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portant fact is that periodically a redwood tree falls and there are competing species ready to take its place.

All the evidence we have been able to collect to date suggests that time is running out for the alluvial-flat redwoods and that flood control could be the final blow unless man actively intervenes with herbicides, the ax, or the chainsaw. Strong support behind a program of active intervention is urgently needed. Our hope is that it will not be too late in coming.

EDWARD C. STONE

RICHARD B. VASEY

School of Forestry and Conservation,
University of California, Berkeley 94720

Defeated by Bad Calculus Text

Regarding the article "Shortage of mathematic teachers" (8 Mar., p. 1082), I wonder if the Committee on the Undergraduate Program in Mathematics might not do well to examine the undergraduate curriculum as well as the graduate degree requirements. As a parent, I have watched a budding mathematician nipped and changing her major in her sophomore year as the result of a disastrously planned course in calcu-

lus. She had not only been highly interested in mathematics since grammar school, but had scored extremely well in all the standard battery of aptitude tests and was, in fact, placed in an "advanced" math group on the basis of her aptitude and background in math. There seems some evidence that the student was not wholly at fault. Her textbook was new, published, in fact, so recently that hers was the first class to use it. Though it is not my field, I know enough math to recognize that it was poorly conceived for teaching purposes—a number of the signs and processes needed to understand early chapters, for instance, were not explained before the second half of the book.

I was close to this experience but I am also aware of other students, in both high school and college, who are shunted away from a math career by a combination of incomprehensible texts and teachers who, however brilliant they may be at learning math, seem unable to explain the why and how of the more abstract processes. (I have been informed by one expert that "There are no good calculus texts.") The student referred to above understood more calculus from a weekend's intensive reading of the article in the *Brittanica* than from 2 months of class work.

Obviously, if fewer students were discouraged from finishing undergraduate majors in math, at least the potential pool for graduate study would be greater.

JAMES H. FLEMING

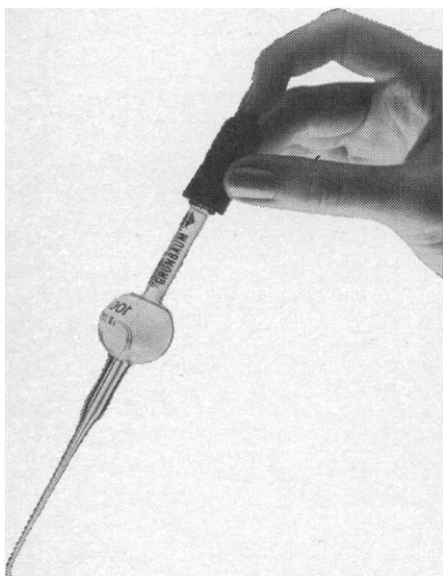
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Erratic Scores by the Computer

It may be that "The future of scientific journals" (1 Dec., p. 1153) will involve computer selection of information of personal interest to each reader. If such a computer system could act as my alter ego, so that I got a stream of information similar to, but, hopefully, much more complete than, that which I now select in my journeys through the journals, it would be utopian.

The present computer capability for information selection falls far short of this ideal, however. My most recent skirmish with a computer information retrieval system gave the following results: 154 total references listed; 12 references with close connection to my area of interest; 131 references with only distant relation; and 11 references

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with no readily perceived connection. In addition, two important references on the subject of interest which I had obtained by the old, more time-consuming (?) method were not listed by the computer.

This listing was obtained in response to a fairly specific request. Imagine the response to a generalized statement of interest covering a wide range of subjects!

EDWARD S. ROGERS
8888 Wolf Road, Hinsdale, Ill. 60521

Survey Synonym

In reporting the results of a survey, Reagan (Letters, 5 April) suggests that scientists live with a "bifurcated tension situation." It sounds like a frightful thing to have around the house. Would it perhaps be less threatening if it were called a "dilemma"?

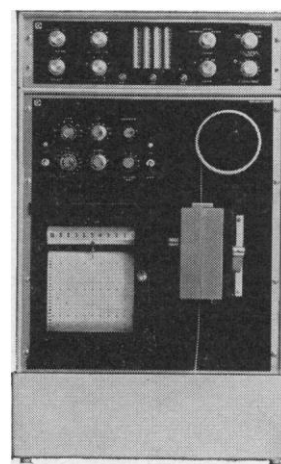
ARTHUR KOHLENBERG
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Importance of Being Important

In his article "When is research the answer?" (8 Mar., p. 1079), Pierce does not acknowledge that much of the great science of the past would have failed initially to meet any reasonable criterion of "importance," social or otherwise. Given the philosophical and practical concerns of the respective times, how "important" did it seem to wonder, for example, about the swing of the pendulum, the effect of current flow on magnetic needles, the properties of partial vacuums, and the fauna of the Galapagos? Not very important, it would seem from the historical record, and there is no evidence that we today are any smarter about guessing where the most powerful secrets of nature are hidden than were the contemporaries of Galileo, Faraday, Boyle, or Darwin.

However hard it may be, it seems essential that the scientific community try to distinguish between applied and basic research or between technology and science. The case put by Pierce is fundamental when research is being conducted for the sake of an "organization," but only then. The customer (individual or institutional) has a right to demand fair value for its investment. And if the commodity is useful knowl-

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