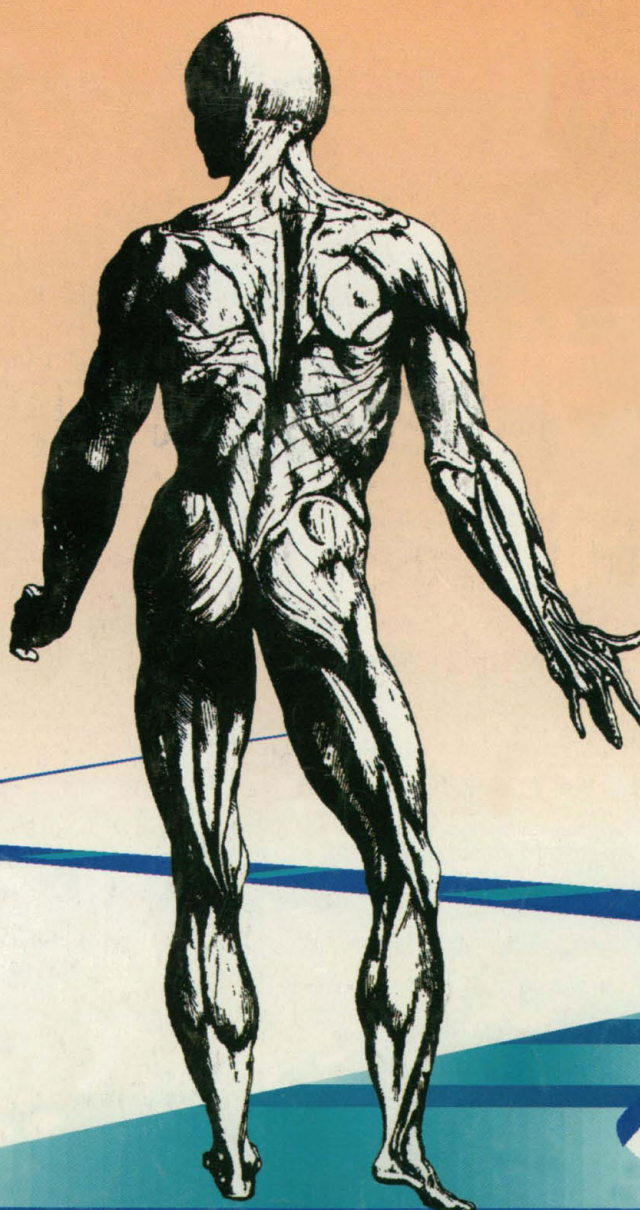


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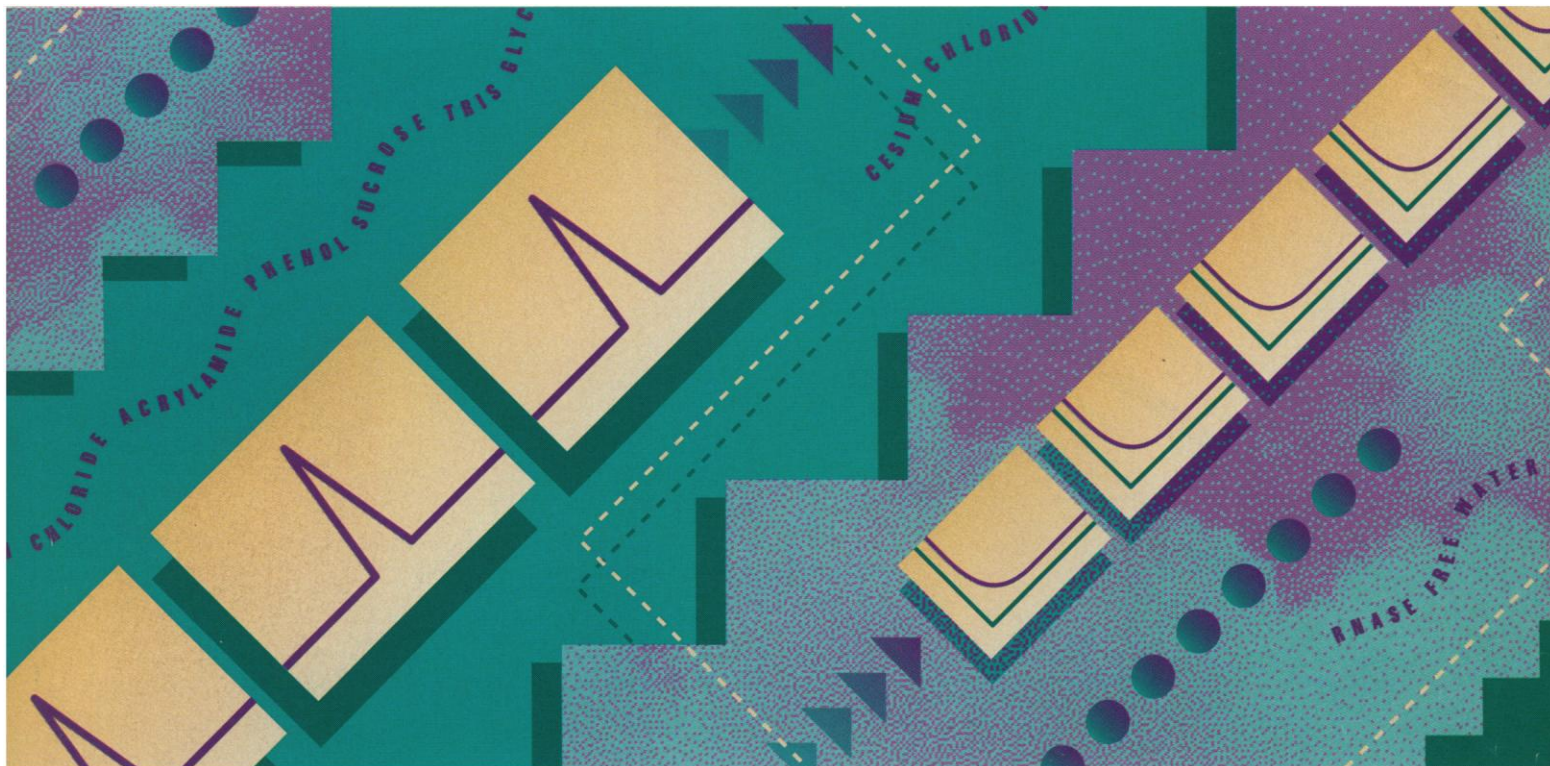
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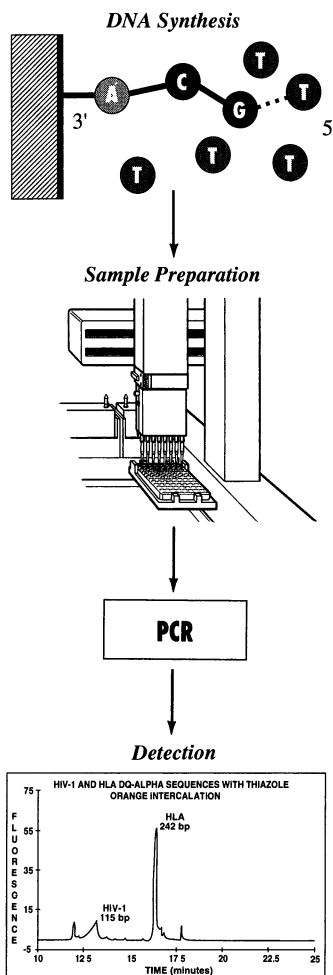
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<sup>1</sup> Mark Holodny, Mark A. Winters and Thomas C. Merigan. *BioTechniques* 1992, Vol. 12, a: 1, 36-39.

<sup>2</sup> Herbert E. Schwartz and Kathi J. Ulfelder. *Anal. Chem.* 1992, 1737-1740.

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# COVER

Although the road is a long one, investigators are making exciting progress toward their goal of mapping the human genome. This issue contains a wall chart, Genome Maps III (pages 87 to 102), as well as Re-

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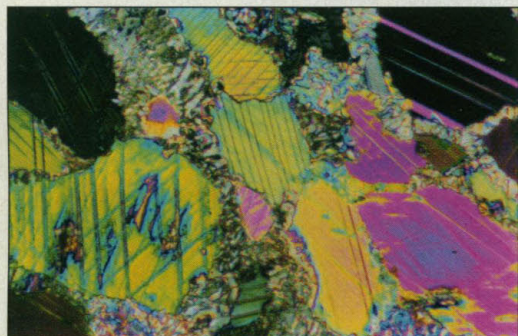
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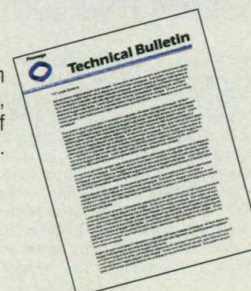
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# THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

## Slower going

Calcium carbonate occurs on the Earth's surface in two common polymorphs: aragonite, which is metastable at ambient conditions but forms during metamorphism to high pressures and low temperatures, and calcite. The calcite-aragonite transformation has been a model system for studying reaction kinetics and for interpreting metamorphic conditions histories; however, most experimental work in this and other systems has been made with the use of fine powders or single crystals rather than polycrystalline samples. Hacker *et al.* (p. 110) found that the transformation of calcite to aragonite proceeded by a different mechanism and more slowly in their polycrystalline samples than in earlier experiments.

## Virtual volcano

High-alumina basalts are a common magma erupted from arc volcanoes, such as those that form the Cascades or Aleutians. These magmas typically contain numerous plagioclase crystals; understanding how and where these crystals form—for example, by accumulation in a magma chamber at depth or during eruption—would provide information on the dynamics of magma transport through the crust. Beard and Lofgren (p. 112) simulated this sequence in a series of laboratory experiments. Melting of typical basalt at 3 kilobars produced a liquid of the appropriate composition. A rapid decrease of the pressure of the samples, which simulated ascent or eruption of the magma, caused abundant crystallization of plagioclase from high-alumina basalts.

## Melting ice and rising seas

Small glaciers have been retreating in many parts of the world and may have contributed to sea level rise during the past 100 years. Oerlemans and Fortuin (p. 115), using a simulation of glacier mass balance based on data on 12 representative glaciers from different climates, revised Meier's earlier estimate of the contribution of small glaciers to sea level rise. The new estimate suggests that an ice-melting caused by a uniform 1 kelvin increase in temperature would lead to a sea-level rise of about 0.58 millimeter per year, which is about one-half of the previous estimate. The model suggests that in a warmer climate, an increase in precipitation cannot compensate for increased melting, so that glacial retreat will continue.

## Sulfate cooling

Not all anthropogenic emissions to the atmosphere result in greenhouse warming; SO<sub>2</sub> emissions eventually generate sulfate particles, which reflect sunlight and have a net cooling effect. Modeling by Lelieveld and Heintzenberg (p. 117) suggests that sulfate particles produced by oxidation of SO<sub>2</sub> in clouds were more efficient scatterers of sunlight than particles formed in dry air. Such cloud-processed sulfate may be the major contributor to the cooling effects.

## Highly sensitive results

Antibody detection of antigens has a number of important clinical applications. Sano *et al.* (p. 120) have used the polymerase chain reaction (PCR) to improve the sensitivity of antigen-

## Genome mapping and the Y chromosome

Linkage mapping, the association of molecular markers with the inheritance of genes, has proven to be a powerful tool in integrating the physical and genetic maps of the human genome. This special Genome issue of *Science* focuses in part on the current state of the human genetic linkage map (pp. 67 and 148). Such maps are not provided for the human Y chromosome because it does not undergo meiotic recombination (breakage and reassembly of the chromosome); physical mapping must rely on naturally occurring deletions. Vollrath *et al.* (p. 52) mapped deletions in 96 individuals who had partial Y chromosomes, such as XY females. Foote *et al.* (p. 60) discuss the construction of a yeast artificial chromosome (YAC) library from genomic DNA from a human male with four Y chromosomes. The ordering of the sequence-tagged sites determined by Vollrath *et al.* was used to help assemble the order of the YAC clones, which yielded a map of 127 intervals (averaging 220,000 base pairs) along the euchromatic region of the chromosome (the short arm, centromere, and proximal long arm). About 25 percent of the loci are highly homologous to loci on the X chromosome. Such a map may provide a starting point for untangling how the relation between X and Y chromosome developed through events such as recombination and translocation.

based detection. A chimeric protein A-streptavidin molecule is used as the linker between an immunoglobulin G, which binds the antibody, and a biotinylated DNA sequence, which is amplified by PCR. Less than 1000 antigen molecules could be reproducibly detected.

ther transfected or endogenous  $\beta$ APP also produced  $\beta$ AP that was similar to that found in the cerebrospinal fluid (CSF) of persons with Alzheimer's disease as well as in normal individuals. The amount of  $\beta$ AP in the CSF did not appear to correlate with having Alzheimer's disease.

## Normal processing

Deposition of plaques in the brain that contain amyloid  $\beta$  protein ( $\beta$ AP) is one hallmark of Alzheimer's disease. It has not been clear whether secretion of  $\beta$ AP is a characteristic of the disease state or if it occurs normally. Shoji *et al.* (p. 126) show that cells may secrete  $\beta$ AP, which contains 39 to 43 amino acids, through processing of a set of longer proteins called the amyloid  $\beta$  protein precursor ( $\beta$ APP). A leukemic cell line expressing a  $\beta$ APP derivative released a protein essentially identical to  $\beta$ AP. Human neuroblastoma cells expressing ei-

## No protection

Individuals who contract non-A, non-B (NANB) hepatitis can have recurring bouts of this disease; at one time multiple causative agents were suspected, but the predominant causative agent is the hepatitis C virus (HCV). Farci *et al.* (p. 135), who performed a 3-year study of inoculation of five chimpanzees with a number of HCV strains, found that each new episode of infection was caused by reinfection, rather than by reactivation of the original infection. This lack of protective immunity raises serious challenges for vaccine development.



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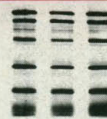


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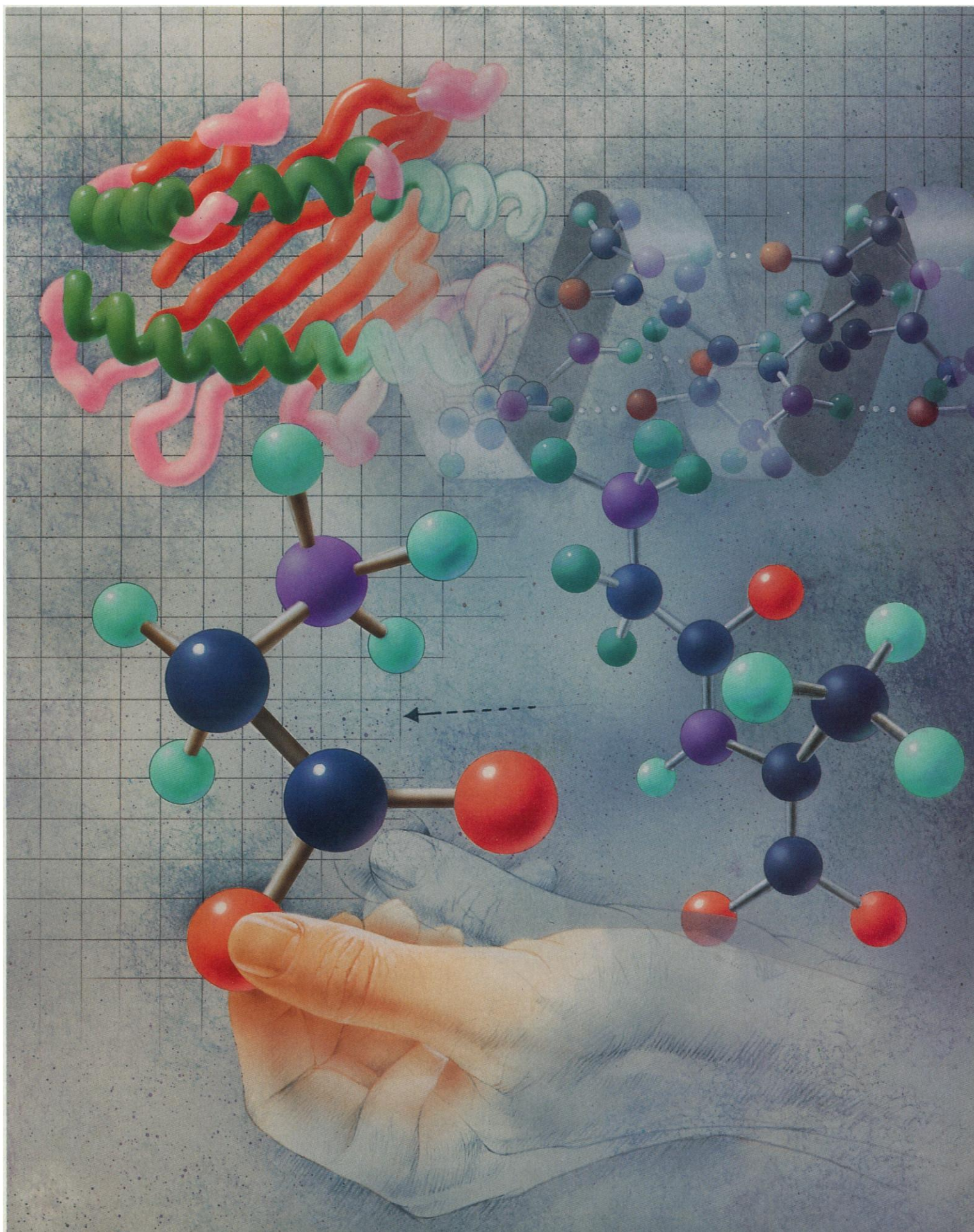
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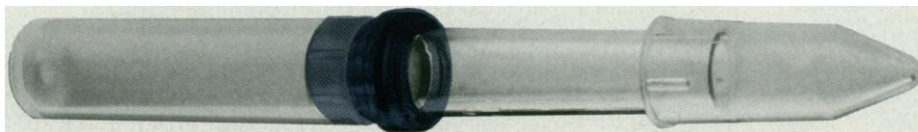


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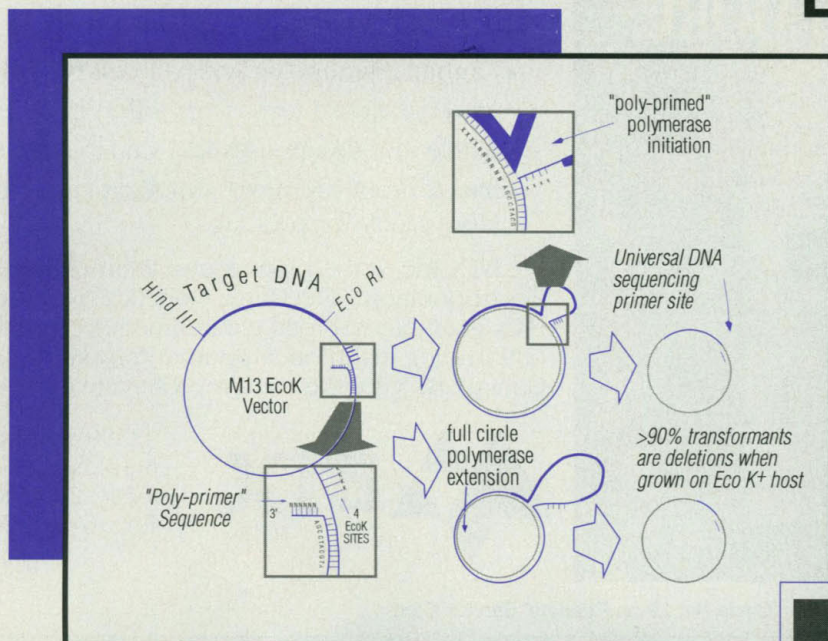
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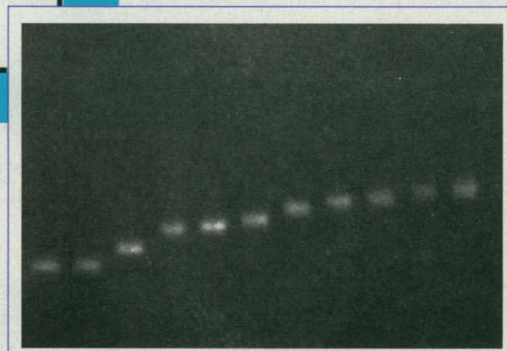
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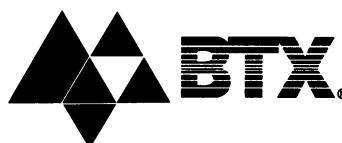
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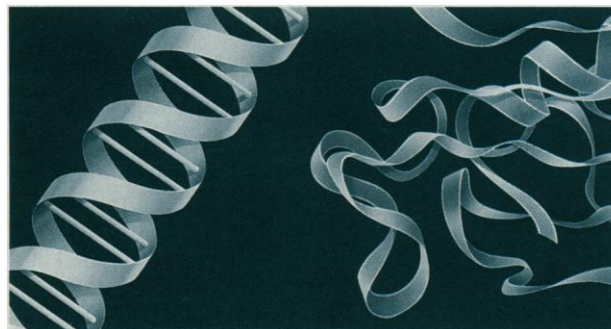
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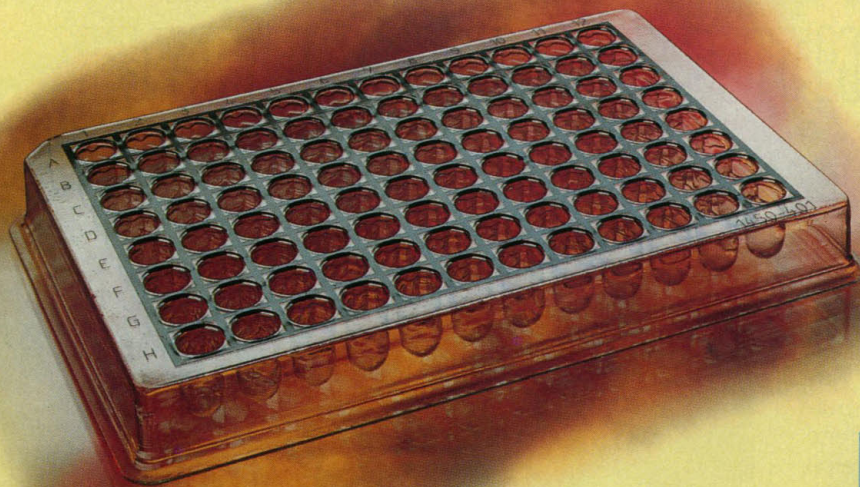
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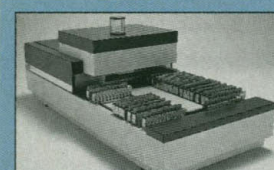
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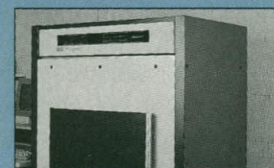
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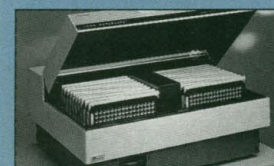
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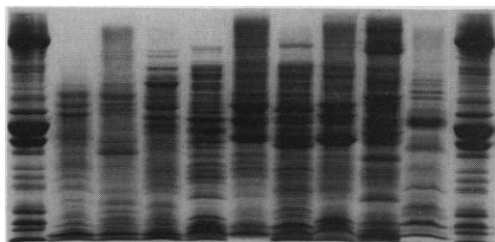
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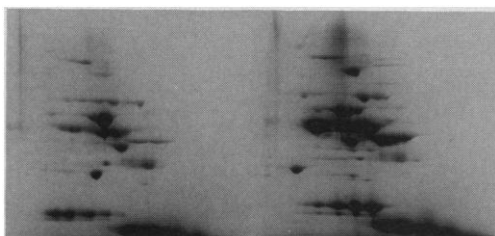
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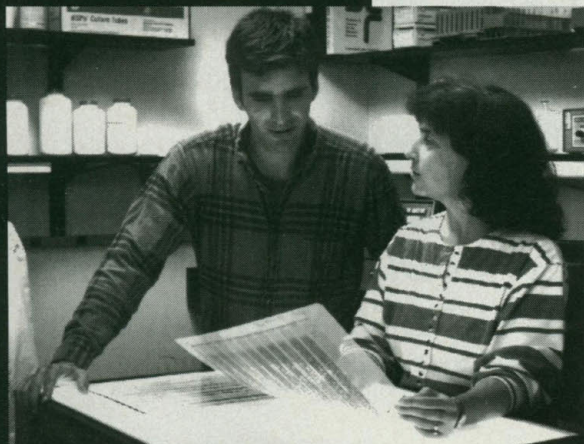
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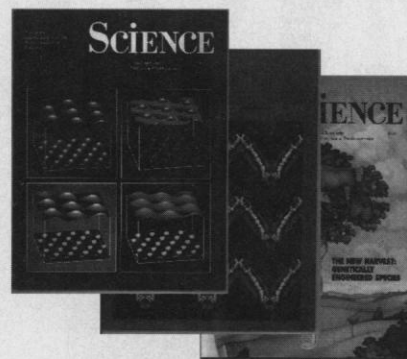
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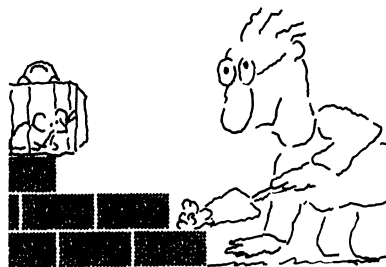
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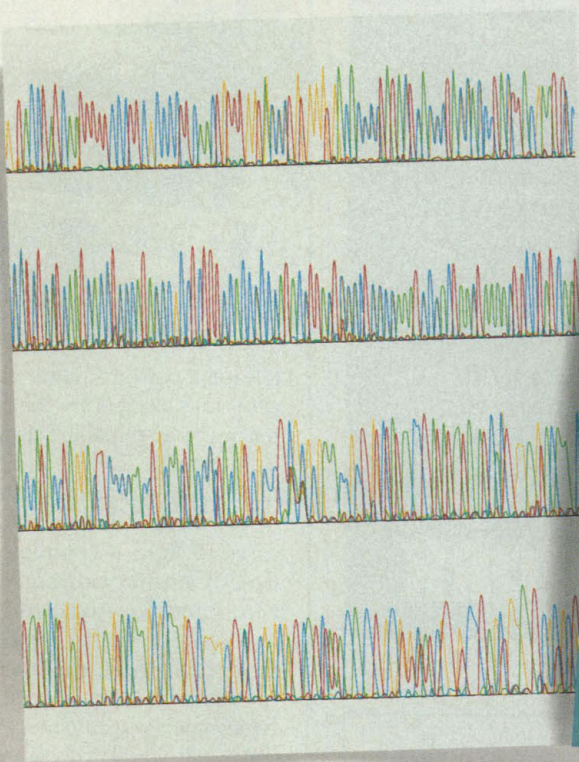
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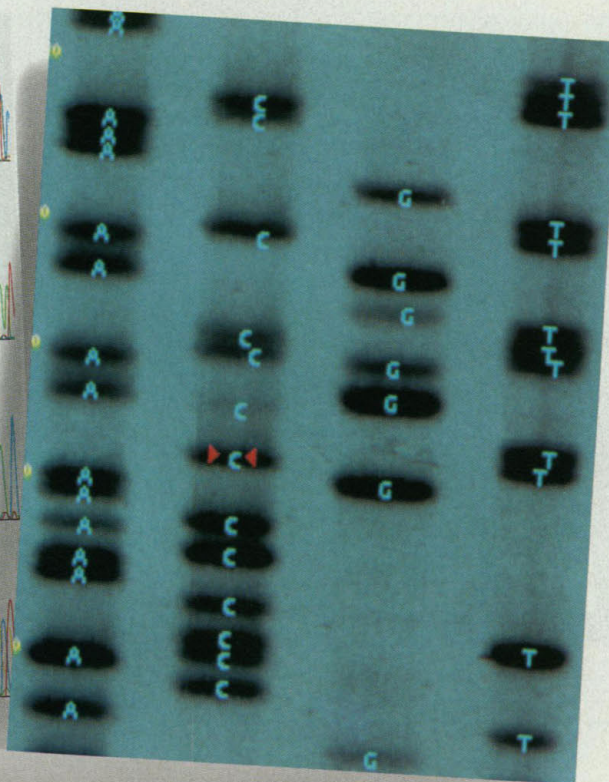
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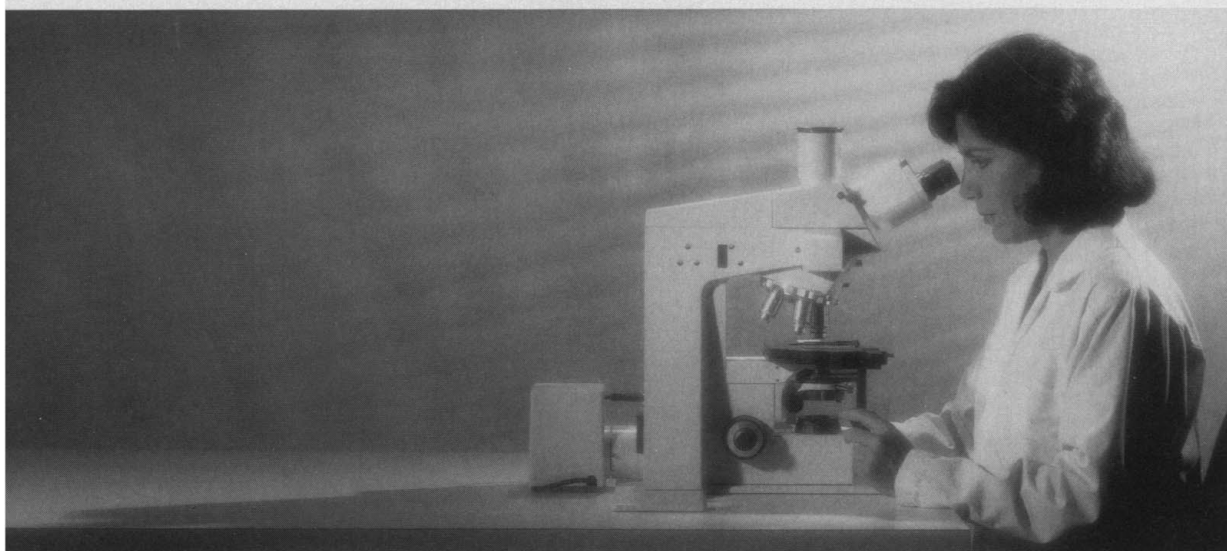
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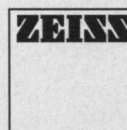
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