate, he notes, 'is to put potentially important science into public view after ensuring its quality as best as we possibly can. After that, efforts at repetition and reinterpretation can take place out in the open' (Kennedy, D., *Science*, 2002, **295**, 1793).

The pressure on high profile journals has increased even as the public expectations of the fruits of science and technology have grown. In many areas like biomedicine the pages of the top journals are scanned carefully to spot the signs of impending breakthroughs, which may affect the lives of millions of people worldwide. There are many red herrings, which have their day in the limelight, as the popular press blows the findings of scientific papers out of all proportion to their true import. There are publicity-seeking authors who can trumpet a scientific paper most effectively for the cause of self-advancement, before apparently sensational findings are washed away by the growing avalanche of scientific literature. For the 'highest impact' journals to stay on top, they must ensure that they snare the best papers. In order not to lose out to the competition, risks must sometimes be taken. The flood of misconduct cases that seem to have hit the best journals in recent times is an indication of the pressures on authors, reviewers and editorial offices. The most recent cases in the physical sciences, notably the problems at Bell Laboratories (Brumfiel, G., *Nature*, 2002, **418**, 120) and the even more recent retraction of the discovery of elements 116 and 118 at the Lawrence Berkeley Laboratory (*Phys. Rev. Lett.*, 2002, **89**, 039901), suggest that science may be approaching a new crisis. In arguing that complacency on misconduct issues may be dangerous, *Nature* notes somewhat ominously that business leaders had often felt 'that markets would correct for dishonest practices, in the fullness of time' (*Nature*, 2002, **418**, 111). The growing range of financial scandals demonstrates the impotence of markets to police themselves. Will this also be eventually true of science?

Journal editors can, if they so desire, wield complete control on the material they publish. But, realistically no editorial office can function without the unflinching and most often, selfless service of peer reviewers. At times, editors must exercise judgement and their decisions will anger either authors or reviewers. In most cases, the benefit of doubt must go to authors, in the hope that publication of results that fail to stand up to subsequent scientific scrutiny, is a lesser evil than the prospect of suppressing an interesting, but controversial finding, that may advance the course of science. In recent times the growing impact of the findings of science on public policy has made the exercise of editorial judgement, at times, a difficult and even professionally hazardous process. Editors have the right of exercising discretion, but inevitably they must be allowed a margin of indiscretion.

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