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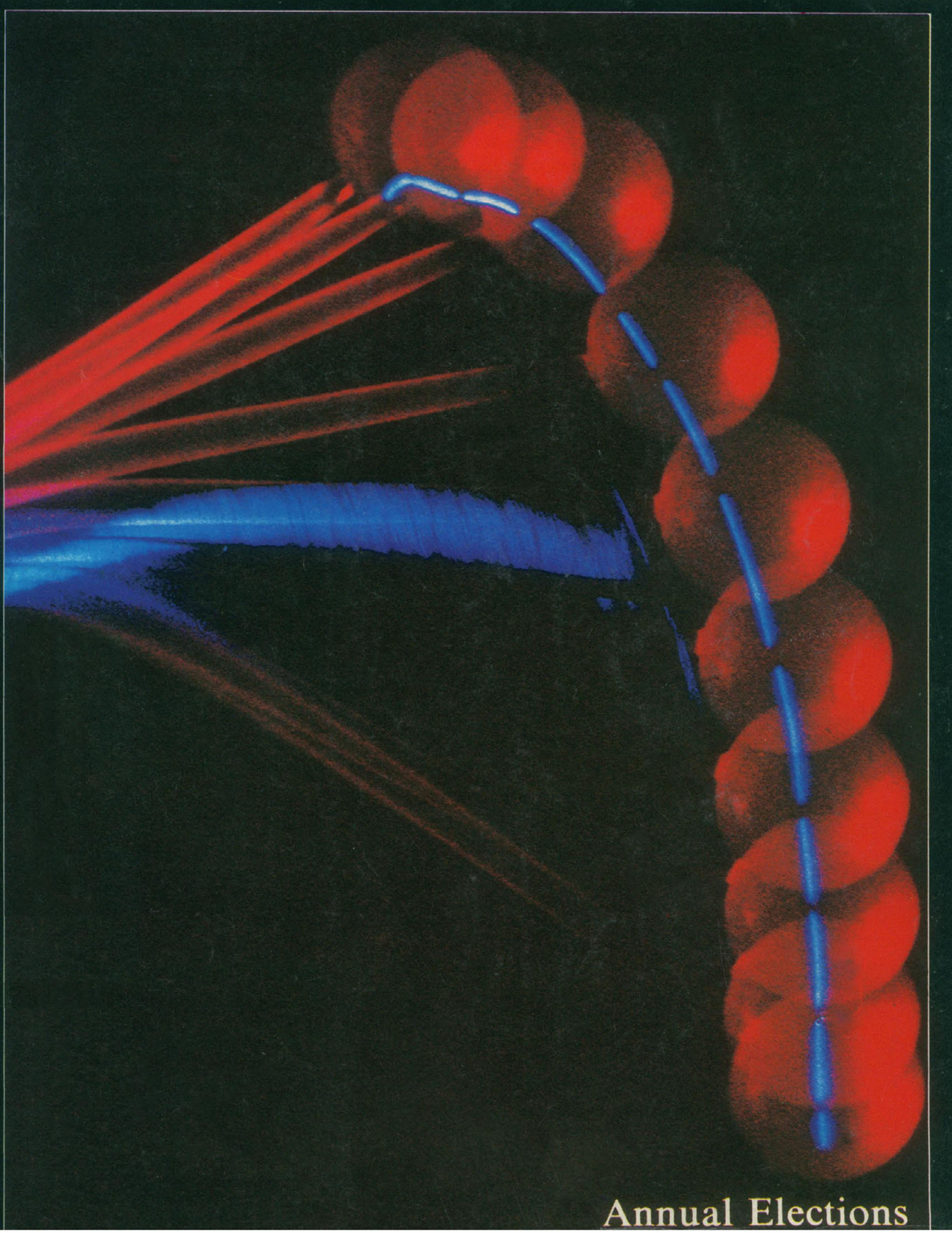

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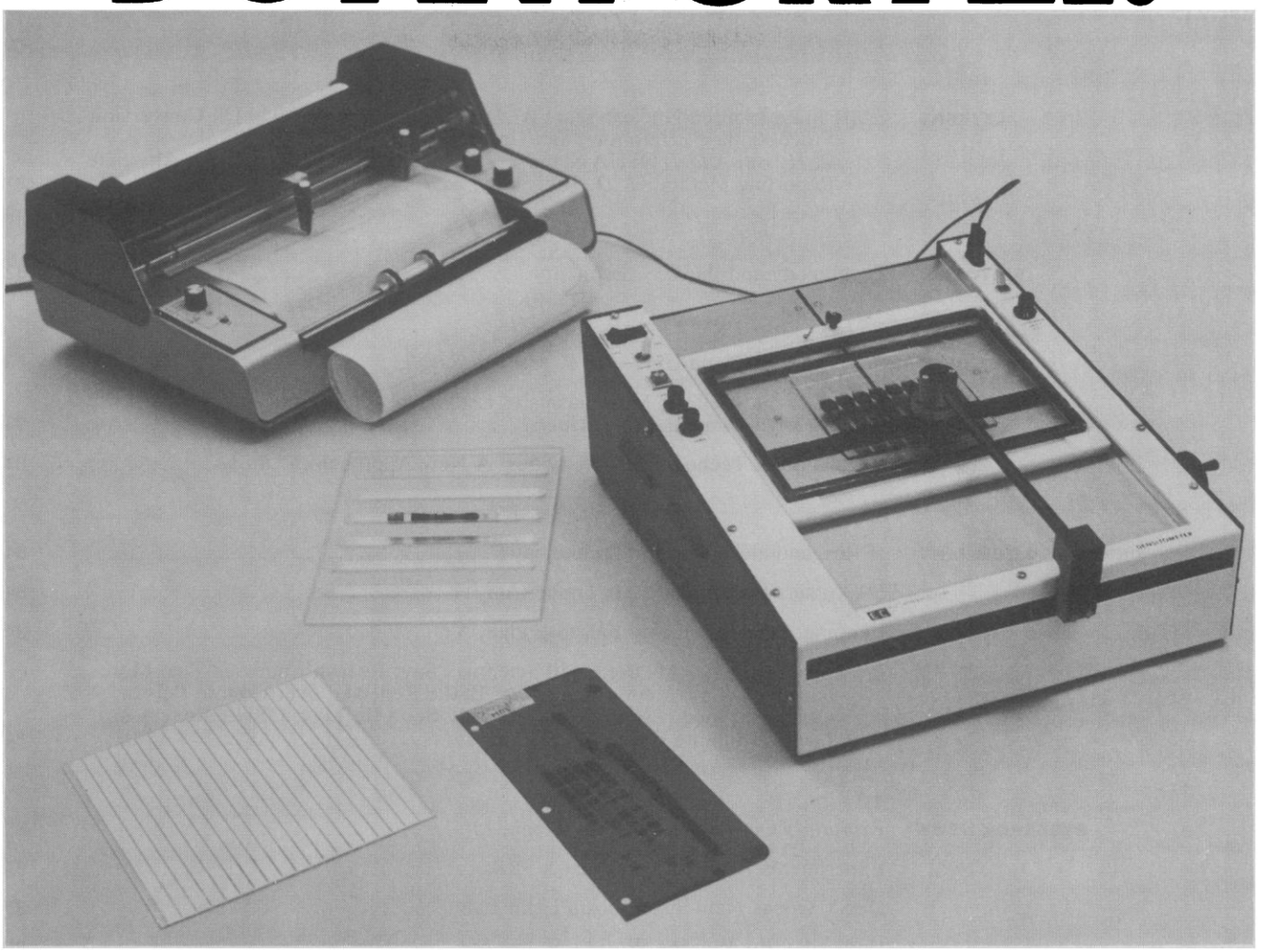

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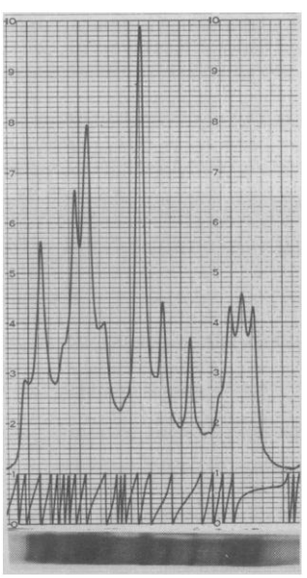

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August 1981

Volume 213, No. 4510

SCIENCE

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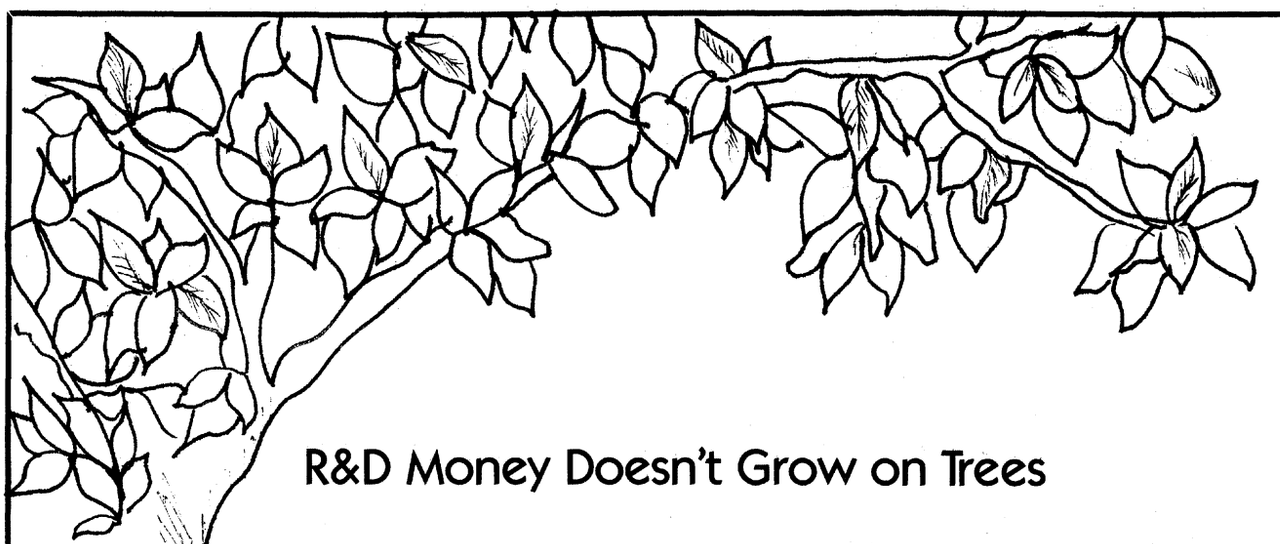
Phycomyces phototactic response to actinic blue light (about ×10). The giant sporangiophores of this fungus exhibit sensory responses to light, gravity, and the proximity of objects. The sensory transducing mechanism involves the modulation of chitin cell wall biosynthesis. *Phycomyces* in vitro chitin synthesis systems can be used to study the molecular mode of action of fungicides and insecticides. See page 905. [David Dennison, Dartmouth College, Hanover, New Hampshire 03755]



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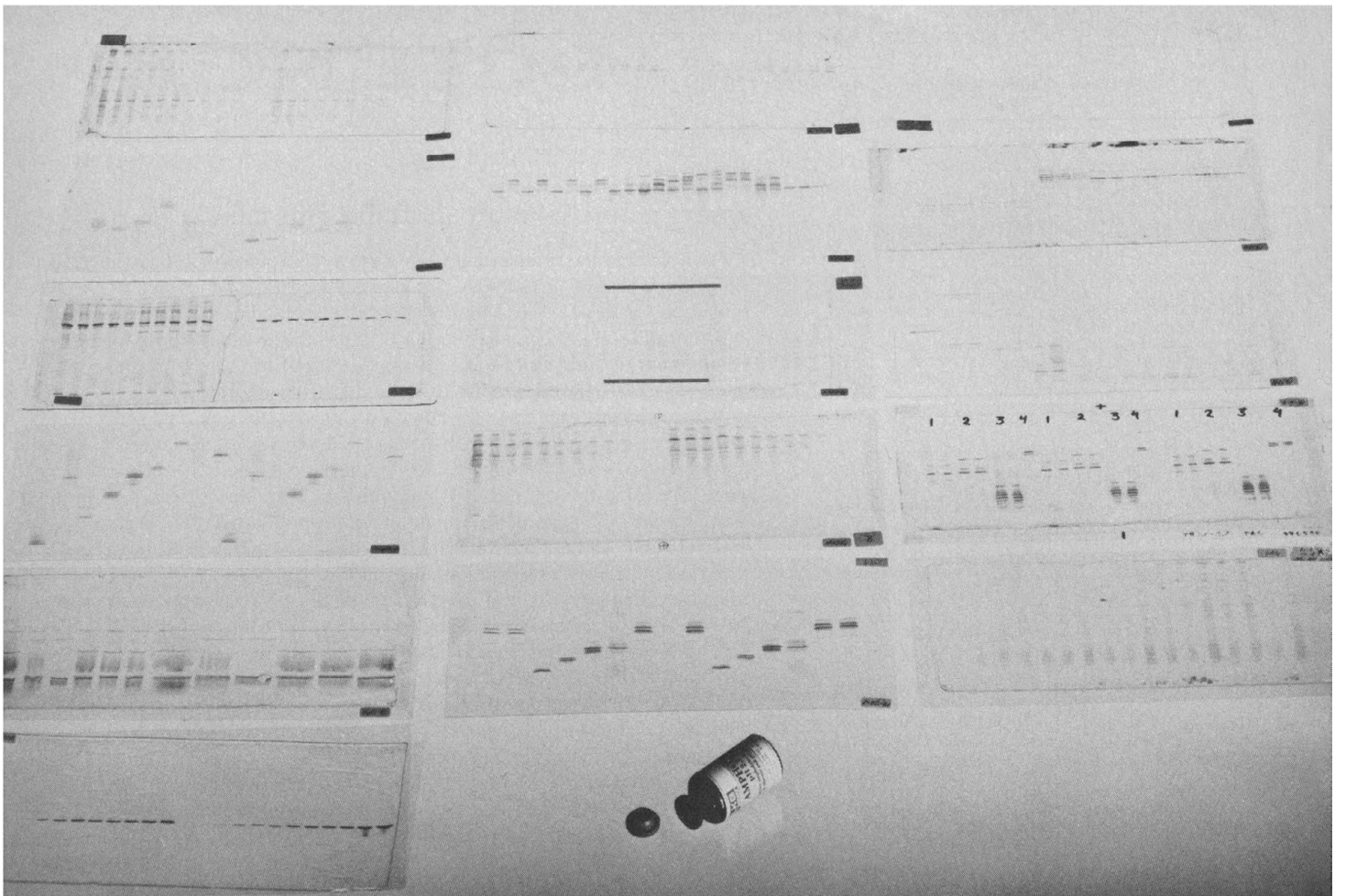

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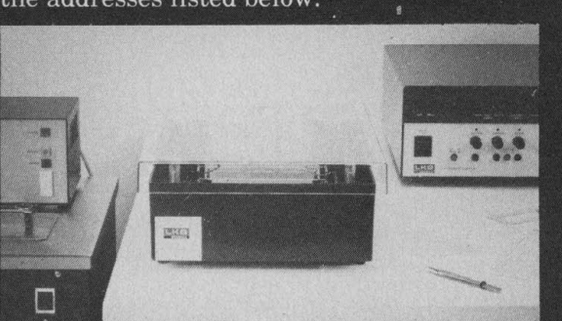

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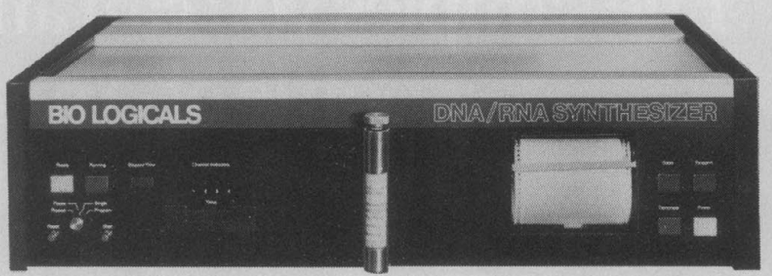

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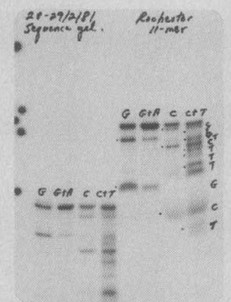

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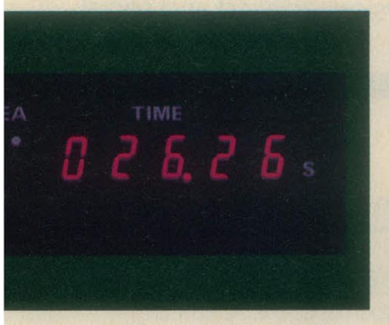

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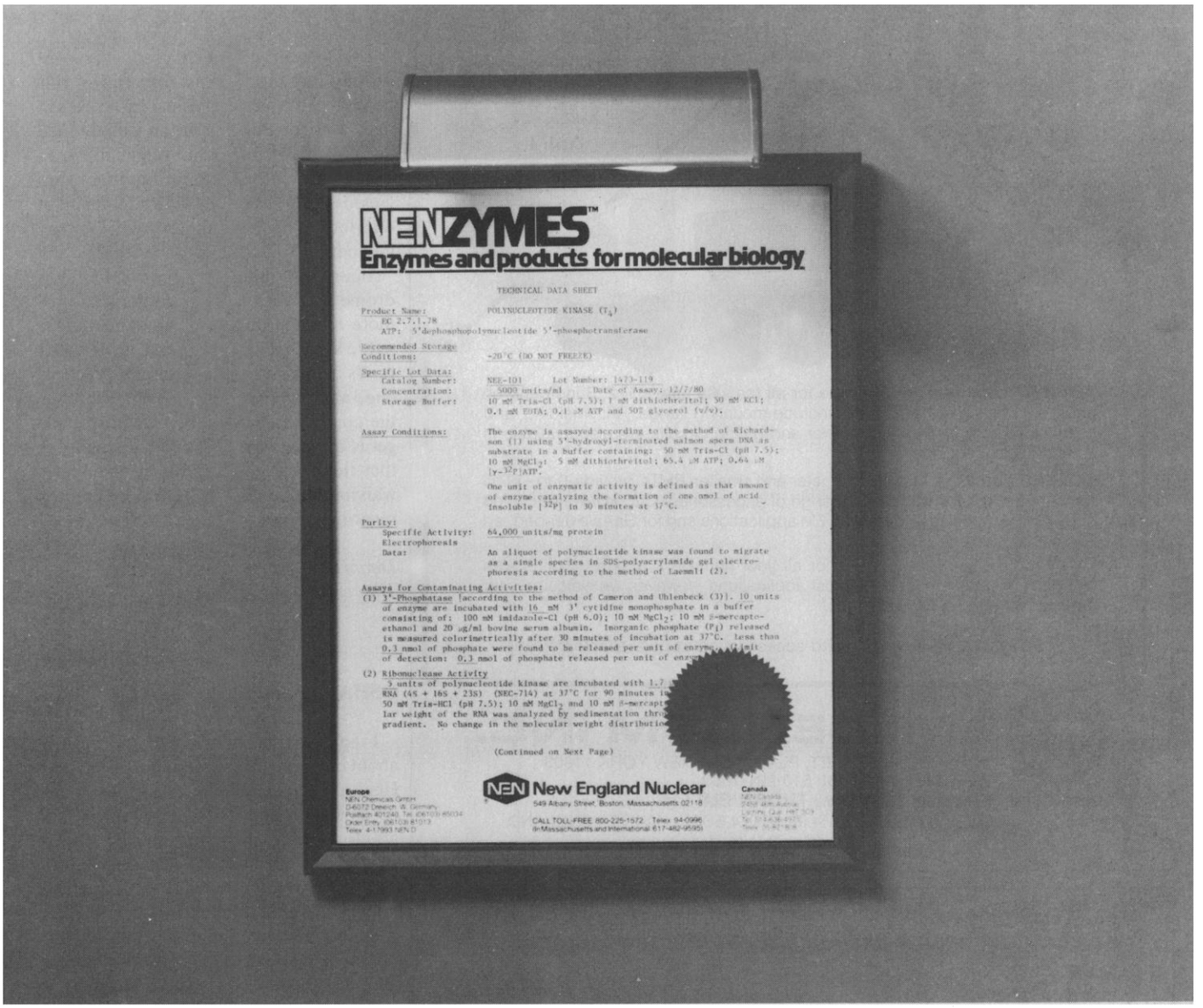

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DOD deserves much credit for supporting important basic research in this country, to a very large extent unclassified, and for doing it in an enlightened and flexible manner that ought to be an example for other federal funding agencies. It deserves better than such blanket diatribes. The "the military will destroy democracy" specter is no better than the "communist under every bed" syndrome and does not do anything to promote a useful debate of fundamental issues. Whether universities accept DOD funds is one issue and largely a practical one, although not entirely so. Whether the country needs a larger defense budget is quite another problem. To address that there are good and tried channels; waiving implied boycotts and innuendos regarding military research will not help.

TJEERD H. VAN ANDEL
Department of Geology, Stanford University, Stanford, California 94305

OSHA Standards

I am writing to correct the record about several Occupational Safety and Health Administration (OSHA) standards mentioned in R. Jeffrey Smith's article "OSHA shifts direction on health standards" (News and Comment, 26 June, p. 1482). Our agency has not withdrawn a *requirement* for labeling of chemical hazards in the workplace, but rather a proposal. As Smith's article correctly states, we expect to issue a revised proposal for labeling chemical substances in the workplace by 1 September.

The hearing conservation amendment to OSHA's current noise standard, scheduled to go into effect on 1 August, would not impose a "tighter limit on workplace noise" as noted by Smith. Rather, it would define in specific terms the components of an acceptable hearing conservation program. Hearing conservation programs are currently required under OSHA's standard covering occupational exposure to noise.

Also, the agency has not exempted the construction industry from the OSHA standard covering worker access to employer-maintained medical and exposure records. Instead, OSHA has stayed for the construction industry those portions of the standard giving workers access to exposure records; construction employers must continue to maintain these records and must provide medical records to workers and individuals given specific written consent by workers to see their individual medical records. The agency has solicited the views of the Advisory

Committee on Construction Safety and Health, which was not consulted during the rule-making on these issues, and is evaluating their recommendations along with public comments requested on the records issue.

JAMES FOSTER
Information and Consumer Affairs, Occupational Safety and Health Administration, Washington, D.C. 20210

Circular A-21: An Alternative Reporting Method

Much has been written about the effort-reporting requirements imposed upon educational institutions by the Office of Management and Budget (OMB) Circular A-21. Much of the furor appears to be due, as John J. Lordan apparently suggested to the Council of Scientific Society Presidents (News and Comment, 15 May, p. 760), to either overreaction or perhaps reaction to inappropriate interpretations of the provisions of paragraph J.6 of the circular, which authorizes and describes two alternative methods for distributing salaries and wages—either personnel activity reports or a monitored work load.

Individual faculty members and other university representatives (especially at institutions that have adopted the personnel activity alternative) have stated that the opposition results from what is perceived to be a requirement that faculty members keep track and report precisely how much time they spend on research, teaching, administration, counseling, and other activities both on campus and off.

The circular, however, provides [in paragraph J.6(b)] that "because of the nature of work involved in academic institutions, the various and often interrelated activities of professorial and professional employees frequently cannot be measured with a high degree of precision, that reliance must be placed on reasonably accurate approximations, and that acceptance of a degree of tolerance in measurement is appropriate." Certifications confirming "that the distribution of activity represents a reasonable estimate of the work performed by the employees during the period . . . will be signed by the employees or by a responsible official having firsthand knowledge of the work performed" [paragraphs J.6c(5) and J.6d(4)]. Therefore, at most institutions many individual faculty members need not be involved in the certification of their activity distribution because department heads or deans

who should have firsthand knowledge of reasonable estimates of the work they perform are authorized to sign certifications.

Another basis for the objections to the requirements of paragraph J.6 is the volume of paperwork resulting from the personnel activity report. The "reason" given for the selection of that alternative is that there is an apparent prohibition (although nobody has explained why) of the use of the monitored work-load alternative for nonprofessional and nonprofessorial employees, and therefore two systems would be required. This "reason" does not appear to support the selection, since many institutions already have the elements of both alternatives in their nonprofessional and nonprofessorial (nonexempt) payroll systems.

An analysis of the two effort distribution systems prescribed by Circular A-21 indicates few, but important and significant, differences. Briefly, the personnel activity reports "reflect an after-the-fact reporting of the percentage of activity of each employee." Reports for professional and professorial staff are to "be prepared each academic term, but no less frequently than every six months." Each report will be signed to confirm that the distribution of activity represents a reasonable estimate of the work performed during the period.

The monitored work-load system (paragraph J.6c), on the other hand, is "a system of budgeted or assigned workload . . . incorporated into the official records of the institution . . . because practices vary among institutions and within institutions as to the total activity constituting full workload—when expressed in measurable units, such as contact hours in teaching—the system will be based on a determination for each individual reflecting the ratio of each of the activities which comprises a total workload of the individual. . . . The system will provide for a modification of an individual's salary or salary distribution commensurate with any significant change in the employee workload or the ratio of activities comprising the total workload." Certification of the reasonableness of the distribution will occur at least annually for those employees whose distributions have not changed during the year, while a certification concerning charges up to the date of change will accompany each change notice initiated during the year. Certifications of reasonableness will be signed by the employee or a responsible official having firsthand knowledge of the work.

When one observes the implementation of the two alternatives at a number of institutions, it is apparent that the monitored work-load alternative is the more desirable for a number of reasons:

1) Many institutions already have a system of budgeted distributions for professional and professorial employees that accounts for 100 percent of their activity, so adoption of the monitored work-load system may merely require a refinement of those existing systems.

2) The monitored work-load system requires a signed statement of reasonableness only annually compared to a requirement of semiannual statements for personnel activity reporting.

3) The monitored work-load system provides a means (usually by the controller function) for the institution to automatically monitor charges that exceed or fall below certain predetermined thresholds established within the system to ensure reasonably accurate distribution.

4) There are few, if any, apparent faculty objections or opposition to the monitored work load.

5) In total, the amount of paperwork generated by the monitored work-load system is considerably less than that which results from the use of personnel activity reports.

Several major institutions (Syracuse University, University of Rochester, University of Oklahoma, University of Michigan) already have implemented monitored work-load systems. Others are in the process of adopting such systems.

In summary, the monitored work-load alternative, which in reality is a payroll budget validation system, focuses the responsibility for both budgeting and validation upon deans, department heads, and other supervisory staff and upon the controller's department. It is, therefore, suggested that institutions consider adopting the monitored work-load alternative in order to meet the requirements of OMB Circular A-21. It appears that something satisfactory exists without insisting on complete elimination of effort reporting.

J. D. TEBBENHOFF
Eastern/Central Regional Office,
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Erratum: In the news story "A firing over formaldehyde" (News and Comment, 7 August 1981, p. 630), the subheadline attributed to Peter F. Infante (Occupational Safety and Health Administration) the position that formaldehyde is a human carcinogen whereas, in fact, his belief is that it is an animal carcinogen. The story also incorrectly reported that mobile home residents are exposed to levels of formaldehyde as high as 10 parts per million (column one, line 28, p. 631). According to a National Academy of Sciences report, the correct level is 4.2 parts per million.

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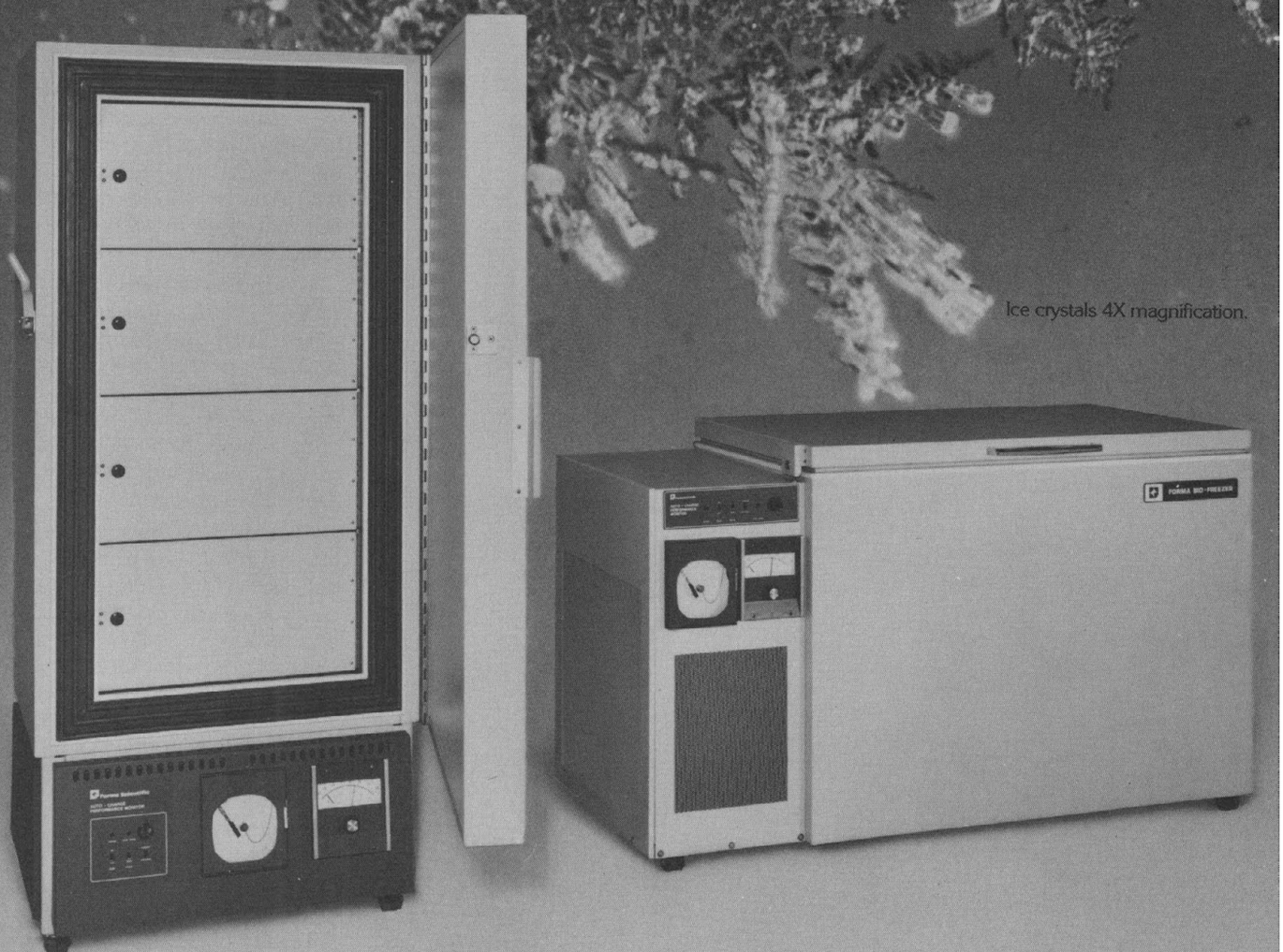

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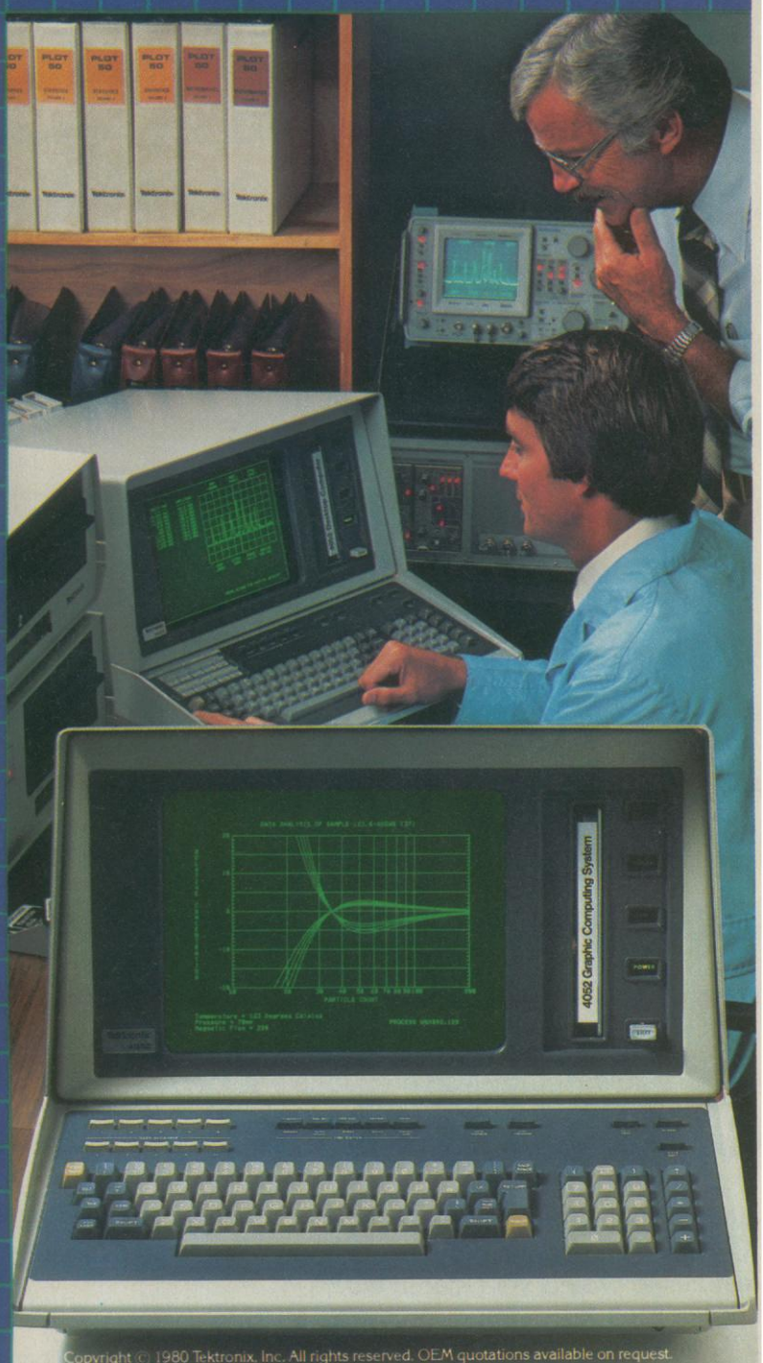

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21 August 1981, Volume 213, Number 4510 **SCIENCE**

Technology and the U.S. Economy

In the two and a half decades immediately following World War II, the United States was far and away the world leader in science and technology. Its high technology products earned respect and markets globally. It enjoyed annual increases in productivity of about 3 percent. The gross domestic product increased about 3 percent annually, and the inflation rate was less than 4 percent.

We still lead in science, but our position is eroding. Unless a turnaround occurs soon in all levels of science education, we are headed for long-term inferiority. We still enjoy a positive balance of payments in high technology goods, but our share of the world market has dropped, and the balance with respect to Japan and Germany has become negative. Innovation is difficult to gauge, but one measure—patents—indicates a relative decrease. In 1966 only 20 percent of U.S. patents were awarded to foreigners. In 1976 the figure was 36 percent. Innovation is also related to increases in productivity, and during the last several years gains in productivity have not occurred. This, in turn, has been a factor in the high inflation rate. Most economists agree that increases in productivity tend to hold down inflation, and failure to obtain such gains was a factor in the double-digit inflation we have experienced. Another symptom of economic woes is the drop in the rate of increase in real gross domestic product, which currently is around zero.

A number of studies have been made to analyze the causes of this country's poor performance. Groups have been organized by the Committee for Economic Development (1980), the National Research Council (1978, 1979, 1980), the Department of Commerce (1979), the Industrial Research Institute (1980), and others. In 1980 the National Academy of Engineering published a report highlighting areas of agreement among previous studies. These findings have now been supplemented by a special issue of *Technology in Society** in which 21 leading economists and technologists give their analyses of our economic ills and prescriptions for their amelioration.

Some part of our problems is due to a drastic change in energy prices. Another factor has been a bias among some business managers toward quick-payoff projects in decisions involving allocation of resources. But the principal targets of criticism, and rightly so, are the past policies and practices of the federal government. These have discouraged innovation through a multitude of regulations. Tax policies have compared infavorably with those of our principal competitors. The introduction of new products or processes is particularly affected by uncertainties raised by regulatory actions. Delays increase costs and add to the substantial risks that accompany innovative ventures. Perhaps the most important factor limiting innovation is the availability of capital. In visits to industrial laboratories, I was repeatedly told this. A leader of R & D at U.S. Steel said to me sadly, "We know exactly what we need to do to compete successfully with the Japanese, but we don't have the money." In times of high inflation, a particularly troublesome factor is that replacement costs of equipment far exceed its original costs.

The recently enacted tax legislation goes far toward a long-term easing of problems of capital accumulation for investment in more efficient plants and processes. But as more funds become available, industry will be expanding its R & D and seeking more scientific and technical personnel. The pipeline from the secondary schools through the universities is not in good shape; if anything, it is deteriorating. Features of the tax legislation that encourage industrial contributions to universities will be helpful, but that addresses only part of the problems of science and engineering education. Technological innovation requires money, a favorable environment for investment, and trained people. The first two requirements are being met; the new bottleneck will probably be a shortage of prepared minds.—PHILIP H. ABELSON

*R. Landau and N. B. Hannay, Eds., "Taxation, technology and the U.S. economy," *Technology in Society*, vol. 3, Nos. 1 and 2, 1981.

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