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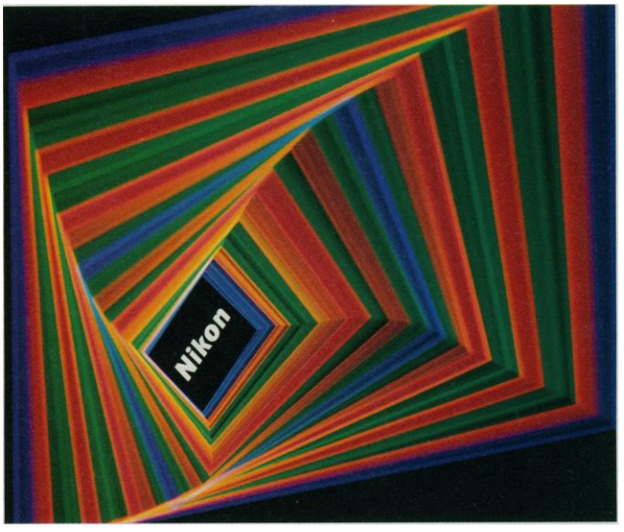

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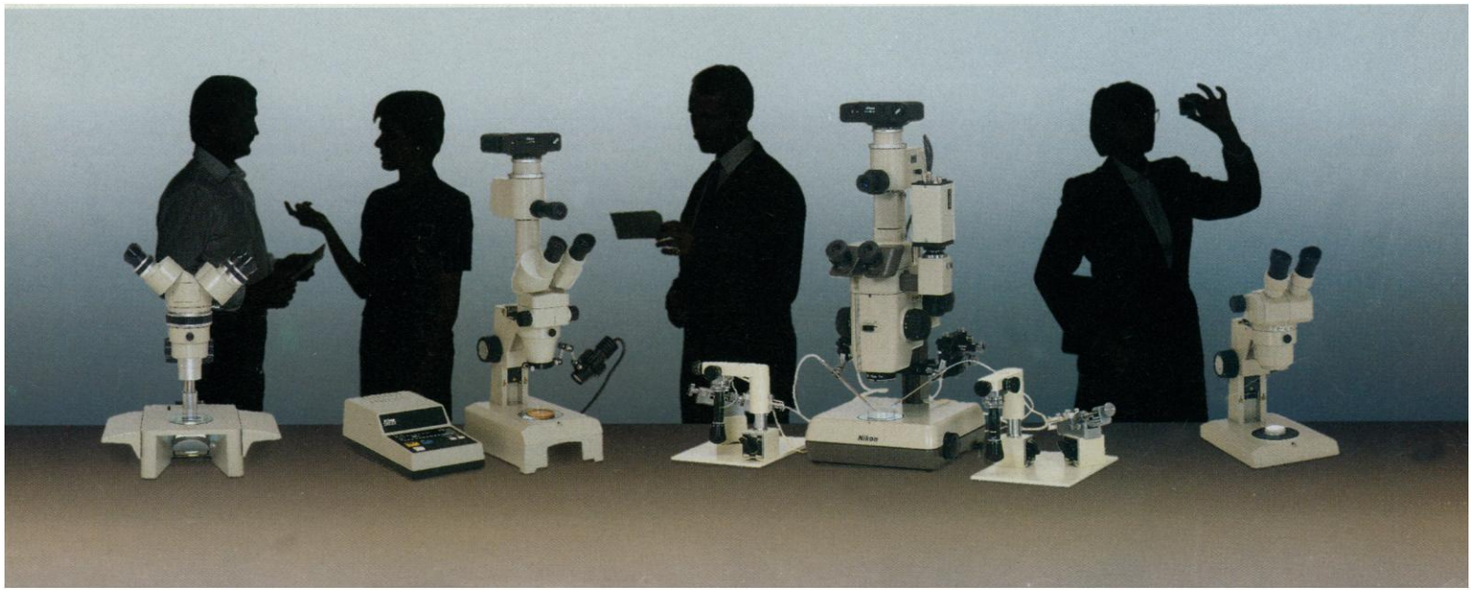

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COVER Supercomputer simulation of an astrophysical jet. This density image reveals the basic physical features seen in extragalactic radio sources, including a narrow radio jet, a planar shock at the jet terminus, and an extended turbulent lobe, or cocoon, of gas. See page 522. [Image by M. L. Norman, J. O. Burns, D. A. Clarke, and the National Center for Supercomputing Applications]

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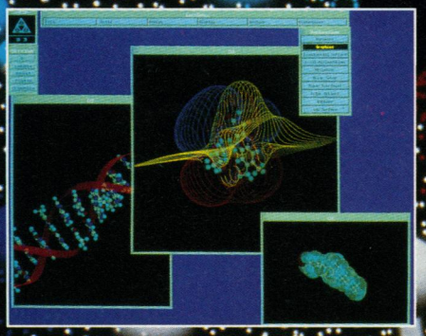

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Pesticide bans

There are complicated health, safety, environmental, political, and economic issues associated with the use and withdrawal from use of pesticides. Pesticides increase agricultural productivity, but when health or environmental costs become unacceptable they can be banned; increasingly in recent years the banning of various pesticides has been suggested. Zilberman *et al.* consider the economic impacts of banning a single pesticide (the example used is parathion, a chemical that protects lettuce plants from aphids) and of broadly banning pesticides, as was proposed in California's recently defeated Proposition 128 (page 518). The cost-benefit equations include diverse factors such as whether ready substitutes exist for the banned substances and whether consumers, producers, or only subsets of these groups will lose economonically when a ban is imposed. Use fees and partial bans appear to be as or more effective than complete bans in achieving environmental and safety goals, and the authors propose that fees collected would best be applied to the development of alternative pest-management strategies.

Remembrance of things past

By the age of four most children automatically use the correct words for the past tense forms of verbs, even verbs such as *be*, *go*, *see*, and *have* that have irregular forms. In addition, most people automatically say *met* and *meted* when the past tense forms of the homonyms *meet* and *mete* are called for. How do these grammatical patterns so reliably become fixed in the human brain? How is rapid consensus on past tense inflection reached when new words, such as *fax* and its past tense *faxed*, enter common parlance? Two theories have been proposed to account for language acquisition and related aspects of cognition—associationism, which views the brain as a network in which connections are made, reinforced, and eventually set, and rule-and-representation theories in which the brain, acting as a set of genetically determined computational modules, applies rules to symbolic data. Pinker discusses how both theories apply to the issue of past tense inflection, with associationism explaining the formation of past tense forms of irregular verbs and rule-based theories accounting for proper inflection of regular verbs (page 530). Understanding of the rules of language has come from the study of language development in children, usage patterns in adults and children, results of tests in which participants guess at likely past tense forms for nonsense words, and case studies of individuals with brain lesions that affect only segments of their language skills.

Formation of planetary systems

The terrestrial planets are thought to have formed from planetary embryos derived from the primordial circumstellar solar nebulae. In a new series of Monte Carlo computer simulations, Wetherill has examined and developed further the likely outcomes of such a scenario (page 535). The new simulations look at what happens as planetary material accumulates and gravitational perturbations and collisions occur not only in the region where the terrestrial planets now exist (which was the region included in earlier simulations) but also in the asteroid belt out to a distance of 3.3 AU. The simulations indicate that even though embryos in the original swarm are present in the asteroid belt, planets would not necessarily reside in the belt; perturbations and collisions between objects in the terrestrial planet region and the asteroid belt would contribute to the clearing of large bodies from the belt region. The new simulations produce the observed distribution of planets even for different assumptions about the evolution and role of Jupiter and lead to predictions of how planets would be positioned in other planetary systems that are evolving in association with other sun-like stars.

Foamy viruses

Foamy viruses were first isolated from humans some 20 years ago, yet in the intervening years it has not been possible to associate them with any specific pathology. A study by Bothe *et al.* shows that when human foamy virus genes are introduced into mice and expressed, the transgenic mice develop neurologic and muscular problems, and these "founder" mice can pass the pathologic phenotype to their offspring (page 555). The transgenic mice became blind, were ataxic, and developed spastic muscular weakness of the limbs. Because the deteriorating tissues did not show signs of inflammation, the damage appears to be due directly to the expression of the viral gene products rather than to an immune response on the part of the host.

Allergy to profilin

Profilins are proteins that are common to a range of plant pollens and that are also found in humans, slime molds, yeast, mice, and many other organisms. They play a part in actin polymerization and in signal transduction in cells. About 10% of people who are allergic to white birch pollen have been found to have IgE antibodies to profilin; cloned white birch pollen profilin and natural birch profilin were used in the search for such antibodies (page 557). The antibodies also reacted with profilin of human origin. Both human and birch profilin caused an allergic reaction—histamine release—in basophilic cells taken from the blood of people allergic to birch pollen; histamine was not released from basophils of nonallergic individuals or in those from individuals allergic to other plant allergens. Titers of antibodies to another birch pollen rise and fall in accord with the pollen season, but those of profilin were found to remain the same all year. Valenta *et al.* suggest that these unwavering levels of IgE antibodies might be the result of regular boosting of the titer of anti-profilin antibodies by cross-stimulatory human profilin. ■ RUTH LEVY GUYER

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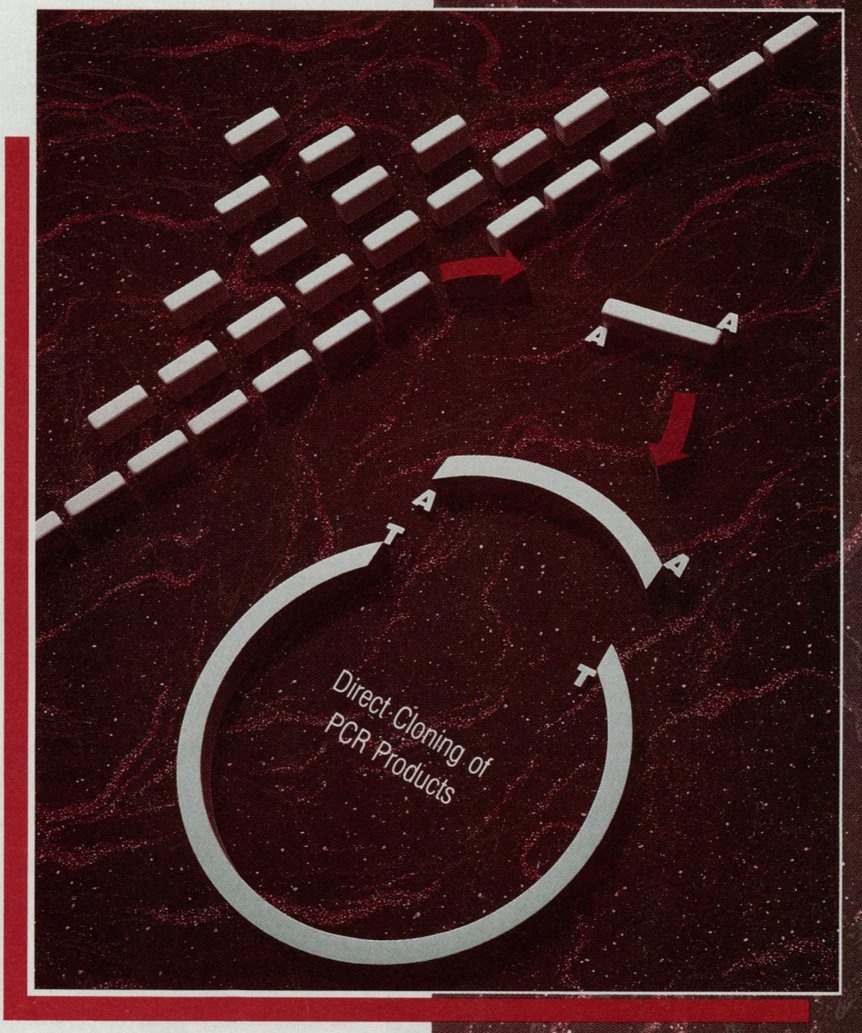

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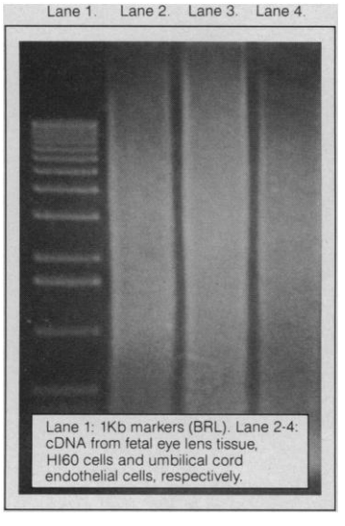
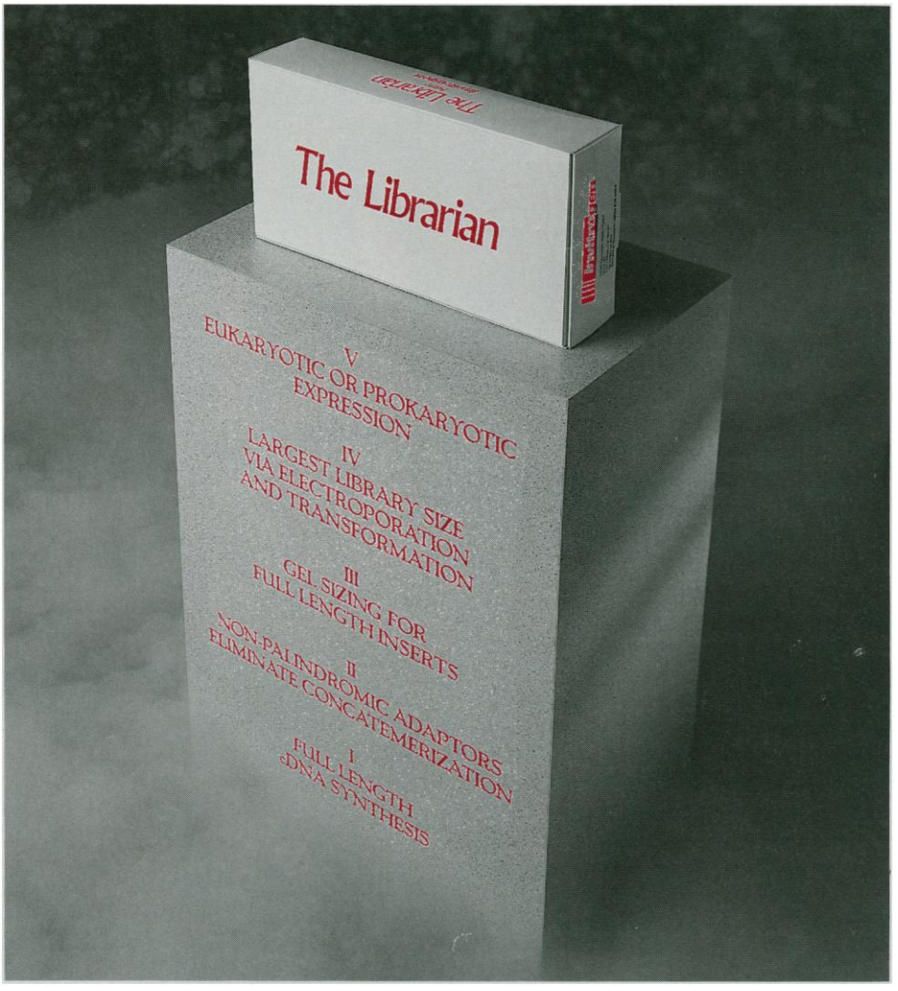


Lane 1: 1Kb markers (BRL). Lane 2-4: cDNA from fetal eye lens tissue, HI60 cells and umbilical cord endothelial cells, respectively.



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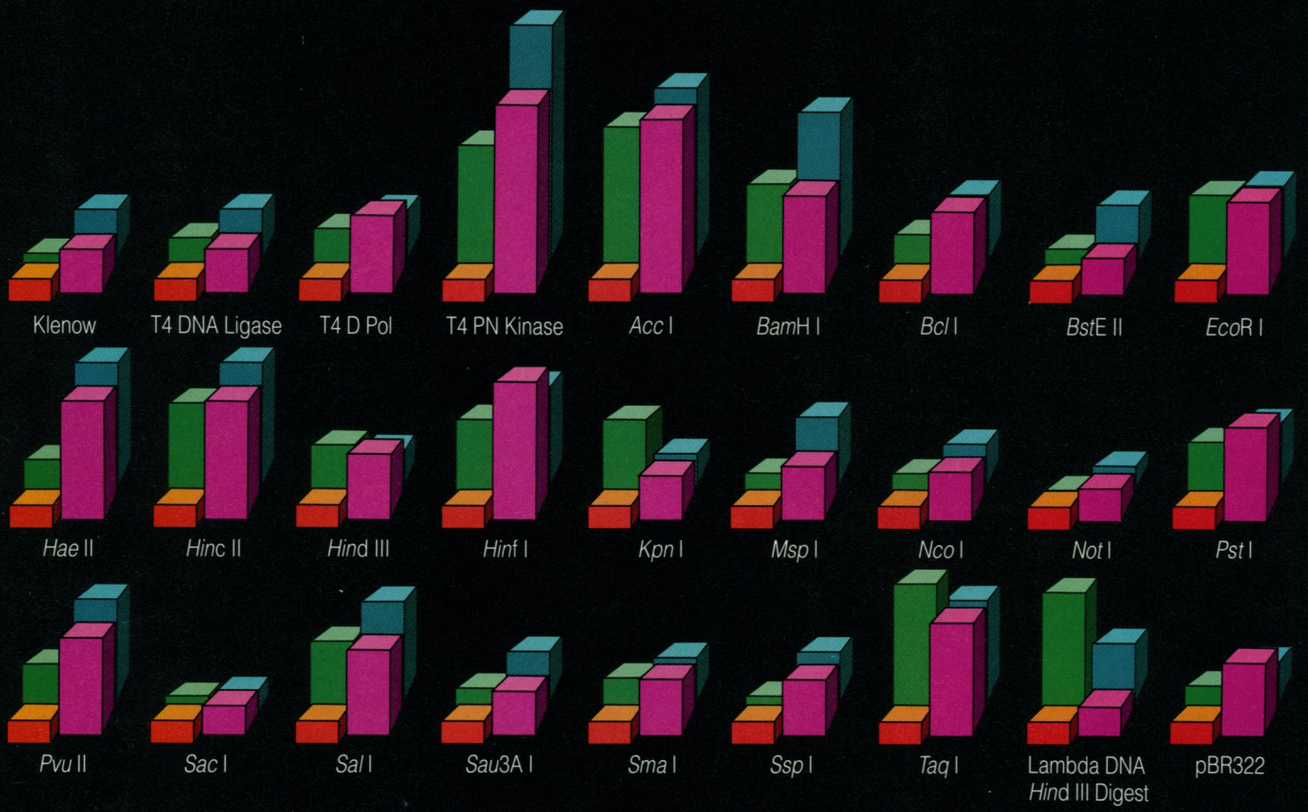

These charts compare the small package retail price for a selection of modifying enzymes and restriction endonucleases common to four of the major suppliers in the US. The data represents the relative $/unit cost.
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