Letters

Z Particle Race

Mark Crawford's informative and generally accurate account of our work here at the Stanford Linear Accelerator Center (SLAC) on the Stanford Linear Collider (News & Comment, 26 Aug., p. 1031) contains a mistake near its end. In the second-to-last paragraph he states that I expect "that the collider will yield at least a few hundred Zs by October 1989." The figure is actually *a few thousand*, our current goal for fiscal year 1989.

This mistake may be very upsetting to our users. Jay Chapman of the University of Michigan is quoted as saying, "If by this time next year we only have 100 Zs, the physics will belong to LEP [CERN's large electron-positron storage ring]." That is something of an exaggeration, but his statement clearly illustrates the confusion that the mistake might cause in the high-energy physics community.

One can do important new physics research with a few thousand Zs—the heaviest known elementary particle. We here at SLAC will do everything in our power to produce at least that many before October 1989.

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Economic Competitiveness

The triptych of articles on U.S. competitiveness (15 July) makes a real contribution to our understanding of underlying causes rather than the symptoms, such as the trade deficit or the declining exchange value of the dollar.

The recent rapid increase in foreign investment in the United States supports the thesis of Hatsopoulos, Krugman, and Summers (Articles, p. 299) that the lower cost of capital in Europe and Japan is a fundamental factor in their greater competitiveness. An approximate value of an investment is the expected revenue-profit stream divided by the average cost of capital or the acceptable rate of return. A lower cost of capital or acceptable rate of return makes a marked difference in apparent value, for example, a 10% acceptable rate of return versus a 20% rate of return means the investment is worth twice as much to the low cost-of-capital buyer. Foreign investment in the United States has become very large in the past few years, more than is explainable simply by the decline in the value of the dollar. It accounted in 1986 for 12.1% of U.S. manufacturing assets and 9.9% of manufacturers' sales (*1*, p. 64).

Likely consequences of foreign investment in the United States worthy of further attention include (i) whether "U.S." technology and industrial competitiveness will improve as a result of foreign management and leadership of their R&D and industrial facilities here and (ii) whether pressures for outright protectionism may be reduced if multinational firms operate on both sides of the border with integrated production and R&D strategies, as has happened with dyestuffs and specialty chemical intermediates.

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REFERENCES AND NOTES

1. N. G. Howenstein, *Surv. Curr. Bus.* **68**, 59 (May 1988); see also other articles in recent issues of the *Survey of Current Business*.

I feel that your 15 July issue devoted to economic competitiveness missed a very important point. Nowhere in Daniel E. Koshland, Jr.'s editorial (p. 273) or in the three articles devoted to the subject was it mentioned that the United States still does not use the system of weights and measures used by the rest of the world. I would hope that a journal devoted to science would bring up the subject of the metric system and what impact it has on U.S. competitiveness. To me, and I believe to many of my foreign colleagues, the fact that the United States refuses to adopt the metric system is a sign that it is not serious about solving its problem of economic competitiveness.

In spite of the fact that the Common Market requires that all imported goods be labeled in metric units, the European scientists I work with are reluctant to buy U.S. products because they fear there may be nonmetric nuts and bolts. If a European is changing a tire on a U.S. car and loses a lug nut, he would have trouble finding a replacement to fit the Society of Automotive Engineers threads. The fear is still there even if the U.S. cars are using metric threads. The only way to remove this fear is for the United States to officially go 100% metric.

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I applaud *Science*'s recent devotion to the theme of economic competitiveness and would like to outline a proposal for the biotechnology industry that would expedite cooperation among scientists, managers, and engineers, as called for by Daniel E. Koshland, Jr.'s editorial (15 July, p. 273).

It is probable that the private sector will continue to accommodate an ever-increasing portion of the financial obligations that support research in the life sciences. Furthermore, countries that spend a greater proportion of their gross national product to subsidize nonmilitary research will be strong competitors in the pursuit of products, applications, and services in the biotechnology market. Inasmuch as it is subject to the economic consequences of these trends, the development of biotechnology trade in the United States could very likely parallel that of the semiconductor industry, with brief prosperity followed by financial adversity.

The creation of biotechnology consortiums whose members would cooperate to finance basic research is one means by which the private sector could fortify its international position and cope with the rising monetary burdens of sponsoring research. This type of institution could achieve financial synergy among commercial firms that share commonly used "high-tech" instruments and reagents. Because many essential techniques require only the sporadic use of such equipment (flow sorters and DNA synthesizers, for example), companies with nonoverlapping commerical interests could reduce the price of funding research at "the leading edge" by economies of scale and shared costs.

Biotechnology research consortiums could also enjoy synergy of effort, particularly if housed near or on university campuses. Not only could collaborations among diverse research projects be encouraged, but a conduit for the exchange of information could minimize redundancy of research.

Industry support for such cooperatively organized research consortiums would be a great step toward alleviating the financial burdens of vital, high-cost research and would help U.S. firms meet challenges to our dominance of the biotechnology market.

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Maddox on the "Benveniste Affair"

May I protest that the opinions of Arnold Relman, editor of the *New England Journal of Medicine*, quoted in Robert Pool's treat-

ment of our "Benveniste affair" (Research News, 5 Aug., p. 658) are inappropriate?

If correctly reported, Relman believes that an editor's function is to ensure that contributions are "rigorously and fairly reviewed"; he refers darkly to the "conflict of interest" that, in his view, must arise when editors are more directly involved in assessing the quality of what they are asked to publish.

That recipe may suffice for archival journals, although even they have recently shown signs of alertness to their readers' interests. *Nature*, which is proud to publish much first-rate science, has always taken a more active role. Thus my first predecessor, Sir Norman Lockyer (editor, 1869–1919), was deeply engaged in the controversy on whether the solar corona is an attribute of the solar or terrestrial atmosphere (he backed the wrong side) and in 1904 commissioned from R. W. Wood a damning investigation of the spurious phenomenon of N-rays.

I believe our readers will have been instructed on three important points by the Benveniste paper and its sequel: how easily authentic science may be simulated by the careful selection of data and the judicious use of language, how even "rigorously and fairly" reviewed papers may embody defects recognizable even by people whom Benveniste (rightly, in the context) calls "amateurs," and—more alarming—how likely it is that much second-rate science finds its way into print somewhere.

But there is no reason why Benveniste should still be saying, as you report him, that he "would be happy" to learn of procedural errors accounting for his unbelievable conclusions. Our report gives a detailed and sufficient explanation. If Benveniste persists in counting stained basophils as a measure of anti–immunoglobulin E activity, he will avoid error only if he first acknowledges that sampling errors are unavoidable (not mere "theoretical objections," as he described them to us), if he controls sampling errors by the standard procedure of replicating measurements, and if he eliminates observer bias by arranging that everything is counted blind. Then, alas, as we found, his conclusions will be unremarkable.

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Erratum: In Gregory Byrne's Random Sample "Love story" (22 July, p. 420), the name of Acadia National Park was misspelled; in the same piece, the Cornell (University) Medical Center was incorrectly located in Queens, New York. The medical center is actually in Manhattan.