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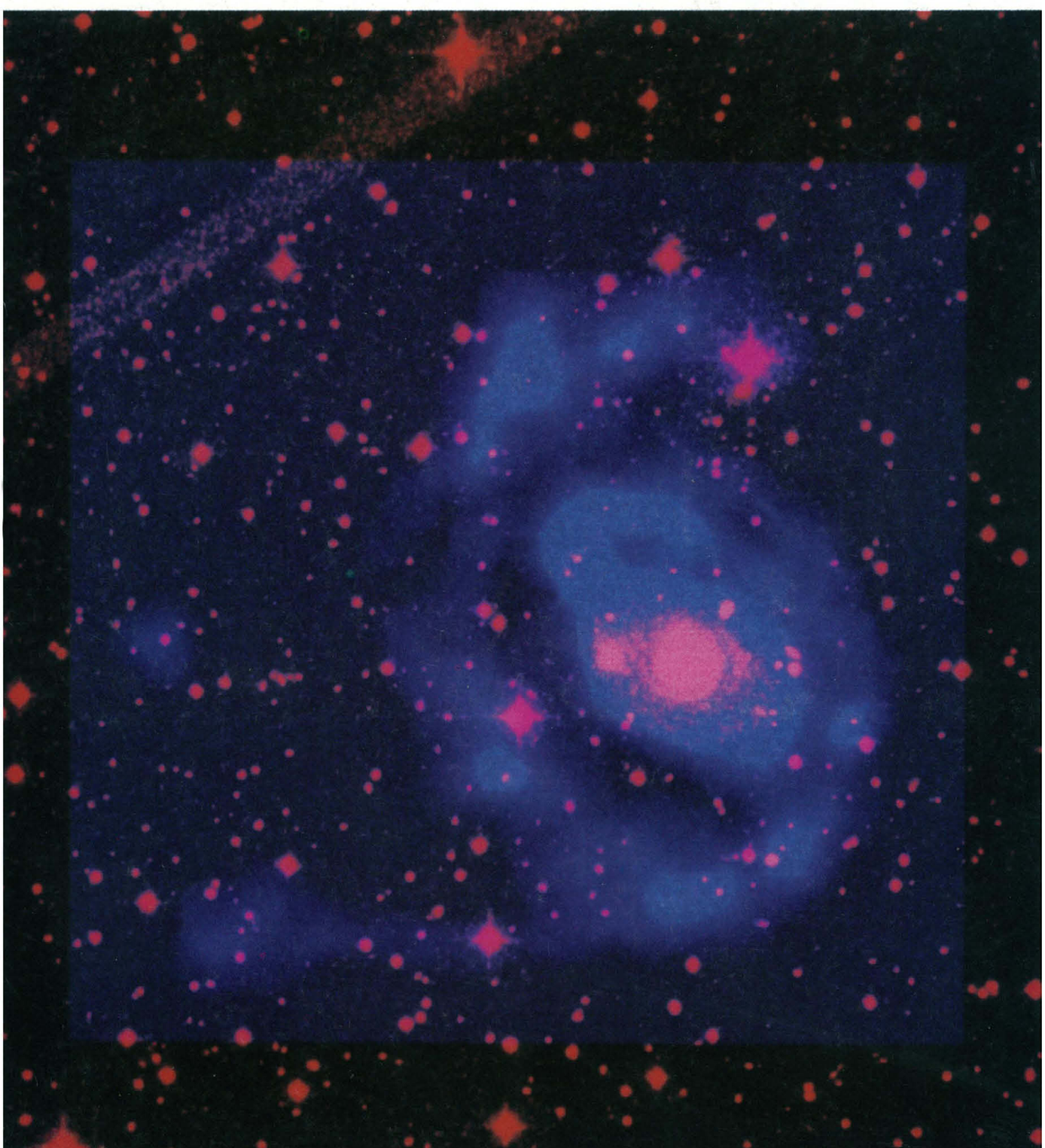

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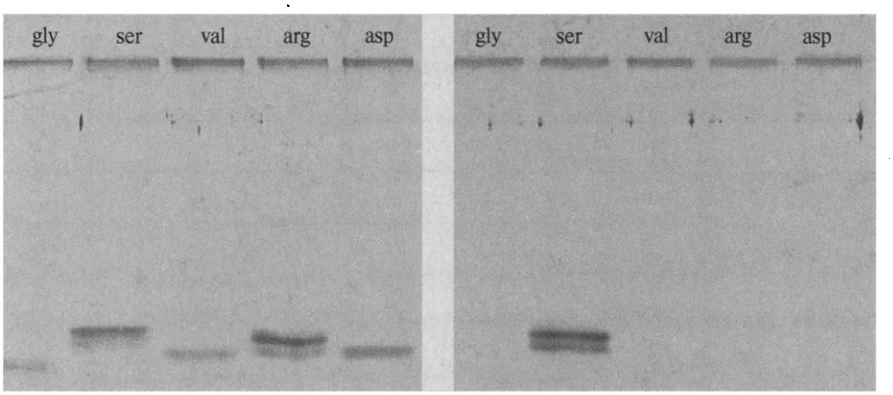

The different reactivities of our anti-p21-Ser and pan-reactive anti-p21 antibodies are demonstrated here. Cellular extracts from five cell lines incorporating five variants of the ras *oncogene were probed. While p21 from all five cell lines was detected with our pan-reactive anti-p21 antibody (left panel), only mutant p21 from the K-balb cell line (Ki-*ras *gene with serine at amino acid 12) was detected with our anti-p21-Ser antibody (right panel).*

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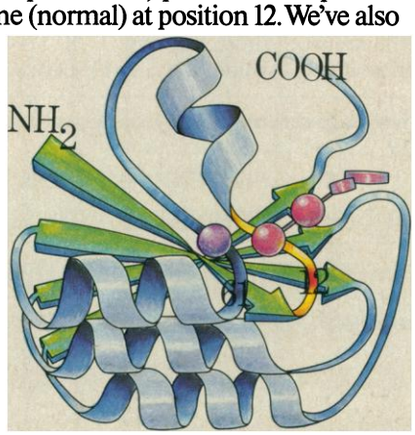
Our pan-reactive p21 monoclonal antibody, on the other hand, reacts with all known forms of the p21 protein and shows no interference with GTP binding activity. It is useful for exploring *ras* oncogene expression, and has been used in immunohistochemical studies.



A model for the tertiary structure of the p21 protein. (By permission from F. McCormick, Cetus Corporation and Brian F. C. Clark, Aarhus University, Denmark.)

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COVER A composite image of Markarian 348, the largest known galaxy. The cold, neutral hydrogen is shown in blue; the stars in the galaxy are shown in red. This is a Seyfert galaxy (one of the 5% of galaxies that have unusually active centers) with dimensions 310 by 390 kiloparsecs, or 13 times the size of our own galaxy. See page 1367. [S. M. Simkin *et al.*, Michigan State University, East Lansing, MI 48824]

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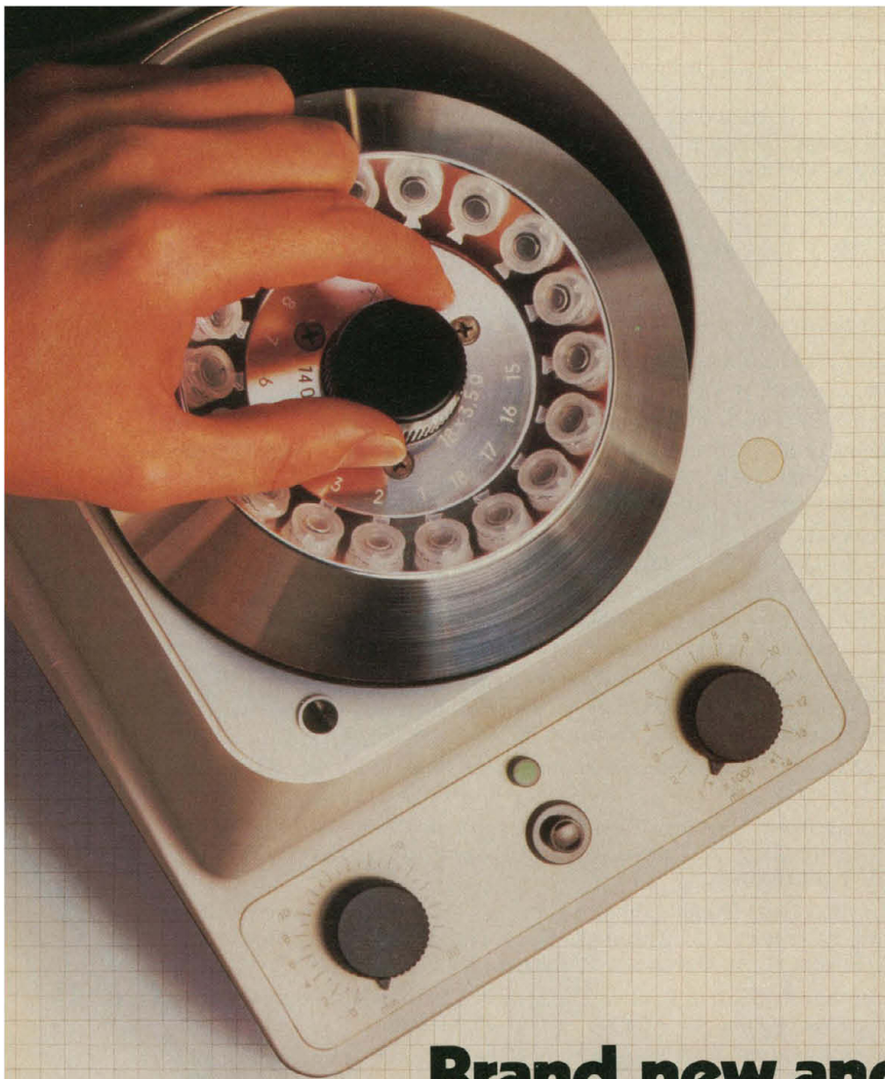

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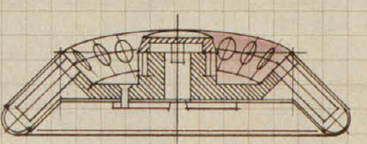

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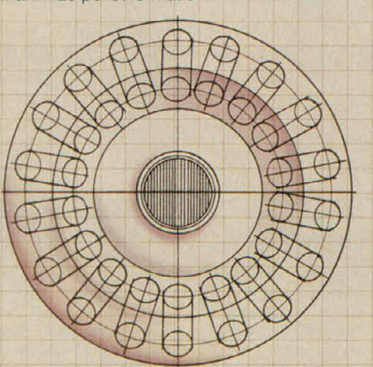

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This Week in SCIENCE

Urban homeless

POPULATION surveys (such as the U.S. Census) are typically conducted by sampling households; thus, people without homes are not enumerated in standard counts (page 1336). How many people are homeless and who they are have been studied in Chicago by researchers conducting nighttime surveys of people sleeping at shelters for the homeless and people spending the night in alleys, hallways, roofs, abandoned buildings, parked cars and trucks, Laundromats, and other all-night operations. In Chicago, about 6000 people are homeless at some time during any one year and about 2700 have no home to go to on any one night. Although homeless people are, overall, an extremely heterogeneous group, three characteristics are common: most are experiencing extreme poverty, have marked disabilities as a result of poor physical and mental health, and have only weak and often no social ties. Three out of four are male. Because the "literally homeless" represents only 3% of the extremely poor in Chicago, Rossi *et al.* speculate that the other 97% manage to remain "homed" through the generosity of relatives and friends or by spending most or all of their money on housing.

Tidally disturbed system

A close look has been taken at the galaxy Markarian (Mkn) 348 and a satellite galaxy to its east (cover) that are roughly 300 million light-years (3×10^{21} kilometers) from the earth (page 1367). These companion galaxies fulfill the criteria for a "tidally disturbed" system; tidal interactions between galaxies are among the forces thought to contribute to galaxy evolution and to affect activity in galactic centers. Mkn 348 is a spiral galaxy that has a prominent energy source (probably a black hole) at its center. It is the largest non-cluster galaxy known. Simkin *et al.* compiled a composite picture of Mkn 348 and its companion from optical and radio telescope data. Peculiarities in Mkn 348 include one or two branching spiral arms of gas that unwind with distance from the center; these plumes are, according to computer simulations, expected for a galaxy with a close companion. Reversals (which a satellite galaxy would induce) of the internal velocity field of Mkn 348 and the mass distribution in the system are also as predicted. Increased understanding of galaxy structure and evolution is expected from study of systems like Mkn 348 in combination with more detailed computer models.

Antagonistic drugs against AIDS virus

TWO drugs that, through different mechanisms, inhibit the replication of human immunodeficiency virus (HIV), the AIDS virus, antagonize rather than complement each other's antiviral effects in vitro (page 1376). Vogt *et al.* found that the combination of azidothymidine (AZT) and ribavirin caused a reproducible antagonism rather than synergism in preventing viral replication in several types of cultured cells. The phosphorylation of AZT, a step in the intracellular processing of the drug, was inhibited by ribavirin (which also undergoes intracellular phosphorylation). Thus, while each of these drugs has been reported to have ameliorative effects in the treatment of AIDS-related diseases, and, while long-term control of HIV infections may best be achieved through use of combinations of antiviral drugs, AZT and ribavirin should only be evaluated for combination chemotherapy in a tightly controlled, cautious fashion.

Alzheimer's disease and Down syndrome

SIMILAR genetic defects on chromosome 21 are implicated in the development of Alzheimer's disease and Down syndrome (page 1390). Delabar *et al.* used a complementary DNA probe to study gene dosage in chromosomes of patients with Alzheimer's disease and patients with Down syndrome with the normal number of chromosomes and an extra chromosome 21. The probe detects the gene for β amyloid; this protein is deposited in excess in patients' brains, which characteristically deteriorate. Down syndrome patients with three copies of chromosome 21 had three copies of the amyloid gene; the extra copy is presumed to be on the extra 21st chromosome. Alzheimer's disease patients and the Down syndrome patients with normal chromosome numbers also had three copies of the amyloid gene, indicating that, on one chromosome 21, the region where this gene resides had been duplicated. These results substantiate the existence of a genetic defect in Alzheimer's disease; whether the defect is necessary and sufficient for development of disease remains to be explored.

Retinoblastoma gene

CANCERS may result when specific genes are activated or inactivated; the development of retinoblastoma, a disease in which tumors grow in the eyes of children, is associated with inactivation of the alleles of the retinoblastoma susceptibility (RB) gene (page 1394). Inherited and noninherited forms of retinoblastoma are known; the disease is not fatal, but often individuals with hereditary retinoblastoma develop fatal tumors later in life. Lee *et al.* identified, cloned, and sequenced the putative RB gene, which has a known location on human chromosome 13. Because probes for genes on chromosome 13 were available, the technique of chromosome walking could be used to isolate and screen clones representing overlapping chromosomal regions. RB genes in retinoblastomas either appeared normal or were deleted. However, gene expression was incomplete or lacking in all retinoblastoma cell lines: messenger RNA for the RB gene was either shorter than normal, present in markedly decreased amounts, or undetectable. A sequence for the RB-encoded protein was predicted and a possible activity (binding of nucleic acid) suggested; the protein's identity and role in the disease process are not yet known.

THE LIGHT OF DISCOVERY

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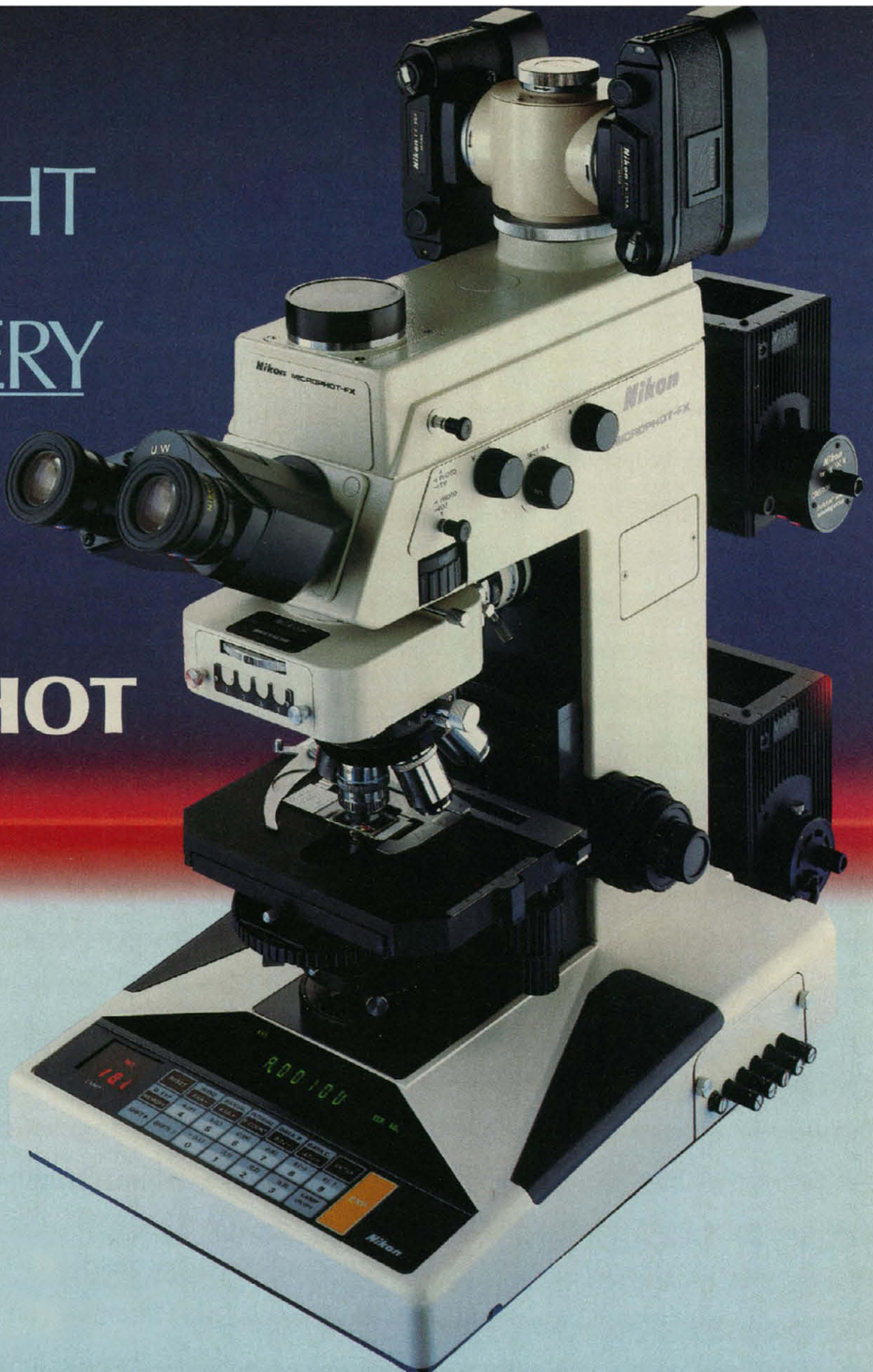

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Export Controls of High-Technology Goods

The impaired ability of the United States to compete internationally and even at home in high-technology products is a matter for searching examination. Our failures come from many sources. Recently, U.S. procedures for controls of exports of high-technology goods have been added to the list of causes. The National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine have rendered a public service by sponsoring a major study that has illuminated the need for changes in our system of controls.*

Japan, France, and members of NATO have recognized that advanced technology confers military advantages over the Communist Bloc and have cooperated to limit transfer of technology there. However, the United States has imposed controls that go beyond those of its allies. In earlier times, we enjoyed a monopoly on high technology. But that status is gone. Japan and some members of the Common Market have been joined by Hong Kong, Singapore, South Korea, Taiwan, and others as exporters of microelectronics goods. Today, the United States purchases only 30 percent of the high-technology goods sold on the world market. If our manufacturers are to achieve economies of scale, they must distribute their products globally.

In spite of these developments, the United States behaves as if it still had the monopoly it enjoyed 20 years ago. We continue to assert "jurisdiction over goods and technology even outside the territorial United States when (i) the product or technology in question originated in or is to be or has been exported from the United States; (ii) the product or technology incorporates or uses products or technology of U.S. origin; (iii) the exporter is a U.S. national or is owned or controlled by U.S. interests." Thus when a U.S. subsidiary operating in West Germany wishes to export a high-technology item, permission must be sought from Washington.

The machinery for control of exports from the United States is slow and not very discriminating. The interval measured from when the application leaves the company to when the company receives an export license averages 54 days. In Japan, export licenses are processed in 2 to 3 days. Expeditious schedules prevail in other competing countries.

Delays and uncertainties handicap U.S. firms. Competitors can supply many of the high-technology items at lower prices or with better quality than can the U.S. firms and without delays. A survey conducted showed that many erstwhile customers of U.S. suppliers are turning to other sources.

An example from the report illustrates effects of U.S. export controls. In March 1983, a U.S. company sought a license to export a $450,000 nuclear magnetic resonance spectrometer to a medical research institute in Eastern Europe. The application was not approved until November 1985. Although U.S. firms pioneered the development of NMR, German and Japanese companies now hold two-thirds of the world market for such instruments. During the review period in Washington, a German competitor sold several similar NMR systems to Communist Bloc customers. The NMR instruments do not appear on the U.S. control list, but the equipment was subject to licensing because it contained 32-bit array microprocessors and 30-megabyte Winchester disk drives.

To obtain information for the report, teams were sent to Europe and Asia. They heard many comments about deleterious effects of delays of processing export licenses and were reminded of the problem of the "$2 microchip in the $20,000 machine." When the U.S. chip was used, the entire product had to receive a U.S. re-export license. They also conversed with U.S. customs officers stationed abroad. One officer complained that on instructions from Washington, he spent most of his time "chasing" personal computers.

The United States is trying to control items produced by the millions in many countries. In 1979, legislation was enacted that called for elimination of controls on items that the Soviet Union either can make for itself or freely buy from uncontrolled sources. However, the will of Congress has been thwarted. Substantial progress has not been made in eliminating outdated controls.—PHILIP H. ABELSON

Balancing the National Interest* (National Academy Press, Washington, DC, 1987). See also, C. Norman, *Science* **235, 424 (1987).

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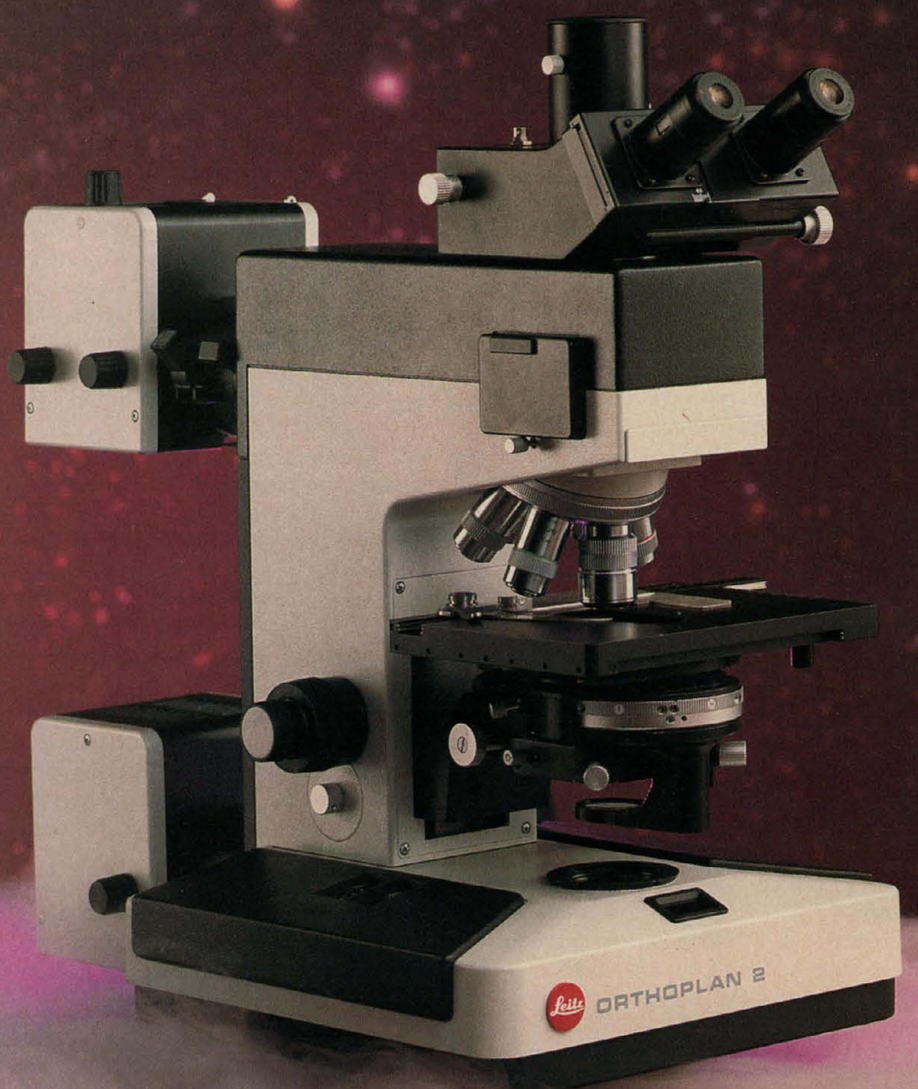

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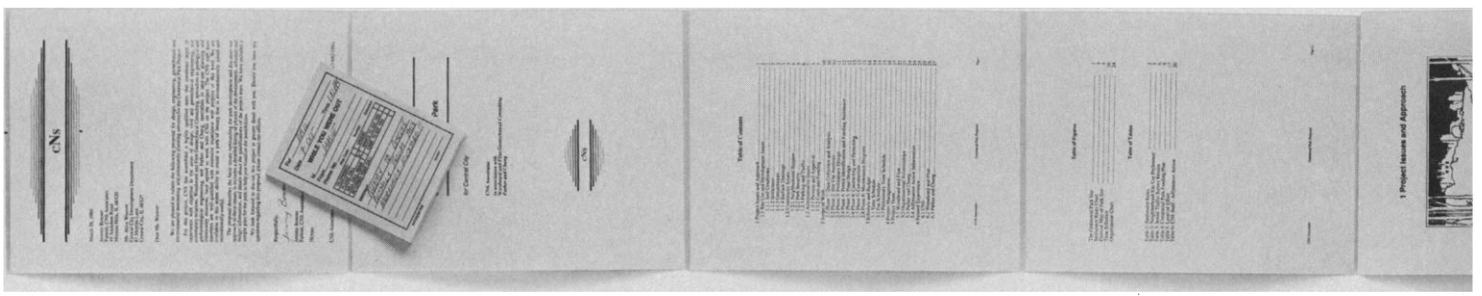

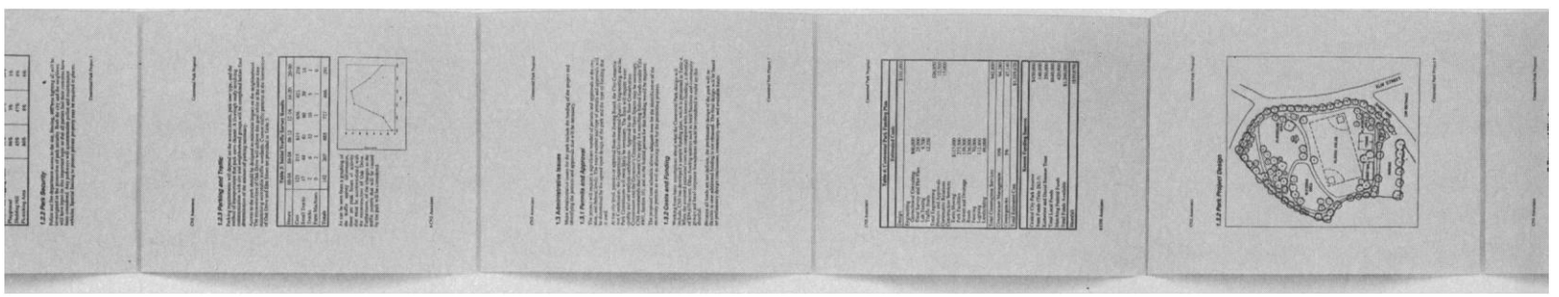

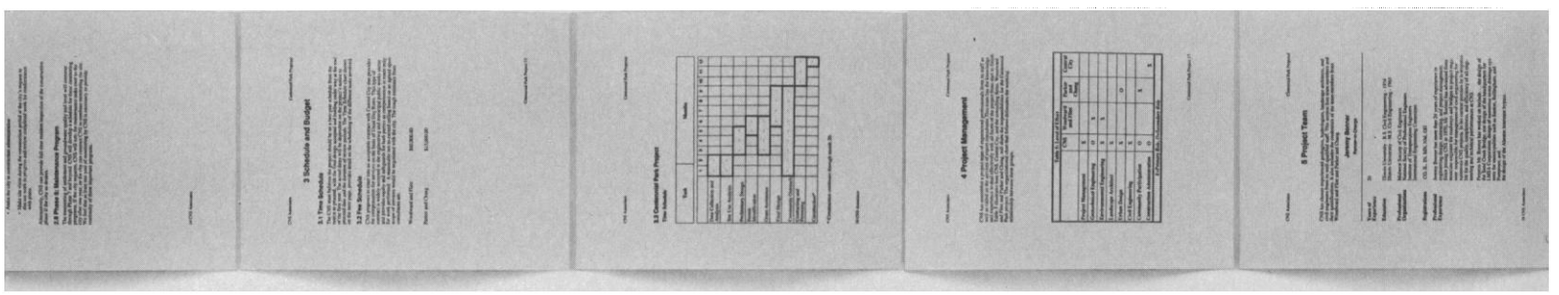

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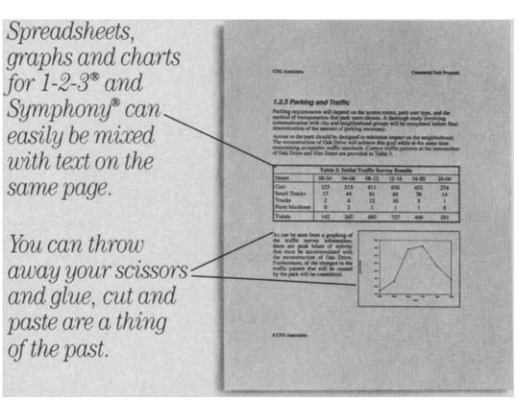

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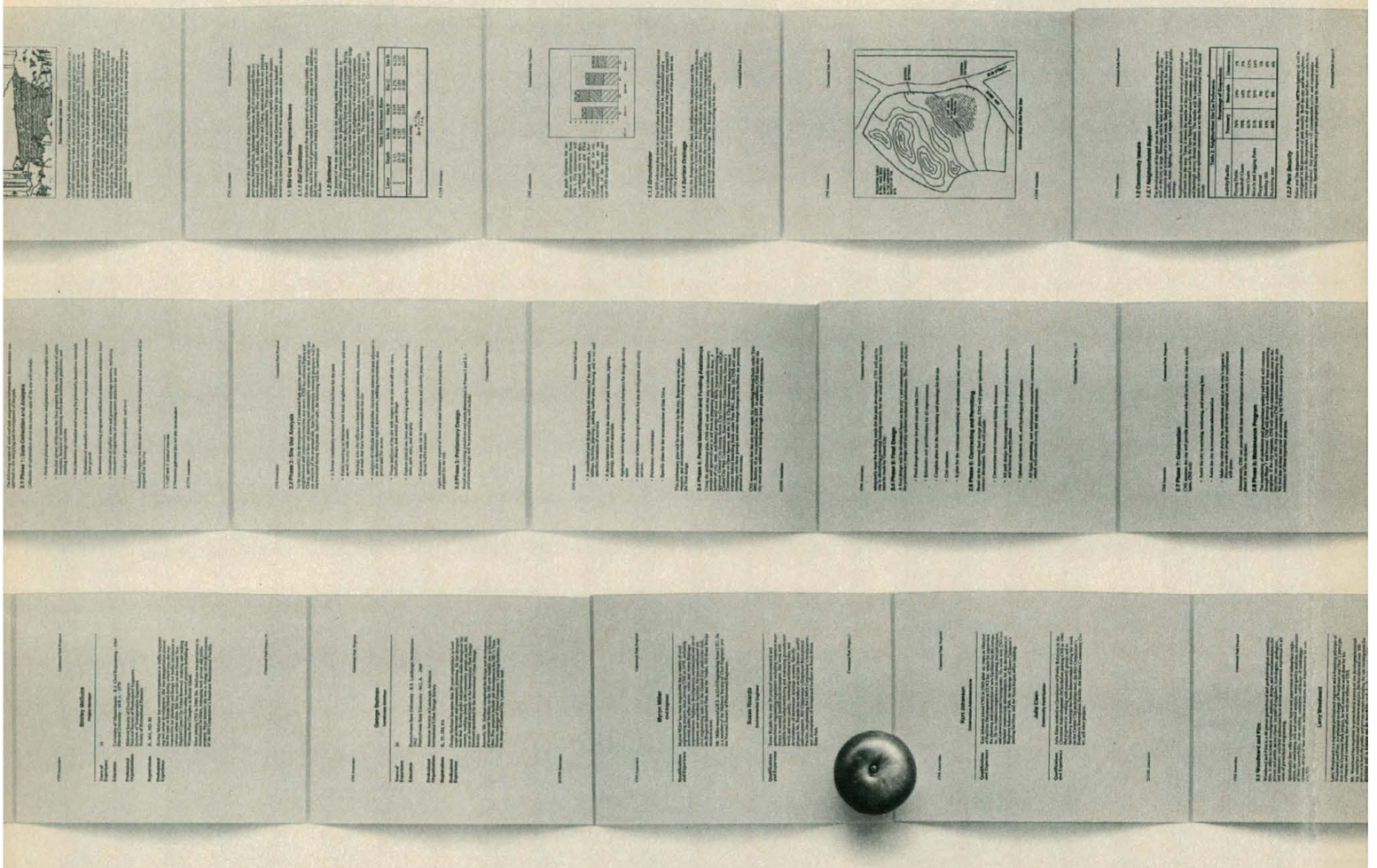

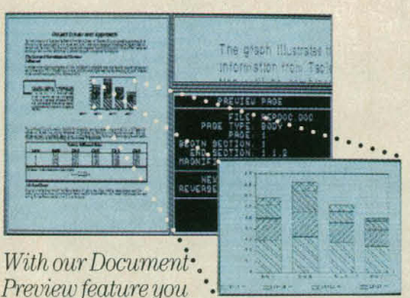

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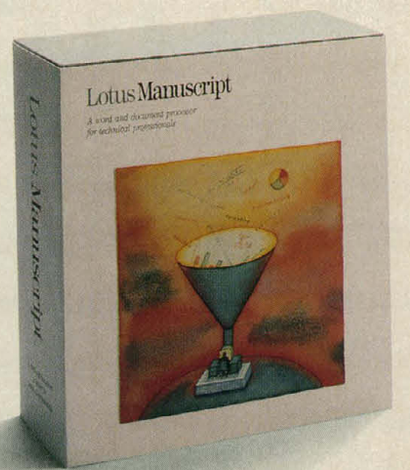

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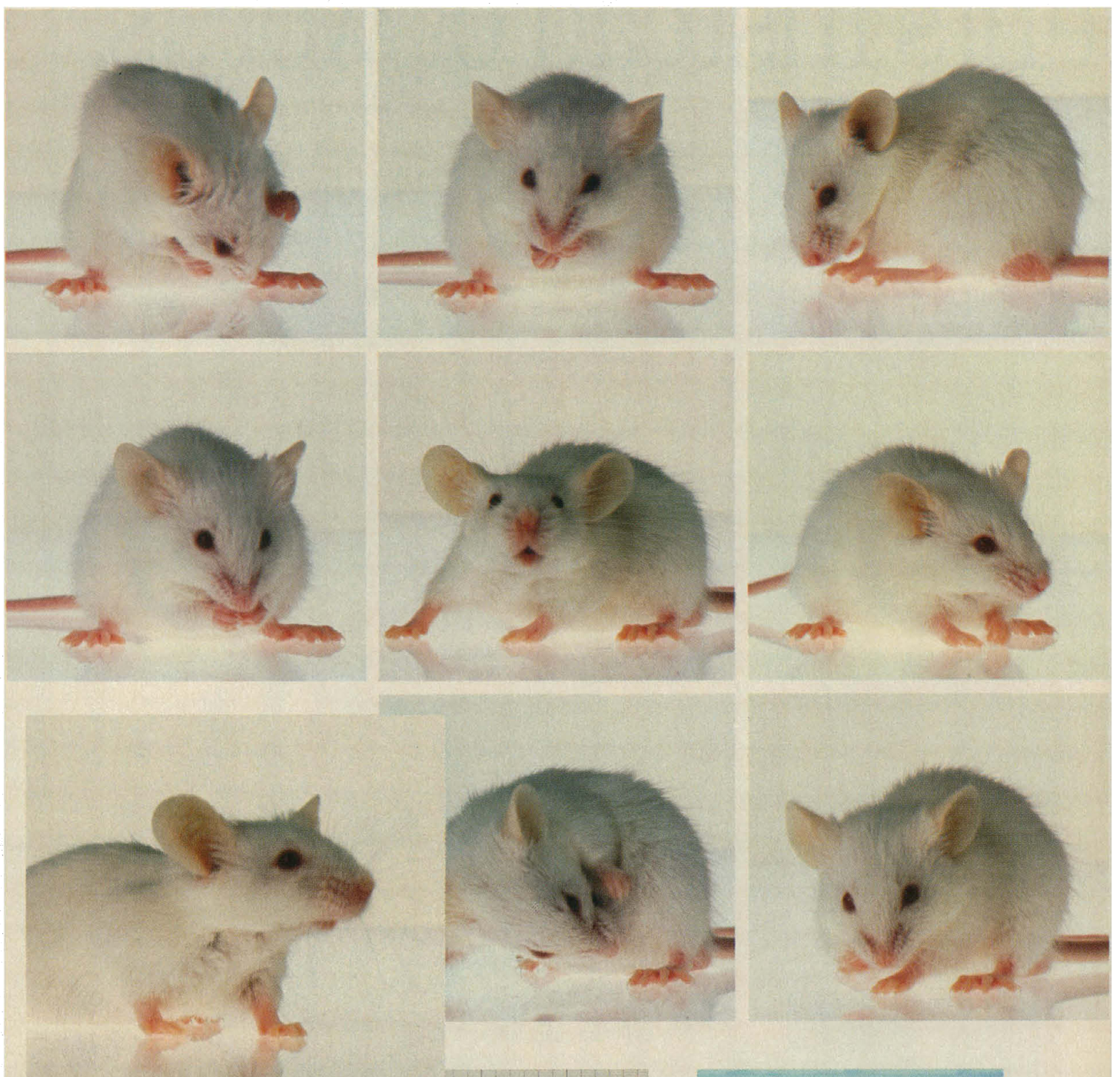

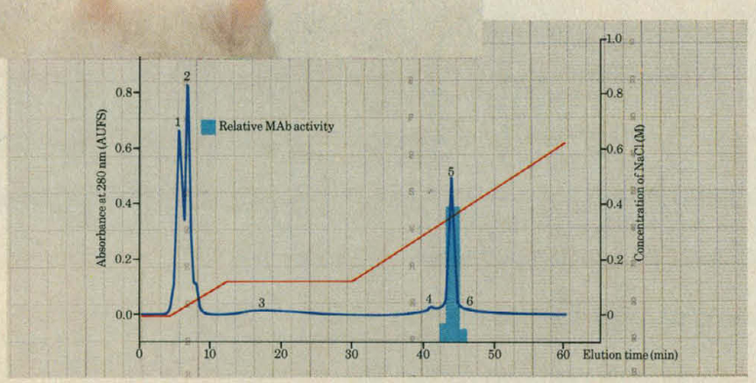

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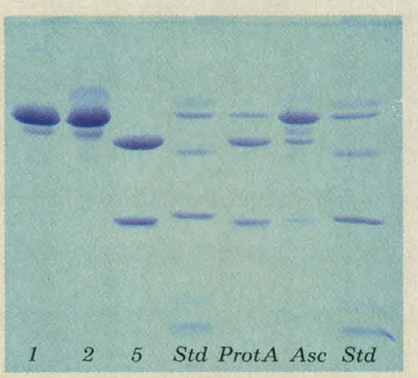

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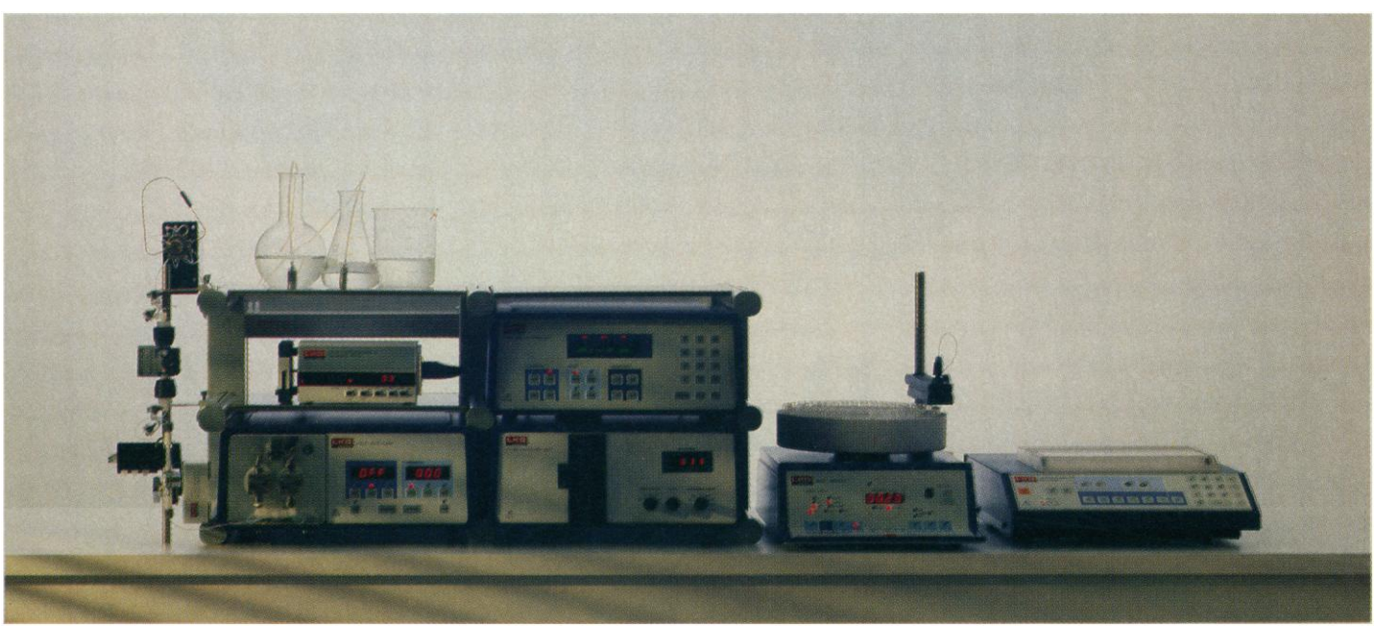

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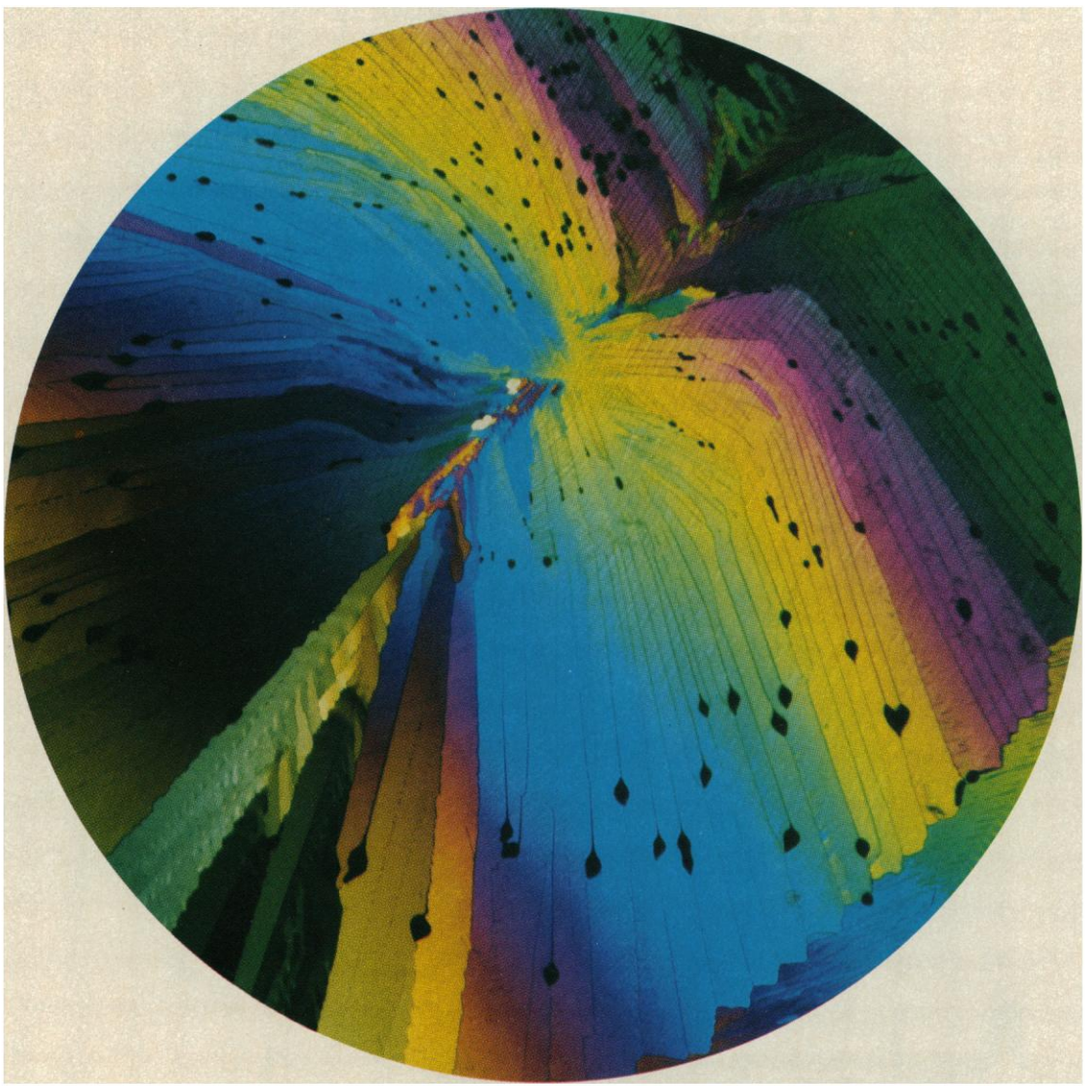

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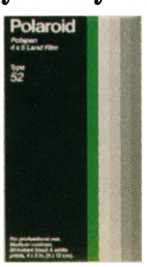

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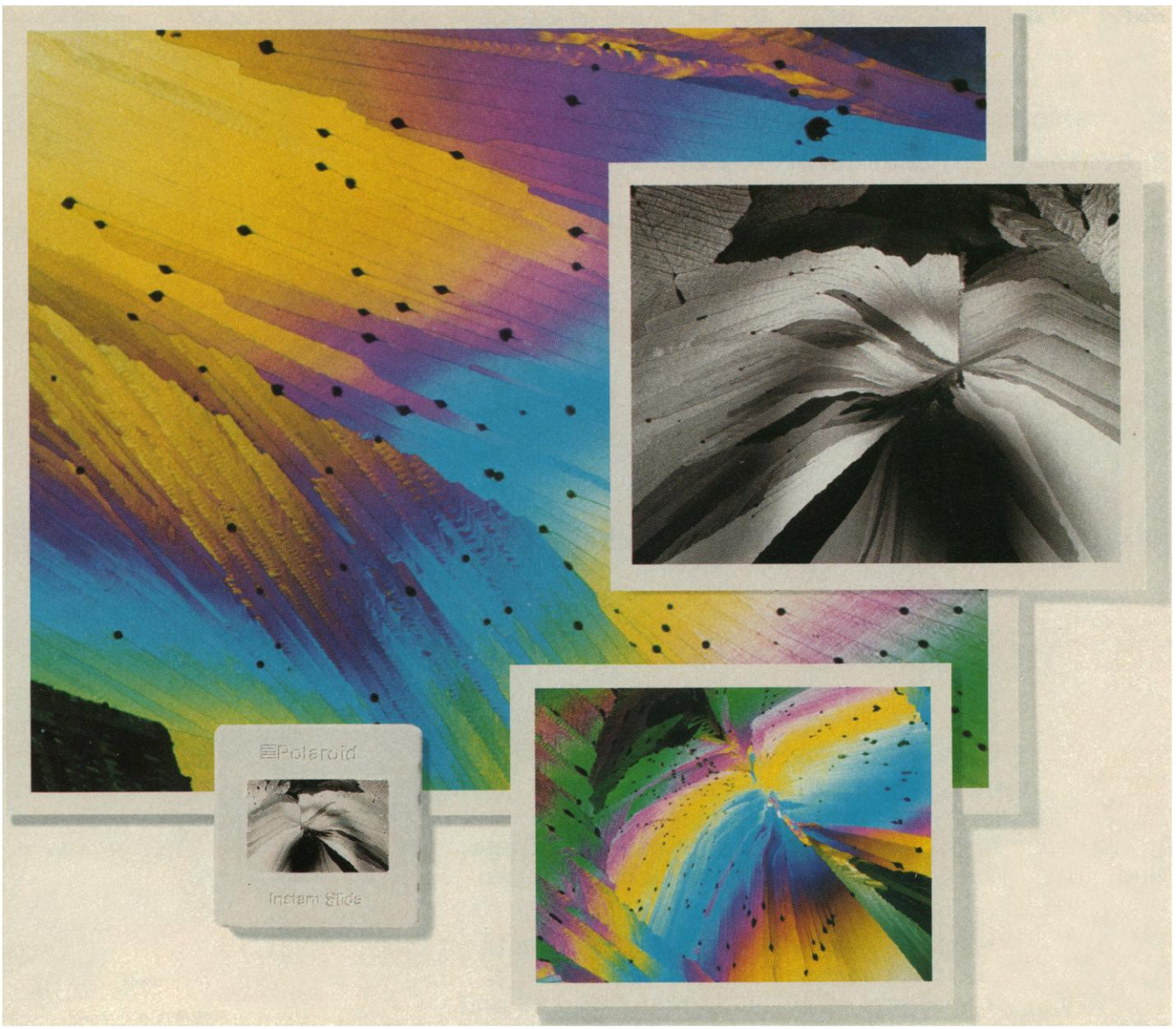

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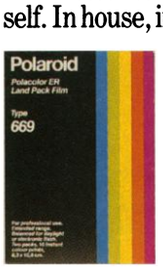

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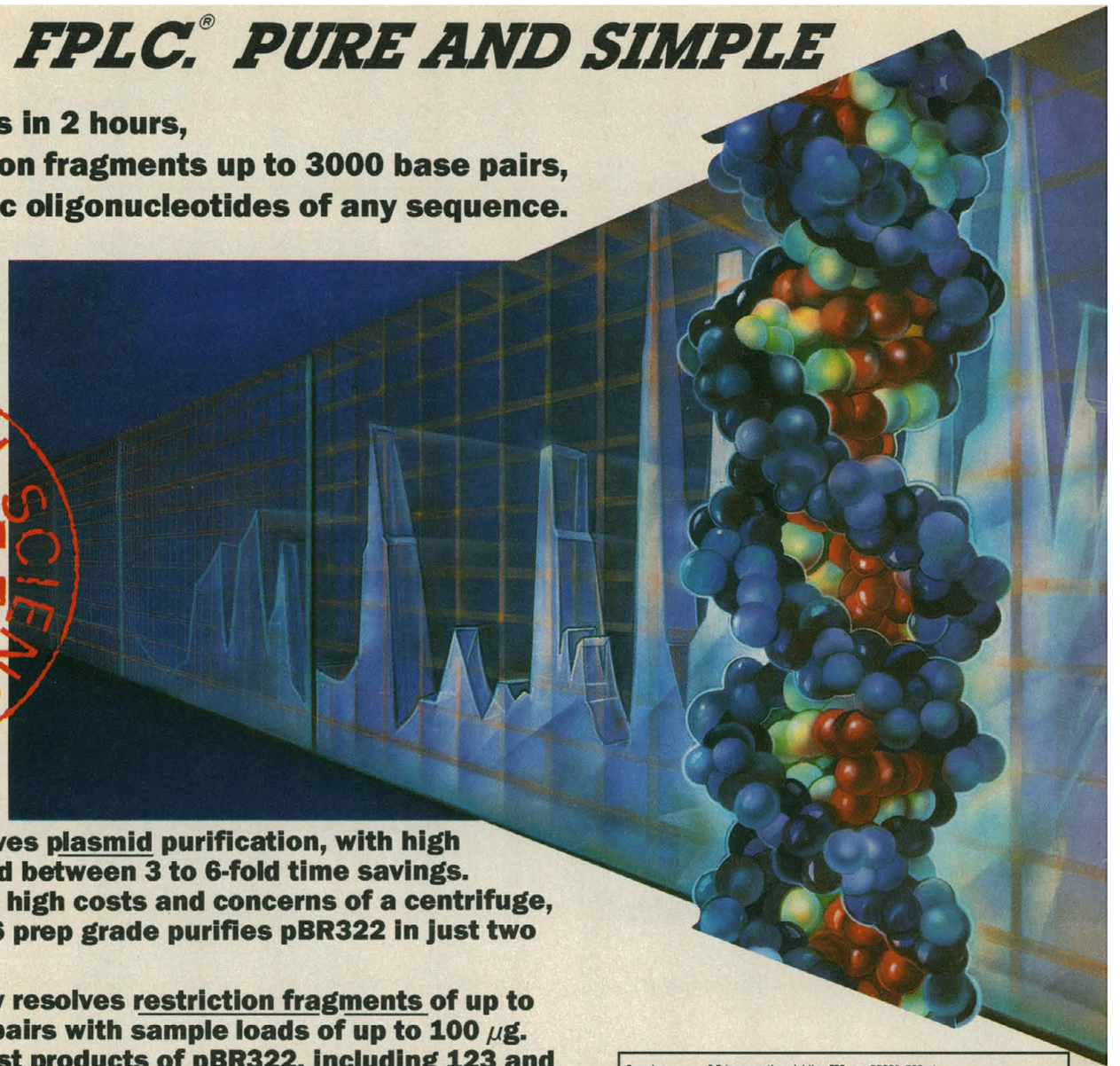

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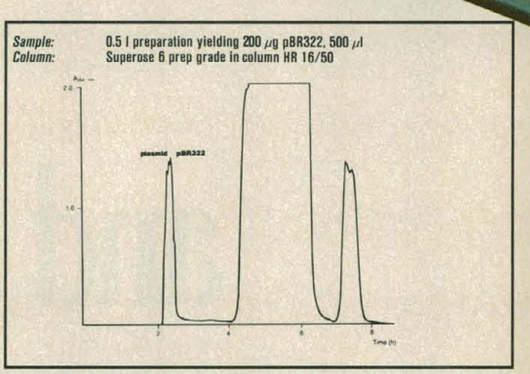
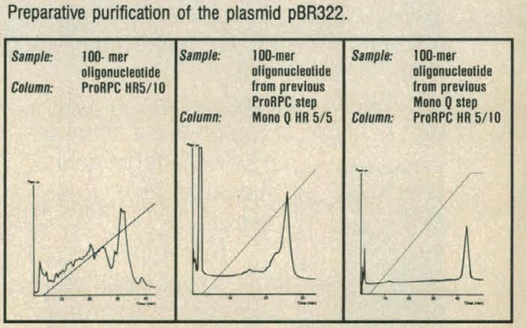


Preparative purification of the plasmid pBR322.



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Letters

Support for the Uspenskiis

The recent departures of Anatoly Shcharansky, Yuri Orlov, and Lev Goldfarb are bright spots in the otherwise discouraging picture for hundreds of refusenik scientists in the Soviet Union. A case in point is that of Inna Ioffe and her husband Igor Uspenskii, medical entomologists who applied for exit visas in 1979. Within 2 years they were both dismissed from their positions at the Martsinovsky Institute of Medical Parasitology and Tropical Medicine of the U.S.S.R. Ministry of Health. They have been denied permission to publish, go on expeditions, and attend meetings, and have suffered the additional outrage of having their names expunged from doctoral dissertations they directed. Ioffe is now unemployed, while Uspenskii works as an elevator operator and translator.

Their desperate situation was the subject of a recent resolution by the membership of the Entomological Society of America and an address by the president of that body (*1*). Close to 150 entomologists and other scientists endorsed a petition calling for the granting of their exit visas in accordance with the provisions of the International Covenant on Civil and Political Rights and the Helsinki Final Act to which the U.S.S.R. is a party (*2*).

This is a particularly auspicious time to make our concerns known to Soviet officials through our representative to the Vienna Followup Meeting of the Conference on Security and Cooperation in Europe (*3*) and, given the new official policy of openness, to other appropriate political and scientific officials in the U.S.S.R. (*4*). Finally, we can correspond directly with the Uspenskiis and provide them with articles and books on medical entomology and acarology and professional society memberships (*5*). This will let the Uspenskiis, as well as the officials who are monitoring their mail, know that we have not forgotten them and that they still have professional standing.

MATTHEW H. GREENSTONE
Biological Control of Insects Research Laboratory, U.S. Department of Agriculture, P.O. Box 7629, Research Park, Columbia, MO 65205

REFERENCES AND NOTES

1. *Bull. Entomol. Soc. Amer.* **29** (No. 1), 63 (1983); *ibid.* **31** (No. 2), 6 (1985).
2. Committee of Concerned Scientists, Inc., news release, 23 December 1986.
3. Send letters and telegrams to Ambassador Warren Zimmermann, Chairman, U.S. Delegation to the Conference on Security and Cooperation in Europe, American Embassy, Vienna, APO New York, NY 09108.
4. Mr. Mikhail S. Gorbachev, Secretary General of the Communist Party of the Soviet Union Central Committee, The Kremlin, Moscow, RSFSR, U.S.S.R.; Gennady I. Tomin, Chief, Moscow OVIR, Kolpachny Pereulok 9, Moscow, RSFSR, U.S.S.R.; Academician N. N. Blokhin, President, Academy of Medical Sciences, Ul. Solyanka 14, Moscow 109801, RSFSR, U.S.S.R.; His Excellency Yuri V. Dubinin; Ambassador of the U.S.S.R., 1125 16 Street, NW, Washington, DC 20036.
5. Drs. Inna Ioffe and Igor Uspenskii, Prospect Vernadskogo, Building 125, Apartment 237, 117571 Moscow, RSFSR, U.S.S.R.; for assistance in sending books and journals contact the Committee of Concerned Scientists, Inc., 330 Seventh Avenue, Suite 608, New York, NY 10001.

Transplantation of Neural Tissue from Fetuses

Several decades of experimental work with rodents, and recently with nonhuman primates, have shown that transplantation of fetal neural tissue holds the promise of great benefit to victims of serious neurological disorders (*1*). At a recent meeting* held to address ethical questions raised by the possibility of transplanting neural tissue obtained from human fetuses, the undersigned neuroscientists, ethicists, and lawyers concluded that retrieval of such tissue from fetal remains is analogous to the transplantation of organs or tissue obtained from adult human cadavers. Similarities include the fact that the donor is dead, and the expectation that there will be significant benefits for the recipient. These similarities suggest the appropriateness of using the same ethical and legal criteria now followed for cadaver transplantation.

It was also agreed, however, that there are dissimilarities between the treatments. First, although use of fetal remains for transplantation is legal in most states (in the United States), it is ethically controversial because of its association with abortion. Second, although parental consent to the donation of fetal remains is legally sufficient in most states, it may not be ethically sufficient. For these reasons, and because the use of neural tissue for transplantation is experimental, such transplantation in humans should be subject to careful review. This review should apply to transplantation supported either by nonfederal sources or by federal funds.

Points to consider in the review process include the need for (i) a clear separation between decisions related to the acquisition of tissue and decisions regarding the transplantation of tissue into a recipient; (ii) anonymity between donor and recipient, with the implication that donors and recipi-

*Sponsored by the Center for Biomedical Ethics, Case Western Reserve University School of Medicine, Cleveland, OH, 4 and 5 December 1986.

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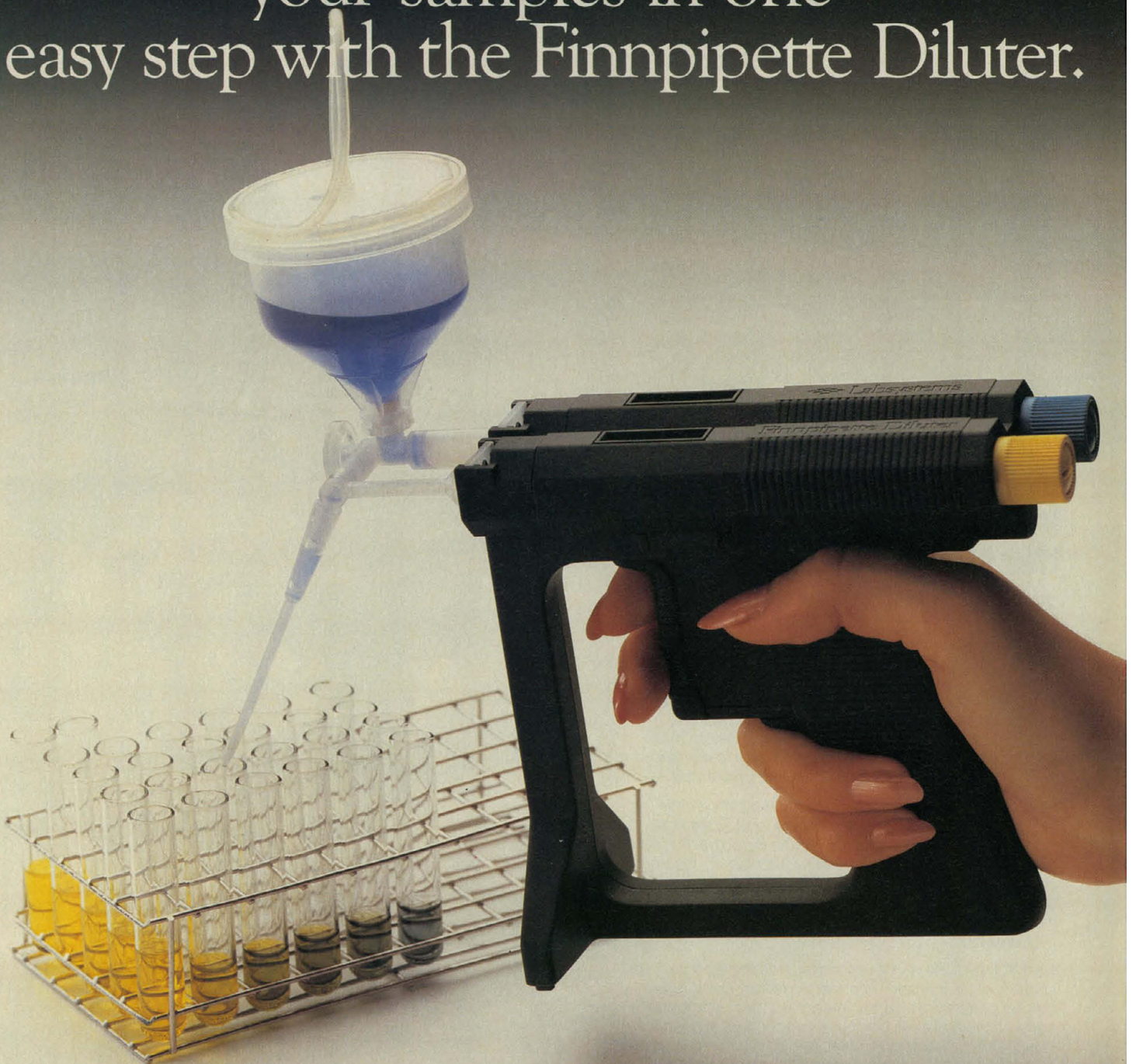

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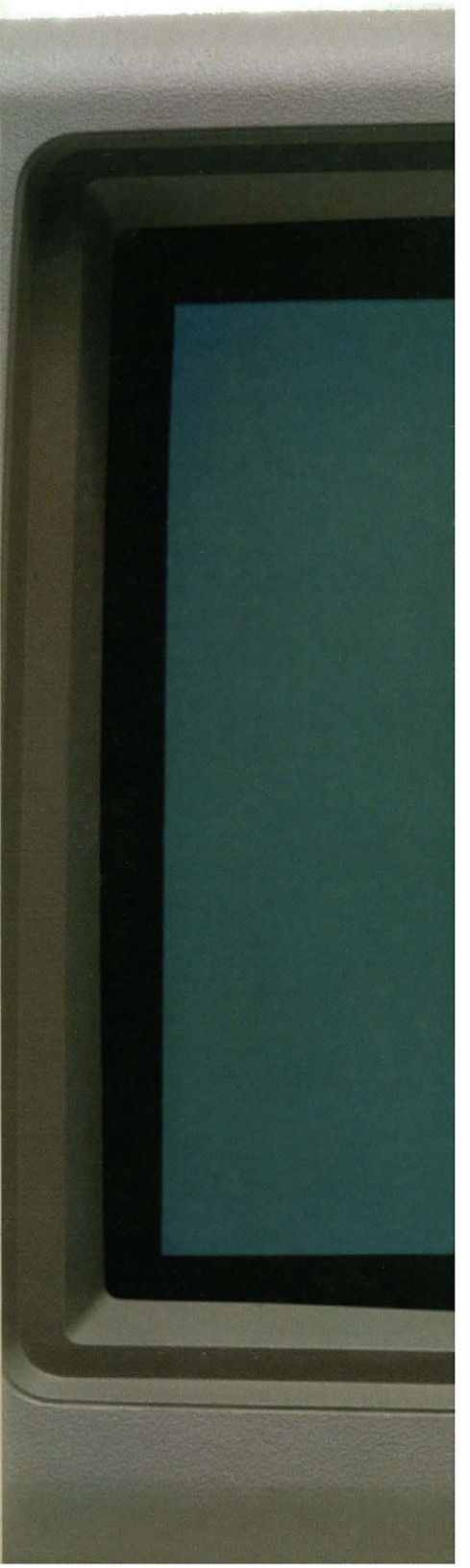

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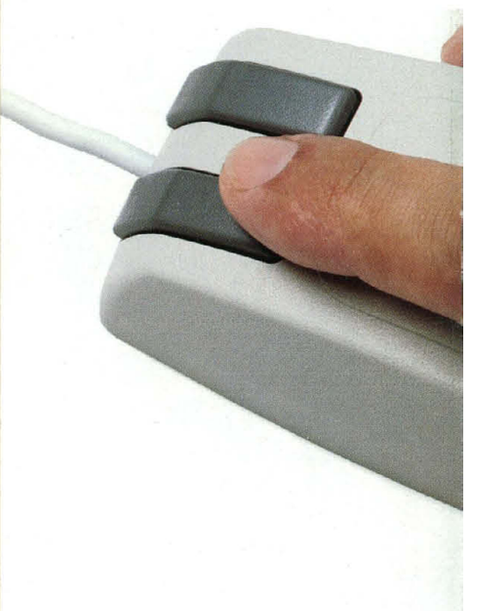
The System Gold digital network lets you link one or two systems, each with eight different LC modules. So you're in control all of the time. You get total system status at a glance. You create, store, download or change method conditions for any module. Or all modules at once. Collect and manipulate data with color graphics, too.

Using the PC, you can select the exact components you need for a particular run. Whether you're matching standards for quality control, doing a metabolism study, purifying nucleic acids or whatever. It's up to you. Point. Click. Personal.



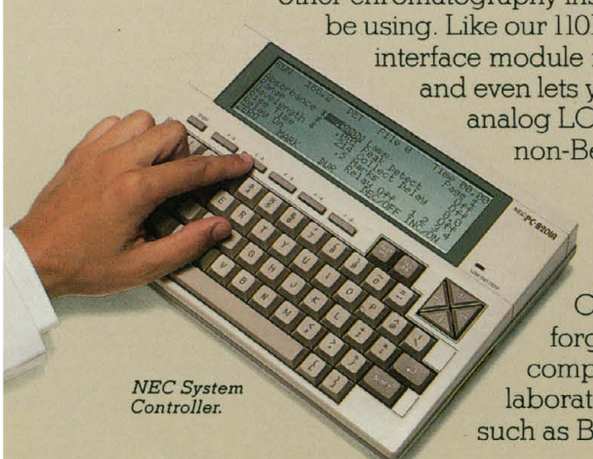
The Portable Alternative.

Another personal touch System Gold gives you is the option to choose the portable lap-top NEC as your system controller.

The NEC's dedicated function keys help you direct up to eight system modules from one single interface point. Command steps are simple to follow. And you can check the status of the entire system from just one screen. Simply pre-select the parameters you want to monitor. It's that easy.

Linking old and new.

Even though it's all-digital, System Gold fits in personably with other chromatography instrumentation you may already be using. Like our 110B and 114M pumps. The analog interface module makes everything compatible, and even lets you take data from conventional analog LC detectors. Both Beckman and non-Beckman.



NEC System Controller.

Flexibility like this allows you to upgrade your current LC systems and gives you a personal path to Personal Chromatography. And, don't forget, System Gold is equally compatible with many large scale laboratory data information systems such as Beckman's own CALS™ System.

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Configuration screen shows which modules make up each of two independent HPLC systems.

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But what about the brawn... the programmable solvent delivery and detection modules? Aren't they the heart and soul, nuts and bolts of the System Gold Personal Chromatograph?

Definitely.

Single piston precision.

From the macro performance of sixty milliliters per minute to the precise and steady flow of just one microliter per minute, System Gold offers you pumping technology you can count on.

Under the fully automated guidance of you and your PC, System Gold solvent delivery modules provide a uniform and pulse-free flow. As far as precision goes, how does reproducibility that's better than ± 0.1% sound?

Stand-alone programmability makes them smart. A unique piston wash feature makes them reliable. High pressure two-stage dynamic mixing makes them accurate. And automated multi-solvent selection makes them versatile. System Gold solvent delivery modules think of everything. You'll find them available as single or binary modules and, if you like, they can be combined into ternary or quaternary systems.

Detection that's sensitive and versatile.

Sensitive indeed. The all-digital System Gold detectors give you nothing less than flawless and consistently reliable data. Featuring sharp, undistorted peaks. Low baseline noise. And variable wavelength monitoring.

System Gold detection modules are subtle and scrutinizing enough to even spot the presence of trace impurities. Real-time high sensitivity scanning provides data you can't get with diode array detectors. Programmability optimizes results automatically. And, to complete the picture, there's a full range of flow cells, from micro to macro.

Versatility. It configures.

Personal Chromatography will really take shape when you team System Gold with the wide range of Beckman column chemistries you may already be depending on.

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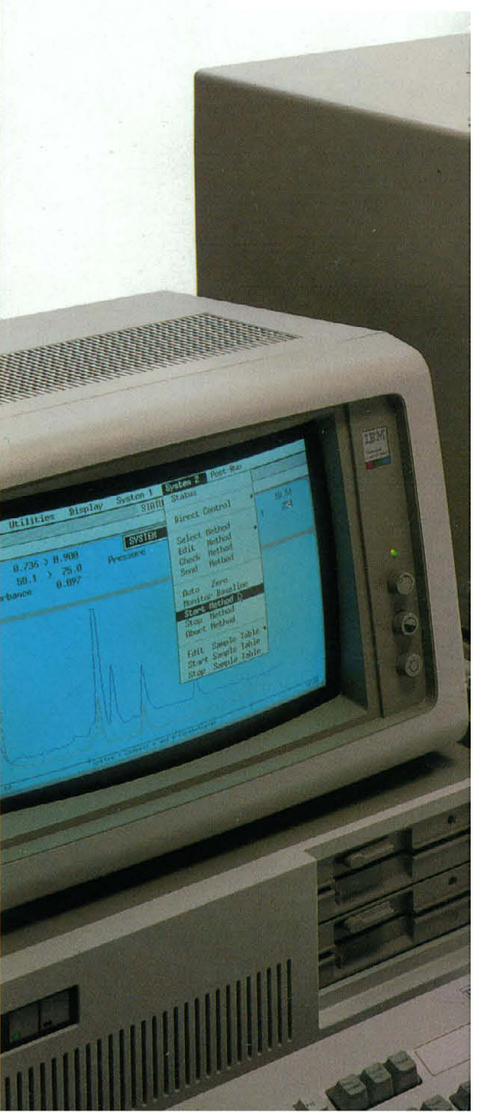

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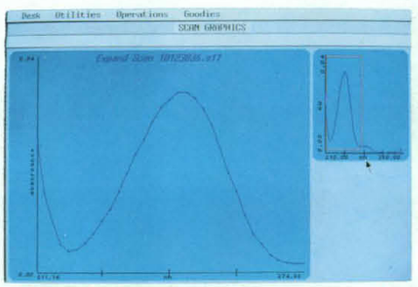

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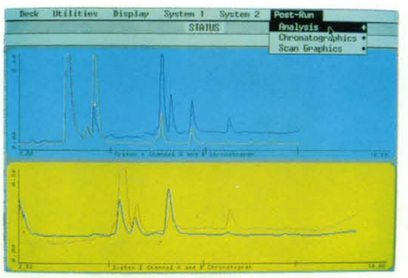
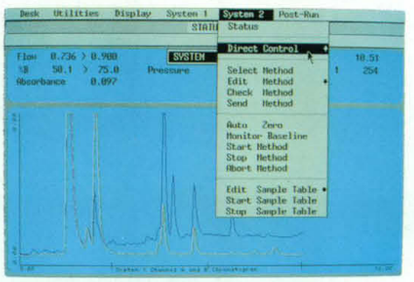
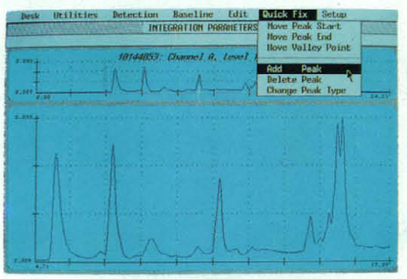


Display from 2 HPLC systems each with dual-channel detection.



Real-time instrument status with simultaneous dual-channel chromatogram.



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R&D Policies, Budgets, and Economic Competitiveness

Twelfth Annual AAAS Colloquium on R&D Policy

9 & 10 April 1987 ✦ Capital Hilton ✦ Washington, DC

- ✦ Discussion will be based on ***AAAS Report XII: Research and Development, FY 1988,*** a timely and comprehensive analysis of the proposals for R&D in the FY 1988 budget, prepared by AAAS and a group of its affiliated scientific, engineering, and higher education associations.
- ✦ Trends and prospects for R&D in defense, energy, health, space, and other areas will be explored by leaders from industry, universities, agencies of the federal government, Congress, the White House, and the scientific and engineering communities.
- ✦ Perspectives will be provided on topics such as budget deficit targets and their impacts on R&D, Japanese science and technology policy, U.S. economic competitiveness and the role of science and technology, "big science" programs and priorities in science, impacts of defense R&D budgets on the U.S. scientific-technical system.
- ✦ Registrants will also receive ***Proceedings*** following the Colloquium and ***Congressional Action on R&D in the FY 1988 Budget*** in the fall.

Preliminary Program

Thursday, 9 April

8:00 a.m. Registration

8:45 a.m. Welcome

Lawrence Bogorad, *Chairman, Board of Directors, AAAS;* and *Maria Moors Cabot Professor of Biology, Harvard University*

Overview of R&D in the FY 1988 Budget

Albert H. Teich, *Head, Office of Public Sector Programs, AAAS;* Stephen D. Nelson, *Manager, Science Policy Studies, AAAS*

9:30 a.m. Budgetary and Policy Context for R&D in FY 1988

Administration proposals for R&D ✦ Overall budget and economic context ✦ R&D community perspectives

Moderator: J. Thomas Ratchford, *Associate Executive Officer, AAAS*

Speakers: William R. Graham*, *Director, Office of Science and Technology Policy;* Timothy J. Muris, *Executive Associate Director, Office of Management and Budget;* Robert A. Roe*, *Member, U.S. House of Representatives (D-NJ);* and *Chairman, Committee on Science, Space, and Technology;* Linda S. Wilson, *Vice-President for Research, University of Michigan*

12:30 p.m. Luncheon

Presiding: George Bugliarello, *Chairman, Committee on Science, Engineering, and Public Policy, AAAS;* and *President, Polytechnic University*

Address: Ezra F. Vogel, *Director, Program on U.S.–Japan Relations, Center for International Affairs, Harvard University*

2:15 p.m. U.S. Economic Competitiveness: Challenge and Opportunity

Health of the U.S. economy ✦ Trade deficit ✦ Industry's response ✦ Federal policies ✦ Role of science and technology

Moderator: W. Dale Compton, *Senior Fellow, National Academy of Engineering*

Speakers: Buddy MacKay, *Member, U.S. House of Representatives (D-FL);* and *Co-Chairman, Congressional*

***Tentative**

→

Caucus on Competitiveness; Erich Bloch, *Director, National Science Foundation;* Joseph Duffey, *Chancellor, University of Massachusetts;* and *Member, Executive Committee, Council on Competitiveness*

4:30 p.m. Agency Perspectives on R&D in the FY 1988 Budget

Simultaneous small group sessions ✦ Highlights of major agency R&D budgets ✦ Congressional reactions ✦ Opportunities for questions and discussion

Department of Defense: Ted G. Berlincourt, *Director, Research and Laboratory Management, DOD*

Department of Energy: Joel A. Snow, *Director, Science and Technology Affairs, DOE*

National Aeronautics and Space Administration: Frank B. McDonald, *Chief Scientist, NASA*

National Institutes of Health: Jay Moskowitz, *Associate Director for Program Planning and Evaluation, NIH*

National Science Foundation: Sandra D. Toye, *Controller, NSF*

Department of Commerce: National Bureau of Standards/National Oceanic and Atmospheric Administration: Raymond G. Kammer, *Deputy Director, National Bureau of Standards;* and Alan R. Thomas, *Deputy Assistant Administrator for Oceanic and Atmospheric Research, NOAA*

6:00 p.m. Reception

Cocktails and hors d'oeuvres ✦ Hosted by AAAS

Friday, 10 April

7:45 a.m. Breakfast

Speaker: A Member of Congress to be announced

9:00 a.m. Major Issues in Science and Technology Policy: Concurrent Sessions

(A) Government and the Dissemination of Science and Technology

Moderator: Dorothy S. Zinberg, *Senior Research Fellow, Science, Technology, and Public Policy Program, Kennedy School of Government, Harvard University*

Speakers: Robert W. Dean*, *Special Assistant to the President for National Security Affairs, National Security Council;* Richard L. Garwin, *IBM Fellow, Thomas J. Watson Research Center;* John Shattuck, *Vice-President for Government and Public Affairs, Harvard University;* Charles H. Herz, *General Counsel, NSF;* Mitchel B. Wallerstein, *Office of International Affairs, National Research Council*

(B) Setting Scientific Priorities: Big/Little Science and Facilities Decisions

Moderator: Thomas H. Moss, *Dean of Graduate Studies and Research Center, Case Western Reserve University*

Speakers: Norman Hackerman, *Chairman, Scientific Advisory Board, Robert A. Welch Foundation;* Mildred S. Dresselhaus, *Institute Professor, MIT;* Donald K. Stevens, *Associate Director for Basic Energy Sciences, DOE*

(C) Defense R&D Budgets: Impacts on the Overall R&D System

Moderator: Kazuhiko Kawamura, *Associate Director, Center for Intelligent Systems, Vanderbilt University*

Speakers: Rodney Nichols, *Executive Vice President, Rockefeller University;* Leo Young, *Office of Deputy Undersecretary of Defense for Research and Advanced Technology;* Lloyd Dumas, *Professor of Political Economy and Economics, University of Texas–Dallas;* Stephen H. Unger, *Professor of Computer Science, Columbia University;* John P. Holdren, *Professor of Energy and Resources, University of California–Berkeley*

12:15 p.m. Cash Bar Reception

12:45 p.m. Luncheon

Presiding: Sheila E. Widnall, *President, AAAS;* and *Abby Rockefeller Mauze Professor of Aeronautics and Astronautics, MIT*

Speaker: James C. Fletcher, *Administrator, National Aeronautics and Space Administration*

Concluding Remarks: William D. Carey

2:30 p.m. Adjournment

Use registration forms on following page →

For further details, write: AAAS R&D Colloquium, Public Sector Programs, 1333 H Street, NW, Washington, DC 20005.

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Registration fees include all sessions and publications; meals are included only with payment of full registration fee. All registrants receive *AAAS Report XII: Research and Development, FY 1988* before or at the Colloquium, published *Proceedings* after the meeting, and a supplementary report, *Congressional Action on R&D in the FY 1988 Budget,* in the fall.

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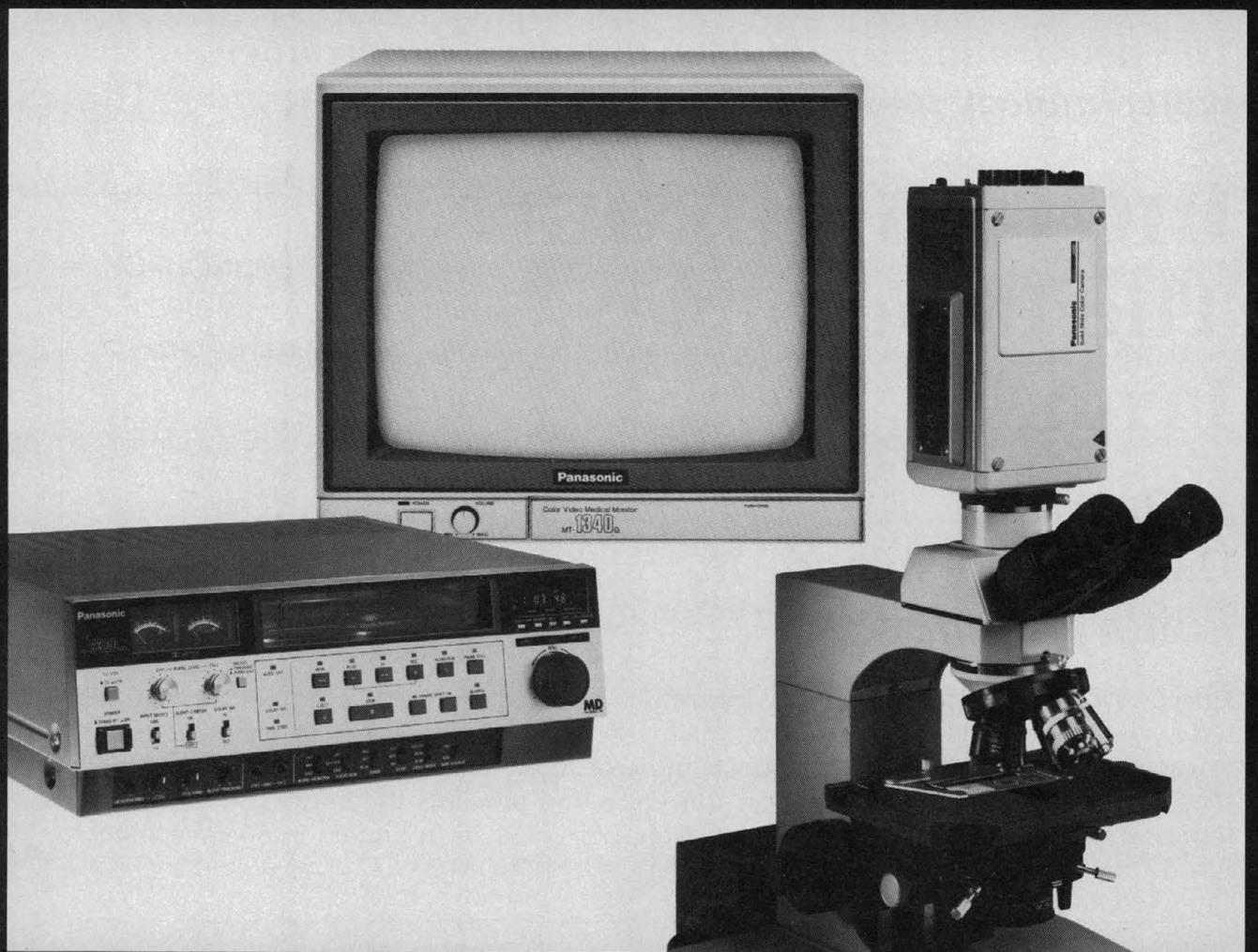

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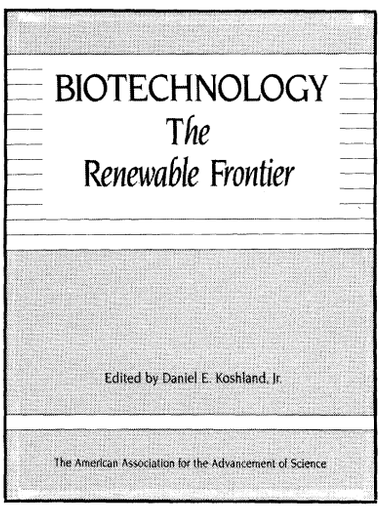

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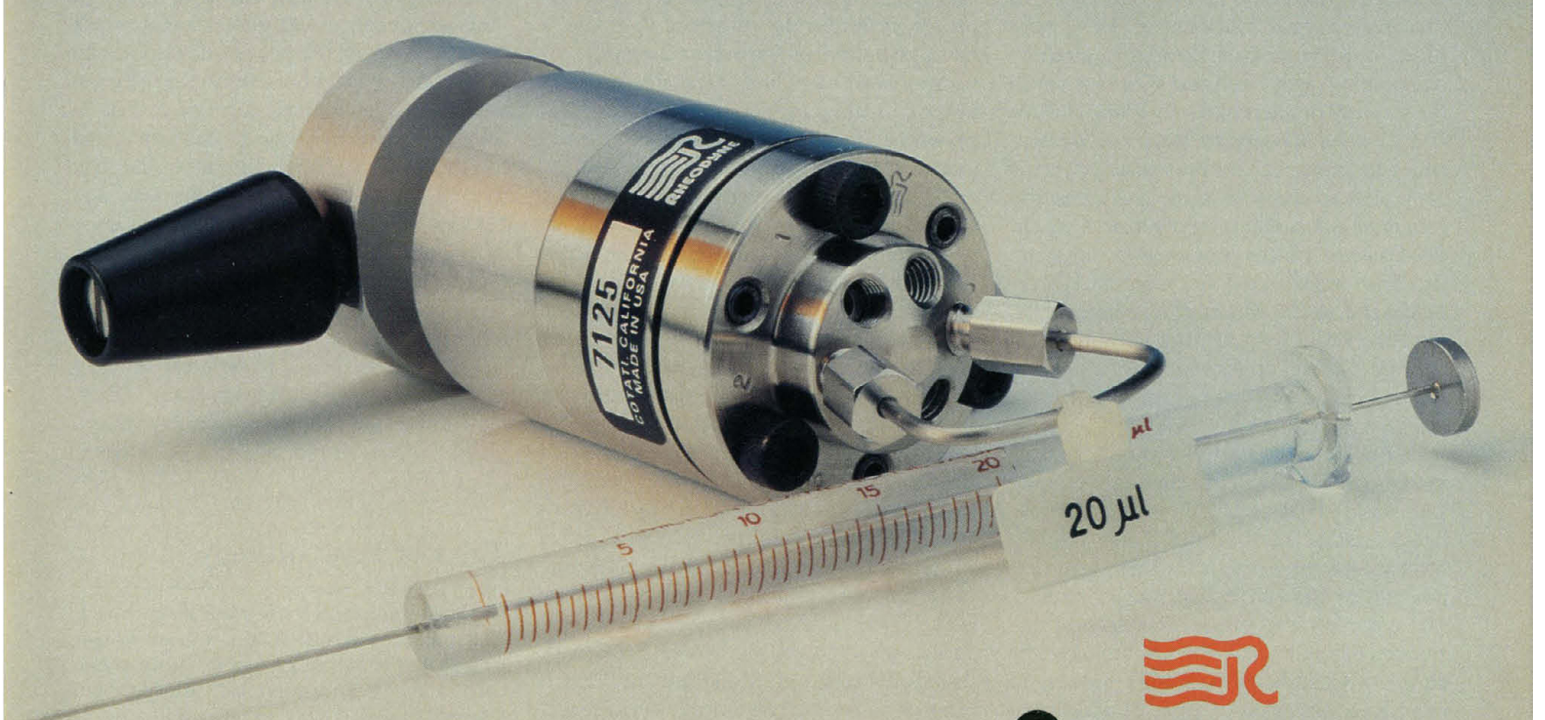

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