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1. Nielson, K. and Mathur, E.J. (1990) Strategies 3:17-19.
2. Nielson, K. and Mathur, E.J. Manuscript in preparation.
3. Nielson, K. and Mathur E.J. (1989) U.S. patents filed.
4. Mullis, K.B., and Faloona, F.A. (1987) Meth. Enzymol. 155:335-350.

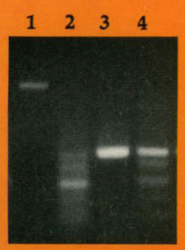

Figure Legend: A photograph of a 1% agarose gel stained with ethidium bromide representing reaction products from PCR amplifications using the GeneAmp™ Kit† from Perkin-Elmer Cetus according to manufacturer's instructions. The reactions were conducted with (lanes 1 and 3) and without (lanes 2 and 4) the inclusion of 1 unit Perfect Match polymerase enhancer. Lanes 1 and 2 represent 100 ng of human genomic DNA amplified with two 26-mer primers separated by 1400 nucleotides. Lanes 3 and 4 represent 100 ng of mouse genomic DNA amplified with two 23-mer primers separated by 550 nucleotides.

Figure 1 shows two examples of *in vitro* amplification reactions that are significantly enhanced by the addition of Perfect Match polymerase enhancer to the polymerase preparation. Note that in lanes 1 and 2, the desired PCR product cannot be detected unless Perfect Match polymerase enhancer is added to the amplification reaction. In lanes 3 and 4, Perfect Match polymerase enhancer not only increases the intensity of the desired amplification products, but dramatically reduces the background artifacts generated by non-specific priming events.

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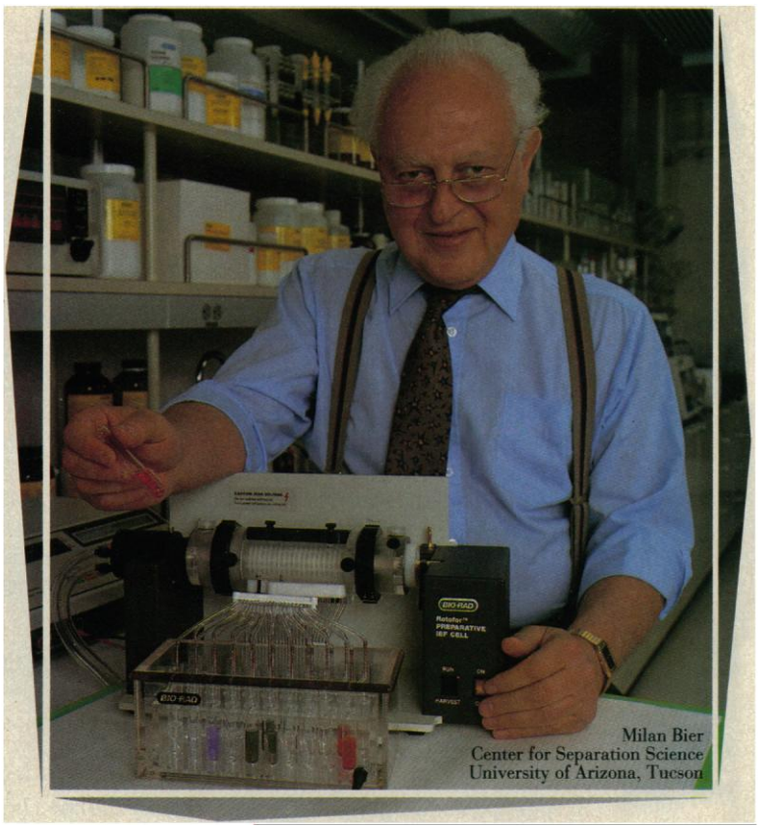

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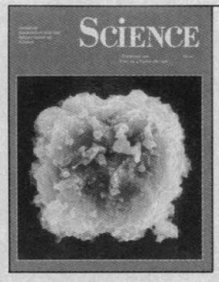

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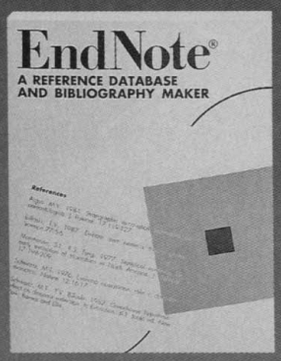

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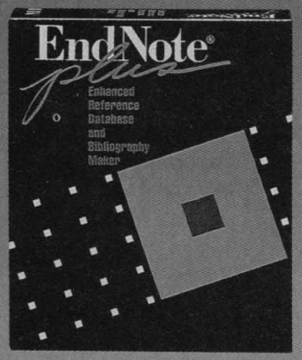

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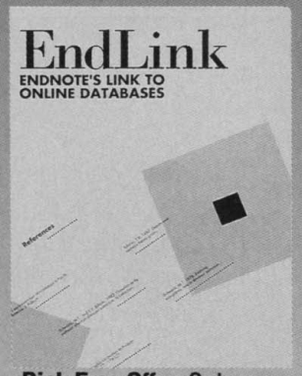

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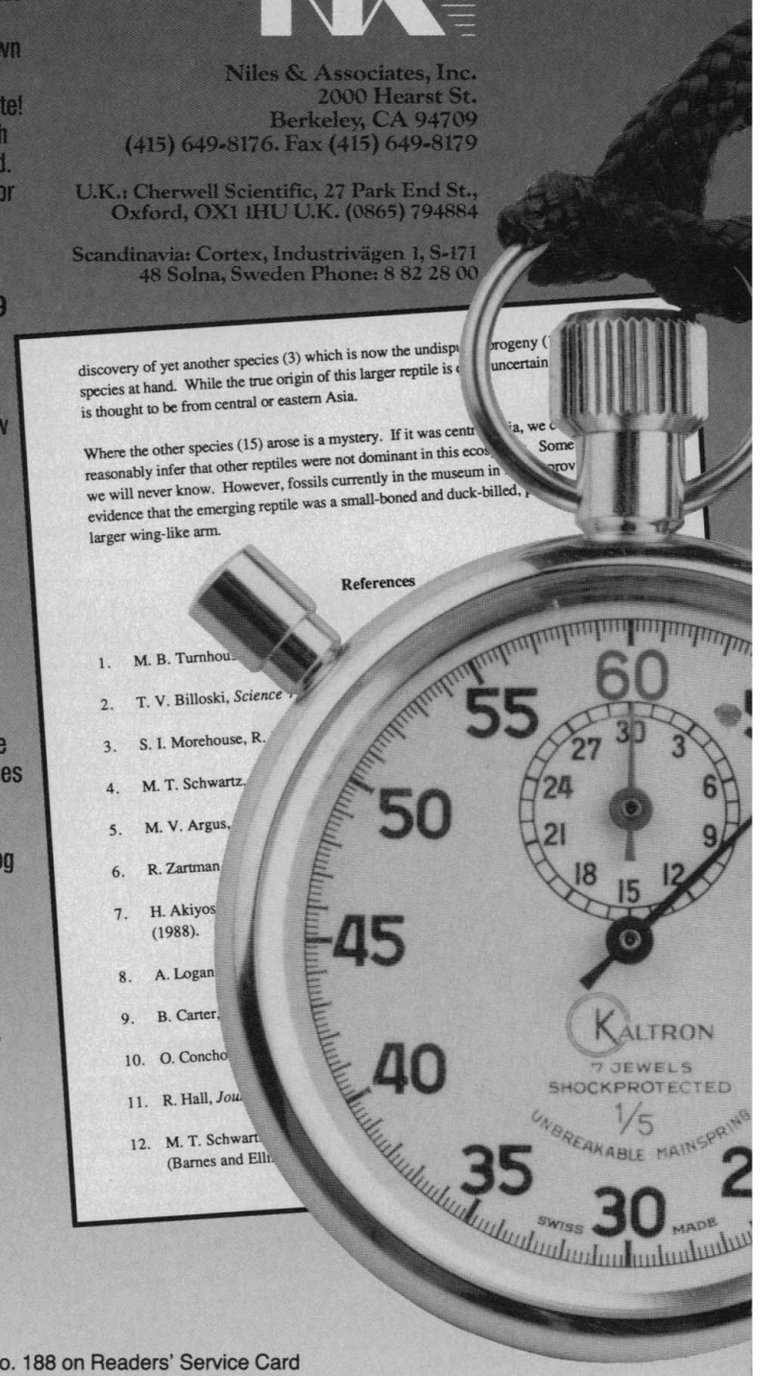

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Baryonic dark matter

MOST of the universe, somewhere between 90 and 99%, is nonluminous. It exists as dark matter that eludes detection by conventional means. Determining the nature of this material is one of the major puzzles in astronomy, and a number of candidate particles and proposals have been put forward in recent years. A new hypothesis is presented by Silk on page 537. He argues that compact stellar remnants, such as neutron stars and white dwarfs, would be plausible candidates for the missing matter. They are abundant in galaxies, have the right masses, and formed at the right place (in the outer halos of galaxies) at the right time in star formation. The prediction is subject to observational test, because, as compact dark matter evolves, some percentage of the neutron stars would become binary x-ray sources that should be detectable in the glow of galaxy halos. Bursts of gravitational radiation might also be produced as the neutron star binaries merge, and these bursts could be detected. The luminous binary neutron stars might also be an important source of the unexplained x-ray background radiation that is present in the universe.

Transitory pine forests

IN northern Scotland some 4000 years ago, the range of Scots pine forests first rapidly expanded and then retreated by about 80 kilometers during a 600-year period (page 544). Although there is no pollen evidence for the existence of the forests, stumps of fossil pine trees in peat attest to their presence. About 4400 years ago the bog surfaces grew drier, and soil conditions were conducive to rapid growth of pines. Then around 4000 years ago another change occurred, causing the trees to begin to die out. By 3800 years ago the northern region apparently had no pine forests; the forests had returned to their original more southerly position, where they are still found today. Gear and Huntley propose that the driving forces for the rise and fall of the pine forests were shifting climates caused by changes in atmospheric circulation; they note that other evidence from northern Europe supports the notion that climate changed rapidly at that time. Although the forests responded reasonably rapidly to climate changes, the speed of the response— several hundred meters per year—is not one that would be fast enough to keep pace with changes that could come as a result of greenhouse warming.

Hydrogen isotopes at Venus

NEW near-infrared measurements made from Earth indicate that the ratio of deuterium to hydrogen in the atmosphere of Venus is about 100 times what it is on Earth (page 547). These measurements confirm earlier data obtained by the Pioneer Venus spacecraft. The atmosphere of Venus is much drier than the atmosphere of Earth, but the inventories of two volatiles—carbon dioxide and nitrogen—on Earth are similar to the abundances of these two gases in the Venus atmosphere. De Bergh *et al.* suggest that the observed enrichment of deuterium in the water vapor on Venus would be consistent with the release of large amounts (oceans) of water at some time during the early evolution of Venus. As outgassing occurred, the lighter hydrogen atoms would have been released preferentially over the heavier deuterium atoms. Models of planetary evolution must account for the sizable differences in the characteristics of the atmospheres of these two terrestrial planets.

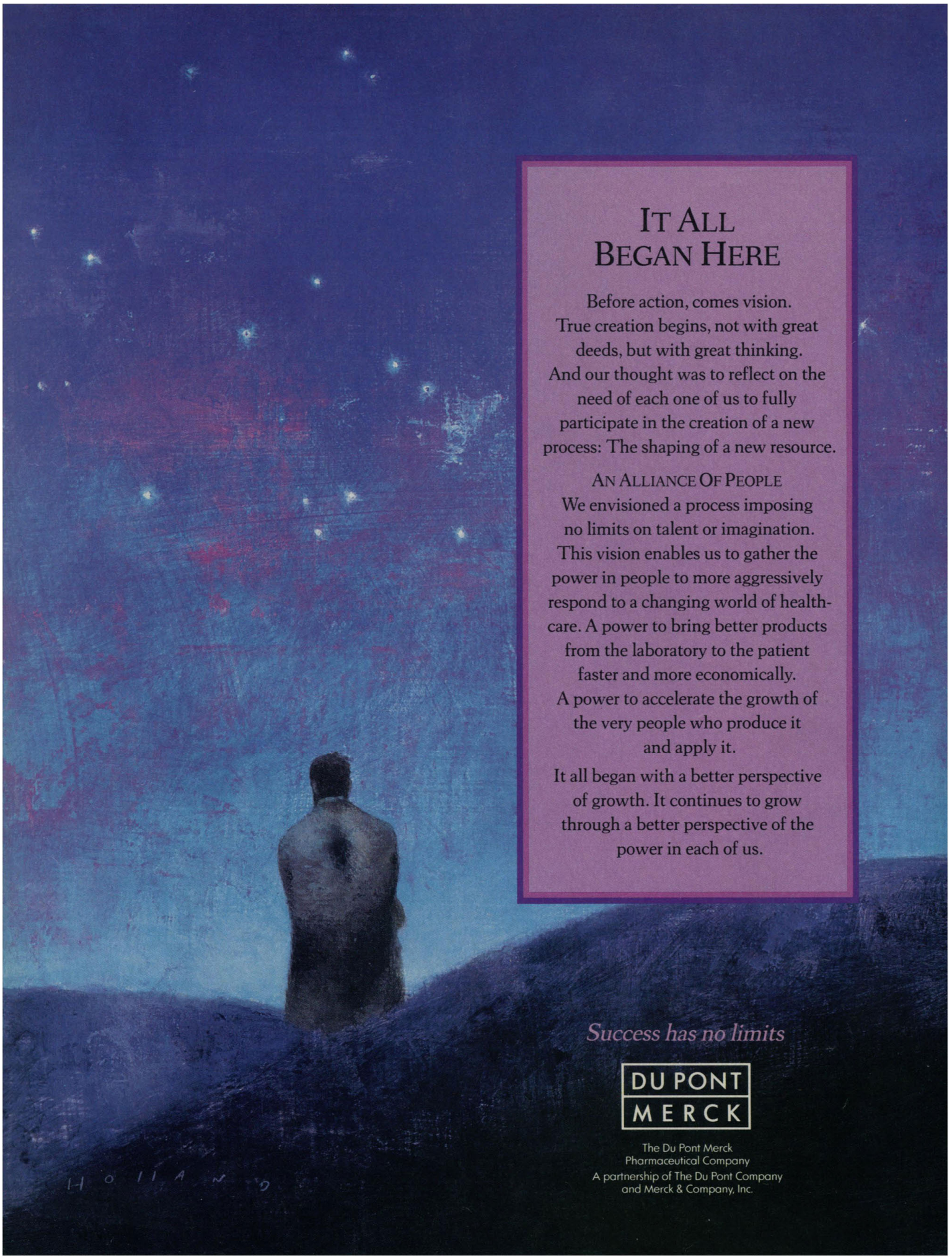
Role for cystic fibrosis protein

THE gene encoding the protein cystic fibrosis transmembrane conductance regulator (CFTR) is defective in cystic fibrosis; the protein it produces is dysfunctional. Some of the domains in CFTR, a large molecule containing some 1480 amino acids, are known to be structurally similar to domains in other proteins that bind nucleotides, stretch across membranes, and perform regulatory functions. A 67–amino acid peptide patterned on residues 450 to 516 of CFTR was synthesized (page 555); this portion of the protein has been thought to include a nucleotide-binding domain. The peptide folded into a predominantly β sheet structure, and it bound a number of adenine-containing nucleotides. It is known that in some 70% of people with cystic fibrosis the phenylalanine residue at position 508 of CFTR is deleted. Thomas *et al.* therefore speculate that loss of that one amino acid may dramatically change the structure of a predicted β strand and reduce the molecule's ability to interact with nucleotides, thereby accounting for loss of function in cystic fibrosis.

Cortical maps

JAMAICAN mustached bats use sonar for hunting insects and for getting oriented in their surroundings. Bats compute their own location or the location of target insects by evaluating frequency and temporal information from both sound pulses that they emit and the echos that are returned. This information is programmed into "computational maps" in the cortex of the brain. Two parts of the cortex that participate in such mapping and information processing are the DSCF and the FM-FM regions. Riquimaroux *et al.* assessed how the perception of the bats changed when each of these regions was chemically inactivated (page 565). The bats were trained to make frequency and temporal discriminations on synthesized pulse-echo pairs. Then muscimol, an agonist of the neurotransmitter GABA, was applied to a small region of the cortex. Inactivation of the FM-FM area disrupted temporal discriminations; inactivation of the DSCF area disrupted fine frequency discriminations. Some of the basic principles revealed in these studies may be relevant not only to bat echolocation but also to the mechanisms by which various other species process auditory information.

■ RUTH LEVY GUYER



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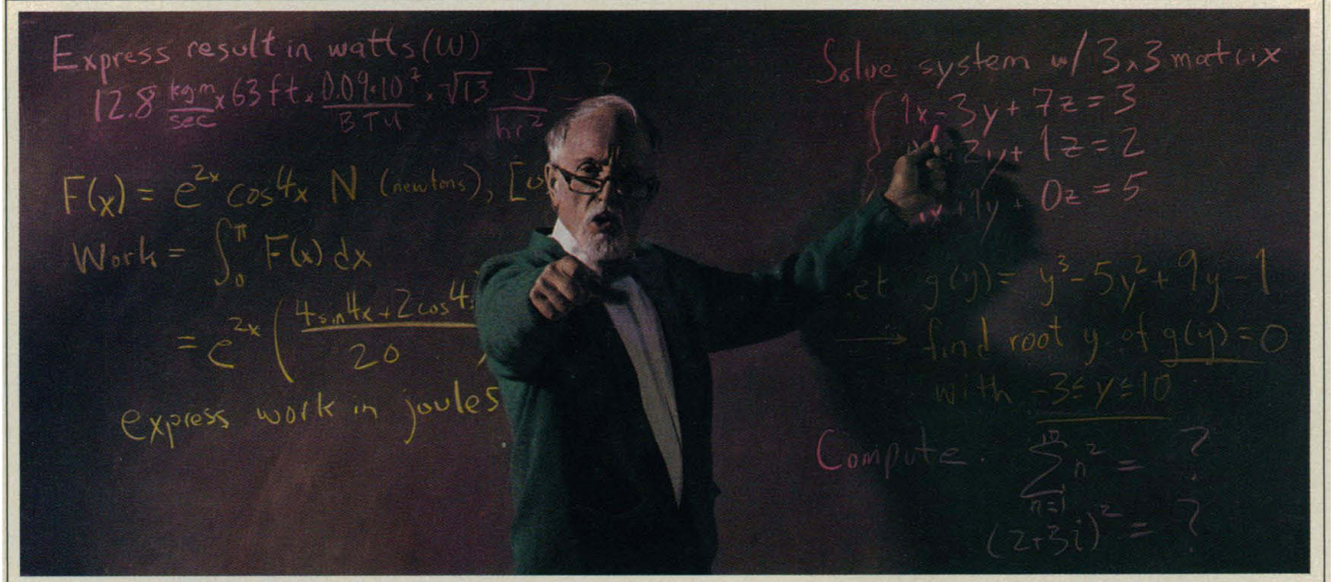

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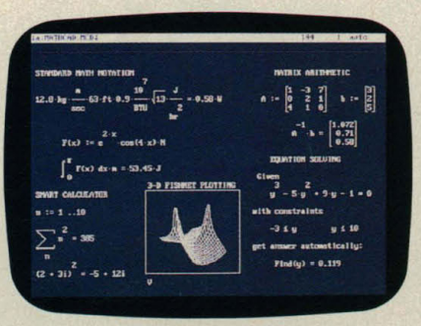

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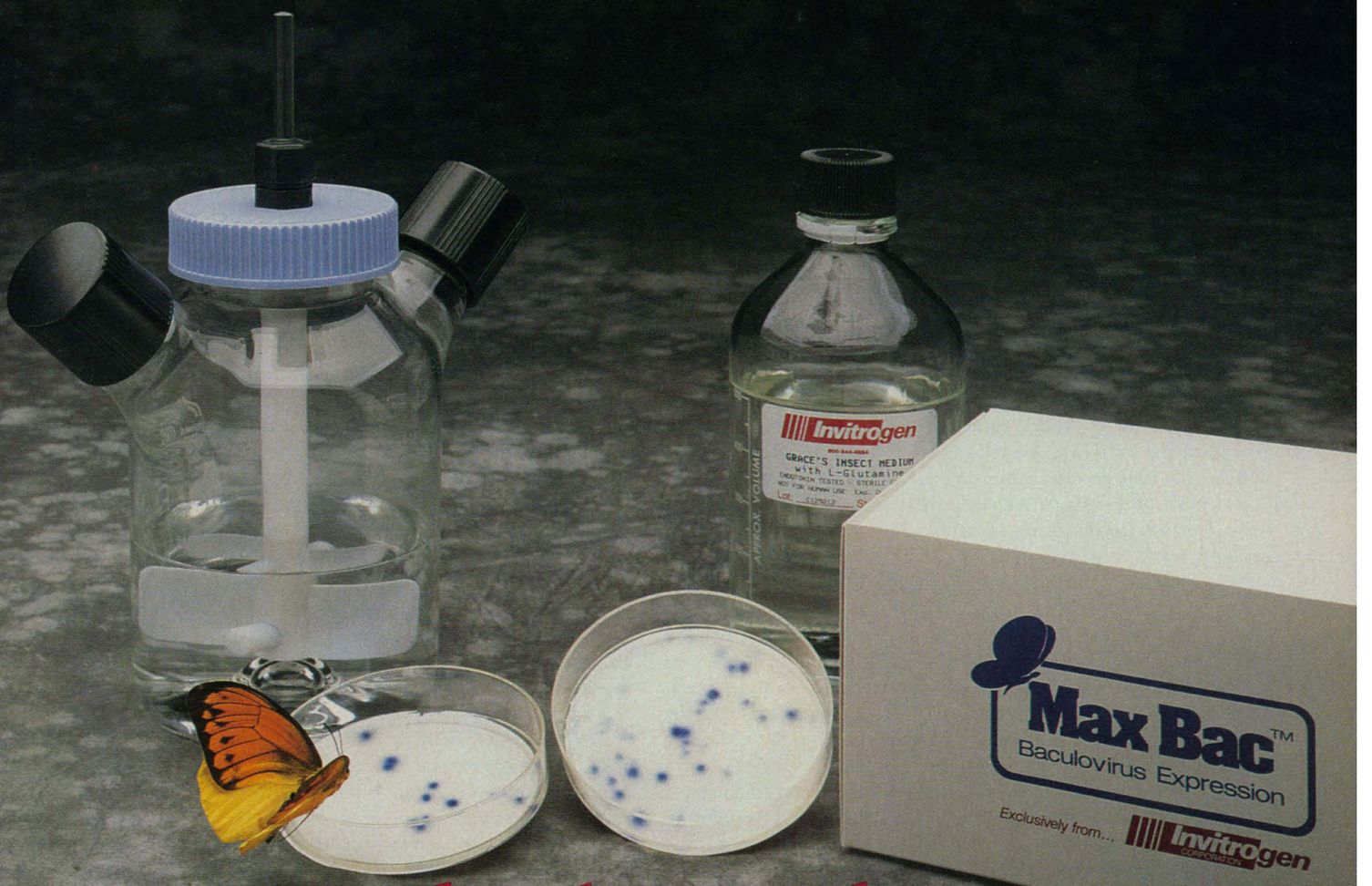

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Figure 1. Infected Sf9 insect cells showing viral occlusions.

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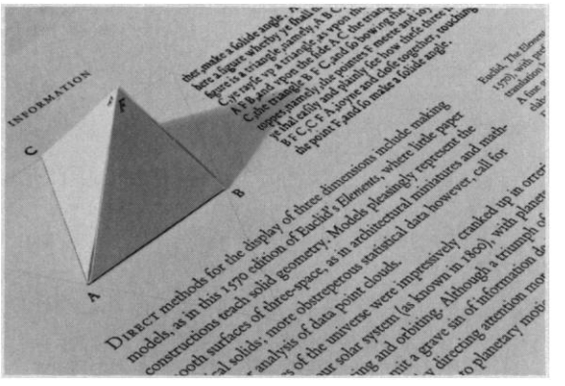

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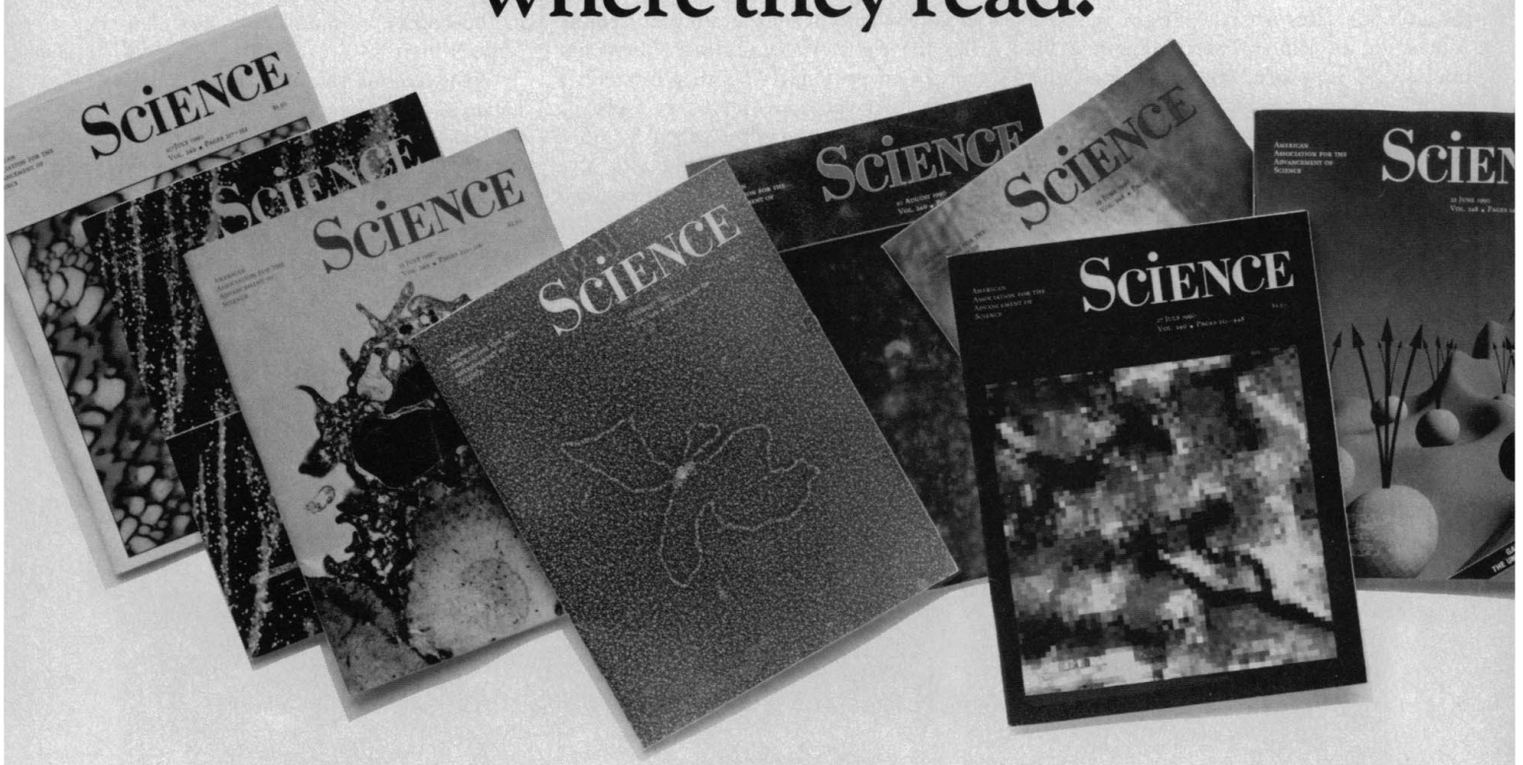

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The **Program on Conscious and Unconscious Mental Processes** of the **John D. and Catherine T. MacArthur Foundation** will host two-day conferences during the last weeks of August. Topics will aim at convergence at the psychodynamics-cognitive science interface. Neurobiological, social, and psychological scientists seeking new perspectives on cognitive processing of highly emotional topics and clinical scientists seeking new approaches to mental processes will be selectively invited to attend. A maximum of eighty participants per year and ample time for discussion (of formal presentations and videotapes of relevant clinical phenomena) will insure a chance for useful communication beyond the usual walls of a specific scholarly discipline.

This year's conference will focus on intrapsychic control of memory, schemas, and modes of representing ideas and feelings. The title of the conference is: **"Control Processes and Emotional States."**

All conference costs including on-site refreshments are covered by the foundation. Each invited scientist will cover his or her own arrangements and expenses for travel, lodgings, and meals. Postdoctoral fellows on full-time stipends may apply for travel expense grants (four per year are available). Lodging advice will be provided.

In requesting further information please indicate your academic appointment and scholarly activities. One reprint would be greatly appreciated.

Write or FAX to:

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San Francisco, CA 94143
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The **Program on Conscious and Unconscious Mental Processes** of the **John D. and Catherine T. MacArthur Foundation** has its research center at the Langley Porter Psychiatric Institute. It has intra- and extramural task forces for collaborative and convergent studies on person schemas, defenses, and topics of thought and communication. The director of the program is Mardi J. Horowitz, M.D., Professor of Psychiatry at UCSF.

INTERNATIONAL SYMPOSIUM ON APPLICATIONS OF BIOTECHNOLOGY TO TREE CULTURE, PROTECTION AND UTILIZATION

August 5–8, 1991

Radisson Hotel Conference Center Columbus, Ohio

The USDA Office of Biotechnology and the USDA Forest Service are sponsoring this symposium to highlight recent contributions of biotechnology to the field of forestry and to facilitate future applications of molecular biology within the forestry discipline. The planned sessions and a partial list of speakers include:

Genetics/Physiology
Drs. W. Cheliak, M. Gordon, R. Nadgauda, R. Sederoff, J. Torrey and S. von Arnold

Biological Control of Tree Diseases and Insect Pests
Drs. I. Chet, D. Dean, B. McCown and L. Miller

Bioprocessing
Drs. R. Farrel, T. Jeffries, T. K. Kirk and A. Springer

Techniques of Tree Culture and Protection
Drs. T. Bradshaw, A. Handler, E. Lam, D. O'Malley and A. Stomp

Techniques in Wood Utilization
Drs. D. Cullen, R. Crawford, M. Leisola and M. Tien

Public Policy Issues
Drs. M. Levin, W. Stiles, C. Van Horn and R. Wachbroit

Commercial Applications
Drs. C. Bomman, A. Mascarenhas, J. Pommier and P. Trotter

The deadline for submission of abstracts for poster presentation is 5–1–91. For registration material and abstract forms please contact Rhonda Cobourn, USDA Forest Service, Northeastern Forest Experiment Station, 359 Main Road, Delaware, Ohio, USA, 43015, (614) 369-4476, fax (614) 363-1437.