American Association for the Advancement of Science

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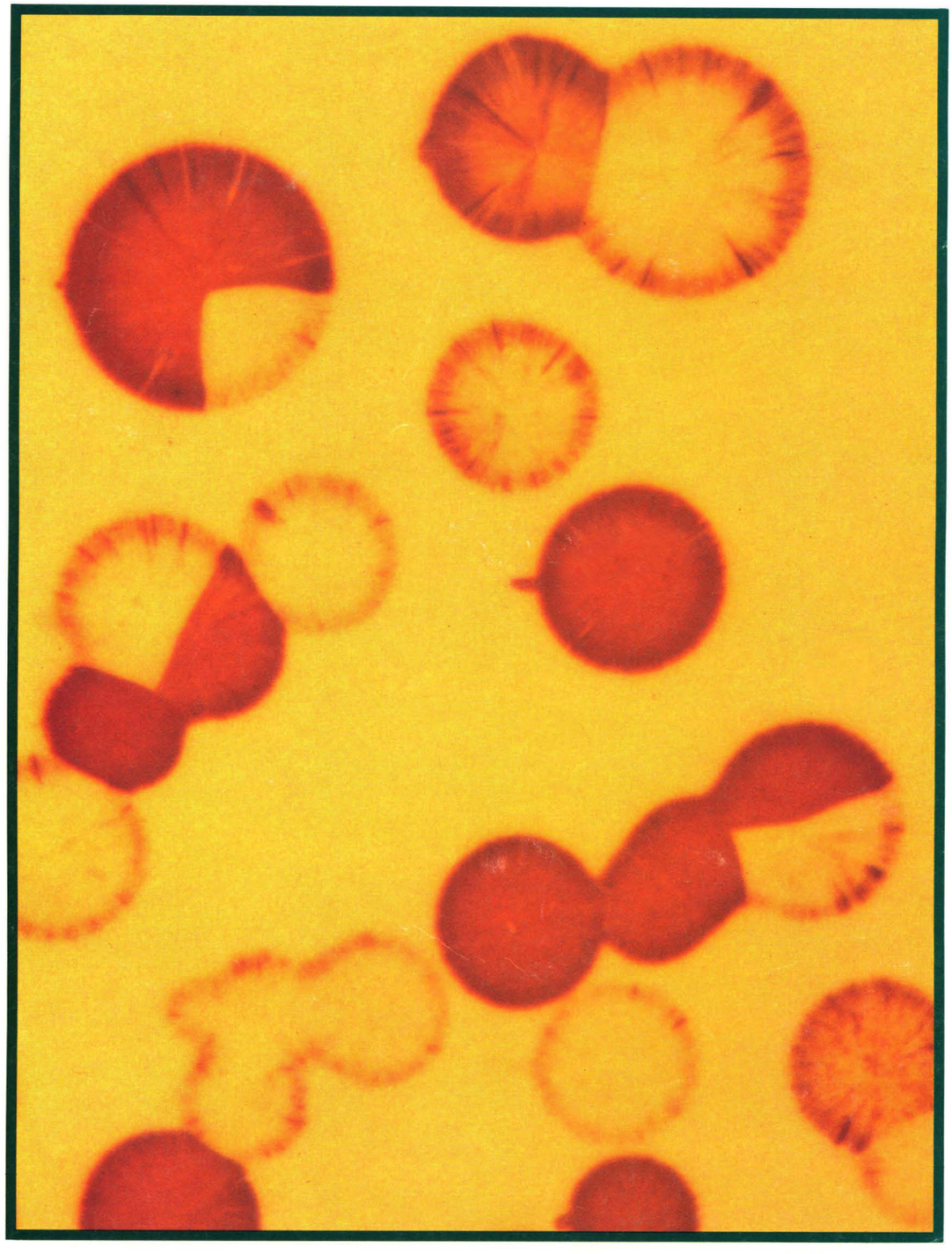

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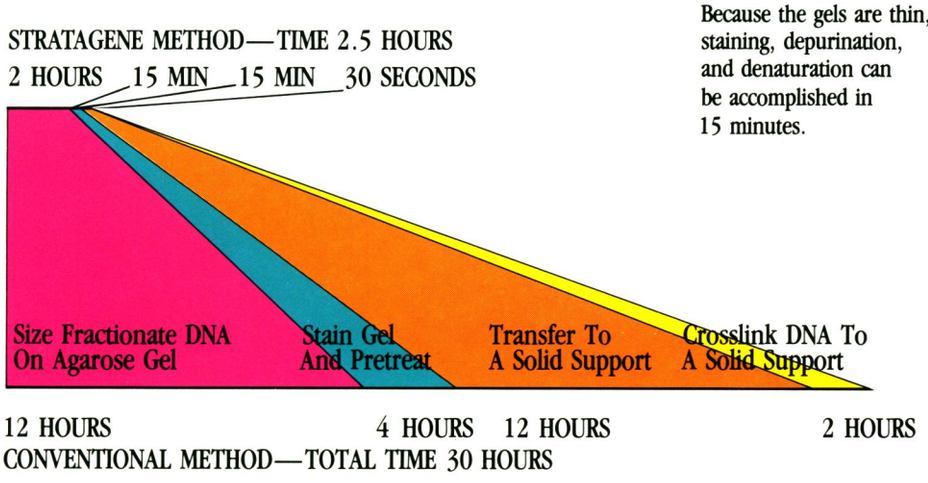
Stratagene has streamlined agarose gel electrophoresis and blotting. The system decreases the time required, from sample loading to prehybridization ten fold.

VAGE™ System

The VAGE™ vertical agarose/acrylamide gel electrophoresis system allows the casting of agarose or acrylamide gels in the unit. Nucleic acids can be electrophoresed through a 3 mm, 0.8% vertical agarose gel in less than two hours with excellent resolution (Figure 1). Because the gels are thin, staining, depurination, and denaturation can be accomplished in 15 minutes.



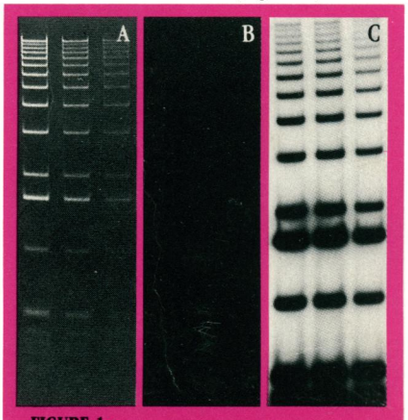
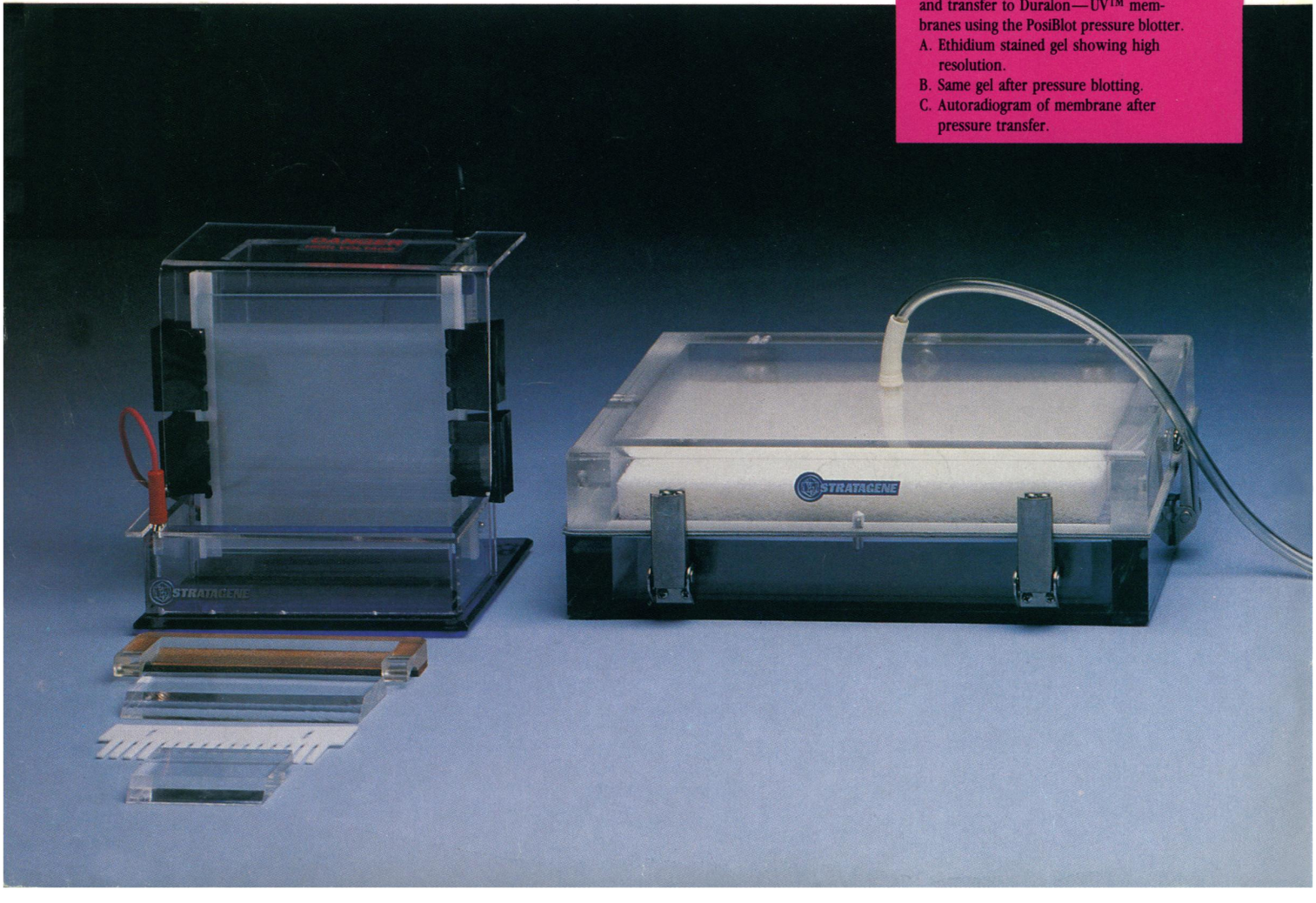


FIGURE 1:
Figure Legend: Fractionation of end labeled DNA markers on 3mm thick 0.8% agarose by the VAGE apparatus and transfer to Duralon—UV™ membranes using the PosiBlot pressure blotter.
A. Ethidium stained gel showing high resolution.
B. Same gel after pressure blotting.
C. Autoradiogram of membrane after pressure transfer.



PosiBlot™ * Pressure Blotter

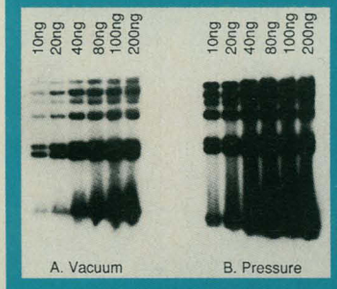


FIGURE 2:
Figure Lengend: ^{32}P end-labeled lambda Hind III markers were electrophoresed in 0.8% agarose. The DNA was then transferred to a nylon membrane with a vacuum blotter at 30mm Hg below atmospheric or with the PosiBlot pressure blotter at 100mm Hg above atmospheric. Both transfers were carried out for 15 minutes. As can be seen, pressure blotting transferred significantly more DNA in the same period of time, especially in the higher molecular weight range (largest band is 23 kilobases).

The PosiBlot™ positive pressure blotter permits the transfer of nucleic acids in 1/3 the time of vacuum blotters and 1/50 the time of capillary blotting (Figure 2). Pressure blotting does not dehydrate gels as do other methods. This allows the use of substantially higher pressure differentials, compared with vacuum blotting, without gel collapse. The PosiBlot apparatus reduces blotting time to 15 minutes.

FIGURE 3:
Figure Legend: Autoradiogram showing the resolution of 2.8 and 1.3 Kb Msp I RFLP alleles revealed by a cystic fibrosis human DNA probe using the VAGE, PosiBlot and Stratalinker all in 2.5 hours.

Stratalinker™ * UV Crosslinker

The Stratalinker™ UV Crosslinker fixes nucleic acids to solid supports such as nitrocellulose or nylon membranes, in less than one minute. This compares favorably to vacuum baking, which requires 2 hours. The Stratalinker actually monitors the ultra violet energy flux and deactivates the light source upon reaching the user-programmed energy level (Figure 4). Figure 3 shows an autoradiogram of a human genomic Southern blot performed using the VAGE, PosiBlot and Stratalinker all in 2.5 hours.

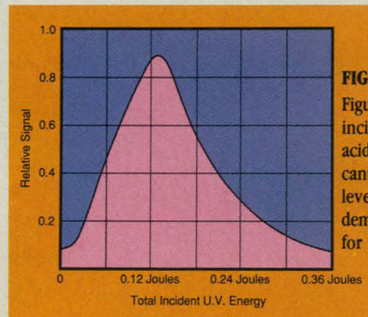


FIGURE 4:
Figure Legend: The effects of altering the incident energy for crosslinking nucleic acids to nylon membranes. The significant drop in signal intensity at energy levels below and above 0.12 Joules demonstrates the limited optimal range for UV treatment.

Stratagene offers a full selection of nitrocellulose, reinforced nitrocellulose and nylon membranes. Each membrane is stringently lot tested to ensure consistency when performing Northern and Southern blotting. Please call Technical Services for detailed information on Stratagene's time saving blotting systems and membranes.

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COVER Immunological staining of individual *Mycoplasma hyorhinis* colonies with a monoclonal antibody to a surface lipoprotein antigenic variant. High-frequency switching in the expression of this component is reflected in the heterogeneous staining and sectoring of colonies representing clonally derived populations of this organism. See page 315. [Photomicrograph by Renate Rosengarten and Kim S. Wise, Department of Molecular Microbiology and Immunology, University of Missouri–Columbia, Columbia, MO 65212]

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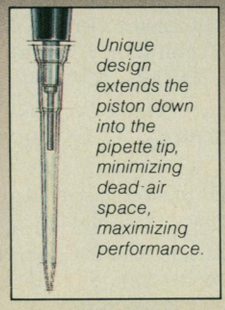

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Lessons from Loma Prieta

IT was no surprise to geologists that the 17 October 1989 California earthquake ruptured the San Andreas fault along the southern Santa Cruz Mountains at Loma Prieta or that the earthquake produced the kind of damage that it did (page 286). The likelihood that an earthquake of high surface wave magnitude (7.1) could occur in this region had been recognized in 1988 and for some time before that; also previously acknowledged were the exceptional vulnerability of the heavily hit Marina District of San Francisco, of unreinforced masonry structures, of the portion of Interstate 880 that collapsed (a portion that was built on Bay mud and known to be in need of reinforcement), and of other structures built on hazardous ground with high liquefaction potential. Staff members of the U.S. Geological Survey describe the recent activity along this part of the San Andreas fault, the salient features of the Loma Prieta earthquake and its aftermath, and the accuracy with which both the event and its consequences had been foreseen. This experience shows that meaningful forecasts can be made and that worthwhile steps can be taken to reduce risks from future earthquakes that surely will occur. In a related Technical Comment, the accuracy and value of models designed to predict aftershocks (and that were applied in the Loma Prieta earthquake) are debated (page 343).

Nonoccupational asbestos hazards

HUNDREDS of billions of dollars may be spent in the next 30 years in testing for and removing asbestos from schools, hospitals, and other buildings; this may be a waste of money. Although the development of asbestos-associated lung diseases is documented for miners and others who are exposed on the job to high concentrations of airborne asbestos fibers, Mossman *et al.* conclude that there is little evidence that individuals exposed to low levels of asbestos in buildings face much risk of developing similar diseases (page 294). In reviewing this topic, they describe clinical features of asbestos-associated diseases, epidemiologic and experimental data that relate asbestos exposure and lung disease, the likely mechanisms by which asbestos fibers can induce disease, and the characteristics of asbestos fibers (such as mineralogic type and morphology) that are credited with disease induction. Airborne asbestos particles that are found in most suspect buildings do not fit the profile of those that induce disease. Deaths from smoking, drowning, playing high school football, and a number of other risk factors are orders of magnitude higher than deaths from asbestos exposure. The misguided removal efforts may even have created a new risk group for asbestos-associated disease: asbestos removal workers.

Superconductor utility

CONCERNS have been expressed that high-temperature superconducting ceramics might not be suitable for certain applications because the magnetic shielding current of such materials decays rapidly at the critical current density (that current beyond which the superconductor begins to lose the property of superconductivity). Thus, for example, in the case of superconducting magnets, the magnets might not be able to provide high magnetic fields long enough to fulfill their functions. However, new measurements of critical currents in thin films of $YBa_2Cu_3O_7$ show that the relaxation, or decay, in the current can be controlled and dramatically or even completely reduced if the operating current is kept somewhat below the critical current density (page 307). Sun *et al.* show that by driving samples into their critical conducting states at one temperature and then dropping the operating temperature slightly, decay could be greatly reduced. They present a general equation for the relaxation of the shielding current-induced magnetic moment as a function of the operating temperature.

Prenylated proteins

PROTEINS can be modified after synthesis in a number of ways; one is prenylation, the addition to the translated protein chain of groups based on the virtually ubiquitous isoprene unit (C_5H_8). Two reports describe the isoprenoid groups that are found on intracellular proteins of animal cells. In Hela cells (Farnsworth *et al.* on page 320) and Chinese hamster ovary cells (Rilling *et al.* on page 318), C_{20} isoprenoid groups were attached to the carboxyl-terminal cysteine residues of proteins; in both types of cells, the isoprenoid group and the protein were linked through thioether bonds. The function of prenyl groups is unknown; other studies have suggested that isoprenoids may help anchor proteins in cell membranes.

PSTAIR in cell cycles

FLUCTUATIONS in the concentrations and activities of a few proteins drive cells through various phases as they cycle from division to division; one important protein in cell cycling is maturation promoting factor (MPF). MPF contains a stretch of 16 amino acids—called PSTAIR—that is common to cell cycle–controlling proteins of all eukaryotes from yeasts to humans; the PSTAIR sequence has not been found in other types of proteins. Picard *et al.* show that injection of the PSTAIR peptide into oocytes of starfish and frogs activates MPF and is necessary and sufficient for inducing a transient increase in the concentration of intracellular calcium; the calcium surge, an initiator of mitosis, was the result of calcium release from intracellular stores (page 327). The PSTAIR peptide also induces breakdown of germinal vesicles, exocytosis of cortical granules, and elevation of a fertilization membrane, all changes that normally accompany oocyte maturation. PSTAIR apparently interacts with a component of the cell that regulates intracellular calcium, and thus a link has been established between the calcium and MPF systems.

■ RUTH LEVY GUYER

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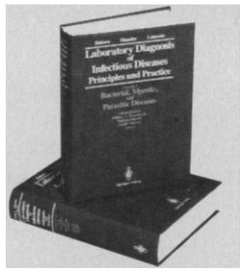

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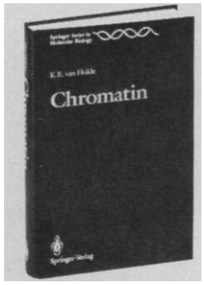

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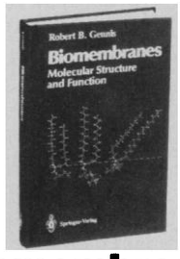

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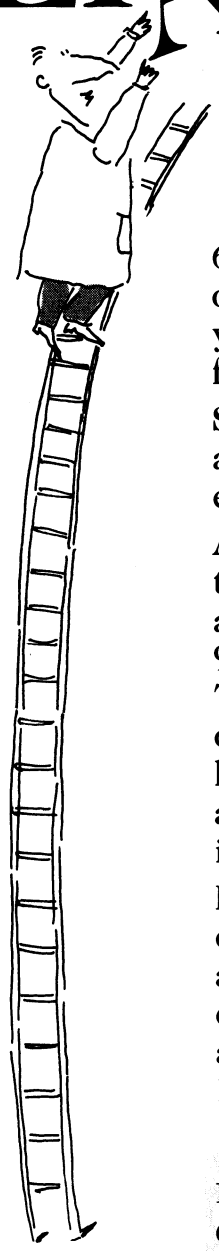

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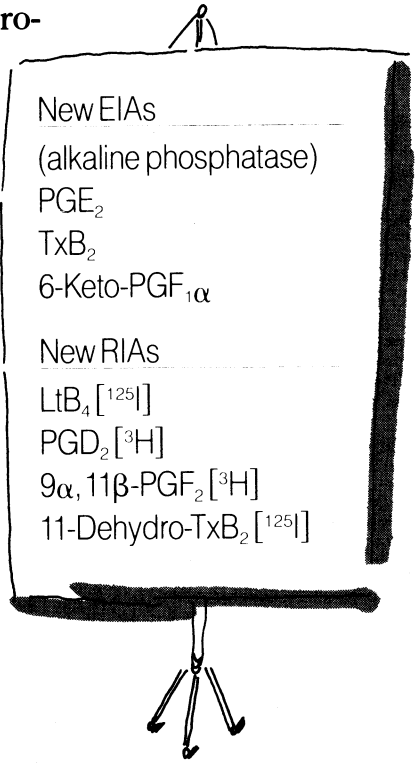

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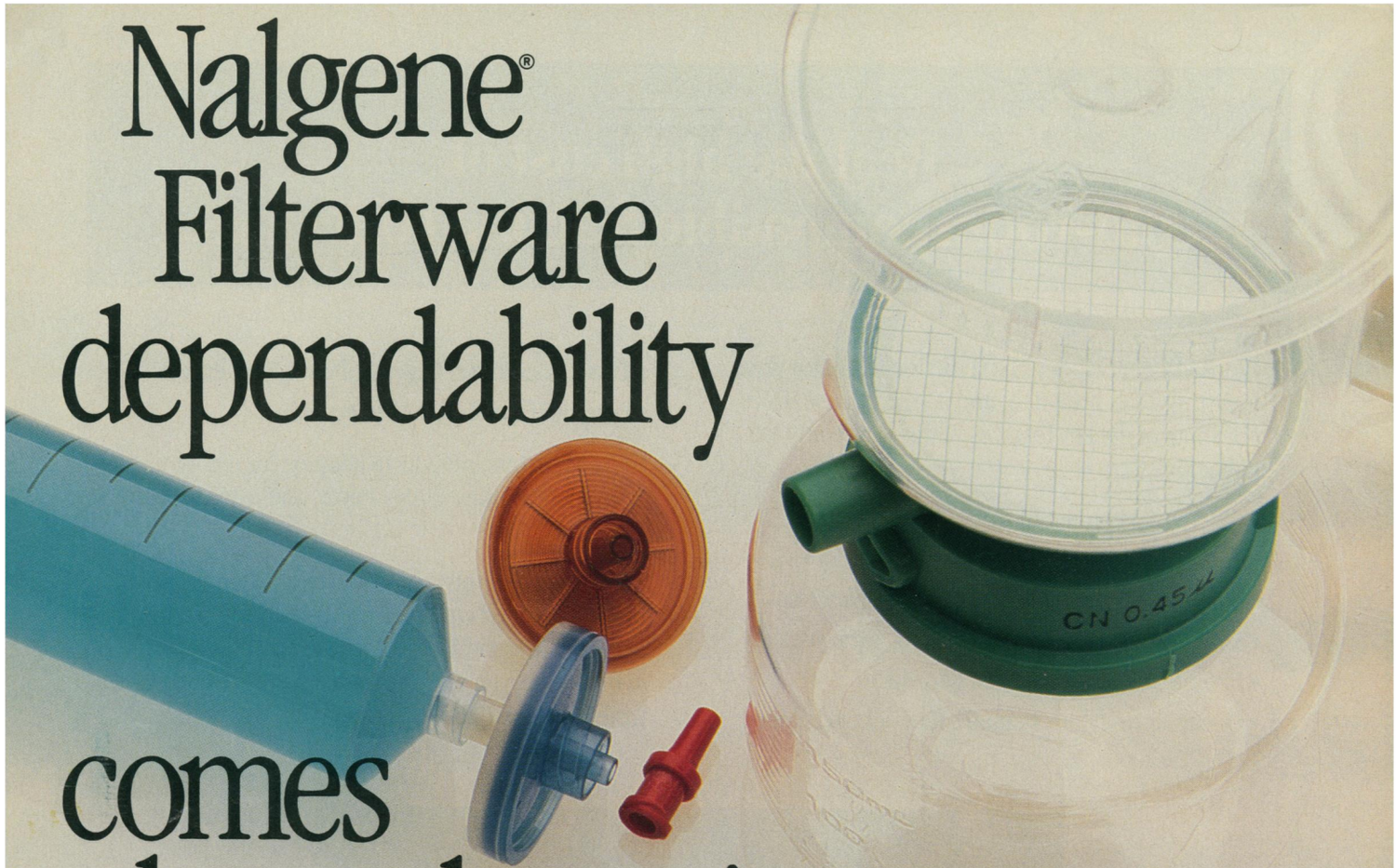

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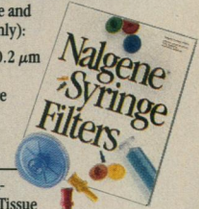

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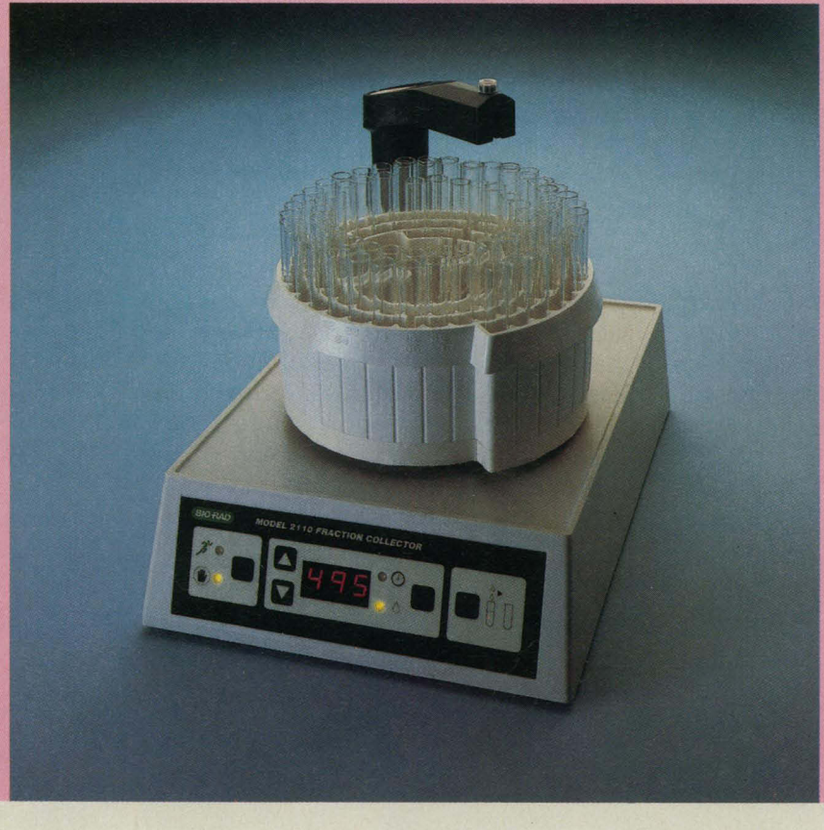

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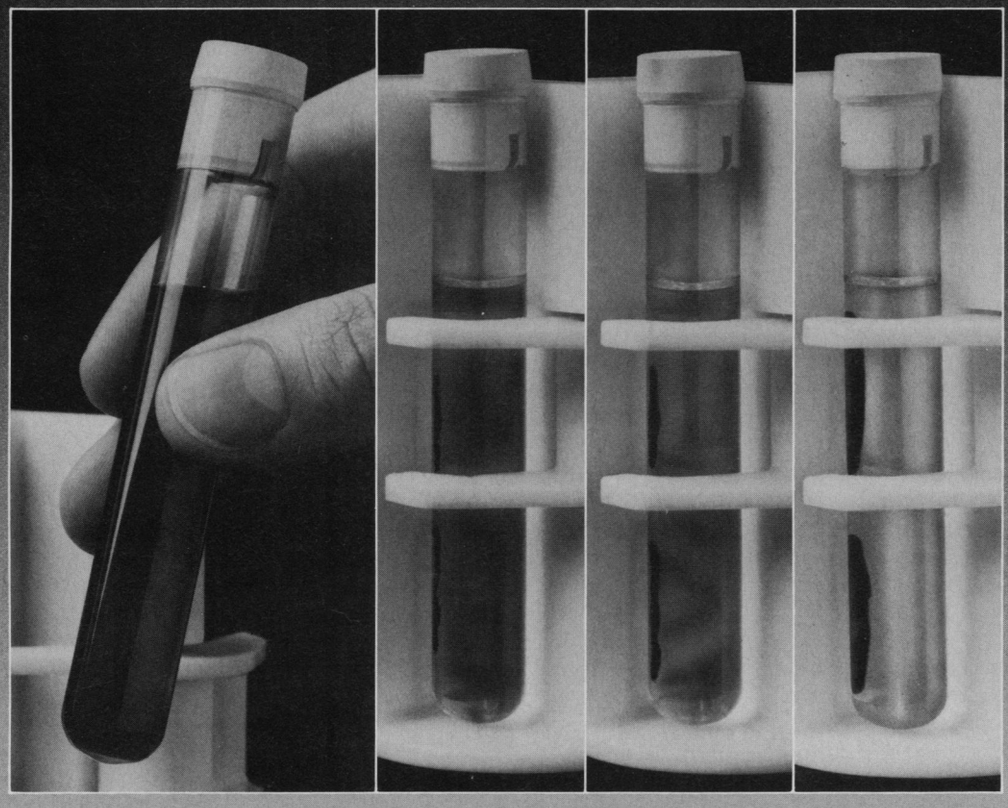

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