COMMENTS

Scientific Societies as Sentinels of Responsible Research Conduct[2] (44535D)

MARK S. FRANKEL[1]

Scientific Freedom, Responsibility and Law Program, American Association for the Advancement of Science, Washington, DC 20005

High-profile disclosures of scientific misconduct during the past decade have understandably raised public suspicions about the propriety of researchers' conduct and have fueled skepticism about the scientific community's willingness and ability to police itself. As a consequence, both the federal government and the scientific community have recognized the need to do more to hold scientists accountable for their research practices.

It is important to remember that whatever professional autonomy is enjoyed by scientists, it is not a right, but a privilege granted by society. If the public perceives the scientific community rife with corruption, abusive of human or animal research subjects, or otherwise indifferent to the ethical requirements of research, then it will impose stricter mechanisms of accountability. Although one should not underestimate the power of the law to influence behavior, relying on government regulations to reduce scientific misconduct or to stem other ethical lapses by scientists will never be sufficient to ensure strict observance of the highest standards. Rules and regulations proscribe rather than prescribe expected behavior. That is, they tell us what we cannot do—not what we ought to do. They also carry unwelcome baggage in the form of administrative and financial burdens on institutions. Moreover, science is a highly creative endeavor, and determining what data are relevant depends on an investigator's experience and judgment as well as on the standards of his or her discipline. It is a process that cannot easily be subjected to the rigidity of government regulations.

Research practices that most scientists would consider deplorable and that may compromise the integrity of scientific research are better handled within the research community itself. For example, some authors may give unwarranted co-authorship of their articles to other, better-known authors to increase acceptance of their work, whereas others may publish several thin articles from a single study to pad their resumes when a single substantive article would be more appropriate. These are not matters that should be subject to the heavy hand of government.

Ideally, the scientific community should elicit from its members a higher standard of behavior than that which can be commanded by regulation. We need to shift our basic approach to scientific misconduct. Instead of reacting defensively to alleged misdeeds, the scientific community should embrace a commitment to promote actively ethical research practices. Regulations imposed from outside science cannot promote the kind of atmosphere necessary to ensure ethical practices. An ethical climate must be fostered from within the scientific community.

Role of the Scientific Society

Although individual scientists must bear ultimate responsibility for their actions, promoting ethical conduct need not be solely the responsibility of the individual. There is clearly a role for scientific societies to play in influencing the moral tone and ethical climate in which research is conducted. Indeed, the evolution of any profession is marked by efforts to define the expected character and proper conduct of its members. Members of a scientific discipline, like other professional groups, are bound together by similar aspirations, values, and training, and enter into a community of common purpose. Its members "are distinguished as individuals and as a group by widely shared goals, beliefs about the value of those goals ... about the appropriate means for achieving them, and about the kinds of relations which in general should prevail among themselves, and in many cases between themselves and others" (1). The scientific disciplines, then, are a prominent normative reference group, whose values and standards of proper research conduct serve as guides by which individual sci-

[1] To whom requests for reprints should be addressed at Director, Scientific Freedom, Responsibility and Law Program, American Association for the Advancement of Science, 1200 New York Ave., NW, Washington, DC 20005. E-mail: mfrankel@aaas.org

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entists organize and perform their work and by which outsiders can understand and evaluate their performance. In large measure, then, a scientist is defined by his or her relationship to the group or discipline.

The scientific society, as a visible, stable, and enduring institution, acts as a custodian of a discipline's core values and distinct traditions. It functions as an important source of identity for individual scientists, enabling them to maintain a conception of themselves as trustees of a rich and respected set of traditions. And the synthesis of professional values and norms of behavior produced by members of the scientific society over time and transmitted to individual scientists can be an effective means of socializing them into this community of common purpose. Hence, while the professional discipline "does not produce the next generation [of scientists] biologically, it does so socially" (2), and over time the behavior of individual members can be—and is—explained by references to it. Moreover, "we rely on the group to guarantee that its members fulfill their ... obligations ... and we trust professionals because the exercise of ... discretion at the individual level is governed by rules which are prescribed and enforced by the group" (3). The societies are gatekeepers, whose oversight of the trust relationship between individual members and outsiders is critical to the advancement of science.

Articulating Standards

In a joint statement issued a few years ago, the U.S. National Academy of Sciences, National Academy of Engineering, and Institute of Medicine declared, "As members of the professional research community, we should strive to develop and uphold standards that are broader than those addressed by the governmental regulatory and legal framework for dealing with misconduct in science" (4). Clear and widely disseminated standards of what is expected of scientists in conducting research can create an environment conducive to promoting integrity in research practices and lessening the temptations for researchers to cut ethical corners. Such standards do not come about overnight. They evolve over time as a consensus emerges within the discipline on what behavior should be expected of its members in a wide range of circumstances. These standards embody the collective conscience of a profession and are testimony to the group's recognition of its ethical responsibilities.

There is no more important task in dealing with misconduct and promoting integrity in scientific research than developing standards of research conduct. Without commonly accepted standards, how can reasoned and fair judgments be made about what is, or is not, acceptable behavior? Even government regulations in the United States recognize that professional standards are critical in defining scientific misconduct. Although these regulations describe certain examples of proscribed practices, such as plagiarism and fabrication or falsification of data, they also rely on science's commonly accepted standards. The U.S. Public Health Service definition of ethical misconduct refers to "other practices that seriously deviate from those that are commonly accepted within the scientific community" (5), whereas the National Science Foundation's definition includes "other serious deviation from accepted practices ..." (6). Clearly, the scientific community has a responsibility to its members and to society at large to define as precisely as possible what constitutes accepted practices in proposing, conducting, evaluating, or reporting research.

Ethical standards offer a guide to what members of the discipline can reasonably expect of one another in practice. And since these standards reflect the accumulated experience and wisdom of members of the community, they are more likely to promote right conduct than rules created by individual scientists acting on their own. Standards also serve a public purpose by providing a basis for evaluating and holding the profession, as well as individual scientists, accountable. And standards that impose an affirmative duty on the part of scientists to report instances of research misconduct are of particular importance. They help to create an atmosphere in which those who report errant behavior are perceived as guardians of the integrity of the scientific community. Scientists must recognize that ignoring or minimizing the seriousness of research misconduct ultimately weakens the cohesion of the collegial group and makes a mockery of claims of self-regulation.

Whatever the standards may contain, there is considerable value in the process by which they are developed. Developing ethical standards of conduct is part of building a community on a foundation of common values and purpose, and offers members of that community an opportunity to participate in the moral life of the profession. This process is a time of critical self-examination by both individual members of the scientific society and the profession as a whole. It is a time for testing one's personal and professional ethics against each other and against those of one's colleagues, and for testing the profession's ethics against the experience of its members and against the values and norms of the larger society. Widespread participation by scientists in such an effort can help to reinvigorate and bring into sharp focus not only their own personal values and moral commitments, but also those of their profession. Such participation also increases the likelihood of their support for the ultimate set of standards, and will generate peer pressure for observance of them.

The adoption of ethical standards does not, of course, guarantee that scientists at the bench or students in training will always adhere to them. It is also imperative that a professional society communicates the values and prescriptions embodied in its standards to members of the discipline. Scientists must be able to recognize and appreciate how the standards can help them in their work.

Ethical prescriptions, such as those contained in various society standards, however, are like blunt instruments; they must be sharpened by interpretation to enhance their practical value. To help accomplish this, societies should establish committees to offer guidance to members in need of

assistance in navigating through a sea of moral ambiguities or to render decisions in response to allegations of unethical conduct. A record of such guidance and decisions should be maintained and publicly available so that over time they become part of a body of "case law" that offers more detailed guidance on how to understand and apply the society's standards. Societies might also want to consider preparing hypothetical case studies and commentaries for use in the continuing education of practicing scientists and the training of students.

The ethical standards adopted by the scientific societies not only define the boundaries of responsible research conduct, but also embody the virtues that researchers are expected to possess. Scientists are expected not only to act in a particular way, but also to exhibit a certain type of character. Recognizing such virtue in particular scientists is an opportunity for the societies to acknowledge those scientists who exemplify high ethical standards, promote responsible research practices in the scientific community, or speak out against research misconduct. As an example, the Scientific Freedom and Responsibility Award, given by the American Association for the Advancement of Science, selected Robert Sprague as corecipient of the Award in 1989. Sprague was the scientist who first uncovered research misconduct on the part of a collaborating psychologist, Stephen Bruening. He was cited by AAAS for "his courage and persistence in reaffirming the highest standards of scientific integrity by initiating the censure of a research colleague who fabricated data ..." (7).

Whistleblowing

Another way for scientists to demonstrate their commitment to putting a stop to unethical research practices is for them to take seriously their self-regulating responsibilities. The detection and subsequent investigation of research misconduct often rely on the willingness of individuals to step forward with their suspicions and to cooperate with those responsible for investigating the allegations. U.S. scientific misconduct regulations recognize the important role of such individuals in weeding out perpetrators of misconduct by requiring that institutions take diligent efforts to protect the positions and reputations of persons who, in good faith, make allegations of research misconduct.

Admittedly, the position of either the scientist inclined to "blow the whistle" on a colleague or the graduate student or postdoc who reports a senior scientist is a difficult one, leading some to conclude that there are too few rewards and far too many risks associated with reporting errant behavior. The threat of being labeled a "troublemaker" and being ostracized by one's colleagues, or the fear of legal action are often sufficient to dampen one's enthusiasm for speaking out. A survey a few years ago of 2000 graduate students and 2000 faculty found that the fear of retaliation for reporting suspected scientific misconduct had a considerable effect on the willingness of people to report misconduct. More than half of the students responding believed that they could not report possible misconduct by a faculty member without retaliation, and only 35% of faculty members surveyed believed that they could report a colleague without experiencing adverse consequences (8).

Whistleblowers in American society have not fared well, even when their allegations have eventually been substantiated. A 1995 report commissioned by the U.S. Office of Research Integrity described the kinds of retaliation self-reported by a sample of those who brought allegations of scientific misconduct. The results are discouraging. Almost 70% of 68 survey respondents reported a negative consequence due to their having blown the whistle. The range of measures taken against them included, for example, loss of position, denial of promotion or salary increase, reduction in research or staff support, pressure to drop allegations, and threat of a lawsuit (9). These actions not only have adverse consequences on the whistleblower, but also serve to deter others from reporting improper research conduct.

So worrisome is the prevalence of retaliation against whistleblowers, that the U.S. Commission on Research Integrity recommended in its 1995 report the adoption of "A Whistleblower's Bill of Rights" and a federal regulation that would guarantee those rights (10). Neither has so far been adopted. Many scientific societies have adopted codes of ethics that make it an affirmative duty to report violations of the codes, including behavior that would constitute scientific misconduct, and to cooperate with society officials and other appropriate authorities charged with pursuing violators. However, in reality, the societies have done little to support their members who take this duty seriously. It is, in my judgment, the height of hypocrisy for a scientific society to establish an ethical duty to blow the whistle on scientific misconduct and then shrink from any organizational responsibility to a good faith whistleblower among it ranks when he or she experiences threats of retaliation. Yet I know of no U.S.-based scientific society that has a process for protecting its members from possible retaliation for doing the right thing according to the society's own ethical standards. This "do as I say, not as I do" approach to promoting research integrity is simply not tolerable in a setting where the scientific society serves as a major normative reference group for its members.

Clearly, more needs to be done. But all the structural and procedural safeguards that could be put into place will be of limited effectiveness unless accompanied by a pervasive change in the way the behavior of whistleblowers is perceived and reacted to by others. The scientific societies must do more to promote such a change by publicly supporting the notion that the reporting of scientific misconduct is critical to maintaining the integrity and quality of science, and not an uncollegial act.

Mentoring

Encouraging good mentoring skills and practices among members is another strategy that scientific societies could adopt to promote responsible research practices. Men-

toring occurs when a professional assumes responsibility for the professional development of a student-trainee.

In science, mentoring is increasingly being recognized as an essential part of efforts to promote responsible research conduct. Although I do not want to exaggerate the importance of mentoring, it is probably safe to say that some of the reported incidents of scientific misconduct on the part of junior scientists can be attributed in part to the breakdown of the mentoring process.

Mentors serve as role models for those they supervise and help socialize their students and trainees into the community of scientists. They should use the research setting and training experience to ensure that student-trainees understand the values, ethical prescriptions, and institutional policies and guidelines governing research.

Mentoring is not without its pitfalls, however. It requires time, energy, and commitment by both sides, qualities more difficult to achieve in the cross pressures of contemporary "big science." There is also the danger that instead of helping the student or trainee become an independent researcher capable of pursuing his or her own area of research, the mentor may, consciously or unconsciously, try to create greater dependency by the trainee on the mentor or attempt to target the student's research in a direction that meets the mentor's needs, regardless of how it might serve the trainee's or student's interests. One must also be on guard for the consequences of the inequalities of power and professional status that exist in such a relationship. Mentors must not be permitted to exploit junior people to enhance their own research and professional reputation, and they must give proper credit for the contributions of junior scientists under their tutelage.

Promoting Integrity

As a society, we could set up the most elaborate regulatory system possible for resolving allegations of misconduct that deals with ethical problems after there has been a breach of protocol, and in the process expend substantial human and financial resources. Alternatively, we could rely on efforts designed to minimize the need for such an elaborate system through vigilant monitoring by the scientific community. Some combination of the two is probably necessary, but the balance should be toward an approach that relies predominantly on community-defined norms reinforced by an internal commitment to the highest ethical standards. The paramount goal should be for researchers to act responsibly because they understand what is ethically expected of them, even when no one is watching.

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