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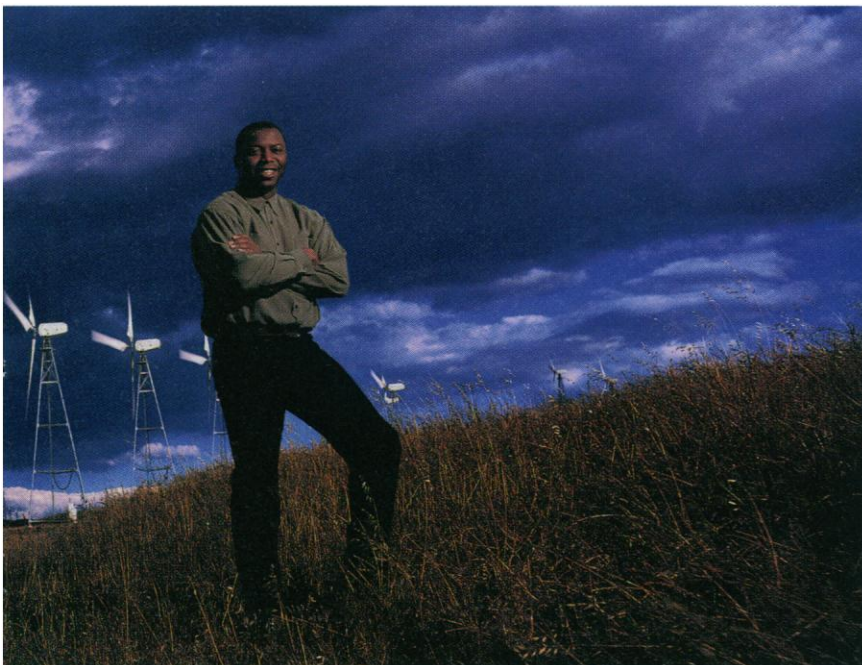
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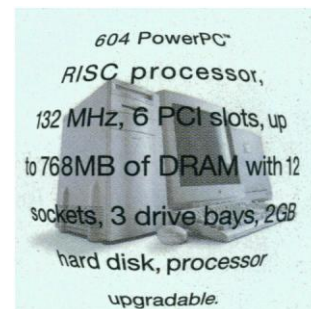
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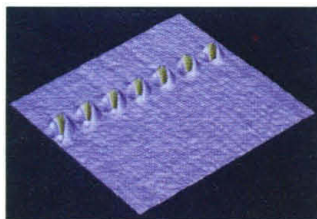
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COVER

False-color image of Earth from the GOES-East satellite. Ecologists have devised approaches to address pressing issues facing the planet, such as the extent of diminished biodiversity and resource depletion. The approaches range from small-scale lab simulations of eco-

systems to larger scale manipulations. In News stories and Articles beginning on page 313, *Science* examines these approaches and some of the answers they may yield to the "big questions." [Photo: NRSC Ltd./Photo Researchers; collage by C. Faber Smith]



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Protein folding funnel

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For a demonstration Circle No 21 on Reader's Service Card

A small moving switch

When the elements of electronic circuitry are shrunk to the atomic scale, electronic conductivity becomes quantized, thus forming the basis for switching schemes to turn the current on and off. Smith (p. 371) has constructed a quantum point contact switch. A gold-coated nickel wire tip is moved by piezoelectrics (as in a scanning tunneling microscope) next to a gold surface. Moving the tip by 2 angstroms is sufficient to switch the conductance, which may be occurring through a single atom.

From disorder comes more light

Successful applications of polymeric light-emitting diodes (LEDs) depend on how the polymers themselves are synthesized. Poly(*p*-phenylene vinylene) (PPV), which is often used as the light-emitting layer, is typically made in the highly crystalline transform, which can make it difficult to cast as a film and which can limit luminescence. Son *et al.* (p. 376) report a synthetic route that increases chain flexibility by introducing cis linkages. The LEDs produced with this material show good efficiency and produce uniform films that can support much higher current densities than conventional PPV LEDs.

Cool but sensitive

Although pollen records, snow line reconstructions, and isotopic data have indicated that tropics experienced significant cooling during the last glacial maximum (LGM), recent sea-surface temperature reconstructions have indicated that the tropics changed little in tem-

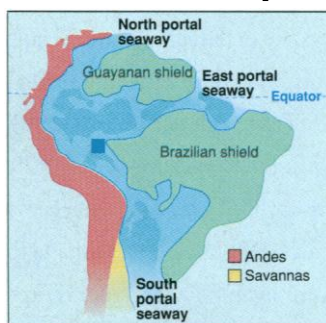
Protein functions in Huntington's disease

In Huntington's disease (HD), a dominant neurodegenerative disorder, one copy of the *Hdh* gene for the protein huntingtin contains an extended CAG repeat, which elongates the protein's polyglutamine amino terminal. This defect could lead to a loss of function (interference with the normal protein) or gain of new functions. Duyao *et al.* (p. 407) inactivated the murine homolog, *Hdh*, and found that heterozygous mice were phenotypically normal, whereas homozygous mice died at a stage of embryonic development preceding formation of the nervous system. These results suggest that the HD defect in human disease involves a gain of function.

perature. Stute *et al.* (p. 379) analyzed noble gases in carbon-14-dated ground water from the Brazilian lowlands and conclude that this region was more than 5°C cooler during the LGM. The Americas between 40°N and 40°S apparently experienced similar cooling effects.

Amazonian seaways

During the late Miocene (about 8 to 10 million years ago), sea level was higher in South America, and portions of the interior of the continent were flooded. Räsänen *et al.* (p. 386);



see the Perspective by Webb, p. 361) present evidence that fine-grained rock deposits at Acre in Amazonian Brazil are tidal in origin, rather than fluvial deposits from the nearby Andes. The grain deposition patterns are indicative of the ebb flow of tides, and marine fossils, including a shark tooth fossil, were found. Flooding by an interior seaway introduced marine spe-

cies into the Amazon river system, which has more marine-derived species than other comparable river systems today.

Means to the ends

Telomeres, which stabilize the ends of eukaryotic DNA, contain highly repetitive DNA sequences synthesized by the ribonucleoprotein telomerase. Cohn and Blackburn (p. 396) have reconstructed in vitro the telomerase activity from two yeasts, *Saccharomyces castellii*, whose telomeres have a regular sequence, and *S. cerevisiae*, which has irregular telomere sequences. The *S. cerevisiae* activity can be reproduced without the normally required *EST1* gene; the slow rates and high stalling frequency may account for its sequence irregularities.

Scanning for virulence

A rapid means of identifying new genes responsible for bacterial virulence has been developed by Hensel *et al.* (p. 400). An insertional mutagenesis scheme tags transposon mutants of an organism (in this case, *Salmonella typhimurium*) with an identifying DNA sequence. The mutants are pooled and used as an inoculum for mice. Comparison of DNA extracted and am-

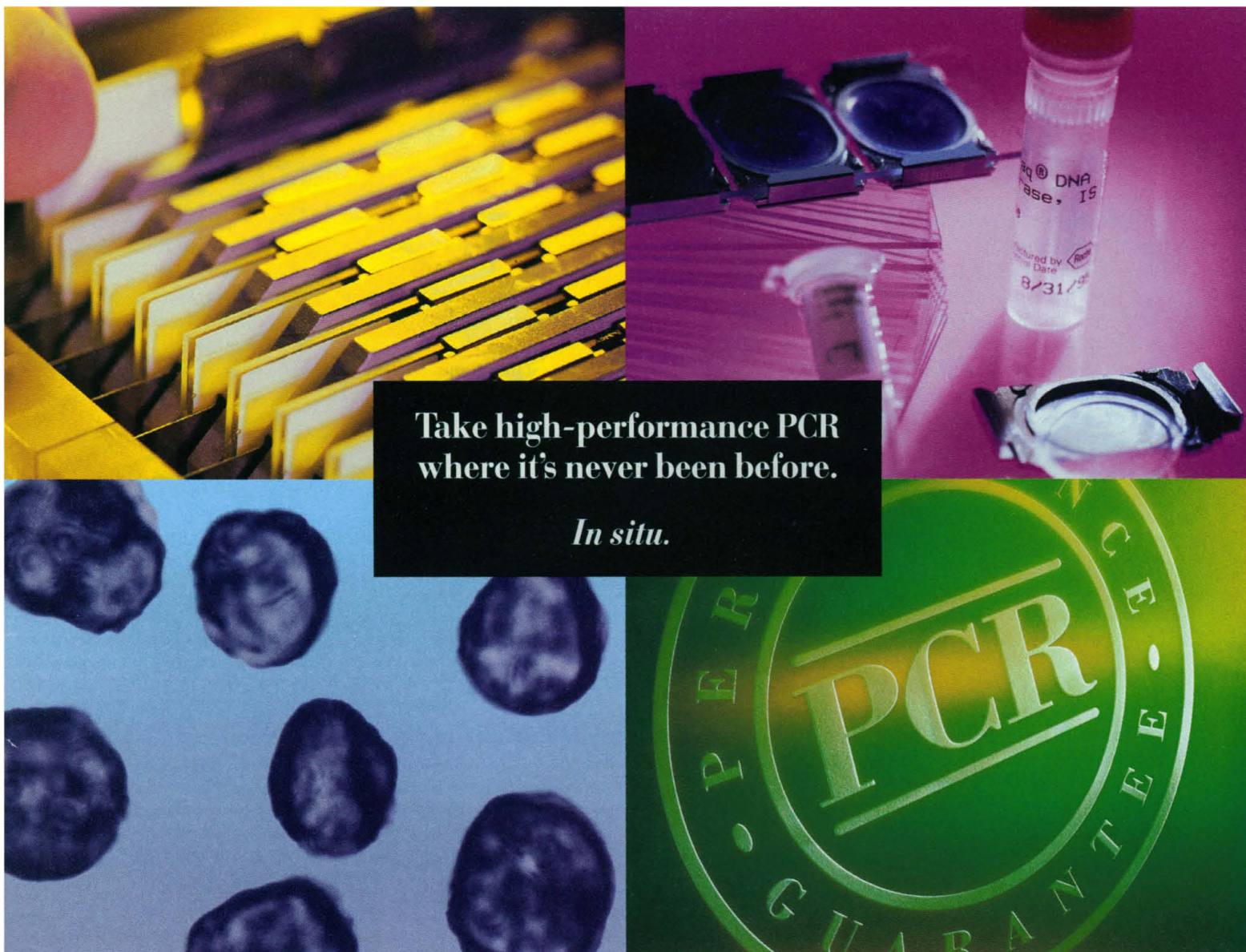
plified from mutants in the inoculum versus those in the spleen of the mice 3 days after injection allowed new virulence genes outside the *inv/spa* family to be identified.

Altogether now

Environmental stress, growth factors, and cytokines stimulate increased expression of the immediate-early genes such as *c-fos*. This gene expression is mediated by the binding of the ternary complex factors (TCFs) with the serum response factor at the serum response element. Whitmarsh *et al.* (p. 403) show that one tcf protein, Elk-1, is phosphorylated by both the JNK and ERK groups of mitogen-activated protein (MAP) kinases. This phosphorylation activates DNA binding, ternary complex formation, and transcriptional activation. Thus, Elk-1 phosphorylation integrates the MAP kinase signaling pathways and the response to various stimuli.

Finding the synapse

At the neuromuscular junction, neurons contact muscle cells in specialized regions, the synapses. Martin *et al.* (p. 413; see the Perspective by Hall, p. 362) examined how particular molecules are specifically localized to the synapse. By making chimeric molecules from two laminins (proteins found in the extracellular matrix which joins cells together), one of which is localized at the synapse and one of which is not, they identified a region of the protein that is required for the correct targeting of the protein to the synapse. Furthermore, the region involved contained a tripeptide sequence to which motor neurons are known to adhere.



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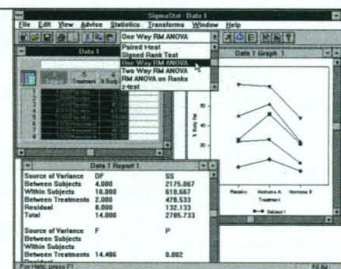
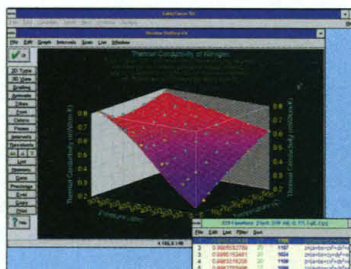
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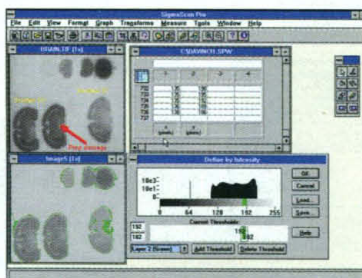
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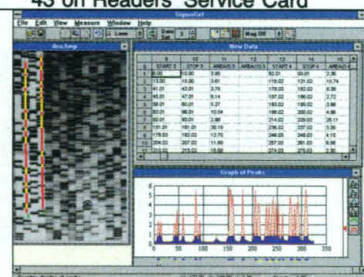
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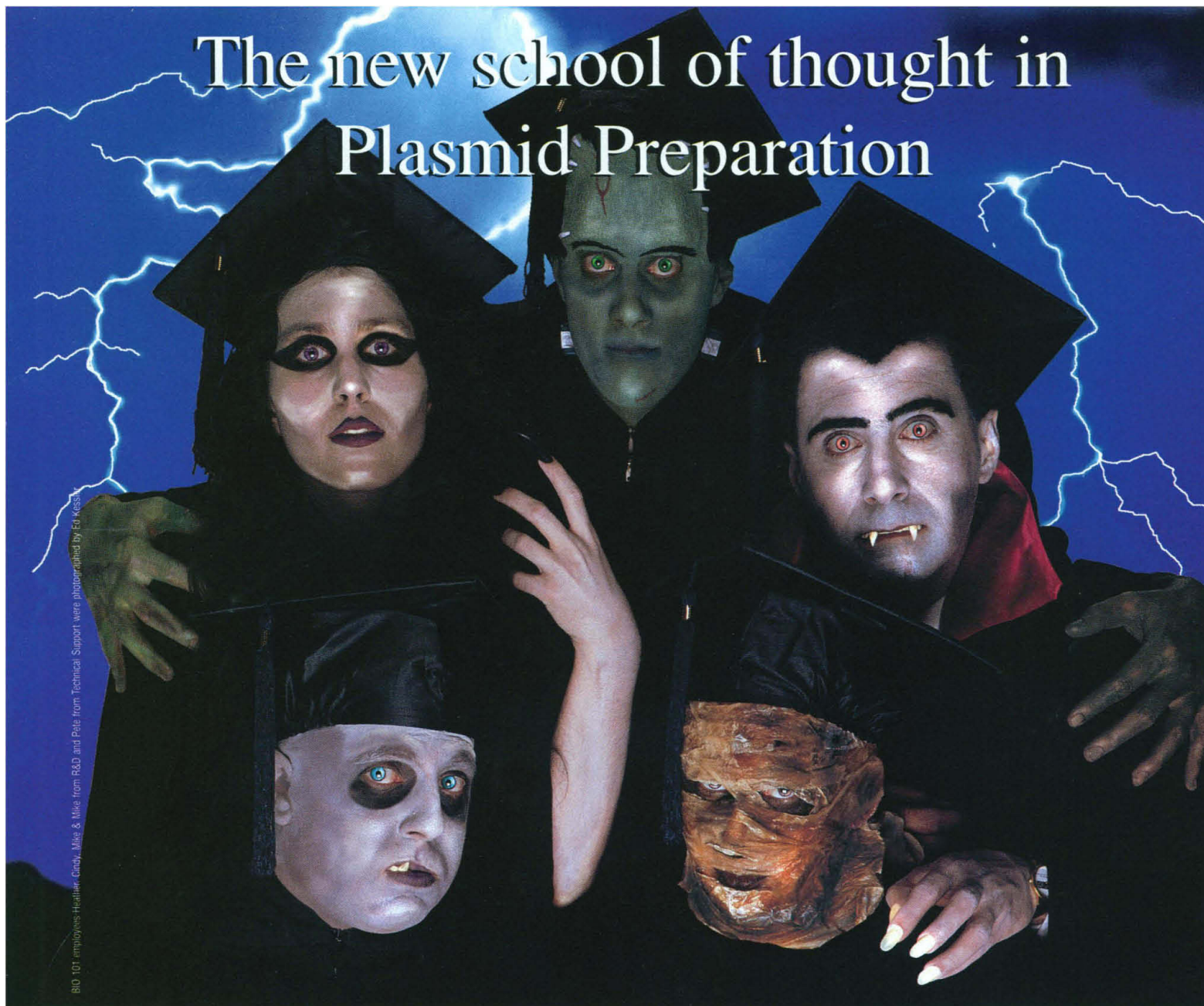
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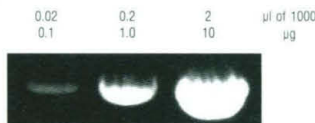
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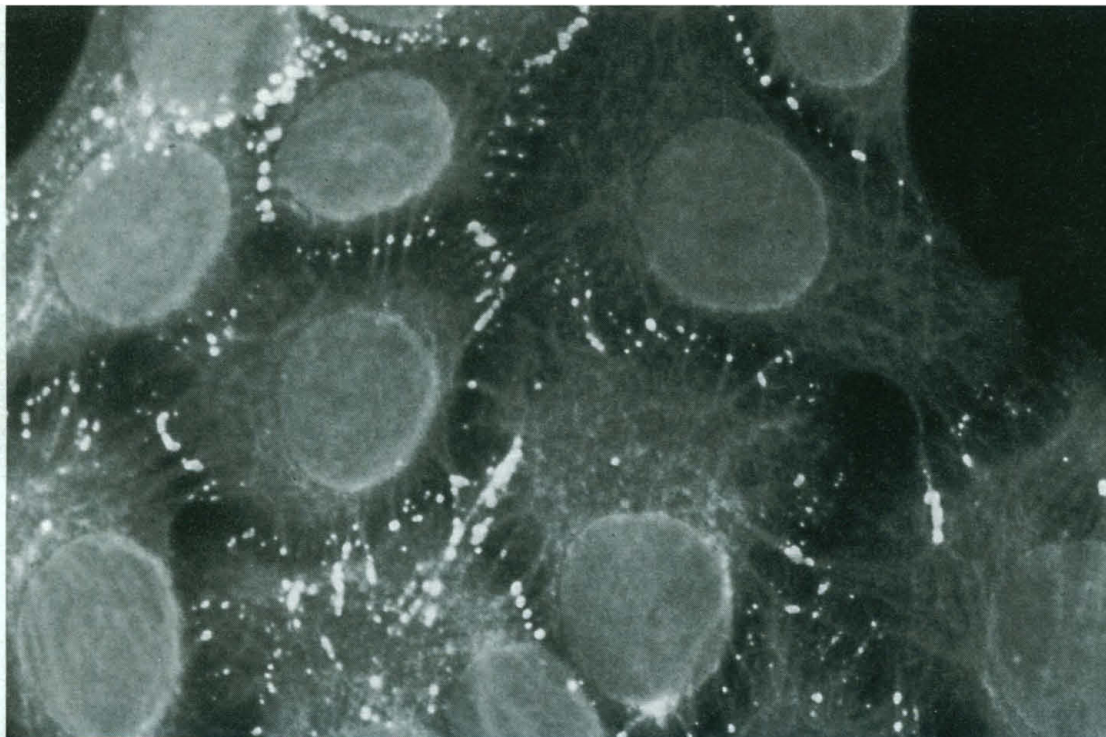
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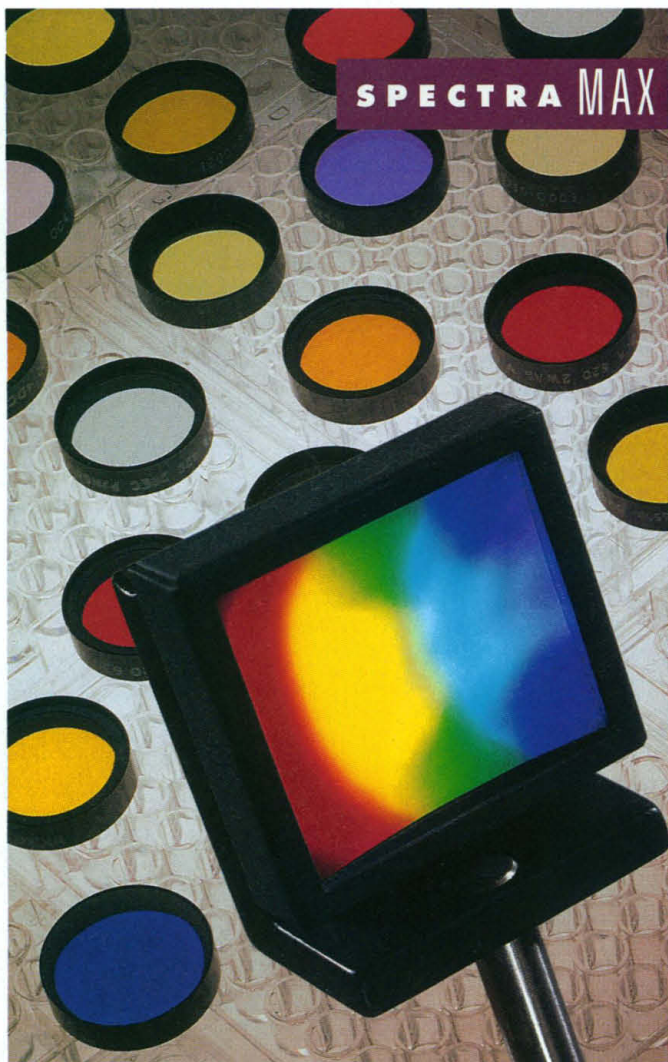
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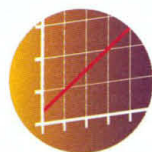
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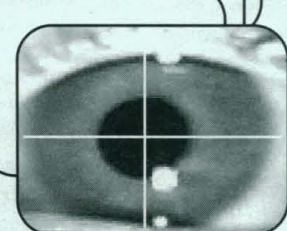
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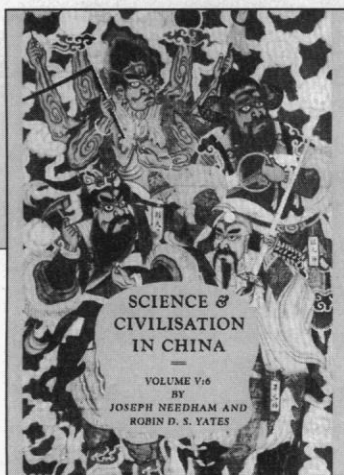
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