

# **“*Science*, Policy, and Peer Review”**

## **American Geophysical Union Fall Meeting**

**Dr. Don Kennedy  
Editor-in-Chief, *Science***

**December 2006**

Peer review is an honored concept and has worked pretty well on average – both in proposal review and manuscript review. We could not get along without it at *Science*. It is work that the scientific community does on a voluntary basis for the good of the enterprise – in its way a special triumph of community service.

But failures of peer review generate problems for journals and for public attitudes about science. We have experienced one of these recently and it has given us an expanded view of both of these aspects. After it turned out that the two stem cell papers from the Huang group in South Korea were revealed to be ingenious falsifications, some asked whether peer review had failed. We appointed a committee of scientists to evaluate everything we had done, and they reported several weeks ago. It contained good news and bad. The good was that we had followed the editorial and review processes typical of top-tier journals and that our editors had exceeded normal requirements in order to assure themselves that the story held. The not so good news was the committee's warning that the environment had changed, strengthening incentives for authors to over claim or even to cheat. They recommended adopting risk-assessment criteria that could be used to single out papers that would merit special attention that might include requesting extra verification from authors, additional data and original copies of images, and specification of the particular roles of all authors. My only worry is that the consequent erosion of trust, if we don't manage carefully, will have costs that outweigh the benefits of catching some fraudulent work.

Peer review came to the Supreme Court's attention in the early '90s in a case involving the admissibility of expert testimony in a product liability case in which plaintiff's experts were testifying as to whether the drug Bendectin for morning sickness had caused birth defects. The circuit court affirmed the district court's decision to disallow the testimony of an expert on the grounds that his techniques were not “generally accepted” in the scientific community. The Supreme Court received many amicus briefs from scientific organizations including several – I participated in one -- that discouraged the idea that peer reviewed publication in a journal be a single qualification for acceptability. The Court set aside the “general acceptance” standard, giving district court judges several criteria to use – including but not limited to peer review. That did give the process of peer review a kind of formal standing.

Perhaps because of new attention to problems associated with peer review, that topic has now assumed a new level of political and policy status – so much so that it now finds itself in a new statutory and regulatory environment. Here is the chain of events: problems arose over the Clean Air Act and its requirement that ambient air quality standards be reviewed every five years for the “criteria pollutants.” EPA cited the Harvard 6 Cities study in support of a stricter standard for

particulate emissions. The industry asked for primary data tapes to support its own reanalysis. Harvard declined; the Shelby Amendment followed, requiring all federally sponsored study results be available under the Freedom of Information Act. The Office of Management and Budget (OMB) set regulations with a threshold of significant economic effect. Two succeeding changes are an important part of this sequence. First was the Data Quality Act, requiring that government publications and advice be subjected to accuracy requirements. After implementing regulations were added by OMB exempting the results of university basic research from the requirement, a new initiative on Peer Review Guidelines was added requiring that agencies establish their own processes under the general guidelines.

In the past six years, peer review as a process of validation has experienced a growth in stature for an odd reason. In a number of well-documented cases, findings produced by government scientists working in an official capacity – sometimes already published or in press in peer-reviewed journals – has been changed at higher administrative levels to conform to some desired policy outcome. In a situation where science can become politics by other means, it is important to have a trusted measure for integrity and reliability. Peer review, for all its limitations, does provide that, and it is an important protection against those who want to change outcomes for their own purposes.