References

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Robert Laughlin's article is incisive and well worth reading. The conflict of interest he described exists in other institutions too. It isn't only high-status scientists who may find themselves making inappropriate choices. A customer support engineer may have to choose between revealing valuable technical secrets to help the customer and revealing aspects of company policy that management would prefer to keep hidden. For example, it might be in the customer's interest to say, "Don't buy that product; it has problems, and we are bringing out a better model next month." But that would be disastrous for the company, because it would leave a pile of unsold merchandise in the warehouse.

Scientists sometimes exaggerate the difference between research work and jobs in other fields. They think they alone are devoted to finding the truth and that they represent some kind of "gold standard" in truth-seeking. Actually, a farmer or programmer must also learn the truth. An airplane pilot or factory worker who ignores the truth may be killed in an accident. As Rudyard Kipling wrote in "The Secret of the Machines,"

> But, remember, please, the Law
> by which we live,
> We are not built to
> comprehend a lie,
> We can neither love nor pity
> nor forgive.
> If you make a slip in handling
> us you die!

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Laughlin replies: Rather than respond to these letters individually, I will take the long view and point out that, together, they say some important things about the discipline. The sentiments expressed largely match those sent to me privately, except that my mail is more positive. Judging from anecdotal evidence, I think the positive mix more accurately reflects the sentiment among physicists generally, but that is hard to quantify. However, even with the balance in this group of letters, it is clear that there is a terrible schism among professional physicists over the whole question of scientific ownership, and there are profoundly different perceptions of exactly the same facts. Reading some of the criticism, I am reminded of the scene in Mel Brooks's movie *Young Frankenstein*, in which Dr Frankenstein asks Igor how he lives with his hump and Igor answers, "What hump?"

A design problem in writing a short piece is that insufficient space to say things defensibly inevitably generates misunderstandings. For example, I took enormous care not to impugn property but somehow managed to get labeled as anti-property anyway. So let me set the record straight by stating that I strongly support technological property and the engineering activity that generates it. I would love to be an engineer, but it is too late. I am in my fifties and—worse—am trained as a theorist. I also agree that de facto property in universities is exactly the same as private property, and that dumping on industry just because it is private is the most despicable hypocrisy.

My point was not that property is bad but that property is owned, and that its ownership has implications. In light of the difficulty the more irritated respondents had in acknowledging this fact, I find myself wondering just who needs a refresher course in economics. To get at the matter of deception, I had to speak in vague abstractions for the obvious reason that specifics are grounds for lawsuits. Those of you who have never seen any corruption should just dismiss what I say. Those of you who have seen corruption know what I mean.

I cannot resist the temptation to respond to a few specific points, although they are peripheral to the central, important matter of the controversy itself. The business page of the *New York Times* of 28 February 2003 reports that Microsoft Corp has given the government of China access to the source code for Windows®. Windows is an immediate and easily understandable counterexample to the assertion that full disclosure is good for technological business. As everyone knows, the reason Microsoft does not simply make the source code open to the world is because the company would be swiftly destroyed if it did. The notorious proprietary nature of that code is the basis of its entire business. I know many other instances of the importance of technological secrecy—for example, my colleague Bill Little's decision not to patent certain aspects of his Joule–Thompson refrigerator technology because it would have been an invitation for theft. As to the benign effects of secrecy, the Enron and WorldCom scandals were facilitated by secrecy, not by the inherently corrupt nature of business. True, the folks involved were not scientists, but it is not true that scientists are orders of magnitude more honest than everyone else. The integrity of science comes only from its openness and its ethic of "trust but verify," to paraphrase Ronald Reagan. As to my own university's private energy-research initiative, I note that this activity is engineering, not science, and thus irrelevant to the discussion.

In the end, however, I must emphasize that my piece was not intended to indict anyone making a living doing practical things. The Schön affair has occurred in the context of very hard times for physics, in which everyone, including me, has spent sleepless nights wondering how to move forward. My proposed solution is simply to focus on integrity as the sustaining asset, even as one makes the compromises necessary to do one's job. Actually, this is not such bad advice generally.

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Bayesian Probability and One Bad Apple

The brilliant, attention-capturing sentences at the beginning of Michael Berry's "Singular Limits" (PHYSICS TODAY, May 2002, page 10) appear untenable unless one considers conditional (Bayesian) probability. In fact, biting an apple and finding no maggot may indicate either the worst or the best experience of the apple eater. Respectively, the eater may have swallowed the entire maggot with some bite or no maggot at all. The outcome depends on a preexisting condition: the presence, or absence, of a single apple inhabitant.

Real things may be even more complex: A particularly unfortunate eater may have gotten an apple with multiple maggots. The situation described also appears to be a suitable illustration of the collapse of probability by observation.

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Reader Inquires: Who Was Thomas Hakon Gronwall?

I am a university professor researching Thomas Hakon Gronwall, a Swedish-American mathematician who did work in physics and physical chemistry. In the late 1920s, he was a research associate at Columbia University and worked extensively in physical chemistry with Victor K. LaMer on Debye–Huckel theory and with K. W. Lamson on reflection of radiation in plates. Gronwall also published papers on the hydrogen and helium wave equations, the latter posthumously in 1937 after his notes were collected and organized by F. Bohnenblust and J. H. Bartlett Jr.

I would appreciate hearing from anyone who has knowledge of Gronwall's life and work, especially regarding his time at Columbia University and the influence, if any, of his work on the development of the respective research areas.

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