

## The Biologist's Burden

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## The Biologist's Burden

Scientists worldwide were doubtless relieved earlier this year to learn the results of inquiries into the integrity of controversial research on climate history at the University of East Anglia (UEA) and at Penn State University. Various panels reported finding no credible evidence that the principal researchers whose conduct had been questioned, Philip Jones of UEA and Michael Mann of Penn State, had engaged in the suppression of data or any other deliberate scientific malpractice. The findings came despite some troubling comments and requests in the thousands of e-mails to and from UEA's Climatic Research Unit that persons unknown hacked and made public last November. (As this article was written, additional inquiries were ongoing.) Yet it would be a mistake to suppose that this damaging controversy therefore carries no lessons for scientific conduct. Biologists, perhaps more than other researchers, would be wise to think hard about other findings from the investigations into "climategate."

A panel chaired by Ron Oxburgh, charged with looking into research at the Climatic Research Unit, found it "very surprising that research in an area that depends so heavily on statistical methods has not been carried out in close collaboration with professional statisticians," and recommended involving a much wider scientific group. Moreover, Oxburgh reported that the "dedicated if slightly disorganized" researchers at the unit accepted "that they should have devoted more attention in the past to archiving data and algorithms and recording exactly what they did." The conclusion is given extra force by the fact, noted by the panel, that research methodologies change over time. Oxburgh's panel further observed that there were "important and unresolved questions" about the availability of environmental data sets and the use of Freedom of Information Act requests by third parties to access such data. A parliamentary report similarly cleared the unit of scientific malpractice, but found it "should have been more open" with raw data that it had permission to make public.

An inquiry at Penn State launched after the disclosure of the e-mails—although finding no evidence that Mann deleted or concealed any information, and noting that the National Academy of Sciences had previously found his research to fall within accepted practice—nonetheless declined to make a finding on the allegation that Mann had "seriously deviated from accepted practices for proposing, conducting, or reporting research or other scholarly activities." It established a separate investigative committee to look at that question, since it hinged on undefined norms of acceptable faculty behavior.

Researchers funded by the public purse presumably are aware that their work is subject to scrutiny, but worldwide instantaneous communications as well as ever-changing technology and statistical methods raise the bar for good research conduct. It is clear that an international blow-up can result when researchers in a disputatious field make themselves targets for criticism. Biology—which is often based on incomplete data sets of diverse origins—is as vulnerable as any science to damaging controversy. As the costs of climate change and its preventive measures spread around the globe, scrutiny will probably only increase. Savvy practitioners will want to take heed and make clear to colleagues, students, and the public that their procedures and data are thoroughly documented and available for independent examination. Public trust in science could depend on it.

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