AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

29 MAY 1992 $6.00
VOL. 256 • PAGES 1249-1364

(ELAMS™) Electronic Laboratory Animal Monitoring System

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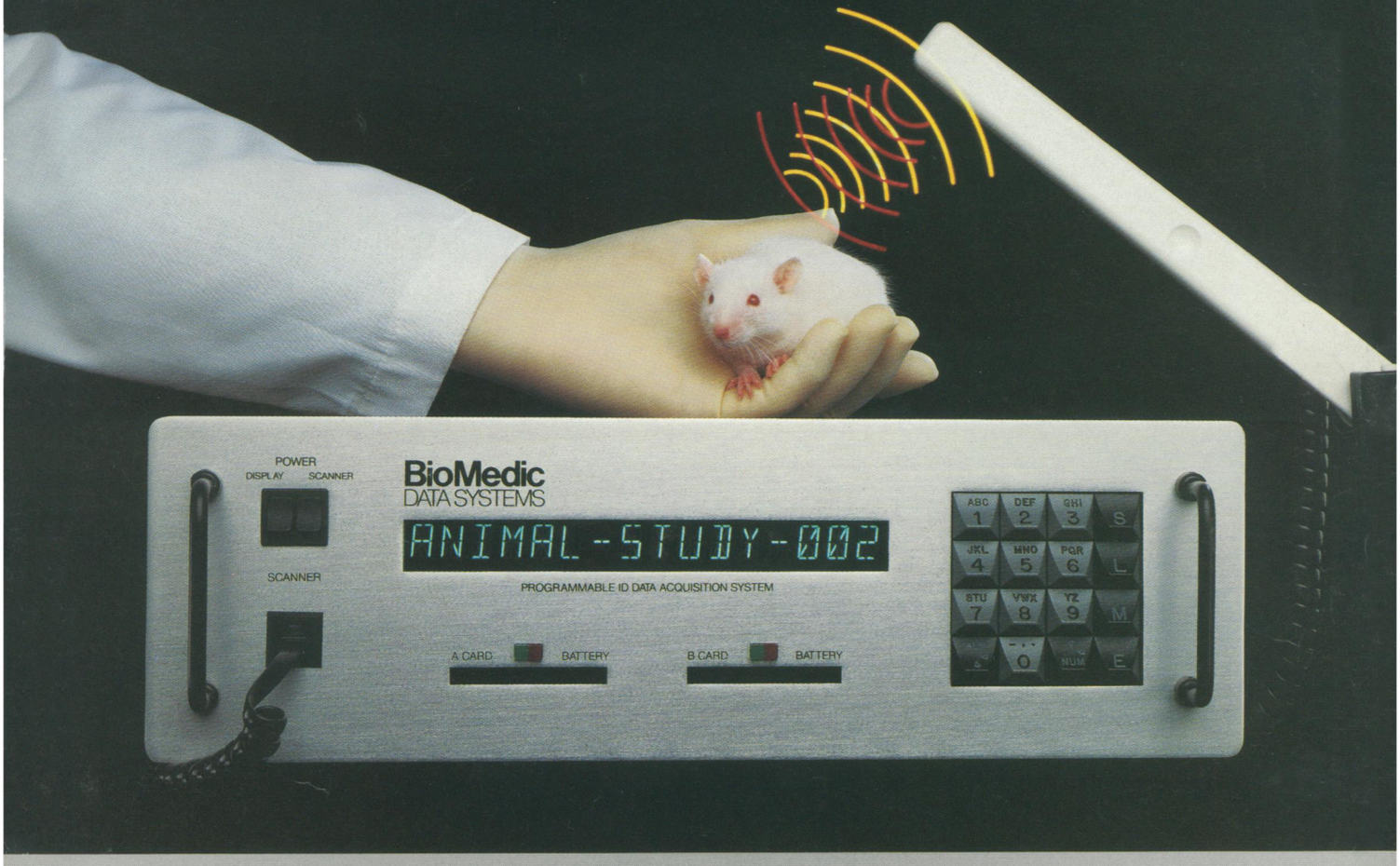

Our new Electronic Notebook is added proof that ELAMS is more than a superior animal identification process.

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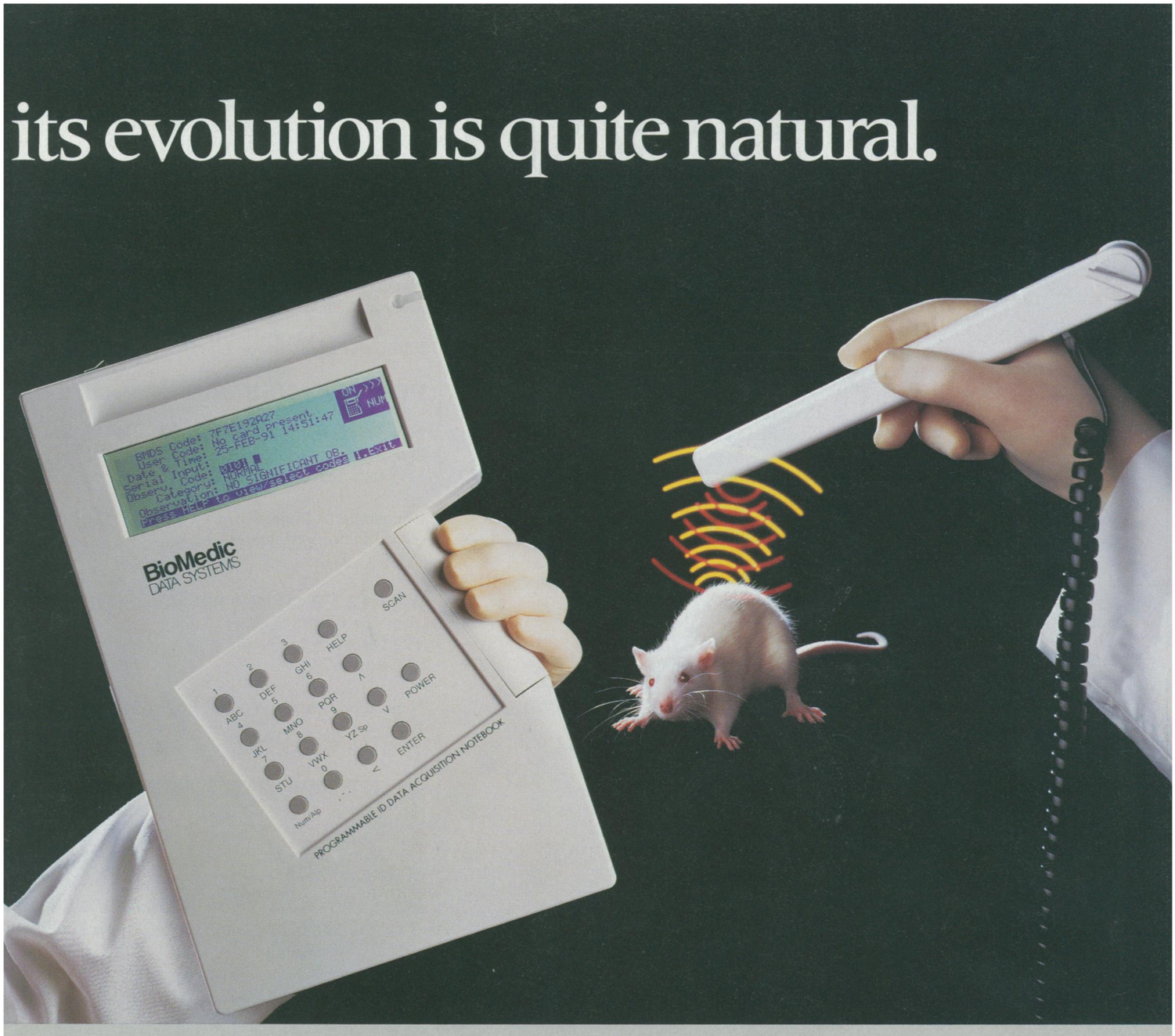
Start with the identification process. Using encoded, subcutaneously implanted microchips (transponders) that are 'read' by an interrogating scanner, ELAMS positive identification renders obsolete the hit-and-miss of tagging, clipping, tattooing, etc. And you can keep and use your present animal codes and read about 100 animals in 20 minutes. It works for all animal species. ELAMS uses patented bio-compatible glass-encased transponders, pre-encoded and conveniently packaged within individual sterile needles, inside an insertion device. Studies and customer usage confirm that animal tissue response is completely non adverse. ELAMS exceeds GLP guidelines.

Secondly, ELAMS provides you with transportable, programmable memory, extending up to 15,000 ID codes on a credit-card sized device. Data can be copied from card to card, or downloaded

its evolution is quite natural.



to your computer or printer. Conversely, you can update these SRAM cards with ID data from your computer.

The New DAS4002

This new unit combines high-density, low-power circuitry with an integral, high-capacity rechargeable battery for complete portability. It goes anywhere.

Like its parent, the DAS4002 memory can cross-reference your own user codes and store a wealth of monitoring information at the precise moment the animal is scanned. This can include time and date, external input from other devices, and user entered clinical observations relating to the animal's condition.

A permanently-encoded microchip (shown 1.5x) is the focus of ELAMS, the first and only absolute, positive animal identification system available.

Again, this new DAS is loaded with safety, security and warning features and sixty different help menus, plus a friendly alpha-numeric keyboard and clear LCD display. An array of alternative and optional features is also available.

ELAMS™ technology is making major contributions to pharmaceutical, government, university and contract research. We invite you to learn more about this state-of-the-art system. Just call our toll free number or drop us a line.

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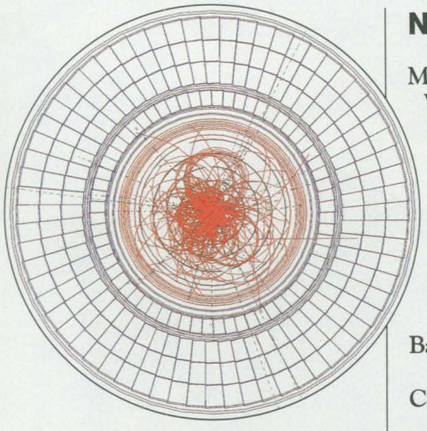

1282 & 1287
Tracking elementary particles

NEWS & COMMENT

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1268 Museums emphasize exhibits over research

DEPARTMENTS

COVER

Photomicrograph of a longitudinal section through an element of the conodont *Cordylodus* showing features that imply that conodonts have a vertebrate affinity. The light-colored birefringent crown is interpreted as cellular bone and the spherules in dark basal filling as calcified cartilage. *Cordylodus* was extant from the late Cambrian to earliest Ordovician. See page 1308 and the Perspective on page 1285. (Background) Photograph of the soft-bodied specimen of the conodont *Clydagnathus* (Mississippian) discovered in 1982 in Edinburgh, Scotland. [Photomicrograph: I. J. Sansom; photograph: J. K. Ingham]

RESEARCH ARTICLE

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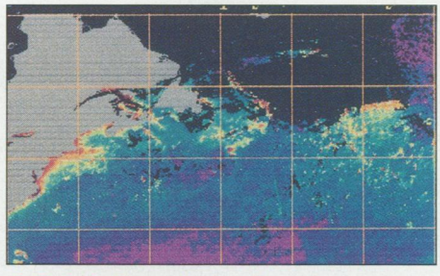
TECHNICAL COMMENTS



1311 Oceanic clouds and chlorophyll

1327
How the brain recognizes faces

Indicates accompanying feature

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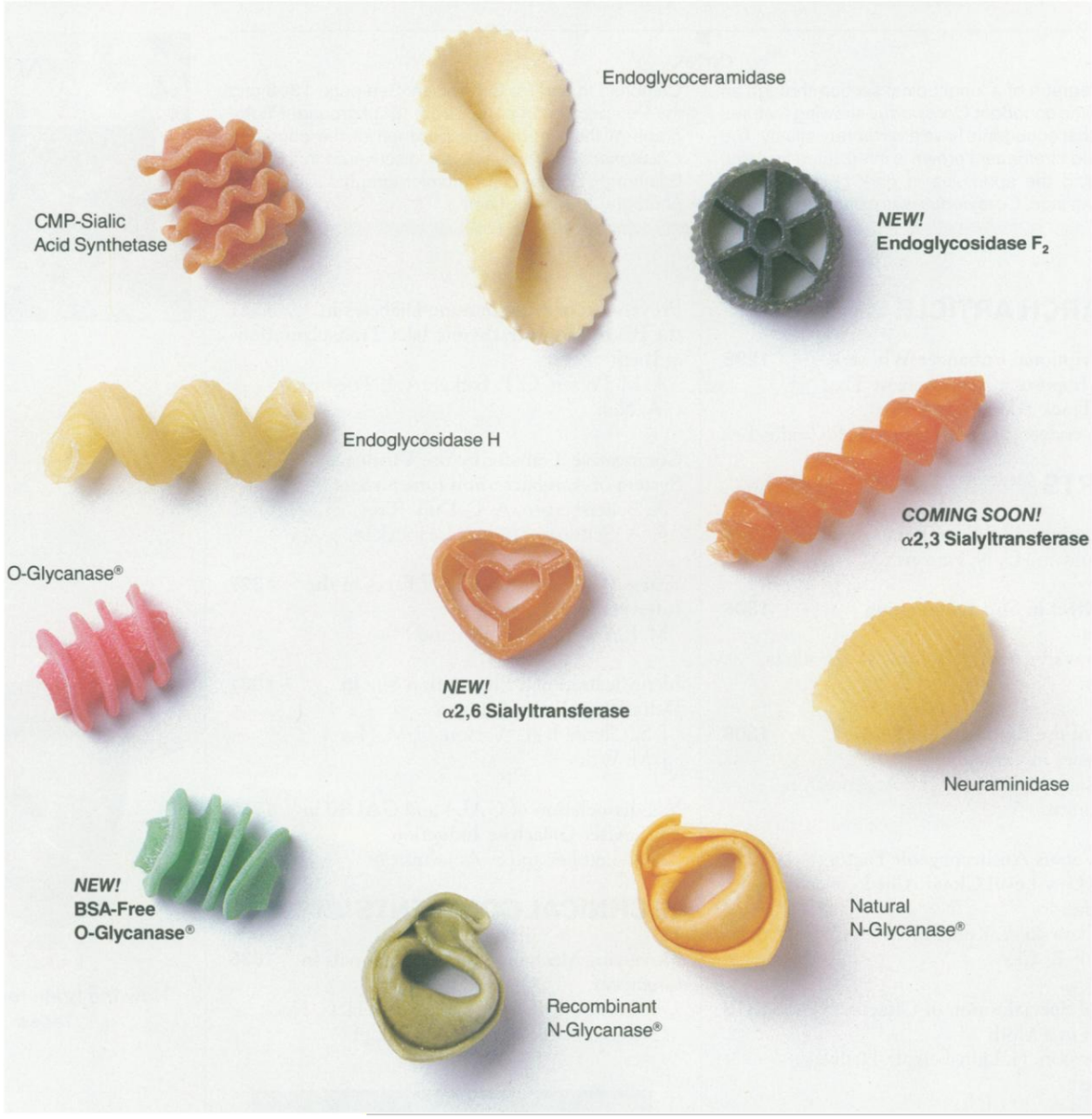

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Selective growth

Growth of silicon films can be controlled by using hydrogen atoms to eliminate strained bonds. Boland and Parsons (p. 1304) were able to vary the structure of silicon films continuously from amorphous to crystalline. The hydrogen exposure can be tuned to discriminate between Si–Si bonds formed on different substrates. Selective growth of silicon on one substrate but not on the adjacent one next to it has applications in device fabrication.

The ocean green

Can the biosphere greatly affect the distribution and albedo of clouds? Although dimethyl sulfide (DMS) produced by photoplankton in the oceans may serve as nucleation sites for water droplets in clouds, the relative significance of DMS compared to anthropogenic or sulfate has been uncertain. Falkowski *et al.* (p. 1311) examined this question by comparing independent satellite measurements of chlorophyll, a proxy for phytoplankton biomass, and cloud albedo for the North Atlantic Ocean. Areas with high chlorophyll content in the central North Atlantic were often observed to also have a high cloud albedo. Anthropogenic sources seemed to effect albedo noticeably only near the coast.

Transplanting islets into the thymus

In human type I diabetes, which is an autoimmune disorder, T lymphocytes destroy pancreatic islet cells by recognizing β cell–specific antigens. Posselt *et al.* (p. 1321) found that transplanting islets into the thymus of the neonatal BioBreeding rat, which is prone to spontaneous diabetes, prevented this disease. Transplantation of β cells into other tissues (such as the kidney capsule) had no effect and only anti-islet autoimmunity was altered.

Moving DNA

DNA is transferred from one cell to another during bacterial conjugation and during tumor induction in plant cells by *Agrobacterium*. Beijersbergen *et al.* (p. 1324) studied certain similarities in these two DNA transfer processes. The Vir region of the *Agrobacterium* Ti plasmid, which normally directs transfer of DNA from bacteria to plants, could mediate bacterial conjugation. The ability of some of the proteins encoded by the Vir region to substitute for the proteins that normally direct conjugative transfer of plasmids between bacteria suggests similar mechanisms for both types of DNA transfer.

Face recognition

The hierarchical nature of visual processing, in which fewer and fewer neurons consolidate information about objects, led to sparse code theories, perhaps better known as the "grandmother cell," that is, the cell in one's brain that recognized a particular familiar image. Identification of a complex visual object such as a face does require surprisingly few cells, but recognition still occurs through the response of a population of cells. Young and Yamane (p. 1327) applied a population analysis to numerous single-neuron recordings from the anterior inferotemporal cortex (AIT) and the superior temporal polysensory area (STP) of macaque monkeys that performed a facial discrimination task. Physical properties of faces were recognized by the AIT, whereas aspects such as familiarity were recognized by the STP. The authors refer to this response as sparse population coding, in that relatively few cells (tens of cells) are sufficient to recognize a face.

Prenylated virus

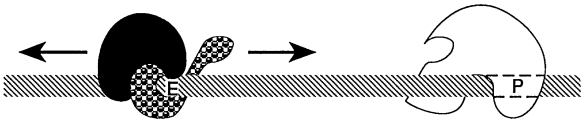
Hepatitis delta virus (HDV), which is implicated in acute and chronic liver disease, encodes two forms of its protein antigen; the larger form is prenylated, that is, a cysteine residue near its carboxyl terminus is modified with a mevalonic acid derivative that forms a long hydrocarbon chain (probably 20 carbon atoms). Glenn *et al.* (p. 1331) found that mutation of this cysteine residue not only abolished prenylation but also the formation of the mature virus particle. Inhibition of the enzymatic pathways for prenylation could lead to HDV therapies.

Upwardly mobile

Vines are graspers and twiners, taking advantage of sturdier host plants, which they use for support as they climb upward to the sunnier top of the forest canopy. Darwin noted that vines achieve rapid growth by devoting just a small fraction of their energy to producing their stems. Givnish (p. 1339), in his review of *The Biology of Vines*, a new compilation edited by Pütz and Mooney, notes that a century has passed since anyone has summarized what is known about vines. These prominent plants of the tropics are important sources of food, pesticides, and pharmaceuticals. Although many of the vines' tricks have been exposed (such as below-ground hoarding of carbohydrates and a propensity to turn to the right when climbing limbs or trunks by twining), there are still a number of unresolved twists to these hardy plants.

Protein tracking along DNA

Regulation of the transcription of the bacteriophage T4 late genes, which are not expressed until after DNA replication has started, can occur through a mechanism in which enhancer-bound (E) and promoter-bound (P) elements find one another by tracking along



the connecting DNA. Transcription is promoted by three T4 DNA polymerase accessory proteins if the DNA contains an enhancer site (a nick or a gap) on the nontranscribed DNA. Herendeen *et al.* (p. 1298) segregated the promoter and enhancer sites onto two interlinking DNA circles that form a catenane. Transcription was enhanced only when the promoter was on the same DNA circle as the enhancer. Transcriptional enhancement was prevented by a DNA-binding protein placed to block the DNA paths between the enhancer and the promoter. These results appear to rule out a purely "through space" interaction between the promoter and the enhancer.

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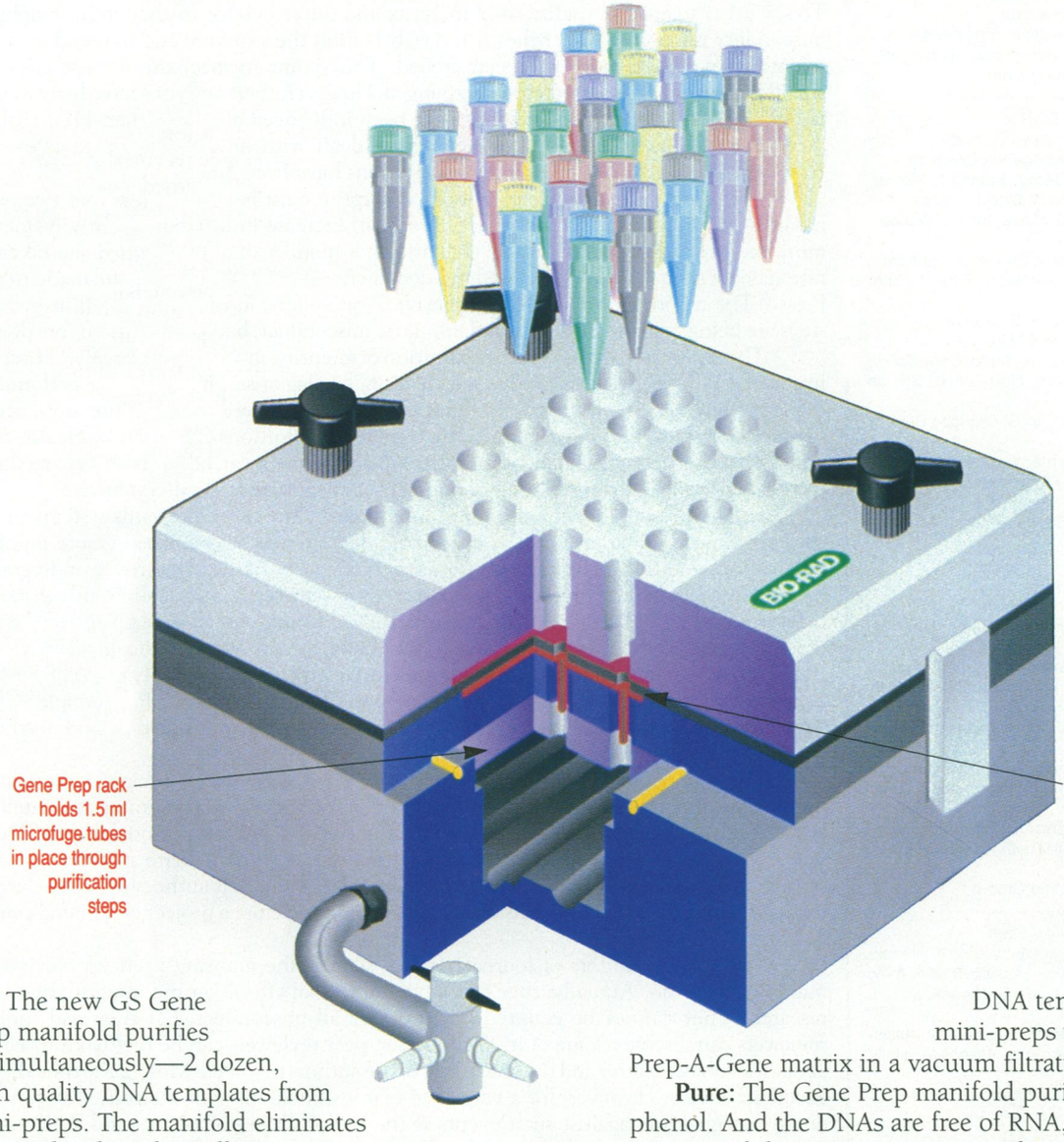

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Helmut Horten Foundation

Madonna del Piano, May 1992

Nominations for the Helmut Horten Research Award 1993

The Helmut Horten Research Award will be presented for the second time on October 15, 1993, in Lugano.

The Helmut Horten Foundation will award a scientist, or a group of scientists working on a common project, the Helmut Horten Research Award which totals one million Swiss francs (approximately US$ 700.000.–). This amount includes a sum to be given to the laureate for his discretionary use and funds to support his research in the field of basic, clinical or applied sciences. The Award will be granted every other year on a worldwide basis.

The Award honours achievements and encourages research in the fields of medicine and biology to benefit human health. Such achievements could include seminal scientific contributions to the basic biomedical sciences, epidemiology, parasitology or to disease eradication efforts.

The Award winner will be selected by a committee of internationally prominent scientists.

Readers are invited to assist in nominating candidates for the Helmut Horten Research Award.

Please note:

1. Nominees should be proposed by scientists, physicians or institutions having detailed knowledge of the candidate's research.
2. Nominations submitted by candidates themselves cannot be considered.
3. Nominations must be made on the official form. For additional information please contact:
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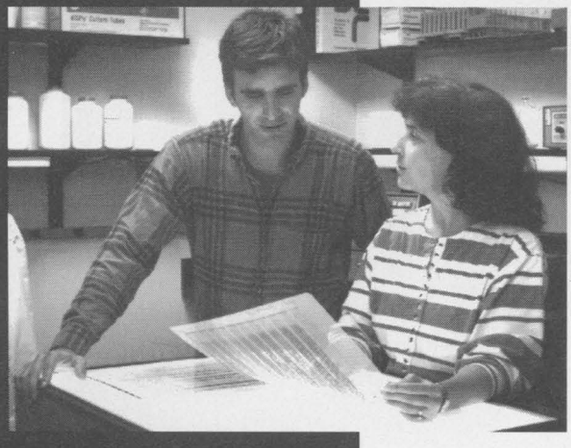

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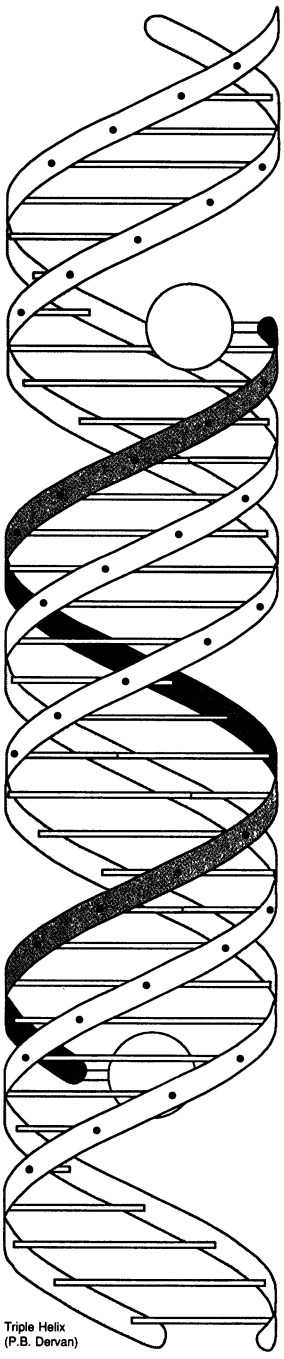

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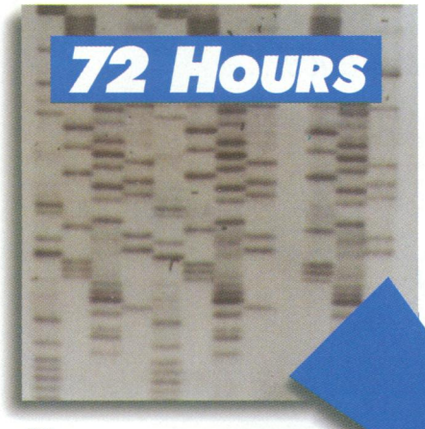

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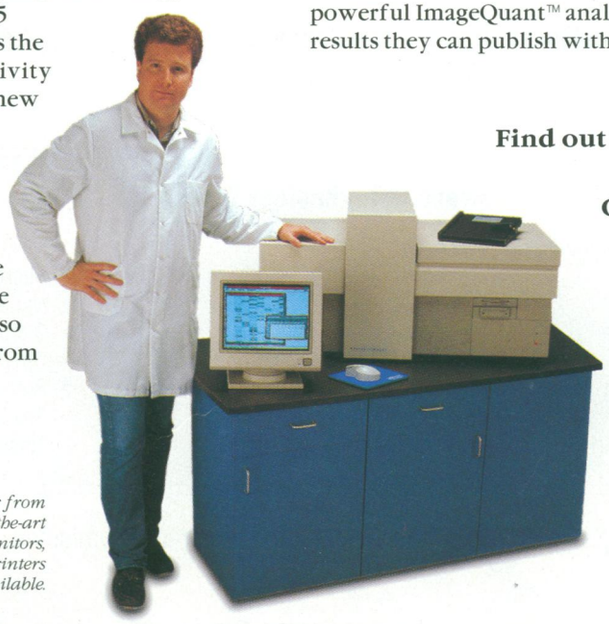

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