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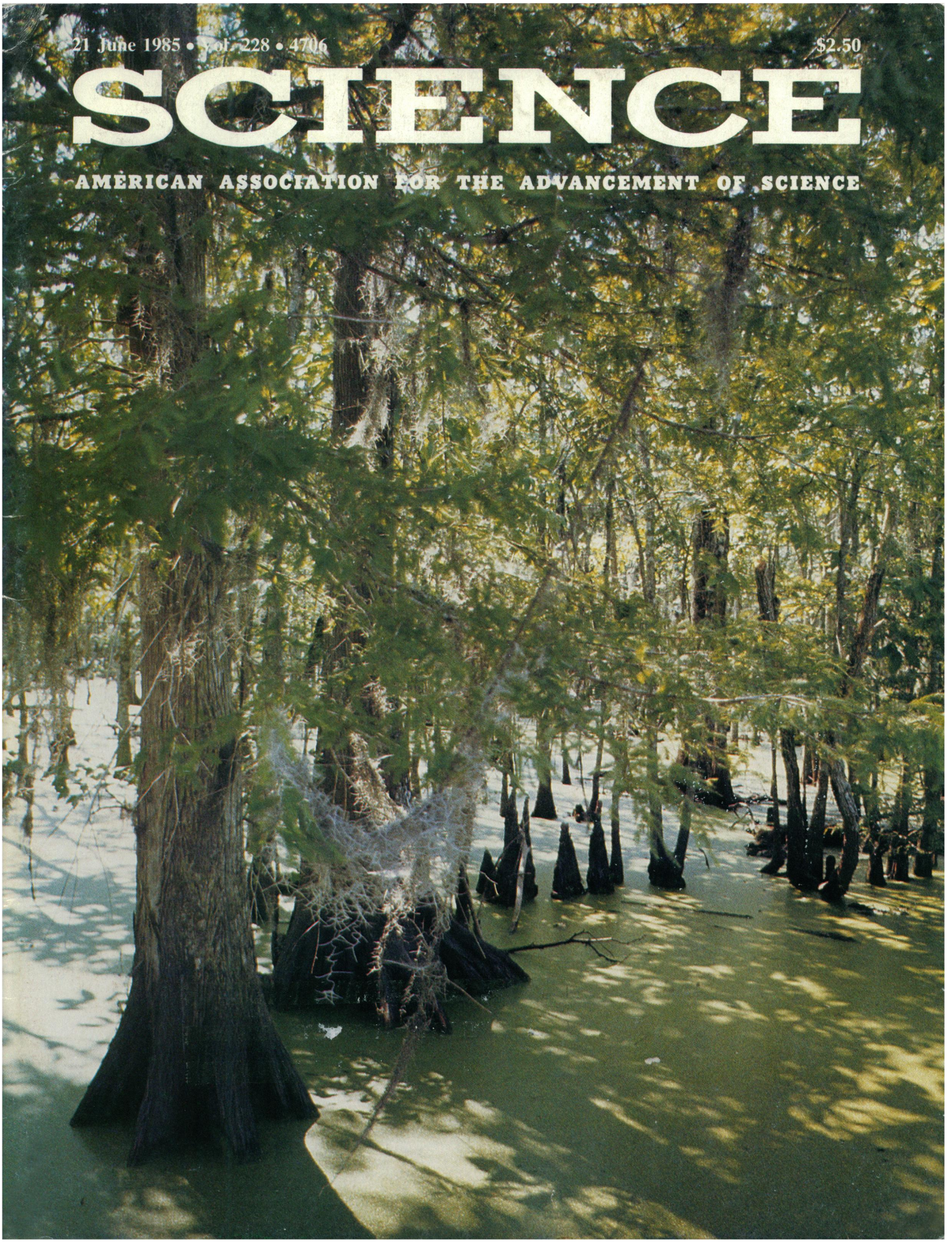

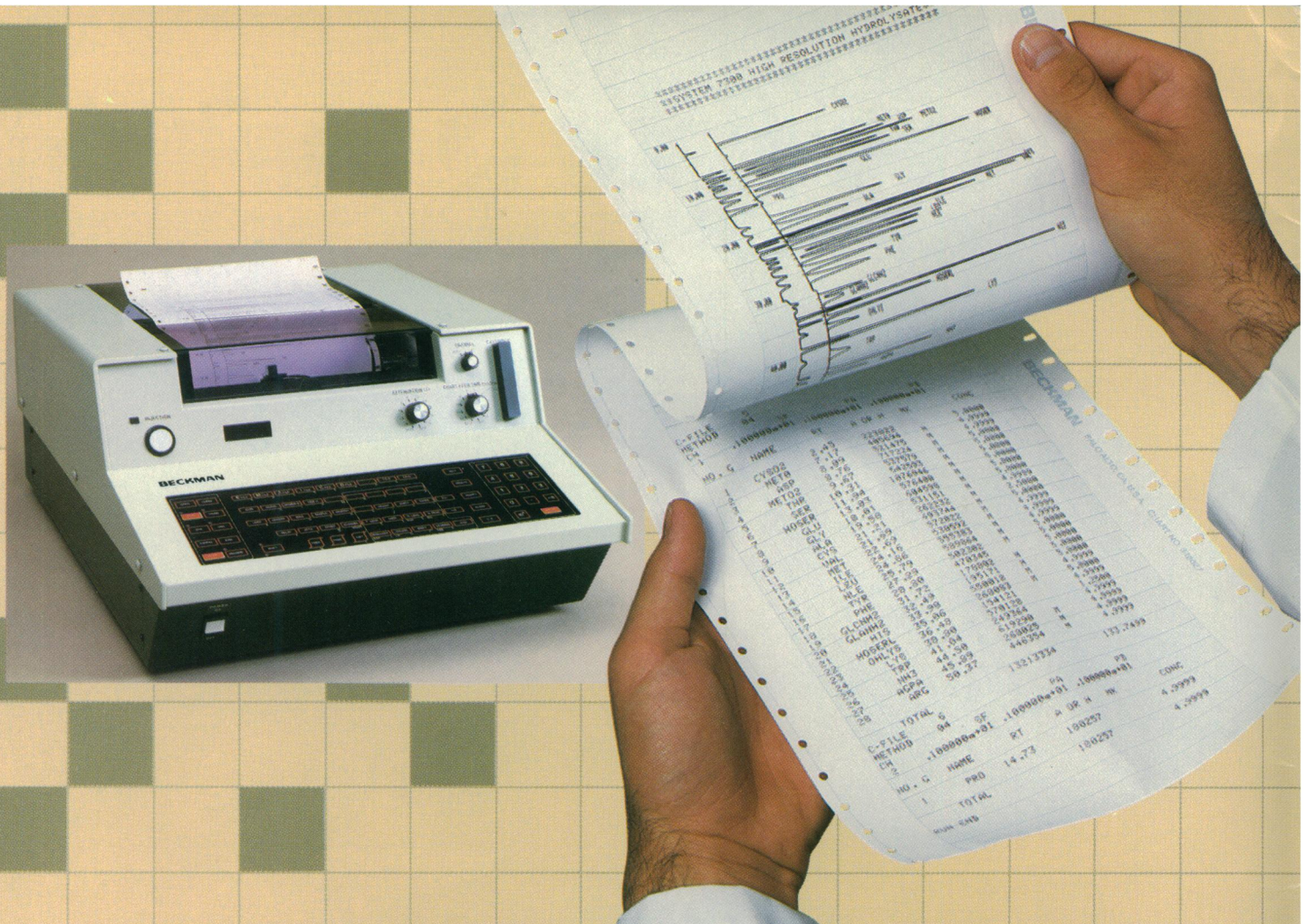

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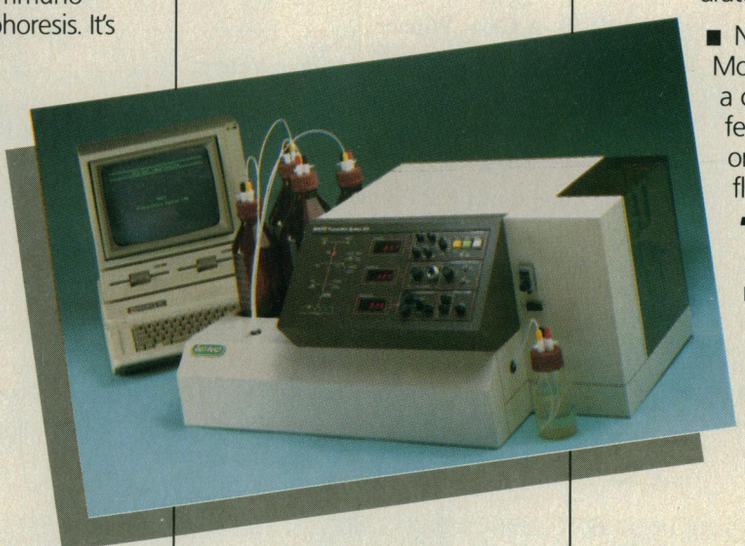

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ISSN 0036-8075

21 June 1985

Volume 228, No. 4706

SCIENCE

SCIENCE is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Second-class postage (publication No. 484460) paid at Washington, D.C., and at an additional entry. Now combined with **The Scientific Monthly**® Domestic individual membership and subscription (51 issues): $60. Domestic institutional subscription (51 issues): $98. Foreign postage extra: Canada $24, other (surface mail) $27, air-surface via Amsterdam $65. First class, airmail, school-year, and student rates on request. Single copies $2.50 ($3 by mail); back issues $3 ($3.50 by mail); Biotechnology issue, $5 ($5.50 by mail); classroom rates on request. **Change of address:** allow 6 weeks, giving old and new addresses and seven-digit account number.
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COVER

Young stand of bald cypress trees (*Taxodium distichum*) in a swamp near New Orleans, Louisiana. Cypress, a needle-leaved deciduous conifer, is one of the most flood-tolerant tree species and is often found in pure stands. Cypress knees, suggested adaptations to flooding, are a unique feature of this species. Spanish moss (*Tillandsia usneoides*), hanging from the branches (foreground), and duckweed (*Lemna* spp.), covering much of the standing water, are common plant associates in this palustrine, forested wetland. See page 1424. [C. J. Richardson, Duke University, Durham, North Carolina 22706]

Star formation

Energetic jets of gases speeding at hundreds of kilometers per second with an energy output 3000 times that of the sun are emitted during the late stages of star formation (page 1389). Both the rate of star formation and the lifetime of the surrounding clouds of gas and dust from which the stars form may be regulated by winds that stir up the clouds, increase pressure, inhibit further collapse of the cloud, and signal the end of the accretion of the star. Welch *et al.* describe measurements of the winds, the emissions, and the gases that characterize the jets. The jets originate either within the forming star or from the surrounding cloud and are propelled by an undetermined physical force. The frequency with which the jets are seen is comparable to the rate at which stars as massive as the sun are formed, suggesting that a jet emission stage could occur as part of the normal evolution of a star, after which the star would settle into stable hydrogen burning.

Acid effects on a lake

Acid precipitation effects were simulated by the addition of sulfuric acid to a small lake in Canada during an 8-year experimental period, and the natural balance of plant and animal life was gradually destroyed (page 1395). Schindler *et al.* point out that the first irreversible disturbances to simple organisms were taking place even before significant changes in the *p*H were apparent. The mass of phytoplankton remained relatively constant; but new species appeared, and the numbers of organisms small enough to be eaten by the zooplankton declined, adversely affecting zooplankton and their predators. At the top of the food web, lake trout remained abundant, but were severely stressed. Filamentous algae overgrew their spawning grounds, normal prey (shrimp, minnows, and crayfish) died out, and the trout became thinner and cannibalized smaller trout. Shrimp died from hydrogen ion toxicity, minnows did not reproduce, and crayfish egg masses were infested with a fungal parasite. These are but a few examples of how the ecosystem was destroyed by acidification.

Fungus degrades environmental pollutants

DDT, dioxin, and PCB's, difficult compounds to degrade, can be broken down by a fungus that rots wood (page 1434). The organism, *Phanerochaete chyrsosporium*, attacks lignin, a major component of wood that gives it rigidity. Fungi secrete digestive enzymes that break large organic compounds into smaller ones which can be ingested and used as energy sources. Lignin and the pollutants studied were degraded under conditions in which nutrient nitrogen was limited and glucose was abundant. Bumpus *et al.* suggest that these fungi may be useful at biotreatment sites processing hazardous waste materials.

Malaria vaccine

Malaria kills over 1.2 million people a year. A promising candidate suitable for either a synthetic or a genetically engineered malaria vaccine has been synthesized by Zavala *et al.* (page 1436). The molecule, a string of four amino acids repeated three times, is modeled on a surface component of the parasite apparent when it is injected by a mosquitoe into a human. An immune response to the compound might catch the organism before it is sequestered in host liver cells. The compound reacted with antibodies in serum of randomly selected individuals living where malaria is endemic and with serum from a volunteer protected from infection by immunization with irradiated parasites. It induced antibodies in animals; the antibodies prevented the parasite from entering human cells growing in culture. (See also *Science*, 17 May, p. 879; 24 May, pp. 958 and 996.)

Heat shock genes

Parasites that spend a part of their lives in insects (whose bodies remain at room temperature) and another in mammals may use the temperature difference to initiate production of new proteins that help them adapt (page 1443). In the laboratory, many plants and animals react to stress with such a heat shock response: new genes are activated, new proteins are produced, and changes occur. Van der Ploeg *et al.* studied two parasites—*Trypanosoma* and *Leishmania*—transmitted to mammals by tsetse flies and sand flies, respectively. Heat shock messenger RNA molecules of parasites isolated from the two kinds of hosts showed quantitative and qualitative differences. In culture, morphologic alterations in the parasites occurred when the temperature was shifted from 25° to 37°C. Concomitant changes occurred in messenger RNA molecules containing instructions for making heat shock proteins.

Prosopagnosia

Some people do not recognize their own face when they look in the mirror (page 1453). They have developed prosopagnosia, a condition brought on by a stroke or head injury that prevents them from recognizing faces of people who should be familiar. Tranel and Damasio found that, while prosopagnosics reported no recognition of faces they should have known, the electrical conductivity of their skin changed when familiar faces were encountered. Thus, although unaware that recognition had occurred, the subjects "knew" the faces subconsciously. Damage to the brain in prosopagnosia is generally bilateral and prevents the evocation of pertinent memories associated with a face. Conscious awareness of familiarity is thus not achieved. Areas of the brain involved in sight and in the autonomic reaction in the skin seem to function normally.

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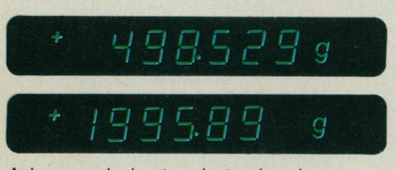

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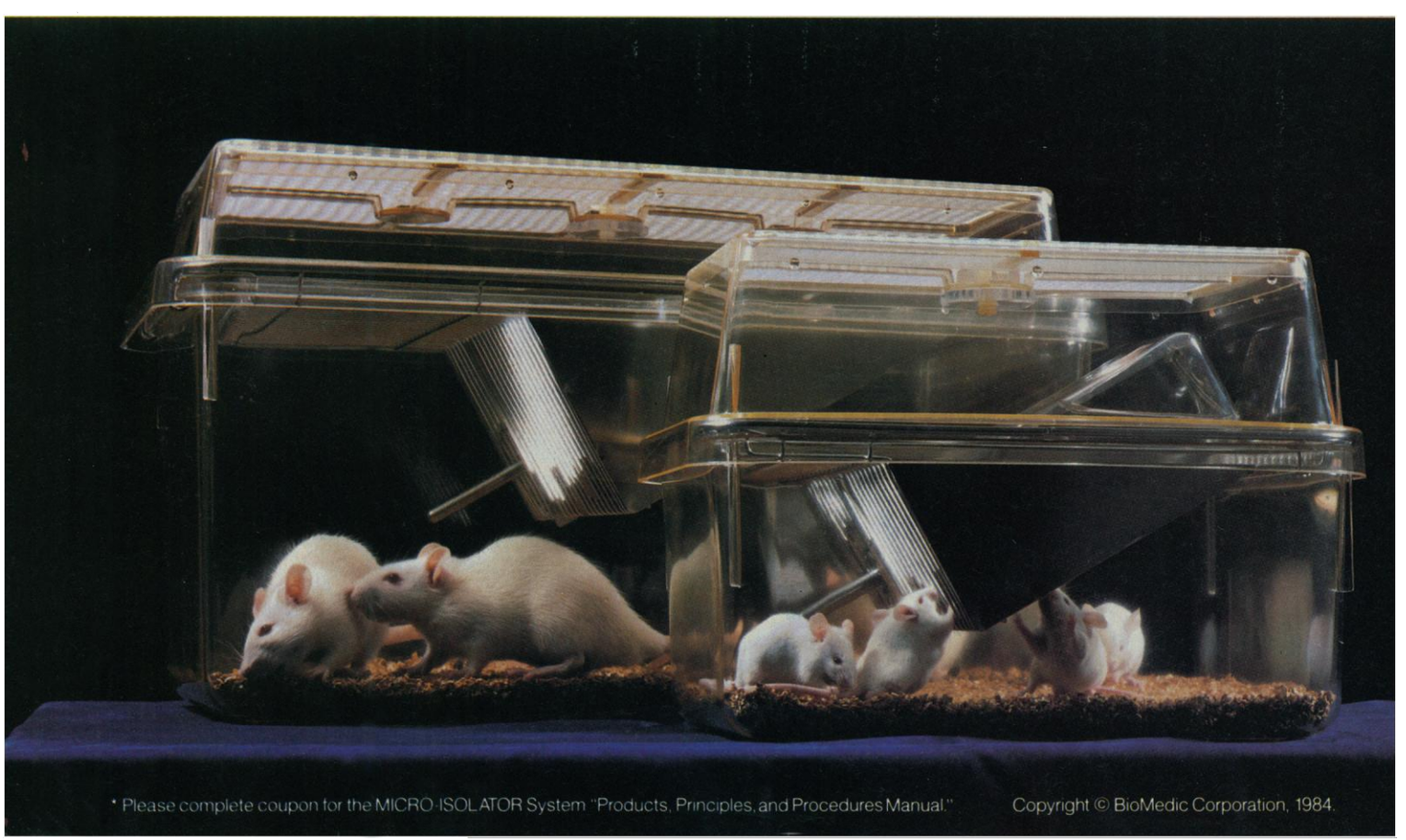

* Please complete coupon for the MICRO-ISOLATOR System "Products, Principles, and Procedures Manual."

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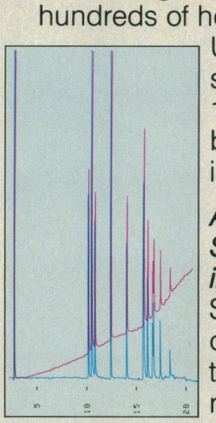

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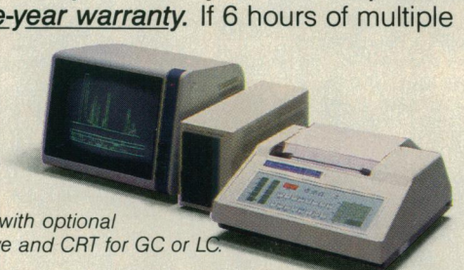

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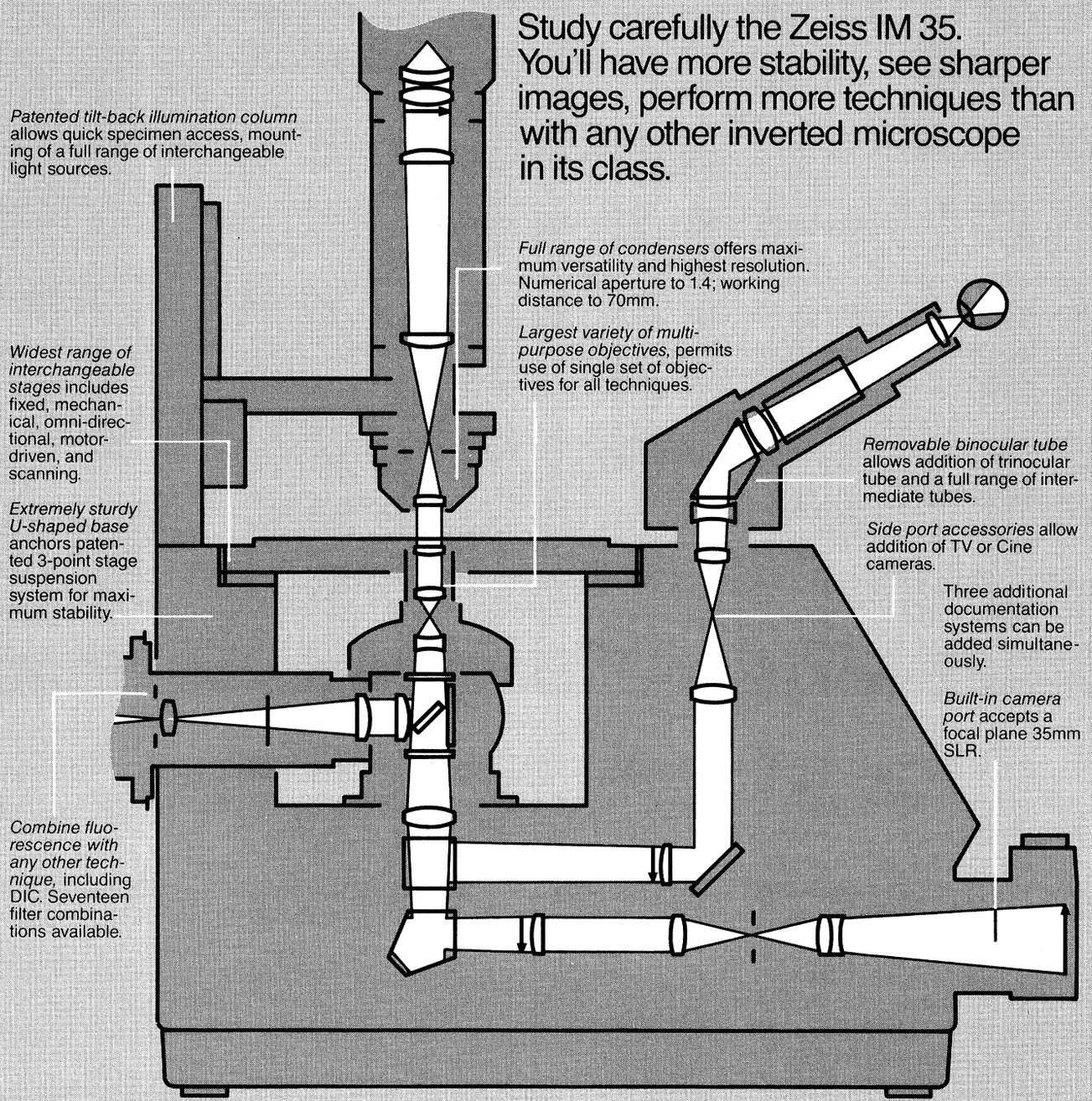

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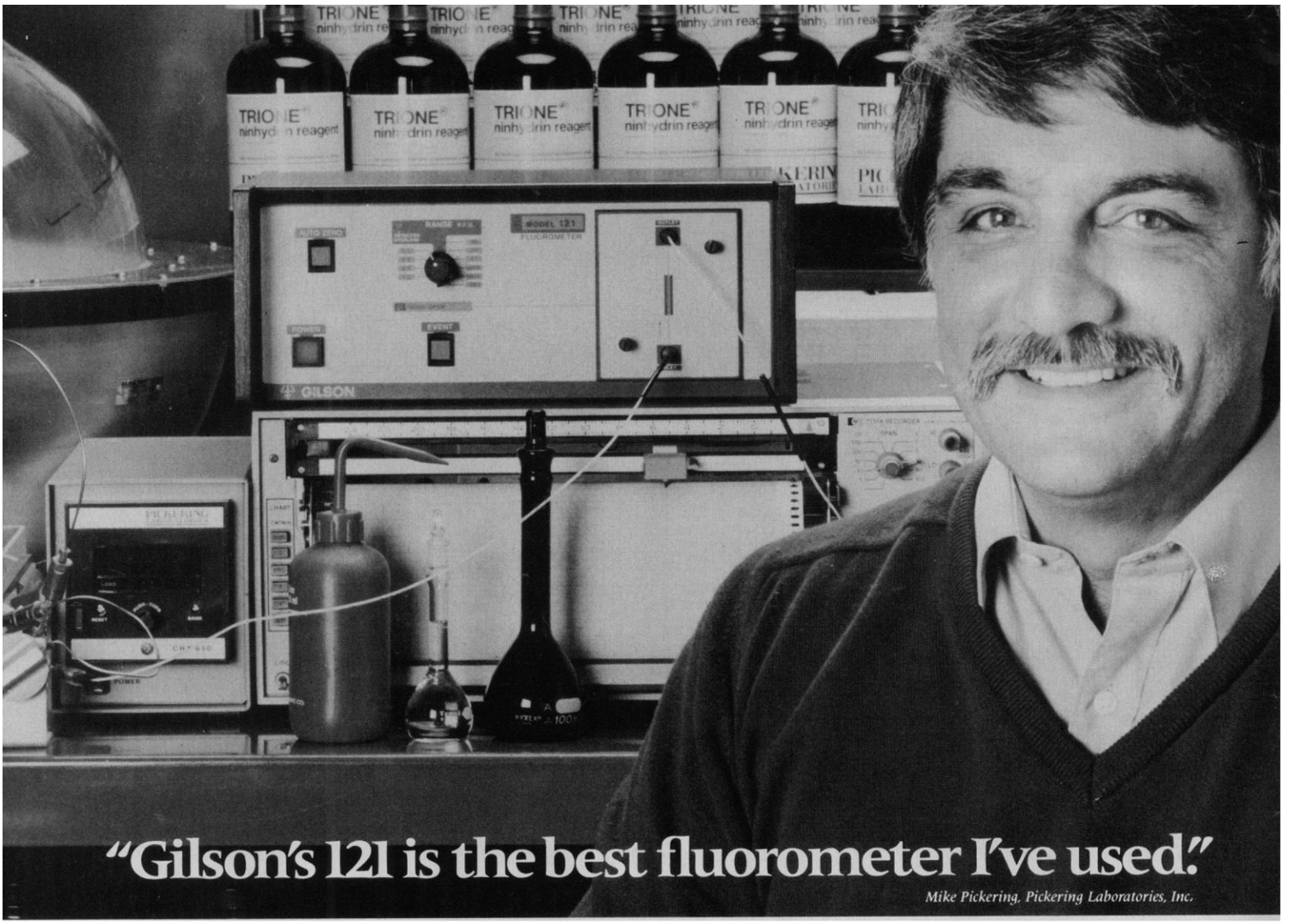

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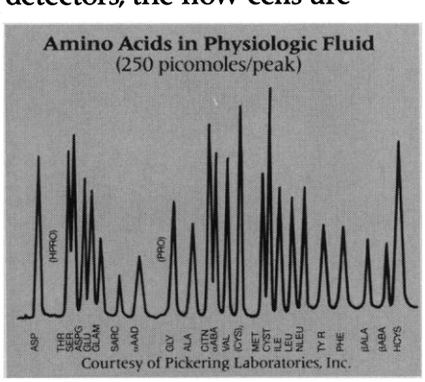

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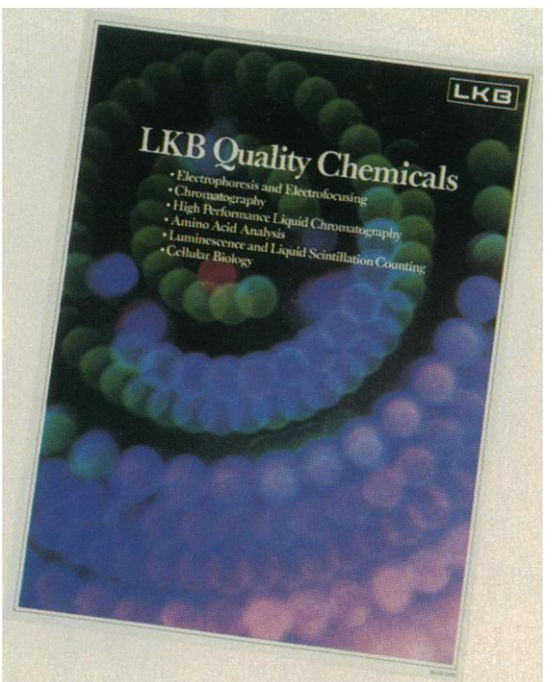

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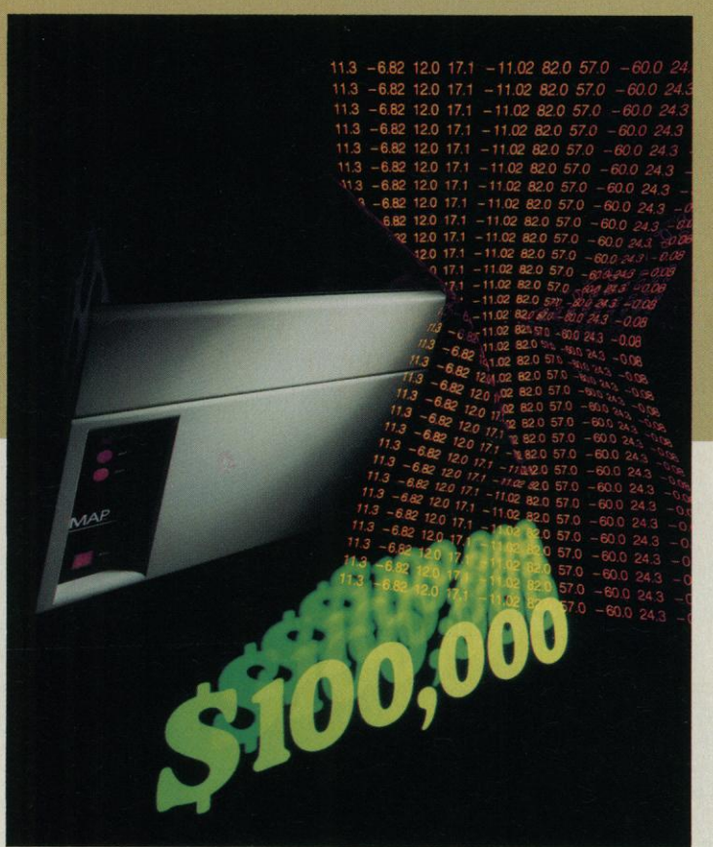

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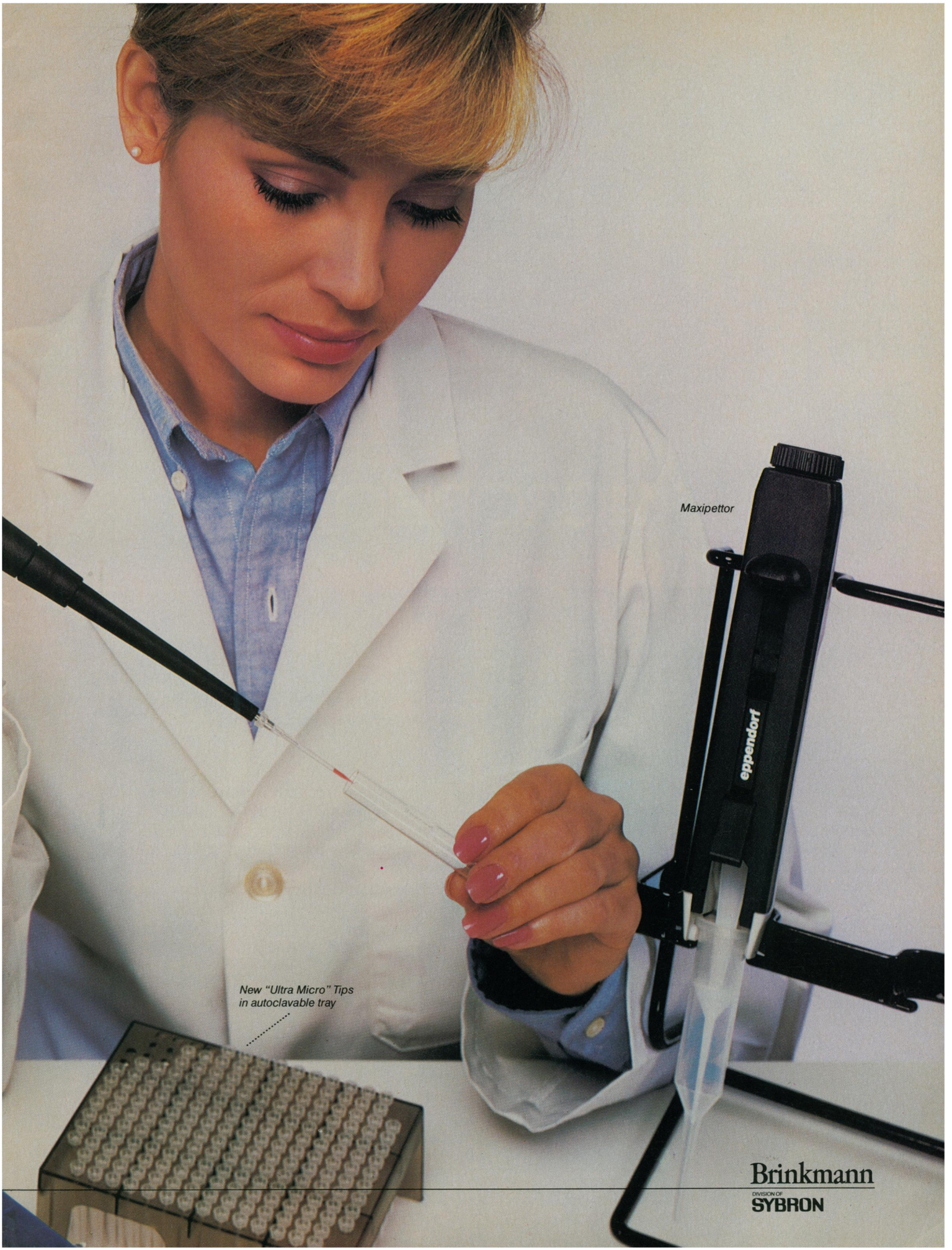

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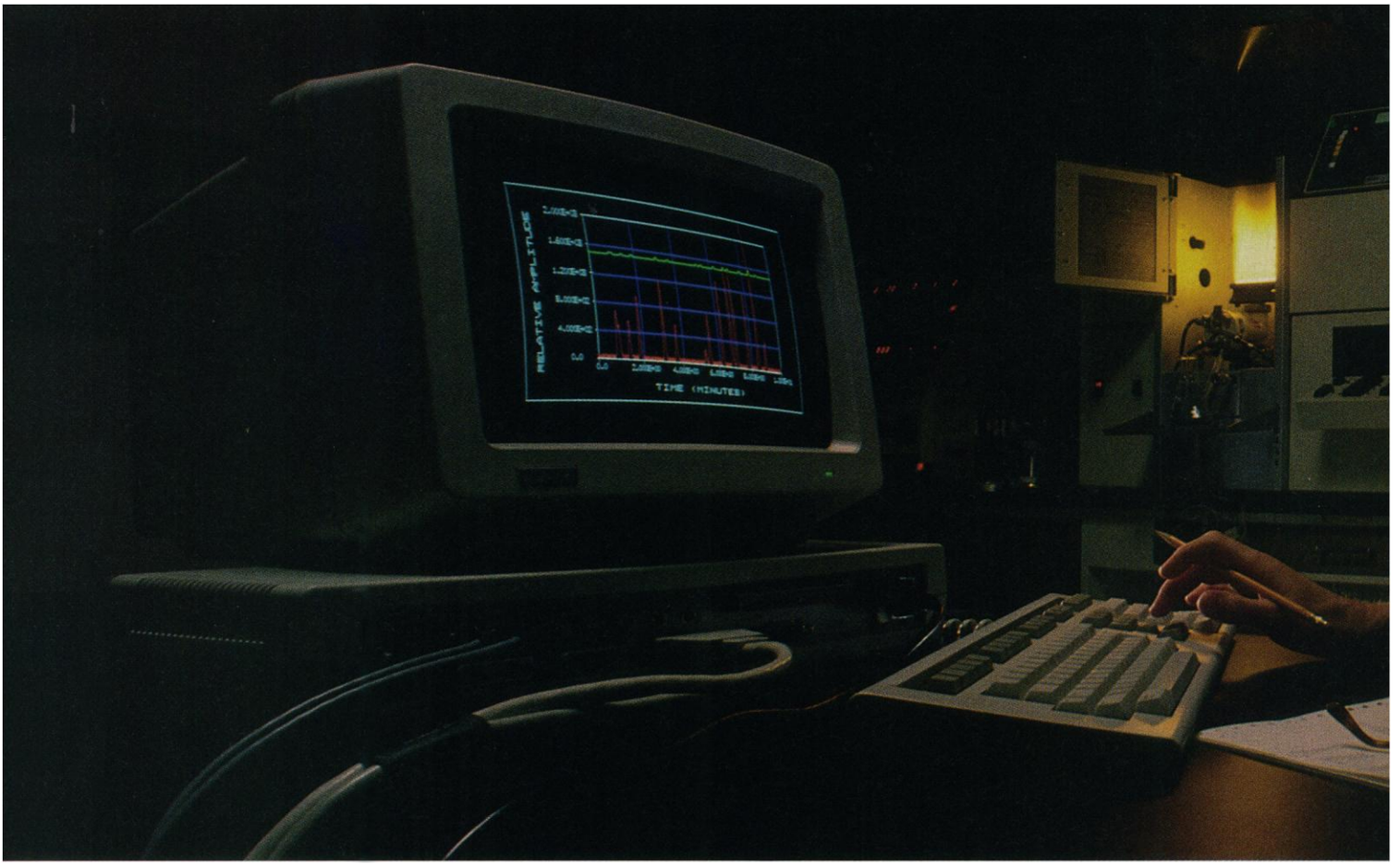

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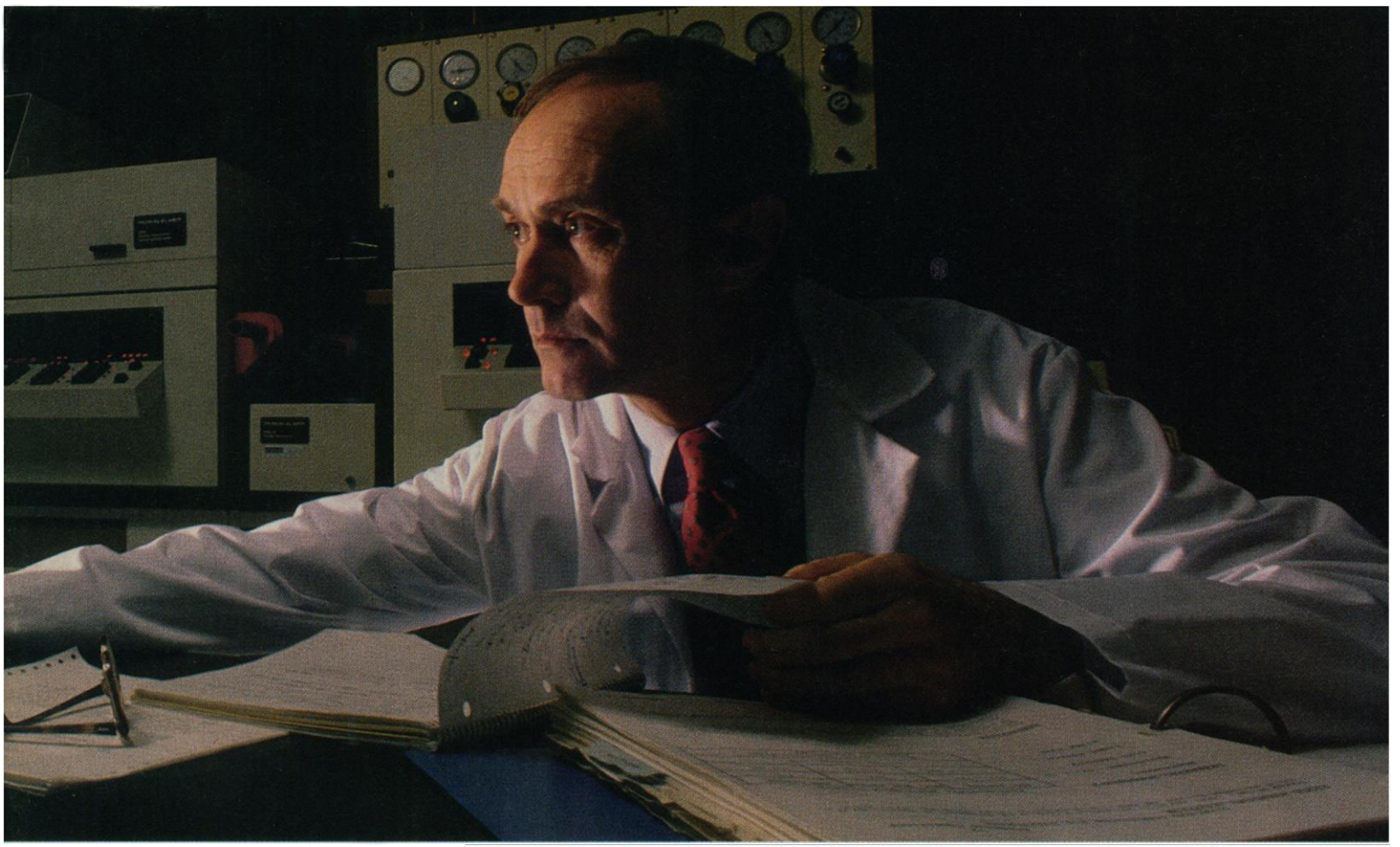

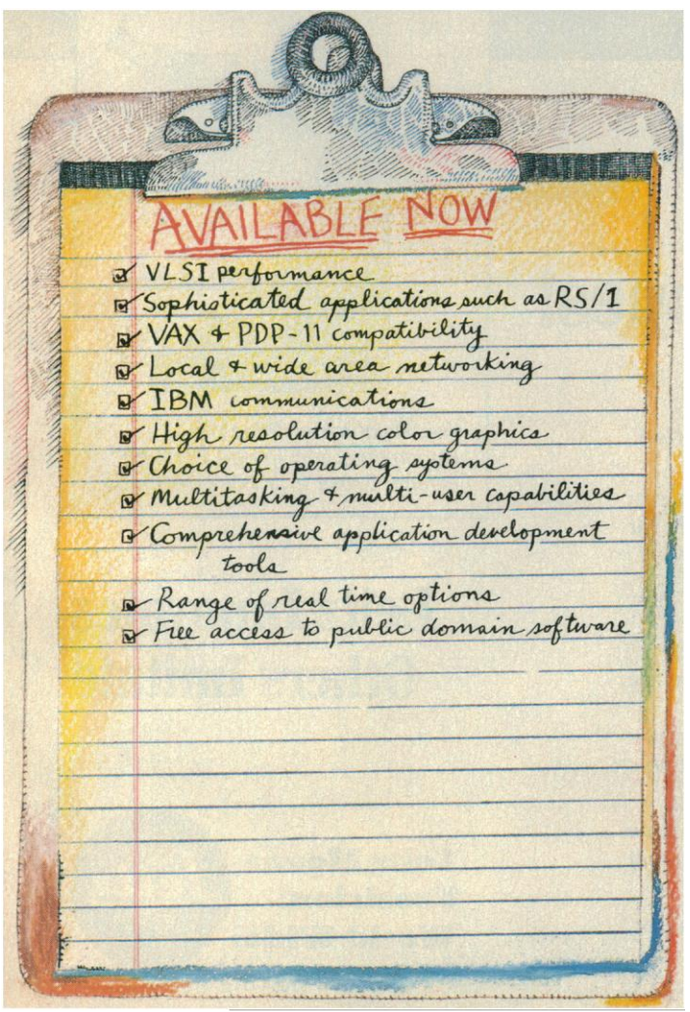

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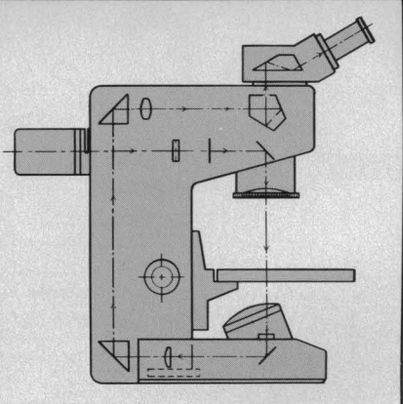

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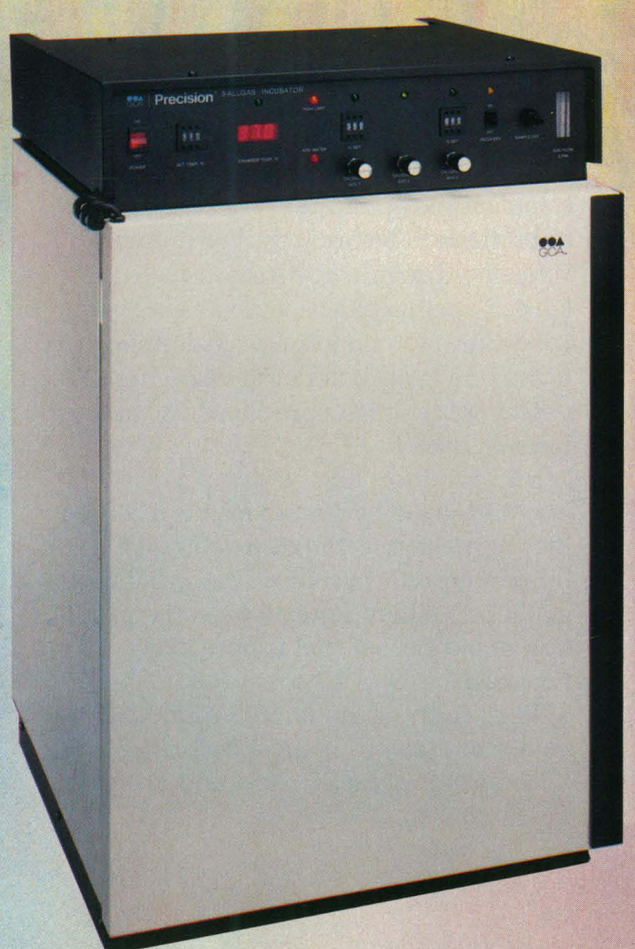

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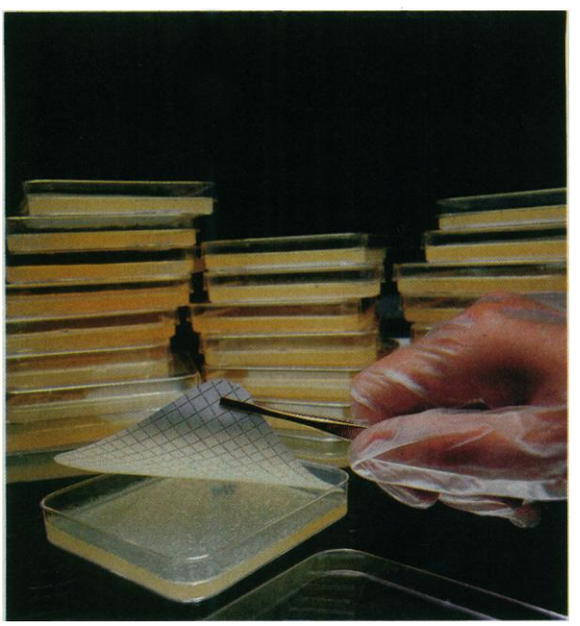

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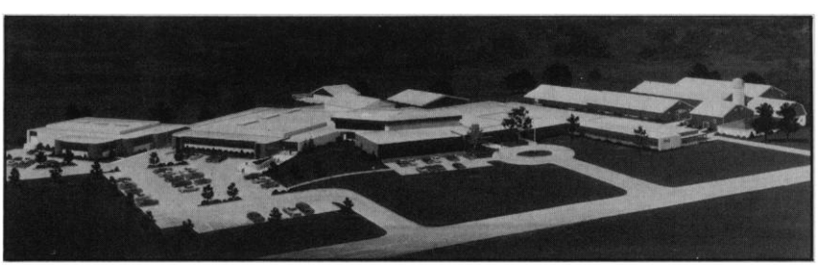

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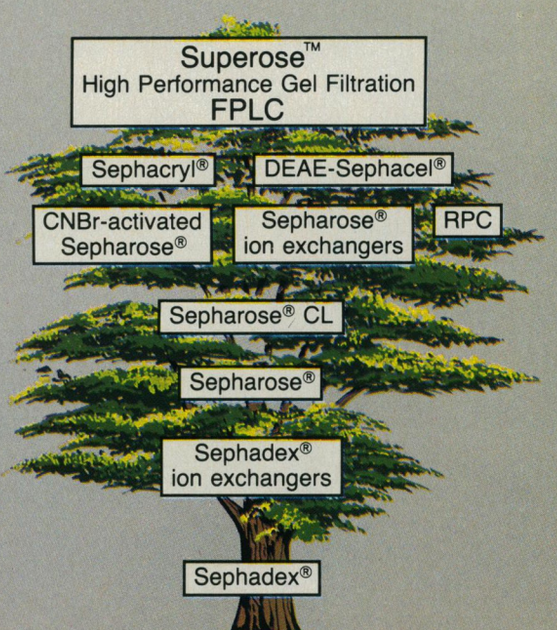

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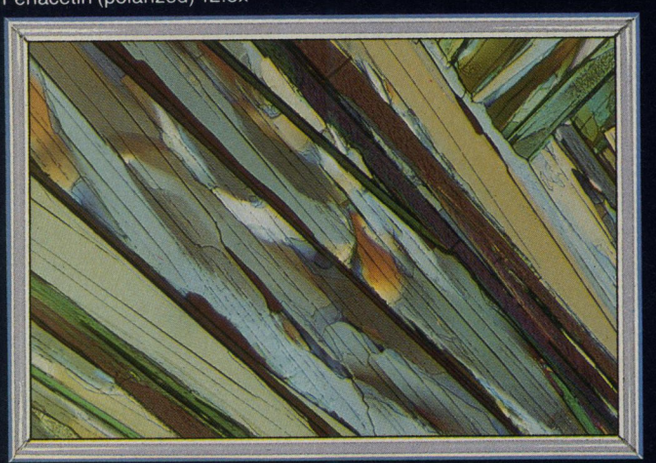

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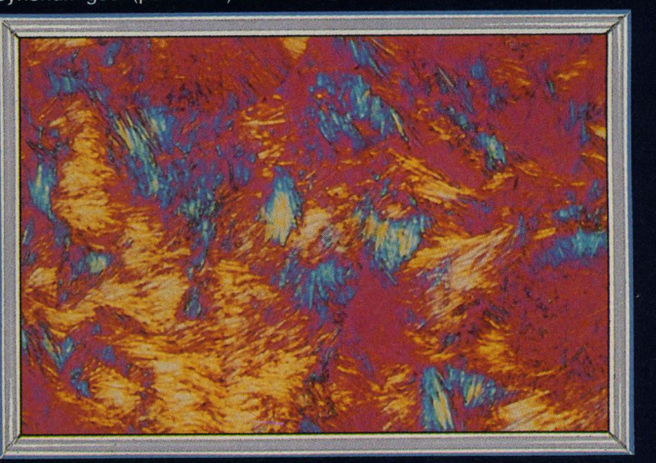

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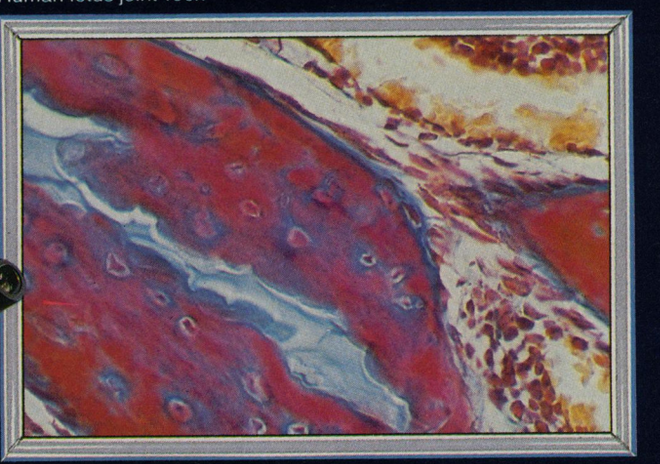

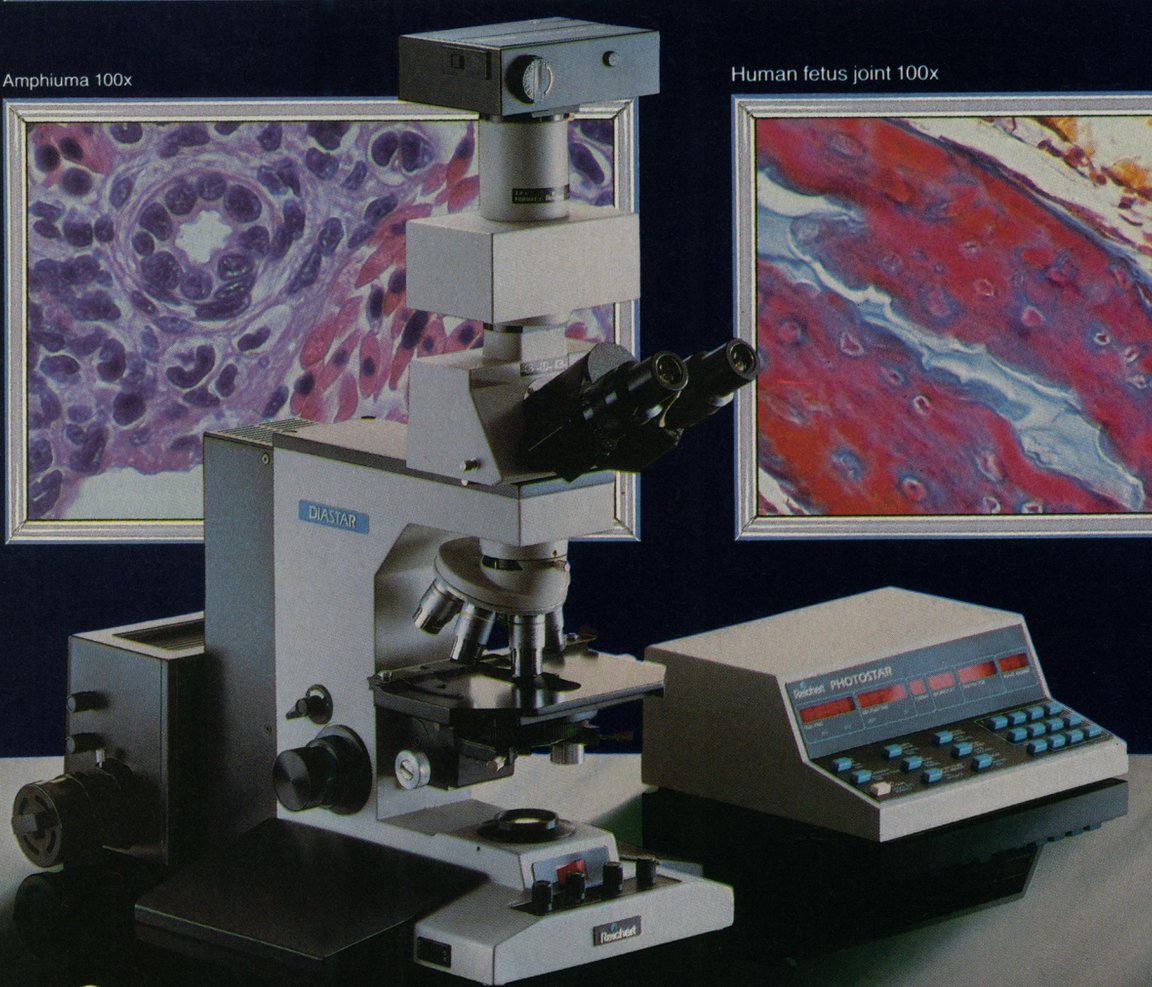

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the Hartley Springs Fault, decreasing influence of lithostatic pressure near the surface, or some other structural control.

An additional slanted drill hole aimed to hit the dike above or below the successful intersection of 1984 could help define the vertical gradient in the 550-year-old paleo–stress field in this currently seismic area. Such information might be used to help predict the location and migration of any future magmatic vents in the Mammoth Lakes area.

JONATHAN FINK
Department of Geology, Arizona State University, Tempe 85287
DAVID POLLARD
Department of Applied Earth Science, Stanford University, Stanford, California 94305

References

1. J. H. Fink and D. D. Pollard, *Trans. Am. Geophys. Union* **64**, 904 (1983); J. H. Fink, *Abstr. Prog. Geol. Soc. Am.*, **16**, 509 (1984); *J. Geophys. Res.*, in press.
2. D. D. Pollard and P. T. Delaney, *USGS Prof. Paper 1202* (1982).

Nuclear Reactor Safety

Susan J. Niemczyk (Letters, 3 May, p. 530) asks that her views on nuclear reactor safety not be misconstrued. But regrettably, in her gratuitous final sentence, she misrepresents my position.

My concern with regard to the study of the radiological consequences of nuclear accidents (known as "source terms") has simply been to ensure that public safety margins are not eroded, particularly on the basis of incomplete and contradictory data.

Although the assessment of nuclear accident consequences is still at a preliminary stage, some within the nuclear power industry have attempted to use this work to lobby the Nuclear Regulatory Commission to relax important safety regulations. In particular, industry lobbyists have sought reduction or elimination of requirements involving emergency planning, equipment qualification (intended to ensure that vital safety equipment functions properly during accidents which it is designed to mitigate), and backfitting (intended to correct design flaws in operating plants).

In reviewing the basis for this lobbying effort, I and my colleagues at the Committee to Bridge the Gap found numerous fundamental inadequacies in the source term research that make broad generalizations about accident consequences and drastic regulatory reductions impossible (*1*). These include unvalidated computer models that have been known to produce widely varying predictions of radioactive releases for the same accident sequence; quality assurance problems that make containment performance uncertain; and important accident sequences, such as those resulting from earthquakes or sabotage, that have been inadequately addressed.

While accident consequences may indeed have been overestimated for some accident sequences and for some radionuclides, we found that consequence estimates for others appear likely to remain the same or even to increase.

Many other technical criticisms have been offered by the American Physical Society (APS) Study Group on source terms and by Niemczyk, among others. The APS found that "the source term research cannot yet be regarded as adequate" (*2*, p. 216) and also pointed to some factors that could raise accident consequence estimates (*2*, p. 212), not lower them.

Because of these inadequacies, we concluded that emergency preparedness and other safety requirements should not be reduced.

STEVEN AFTERGOOD
Committee to Bridge the Gap, 1637 Butler Avenue, No. 203, Los Angeles, California 90025

References

1. S. Aftergood, "Nuclear accident source terms: No basis for eliminating safety regulations" (Committee to Bridge the Gap, Los Angeles, February 1985).
2. *Radionuclide Release from Severe Accidents at Nuclear Power Plants* (American Physical Society, New York, February 1985).

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Erratum: In the Research News article by Jean L. Marx, "The polyphosphoinositides revisited" (19 Apr., p. 312), the discovery of inositol 1,3,4-trisphosphate was erroneously attributed to Michael Berridge of Cambridge University. Although Berridge presented some of the data at the Smith Kline & French symposium, the work was actually done by his Cambridge colleagues Robin Irvine and Peter Downes.

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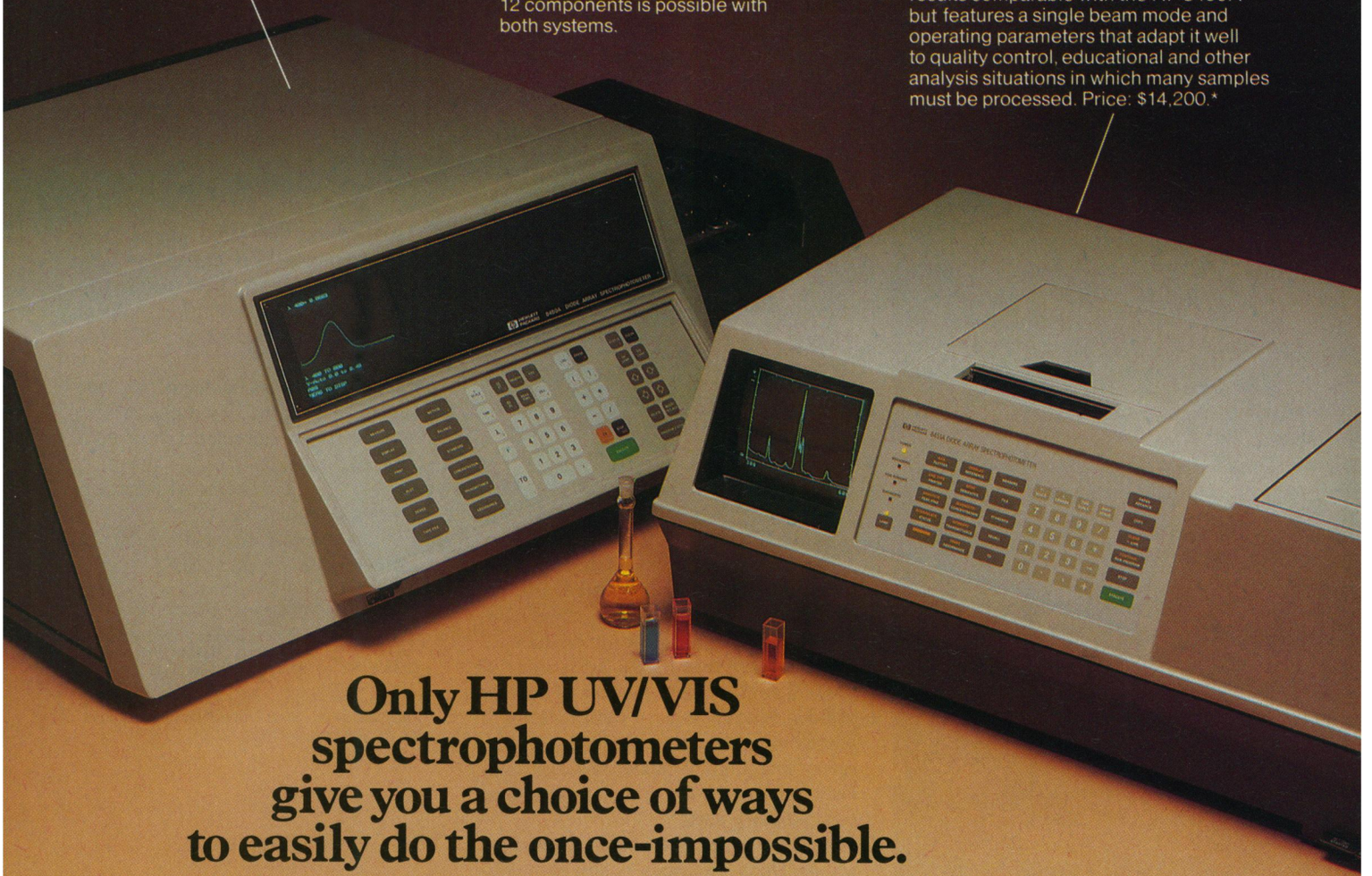

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21 June 1985, Volume 228, Number 4706 SCIENCE

Peer Review of Peer Review

Peer review is once again under review. That is appropriate in one sense, as any policy that continually affects many lives and large amounts of money should be appraised periodically. A committee of the National Science Foundation is evaluating peer review; the president of the National Academy of Sciences has mentioned the need for reform; the anguished recipients of "approved but not funded" notices have cried for reform.

Undoubtedly some reforms are needed, but they must be evaluated against the backdrop of the decision-making system that has in the main been responsible for the spectacular developments of modern science. Some of the current demands for reform are activated by a crisis that peer-review committees cannot solve—that is, lack of money. One of the complaints is that in the "good old days" the review committees were more distinguished than they are today. Perhaps so. The members of those old review committees, however, have had time to become well known; the current members have not. Even if they were more distinguished, the old committees were evaluating grants in an era in which the competition was not as severe as it is now, and priority scores for funding were reasonable. With quality as high as it is today, and funding low, a committee of Solomons would have difficulty distinguishing between grants that should and should not be awarded.

Science has done quite well in annual budgets in recent decades. What, then, is causing the current crisis? Not only is there inflation in the cost of materials, but the information needed to prove a point has expanded because more complex problems are being approached. Scientists need more dollars to solve problems because of the advancing sophistication of research. Another factor is that university overhead has taken a higher percentage of the total research money. Finally, and probably most important, there are many more investigators. The general impression of the granting agencies is that current researchers are better trained than were their predecessors. The sheer size of the competition means that each investigator, understanding the law of mass action, applies for multiple grants, thereby increasing the work load of the peer reviewers.

Do scientists think they are writing too many grant proposals? Of course not. Do university presidents think they are asking for too much overhead? Of course not. Do editors think they are requiring too much data for an acceptable article? Of course not. It follows as the night the day that peer reviewers are at fault.

Are peer-review procedures beyond criticism? Again, of course not. Procedures that worked when funding levels were higher certainly deserve reexamination when conditions change, but it is appropriate to reexamine all aspects—university overhead, policy matters that affect the distribution of grants, appropriate levels of total support, and so on, as well as peer review.

The agencies with the most distinguished records of funding fundamental research, the National Science Foundation and the National Institutes of Health, have had peer-review procedures that their constituents respect and defend. When "czars" have been placed in charge of distributing money, unfortunate results have ensued. Those who would like a "spoils system" would like to eliminate peer review. Scientists who are correctly raising a question in regard to improvement in peer-review procedures must take care to emphasize that they want evolution and not revolution, lest others in legislative or administrative circles demand abolishment of a system that has served science and the country so well.—DANIEL E. KOSHLAND, JR.

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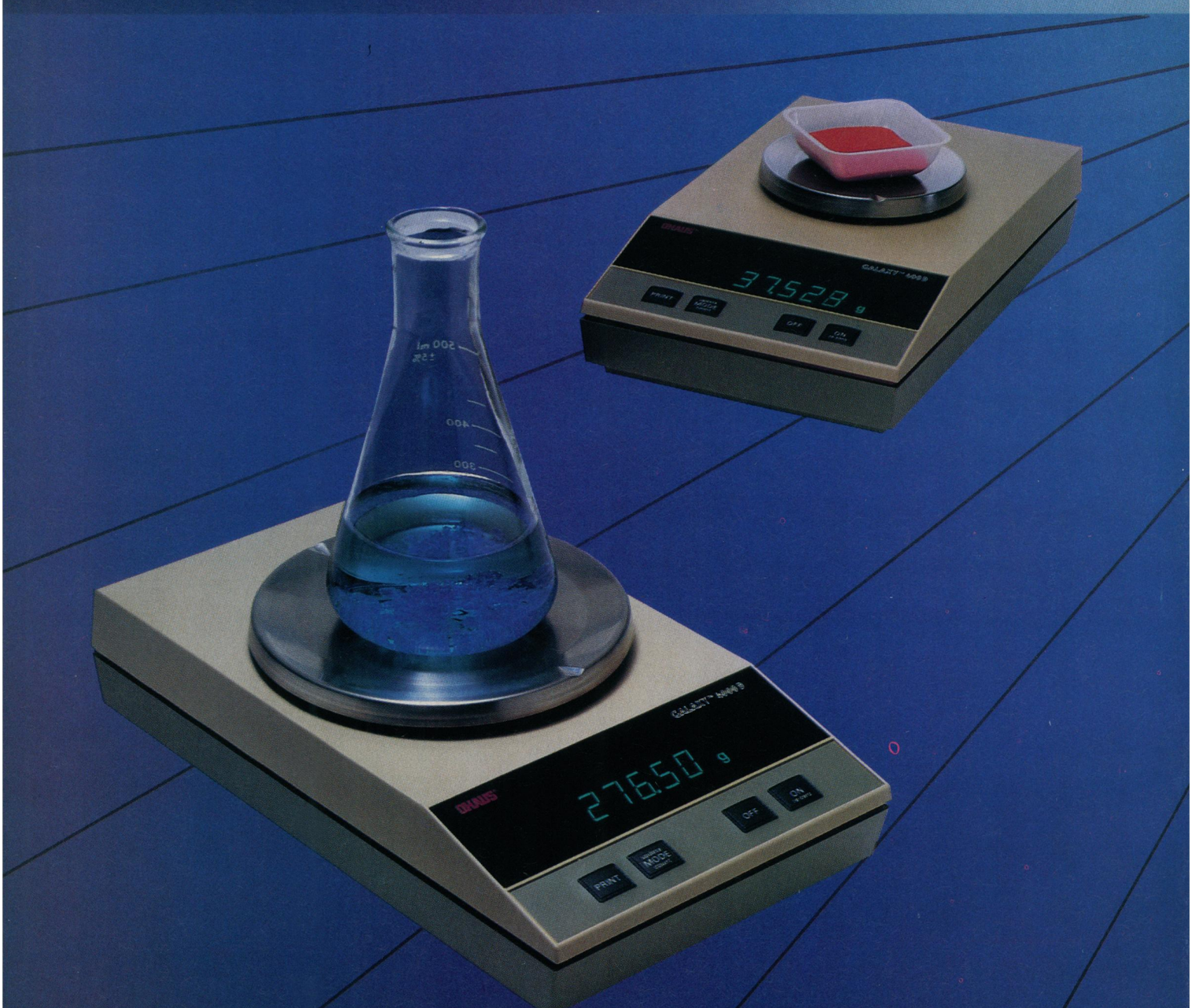

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