

# Grace Under Pressure: A Challenge to the Modern Reviewer



This is not another commentary on fraud in science, although the temptation is great. Each month yields another instance of a researcher caught in the fabrication of data. That triggers a sequence of events as predictable as radioisotope decay. Committees are appointed to explore the evidence.

Papers are retracted (but still cited anyway). Guardians of Civilization intone that the scientific community is in dire need of housecleaning. Scientists respond that the very exposure of misconduct proves that the House of Science is in good order. We, being scientists, agree with that.

Recently, however, I've wondered about the ethics of our publication protocols. Two coincident events prompted these ruminations. The first involved a graduate student who was tapped for the first time to review a journal article. My first bit of advice startled her: "If you have anything critical to say, be sure not to identify yourself." The second occurred later that day. On perusing the newspaper, I noticed an advertisement for the fiftieth anniversary edition of John F. Kennedy's *Profiles in Courage*.

The book portrays eight senators who withstood overwhelming public opposition and allowed only conscience to dictate their votes on pivotal pieces of legislation. Many of us first read the book as intellectually pliable teens. Despite the haze of the intervening years, the advertisement conjured the memory of a particular senator from Kansas who prevented the dismissal of Andrew Johnson from the US presidency. Hungry for the details, I purchased the modern edition and re-read the slim volume.

Edmund G. Ross was a Radical Republican who at a political convention in 1866 introduced resolutions condemning James Lane, Senator from Kansas, for supporting Johnson's moderate approach towards Southern reconstruction. Unable to endure the political firestorm, Lane committed suicide, and Ross was handed Lane's Senate seat. Congress then attempted to eviscerate the President by limiting Johnson's ability to hire and fire members of his own cabinet, but the President flouted the new restrictions. Impeachment immediately followed, and all senators but Ross made their verdicts public well before the trial. Conviction hinged on Ross's single vote. Convinced by the evidence that the legal basis for Johnson's dismissal was patently unconstitutional, Ross shocked his fellow party members by voting in support of a man he detested. He thereby saved not only the President but the presidency, and in so doing he destroyed the bright promise of his own political career.

Scientists are luckier than politicians. We constantly judge the merit of other people's ideas and render votes of yea or nay, but we may do so under cover. Most journals offer manuscript reviewers the option of either concealing or disclosing their identities, and highly competitive magazines such as *Science* do not provide even a tick box for self-revelation. Funding agencies similarly adhere to total secrecy in the evaluation of proposals, and they consider anonymity as vital to the integrity of the system. Appraisal that is expert and honest, the philosophy goes, is the best route towards unbiased assessment of scientific research. And honest appraisal can be achieved only by protecting the identities of the judges.

*But is that true? Is the scientific enterprise seriously threatened by the open review of manuscripts?*

The medical community has wrestled with the moral implications of this issue to a far greater degree than have Earth scientists. In 1999, the *British Medical Journal* disallowed anonymous review entirely; the editors concluded that secret peer evaluation is "slow, expensive, profligate of academic time, highly subjective, prone to bias, easily abused, poor at detecting gross defects, and almost useless for detecting fraud."<sup>1</sup> Subsequent studies have supported the feasibility of open review while disagreeing with some of these particulars. A controlled trial involving signed and unsigned reviewers for the *British Journal of Psychiatry* found that "signed reviews were of higher quality, were more courteous, and took longer to complete than unsigned reviews."<sup>2</sup> *BMJ* itself observed that the open system "significantly increased the likelihood of reviewers declining to review,"<sup>3</sup> but the journal noted that this route is always a recourse for those who fear the personal repercussions of a signed negative evaluation.

The practical strengths and weaknesses of total transparency deserve further exploration, but the arguments against secrecy really are more of a principled nature. Reviewers of manuscripts are accountable to two constituents. First and most obviously, authors surely have some right to evaluate criticisms of their articles in a context that includes the quality of the reviewer. Is an expert in molecular dynamical simulations quibbling with the experimental technique? Is an avowed proponent of an anoxic early atmosphere ravaging a contrary model? Even when criticisms are wholly valid, intrinsic reviewer bias or limitation rightly plays a role in the recipient's self-analysis.

In addition, reviewers are accountable to their public. In the US, scientists receive about \$35 billion each year for the performance of basic and applied research. We are individually privileged with the responsibility for disbursing these funds, albeit indirectly, through peer evaluation of the papers that build reputations and of the proposals that map out future research directions. Although these decisions may appear less dramatic than the impeachment of a president, the ramifications of our collective judgments are not trivial. From the quashing of a career to the suppression of an idea that may ultimately save or enhance lives, the wrongful rejection of a scientific inspiration damages our society.

*Nature* announced this past June that it is running a several-month trial of the review process.<sup>4</sup> Papers that have been distributed to confidential reviewers will be posted on an open website. Anyone may contribute comments on-line while the standard review process occurs. The hitch: Only signed remarks will be accepted. Final assessment of the paper will include both the confidential reviews and the on-line evaluations. The approach may not work for the society journals managed by the sponsors of *Elements*. Nevertheless, it is refreshing that high-end publications perceive that traditional modes of scientific assessment are themselves fit subjects for testing.

Recently, a paper of mine was evaluated by the *American Mineralogist*. Each of the two reviewers had scrutinized the paper with a fine-toothed comb, and they each found errors that would have proved acutely embarrassing to me had they been published. Nevertheless, the tone of the reviews never strayed from the respectful, and each reviewer offered constructive suggestions for repair. In short, they provided exactly the kind of feedback that one hopes for, and I wanted to send a personal note in thanks for their commentary. Unfortunately, I couldn't do that, because the reviewers had taken my own advice and elected not to reveal their identities.

Maybe this is an article about fraud in science after all, but of a type in which we all have willingly conspired. The measurement of courage is an inexact exercise. Kennedy observes that Edmund Ross "faced the accusation that he accepted office under one banner and yet deserted it in a moment of crisis for another."<sup>5</sup> Certainly there are instances when anonymous review is the best recourse, but in an age when transparency of information is the stuff of revolution, perhaps we should model ourselves more closely after those who pronounced their opinions publicly and bravely faced the aftermath.

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