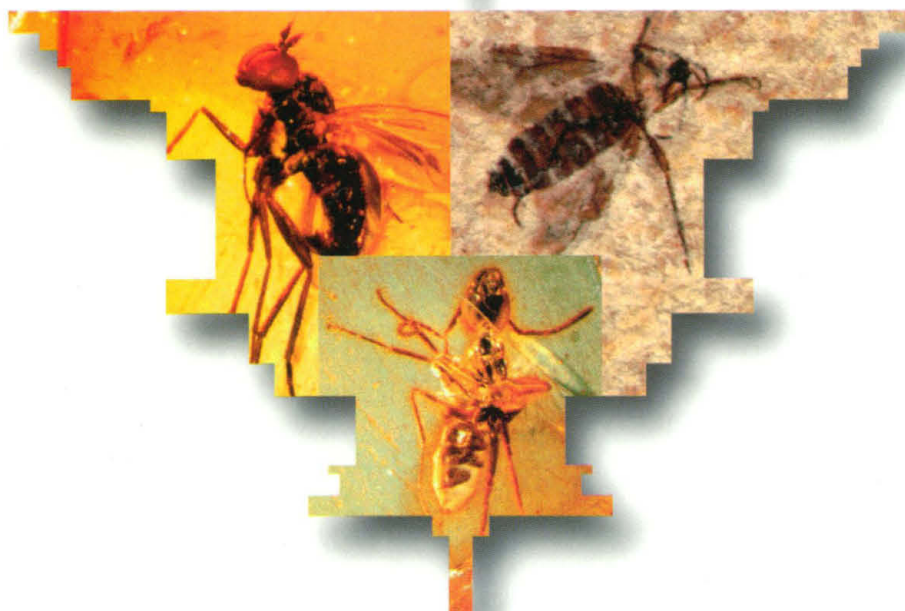


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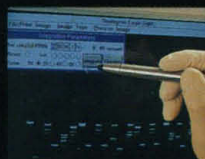
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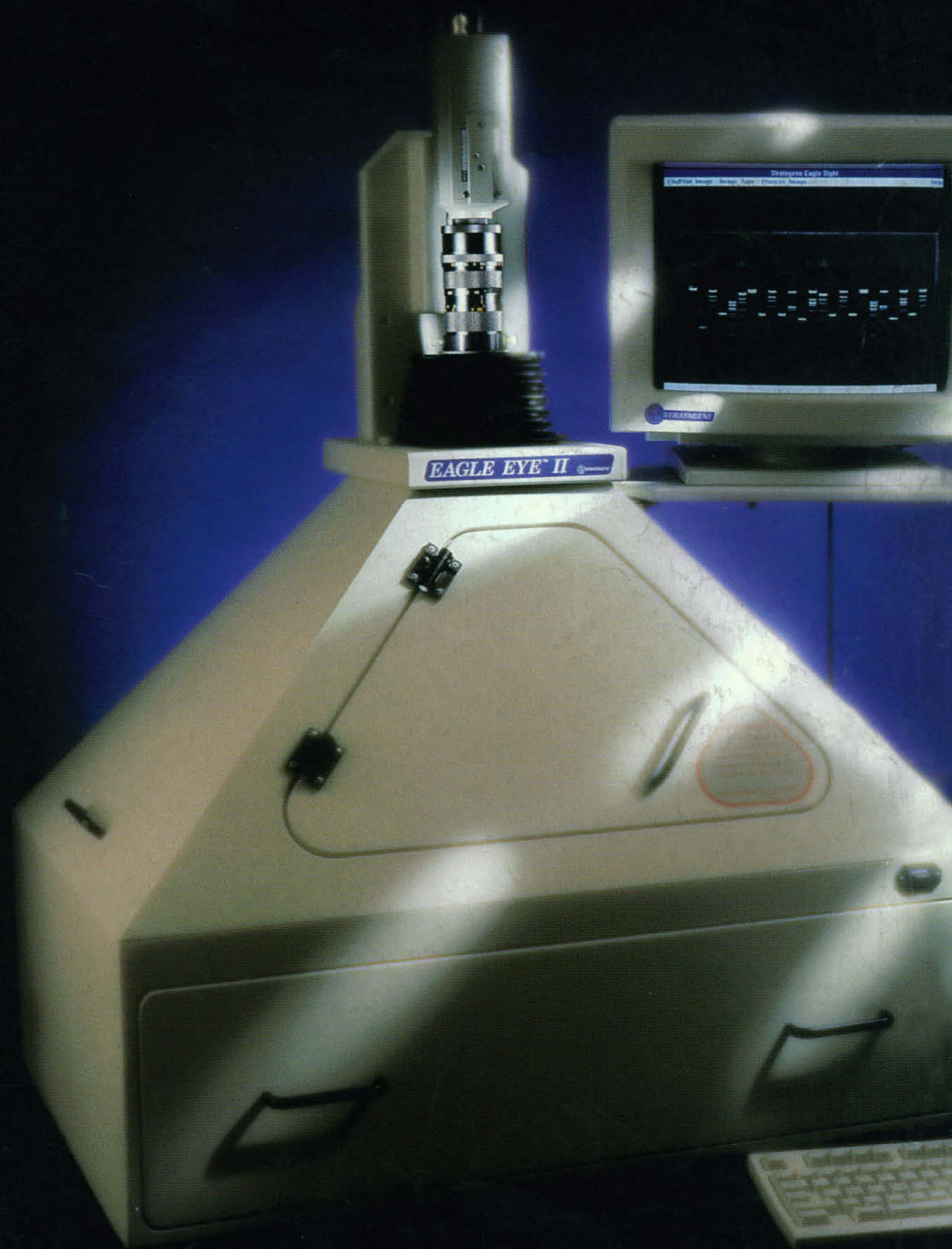
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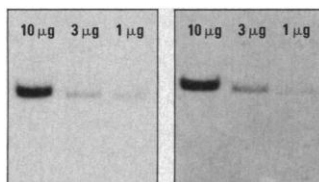
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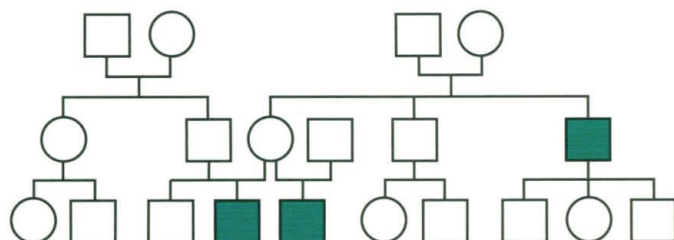
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Spindle diversity diagram for Heteroptera (true bugs) from 250 million years ago to the present, representing 39 families at its widest extent; a typical heteropterian adult (stink bug) is depicted at the top. Data from the fossil record indicate that modern insect diversity

results from low extinction rates rather than high origination rates. See page 310. Insets: early Oligocene insects—from Baltic amber, a scuttle fly (left) and an ant (bottom), and from the Florissant beds, a March fly (right). [Illustration: Finnegan Marsh]



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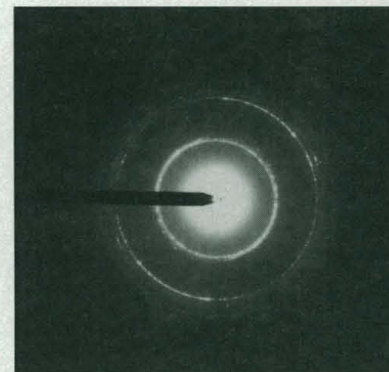


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Waves of calcium release in sea urchin eggs

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Harder than diamond



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Insect history

Insects are particularly diverse and abundant on Earth today, and in a survey of insect families through time, Labandeira and Sepkoski (p. 310) show that the fossil record of insects is also rich throughout most of their

390-million-year history. Their analysis shows that insect diversity, as preserved in the fossil record, exceeds that of tetrapods since before about 325 million years ago, when a major radiation began. One reason is that extinction rates of insect families were continually low compared to those of other groups. Insect diversity does not

seem to have been greatly accelerated by the evolution of angiosperms in the Cretaceous (144 to 66 million years ago); instead, the radiation of modern insects began about 100 million years earlier

□

Cooler under the equator

Chemical analysis of samples of the mantle carried along by basalts or exposed by deep faults can be used to infer the local temperature of the mantle. Bonatti *et al.* (p. 315) used such an approach, along with data on topography and gravity, to show that the mantle upwelling beneath the mid-Atlantic ridge is 150°C or more cooler near the equator than elsewhere along the ridge system. With more limited data, they suggest

Genetics and male homosexuality

A pedigree study of families of homosexual men and a DNA linkage analysis of families in which there were two gay brothers indicate that at least one subtype of male homosexuality is genetically influenced. Hamer *et al.* (p. 321) found a high rate of incidence that a male homosexual has maternal uncles or cousins who are gay, suggesting transmission of an X chromosome-linked trait. DNA markers to a subtelomeric region on the long arm of the chromosome Xq28 were linked to male homosexuality with an odds ratio of 1 in 10,000. In a news story, Pool (p. 291) discusses the implications of this finding.

that anomalously cold mantle may also underlie the equatorial part of the East Pacific Rise. If this is the case, then a belt of colder mantle may underlie the equator.

□

Realizing hard predictions

Materials development often relies on finding useful substances, either in nature or through exploratory synthesis, but sometimes more rational design routes succeed. Niu *et al.* (p. 334) report on their synthesis of films of β - C_3N_4 , a material that was theoretically predicted to be harder than diamond (see the Perspective by Cohen, p. 307). Carbon vapor, ablated from a graphite target, reacts with atomic nitrogen to form covalently bonded carbon nitride. Electron diffraction shows the material to have the β - C_3N_4 structure, and qualitative tests indicate the films to be robust and hard.

□

Space magnet

When the Galileo spacecraft passed within 1600 kilometers of the 7-kilometer-radius asteroid Gaspra, its magnetometer unexpectedly recorded two changes of ambient magnetic field direction shortly before

and after the encounter. Although such variations in the interplanetary magnetic field are fairly common, the geometry of these two field rotations strongly suggest that the changes were due to the magnetic influence of the asteroid, according to Kivelson *et al.* (p. 331). For the signature detected by Galileo to be due to the draping of the solar wind magnetic field around Gaspra, its surface magnetism must be as strong as the Earth's. How Gaspra could be so strongly magnetized is a puzzle; the authors suggest that it must have cooled bodily in the presence of a large external field.

□

Swimming expert

Fish drive their swimming by moving their tails, but it has generally been thought that the anterior muscles provide most of the power. Not so, say Rome *et al.* (p. 340), who were able to isolate and stimulate individual muscle bundles in the scup. Most of the power comes from posterior muscles that are specifically adapted for the job.

□

Making waves

Eggs that are fertilized by sperm undergo a transient increase in the concentration of intracellular Ca^{2+} that moves as a wave

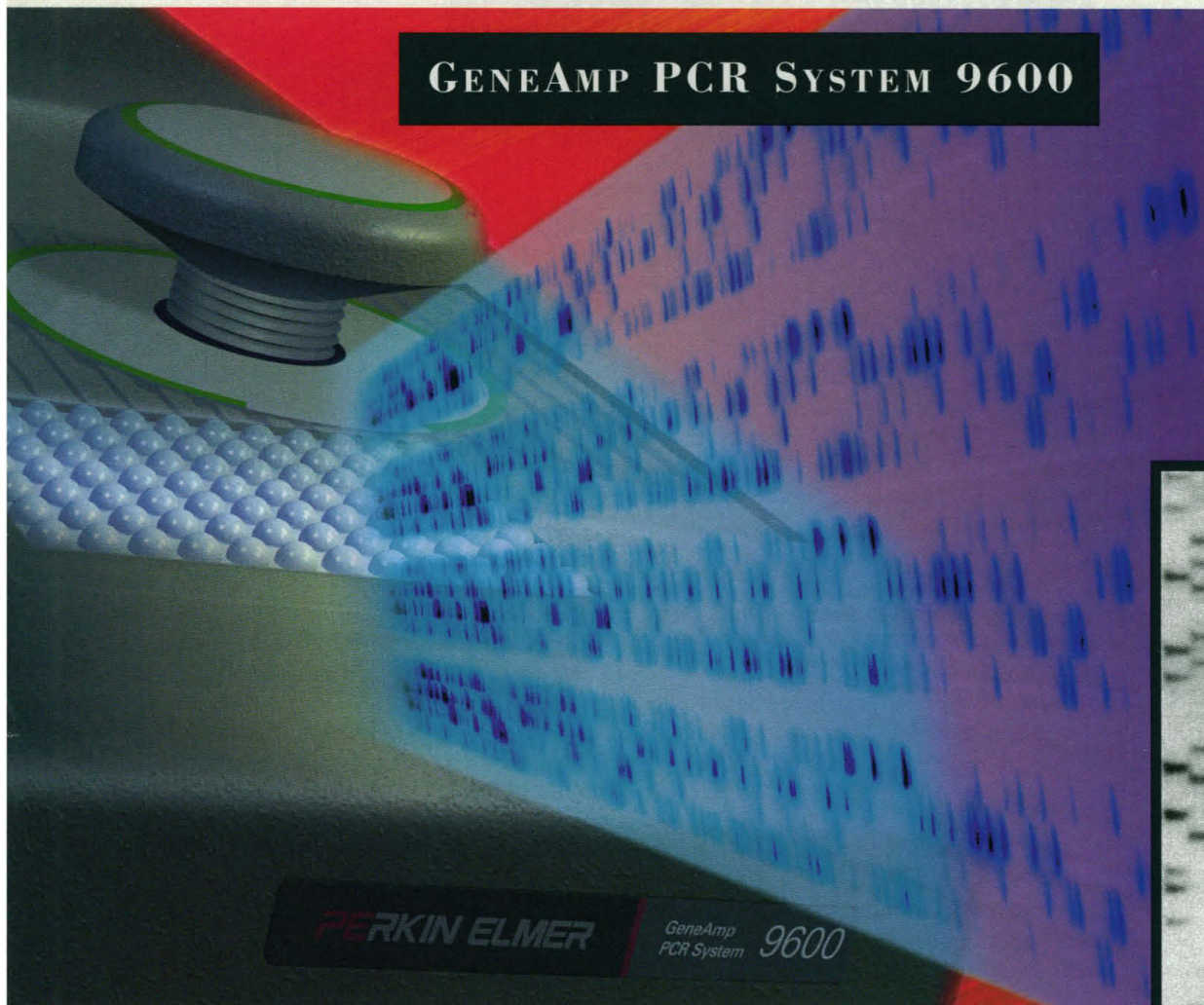
across the cytoplasm. The Ca^{2+} ions can be released from intracellular stores by inositol trisphosphate (IP_3) or the more recently recognized Ca^{2+} -mobilizing agent cyclic adenosine diphosphate-ribose (cADPR). Lee *et al.* (p. 352) and Galione *et al.* (p. 348) describe experiments which show that both of these mechanisms are used to promote Ca^{2+} release after fertilization of sea urchin eggs. In fact, activation of Ca^{2+} release by either of these agents is sufficient to trigger generation of a wave of Ca^{2+} -induced Ca^{2+} release and induce the cortical exocytosis reaction. The redundancy of these signaling mechanisms may reflect the essential nature of the initial Ca^{2+} signal for proper development of the fertilized egg.

□

Old mouse model made new

Mice that bear the *xid* mutation have an X chromosome-linked B cell defect that makes them unable to respond to polysaccharide antigens. In two reports, Thomas *et al.* (p. 355) and Rawlings *et al.* (p. 358) present results from backcross analyses which show that the *xid* mutation cannot be separated from the gene for Bruton's agammaglobulinemia tyrosine kinase, *btk*, a gene that is implicated in a human immune deficiency. They find that the *xid* mutation in *btk* is at a highly conserved arginine residue near the amino terminus. This mutation occurs in a region that is not critical for kinase activity and that may have a regulatory function. Indeed, the disease in mice is less severe and may prove more amenable for studying the role of tyrosine kinase signaling in this defect in normal B cell development.

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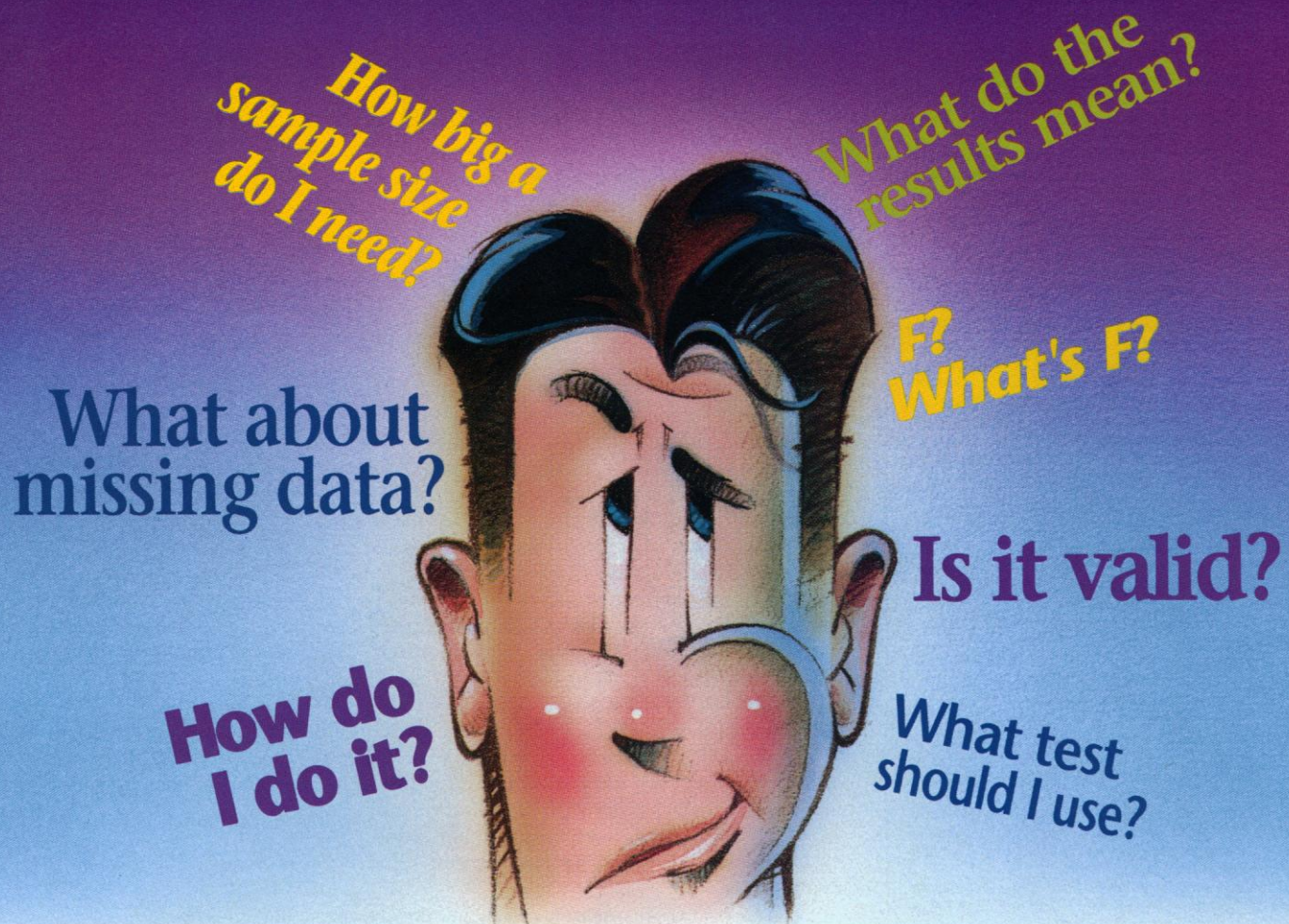
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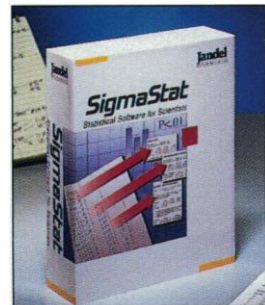
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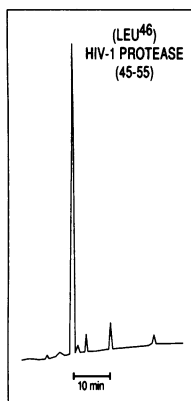
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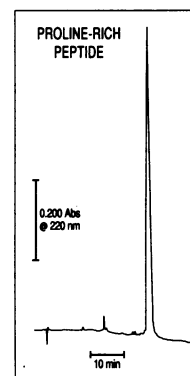
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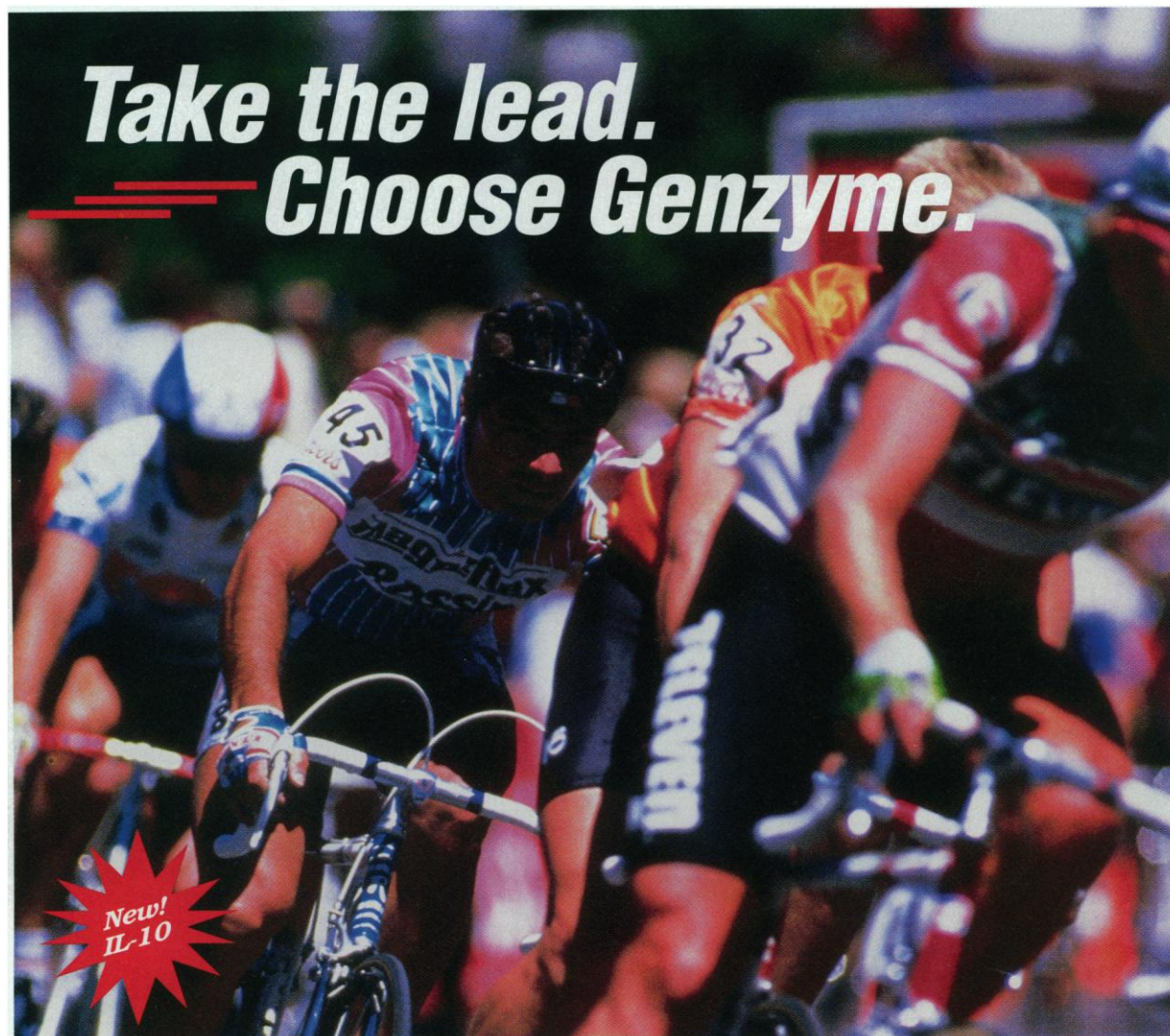
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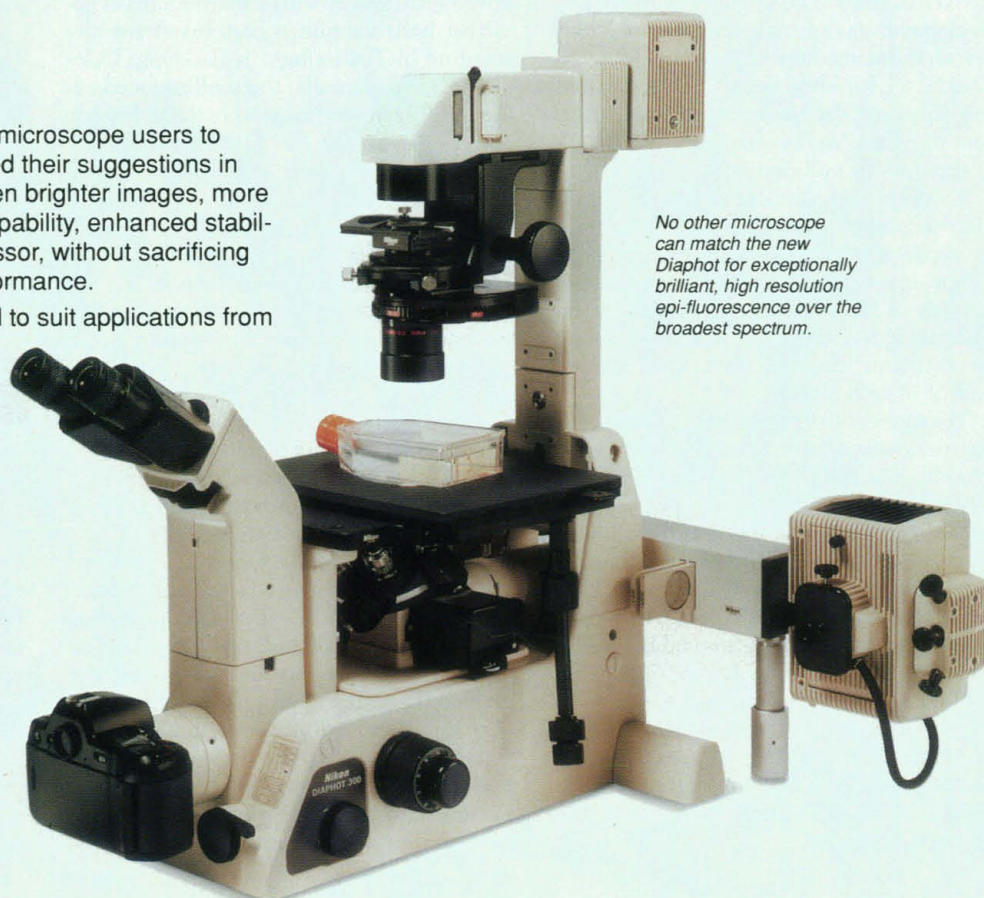
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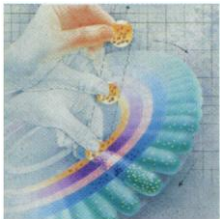
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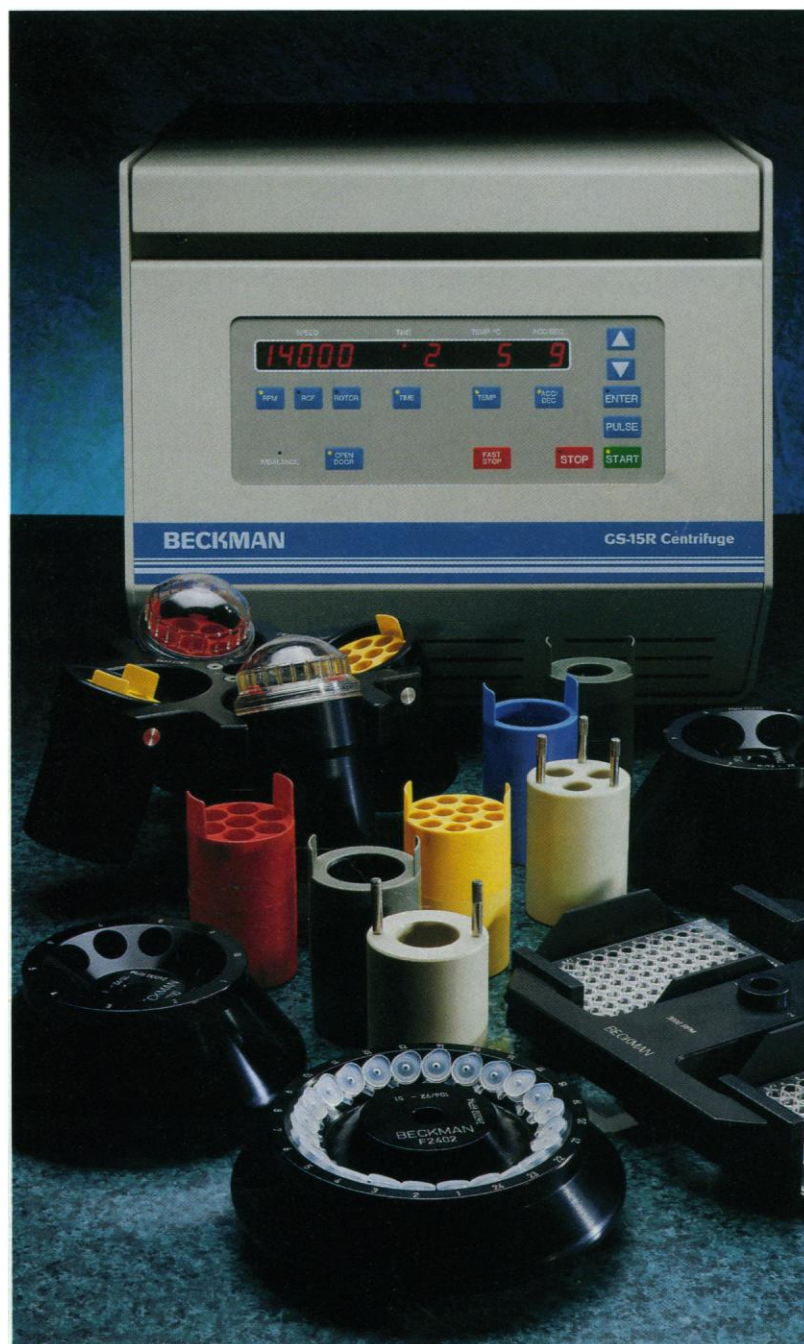
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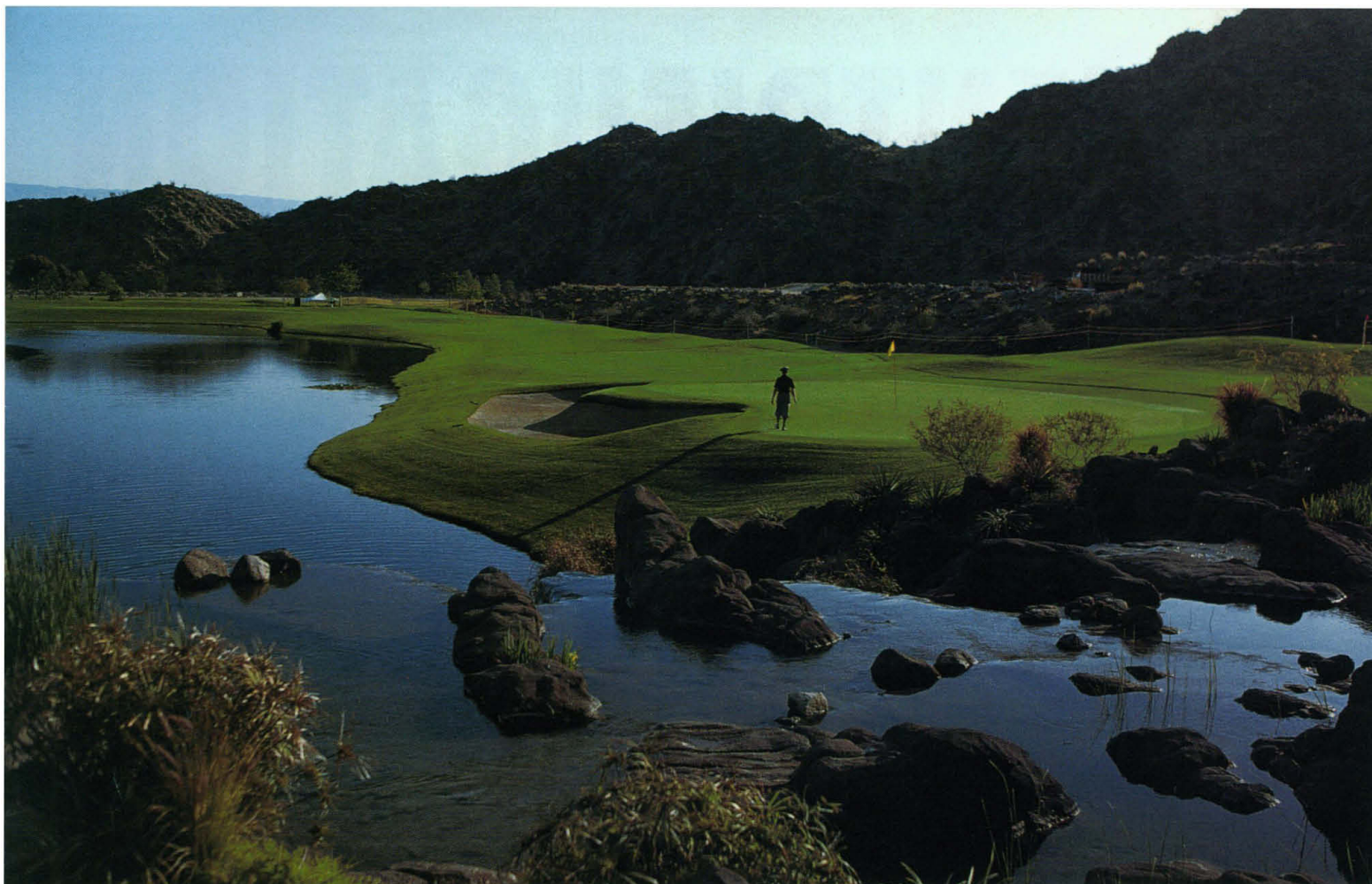


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3. A semiconductor plant testing for copper had its chromatographic results ruined by contamination in their water system.

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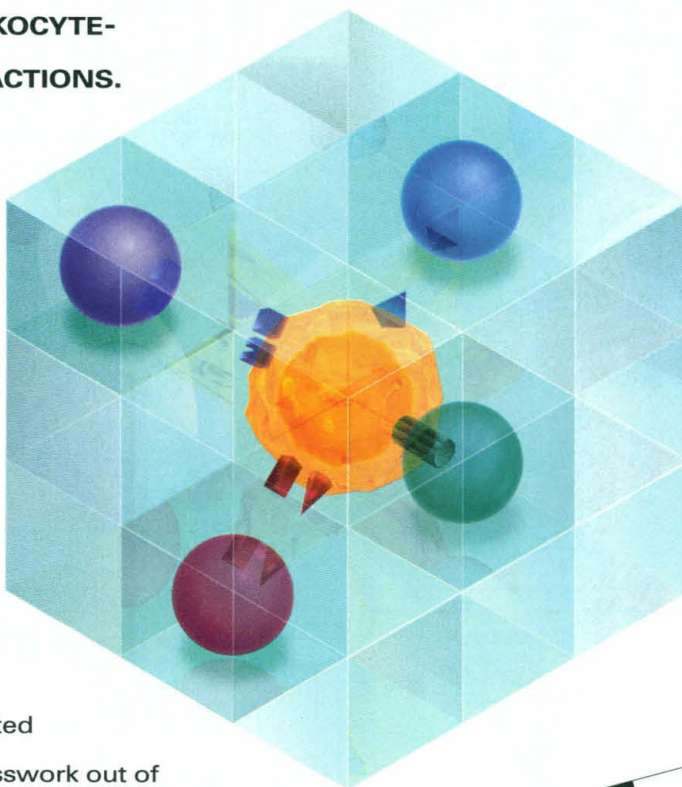


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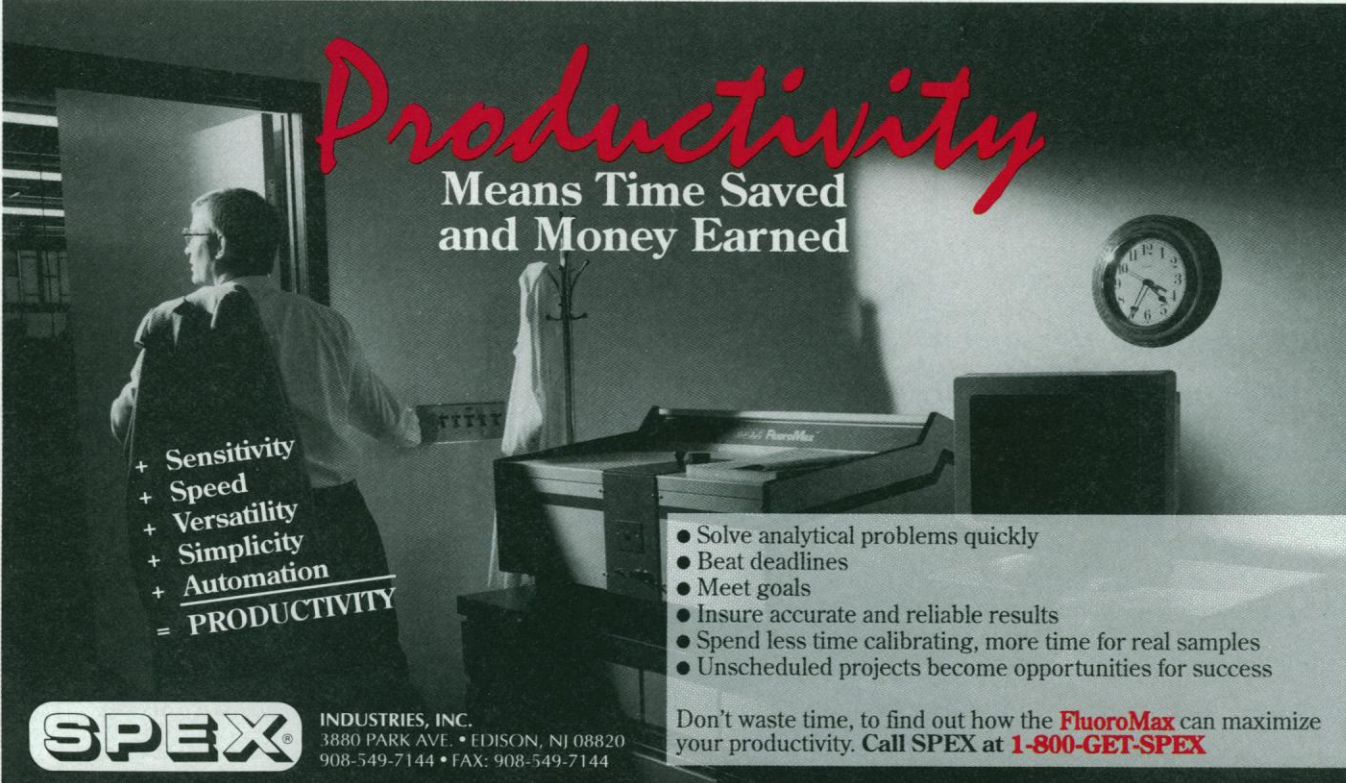
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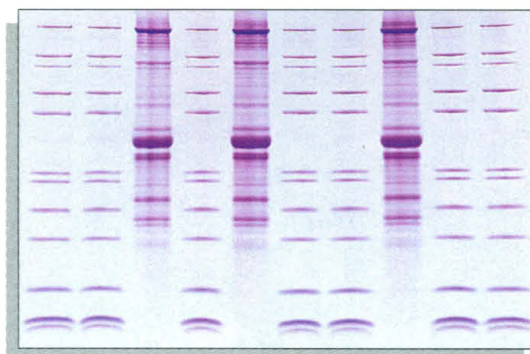
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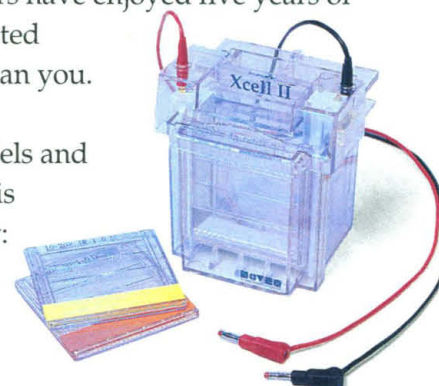
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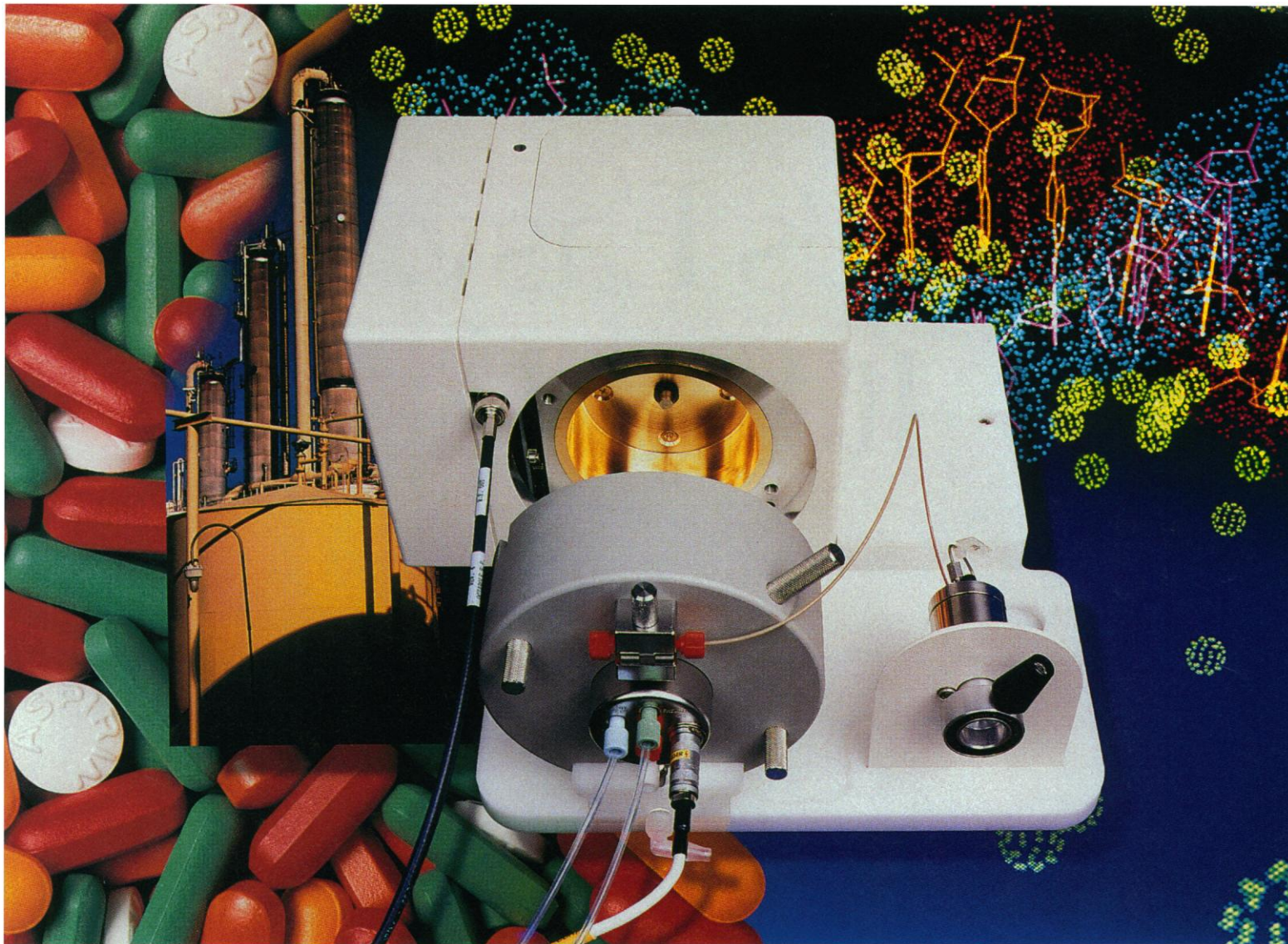
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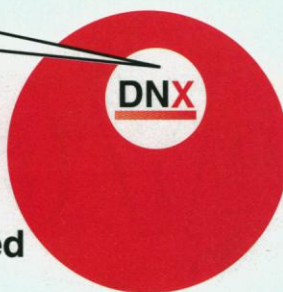
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"Gender and the Culture of Science" SCIENCE 16 April 1993 Reprint

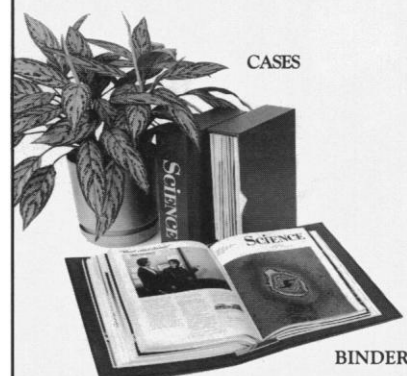
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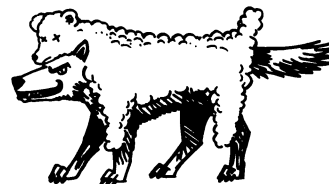
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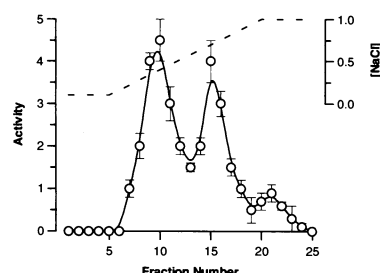
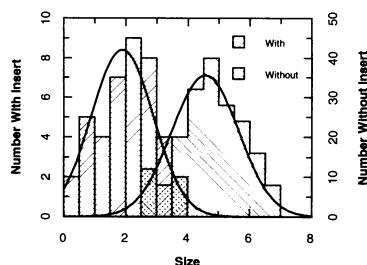
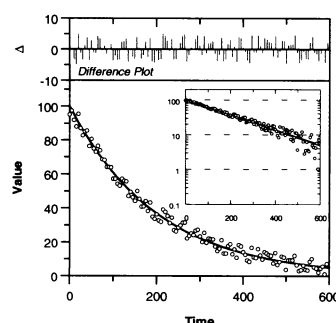
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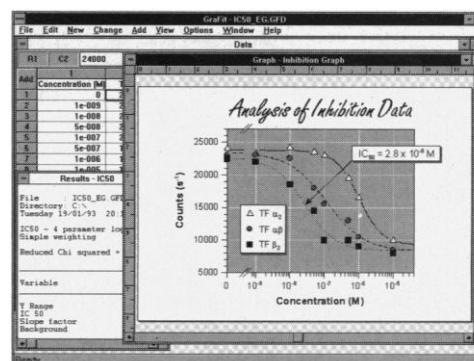
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