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## POSTERMINARIES

### Easy Ethics

The easiest aspect of ethical considerations in science and technology, or for that matter in any human endeavor, is the posing of thorny questions. Finding answers appropriate to particular times, circumstances, and cultures is usually the hard part. Therefore *POSTERMINARIES* will follow the path of least resistance and only ask the questions. Why here? Because other fields, primarily with biomedical leanings, have been stealing the ethics limelight of late, and it's time that we discovered why more materials mischief has not made headlines. We may find it is because only the most saintly aspire to materials research. More likely, it results from an almost automatic built-in self-policing mechanism in the community. Or, we may simply find that nobody cares as much about materials (which, after all, only enhance the quality of life) as they do about biomedicines (which actually save lives).

A heavy caveat: Some unethical behavior leaves no room for debate, and the questions answer themselves. Lest we be seen as insensitive to these questions, we mention them first under the following heading:

#### Blatant Misconduct

Are theft or deliberate falsification of data, clear plagiarism, sabotaging of competitors' equipment, intentional misrepresentation of results and procedures, or other such heinous deeds acceptable? Reaching a conclusion requires no subtle analysis. When the thankfully rare instances of such transgressions are uncovered, they should spark introspection into the root causes and professional pressures that drive the misguided toward such malicious acts and, one hopes, make their occurrence less likely.

And now for the lighter fare—organized according to *POSTERMINARIES'* own taxonomy:

#### Publication

*Authorship Criteria:* Must your co-authors be experts on the whole work? Must they hold rank coordinate to yours? Should technical support personnel be co-authors? Is titular co-authorship for professors and managers appropriate? Is alphabetical order automatically fair, or is it a trivial solution to a difficult problem?

*Timing:* How and when should pre-

publication of results occur? As abstract? As preprint? As Letter? As press release?

*Hyperbole:* Where is the line between optimism and overstating the importance and practical consequences of a "break-through"?

*Citation:* How far back must citations reach? Should Newton, Euclid, Archimedes, or Lavoisier be cited today? How peripheral may citations be? Must one have used the work or merely know of it? Does an exhaustive literature search have to be exhausting?

*Errata:* Where between an error in punctuation and a completely false report is the trigger for publishing an erratum?

*Duality:* When may one report essentially the same work in several proceedings and/or journals? Are criteria for reviews different than for original research papers? Is broad dissemination a good reason? Is being permitted to attend a conference a good reason? Is lengthening one's list of publications, particularly if tenure decisions are on the horizon, a good reason?

*No-Shows:* What are acceptable reasons

for renegeing on commitments to present a paper at a conference or simply not showing up? What if it's a poster paper? Is it OK to give the talk but not deliver the manuscript for the proceedings? Do the answers to these questions depend on whether conference support for your attendance has been provided?

*Author-Editor Minuet:* May an editor state an earlier than necessary deadline for paper submission to hedge against tardiness? May an author submit late on the assumption that deadlines are never really deadlines?

*Serial:* When should one publish results (usually as Letters) bit by bit as work progresses? When should one collect all the results for a massive tome at the end? Is this a question of padding publication lists or of disseminating results to colleagues as early as possible?

*Unpublished Work:* Is citing unpublished results received via preprint or other private communication OK? Does it depend on your expectation of future publication? Does the fact that such information has not passed a peer review affect how you should view its reliability? If citation of any "hard-to-locate" sources burdens the reviewer and reader, what fraction of citations in a paper may be of this type? May such a citation be crucial to a central conclusion in the paper?

### Funding Sources

Is there a "Nuremberg" test of conscience attached to accepting defense research contracts? Is "dual use" a legitimate motive or a rationalization? Under what circumstances may researchers accept earmarked (pork) appropriations that circumvent peer review? Is working in an underfunded demographic group reason enough to promote earmarks?

### Citizen Scientist

In a public debate, where is the line between an "expert" opinion on a technical issue and the personal (moral, ethical, or political) opinion of an expert? How ought a technical expert announce or renounce objectivity?

### Speculation

How much unsupported speculation (either on current interpretations or on outcomes) is appropriate in a journal article? In a press release? In an internal report? Is the speculation more justified if it will garner continued support of work you "know" is good?

### Honoraria

Should you expect an honorarium for a technical talk? For refereeing a journal

article? For reviewing a grant proposal? For giving a popular lecture to the local garden club? To the chamber of commerce? To the National Press Club? When is an honorarium really a consulting fee? Where does duty to one's profession end and a "no-free-lunch" philosophy begin?

### Peer Review

Does anonymity of the reviewer promote or preclude bias? How far does the reviewer's obligation of nondisclosure go? Is it mitigated by parallel (partial) release by the authors? To what extent may reviewers take the content into account in their own work prior to publication? Must reviewers and associates continue on the wrong track for months to preserve the honor system? When should reviewers identify themselves to an author? May an editor ever disclose a reviewer's identity? Must reviewers defend themselves against charges of bias from dissatisfied authors?

### Mentorship

What are the obligations of senior researchers/professors to more junior personnel in helping them find jobs? In including them on many publications? In drafting "truthful" letters of recommendation? Is a professor obliged to direct the best graduates to the industry that sponsors his/her research?

### Teaching vs. Research vs. Service

Is the proportion of credit for university activities in these three areas fair to professors? To their students? To society? Does a strong bias toward research create an ethical teaching dilemma?

### Data Ownership

Who with access to data has the right to use it and under what circumstances or for what purpose? The sponsor? The employer? The researchers who personally recorded the data? Collaborators from the same or other institutions? Does the night shift on a 24-hour experiment have greater claim to data collected on their watch in particular? When are formal agreements needed and when can an accepted ethic be relied upon?

### Reverse Engineering

Is it ethical to reverse engineer a proprietary product and use the *know-how* to fabricate a competitive product so long as no patent infringement is committed? Does the answer depend on whether the product originates in another country?

### Educating vs. Lobbying

At what point does providing information to policy-making legislators cross the line between educating them and trying to influence legislation in favor of a special interest? Is lobbying inconsistent with scientists' ethical standards or merely with their self-imposed demeanor?

### End-Use Responsibility

At what point is the researcher responsible (legally, morally, or ethically) for socially unacceptable applications of good science? Is it a matter of degree in the end-use (e.g., the "bomb" is worse than pollution, which is worse than video games)? Should a researcher be liable for an application failure traceable to an innocently erroneous scientific report?

### Slidesmanship

(What is the gender-neutral substitute for "slidesmanship"? ) Is the visual embellishment and exaggeration of the size of a measured effect, through choice of plotting scales and zero-offset of the origin, for example, always OK? OK if explicitly and visibly noted to the audience? OK only if it is noted *and* it displays an effect judged truly significant for reasons other than graphic impact (e.g., the shift in the perihelion of Mercury)?

Seasoned researchers have undoubtedly managed many or most of the kinds of issues these questions raise according to the local protocols of their field, their institution, and their personal sense of fair play. Most of these issues are internal to the scientific community; the public is oblivious to them, and nothing egregious results if faux pas occur and are redressed collegially. So much for the easy part.

Perhaps we should be a little surprised that a multidiscipline such as ours, mixing as it does people with disparate training and technical cultures, is as quiet as it is on ethical issues. Let the readers be heard on these matters (actually it would be better if you write), and we shall see how uniform our views really are. Please note that failure to answer these questions for yourself is in itself ethically suspect.

E.N. KAUFMANN

P.S. Serious and thoughtful answers (completely out of character for this column) would be welcomed by the editorial pages of the *MRS Bulletin* and are encouraged.