American Association for the Advancement of Science

SCIENCE

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Seattle, Washington
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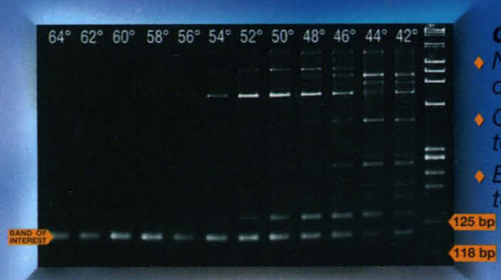

EXPERIMENTAL DETERMINATION OF OPTIMAL ANNEALING TEMPERATURE
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*U.S. Patent No. 5,525,300
Patents pending

† Practice of the patented Polymerase Chain Reaction (PCR) process requires a license. Stratagene's thermal cycler is an Authorized Thermal Cycler. Its use with Authorized Reagents provides a limited PCR license in accordance with the label rights accompanying such reagents. It may also be used with PCR licenses available from The Perkin-Elmer Corporation.

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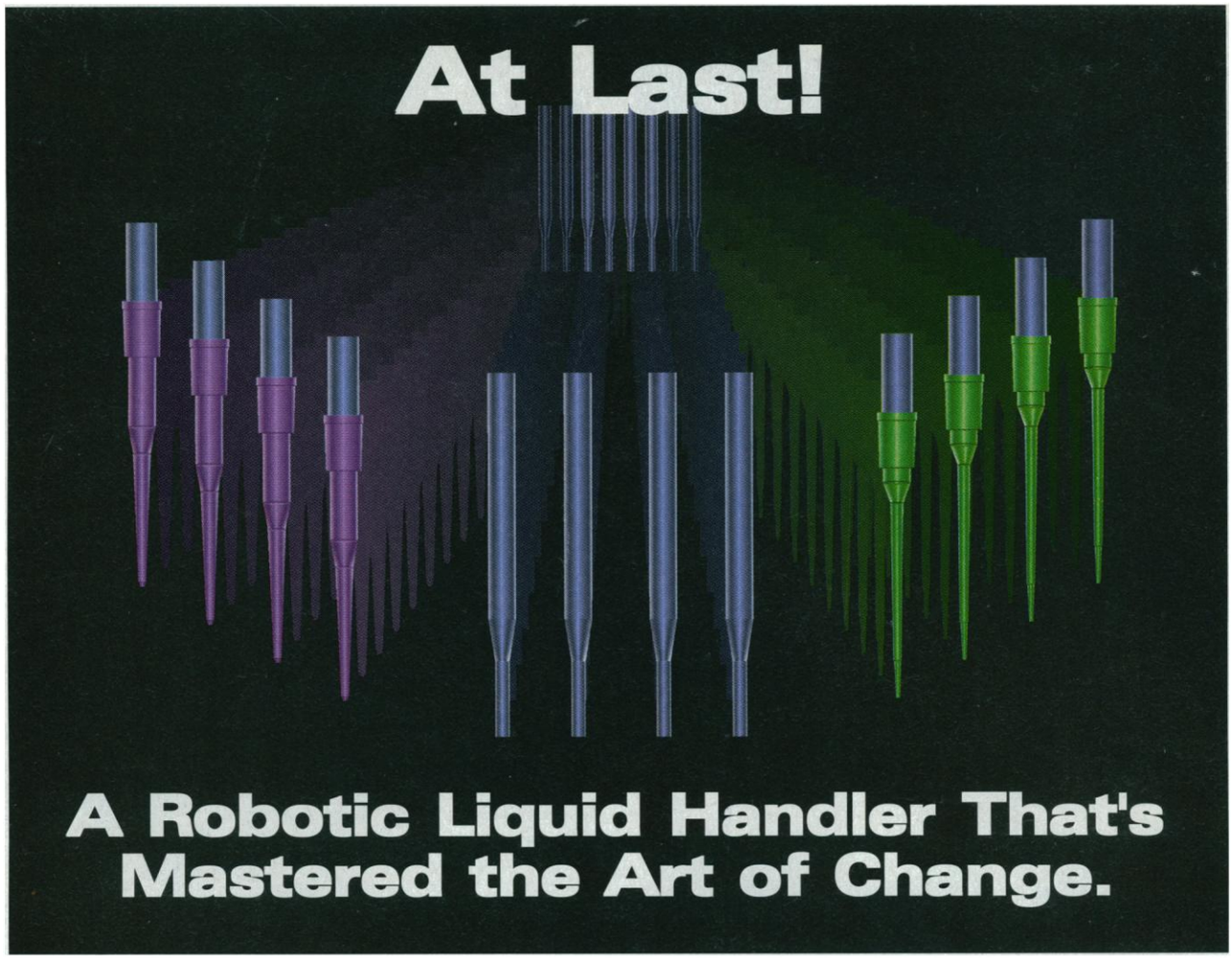

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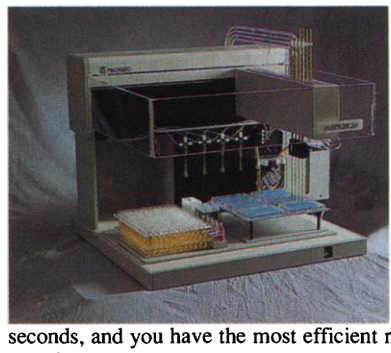

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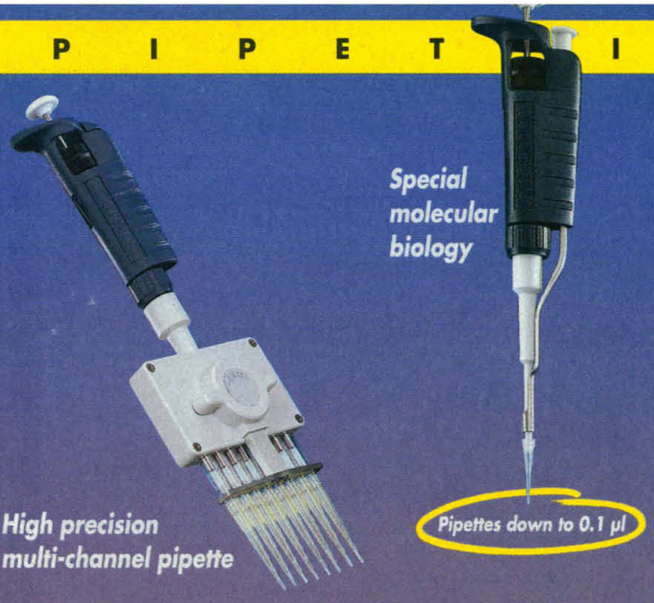

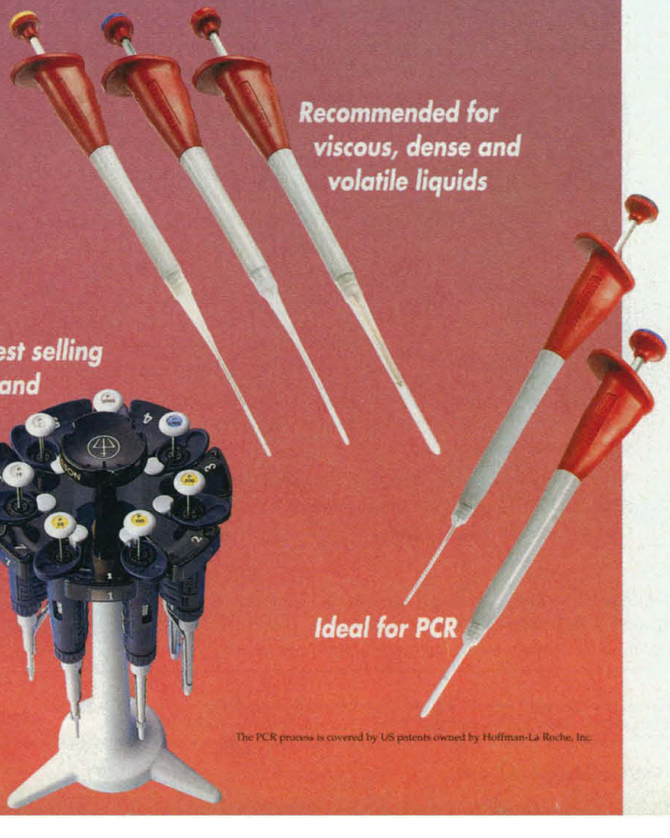

The PCR process is covered by US patents owned by Hoffman-La Roche, Inc.

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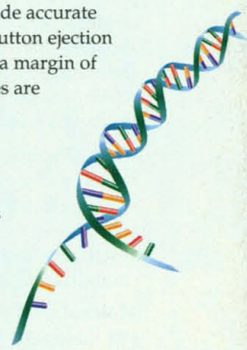

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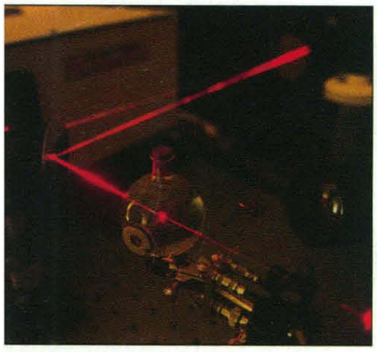

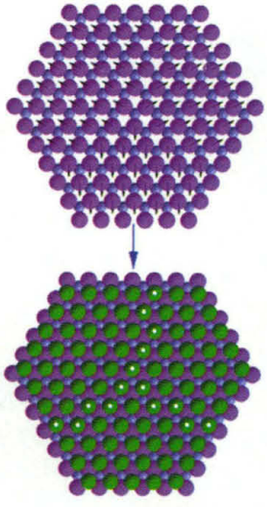

NEWS & COMMENT

RESEARCH NEWS

PERSPECTIVES

POLICY FORUMS

REPORTS

DEPARTMENTS

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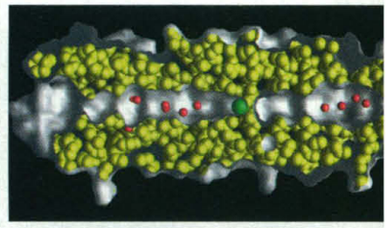
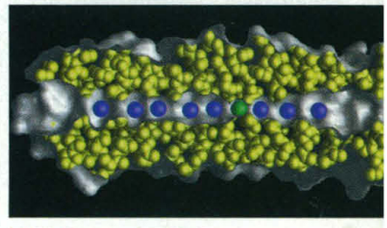
COVER

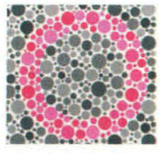
"Engaging Science—Sustaining Society" is the theme for the 1997 American Association for the Advancement of Science Annual Meeting and Science Innovation Exposition in Seattle, Washington, from 13 to 18 February. Researchers from diverse disciplines will discuss new knowledge and what is to come, not only scientifically but with regard to the relation of science and society. See page 807 for a complete program with registration and hotel forms. [Exterior images: Seattle-King County Convention and Visitors Bureau. Interior image: AAAS]

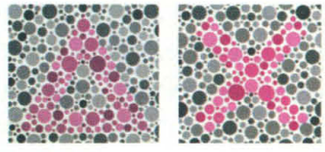




738 & 761
An (ion) channel?

801
Color-blind?





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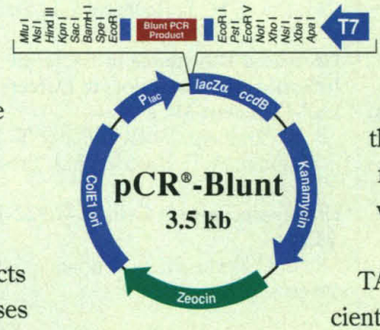

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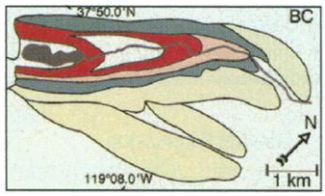
THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Ice age in California

During the last glaciation, North American ice sheets periodically became unstable and discharged numerous icebergs. These Heinrich events are associated with rapid (1000-year) changes in air and sea surface temperatures recorded in the Greenland ice cores. Benson *et al.* (p. 746) and Phillips *et al.* (p. 749) show that similar rapid oscillations in climate occurred



in the western United States and were roughly coeval with the Heinrich events. They correlate a detailed record of climate changes and local glacial conditions inferred from cores from Owens Lake in eastern California with variations in the extent of mountain glaciers in the Sierra Nevada.

■

Times to relax

When supercooled liquids or polymers are perturbed externally, the return to the original unperturbed state occurs over a spread of relaxation times. This effect could arise through a heterogeneous response, with local domains relaxing at different times, or to an intrinsic complexity in an overall homogeneous response. Schiener *et al.* (p. 752) present direct evidence for a heterogeneous response in the relaxation of supercooled liquids. By selectively modifying the dielectric loss spectrum, they show that spectral holes can be created, leading to characteristic changes in the dielectric response.

STM-induced phase change

A scanning tunneling microscope (STM) study of the surface of the 2H phase of $TaSe_2$, a material that exhibits weak charge density waves (CDWs), revealed a surprising result. Zhang *et al.* (p. 757) found that at 4.8 kelvin a low-voltage pulse induced a phase transition that produced surface nanocrystals of the 1T phase, which exhibits strong CDWs. The phase change could extend more than 100 nanometers, a distance much greater than that localized by the tip. The authors suggest that correlated motions of the top layer of Se atoms shift the Ta coordination from trigonal prismatic to octahedral.

NF-κB and apoptosis

Tumor necrosis factor–α (TNF-α) is a major cytokine present at sites of inflammation and can induce cell death through apoptosis. Three reports by Beg and Baltimore (p. 782), Wang *et al.* (p. 784), and Van Antwerp *et al.* (p. 787) show that certain cells are more resistant to the apoptotic signal because TNF-α also stimulates the production of nuclear factor–κB (NF-κB) (see the news story by Barinaga, p. 724). Cells that were made deficient in NF-κB lost their resistance and underwent cell death. Specific inactivation of NF-κB may prove helpful in the design of more effective strategies for the treatment of tumors and chronic inflammation.

■

Stealing equipment

How bacterial pathogens invade cells of their hosts is not well understood. Ireton *et al.* (p. 780) found that the invasion of cells by *Listeria monocytogenes*, a bacterium that can cause food-borne infections in humans, requires the activity of the host enzyme phosphoinositide 3-kinase (PI 3-kinase). It is not clear how PI 3-kinase or its products contribute to the invasion process, but the enzyme is implicated in control of the cytoskeleton, phagocytosis, and endocytosis. The invading bacteria may commandeer the host cells' own apparatus that is normally used for endocytosis to gain transport into the cell.

■

NO blocker

Nitric oxide is a critical messenger molécule in many biological processes, and its activity is regulated by the enzyme that makes it, nitric oxide synthase (NOS). Jaffrey and Snyder (p. 774) have identified a 10-kilodalton protein that binds to the neuronal form of NOS and inhibits its activity, most likely through destabilization of the active NOS dimer. This protein, called PIN, is one of the most conserved in nature and conceivably could regulate many processes through its dampening effect on NOS.

■

Coordinating day and season

The *early-flowering* (*elf*) mutants in *Arabidopsis* cannot coordinate flowering with changes in the length of days. Hicks *et al.* (p. 790) found that daily rhythms of the *elf3* mutants are also disrupted. Analysis of leaf movements and gene transcription showed that circadian rhythms in *elf3* mutants persist normally in constant darkness but fail in constant light. The *elf3* mutation thus indicates a point in common between mechanisms sensing day length and circadian rhythms.

■

Overactive B cells

Antibody production by B cells is initiated by antigen interactions with the B cell antigen receptor, which then sets off a cascade of protein tyrosine phosphorylation events. One surface glycoprotein that undergoes phosphorylation, CD22, is critical for controlling antigen responsiveness. O'Keefe *et al.* (p. 798) show that B cells from the spleen of mice lacking CD22 respond to lower than normal antigen concentrations. They suggest that CD22 is a negative regulator of B cells that helps them respond to foreign antigens and avoid autoimmune responses.

■

Color chart

Red-green color blindness comes in a variety of shades—the ability to discriminate color in deuteranomalous individuals ranges from almost normal to severely limited. From a molecular analysis of individual genes encoding the visual pigments, Neitz *et al.* (p. 801) find that a specific aspect of the genetics serves to predict the behavioral outcome. The key lies in the amount of divergence between spectral sensitivities of the pigments in any one person. As the divergence that results from shuffling of the specific available mutations increases, the ability to discriminate color approaches normal.

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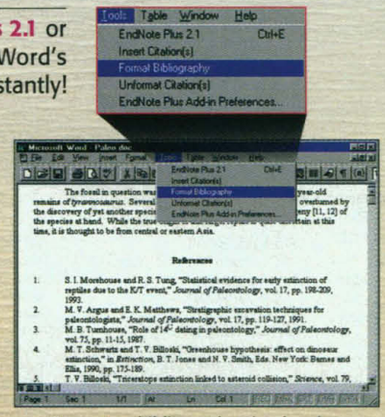

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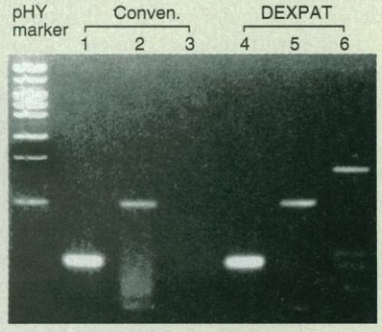
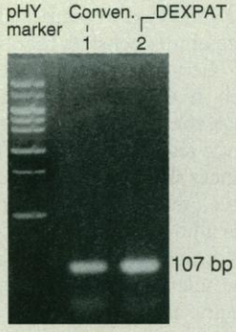
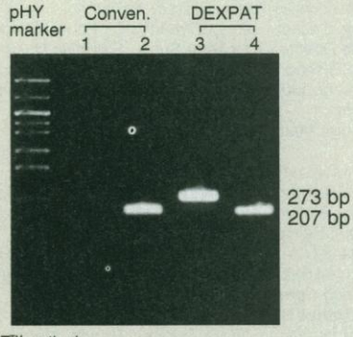


2. Amplification of K-*ras* 12 (107 bp)



3. Amplification of p53 exon5 (273 bp) and p53 exon6 (207 bp)



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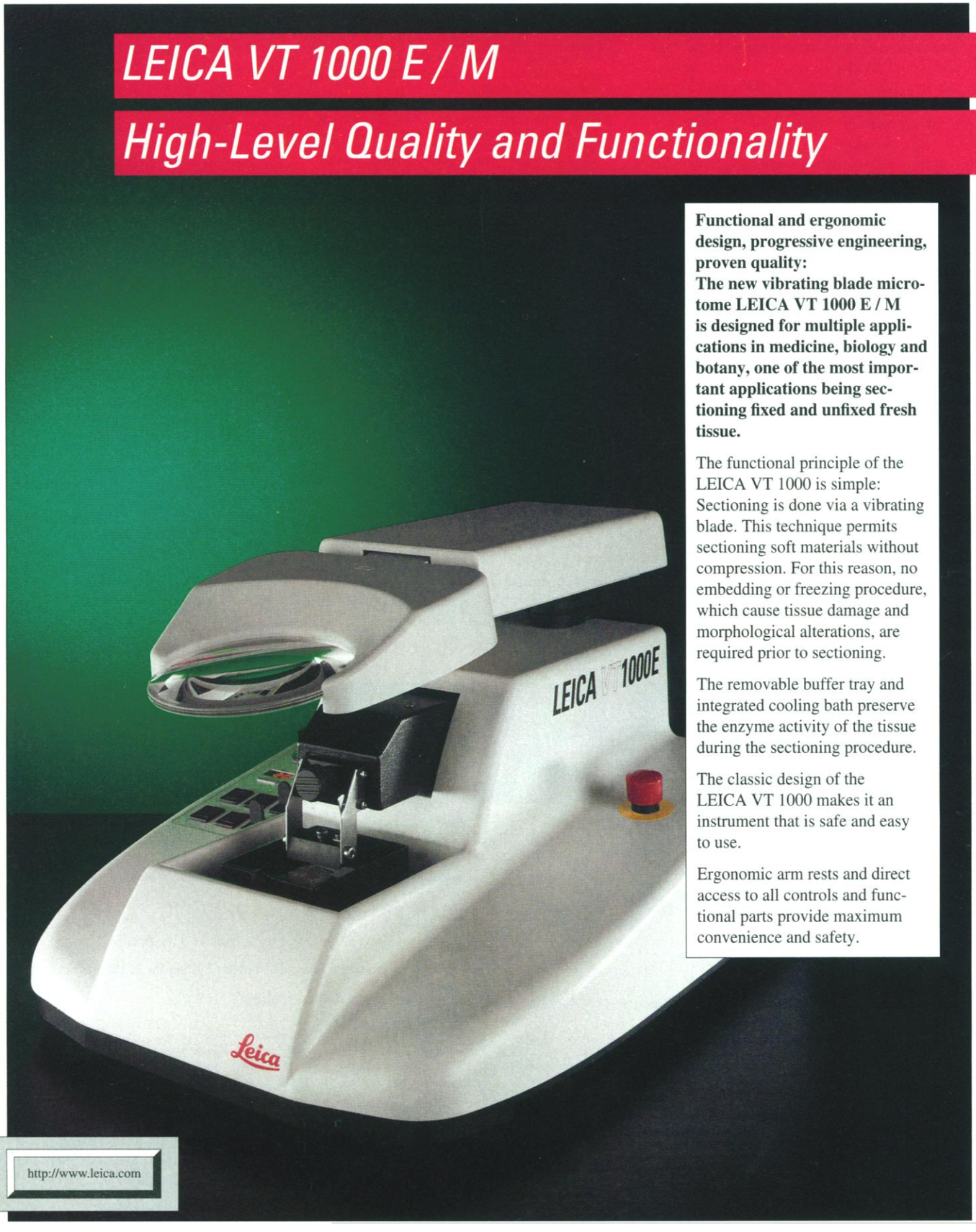

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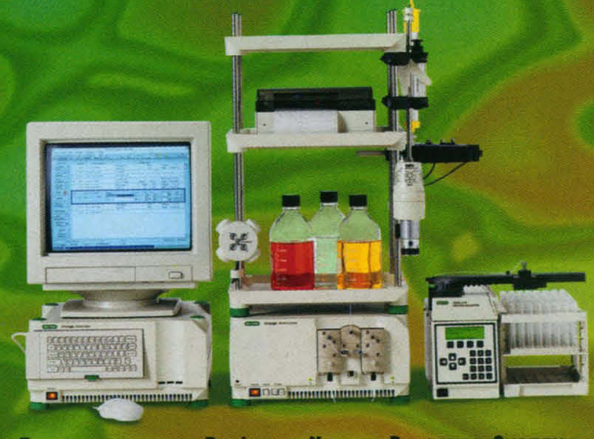

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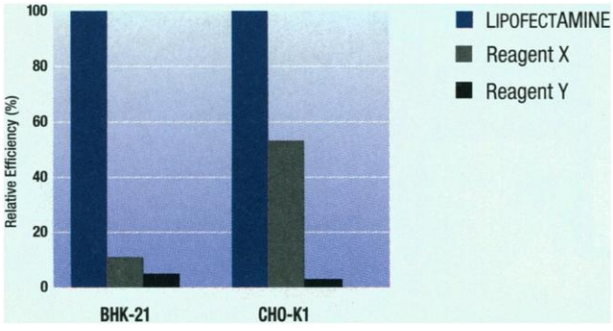

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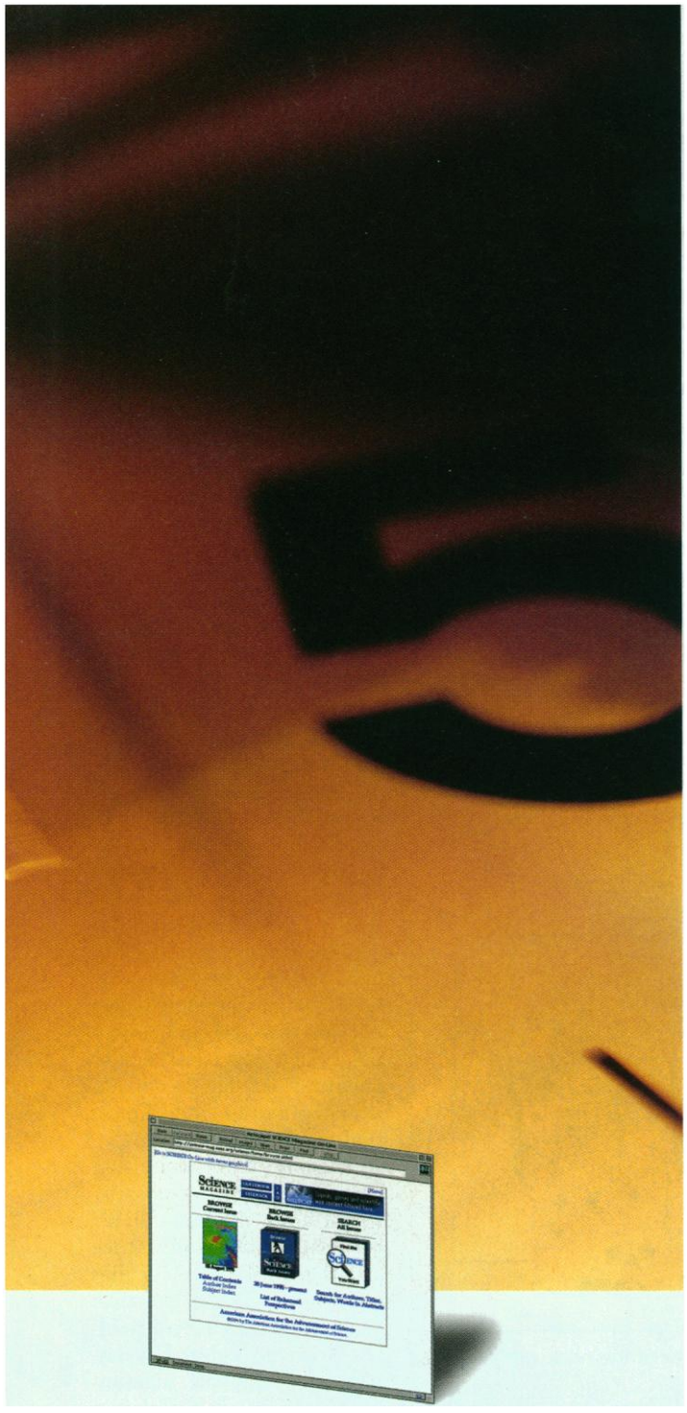

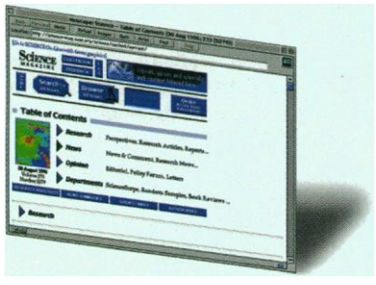

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