



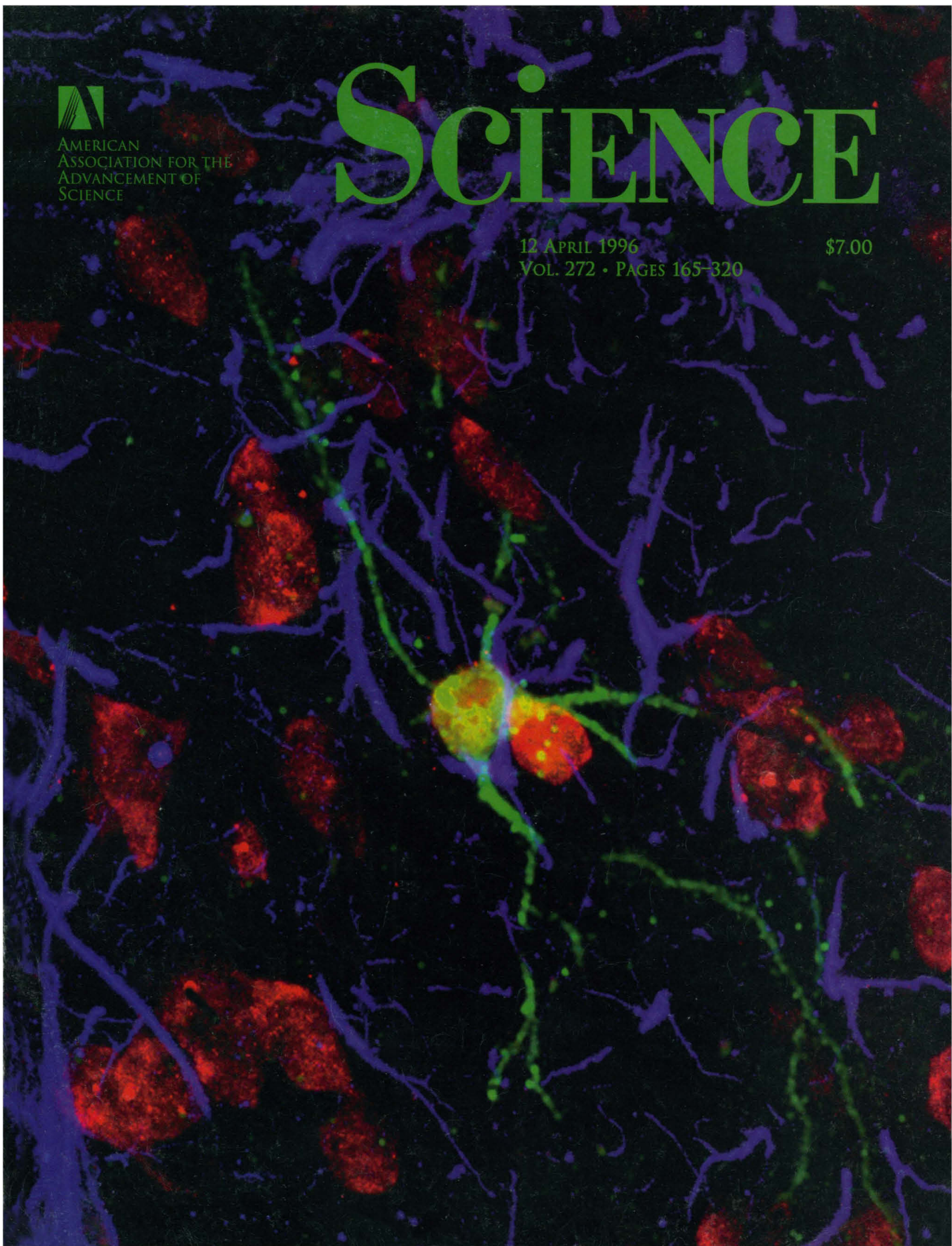
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12 APRIL 1996

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1. Bernard, P. *et al.* (1994) *Gene* 148: 71-74.

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New gene may provide  
clue to aging



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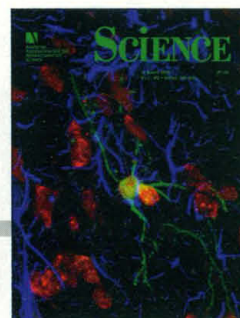
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Confocal microscope image of a section from an adult rat brain injected 4 weeks earlier with a human immunodeficiency virus-based vector expressing  $\beta$ -galactosidase ( $\beta$ -gal). The section was stained by immunofluorescence with antibodies to  $\beta$ -gal (green), the neuronal-specific marker NeuN (red), and the

astrocytic protein GFAP (blue). A  $\beta$ -gal-expressing neuron (doubly stained, yellow) shows that the vector can transfer genes into nondividing cells, a desirable trait in gene therapy. Image width: ~240 micrometers. See page 263 and the related News story on page 195. [Image: U. Blömer and F. H. Gage]



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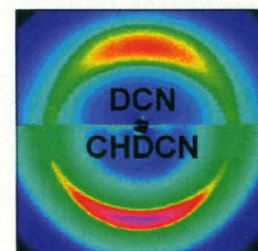
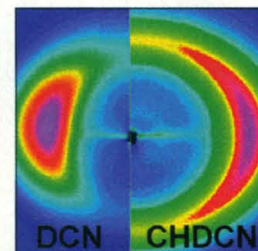
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## Copper chronicles

Greenland ice layers have preserved a record of copper pollution for the last few thousand years. Hong *et al.* (p. 246; see the Perspective by Nriagu, p. 223) have been able to relate the copper concentrations to total atmospheric emissions for different periods, including ancient Roman and medieval Chinese copper production. Early smelting methods were highly inefficient; total copper emissions before the Industrial Revolution were an order of magnitude greater than total emissions since industrialization

## A slow recovery

Efforts to reduce the effects of acid rain have focused largely on reducing emissions of sulfur dioxide. Despite declining sulfate inputs, Likens *et al.* (p. 244; see the news story by Kaiser, p. 198) present data from a long-term study area in New Hampshire which show that stream-water pH has not recovered significantly. Soil inputs of basic cations, such as calcium and magnesium, have been depleted by previous acidification, and inputs from particulate sources in the air have also been reduced. The authors note that even the reductions mandated by 1990 amendments to the Clean Air Act in the United States are unlikely to allow full recovery of these watersheds.

## Fullerenes from space?

Were the fullerenes that have been found at the Sudbury Impact Structure, one of the largest and oldest impact craters, formed before, during, or after the impact event? Becker *et al.* (p. 249) have identified helium (He) within a fullerene from

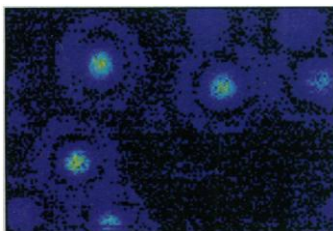
## Little waves in a big hurry

Oceanic Rossby waves represent a large-scale response to wind and buoyancy forcings at the eastern boundaries of continents and the ocean interiors. These waves have been difficult to detect because they propagate very slowly with long wavelengths and small height variations (less than 10 centimeters). Chelton and Schlax (p. 234) used the TOPEX/POSEIDON satellite altimeter to observe Rossby waves for 3 years and have found that these waves travel faster than predicted, implying that the ocean reacts more rapidly than we thought. These observations should help refine models of ocean circulation that are used to define climate variability.

one of their Sudbury samples. Based on the He isotopic ratios and the need for a relatively high He vapor pressure during entrapment of the gas within the fullerene, they suggest that this He-rich fullerene was present in the bolide before impact and therefore has an extraterrestrial origin.

## Individual excitement

Molecular spectroscopy usually averages the individual spectra of huge numbers of molecules. Variations between single mol-



ecules due to their particular environment can be seen at low temperatures or by using near-field probes, but such methods and conditions can perturb the measurement. Macklin *et al.* (p. 255) have performed single-molecule spectroscopy at interfaces at room temperature. Dye molecules were excited with a laser, and their individual fluorescence could be followed over time. The dispersion in the emission spectra and excited-state lifetimes of different single mol-

ecules could be related to their orientation and position relative to the interface.

## Frequency flip

External electric fields can be used to change the ordering of liquid crystals; this effect is used in display technologies. The ordering of liquid crystals is also attractive for controlling materials properties of polymers. Körner *et al.* (p. 252) have developed a nematic liquid crystal whose ordering direction changes by 90° in response to a change in frequency of an applied electric field. The molecules can then be polymerized to lock in the ordering direction.

## Undivided attention

RNA viruses such as murine leukemia virus are used in gene therapy because integration of the target gene into the genome of the host provides the potential of permanent correction of defects. However, integration of the retroviral vector requires a dividing cell line. Lentiviruses, such as human immunodeficiency virus (HIV), are retroviruses that can integrate into the genome of nondividing cells. Naldini *et al.* (p. 263; see cover and the news story by Cohen, p. 195) have used a nonreplicating

HIV vector (a construct defective for producing viral coat and other key proteins) to transfect nondividing cells, including human primary macrophages and rat brain neurons.

## Clues to aging

Patients with Werner's syndrome (WS), an autosomal recessive disorder, prematurely develop many of the diseases associated with aging, and the replication lifetime of cells taken from these patients is shorter than expected for their age. Yu *et al.* (p. 258; see the news story by Pennisi, p. 193) have cloned the gene for WS and have identified four mutations in WS patients. The gene likely encodes a DNA helicase and suggests that defects in DNA metabolism may lead to disease susceptibility.

## Forming new cells

Cells of the yeast *Saccharomyces cerevisiae* reproduce by forming a bud, which then grows to form a daughter cell. Construction of a new cell wall is restricted to the bud site. Drgonová *et al.* (p. 277) and Qadota *et al.* (p. 279) show that Rho, a small guanine nucleotide binding protein that is localized along with actin at the growing bud tip, acts to control formation of the new cell by directly regulating the activity of  $\beta(1\rightarrow3)$ glucan synthase. This enzyme produces the major structural component of the cell wall. In a Perspective, Bussey (p. 224) discusses the relation of these findings to the control of morphogenesis. Rho also exists in mammalian cells, where it may function in controlling the interaction of the cytoskeleton with the extracellular matrix at focal adhesions.



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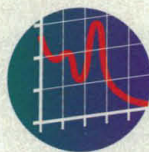
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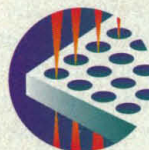
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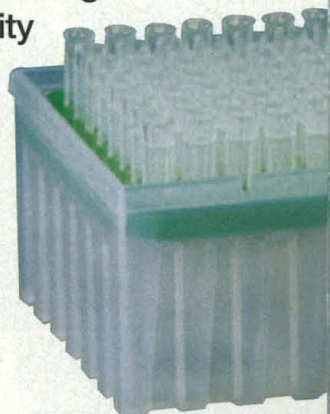
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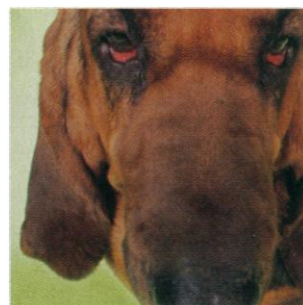
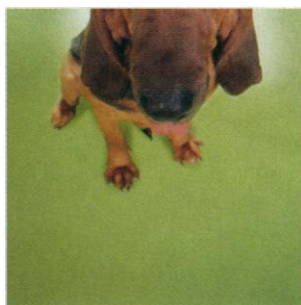
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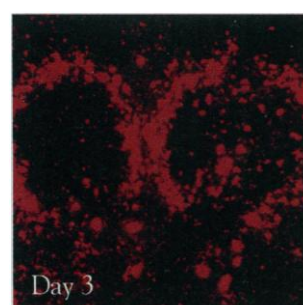
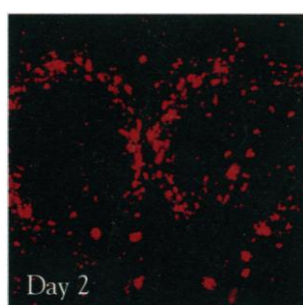
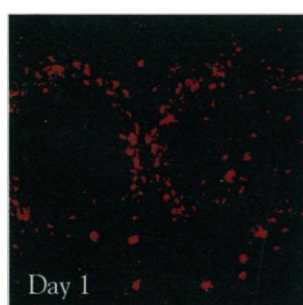
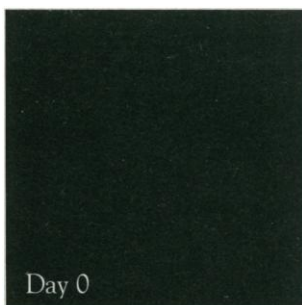
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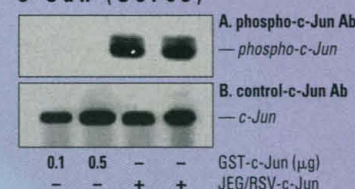
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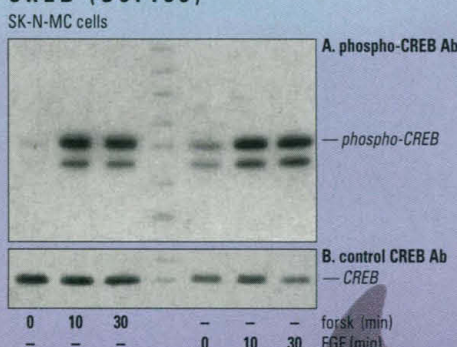
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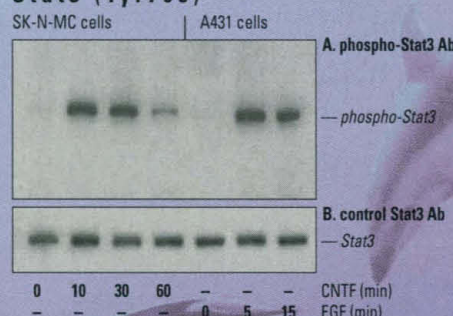
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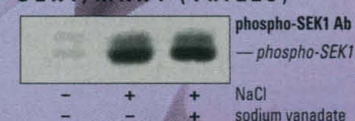
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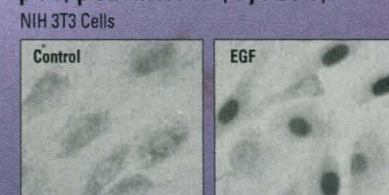
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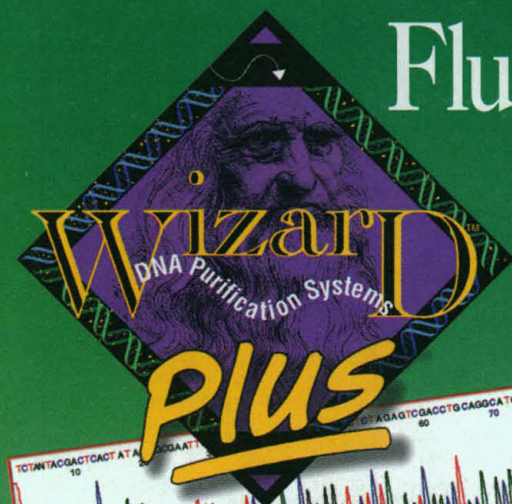
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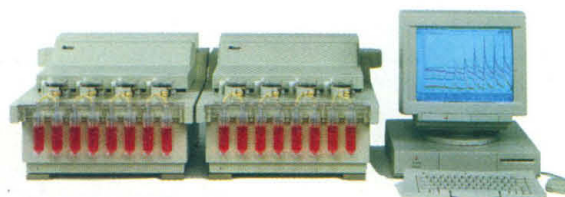
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1. *Science* 257: 1906 (1992) 2. *Cancer Research* 55: 5642 (1995) 3. *PNAS* 92: 2750 (1995)

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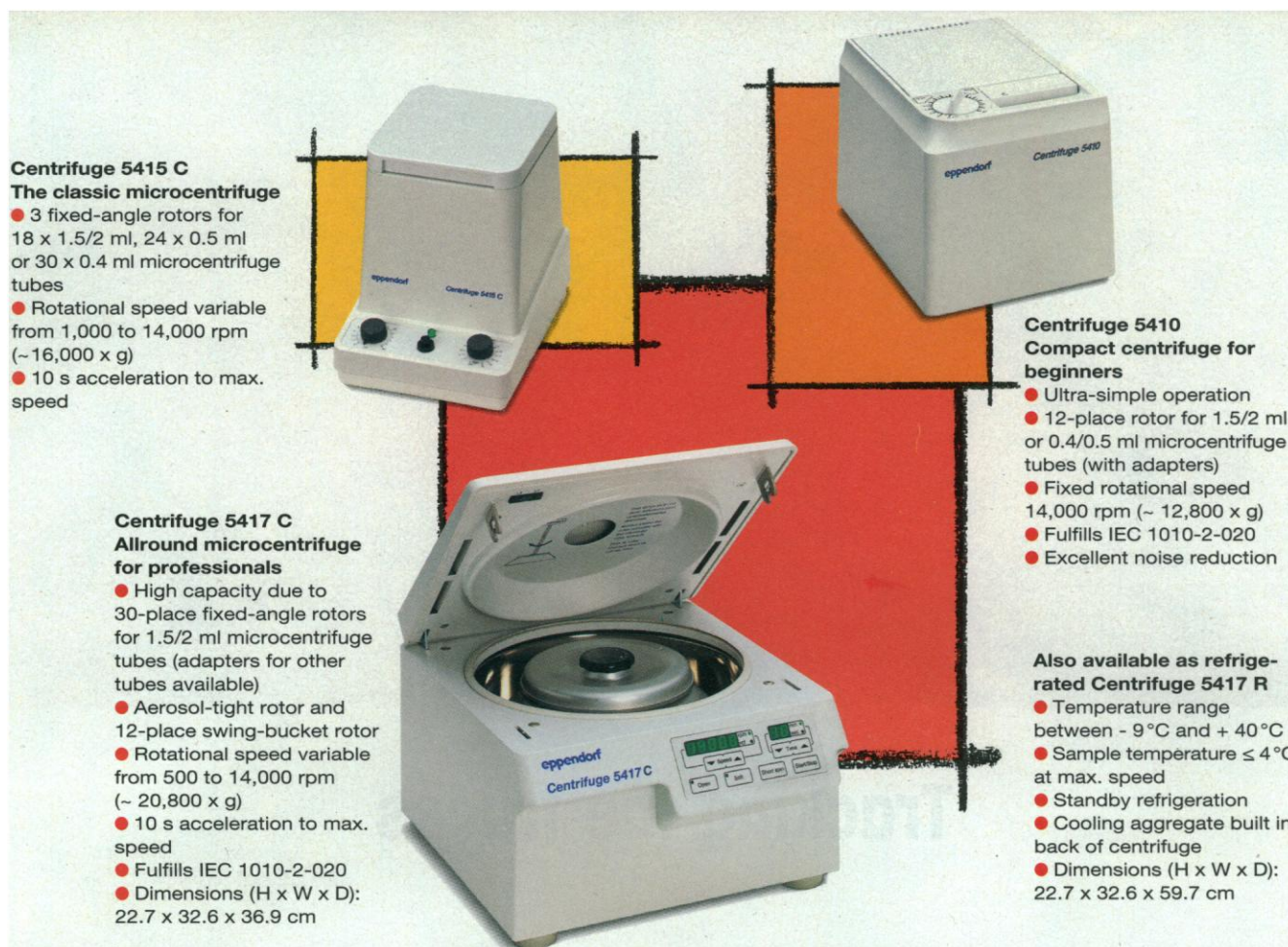
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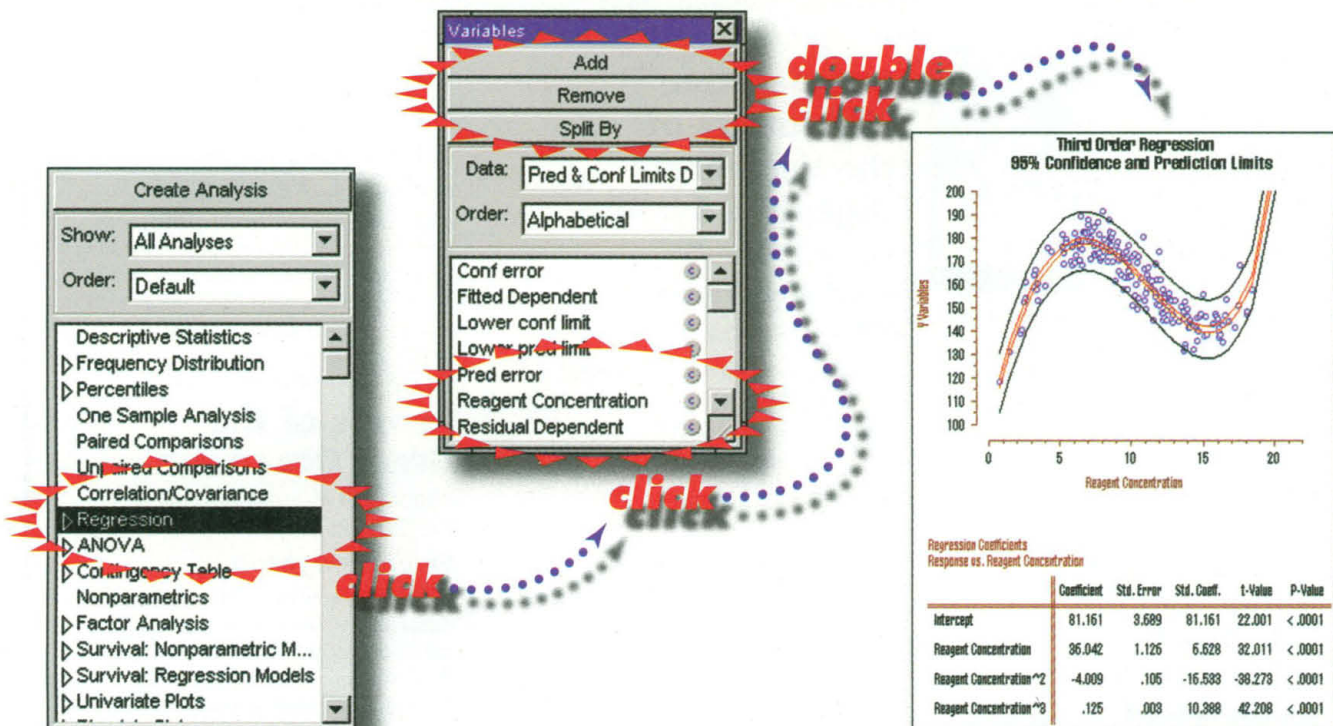
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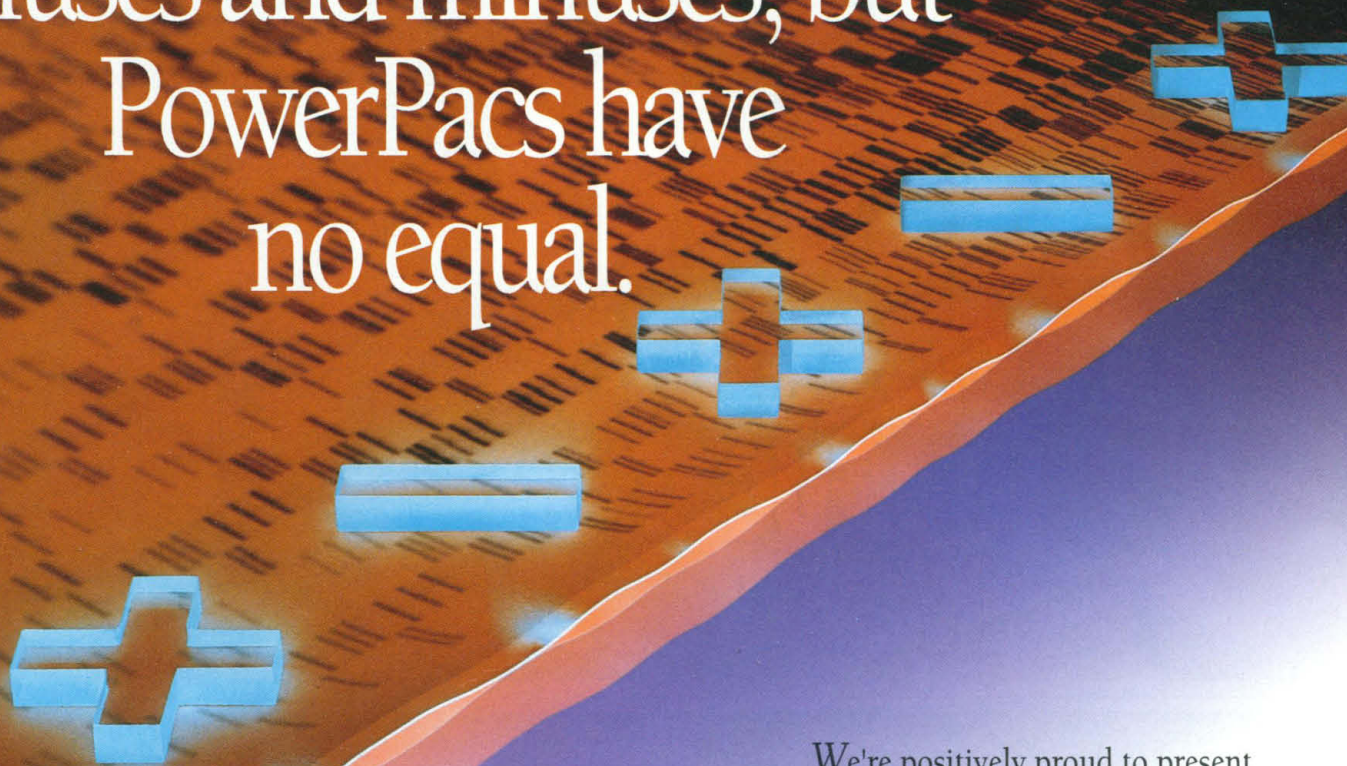
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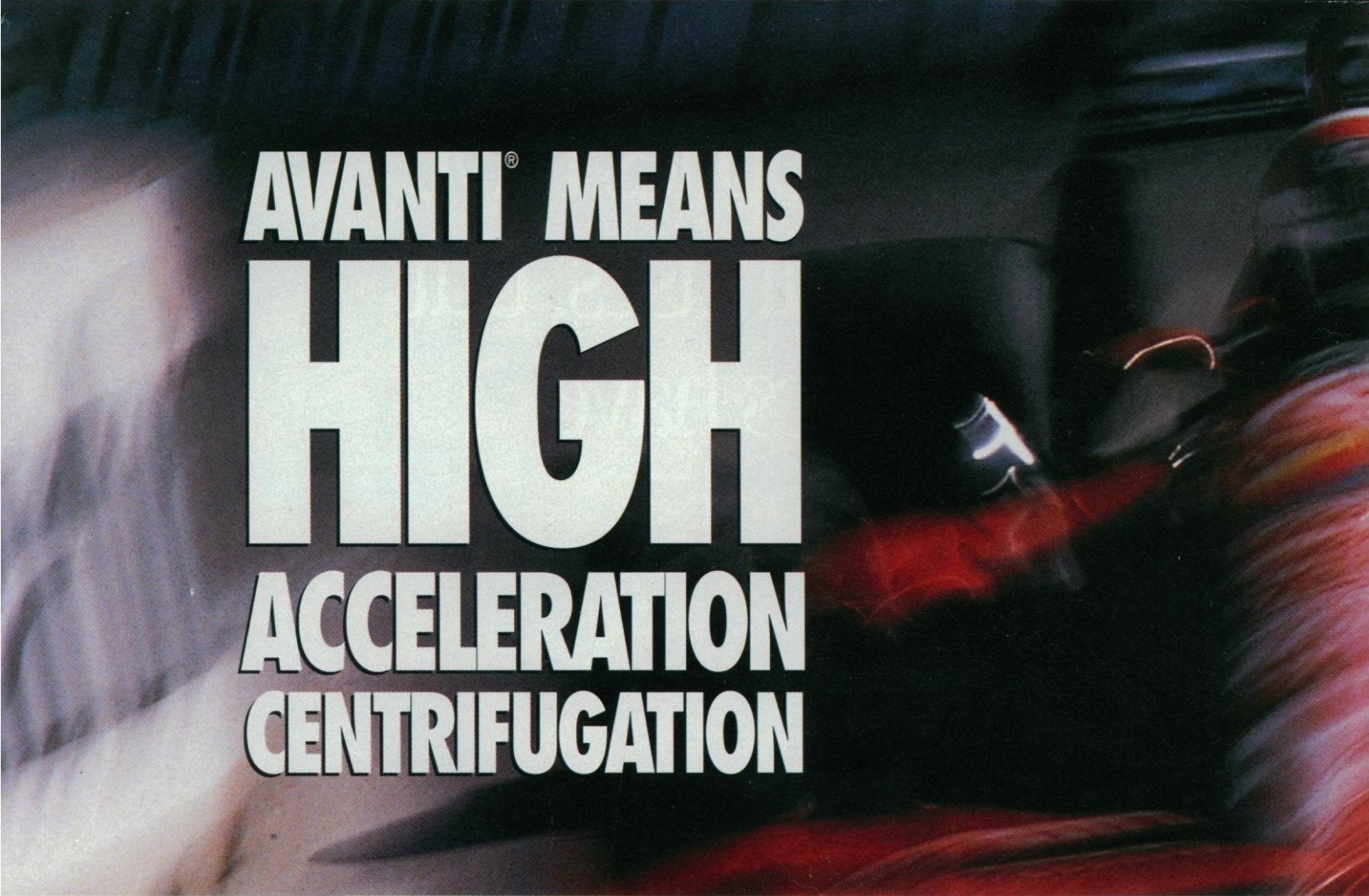
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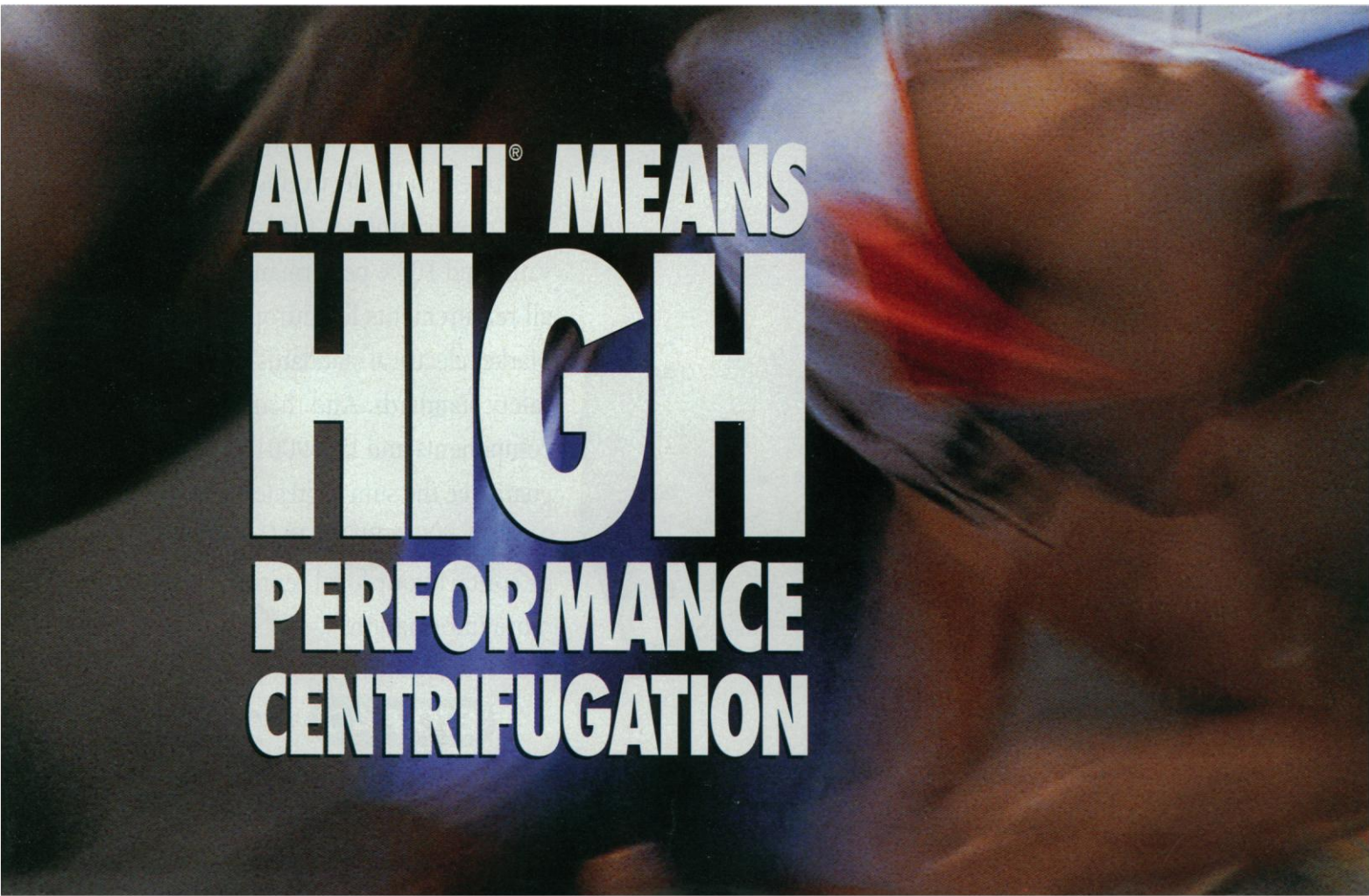
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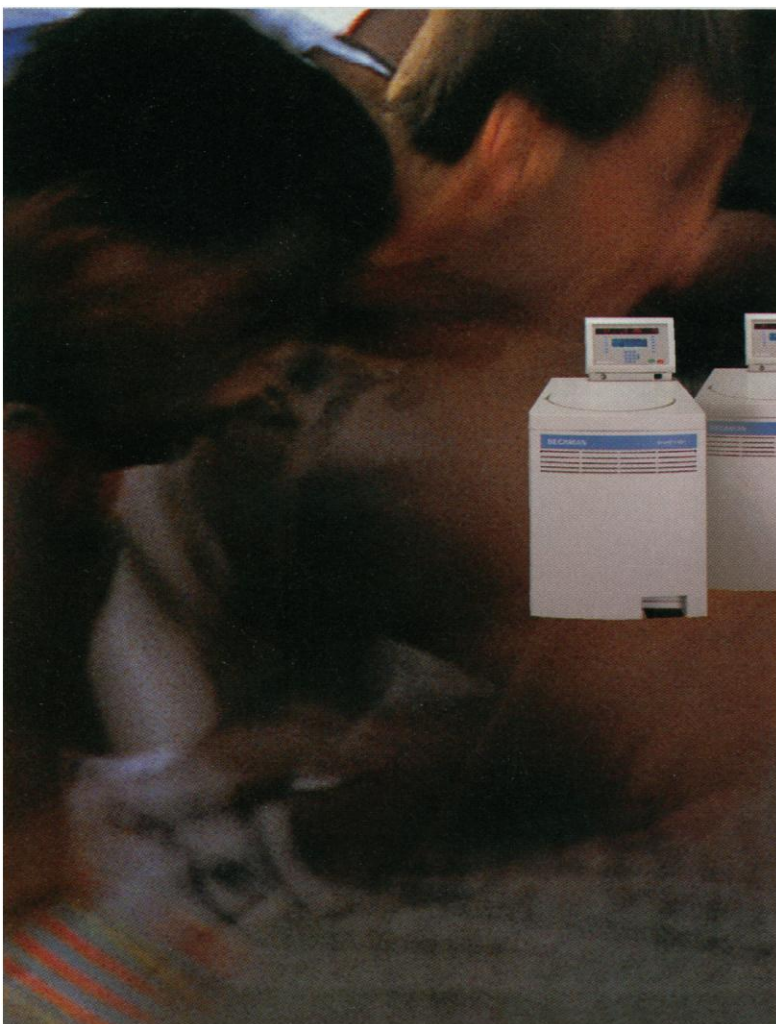
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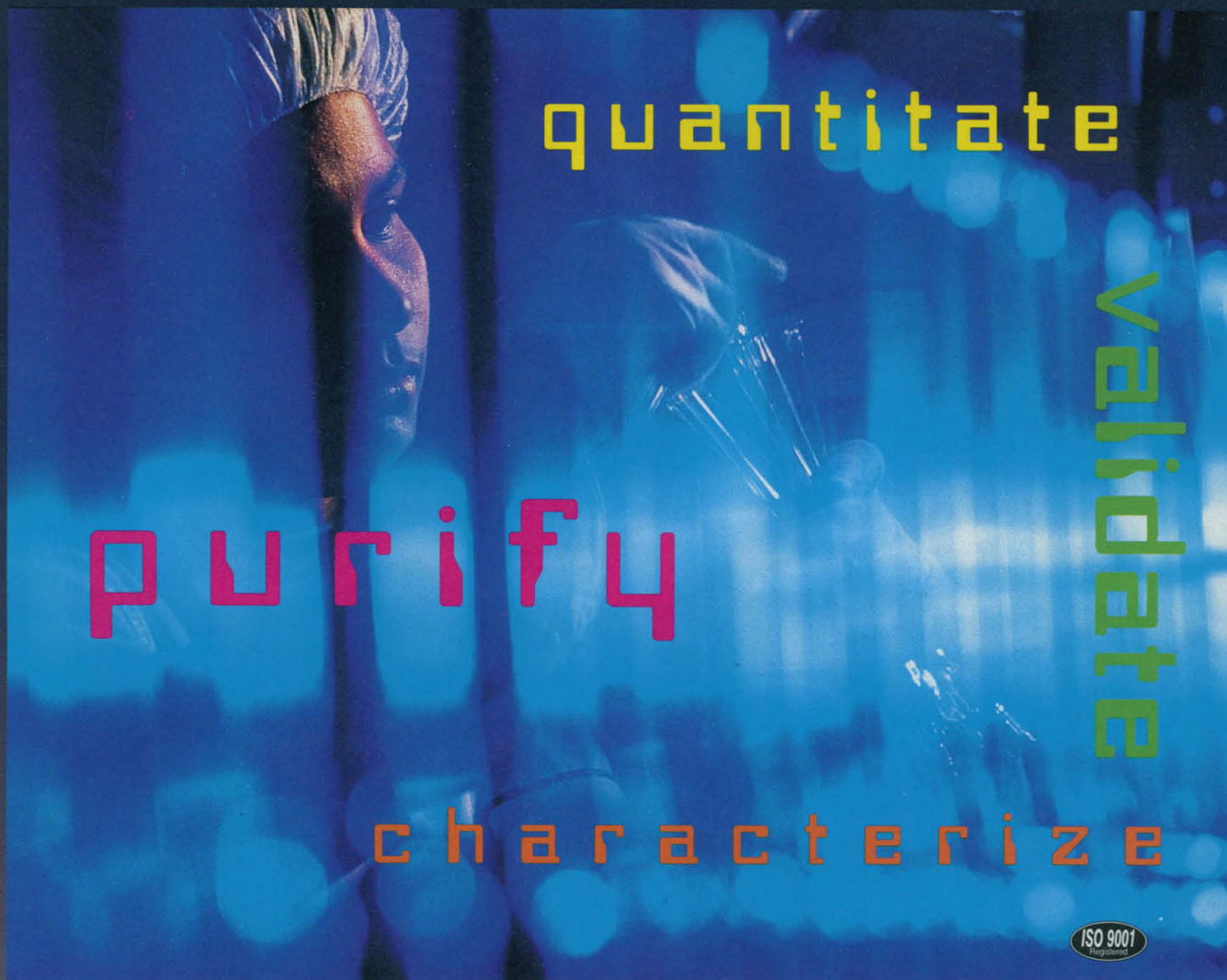
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# BAS-5000

|               |                                       |
|---------------|---------------------------------------|
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| Shading       | $\pm$ 5% over entire scan area        |
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| Software      | MacBAS/AIS/BASStation                 |
| IP(s)         | BAS-SR2025, BAS-TR2025                |



Brain image courtesy of Dr. Eiichiro Nagata, Dr. Kōtarō Tanaka, Dept. of Neurology, School of Medicine, Keio University.



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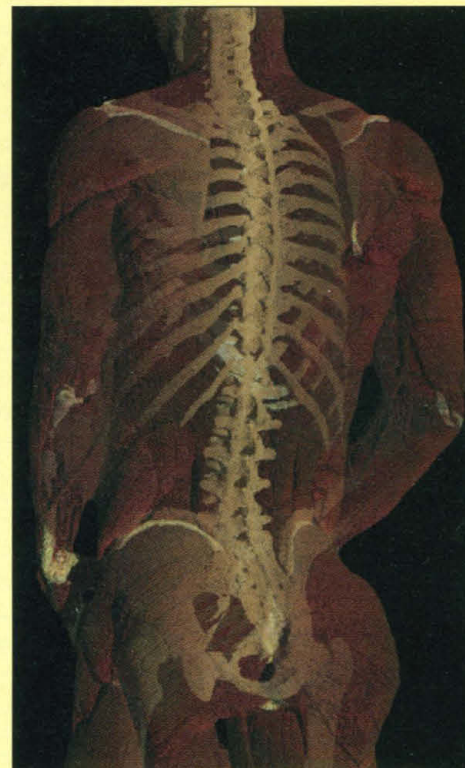
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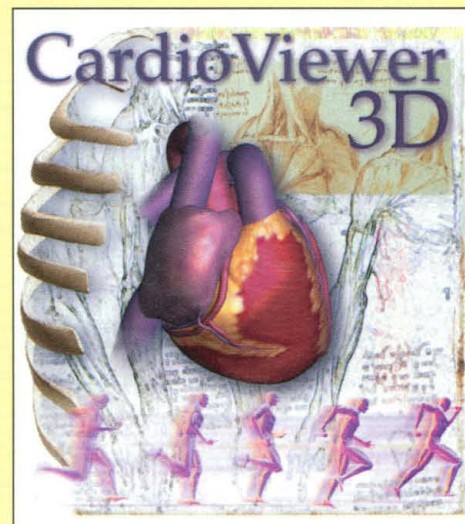
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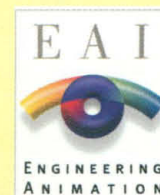
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As a result of these Apple innovations, ordinary people can sit down at all kinds of PCs and actually get some work done. Of course, if they sit down at a Macintosh, they can build 3-D graphics. Use virtual reality in very real ways. Videoconference across continents. Collaborate with colleagues on the far side of the corporate campus. Build interactive sites on the World Wide Web. And more. That's the Mac advantage.

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Today, 56 million people do their work the Macintosh way. Some in school. Some at home. And, when you look at the numbers from recent studies, quite a few in business. We command a 47% share of the U.S. commercial publishing market. And 76.2% of the color pre-press market. And though our dominance in graphics-related businesses may not

shock you, consider this: we have a 50% share of the chemical, pharmaceutical, biotechnology, scientific and engineering computing markets.

And then, there's the fact that Macintosh brand loyalty is the highest of any PC in the world: 90% of Macintosh customers buy a Mac the next time around. Which leads people like Andrew Laham, MIS Director at the law firm Fleming, Hovenkamp & Grayson, to say, *"There would be a major crisis if we had to do without Macs. In fact, there would be an open revolt."* Indeed, if the mail we've received lately is any indication, more than a few CFOs out there would revolt, too, if their companies didn't use Macintosh computers.

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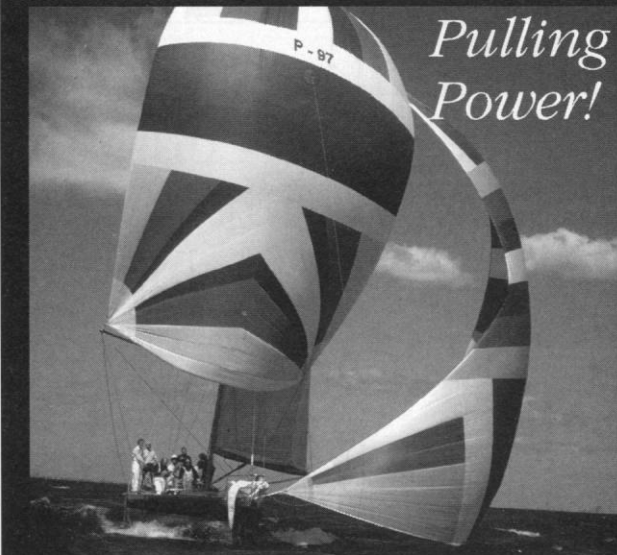


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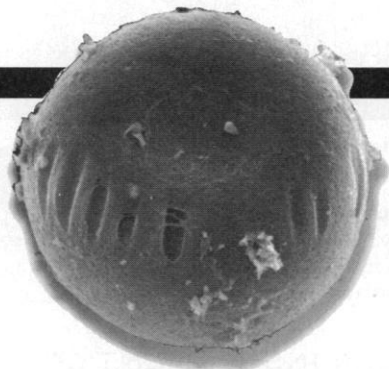
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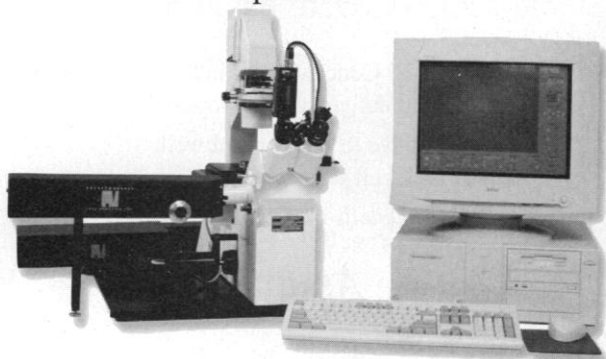
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Wang, X. et al. Matrix metalloproteinase inhibitor BB-94 inhibits human colon tumor growth and spread in a patient like orthotopic model in nude mice. *Cancer Res.* 54, 4726-28 1994.

Hoffman, R. Orthotopic is orthodox: why orthotopic transplant metastatic models are different from all other models? *J. Cellular Biochem.* 56, 1-4, 1994.



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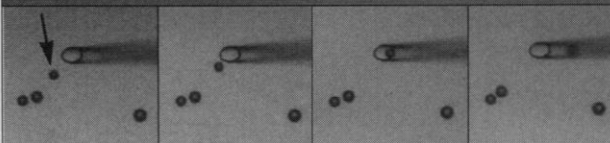
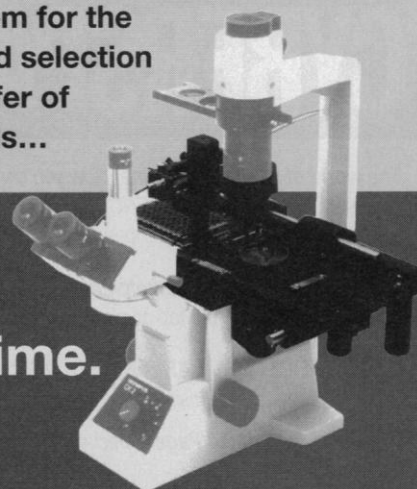
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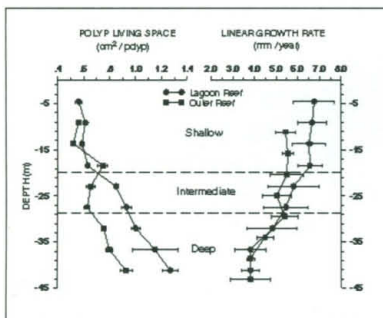
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