

THIS WEEK



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Failure of care

Laboratory animals must have the very best standard of care if we are to justify their use in science. As one institution is found wanting, others should look to review their animal-welfare practices.

In 1911, the United Kingdom made it a criminal offence for scientists, doctors and others to 'infuriate' animals in their care. It was a curious choice of words, and one that demonstrates the level of protection that British authorities sought — and still seek — to give rats, mice and other creatures. Such animals are vulnerable, and scientists who use them in laboratories, British law demands, must work to protect not just their physical well-being, but their emotional state too. As a result, researchers and those who support their efforts, including this journal, can respond to critics of the ethics of vivisection with the twin defences that the work is essential and carried out under strict controls.

It is infuriating, then, to see that legitimate defence of the use of animals in research weakened, as it has been this week by revelations of poor animal-research standards at one of the world's leading universities. The university, a new report finds, lacks adequate leadership, management, operational, training, supervisory and ethical-review systems to support high standards in animal use and welfare. It highlights an academic culture of complacency, of understaffed animal facilities, patchy training and poor supervision. It makes difficult reading for anyone who has ever argued for the use of animals in research.

The institution criticized is Imperial College London, but the failings and the problem almost certainly extend further. At a press conference held to release the report in London on 9 December, members of the investigating committee were keen to emphasize that they had witnessed no malpractice themselves during their inspections, but said that the improvements they suggested would make malpractice less likely to occur in future, at Imperial College or elsewhere. To manage and coordinate hundreds of scientists and support staff involved in work with animals is a complex task — one, the report says, that universities should take as seriously as running an individual academic department.

To be clear, the failings identified do not weaken the case for using animals in science — although the more strident opponents of vivisection will probably argue otherwise — but instead offer a clear demonstration that the ethical considerations of such work do not begin and end with its scientific justification. The day-to-day implementation of the task is as important as the purity of the goal. Those who take the moral high ground must, after all, be sure they stand on solid foundations.

The value of research with animals and the need for that research to be done properly should not be confused — and it is unfortunate that Imperial College chose to buttress its contrite official response to the review with polished summaries of the benefits of animal research for human health. That is not what this is about.

Imperial College has already said that it accepts all the recommendations of the committee that wrote the critical report, and is working to improve the situation. The failings identified are unlikely to be picked up in government inspections, and other institutions should carry out their own reviews. Imperial College commissioned the current report

only after specific allegations of misconduct were raised by anti-vivisection campaigners. Other universities should not need to be asked twice.

In the case of Imperial College, the investigating committee had to tip-toe around the specific allegations, raised in April after an undercover investigation by the British Union for the Abolition of Vivisection. Those allegations are being looked at in a separate inquiry by the British government, which grants scientists and universities the licences necessary to work with animals, and sets out the required conditions.

"The ethical considerations of animal research do not begin and end with its scientific justification."

Not for the first time when it comes to academia, many of the proposed improvements centre on better and more constructive communication. E-mailed queries to project scientists from the technicians who supervise the animals, and who are best placed to spot if they are in discomfort, should be replaced with face-to-face meetings. Statisticians should be brought in to discuss projects at the

planning stage, so as to ensure that the experiments will be properly powered and the results meaningful.

What is most disappointing about the weaknesses exposed at Imperial College is that they come as the public-relations battle over the use of animals in research, in Britain at least, seems to have been won. Violent direct action against scientists and laboratories has ended. Public sympathy and political support for the work have been secured. A key part of that victory was the ability to stress, time and time again, that the research was permitted only because it was always done under the strictest possible conditions. We cannot say that today. ■

The patent bargain

An open-source patent database highlights the need for more transparency worldwide.

It may take a patent lawyer to fully understand the scope of US patent number 7,777,022, but one thing is clear: at first glance, it certainly appears broad. The patent includes 4.2 million genetic sequences, some of which were identified computationally in a fishing trip for sequences that have applications in virology.

In June, the US Supreme Court determined that patents should no longer be granted for 'inventing' naturally occurring human genes, ending 30 years of the practice at the US Patent and Trademark Office. The decision will probably affect the growing genetic-diagnostics industry, and its influence will extend to patents on genes from other organisms. But it did not abolish all claims on DNA sequences — some

have estimated that the case will affect only about 8,000 of the at least 72,000 US patents that mention DNA sequences of one sort of another.

That leaves businesses with the unenviable task of sifting through the remainder to determine which, if any, will affect the commercialization of a given invention. Patent 7,777,022 highlights the growing difficulty in doing so: although it lists millions of sequences, it lays claim to only a few. A firehose of data and limited search tools make it impossible for all but highly trained patent specialists to make sense of the landscape around any technology. Highly trained patent experts do not come cheap: companies invest millions each year to keep track of the shifting intellectual-property landscape. Those that cannot afford the fee take the risk of being unable to patent their discoveries, or of being sued.

On 6 December, a study published in *Nature Biotechnology* took an important step towards rectifying that problem by revealing an open-source database that allows interested parties to map out the patent landscape around a technology without racking up exorbitant legal fees (O. A. Jefferson *et al.* *Nature Biotechnol.* **31**, 1086–1093; 2013).

The database, called the Lens (www.lens.org/lens), was created by Cambia, a non-profit organization in Canberra dedicated to facilitating innovation. It pulls together information from more than 90 patent jurisdictions worldwide. The Lens can be used to investigate patents of any ilk. But it has dedicated tools to analyse patents on DNA and protein sequences, and has plans to develop similar tools for other classes of patents, including those for circuits, software and chemicals.

The Lens is a bold effort to bring clarity and parity to the analysis of patents. It is also an innovation in need of support. Powered by eight busy software engineers, and funded by a patchwork of foundations and the Queensland University of Technology in Brisbane, Australia, it is tackling big-data problems that few have dared to take on. It will work best when it has cultivated a wiki-style following of users willing to take the time to annotate content, develop tools and share analyses.

Such a following can be hard to come by when academics and business leaders are already juggling busy schedules and scrambling for funding of their own. Cambia founder and chief executive Richard Jefferson is quick to acknowledge that some previous open-source efforts met with much enthusiasm but little participation from the academic community. It would be worth the effort for funders and institutions to find ways of incentivizing participation in an open-source patent effort.

Technology-transfer offices can help by logging the allocation of licences and changes in ownership in patent-assignment databases, where possible. A recent study led by Arti Rai, a specialist in intellectual-property law at Duke University in Durham, North Carolina, found that many universities fail to comply with basic requirements to acknowledge the contribution of federal funding to inventions in patent databases (A. Rai and B. Sampat *Nature Biotechnol.* **30**, 953–956;

“Many patent systems do not post their patents in a machine-readable format.”

2012). Such information is important to track the history of the patent and the impact of federal research funding, as well as to allow the federal government to pursue its rights regarding such patents.

In the United States, the push to boost patent transparency has gained much-needed attention from on high. Revelations that some businesses, sometimes known as ‘patent trolls’, have been amassing large patent estates and using them to threaten other firms with litigation has caught the attention of the US Congress and the administration of President Barack Obama. Lawmakers are now considering legislation to rein in patent trolls, in part by creating reporting requirements that will help to clarify who owns a given patent — information that is currently hard to come by.

But the US patent system, troubled though it is, is not the only system that makes it difficult to track patents. In a survey published along with the Lens analysis, Cambia researchers noted that many patent systems do not routinely post their patents in a machine-readable format, making it difficult to search and analyse them. Where possible, it is time for such systems to address these flaws.

On the first day of many introductory patent-law classes, students are taught about the ‘patent bargain’. This is the foundation upon which the patent system is built: in exchange for protection for an invention, the inventor agrees to publicize their creation so that others may build upon it. The idea behind patenting was thus to put innovation into the public domain — yet the patent system has developed too many nooks and crannies in which information can be hidden away.

It is time to return to the bargain at the root of the patent system, and to use the computational and social-media tools at our disposal to publicize inventions, rather than obscure them. ■

Gender progress (?)

Despite some success, the proportions of women in Nature’s pages and as referees are still too low.

There are many obstacles to diversity in science. In any nation, there will be cultural and societal factors — often intersecting — that prevent the full research potential of one population group or another being fulfilled. One manifestation is discussed on page 211.

We at *Nature* have attempted to put our own house in order, and have produced just a scratch on the surface of one particular challenge — the low proportion of women contributing to our own content. That scratch is there thanks to actions taken since we focused on this issue in an Editorial a little over a year ago (see *Nature* **491**, 495; 2012).

So what have we achieved? In the visibility of women in our pages, progress has indeed been made.

In the News & Views section, the proportion of female authors has increased from 12% in 2011 to 19% in 2013.

The proportion of women appearing in profiles by our journalists has increased from 18% in 2011 to 40% in 2013. That does not include the four profiles in our ‘Women in science’ special issue early this year (see nature.com/women).

The number of articles by women in our World View section, which is driven by current topics, has remained low, now running at 12%. By contrast in 2013, 33% of Comment articles had at least one female author (27% of them had a woman as the first author). The combined total of World View and Comment articles with at least one woman author in 2013 is 26% — an improvement on 19% in 2011–12.

In our Editorial a year ago, we highlighted the need for a ‘gender loop’ — a conscious step in which an editor deliberately identifies several female candidates before selecting authors and profile subjects in our magazine sections, and referees for our research papers.

In this last category, the result has been disappointing — the number of women referees has remained all too low. From 14% in 2011, the proportion of women fell to 12% in 2012 and then rose to 13% in 2013. Taking into account uncertainties resulting from ambiguities in some names, these numbers are essentially on a plateau.

Efforts have been made by research editors, when visiting labs and meetings, and when surveying the literature, to increase the number of women invited to act as reviewers. Women already make up only a small proportion of the potential referees, owing to the demographics of the research community. And our efforts have made us all the more aware that a higher proportion of women than men decline our invitations to referee. We have not investigated this with a survey, but informal comments indicate that women tend to be that much more busy.

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The lesson in this tale is: we must try harder. ■