

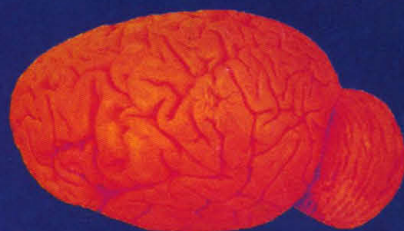


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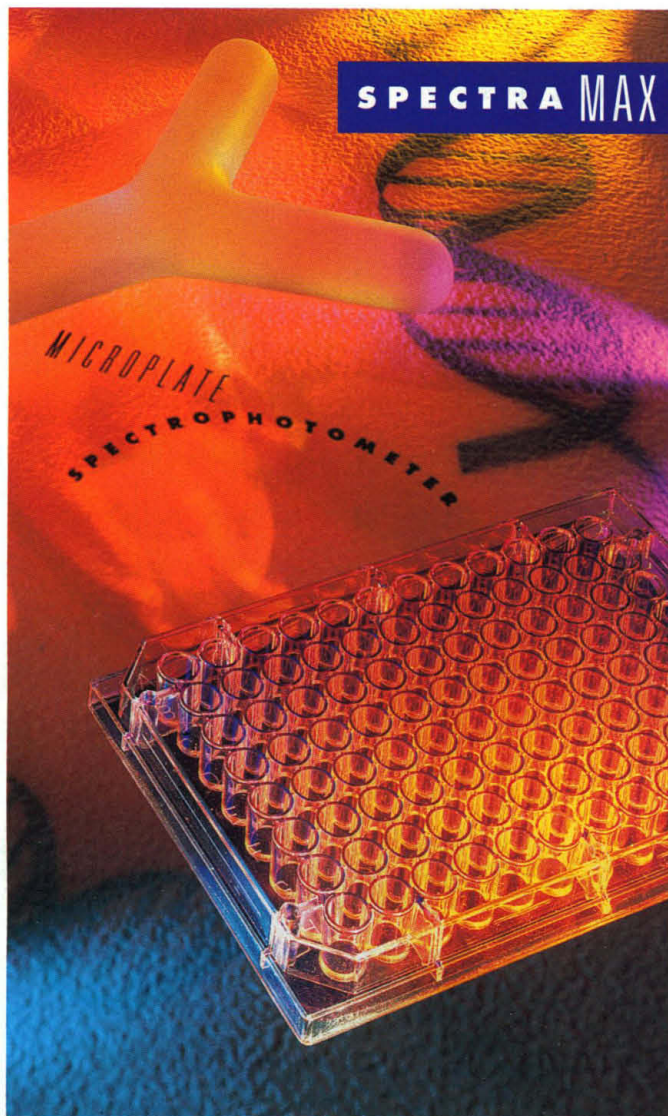


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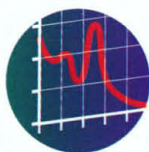
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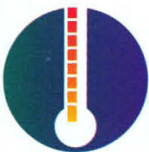
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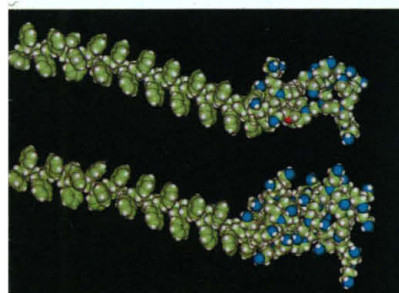


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1568

New clues to species
loss on Madagascar



1592

Hydra-headed polymer

NEWS & COMMENT

- Germany Warily Maps Genome Project 1556
- Russia Readies Its First Gene Law 1558
- Republicans Split Over Fate of the Department of Energy 1559
- Closing In on the Complete Yeast Genome Sequence 1560
- Imanishi-Kari Case: Marathon Hearing Gets Under Way 1561
- Gathering Airls Schemes for Averting Asteroid Doom 1562
- France: AIDS Expert Charged in HIV-Blood Case 1563
- German-U.S. Exchanges: Meeting Seeks to Link Young Scientists 1563

RESEARCH NEWS

- Mapping the Cell's Nucleus 1564
- Can One Type of HIV Protect Against Another Type? 1566
- Studies Say—Tentatively—That Greenhouse Warming Is Here 1567

- Many Suspects to Blame in Madagascar Extinctions 1568

- Did *Homo erectus* Tame Fire First? 1570

- Two Steps for Light-Altering Polymers 1570

PERSPECTIVE

- Climatic Warming in North America: Analysis of Borehole Temperatures D. Deming 1576

ARTICLES

- Linked Regularities in the Development and Evolution of Mammalian Brains B. L. Finlay and R. B. Darlington 1578
- Extreme Discordant Sib Pairs for Mapping Quantitative Trait Loci in Humans N. Risch and H. Zhang 1584

REPORTS

- Atomic-Scale Desorption Through Electronic and Vibrational Excitation Mechanisms T.-C. Shen, C. Wang, G. C. Abeln, J. R. Tucker, J. W. Lyding, Ph. Avouris, R. E. Walkup 1590

DEPARTMENTS

- THIS WEEK IN SCIENCE** 1545
- EDITORIAL** 1547
- Low-Level Radioactive Waste
- LETTERS** 1549
- The Structure of Glasses: F. T. Wallenberger • Economic Growth and Environmental Policy: T. M. Selden; D. Ludwig; E. A. Rosa and T. Dietz • Pharmaceutical Value Estimates: P. P. Principe • Genetic Chimerism: J. Chen, B. Heerd, L. Augenlicht • Inventions: A. O. Lutes • Quantitative Trait Locus for Reading Disability: Correction:

- L. R. Cardon, S. D. Smith, D. W. Fulker, W. J. Kimberling, B. F. Pennington, J. C. DeFries
- SCIENTESCOPE** 1555
- RANDOM SAMPLES** 1571
- BOOK REVIEWS** 1636
- The Bengal Monitor*, reviewed by E. R. Pianka • *Being Digital*, D. Voss • *Fullerene Research, 1985–1993*, K. Livingston • *Turbulence*, K. Livingston • Vignettes • Publishers' Addresses • Books Received
- PRODUCTS & MATERIALS** 1642

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A hamster brain and a human brain with three computer-generated intermediates to show the differential scaling of brain regions as brain size increases in mammals. A highly conserved sequence of neurogenesis produces predictable and disproportionate

growth of late-generated structures as brain size increases. This suggests that processing capacity for specific functions is gained primarily by general rather than local increases in brain size. See page 1578. [Image: J. C. Crowley]



Polystyrene-Dendrimer Amphiphilic Block Copolymers with a Generation-Dependent Aggregation 1592

J. C. M. van Hest, D. A. P. Delnoye, M. W. P. L. Baars, M. H. P. van Genderen, E. W. Meijer

EUV Observations of Jupiter During the Impact of Comet Shoemaker-Levy 9 1595

G. R. Gladstone, D. T. Hall, J. H. Waite Jr.

ROSAT Observations of X-ray Emissions from Jupiter During the Impact of Comet Shoemaker-Levy 9 1598

J. H. Waite Jr., G. R. Gladstone, K. Franke, W. S. Lewis, A. C. Fabian, W. N. Brandt, C. Na, F. Haberl, J. T. Clarke, K. C. Hurley, M. Sommer, S. Bolton

Microchronology and Demographic Evidence Relating to the Size of Pre-Columbian North American Indian Populations 1601

D. R. Snow

Exceptionally Thermally Stable Polyimides for Second-Order Nonlinear Optical Applications 1604

T. Verbiest, D. M. Burland, M. C. Jurich, V. Y. Lee, R. D. Miller, W. Volksen

Plant Growth-Rate Dependence of Detrital Carbon Storage in Ecosystems 1606

J. Cebrián and C. M. Duarte

Identification of a Stimulator of Steroid Hormone Synthesis Isolated from Testis 1609

N. Boujrad, S. O. Ogwuegbu, M. Garnier, C.-H. Lee, B. M. Martin, V. Papadopoulos

Natural Protection Against HIV-1 Infection Provided by HIV-2 1612

K. Travers, S. Mboup, R. Marlink, A. Guèye-Ndiaye, T. Siby, I. Thior, I. Traore, A. Dieng-Sarr, J.-L. Sankalé, C. Mullins, I. Ndoeye, C.-C. Hsieh, M. Essex, P. Kanki

Association of Increased Spontaneous Mutation Rates with High Levels of Transcription in Yeast 1616

A. Datta and S. Jinks-Robertson

Correction of Radiation Sensitivity in Ataxia Telangiectasia Cells by a Truncated IκB-α 1619

M. Jung, Y. Zhang, S. Lee, A. Dritschilo

A Nuclear-Encoded Form II RuBisCO in Dinoflagellates 1622

D. Morse, P. Salois, P. Markovic, J. W. Hastings

Presynaptic Component of Long-Term Potentiation Visualized at Individual Hippocampal Synapses 1624

A. Malgaroli, A. E. Ting, B. Wendland, A. Bergamaschi, A. Villa, R. W. Tsien, R. H. Scheller

Receptor Endocytosis and Dendrite Reshaping in Spinal Neurons After Somatosensory Stimulation 1629

P. W. Mantyh, E. DeMaster, A. Malhotra, J. R. Ghilardi, S. D. Rogers, C. R. Mantyh, H. Liu, A. I. Basbaum, S. R. Vigna, J. E. Maggio, D. A. Simone

Integration of Visual and Linguistic Information in Spoken Language Comprehension 1632

M. K. Tanenhaus, M. J. Spivey-Knowlton, K. M. Eberhard, J. C. Sedivy

TECHNICAL COMMENTS

Origins of Fullerenes in Rocks 1634

T. W. Ebbesen, H. Hiura, J. W. Hedenquist, C. E. J. de Ronde, A. Andersen, M. Often, V. A. Melezhik; P. R. Buseck and S. Tsipursky

**1629
Pain receptors**



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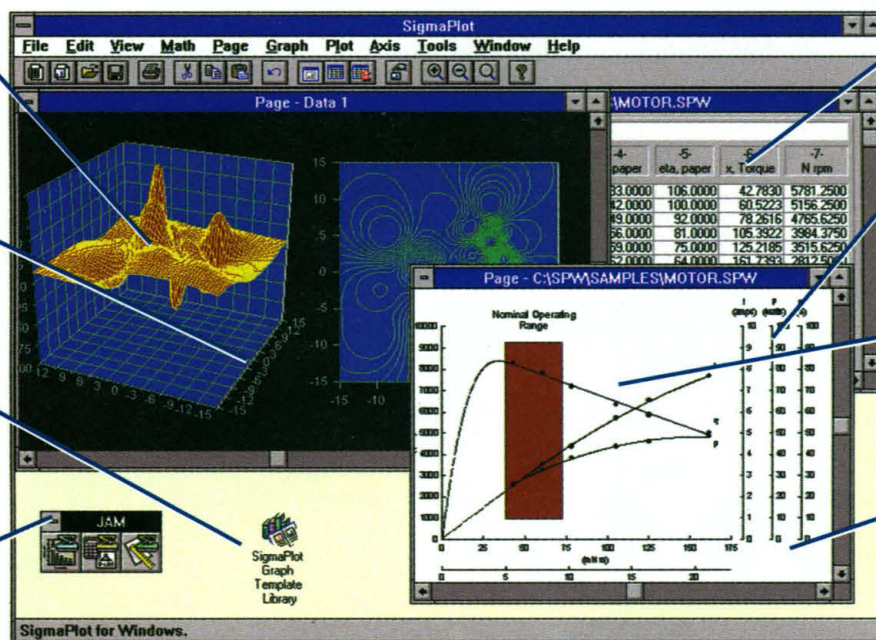
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THIS WEEK IN SCIENCE

edited by DAVID LINDLEY

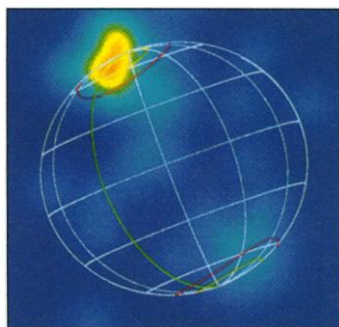
Low-energy removal

Electrons can induce desorption of atoms and molecules from a surface under vacuum. Shen *et al.* (p. 1590) used electrons from a scanning tunneling microscope tip to study this process for atomic hydrogen adsorbed on the Si(100) surface. In addition to a higher energy electronic process, they see a lower energy process, at 2 to 5 electron volts, in which multiple electrons vibrationally excite the Si-H bond. These tunneling electrons allow patterns of desorbed atoms to be formed with subnanometer structure.

■

High-energy impacts

The impact of comet Shoemaker-Levy 9 into Jupiter in July 1994 was observed by the Extreme Ultraviolet Explorer and the ROSAT x-ray satellite. Gladstone *et al.* (p. 1595) saw increased ultraviolet emissions after a number of the impacts,



and attribute the radiation mainly to scattered sunlight. Waite *et al.* (p. 1598) report evidence for transient brightening of the planet's x-ray aurora, perhaps due to disturbance of the magnetosphere.

■

Undecimated

Estimates of the native population of North America before colonization vary by a factor of

Understanding words through images

To test the psycholinguistic hypothesis that language is processed in the brain in an "encapsulated" fashion, independently of other cognitive activity, Tanenhaus *et al.* (p. 1632) followed the eye movements of subjects on a millisecond time scale as they were verbally instructed to perform simple manipulative tasks. Fixation of the subjects' gaze on one of several objects indicated when deliberate ambiguities in the instructions had been resolved. Contrary to the encapsulation idea, subjects used visual information to resolve linguistic ambiguities as soon as such information became relevant, indicating that linguistic and visual inputs are processed together, in a mutually dependent way.

10, depending on the extent to which imported diseases are thought to have reduced the population before any reliable counts were made. In a study of Mohawk encampments in one New York county that were continuously occupied from at least 1400 up to 1776, Snow (p. 1601) finds no evidence for any precipitous population declines that would have been due to unrecorded pandemics of diseases brought by the settlers. If this history is typical, it supports lower estimates for the pre-Columbian population of about 2 million in North America.

■

Beating the heat

Organic materials used in electronics and optics must often withstand high fabrication and operating temperatures. The performance of materials that exhibit second-order nonlinear optical phenomena depends crucially on ordering of the molecules, which is usually induced with an external electric field. Verbiest *et al.* (p. 1604) have incorporated nonlinear optical chromophores into the backbones of polymers with high glass transition temperatures. Stable second-harmonic generation was observed for several hours for one of these materials at temperatures up to 250°C.

Waste disposal

In a wide variety of plant ecosystems, three times as much carbon resides in the detritus as in the living biomass, and the rate at which carbon enters the detrital pool is strongly correlated with its primary production rate. As Cebrián and Duarte (p. 1606) show, however, the total mass of detrital C correlates poorly with the rate at which C enters the pool. Instead, detrital C mass is inversely correlated with plant turnover rate, meaning that the more rapidly C is cycled through the biomass, the smaller is the amount of detrital C, a result that helps clarify the relationship between ecosystem activity and the global carbon budget.

■

Two against one

The HIV-2 strain of the human immunodeficiency virus, mostly seen in Africa, appears to be less easily transmitted and less virulent than HIV-1, which is largely responsible for the global AIDS epidemic. In a 9-year study of women in Senegal, Travers *et al.* (p. 1612; see also news by Cohen, p. 1566) found that the rate of HIV-2 infection has remained constant since 1985, but that the incidence of HIV-1 infection has increased more than 10-fold. Further

analysis indicates that women already infected by HIV-2 were significantly less likely to become infected by HIV-1. The protective effect of HIV-2 against HIV-1 hints at the possibility of a feasible vaccine.

■

Error rate

Recent studies have shown that some of the DNA repair machinery is associated with the transcription machinery: The transcribed DNA strand is subjected to increased repair in comparison to the nontranscribed strand. Datta and Jinks-Robertson (p. 1616) examined the relationship between mutation and transcription in the yeast *Saccharomyces cerevisiae*. They find that the rate of spontaneous mutation was increased when a gene was highly transcribed, a correlation which has significance not only for DNA repair and mutagenesis but also for genome evolution.

■

Coping with pain

In cultured cells, agonist interaction with receptors for many neurotransmitters and neuropeptides induces a cellular internalization of the receptors. By means of painful stimulation of the hindpaws of rats, Mantyh *et al.* (p. 1629) evoked release of substance P, a neurotransmitter, in the spinal cord. Substance P receptors in spinal cord neurons underwent internalization. In addition, the spinal cord showed structural changes characterized by a thickening of the normally uniform dendrites into swollen varicosities connected by thin strands. After an hour, these changes had reverted to normal, indicating possible involvement with neuronal plasticity.

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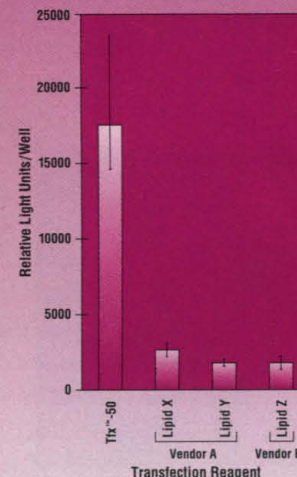
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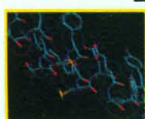
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Breast Cancer

Science 266: 66-71 (1994)

Colon Cancer

Cell 75: 1215-1225 (1993)

Obesity

Nature 372: 425-432 (1994)

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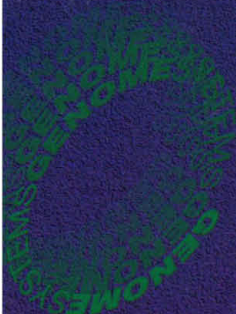
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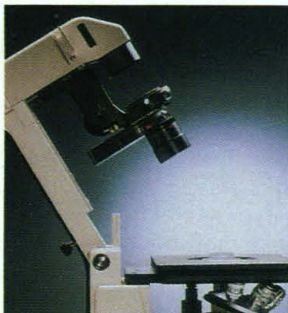
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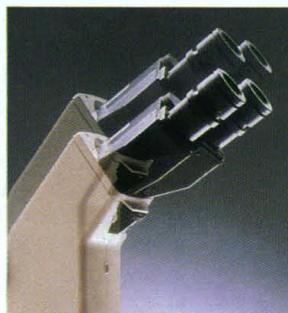
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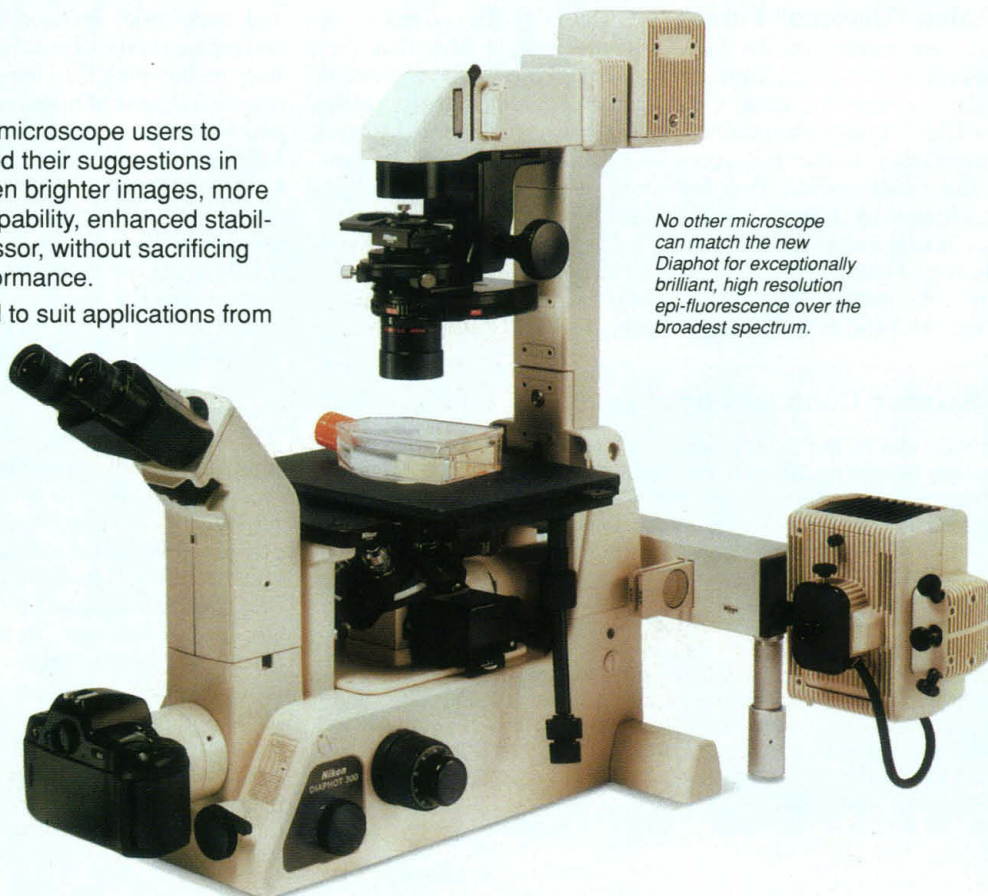
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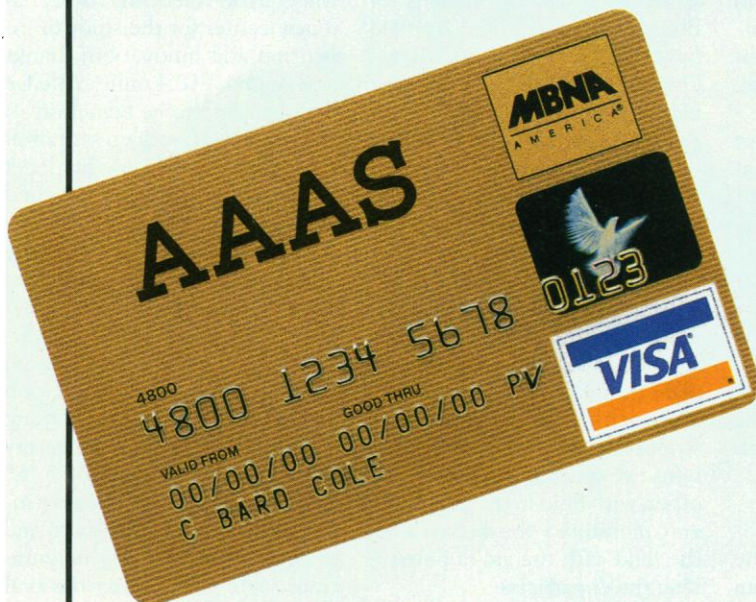
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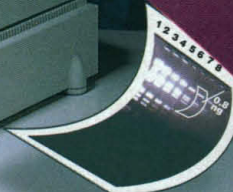
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