

Reflections on scientific fraud

An exhaustive investigation has revealed significant contamination of the physics literature by a researcher. Such incidents are difficult to prevent, but all involved can try harder.

Long gone are the days when scientific frauds could be dismissed as the work of the mad rather than the bad. The unhappily extensive record of misconduct suggests that many fraudsters believe their faked results, so attempts at replication by others represent no perceived threat. Just what was going through the mind of the condensed-matter physicist Jan Hendrik Schön has not been revealed by the inquiry into his work, which last week reported 16 incidences of fraud (see page 419). Was he trapped in a spiral of expectations that could only be fulfilled by deception?

Maybe time will tell. In the meantime, others need to look to their laurels. Co-authors have been exonerated of fraud, but those who had most experience of the materials being explored will be searching their consciences over what they might have been able to prevent had more self-critical attitudes been adopted. Editors, referees and co-authors: be cautious if one co-author has been single-handedly and prolifically ground-breaking without replication by their colleagues or others.

The report reaches no conclusions about the role of the journals, including *Nature*, *Science* and *Applied Physics Letters*. *Nature's* editors have looked at their files, including the timing and the state of the concurrent literature, and the scatter of Schön's research across different types of material. *Nature's* peer-review processes have picked up fraud on occasion, and if a referee of Schön's *Nature* submissions had looked at papers on different materials, he or she might have spotted the duplications in data that, in the end, were the smoking gun. But that would have been by luck, rather than by reasonable expectation.

In some media reports, journalists and a few scientists who are unconnected with the Schön investigations have taken the opportunity to make potentially damaging assertions about journals, including *Nature*: that in order to compete or to publish exciting results, journals will cut corners in peer review, overrule hostile reviewers or select sympathetic ones.

We at *Nature* unequivocally reject such charges. The publication history and files of these particular papers and the editorial policies

and interests of *Nature* are completely at odds with these assertions. *Nature* has nothing to gain by the pursuit of glamour at the expense of scientific quality, considering, not least, the criticisms, corrections and retractions we would then habitually be forced to publish. There is more than enough rock-solid and splendid science to publish. Furthermore, it is a strict policy of *Nature* that our Letters and Articles are selected for their outstanding scientific impact, sometimes also taking into account relevance to public policy issues, but never simply because the results will make headlines.

Reviewers are not selected so as to ensure a positive outcome for exciting work. Preference is given to experts with a proven track record in providing thorough and critical advice. There is always the possibility that exciting papers from groups with an excellent track record will be viewed less critically than those from an unknown quantity, as referees and editors might take more on trust, and it is here that journal reviewers and editors may find the investigating panel's report to be salutary (see www.lucent.com/news_events/researchreview.html).

Nature stands by its insistence that all co-authors should have seen and agreed to a submitted paper. We have indicated on the online versions of the five *Nature* papers that they are contaminated — see also page 425. We have invited all co-authors whom we could contact to send in retractions. As we have done in the past, we are prepared to publish retractions by a majority of authors in the face of non-cooperation by one co-author, making any author's abstention clear to readers. As *Nature* goes to press, the signs are that Schön's co-authors will agree to such retractions.

The Schön scandal is generating widespread attention and critical introspection. Such misconduct has occurred before, mostly in the life sciences, and the scientific community has improved its procedures for investigating misconduct when it arises. Moreover, in many countries, government agencies have introduced principles of laboratory management in order to minimize the potential for fraud. A key question now is whether such guidelines are being implemented. ■

Time to eradicate malaria

The fight against the disease needs not only money but also coherence.

Malaria kills over one million people every year, mainly in Africa south of the Sahara. Another 300 million to 500 million have the disease. But despite the dedication of many fighting this formidable enemy, progress is chronically slow. Politicians and research administrators are prone to throwing in the towel. Basic researchers often care more about their next grant proposal or publication than going that extra mile to tailor their work better to meet the needs of researchers in poor countries for applicable tools. And bureaucrats in the international health system (see page 422) sometimes pay more attention to, well, their bureaucracy.

The time is right for a sustained effort to eradicate malaria. This week sees the publication of the genomes of *Plasmodium falciparum*, the deadliest malaria parasite, and its proteome (see pages 498–542), and of *Anopheles gambiae* (*Science* **298**, 129–149; 2002), the mosquito

vector. These, combined with the human genome, mean that the scientific infrastructure for a complete understanding of the biology is now in place, as well as for generating drug and vaccine targets in a faster and more rational manner (see also pages 426 and 429).

Resources for malaria research and control are still scandalously scarce, but are getting better for control, thanks to the Global Fund to Fight AIDS, Tuberculosis and Malaria, whose US\$100-million input this year will double the overall funding for control. To capitalize on the science, a comparable Global Health Research Fund is also required. Most importantly, there is a need for everyone involved to coordinate their efforts in basic genomics, drug and vaccine discovery, and implementation in the field. There is a rallying call for the international health and research community that may sound trite but is both apt and timely: "Together, we can and must stop malaria." ■