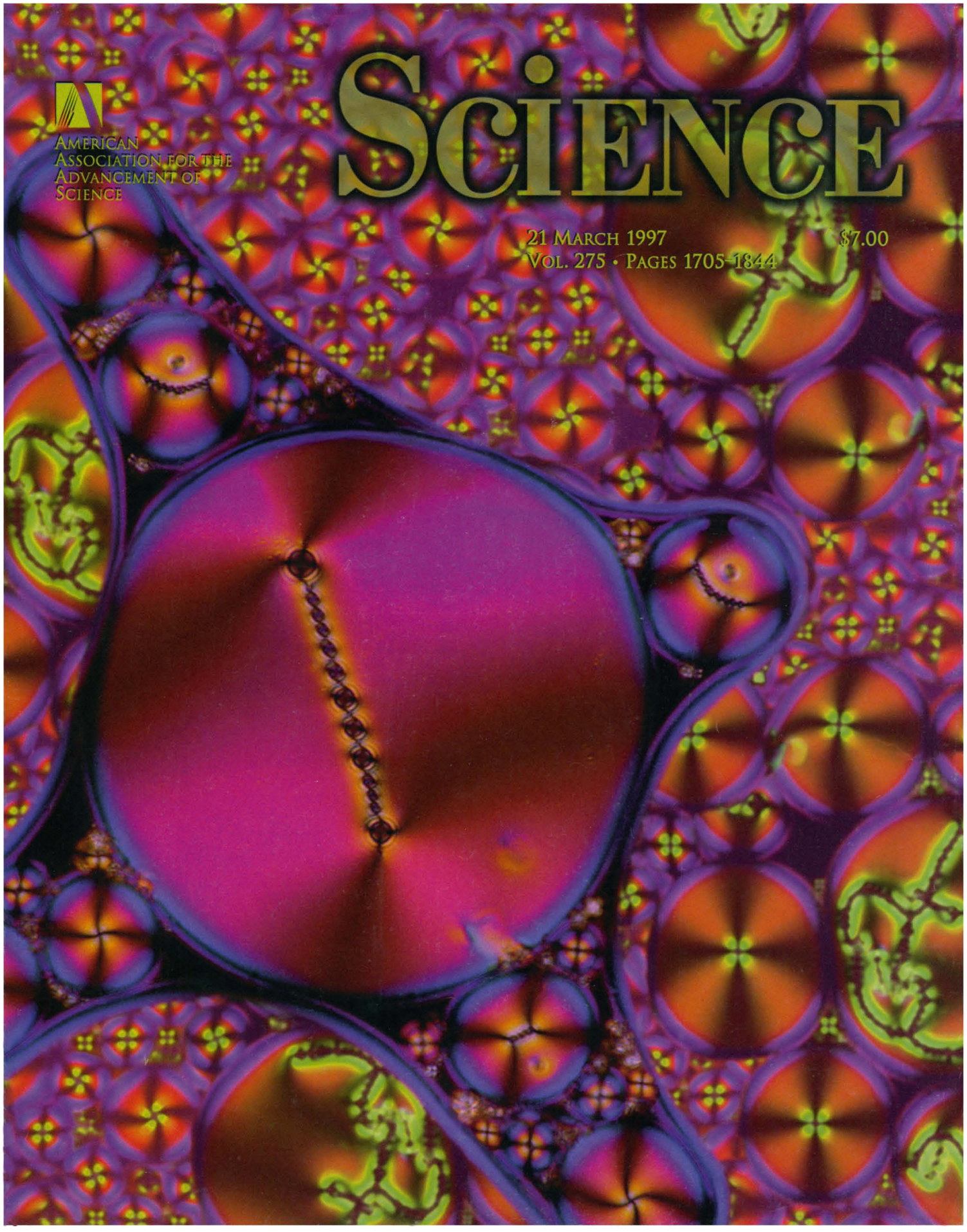
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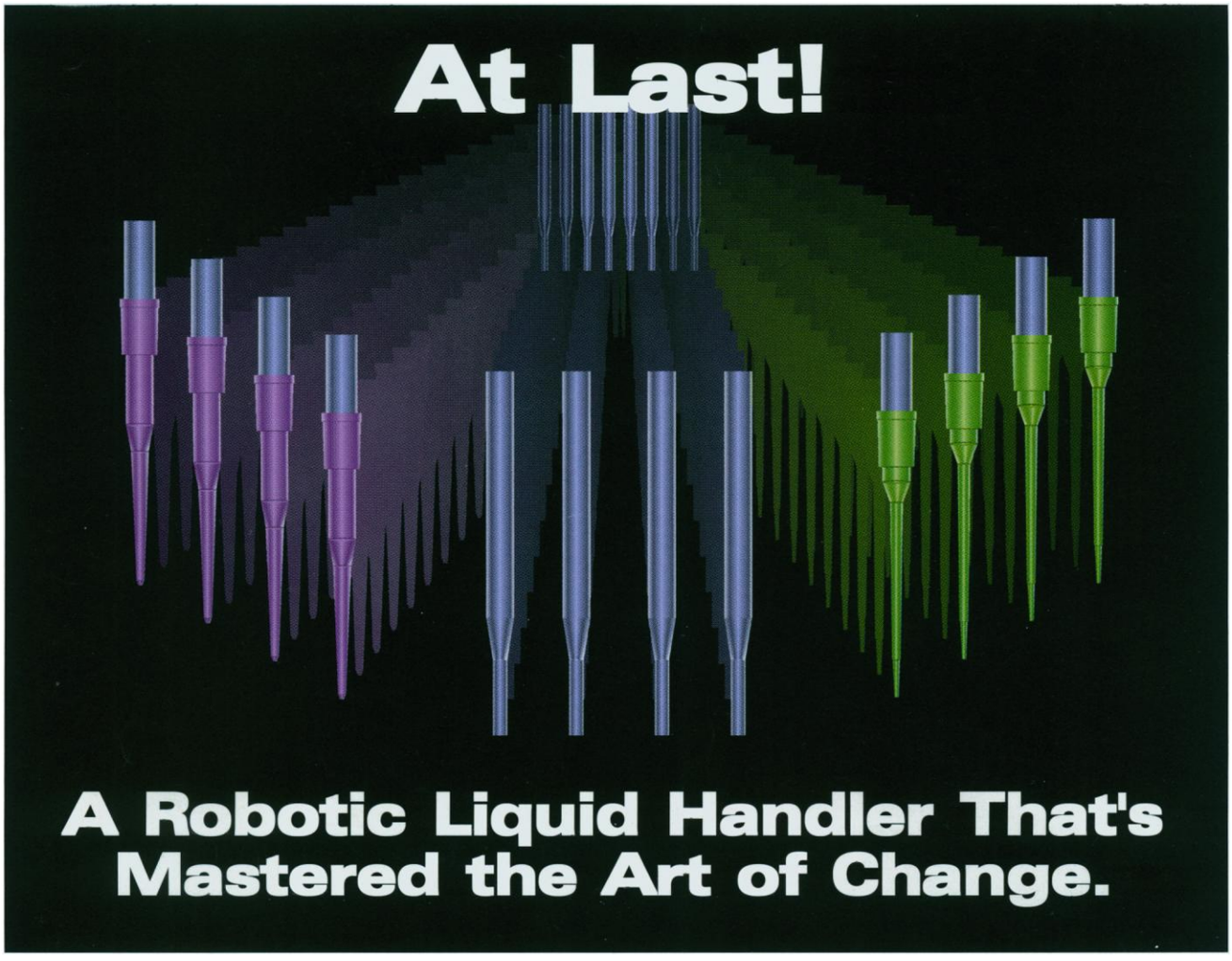

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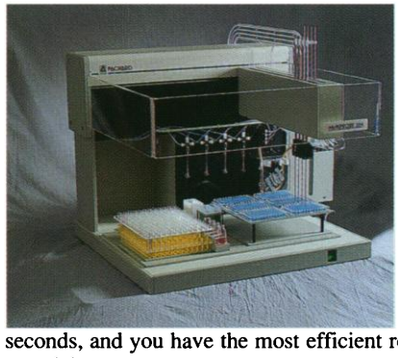

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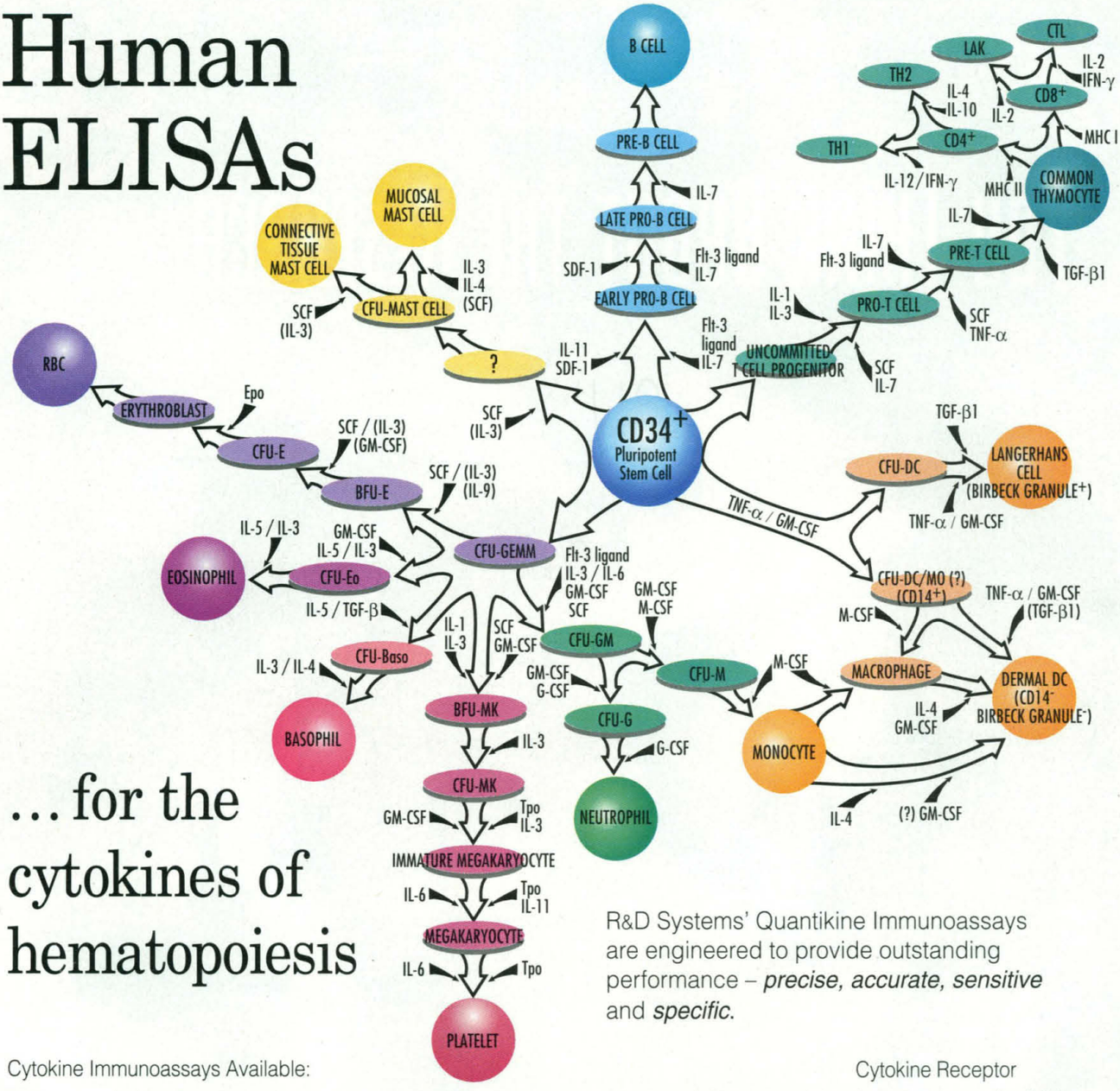

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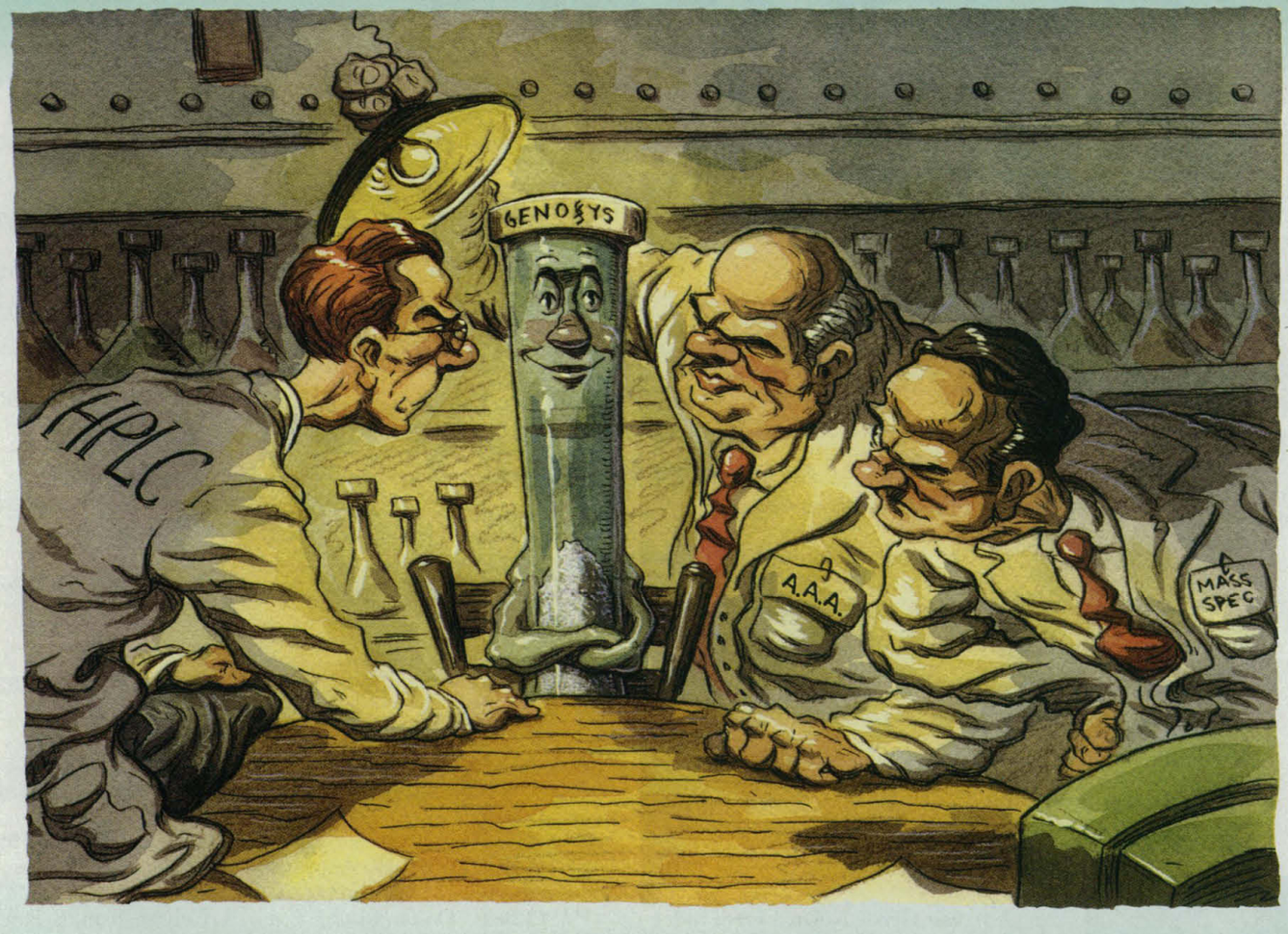

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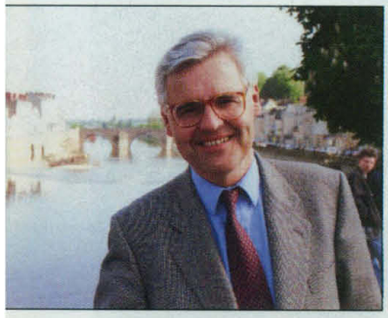

1728
Calling the shots for French science

1776
Climate smoke signal

NEWS & COMMENT

RESEARCH NEWS

PERSPECTIVES

POLICY FORUM

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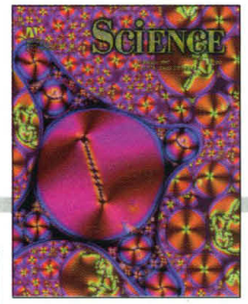
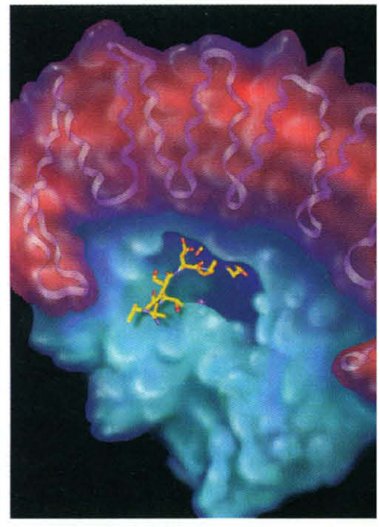
COVER

Collage, obtained with a microscope and cross polarizers, of a multiple emulsion of water droplets in larger drops of a nematic liquid crystal. The nematic appears colored, and the water droplets appear darker. The nematic induces novel interactions among the water droplets, causing them to form linear chains and to lie near the center of the nematic drops (central droplet, 130 micrometers in diameter). See page 1770 and the related Perspective on page 1751. [Image: P. Poulin, H. Stark, T. C. Lubensky, D. A. Weitz, and F. Macera]



RESEARCH ARTICLE

REPORTS



1750, 1796, & 1800
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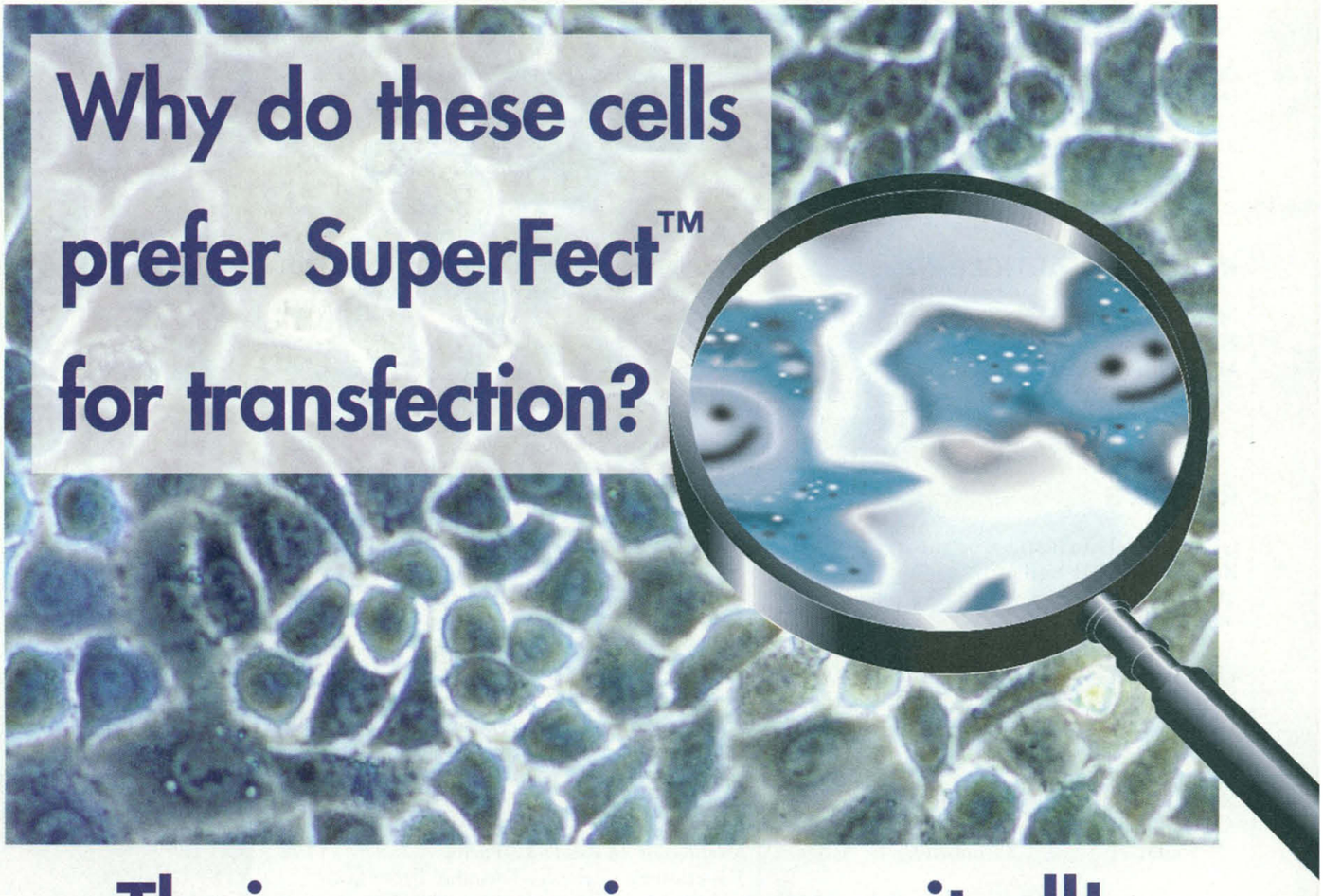
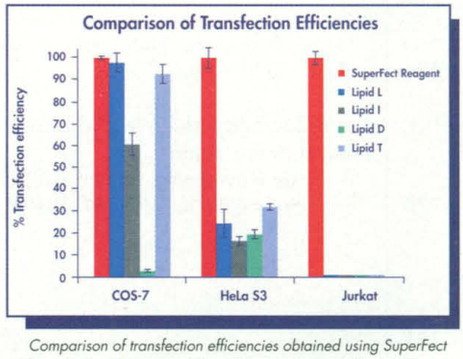


Their expression says it all!



Comparison of transfection efficiencies obtained using SuperFect Transfection Reagent and four of the most commonly used liposome reagents. COS-7, HeLa S3, and Jurkat cells as indicated were transfected in 96-well format. Transfection efficiencies are given as percentages relative to the transfection efficiency obtained with SuperFect (100%).

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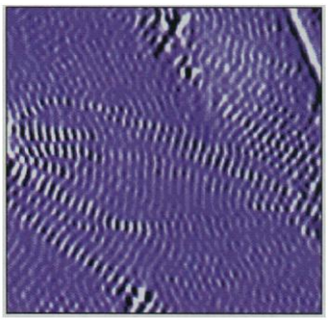
Parity violations

In 1957, it was found that nuclear beta decay exhibited parity violation, which showed a fundamental process could produce unequal numbers of particles that display left and right handedness (such as in their spins). It was also predicted that parity violations and electrical charges would lead to an "anapole" moment in atomic nuclei. Wood *et al.* (p. 1759; see the Perspective by Haxton, p. 1753) measured the parity-violating transition in cesium atoms and hence the anapole moment with a precision that should allow tests of the standard model of particle physics.

■

Giant waves

The conduction electrons within a solid can redistribute themselves in response to charged defects. This effect, called screening, leads to long-range Friedel oscillations in the charge density. Sprunger *et al.* (p. 1764) used scanning tunneling microscopy (STM) to study the (0001) surface of beryllium, which they chose because this



surface should behave as a two-dimensional electron gas riding on top of an almost semiconducting bulk solid. Electron density oscillations were observed with the correct wavelength for Friedel oscillations but with usually large amplitudes (so large that the underlying lattice of beryllium atoms cannot be imaged). The large amplitudes suggests that unlike Friedel oscillations, these waves must originate as a many-body effect.

■

Signals from the gatekeeper

The adenomatous polyposis coli (APC) tumor suppressor protein is thought to function as a "gatekeeper" that, through undetermined signaling mechanisms, helps to maintain the proper balance of dividing and dying cells in the colonic epithelium. APC has several binding partners, including β-catenin, a protein that activates transcription mediated by the Tcf/Lef family of transcription factors (see the Perspective by Peifer, p. 1752). Korinek *et al.* (p. 1784) and Morin *et al.* (p. 1787) show that in normal cells, APC down-regulates transcriptional activation by β-catenin and that this critical regulatory function can be circumvented in colon cancer cells by mutations in APC itself or in β-catenin. Related work by Rubinfeld *et al.* (p. 1790) indicates that disruption of this signaling pathway by similar mutational mechanisms may also be important in the genesis of melanomas.

All in a row

Small water droplets dispersed in nematic liquid crystals have been found not to coalesce but to extend into a chainlike structure. Poulin *et al.* (p. 1770; see the cover and the Perspective by Joanny, p. 1751) show that short-range repulsions and long-range dipole attractions interact to produce this effect, which can be modeled in terms of topological defects.

■

Dealing locally

Magnetism and superconductivity can be competing effects in solids; for example, magnetic impurities can dramatically lower the transition temperature into the superconducting state. Yazdani *et al.* (p. 1767) obtained high-resolution differential conductance spectra with STM to study the effects of local magnetic impurities (adsorbed manganese or gadolinium atoms) on a superconductor (niobium metal). Excitations were present in the superconducting gap in a region of a few atomic diameters around the impurity atoms. The spectra are nonsymmetric with respect to electron or hole tunneling, which model calculations show is due to a breaking of time-reversal symmetry.

■

Radiative forcing

The contributions of different atmospheric species to the overall radiation budget of the Earth's atmosphere are the focus of two reports. Valero *et al.* (p. 1773) used in situ data measured from three research aircraft flying in coordinated tracks over the equatorial Pacific to determine the clear sky water vapor greenhouse effect, that is, the radiative forcing of the water vapor in the absence of clouds, as a function of sea surface temperature and height. Hobbs *et al.* (p. 1776) investigated the radiative forcing due to anthropogenically derived aerosols. Airborne measurements in smoke from biomass burning in Brazil indicate that their direct radiative forcing is small compared to forcing caused by greenhouse gases.

■

Influenza virulence

The influenza outbreak of 1918, the "Spanish" flu, was the worst pandemic disease outbreak in history and killed more than 20 million people. Taubenberger *et al.* (p. 1793; see the news story by Pennisi, p. 1739) sequenced viral RNA fragments obtained from a preserved lung sample of an individual whose death occurred at an early stage when influenza virus would still have been present. The analysis suggests that the strain was an H1N1 subtype that is closely related to classic swine influenza virus, as opposed to the avian subgroup. Such sequence data may help in predicting the virulence of future outbreaks.

■

Best viewed naturally

How do neurons represent information? As neuronal output is restricted to firing action potentials, commonly known as spikes, the important parameters are two, the number of spikes and their frequency. Nevertheless, the variation of these as a function of time leads to other important factors, the interspike intervals and the variance of these parameters. Van Steveninck *et al.* (p. 1805) analyzed these parameters in the responses of a visual neuron of a fly when constant (laboratory-like) or varying (naturalistic) images are viewed. Information theoretic measures of these data indicate that the neuron exhibits more reproducible activity and transmits with a much higher signal-to-noise ratio during naturalistic stimuli.

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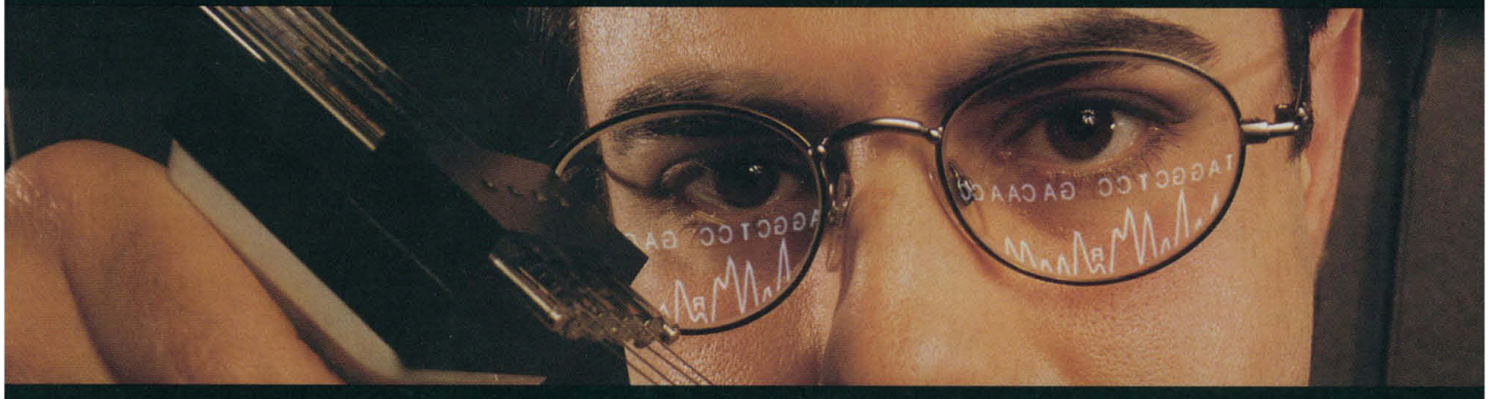

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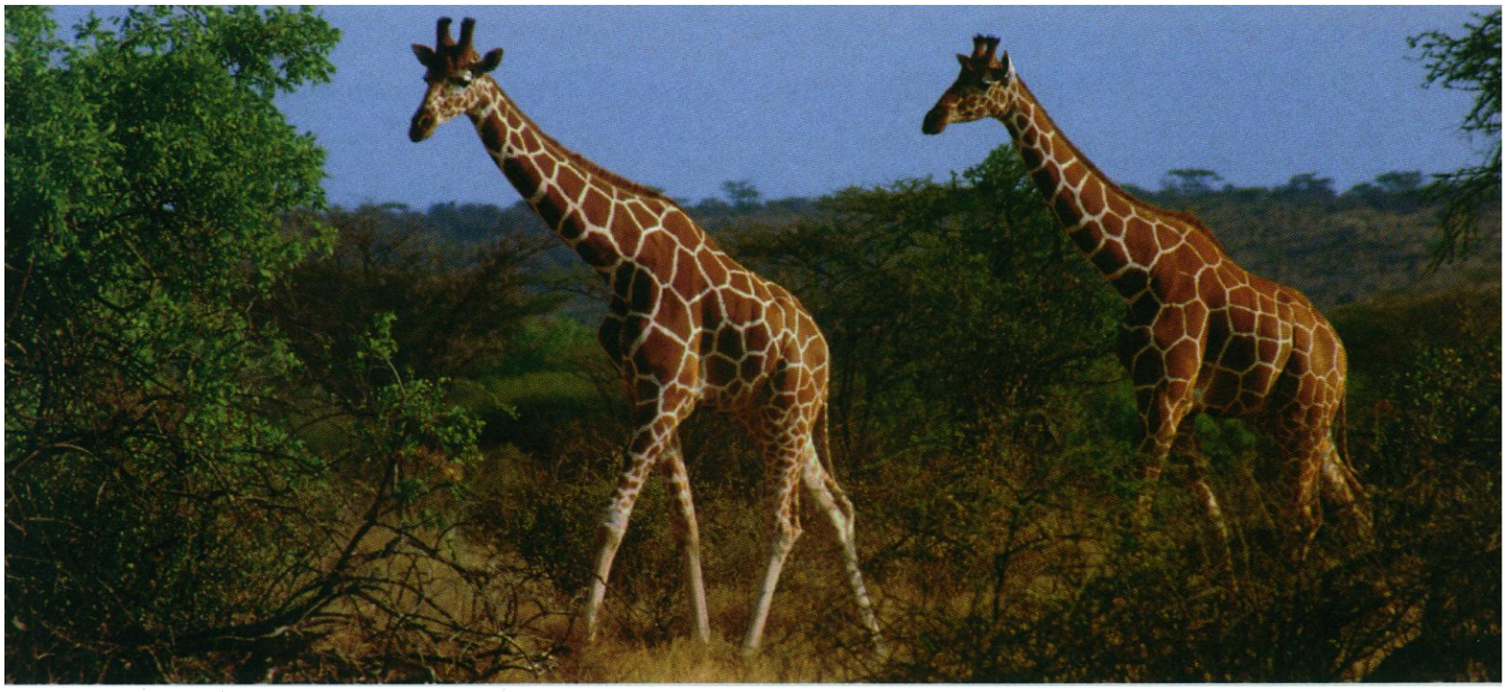

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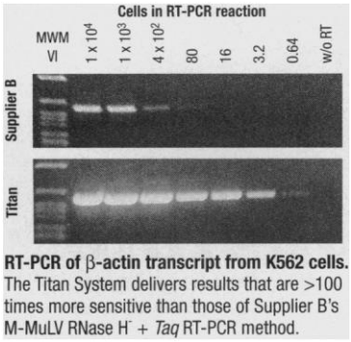

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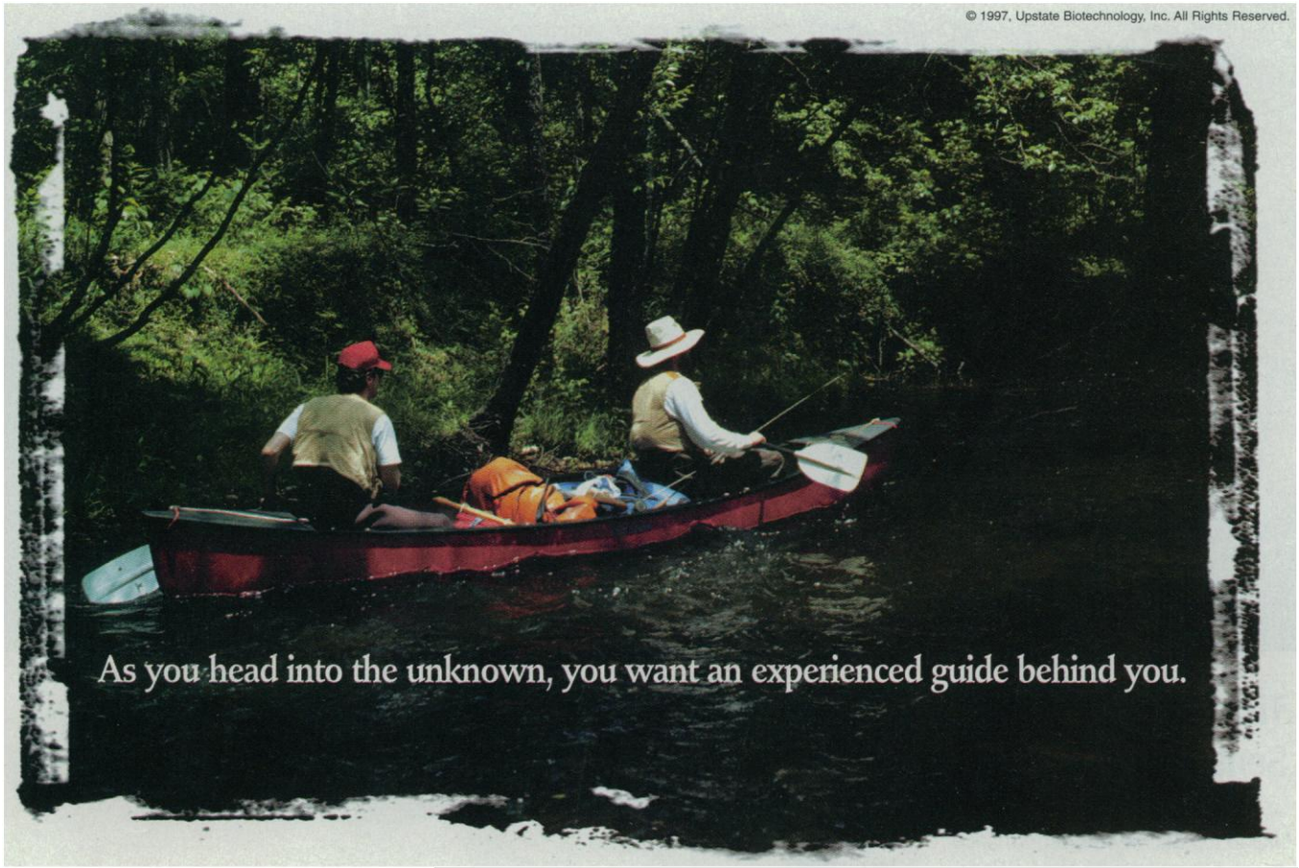

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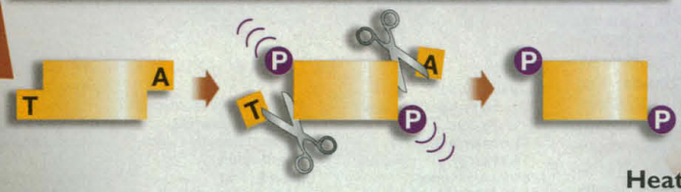

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References

1. Brownstein, J.M., *et al.* (1996) *BioTechniques* **20**, 1004–1010.
2. Magnuson, V.L., *et al.* (1996) *BioTechniques* **21**, 700–709.
3. Novy, R.E., Yaeger, K.W., and Kolb, K.M. (1996) *In**Nova**tions* **6**, 7–11.

*The Polymerase Chain Reaction (PCR) process is covered by patents owned by Hoffmann-La Roche.

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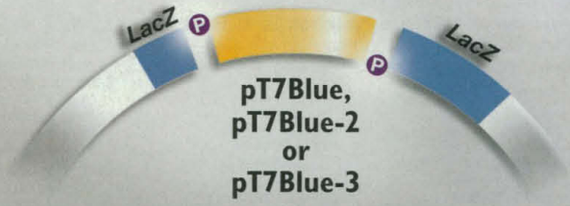

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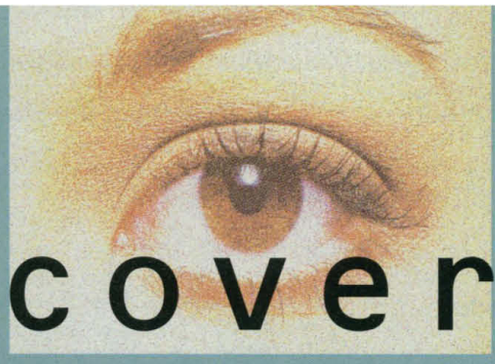

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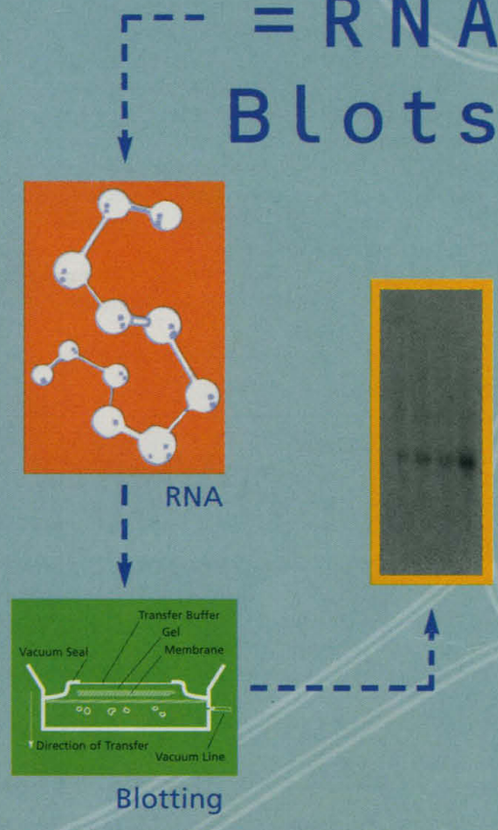

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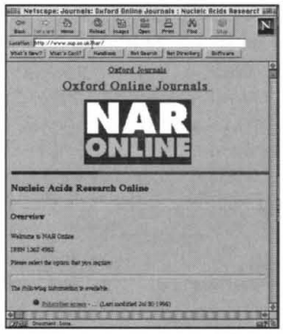

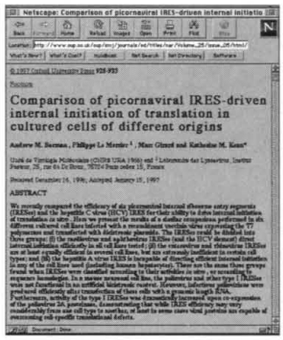

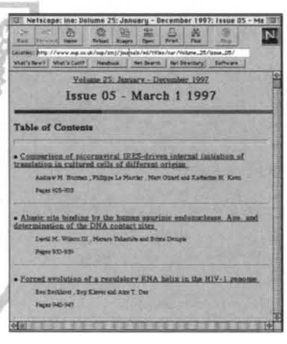

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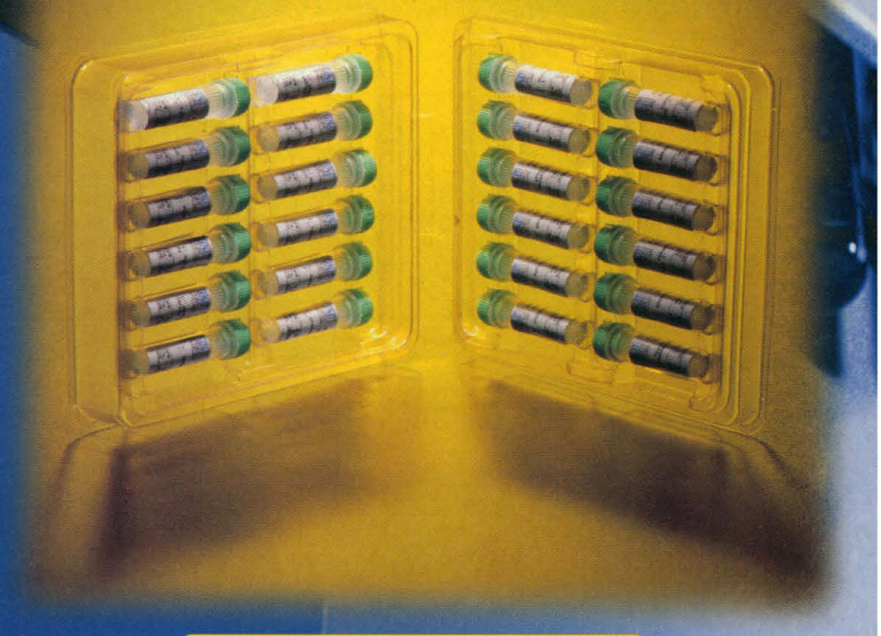

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