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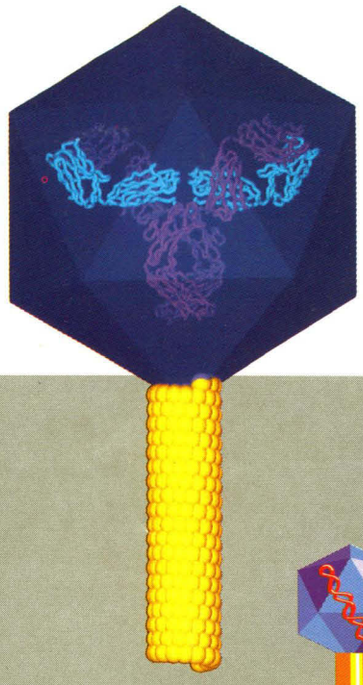

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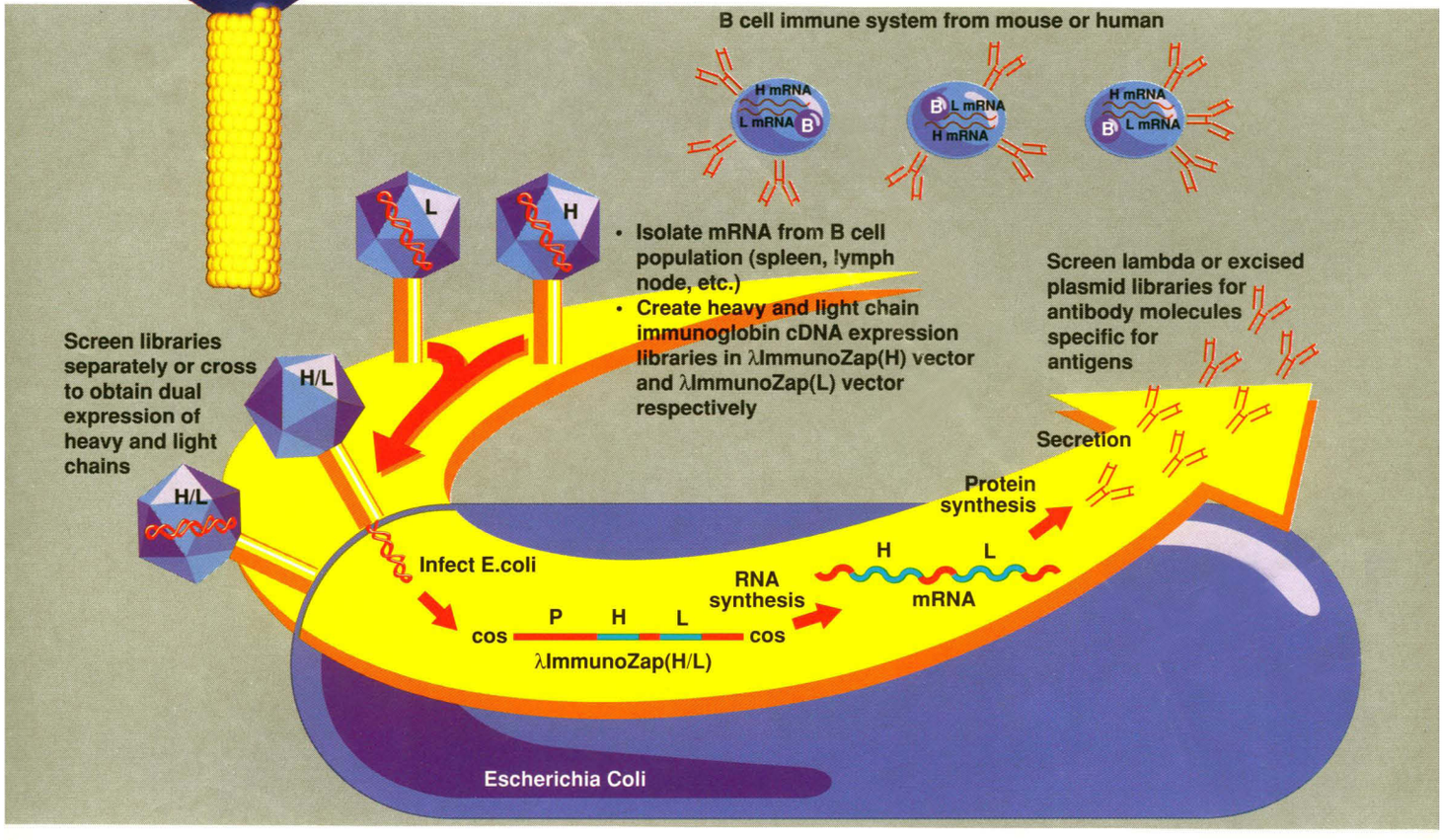

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1. "Cloning of the immunological repertoire in *E. coli* for generation of monoclonal catalytic antibodies: Construction of a heavy chain variable region-specific cDNA library". Proc. Natl. Acad. Sci. 86:5728-5732, 1989.

2. "Generation of a large combinatorial library of the immunoglobulin repertoire in phage lambda" Science 246: 1275-1281, 1989.

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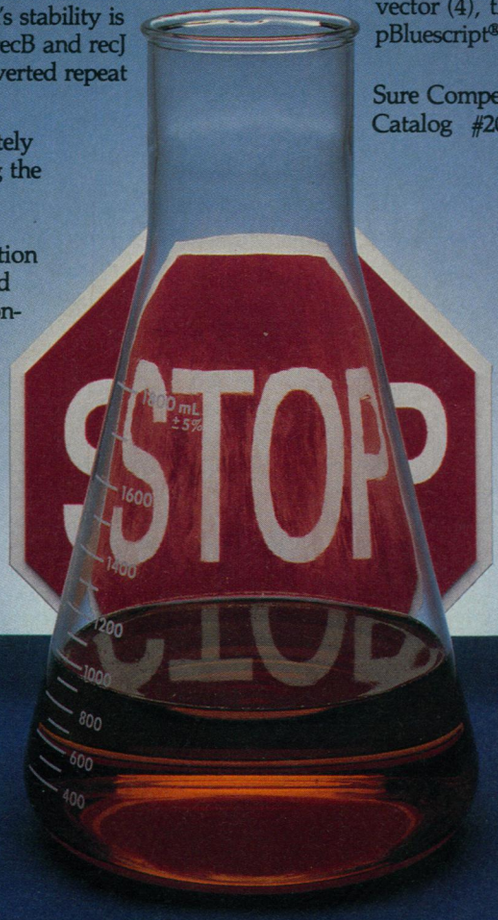

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2. Wahl, G.M., et al., Proc. Natl. Acad. Sci. USA 84, 2160 (1987).

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STABILITY OF INVERTED REPEATS IN VARIOUS *E. COLI* STRAINS.

Strain	Percentage of cells generating rearranged plasmid per generation
AG1	15-20
DH5α	15-20
C600	20-25
NM621	20-25
HB101	15-20
TB1	20-25
DL538	20-25
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TABLE #1: Percent rearrangement calculated from the number of cells maintaining a tester plasmid carrying an unstable inverted repeat in its unrewarding configuration (chloramphenicol resistant) divided by the total number of plamid-containing cells.

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COVER Basalt lava erupted from Kilauea Volcano, Hawaii, pours 3 meters from a shallow tube into the Pacific Ocean. The current eruption began in January 1983; the lava produced now covers 70 square kilometers, including 150 acres of new land formed along the seacoast. Analysis of more than 20 years of ground deformation data suggests that Kilauea's magma system is deeper and more extensive than previously thought. See page 1311. [Photographed on 27 November 1989 by J. D. Griggs, U.S. Geological Survey]

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Underground plumbing at Kilauea volcano

HAWAII's Kilauea volcano is one of the most active volcanoes in the world. An event that significantly altered the shape of the volcano and that has provided new clues to its inner workings was a large earthquake of magnitude 7.2 that occurred in 1975: the south flank of the volcano was pushed toward the sea and for the past 15 years the rest of the edifice has continued adjusting. Before and since that time, gradual deformations over a more than 500-square-kilometer area have been recorded; many eruptions and thousands of smaller earthquakes have also occurred (cover). The great extent of the deformations, described on page 1311, has led Delaney *et al.* to propose that the surface of the volcano is responding to changes deep within its interior, where a dike-like magma system may be inflating. The well-known but less extensive magma chamber that is at Kilauea's summit could not account for the widespread and sizable surface deformations.

Deforestation and its sequelae

IF the current rate of deforestation in Amazonia continues, there may be no rain forest there 50 to 100 years from now. Loss of forest and its replacement with degraded pasturelands induces major changes on the earth and in the atmosphere, including the development of warmer soil and a warmer land surface, reduced evaporation, longer dry seasons with perhaps more forest fires, and a dramatic fall in the amount of precipitation. Because feedback with atmospheric circulation redirects the paths of storms and stabilizes a drier climate, reestablishment of the forest at a later time may be impossible. The dire outcomes of these related events are predicted on the basis of computer simulations with a coupled atmosphere-biosphere model run by Shukla *et al.* (page 1322). Besides the permanent effects on the local climate and on global atmospheric chemistry, deforestation of Amazonia could dramatically alter species diversity because about half the world's species, including many important pollinators for the forest, now inhabit the Amazon basin.

Advanced zeolite applications

ZEOLITES are microporous ceramics that have been used as catalysts, ion exchangers, and molecular sieves. Molecules and ions enter zeolites through pores, but until now this process has been difficult to observe. However, with the atomic force microscope, Weisenhorn *et al.* have been able to produce images of ions and neutral molecules as they are binding to pores on the surfaces of zeolites (page 1330). Neutral molecules of *tert*-butanol formed ordered arrays on the surfaces of clinoptilolite (a natural crystal of zeolite from Succor Creek, Oregon), whereas in an ion exchange situation (*tert*-butyl ammonium ions) clusters formed on the surfaces instead; formation of the clusters and of the arrays could be followed in real time. When a larger force was applied to the surface by the microscope tip, the ions and molecules could be moved about and redistributed in new patterns. That such manipulations are possible indicates that zeolites will have applications besides the ones already known: for example, zeolite biosensors with arrays of receptors could be monitored for the attachment of absorbing species and their surfaces regularly "refreshed" by removing such molecules from them.

Silkmoth developmental hormone cloned

ONLY four cells in the brain of the silkmoth *Bombyx mori* are known to secrete prothoracicotropic hormone (PTTH). Nonetheless, PTTH is an important substance for the development of this insect because it stimulates the production of ecdysone, which is an essential hormone for the silkmoth's growth, molting, and metamorphosis. Despite difficulties in collecting PTTH and in unraveling its structure, Kawakami *et al.* have now cloned the complementary DNA for PTTH; the strategy that they have used is described on page 1333. The amino acid sequence of the hormone was deduced, and this has led to a better understanding of the structure of the molecule. When the cloned DNA was inserted into bacteria, the bacteria expressed active PTTH molecules. Through the use of antibodies to PTTH and complementary RNA molecules that bound to messenger RNA molecules inside cells, the locations of the two pairs of neurosecretory cells that make PTTH were identified in the *Bombyx* brain.

Probe for enteric hepatitis virus

PROBES for non–A, non–B hepatitis viruses, so called because they are not detectable by laboratory tests for the A and B forms of the virus, are now being developed. Last year the hepatitis C virus, which is transmitted sexually and in the blood, was identified. In a report by Reyes *et al.*, genetic material from the hepatitis E virus (HEV)—it is transmitted through a fecal-oral or enteric route—has been positively identified (page 1335). HEV has caused major epidemics in areas of the world where sanitation is poor, where drinking water is contaminated, and where people are malnourished. Up to 20% of pregnant women who contract this viral infection may die. In the studies reported, macaques were inoculated with fecal material from an infected person. Virus-like particles appeared in the gall bladder bile of these animals, and the bile was then used to induce disease in other monkeys. The genetic material of HEV was found to be single-stranded RNA; this RNA encoded an RNA-directed RNA polymerase. Only diseased individuals had the HEV genetic material; its presence in infected individuals from five geographically distinct areas—Mexico, Tashkent, Somalia, Pakistan, and Borneo—suggests that HEV genes may be highly conserved. ■ RUTH LEVY GUYER

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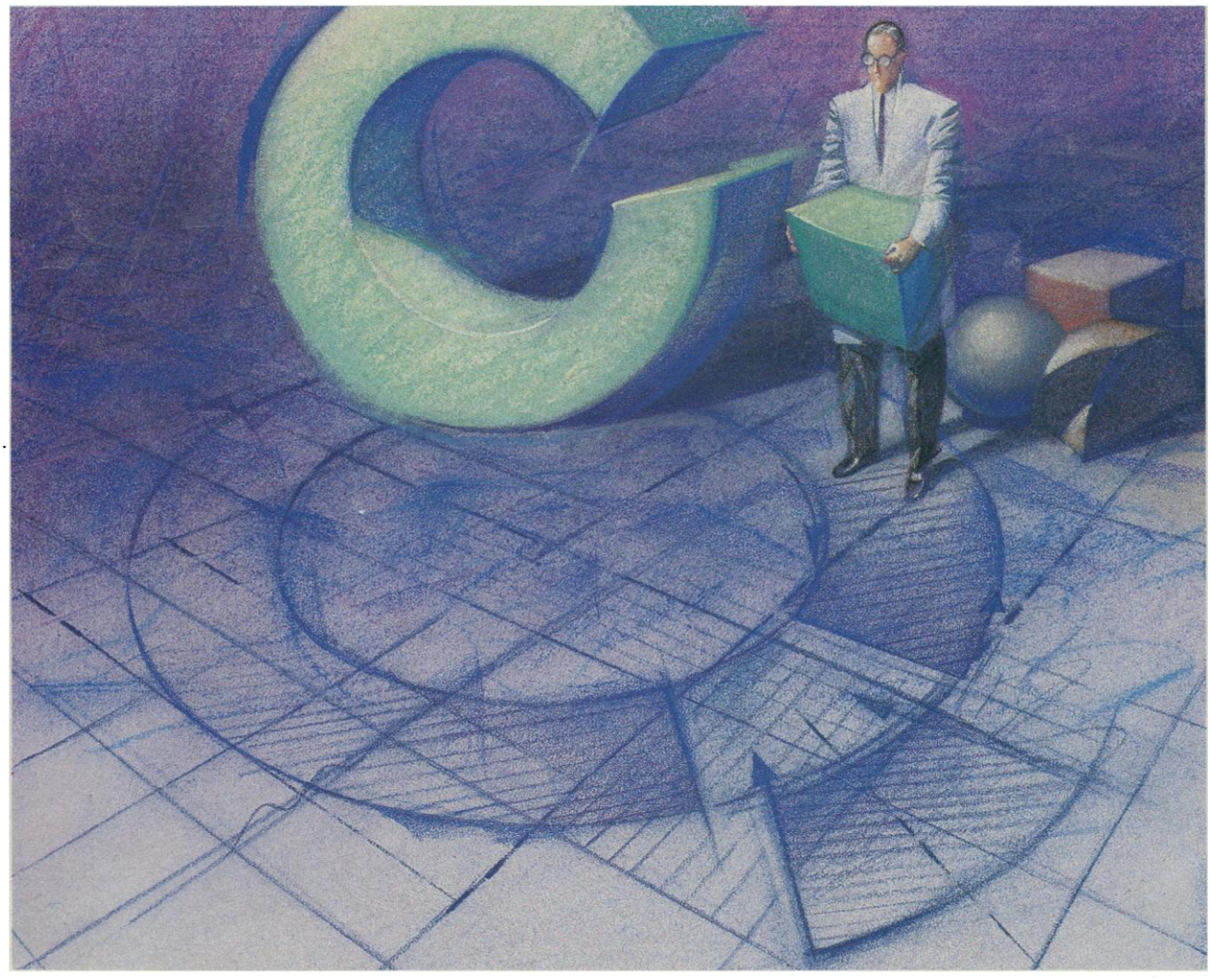

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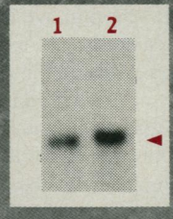

Figure 1.
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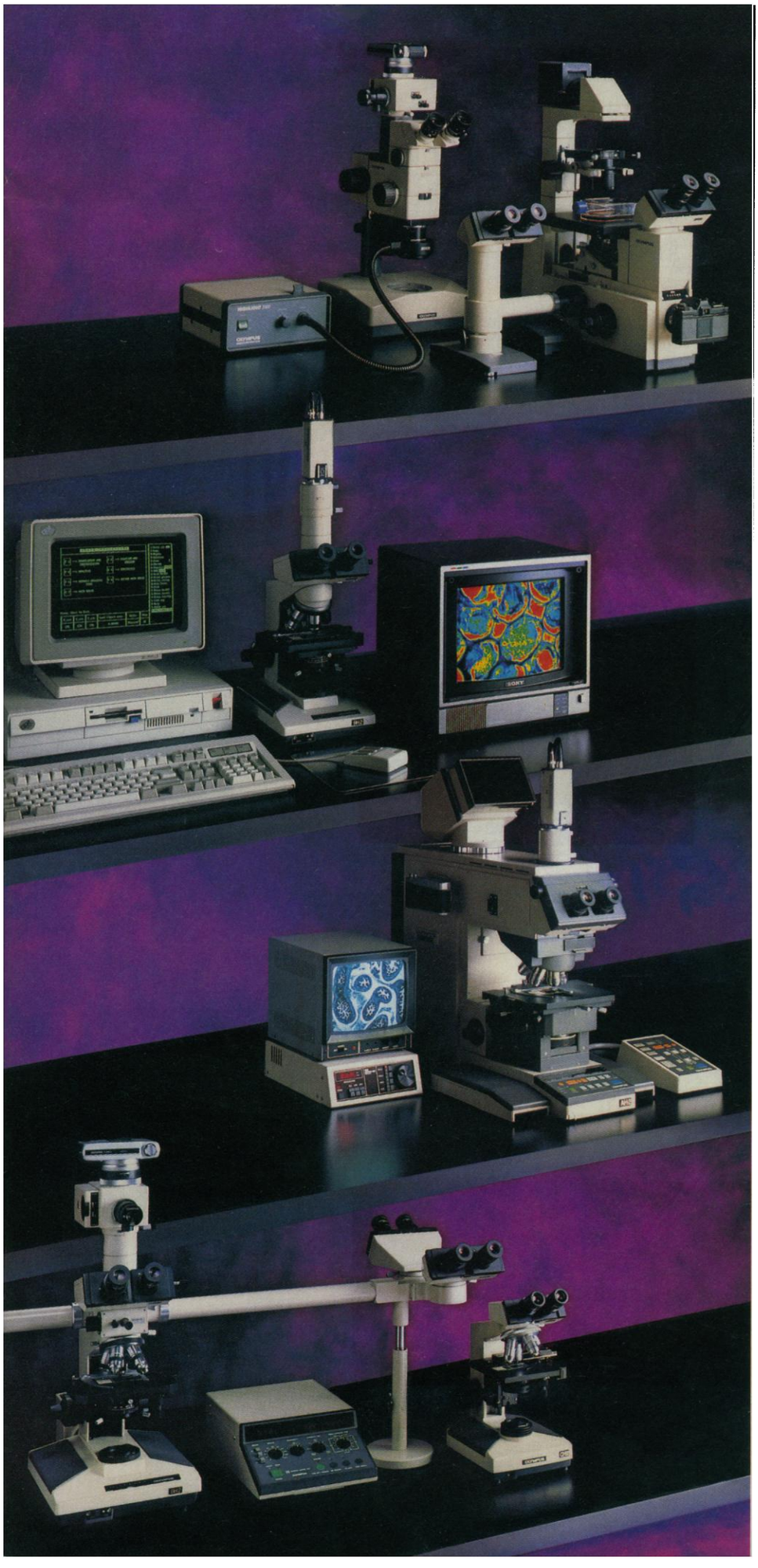

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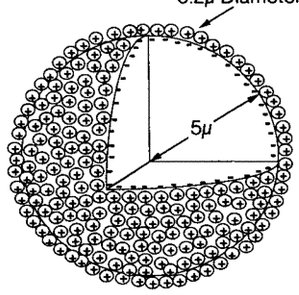

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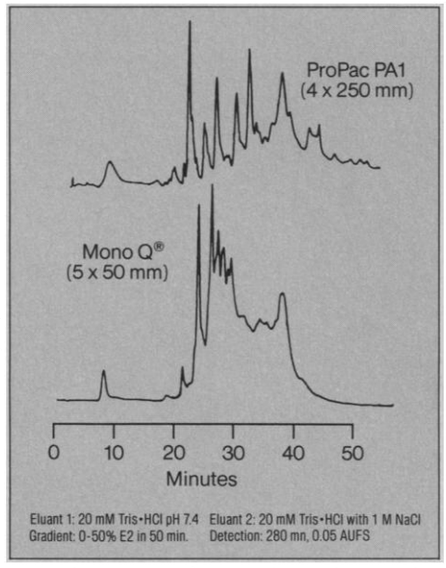

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Cytochrome C	12.4	10.7	0.8–66
BSA	67.1	4.9	0.8–200
Myoglobin	16.9	7.1	0.8–66
Ovalbumin	43.1	4.6	0.8–66
Carbonic Anhydrase	31.1	6.2	5.0–125
Apoferritin	669.0	—	3.0–200

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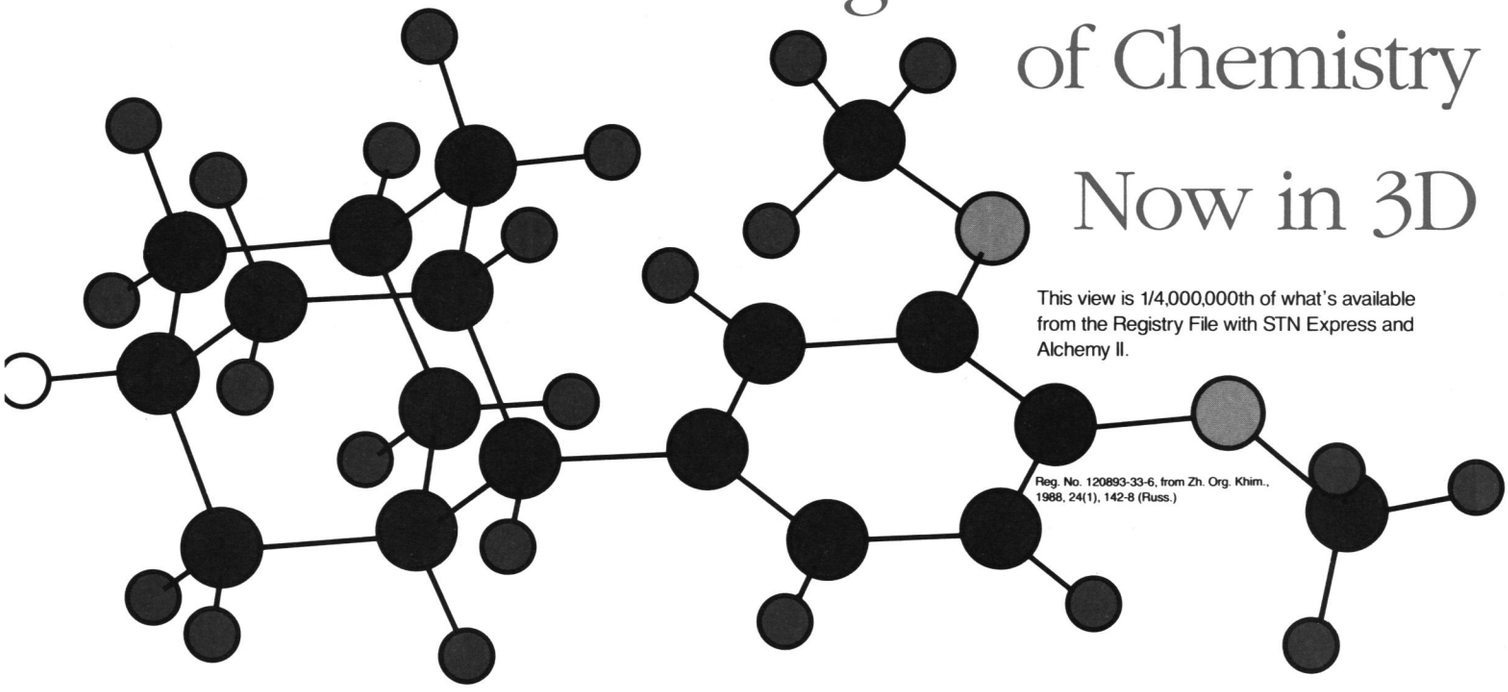

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American Chemical Society
American Geophysical Union
American Institute of Biological Sciences
American Institute of Physics
American Physical Society
American Psychological Association
American Society for Agronomy/ Crop Science Society of America/ Soil Science Society of America
American Society of Mechanical Engineers
American Society for Microbiology
American Society of Plant Physiologists
American Society of Zoologists
American Veterinary Medical Association
Biophysical Society
Engineering Society of Detroit
Geological Society of America
Institute of Electrical and Electronics Engineers
National Society of Professional Engineers
Office of Technology Assessment
Society for Research in Child Development

Applicants for these fellowships should apply directly to the appropriate professional society. Stipends, application procedures, timetables, and deadlines vary by society. For further information about the program, contact each society directly. A list of the societies, with mailing addresses and contact people, is available from:

Congressional Science and Engineering Fellowship Program
American Association for the Advancement of Science
1333 H Street, NW, Washington, DC 20005

Minorities and persons with disabilities are encouraged to apply.