SCIENCE

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LETTERS

Success in Science

I read with much interest James D. Watson's playful "Succeeding in science: Some rules of thumb" (Careers in Science, 24 Sept., p. 1812). His first rule is that you have to avoid dumb people. His fifth and final one is that if you can't stand to be with your real peers, get out of science.

While somewhat tongue in cheek, his rules are right on target, although they are not very helpful. For example, if you can't stand your real peers and get out of science, how can you succeed? It could be, "If you wish to succeed at science, you may have to overcome, circumvent, outlive, persuade, or otherwise learn to deal with your peers." My personal response to this rule reaffirms me as a scientist.

More important, you cannot avoid dumb people, because it is inevitable that in peer review you will encounter them—frequently. If you really are good at your science then, sooner or later, you may think of something that no one else knows or suspects. Furthermore, even after you explain your discovery it will not be readily understood or accepted. Under these circumstances everyone is "dumber" than you are, at least on this one point.

Good reviewers expect to judge contributions from people who are "smarter." And, while they can detect some errors and unoriginal work, and even good new ideas in their realm of knowledge, they recognize when they cannot reject foreign ideas with confidence. Relinquishing control and, if necessary, suspending their convictions, they step aside to let the general community evaluate these ideas.

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Nationality of Engineering Students

In Constance Holden's article "Foreign nationals change the face of U.S. science" (Careers in Science, 24 Sept., p. 1769), I am quoted as saying, "Our mechanical engineering department [which turns out about five Ph.D.'s a year] hasn't had an American Ph.D. for some years now."

The data I gave are wrong. For the last year (1992–1993) at Northwestern University, 3 and 11 Ph.D.'s in mechanical engineering were granted to U.S. and foreign-born students, respectively. For the past 3 years, 9 and 31 Ph.D.'s were granted to U.S. and foreign-born students, respectively. For the 1993–1994 academic year, 3 foreign-born and 16 U.S.-born graduate students were admitted to the mechanical engineering program. A new trend may be starting.

We need to think more about how to attract U.S. advanced science and engineering degree students and worry less about foreign students. After all, we should consider our advanced science and engineering education for the foreign-born as one of our "exports" to help our balance of payments!

For the longer run, we could do more to create a higher industrial value and demand, particularly for the engineering Ph.D., if more thesis problems were directly related to and ideally done in an industrial setting. While this may be dismissed by some in academia, such Ph.D. work can be as valuable academically as an "in-house" thesis, and the industrial company would learn more directly the value of a Ph.D. I have had my students do this a number of times. They were assured of a job and continued to be paid by their employers while they worked on their thesis. In a case or two, they also moved rapidly after finishing their degree.

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M.D.-Ph.D. Degrees

The discussion by Elizabeth Culotta of M.D.-Ph.D. degrees (Careers in Science, 24 Sept., p. 1784) is right on the mark. A fuller treatment of the important issues associated with seeking such training can be found in a newly published book on M.D.-Ph.D. programs and other pathways to scholarship in medicine (*1*).

Culotta's article focuses on M.D.-Ph.D.s in the biomedical sciences, which are the fields traditionally associated with medical research. There is also a great need for M.D.-Ph.D.'s in the physical and engineering sciences, the social sciences, and the humanities. Many of the important problems facing medicine require knowledge of the physics and chemistry of imaging techniques, health services and medical outcomes, and the limits of patient autonomy, to name but a few of the multitude of topics that impinge on medicine and the health care system with increasing urgency. The perspective of scholars working on such issues who also have medical education and clinical experience is as valuable as that of the physician trained in basic biomedical research.

The program at the University of Illinois is one of (unfortunately) only a few providing students with opportunities to seek M.D.-Ph.D.'s in such areas. Pursuing the two degrees separately is an option, but formal programs provide administrative, financial, and peer support that helps offset the challenges of seeking two advanced degrees.

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Reference

1. H. M. Swartz and D. L. Gottheil, Eds., *The Education of Physician-Scholars* (Betz, Rockville, MD, 1993).

Medical schools award the M.D.-Ph.D. degree to brilliant, young "physician-researchers" who they hope will make a positive contribution to society by earning as much as doctors while having the same fun as scientists. No doubt some are great scientists, some are great physicians, and all have paid their dues. But it is beyond reason how the research and medical establishments (are they the same in this case?) can tolerate less than full dedication to careers which, under normal circumstances, individually require much more than a normal 40-hour-per-week commitment. No mere Ph.D. scientist would be hired for any faculty position if, during her interview, she stated she would like to help run her family business or take courses to "learn a way of learning," as Carl Nathan puts it, for an indeterminate amount of time every week. Yet the same department will not think twice about hiring someone who will do molecular genetics on Monday through Wednesday, see patients on Thursday through Saturday and, like God, rest on the seventh day.

To be an outstanding physician requires seeing lots of patients and reading everything written on your specialty. Likewise, to be an outstanding scientist requires performing lots of experiments and reading everything written on your specialty. No academic pedigree and no amount of genius can result in the 35-hour days or 53-day months required to practice enough medicine and science in a time frame usually associated with excellence in either field, much less both. As Nathan puts it, "You lose momentum and you're always behind in both." Amen.

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Conflict of Interest

Kenneth J. Rothman (Letters, 24 Sept., p. 1661) says that the review process should not be affected by considerations of conflict of interest. Daniel E. Koshland Jr. (Letters, 24 Sept., p. 1661) does not directly contradict this, but argues that the reader should be as informed as possible. The simple compromise is that the review process should ignore issues of conflict of interest, but that the publication process should not.

This simple distinction avoids ad hominem critiques of scientific articles while promoting rational skepticism in the reader. What's wrong with that?

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Response: If all decisions were as simple as whether 2 + 2 = 4 or 5, we could ignore conflicts of interest; but unfortunately we have to make decisions about many less clear-cut cases involving interest, quality of data, newness, and so forth. Thus we like to know any reviewer's conflict (which is for our information only). We can then get additional reviewers while not discarding a possibly prejudiced source. For authors, the information of a conflict is needed by the reader only if the data are borderline or if the article is an opinion piece.

—Daniel E. Koshland Jr.

NIH: Intramural and Extramural Programs

In his article "Conflicting agendas shape NIH [the National Institutes of Health]" (Special News Report, 24 Sept., p. 1674) Jon Cohen quotes only part of my comments to him. What was quoted referred to the NIH intramural program doing valuable research "that can't be done [as easily] on the outside." The pioneering work at NIH in gene therapy would be a good example.

One of my comments that was omitted was that if "research was ongoing in the extramural community, then similar work in the NIH intramural program must be of the highest caliber and at the cutting edge of the field." I think this statement could complement that of Igor Dawid, a developmental biologist at the National Institute of Child Health and Human Development, who is quoted as saying that, in the area he works in, "there aren't things that could only be done in the intramural program [at NIH]. . . ." Work similar to Dawid's in developmental biology can and is being done in the extramural community, but his work is obviously among the very best.

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Japanese Superconducting Computer

In his article "Is the third time a charm for a superconducting computer?" (Research News, 24 Sept., p. 1670) Gary Taubes writes, "in 1991, [a] grandiose Japanese effort sponsored by the Ministry of International Trade and Industry came to a barren end" to explain the Japanese national program of research and development of Josephson integrated circuit technology that was conducted by the Agency of Industrial Science and Technology from 1981 until fiscal year 1989.

The aim of this program was to pursue two subjects: new parallel computer architecture and new devices made of gallium-arsenide field effect transistors, high electron mobility transistors, and Josephson tunnel junctions for high-speed computing systems for scientific and technological uses. The mission was to develop reliable integration technology, and it resulted in the invention of a fabrication process combining refractory superconducting materials such as niobium and niobium nitride as an alternative to the lead-alloy technology developed by IBM. Near the end of the program, in 1989, a superconducting prototype computer named ETL-JC1 was built in Tsukuba. To our knowledge, it was the first prototype superconducting computer to execute man-made computer programs installed in the Josephson ROM (read-only memory) chip with a Josephson central processing unit and RAM (random access memory) chips.