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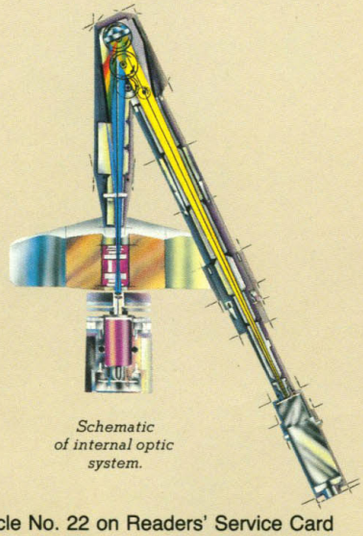

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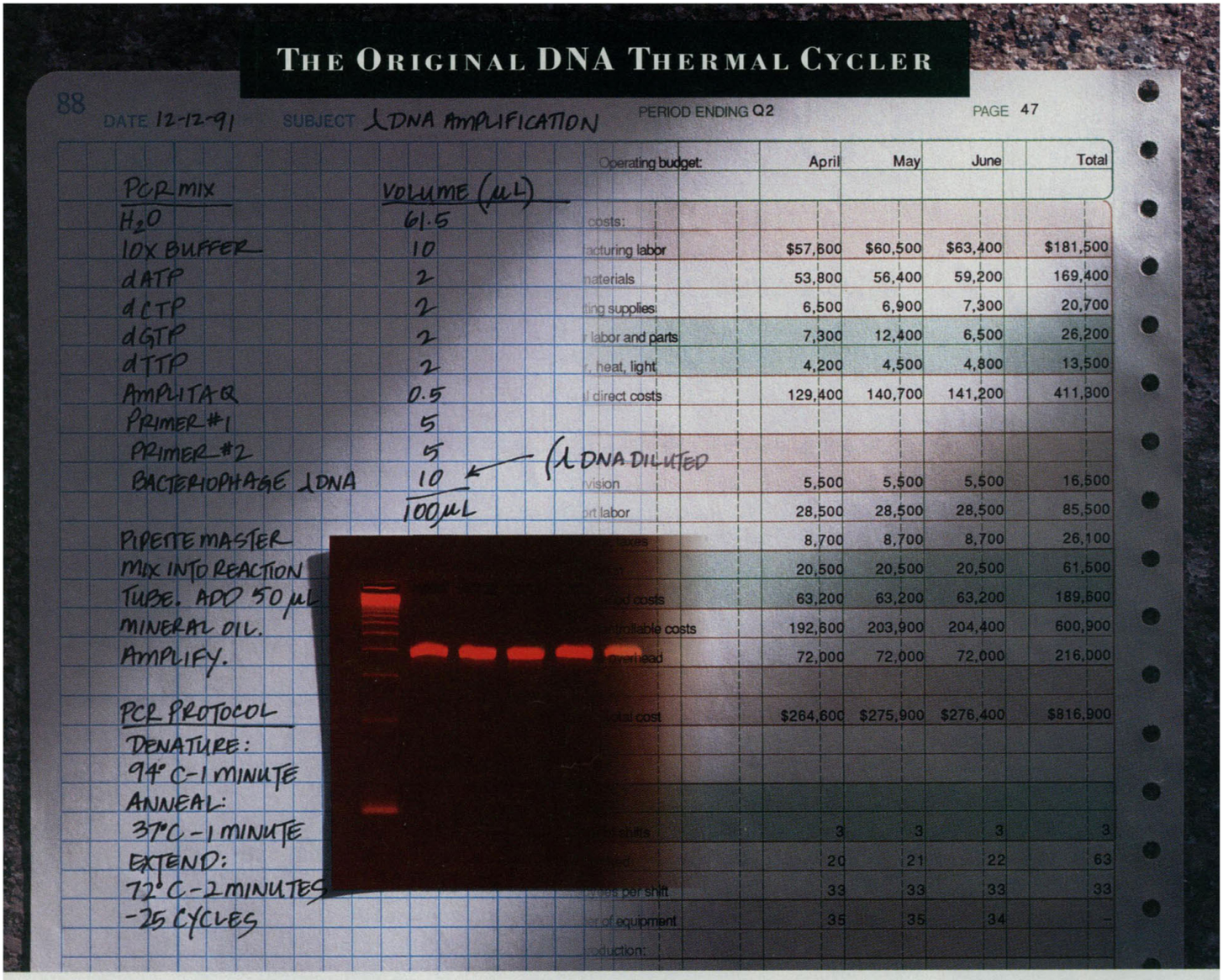

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SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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Sorting out the ancestors of apes and humans

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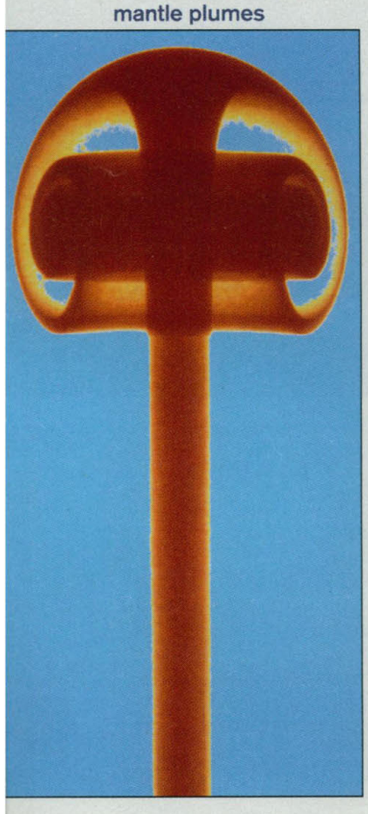
The tectonic effects of mantle plumes



NEWS & COMMENT

RESEARCH NEWS

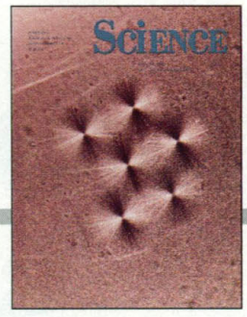
PERSPECTIVE

ARTICLES

DEPARTMENTS

COVER

Polarized light micrograph of asters (systems of microtubules emanating from centrosomes; these microtubules contribute to the mitotic spindle during cell division) in cytoplasmic lysates prepared from oocytes of the Atlantic surf clam, *Spisula solidissima*. A method of duplicating centrioles outside of the confines of the cell has now been developed. See page 219. [Photomicrograph by Robert E. Palazzo]



RESEARCH ARTICLE

REPORTS

TECHNICAL COMMENTS

243 *Xenopus* (frog) embryos at the time of mesoderm induction

Indicates accompanying News story or Perspective

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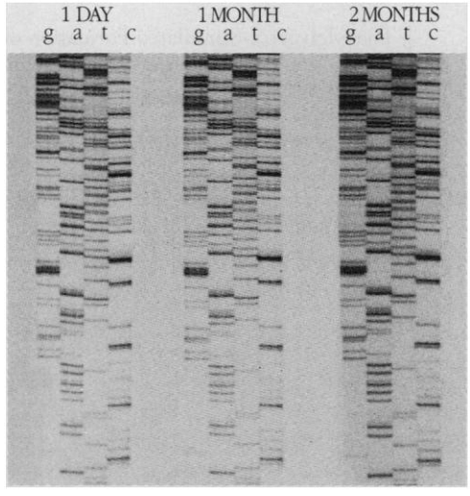

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DUPONT

edited by PHIL SZUROMI

Darwin's finches

Interbreeding or hybridization is relatively common among many species of birds, but the fate of hybrid offspring is not well known. Grant and Grant (p. 193) have documented the frequency of hybridization between three species of Darwin's finches on a small island in the Galápagos chain through a number of generations and assessed the fitness consequences. Surprisingly, the hybrids in this natural environment in the years studied showed higher overall fitness than conspecifics by combined measures of survival and breeding success.

Come together

Site-specific recombination in bacteriophage λ is mediated by higher order protein-DNA complexes that bring together distant DNA sites on the chromosome of *Escherichia coli*. Kim and Landy (p. 198) studied the excision of bacteriophage λ DNA from its *E. coli* host by comparing synergistic effects between pairs of mutants with marginally impaired function. A map is proposed for the association of the two prophage DNA sites, *att*L and *att*R, with copies of the Int protein, which can bind two DNA strands, and with the DNA bending proteins IHF, Xis, and Fis, which facilitate long-range tethering.

Triton's ionosphere

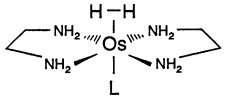
Initial analysis of Voyager observations suggested that Triton's extensive ionosphere was produced by precipitation of electrons when Triton passed through Neptune's magnetic equatorial plane. The principal ion present was thought to be N^+. A photochemical model of Triton's atmosphere by Lyons *et al.* (p. 204) that accounts for reactions among H, C, and N species shows that the extensive ionosphere could be produced simply by solar radiation if the principal ion in the ionosphere was C^+ rather than N^+.

Solar diamonds

Many primitive meteorites contain trace amounts of small (about 2 nanometers across) diamonds whose chemical and isotopic nature indicate that they were produced at low pressures as circumstellar grains and predate formation of the solar system. Russell *et al.* (p. 206) report the presence of similar appearing diamonds from the enstatite chondrite Abee, except that these diamonds lack the chemical and isotopic characteristics of the presolar diamonds and thus likely formed within the solar nebula.

Versatile NMR probe

An osmium complex, $[en_2Os(\eta^2\text{-}H_2)]^{2+}$ (where en is ethylenediamine), binds readily to a wide variety of biological molecules (ligand L) in aqueous solution. Li and Taube (p. 210) show that the nuclear magnetic resonance (NMR) peak associated with the dihydrogen ligand, which is bound in a side-on fashion to the metal, appears in the clear part of the NMR spectral window between 0 and –20 parts per million. This peak can serve as a probe for the binding of nucleotides, RNA, amino acids, peptides, and phospholipids.



Backbone engineering

Synthesis of large proteins by chemical means is attractive because unusual modifications can be made to proteins, such as in the backbone chain. Schnölzer and Kent (p. 221) synthesized a fully active, backbone-engineered form of HIV-1 protease by ligating two large peptide segments. The segments were modified so that they formed a thioester bond between Gly^{51} and Gly^{52} in each half of the dimer. The solubility of these unprotected peptide segments allowed the synthesis to proceed in high yield.

HMG1 and cisplatin

Cisplatin [*cis*-$Pt(NH_3)_2Cl_2$] is an effective anticancer drug, whereas its trans isomer is not, even though both bind to DNA and block replication. Pil and Lippard (p. 234) show that DNA damaged by cisplatin specifically binds the high-mobility group protein HMG1. Such binding is not seen with therapeutically inactive platinum compounds. The cytotoxicity of cisplatin may result because binding of HMG1 might prevent repair, or perhaps HMG1 and related proteins are made unavailable for transcription.

Muscles minus myoD?

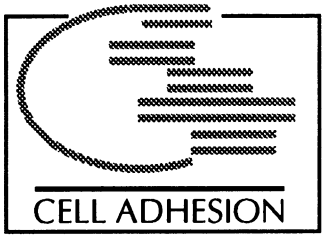
Members of the myoD family of DNA binding proteins appear to exert control over the formation of muscle cells in vertebrates, but experiments in the nematode *Caenorhabditis elegans* by Chen *et al.* (p. 240) suggest that involvement of these proteins may not be necessary in invertebrates. Only one gene, *hlh-1*, was found in a search for myoD homologs in *C. elegans*. This gene is expressed in body-wall muscle cells and their precursors. Several gamma-ray–induced mutants that were homozygous for deficiencies in the *hlh-1* gene still differentiated to form muscle cells and myofilaments. Myogenic activity may be initiated through a myoD-independent pathway.

Lithium in development

The teratogenic effects of lithium on the development of early embryos are well known, but poorly understood. Maslanski *et al.* (p. 243) injected lithium into a cell in the vegetal region of early frog (*Xenopus laevis*) embryos, which disrupts the normal development of the mesoderm. Co-injection of specific isomers of inositol counteracted the effects of lithium. Lithium may inhibit the polyphosphoinositide cycle, which may normally contribute to the signal transduction pathways that result in induction of mesoderm.

Activating actin

Polymerization of actin is increased in cells stimulated by growth factors or chemoattractants. Shariff and Luna (p. 245) report that in the slime mold *Dictyostelium discoideum*, diacylglycerol (DG), which is produced from phosphatidylinositol bisphosphate during mitogenesis or chemotaxis, stimulates nucleation of actin filaments at the plasma membrane. The effect of DG on actin polymerization required one or more proteins tightly associated with the plasma membrane. Protein kinase C is activated by DG, but it did not appear to mediate the effect of DG on actin polymerization (see news story by Travis, p. 177).



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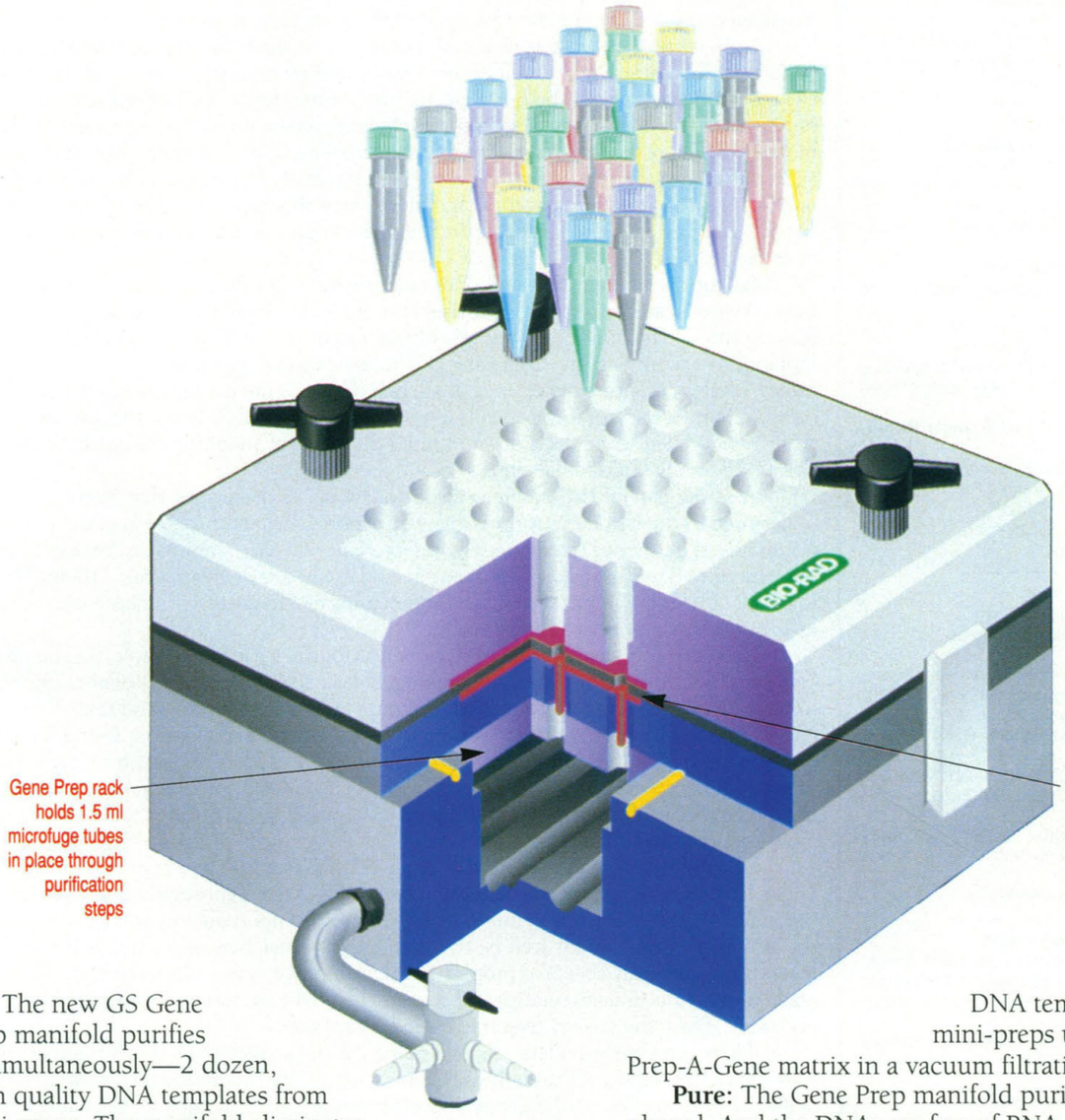

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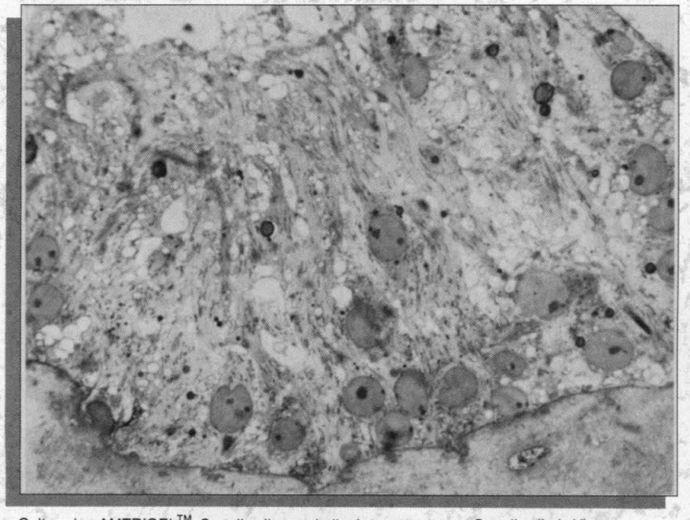

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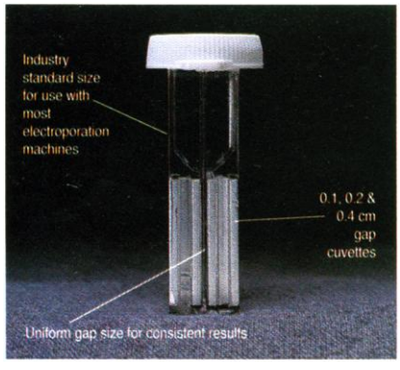

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- have existing contacts with Romanian researchers and/or institutions.

U.S. twinning program participants will receive grants to support their travel between their residences and Romania, their living and travel expenses within Romania, and the living and travel expenses in the United States for their Romanian twinning partners.

Applicants should submit 5 copies of each of the following:

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- list of publications
- 1 page single-spaced description & justification of proposed research
- letter of support from the Dean or other senior official of the applicant's institution
- correspondence with Romanian twinning partner

Each applicant must arrange for two letters of recommendation to be sent to the National Academy of Sciences.

Application materials should be sent to the address listed below postmarked no later than May 30, 1992.

Selection criteria will emphasize scientific achievements and ability and benefits from research carried out in Romania.

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Inquiries and application materials should be addressed to:

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Announcement for the AAAS Black Church Health Connection Project

To boost the number of blacks who are scientifically literate and who understand how the body functions and how it can be abused, AAAS is conducting a three-year project to develop a set of participatory biology activities and an accompanying training program.

Scientists and health professionals are invited to develop a set of participatory activities that will emphasize basic concepts of biology, as well as how the body functions and can be abused by addictive drugs, tobacco, and alcohol. Activities, which will be used in a church setting by school-aged children as well as adults, should also emphasize problem-solving skills and creative thinking. Scientists and health professionals who submit activities selected and used in this project will receive $100. The deadline for submitting activities is May 22, 1992. For detailed information on guidelines for submitting materials, contact **Audrey B. Daniel at (202) 326-6670 or write to: Audrey B. Daniel, AAAS Directorate for Education and Human Resources Programs, 1333 H Street, NW, Washington, DC 20005.**

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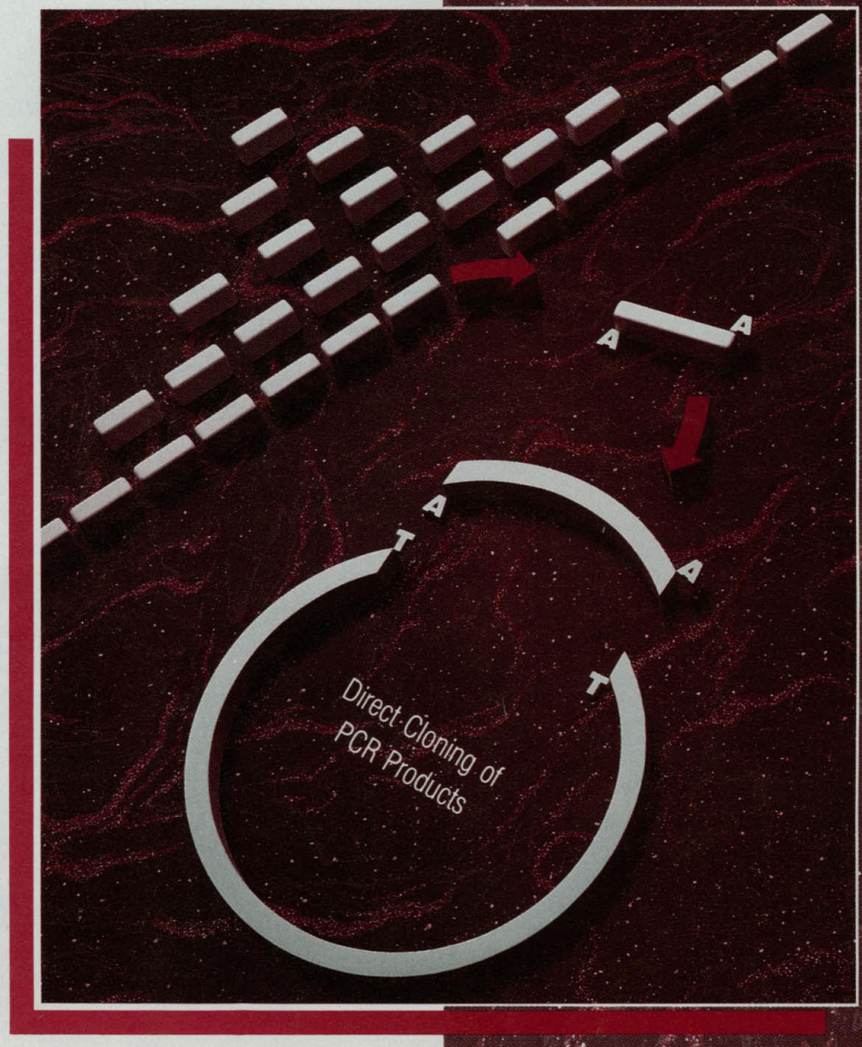

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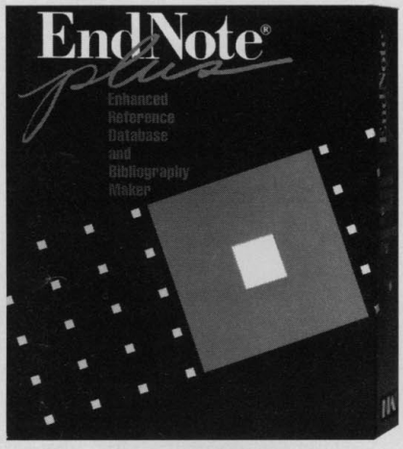

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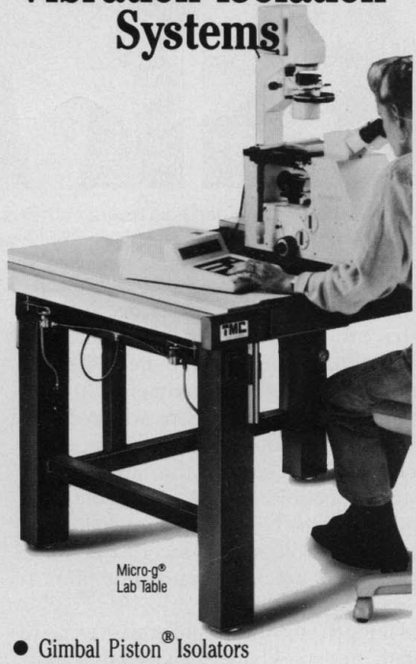

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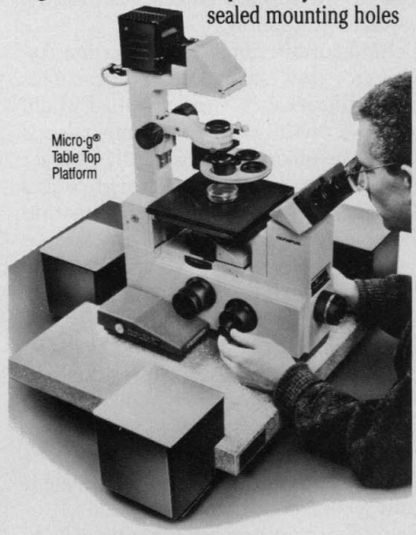
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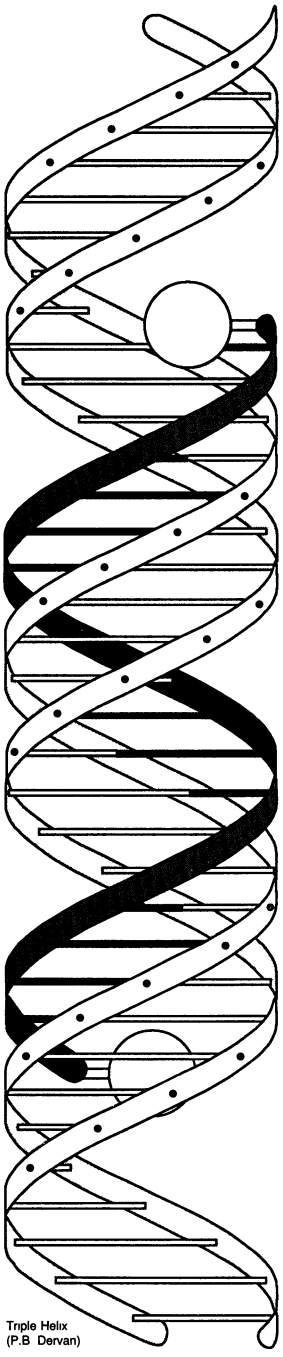

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