More Squabbling Over Unbelievable Result

Nature's *publication of the investigation of an unbelievable experiment has triggered as much debate on the journal's conduct as on the truth or falseness of the results*

AN INVESTIGATION of unbelievable results that were published last month in *Nature* has raised more questions than it answered, particularly concerning why the results were published in the first place. The investigation, conducted by *Nature*'s editor, John Maddox, professional magician James Randi, and fraud investigator Walter Stewart, concluded there was "no substantial basis" for the claims put forth in the earlier *Nature* paper. In response, the scientist who did the research has criticized the conduct of the investigation and questioned *Nature*'s decision to accept the paper when the journal apparently suspected fraud or trickery.

In the 30 June issue of *Nature*, French chemist Jacques Benveniste and co-workers published the results of a series of experiments that seemed to have no physical explanation. The researchers measured the response of a type of human white blood cells to varying concentrations of a particular type of antibody. They diluted the antibodies with distilled water to the point where there should have been no antibody molecules left in the solution, and still they observed a reaction from the white blood cells. Standard theory offers no explanation for such a result, and the researchers suggested that the antibodies were somehow leaving an imprint on the water molecules that triggered the response of the white blood cells.

To convince *Nature* to accept the paper, Benveniste arranged for independent laboratories in Israel, Italy, and Canada to repeat the experiments, and researchers from these three labs were listed as coauthors on the final work. The journal held up publication of the paper for 2 years as it pushed for various substantiations, and finally published it with the condition that later an investigative team would watch Benveniste's group perform the experiments and file a report on the conduct of the work.

That report, which takes up four pages in the 28 July issue, damns Benveniste's experiments as "statistically ill-controlled, from which no substantial effort has been made to exclude systematic error, including observer bias, and whose interpretation has been clouded by the exclusion of measurements in conflict with the claims [of the researchers]." The investigating team depicts the experiment as one whose results were more likely due to the desires of the experimenters than to physical reality. The report suggests that the research team members, two of whom are doctors of homeopathy, wanted the experiments to succeed because that success would support some of the tenets of homeopathic medicine, which uses very small doses of various substances to cure ills.

The investigation found "no substantial basis" for the claims put forth in a paper* Nature *published.

Maddox said that Randi, who has made a name for himself uncovering trickery of various sorts, was included on the team because Maddox suspected some of the results might be due to fraud. "We thought it quite probable that there was someone in Benveniste's lab who was playing a trick on him," Maddox said. Randi found no evidence of conscious fraud, however, and Maddox said a more likely source of Benveniste's results was "autosuggestion"—one or more of the researchers seeing what they expected to see or wished to see.

Benveniste, replying to the report in the same issue of *Nature*, denounces the behavior and the conclusions of what he calls the "almighty anti-fraud and heterodoxy squad." He notes that neither Randi, Maddox, or Stewart has a background in immunology and claims that this ignorance caused various mistakes and misunderstandings in the investigation. More seriously, he charges that the investigation was more a witch hunt than a sober search for scientific truth. "This was nothing but a real scientific comedy, a parody of an investigation carried out by a magician and a scientific prosecutor working in the purest style of the witches of Salem or of McCarthyist or Soviet ideology," he told the French newspaper *Le Monde*.

The conclusions of the investigation and the controversy over how it was performed spotlight *Nature*'s original decision to publish the paper. Why, for instance, would a journal publish experimental results suspected of stemming from fraud or misinterpretation of data? Maddox said he was pushed to print the article because the French press had been alerted to the story and were spreading details of Benveniste's work.

Perhaps the more important question is: Why not wait 4 weeks and publish the paper at the same time as the report of the investigation? In 1972, when *Nature* published an earlier unbelievable result that turned out to be incorrect—that rats could be trained to avoid the dark by injection of the chemical scotophobin into their brains—the journal included a vigorous dissent by one of the paper's referees in the same issue. (A historical note: That referee was Stewart, and the scotophobin experiment was what got Stewart started on his crusade for accuracy in scientific publications.) Maddox said he decided not to publish the research article and the investigation together because he was concerned Benveniste would withdraw his paper upon seeing the report of the investigators.

Many scientists question *Nature*'s handling of Benveniste's paper. For instance, Arnold Relman, editor of the *New England Journal of Medicine,* said that, for such unbelievable results, the journal should have insisted on verification by a completely independent set of authors before publishing anything. What the journal should not have done, Relman said, was publish the paper and then undertake an investigation itself. "A journal should not be an investigative body," he said. An editor's job is to see that material is rigorously and fairly reviewed, he said, and when a journal acts as *Nature* did, "the editor becomes the judge, the jury, the plaintiff and—in some sense—the accused." Such a fraud investigation by the editor is a conflict of interest, Relman said.

The handling of the affair has certainly left a bitter taste in Benveniste's mouth. He says he would be happy to have someone point out errors in his experimental procedure that can account for the unbelievable result, but he feels betrayed by *Nature*'s decision to run the article and then attack it through the report of the three fraud investigators. "Everything has taken place as if one was trying to flush out a skylark from a field of corn in order to get a better shot at it," he said. "It may be that all of us are wrong in good faith," he wrote in his rebuttal to *Nature*'s investigation. ■ **ROBERT POOL**