NEWS & COMMENT

New Mission for the National Labs

NRC Pledges Faster Delivery on Reports to Government

Midwife to Global Megaprojects Given Time to Deliver

Panel Faults Research Consent Process

Waivers Proposed for Emergency Studies

Panel Critiques NASA Science

RESEARCH NEWS

A Volcanic Crisis for Ancient Life? Searching for Volcanic Extinctions

Laser Pulses Make Fast Work of an Optical Switch

Differences in HIV Strains May Underlie Disease Patterns

Thailand Points the Way

POLICY FORUM

Graduate Education and Research for Economic Growth

T. P. Smith III and J. C. Tsang

PERSPECTIVES

PIK-Related Kinases: DNA Repair, Recombination, and Cell Cycle Checkpoints

C. T. Keith and S. L. Schreiber

Exciting Resonances

D. Voss

Religion and Gene Patenting

R. Cole-Turer

ARTICLE

Pli-Pleistocene African Climate

P. B. deMenocal

DEPARTMENTS

THIS WEEK IN SCIENCE

Launching Science's Next Wave

LETTERS

LETtering Press Embargo?: S. Whiting; J. Kleinman; E. W. Campbell Jr. • Data on the Web?: J. W. O. Ballard • Lights, Camera...and Action!: C. Chen • Hot at the Center: M. C. Zarnstorff • Kaposi's Sarcoma Findings: P. S. Moore and Y. Chang • Tsunami Prediction: C. E. Synolakis • Paving the Info Superhighway: R. S. Sikorski and R. Peters • Cockroach Immunity: R. D. Karp

SCIENCESCOPE

Minimum Population Grows Larger

Electron Ball Probes ‘House of Mirrors’

Graduate Education and Research for Economic Growth

T. P. Smith III and J. C. Tsang

PIK-Related Kinases: DNA Repair, Recombination, and Cell Cycle Checkpoints

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CONFIRMATION FOR COMBINATION AIDS THERAPY • CRUSTACEAN RIP VAN WINKLES • WOMEN AT THE TOP: EASTERN DIVISION • DIABETES MARKER IDENTIFIED • PRIZE TIME • WEB SITE FOR MUTATION SITES • BUDDING PROJECT AT LIVERMORE

SEX DETERMINATION, DIFFERENTIATION AND INTERSEXUALITY IN PLACENTAL MAMMALS, reviewed by B. R. Migeon • THE ALGORITHMIC BEAUTY OF SEA SHELLS, E. C. Cox • BOOKS RECEIVED • VIGNETTES • PUBLISHERS' ADDRESSES

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Victims of a volcano?

Dust clarifies African climate changes
The future of the science doctorate goes under the microscope in this special issue of Science. And the most pressing question new graduates pose about that future, as illustrated in this image, is, Will I get a job? To adapt to a shrinking job pool, many are proposing Ph.D. population control, curriculum changes, and altering the research university in very basic ways. See the special News section "Careers '95: The Future of the Ph.D." beginning on page 121. [Illustration: Jody May]

RESEARCH ARTICLE

Sulfite Reductase Structure at 1.6 Å: Evolution and Catalysis for Reduction of Inorganic Anions

B. R. Crane, L. M. Siegel, E. D. Getzoff

REPORTS

Nanochannel Glass Replica Membranes

D. H. Pearson and R. J. Tonucci

Emission Measurements of the Concorde Supersonic Aircraft in the Lower Stratosphere


P/P Precursors Under Africa:
Evidence for Mid-Mantle Reflectors

Y. Le Stunff, C. W. Wicks Jr., B. Romanowicz

Coherent Laser Control of the Product Distribution Obtained in the Photoexcitation of HI

L. Zhu, V. Kleiman, X. Li, S. P. Lu, K. Trentelman, R. J. Gordon

Radar Images of Asteroid 4179 Toutatis


Shape and Non–Principal Axis Spin

State of Asteroid 4179 Toutatis

R. S. Hudson and J. S. Ostro

Mt1: A Membrane-Associated Inhibitory Kinase That Phosphorylates Cdc2 on Both Threonine-14 and Tyrosine-15

P. R. Mueller, T. R. Coleman, A. Kumagai, W. G. Dunphy

Dephosphorylation of Cdc2 Thr160 by the Cyclin-Dependent Kinase–Interacting Phosphatase KAP in the Absence of Cyclin R. Y. C. Poon and T. Hunter

Prion-Inducing Domain of Yeast Ure2p and Protease Resistance of Ure2p in Prion-Containing Cells

D. C. Maison and R. B. Wickner

Bax-Deficient Mice with Lymphoid Hyperplasia and Male Germ Cell Death


Dissociation of Synchronization and Excitability in Furosemide Blockade of Epileptiform Activity

D. W. Hochman, S. C. Baraban, J. W. M. Owens, P. A. Schwartzkroin

Discrete Cortical Regions Associated with Knowledge of Color and Knowledge of Action

A. Martin, J. V. Haxby, F. M. Lalonde, C. L. Wiggs, L. G. Ungerleider

Dependence of Peptide Binding by MHC Class I Molecules on Their Interaction with TAP


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The U.S. science Ph.D. seems to have hit a wall—hard. After decades of expansion, the number of scientists seeking research grants and research jobs appears, in the eyes of many, to have outstripped the money available to supply them. Cell biologist Richard McIntosh, former president of the American Society for Cell Biology, has described the situation as a “Malthusian crisis.”

The first group to run into this harsh reality was physical scientists. With the shrinkage of the defense industry after the crumbling of the Iron Curtain beginning in 1989, there were fewer research jobs, says provost Mark Wrighton of Washington University in St. Louis. At the same time, the “biological revolution” of the last few decades had created a renewed surge of interest in the life sciences, says Ed Penhoet, chief executive officer of the biotech firm Chiron Corp. in Emeryville, California. The result: more people competing for fewer jobs. And attempts to reduce the federal deficit have reduced hopes for new growth in science budgets.

The effects of this changing environment are sweeping, and in this special issue of Science, we explore some of the most important features. Until now, says Karen Holbrook, vice president for research and dean of the graduate school at the University of Florida, Gainesville, “policies for graduate education, particularly in science and engineering, have not been seriously considered since the end of World War II.” But what began as complaints by jobless physicists has grown into a debate that is embroiling the entire community. Many favor curtailing Ph.D. production—and even those who don’t are talking about altering the curriculum to make Ph.D.s more marketable in a changing economy. Research universities, too, are changing, in ways that will affect the careers of scientists for years to come. (Early next year, Science will examine the changes affecting graduate education in Europe and Asia.)

**Birth control.** The major sign that things have changed in U.S. science is that some scientists—and some scientific societies, such as the American Chemical Society—are calling for reductions in the number of Ph.D.s being trained. The establishment—that is, scientists representing the National Science Foundation and the National Academy of Sciences—has been resisting calls for restrictions. Instead, the message, as spelled out in a recent report by the Committee on Science, Engineering, and Public Policy (COSEPUP),* is that with a “broadening” of their train-


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**Catch “Science’s Next Wave”**

Along with the Careers issue of Science, today marks the beginning of a new medium for providing information, services, and communication among the next generation of scientists. The new medium is an electronic network—“Science’s Next Wave”—found on the World Wide Web at [http://sci.aas.org/nextwave/](http://sci.aas.org/nextwave/). In addition to an electronic version of the Careers section, the network will offer a wide array of specifically electronic features. The first, premiering today, is an interactive forum on “Training Scientists for 21st Century Careers.”