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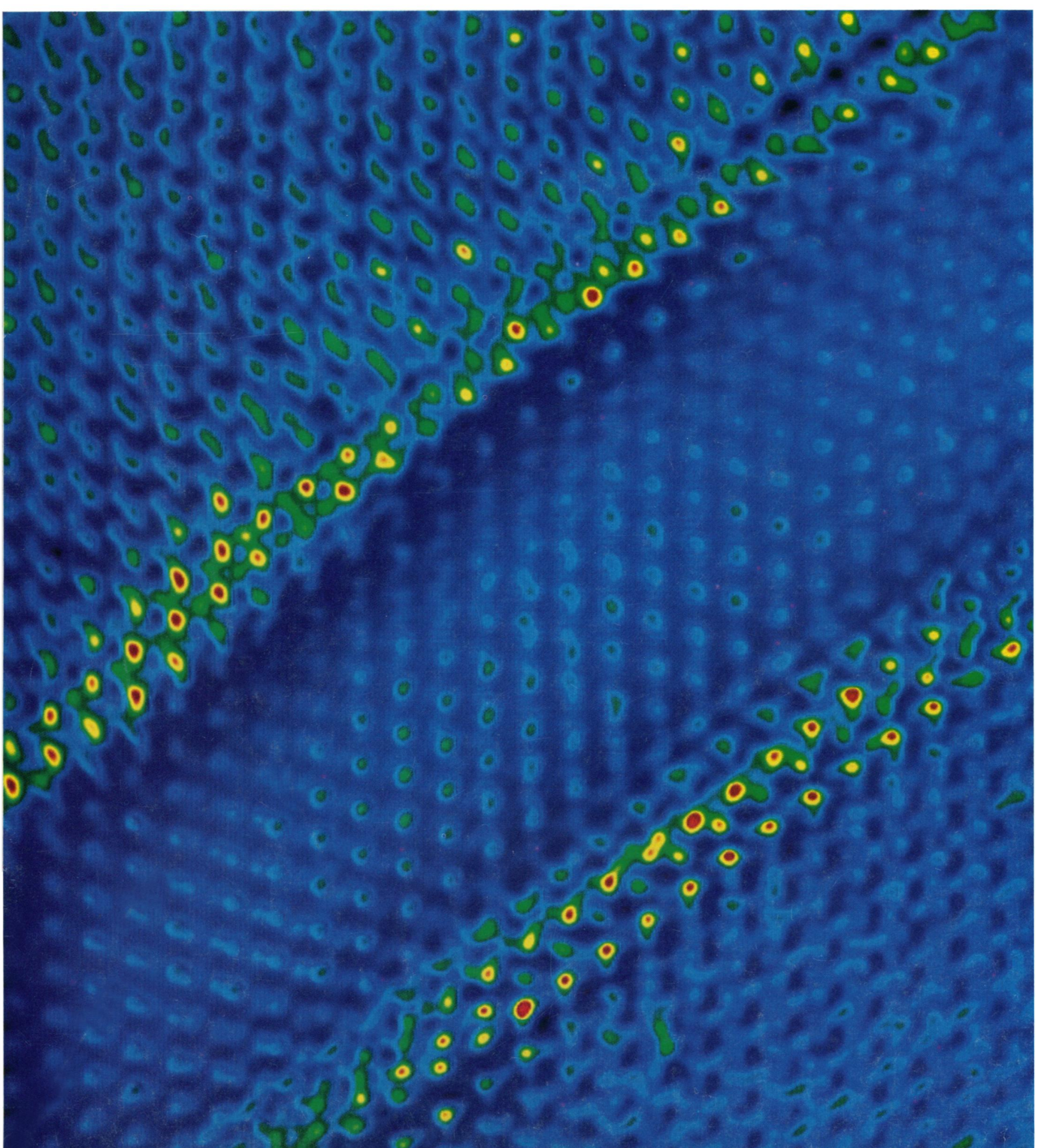

MEET A FEW OF MISSISS

Among those who are making Mississippi a place where world-class researchers can do good work are, from left, ***Sally B. Cornwell****, director of TechNet, an Institute for Technology Development technology transfer program in North Mississippi;* ***Dr. Lawrence Crum****, acting director of the National Center for Physical Acoustics at the University of Mississippi;* ***Dr. George May****, research program manager for the Space Remote Sensing Center;* ***Dr. David Murphree****, president of the Institute for Technology Development;* ***Dr. James Perkins****, Superconducting Super Collider project manager;* ***Dr. W. Steve Shepard****, director of the Magnetohydrodynamic Energy Center at Mississippi State University; and* ***Dr. Joseph A. Portera****, a founder of the accelerated math and science high school at Mississippi University for Women.*

They're part of a powerful team that quietly and deliberately is transforming Mississippi into a place where technology can thrive.

Witness their accomplishments of the last few years...creation within Mississippi of the Institute for Technology Development, a national demonstration project in technology-based economic development; the National Center for Physical Acoustics and the Mississippi Super Computer Center in Oxford; the U.S. Center for Advanced Scientific Computing in Starkville; and the Space Remote Sensing Center and Mississippi Technology Transfer Center on the Gulf Coast. All are programs that complement strong research and development activities in the state, such as the 12-year-old Magnetohydrodynamic Energy Center at Mississippi State University.

Their Mississippi is a much different place from the

The Commission on Community Excellence is an organization of community leaders in

Mississippi of 20 years ago. It's a Mississippi whose public school improvements today inspire reform efforts around the country...a Mississippi that can tout one of only five residential math/science high schools in the nation.

Their Mississippi is unified in its commitment to change. It wants progress and is willing to pay for it.

Witness their legislature's recent approval of $1.6 billion in educational, cultural and physical improvements to the region surrounding the proposed Mississippi Superconducting Super Collider site. Combined with the site's superb geology, the enhancement package ensures the U.S. Department of Energy of a true international center of scientific excellence for the SSC.

Note that this package is one of the *largest* financial offers made by any state, that it commits an impressive *15 percent* of SSC construction contracts to minority businesses, that its adoption came through a *unanimous* vote by the Mississippi Legislature.

That's not what you'd expect from a state once publicized only for racial division, a state once dismissed as a noncompetitor in the technology field.

But then, not much in Mississippi is what you might expect these days.

...not even its good old boys.

COMMISSION ON COMMUNITY

Excellence

Noxubee, Oktibbeha, Clay and Lowndes counties who support Mississippi's selection for the Superconducting Super Collider. Gene Smith, Chairman, (601) 327-4422.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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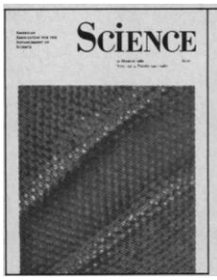

COVER Image of the core of a crystallographic dislocation in grossular garnet (approximate composition $Ca_3Al_2Si_3O_{12}$) obtained by high-resolution transmission electron microscopy.The two parallel yellow lines are partial dislocations, separated by a core region of stacking fault. Perfect, unfaulted crystal structure surrounds the defect on the outside of the partial dislocations. The width of the fault corresponds to about 6 nanometers, or approximately 5 unit cells of garnet structure. See page 1695. [Computer processing of the image is by P. R. Buseck and A. Rimsky, Laboratoire de Mineralogie-Cristallographie, U.A. 09, Centre National de la Recherche Scientifique, Universités P. M. Curie and Paris, 7 Paris, France]

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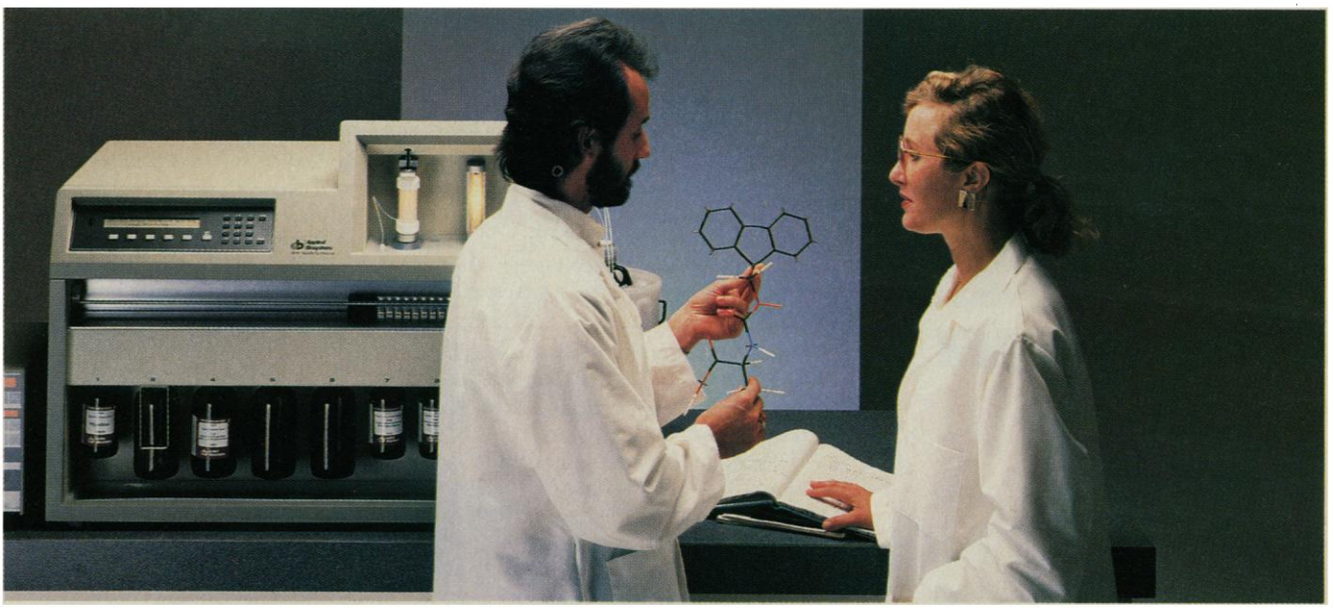

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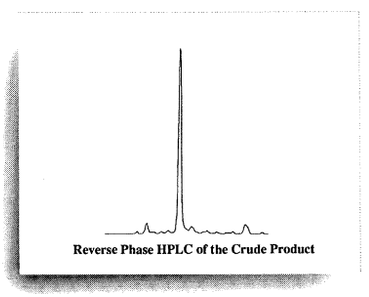

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This Week in
SCIENCE

Garnet defects

ELECTRICAL, chemical, and mechanical properties of crystals are affected by how the atoms of the crystal are arranged (page 1695). Allen *et al.* used high-resolution transmission electron microscopy to study what structural features characterize the defects that occur in natural grossular garnets (cover). Some garnets are gemstones and some are abrasives, and the garnet crystal structure is typical of many of the naturally occurring and synthetic oxides; the distinctive properties of garnets have made them useful in materials science. It has been suggested that linear defects in garnets, termed dislocations, may be associated with anomalous concentrations of atoms that disrupt the crystal structures; however, in the grossular garnets studied, no such impurities were detected near the dislocations. Instead the dislocation structures resulted from the movement of atoms into previously unoccupied sites in the crystal lattice. Other oxide minerals and perhaps some of the new superconducting ceramic oxides may be found to have lattice defects of the type associated with grossular garnets.

Growth of the Great Barrier Reef

NORTHWARD migration of the Indian-Australian plate has played an important part in the formation of the Great Barrier Reef, the longest (about 2000 kilometers) reef province anywhere in the world (page 1697). The Great Barrier Reef is situated off the northeast coast of Australia and is thickest in the north and thinnest in the south. Recent drill hole and seismic data support the contention of Davies *et al.* that movement of the Indian-Australian plate has had a significant impact on how the reef has developed: as the plate moved northward, successive regions of the reef left temperate climates and were exposed to tropical ones. Reefs in the north began growing under tropical conditions about 16 to 25 million years ago, those in the central section were exposed to a tropical climate only 10 to 15 million years ago, and those in the southern section have only been developing in the tropics for the past few million years. Now the entire reef is developing in a tropical environment where its rate of growth continues to fluctuate in response to changing conditions of the sea around it.

Venus: wet or dry

VENUS may never have been an ocean-bearing planet like Earth (page 1702). Although a wet past for Venus has been proposed to account for the planet's high ratio of deuterium to hydrogen (the atomic hydrogen could have escaped from the planet while the heavier deuterium ions remained, resulting in a deuterium-to-hydrogen ratio that is 100 times as great on Venus as it is today on Earth), it now appears that the little bit of water on the planet is in a steady state, and it may always have been so. Grinspoon calculates that the steady state could be maintained if escaping hydrogen were replaced continually with water-bearing material brought to the planet by colliding comets and asteroids. A parsimonious explanation for the origin of the terrestrial planets would have all of the terrestrial planets composed of the same accreted material, but this need not have been the case. Future studies of the surface morphology and mineralogy of Venus should help to determine whether Venus did in fact, as Botticelli's painting suggests, have a watery birth.

AIDS virus attachment

AN early step in the infection of a cell by human immunodeficiency virus type 1, the AIDS virus, is the attachment of the major envelope glycoprotein of the virus, called gp120, to a surface receptor on the cell, called CD4 (page 1704). Helper T lymphocytes, macrophages, glial cells, and neuronal cells are among the cell types that have CD4 surface receptors. These cells have the potential to be infected by the virus and then might cease to function; in fact, clinical findings in AIDS include major dysfunctions associated with the immune system and the central nervous system of which these cells are components. Smith *et al.* describe the protein engineering techniques that have been used for producing soluble forms of CD4; the secreted CD4 molecules were truncated, lacking the transmembrane and cytoplasmic domains that normally anchor them into a cell membrane. Soluble CD4 molecules inhibited the interaction of CD4 with gp120 and the subsequent infection of human T cells by the virus in vitro. Such molecules may thus have a use in the therapy of AIDS patients for inhibiting the spread of the virus throughout the patient's body or for interfering with other pathology-associated effects that result from the interaction of CD4 and gp120.

Neurotransmitter release mechanism

HOW are neurotransmitter substances released from neurons (page 1712)? The most plausible model for how this process occurs remains the vesicular release hypothesis in which release involves the fusion of neurotransmitter-containing vesicles within a neuron to the surface membrane of the neuron, release of the neurotransmitter substance into the gap between the transmitting neuron and the receiving cell, and diffusion of the neurotransmitter substance to the cell membrane of the receiving cell. Young and Chow rule out a major contending alternate hypothesis according to which neurotransmitter release could occur through the opening of gated ion channels in the membrane of the sending neuron. Membrane currents were measured at the resolution of single channels at the synapses between a nerve and a muscle cell from *Xenopus* frogs; no evidence was found for a change occurring in the membrane current in conjunction with the release of a neurotransmitter substance.

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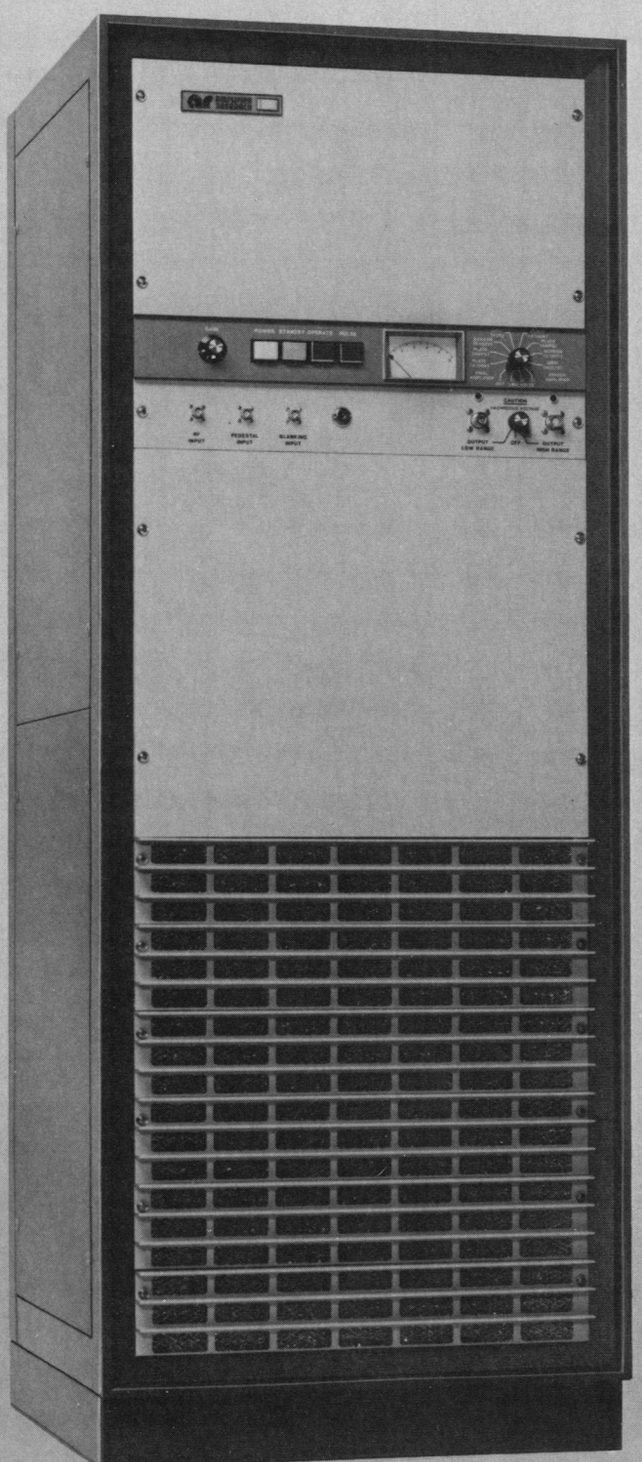

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Soviet Science and Technology at the Boston Meeting

Much has been written about the Washington summit and the activities surrounding it. More is sure to be written about what it means in terms of world peace, arms control, *glasnost*, and *perestroika*. Unfortunately, not much has been written about the importance that the Soviet Union attachés to science and technology as engines of present and future development. The Soviet Union now trains more scientists and engineers than any other country in the world. The Soviets have an outstanding space research and development program and world-class efforts in some areas of basic research, as well as some of the same problems that we do in transforming basic research into practical products. They also have problems with the environment, ecology, and quality control that are not unlike some of those that concern the United States.

Members of the Soviet delegation touched on these and several other subjects in a 3-hour meeting at the National Academy of Sciences on 8 December. What was remarkable about this meeting was the openness and frankness with which the Soviet delegation discussed issues of science, technology, and economic development. The makeup of the Soviet delegation included leaders in science, engineering, economics, and law.

Academician Yevgeni Velikhov pointed out the problems with producing personal computers, the fact that the country needs 1.0 million by 1990 and that one half would go to precollege education programs. Sergei Zaligin discussed how a government plan to divert some northern rivers to the south would have been an environmental and ecological disaster and how the role he played as the editor of *Novy Mir* helped in mobilizing a popular effort that stopped the project. I found this even more remarkable than stopping a major water project in the United States on environmental grounds. Academician A. G. Aganbegyan, secretary of the Economics Department, discussed the economic aspects of *perestroika* and said that Soviet management must change: "It has served as a brake on economic and social development." He pointed out that this change will cause serious problems of disruption in careers of mid-level managers: "It is not possible to make progress if you don't touch anyone."

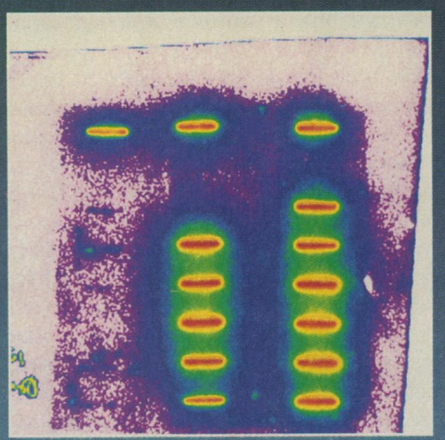
It is unfortunate that U.S. delegations to summit meetings do not also include a group of leading scientists, engineers, economists, and editors—not as window dressing, not just brought along for the ride, but rather, as an involved, informed group capable of discussing the scientific and technical issues on their merits with their peers and counterparts from the other side. Economics, arms control, and management do not exist as disembodied activities, but influence and, in turn, are influenced by science and technology.

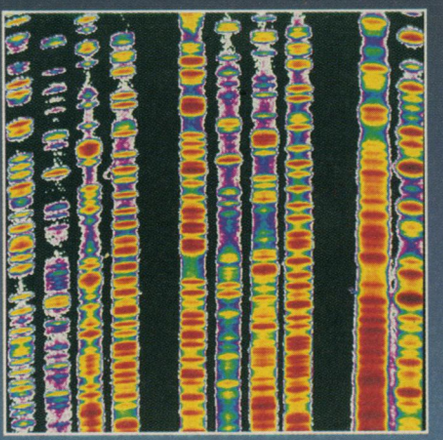
Later, on the same day as the meeting, an eclectic collection of individuals were invited to the Soviet Embassy for a meeting with General Secretary Gorbachev. The group included several scientists and engineers in addition to some 40 authors, actors, religious leaders, and arms control activists. After a brief reception, Gorbachev addressed the group for about 40 minutes, calling attention to Velikhov and the importance of science. This was followed by about a 40-minute discussion period during which most of those who commented praised Gorbachev for his role in *perestroika* and *glasnost*. On the basis of my limited observations, I believe that Gorbachev has a good understanding of the roles that science and technology play in economic development and that he is going to give increased emphasis to science and technology in his government's *perestroika* efforts.

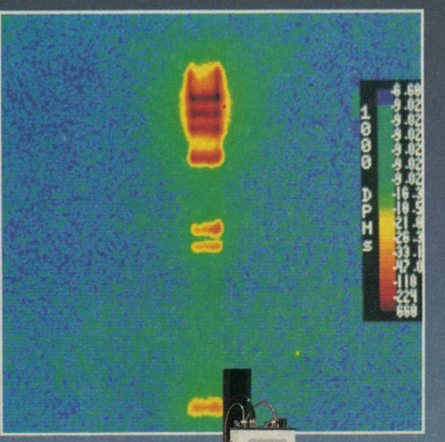
I was pleased to see the emphasis placed on science and technology in some of the activities associated with the summit. I have long felt that the United States would benefit from a better understanding of basic and applied research in the Soviet Union. So about 8 months ago, I invited Velikhov to come to the AAAS Annual Meeting in Boston in February and to bring with him about ten Soviet scientists and engineers to make presentations on Soviet science and technology. Velikhov accepted but, unfortunately, the names of the Soviet speakers and their subjects were not provided in time to be included in the meeting program. A complete listing of the names and titles of the talks will appear later in *Science*. The AAAS meeting will provide an excellent forum for talks in areas such as biology, chemistry, physics, archeology, genetic engineering, and military-political research by leading Soviet scientists and engineers. I hope that many of you will attend the Boston meeting and participate in what promises to be an interesting event.

—ALVIN W. TRIVELPIECE

Image analysis for **molecular biology**







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2) the title of the paper and a statement of its main point;

3) three to eight keywords to be used for indexing;

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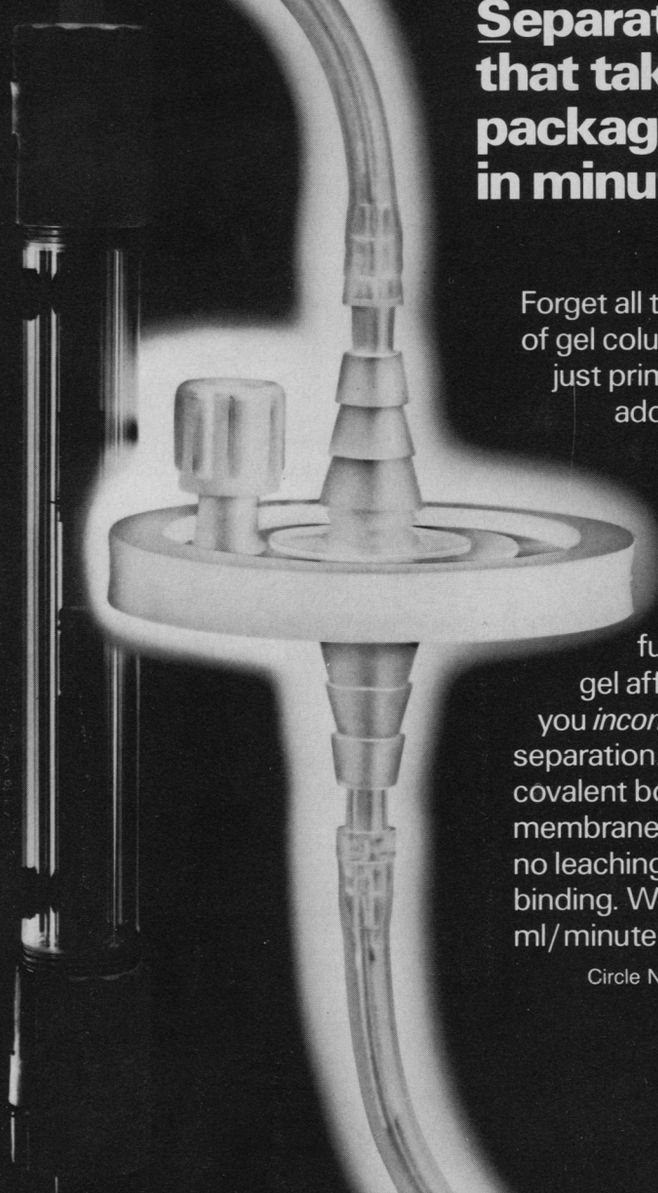

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