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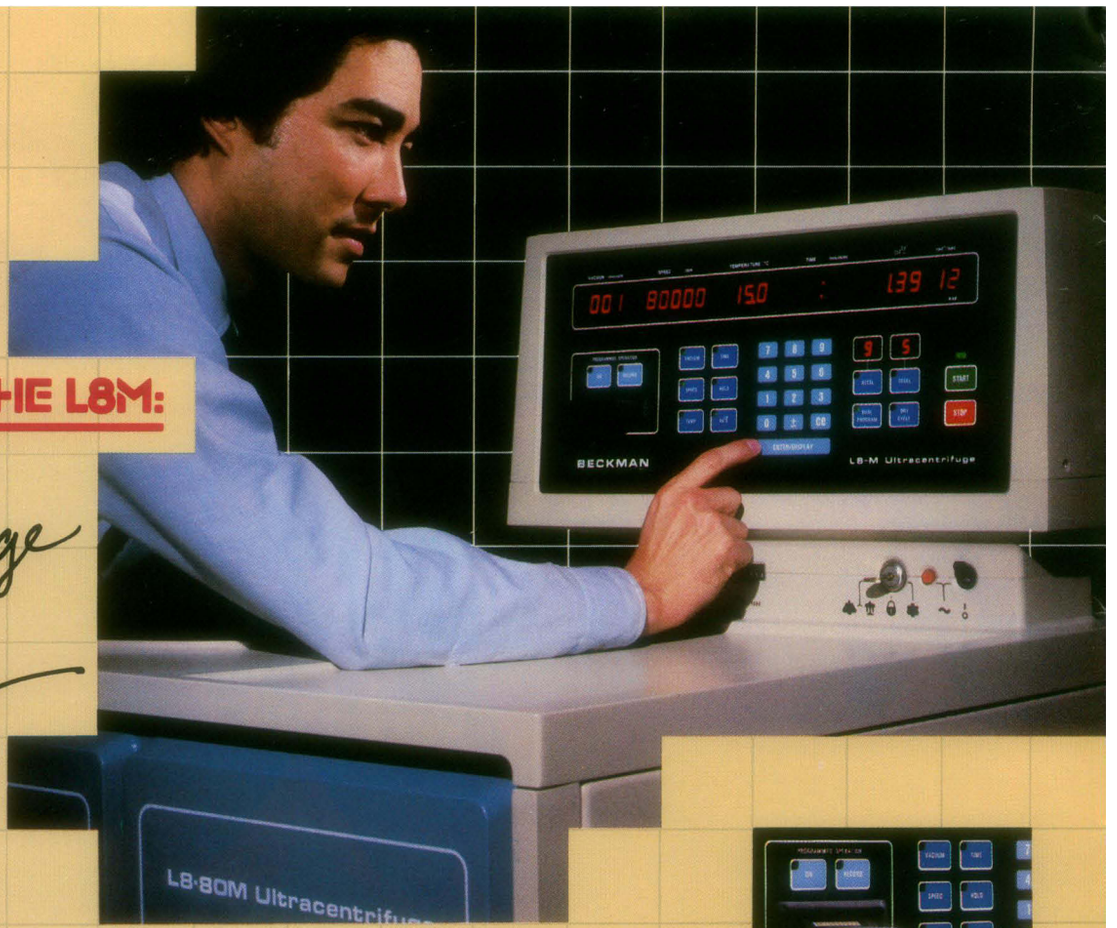

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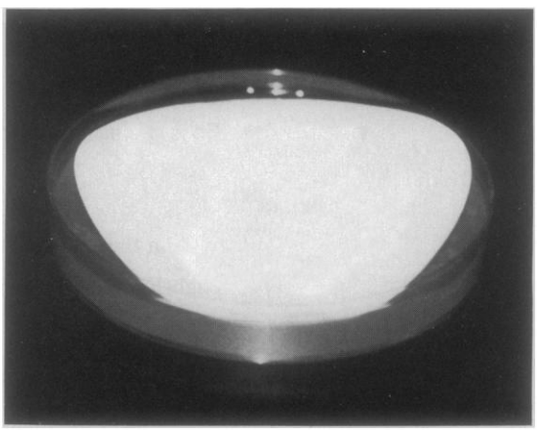

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COVER

Eruption of Vesuvius on 24 August A.D. 79 under the Reign of Titus by Pierre-Henri de Valenciennes (1813). Painting shows the artist's vision of the ancient volcanic catastrophe that destroyed Pompeii and other towns around the Bay of Naples. The eruption was one of the most explosive in Europe during the past 3500 years. See page 411. [Courtesy of Musée des Augustins, 21 Rue de Metz, 31000 Toulouse, France]

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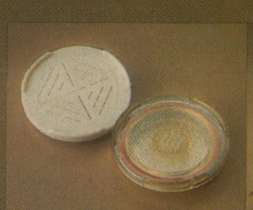

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tion of moldy food within the previous day or two. That T2 can contaminate food in the Asian tropics is indicated by reports from India of high levels in corn, sorghum, and safflower seed (*7*).

Although a more systematic investigation is needed, the available evidence strongly suggests that the yellow rain samples and the trichothecenes result from natural phenomena. Similar phenomena may have been responsible for the complaints brought by Cambodia before the United Nations Security Council 19 years ago alleging that U.S. and South Vietnamese planes were spraying lethal yellow powder over Cambodian villages (*8*). If the yellow rain is a natural phenomenon, there could nevertheless remain serious and possibly widespread human illness caused by trichothecenes.

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Adjectives, Nouns, and Hyphens

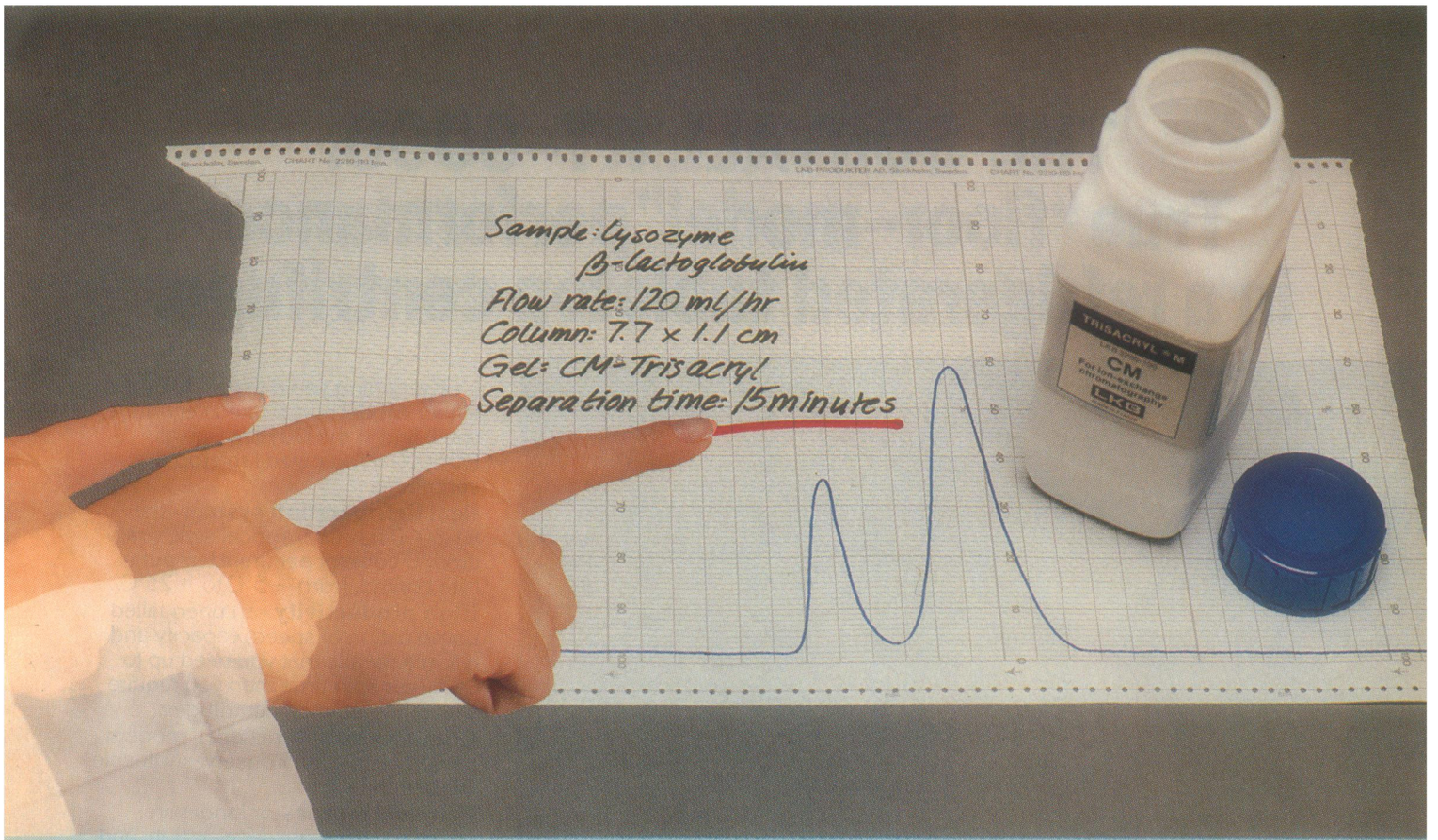
Reading Milton Hildebrand's recommendation against the "adjective noun use tendency" in the writing of biologists (Letters, 19 Aug., p. 698), I remembered the copybook injunction against the use of nouns as adjectives. But I also remembered a day in Santo Domingo when, waiting for my host's car to be allowed past an accident scene, I spent a moment translating a movie marquee and discovered that the Dominicans could see "The Fever of the Night of Saturday." I decided then that my copybook injunction might well be discarded formally, as it had already been functionally, and I found myself glad that English allowed me the advantage of using nouns as adjectives.

I have considered Hildebrand's examples and find that I prefer "heart chamber pressure change" to "change in the pressure of the chamber of the heart," "sea snake diet data" to "data on the diet of the snake of the sea," "hair cell orientation pattern" to "pattern of orientation of the cells of hair," and "ankle joint angle measurement" to "measurement of the angle of the joint of the ankle." I prefer even more "heart-chamber pressure change," "sea-snake diet data," "hair-cell orientation pattern," and "ankle-joint angle measurement." True, "lizard ovary winter lipid level change" is poor writing, but again, "change in the level of the lipids of the ovaries of the lizard in winter" is not lucid either. But use of a hyphen and three noun adjectives yields "winter changes in lizard-ovary lipid levels," which seems clear, efficient, and unobtrusive.

In summary, noun adjectives are not the problem, logical juncturing is; and logical juncturing can in fact be facilitated by noun adjectives, especially when they are aided by hyphens. We used to have a rule about hyphens (which I have exemplified in this letter); it is not currently in vogue among style-rule-book writers. Hildebrand's problem would dissolve if science editors would ignore the current fashion in rules and attend instead to clarity, efficiency, and unobtrusiveness in science writing.

DONALD M. BAER
Department of Human Development and Family Life, University of Kansas, Lawrence 66045

Erratum: In R. Jeffrey Smith's News and Comment article "Antisatellite weapon sets dangerous course" (14 Oct., p. 140), a remark on page 141 (column 3) by Richard Garwin about the usefulness of rockets, balloons, and aircraft to supplant U.S. photoreconnaissance and meterological satellites was inadvertently attributed to Robert Buchheim. And a characterization on page 141 (column 2) of the Soviet antisatellite weapon, or ASAT, was actually made by General Lewis Allen, the former Air Force chief of staff, not by General David Jones, the former chairman of the Joint Chiefs of Staff. Finally, a footnote on page 142 should have identified the Patriot as an air-to-air missile, not an air-to-ground missile.



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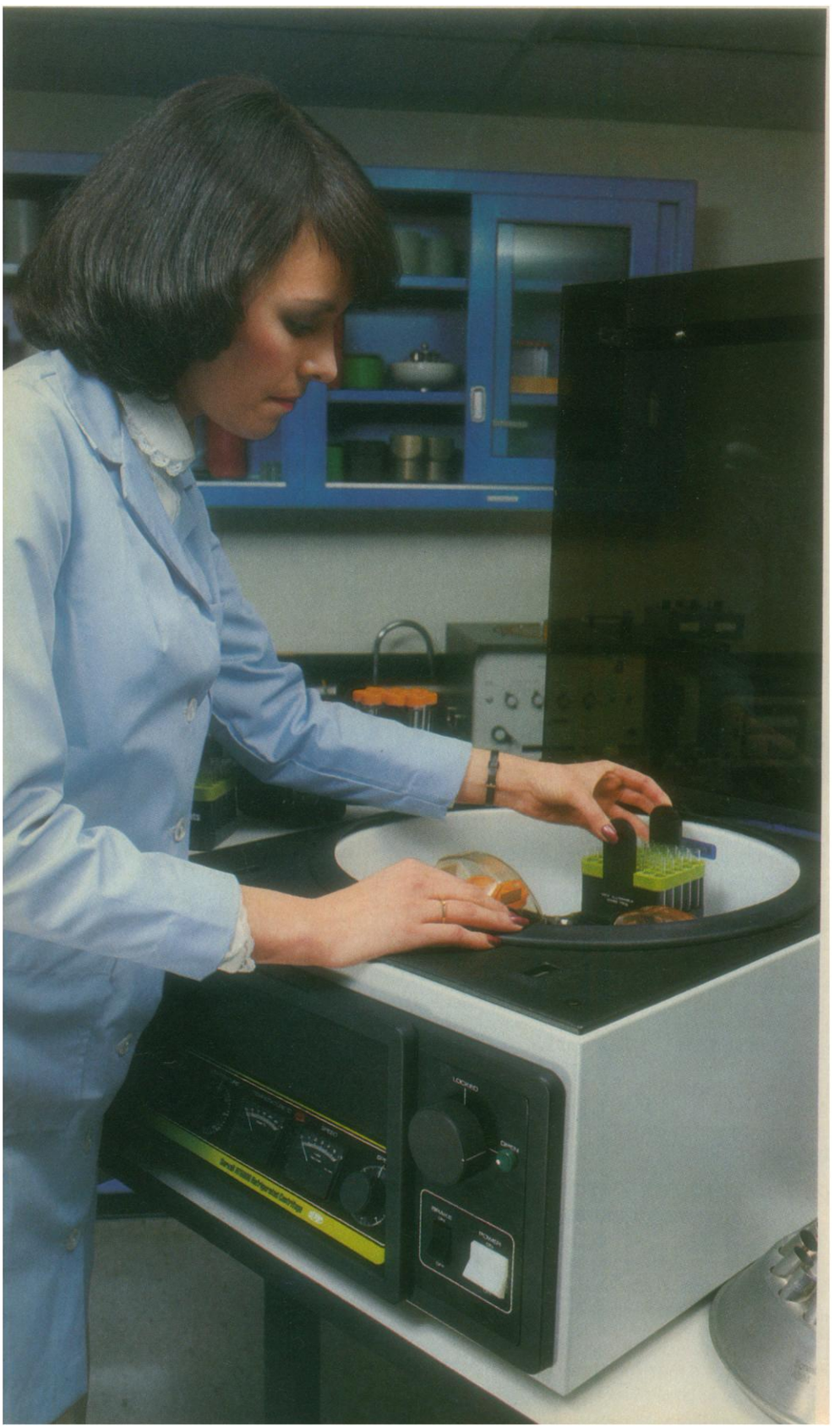

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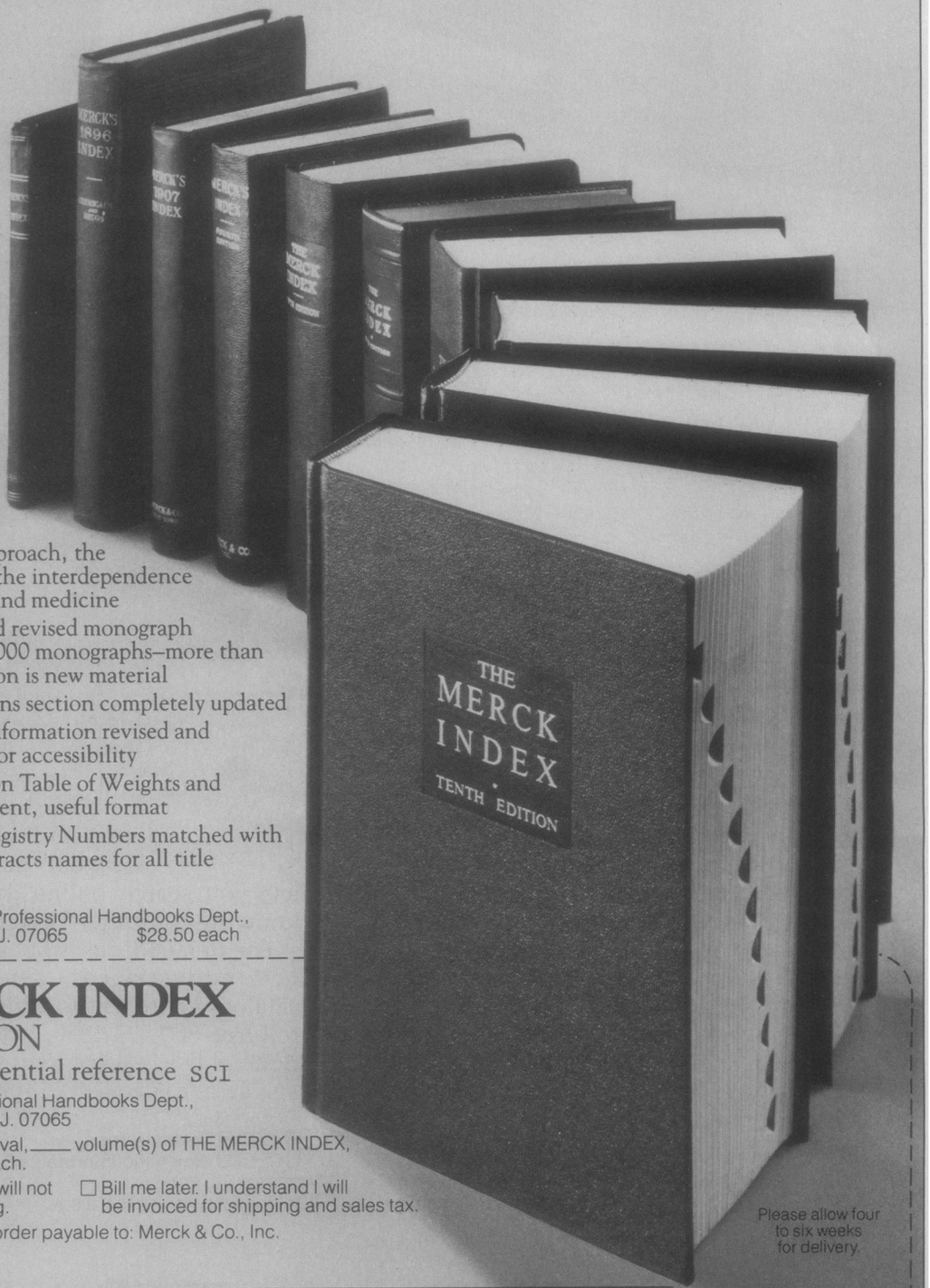

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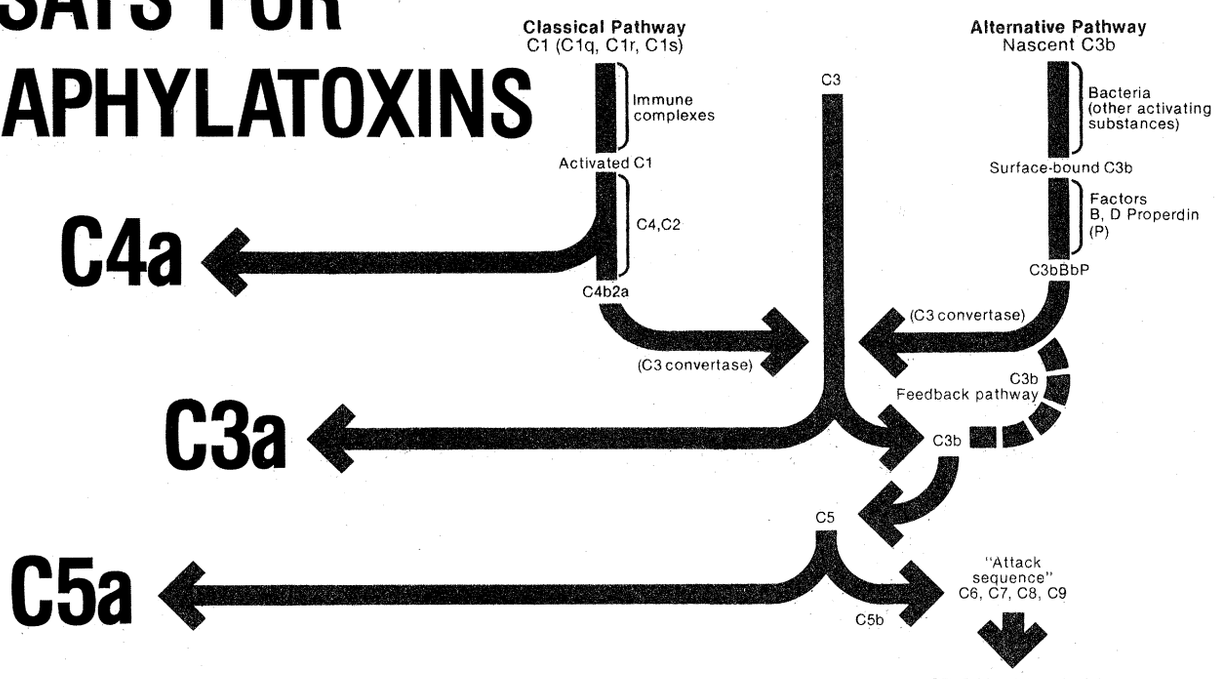

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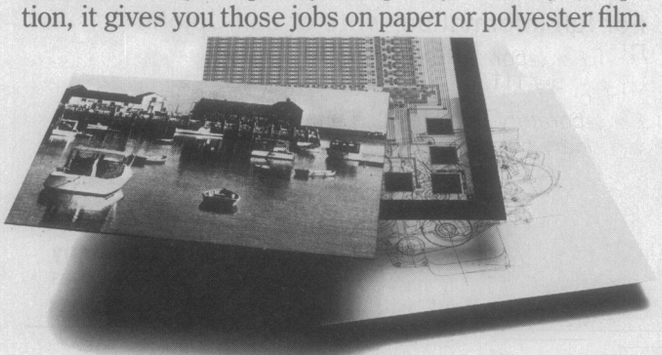

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28 October 1983, Volume 222, Number 4622 **SCIENCE**

Engineering Education

On this editorial page last year, Edward E. David, Jr., proclaimed, "The time for action to deal with the precarious state of engineering education in the United States has come."* Much has happened since. Industry has provided funds for stipends and equipment to make graduate engineering study more attractive and to help attract and keep beginning faculty. A number of universities have begun to set "engineering faculty compensation at a level that realistically reflects the market for such talent in industry." Yet these beginning steps are overwhelmed by the increasingly inadequate output of Ph.D.'s in engineering, far too few of whom come from the upper 15 percent of graduates receiving B.S. degrees. Across the country a terribly overloaded faculty strives valiantly to educate a growing number of the brightest and best students ever to enter engineering schools. Almost every school of engineering is unable to provide what it views as an adequate quality of education because of obsolete instructional laboratories and facilities and an increasing shortage of qualified faculty.

Given no other choice, many schools have already granted tenure to the best of the inadequate people available and will continue on this downward path. Yet engineering graduates will be turned out in appreciable numbers, although many schools are restricting their enrollment. It is the quality of education, not the quantity, that progressively degrades. That is the insidious nature of the crisis in engineering education, devastating to the economic welfare and defense capability of the country on a time scale of less than a decade ahead.

Now our attention as a nation is turned to the deplorable state of primary and secondary education. That massive problem will take huge sums of money and far more than a generation of great change. It is all too likely that, unless there are loud and frequent reminders, the far smaller sums from all sources ($5 per person per year) needed to completely solve the crisis of quality in engineering education in less than 10 years will not be made available. Should that happen, our children's children may know enough arithmetic to balance a checkbook and be literate enough to read bank notices, but our economy will not be strong enough to permit them to have a checking account.

Perhaps once the crisis is understood and ameliorated we can devote long overdue attention to the education itself. The sophistication of analytical and computer techniques produces the comfortable feeling that we are prepared for whatever will come along. It is easy to delude oneself that all the new mathematics, physical science, life science, and social and behavioral science along with the associated engineering sciences that develop are far too esoteric ever to be useful. Each engineering curriculum tends to co-opt more and more of its own students' time. The frontiers of apparently less applicable knowledge recede over the horizon to each side as we repeatedly barricade those winding secondary roads that historically have led to the engineering of the future and devote full attention to the well-traveled superhighway of our own discipline. Also, times of economic recession or stagnation cause us to focus on design and current practice rather than R & D and the likely long-range future.

Without adequate faculty with ample time for contemplation, these backward steps are taken in the name of progress. We call for unity of the engineering profession and educate our students so that they can barely communicate with each other on a professional level. Time indeed is running out for our system of engineering education and our country.

—D. C. DRUCKER, *Dean, College of Engineering, University of Illinois at Urbana-Champaign, Urbana 61801*

*E. E. David, Jr., *Science* **216**, 465 (1982).

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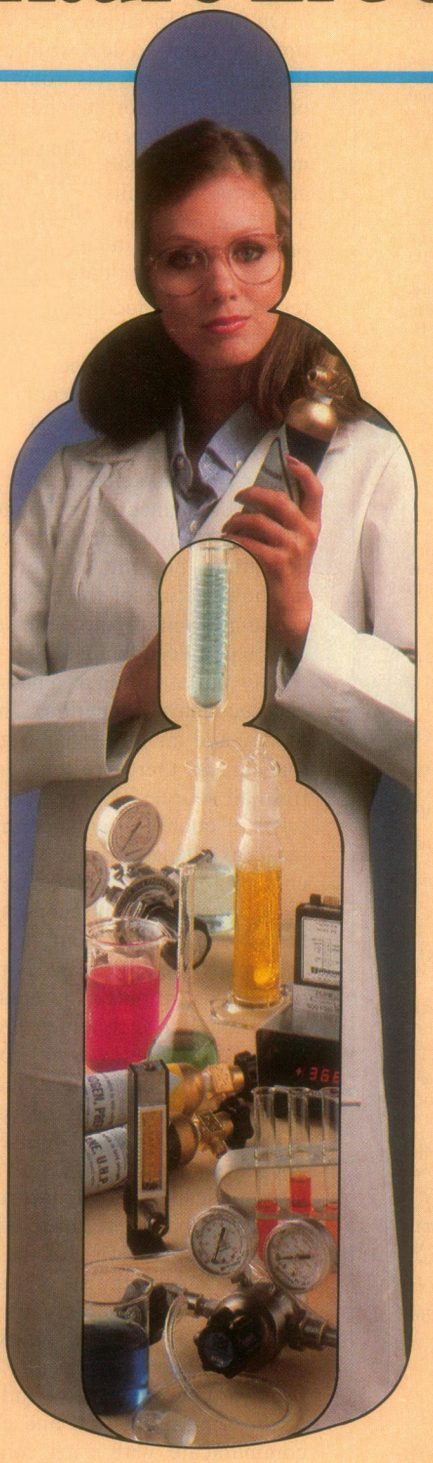

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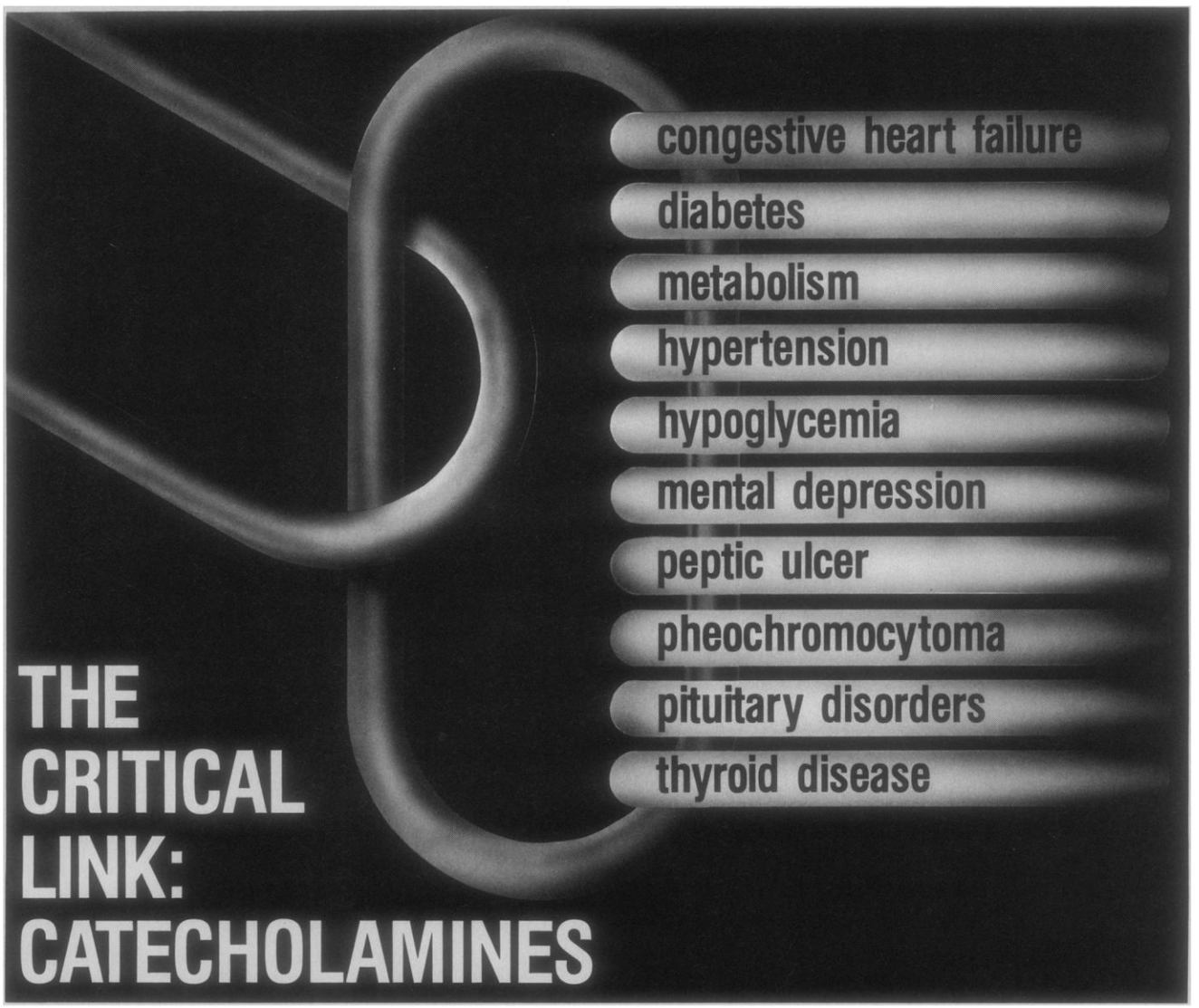

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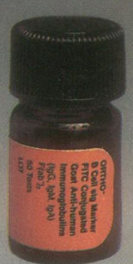

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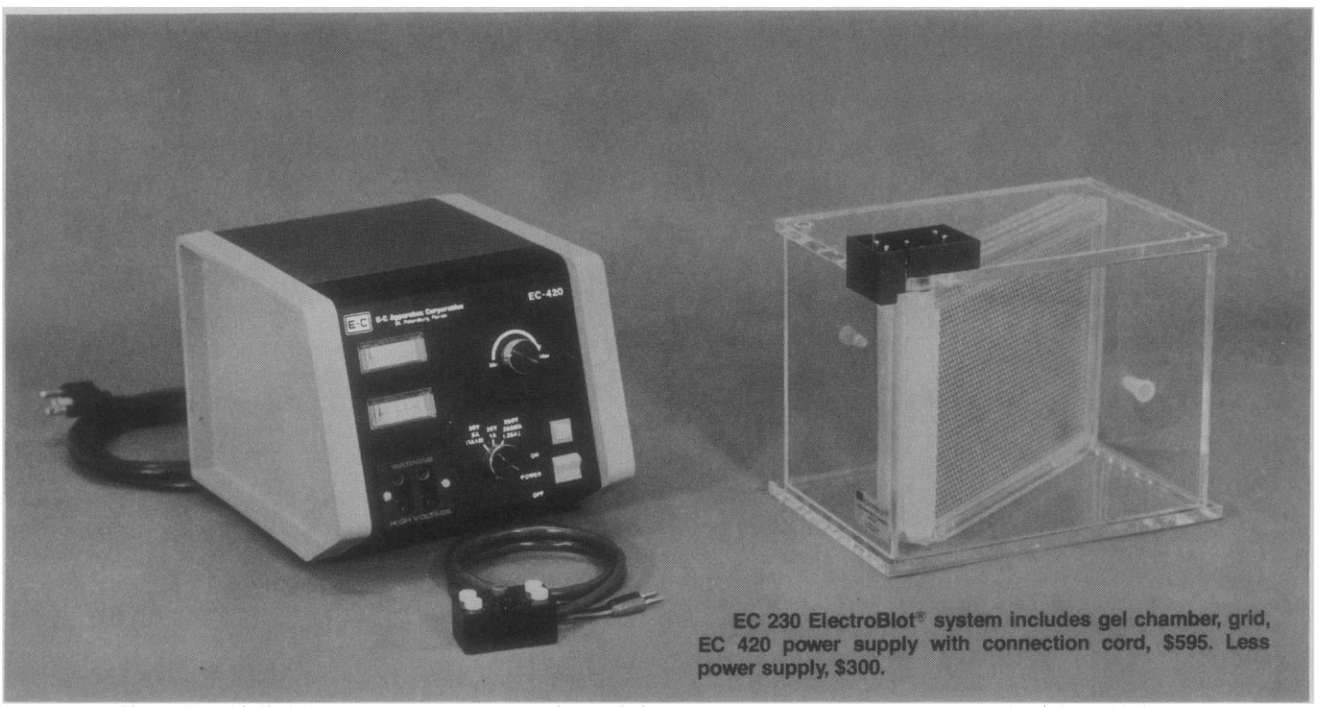

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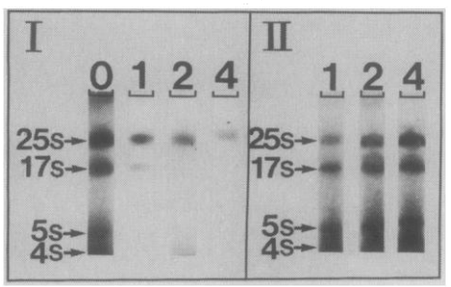

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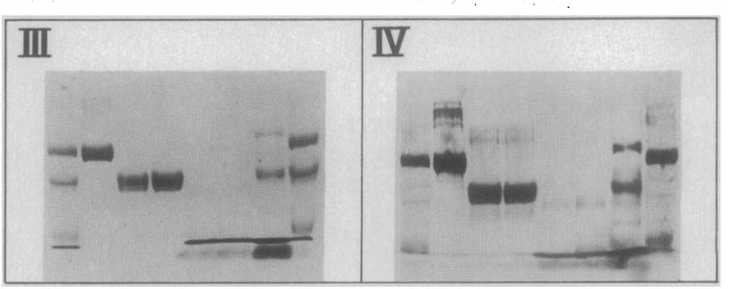

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