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1782
Optical micrograph (crossed polarizers) showing parallel dark rods of FeTiO₃ (up to 20 micrometers long) that precipitated from solution in the mineral olivine during tectonic transport of a piece of mantle to a location high in the Swiss Alps. These rods formed under high pressure at depths greater than 300 kilometers, indicating profound subduction of continental rocks after the collision of Africa and Europe and their return to the surface carrying this piece of mantle. See page 1841 and News story on page 1811. [Image: L. Dobrzhinetskaya, H. W. Green II, and S. Wang]
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Out of the depths (I)
More and more rocks exposed at the Earth’s surface are now recognized as coming from deep in the mantle. These include xenoliths, which are small rocks carried upward by magmas that may come from depths of 400 kilometers or more, and larger rock packages, typically exposed by tectonic processes in continental collision zones and containing high-pressure minerals such as diamond. Dobrzhinetskaya et al. (p. 1841; see the news story by Kerr, p. 1811) show that the Alpe Arami peridotite, a large rock massif in the Alps, may have come from depths of 300 kilometers or more. Olivine in the rocks contains inclusions of a new phase of FeTiO₃ (see the cover) that indicate original exsolution of the perovskite phase at high pressures.

Out of the depths (II)
The rates and methods by which silicic magmas ascend through the crust have been uncertain. Brandon et al. (p. 1845) studied the dissolution of epidote, a mineral that is stable at high pressures in magmas but dissolves at shallow depths, to evaluate magma emplacement and cooling rates. Preservation of epidote in some dikes and intrusions implies that the parent magmas were emplaced and crystallized within 1000 years or so. Such rates are too fast for ascent of these magmas in diapirs.

No old greenhouse?
The latest Cretaceous climate has often been considered to be a warm greenhouse climate. Certainly high-latitude regions were warmer than comparable regions today, but there is evidence that the tropical oceans were cooler than one would expect. D'Hondt and Arthur (p. 1838) analyzed oxygen isotopes from planktonic foraminifera in Late Cretaceous sediments from a wide range of latitudes and found that the tropical oceans were cool. There was also a small latitudinal sea surface temperature gradient, indicative of enhanced poleward heat transport but not of a greenhouse-controlled climate.

What makes a queen
The differentiation of queen and worker castes in honeybee colonies is regulated by differential pheromone production. Plettner et al. (p. 1851; see the Perspective by Robinson, p. 1824) used deuterated enzyme substrates to work out the biosynthetic pathways for these pheromones. Various isomeric compounds that perform different functions in different castes are related, and slight changes in the functioning enzymes produce the caste-specific blends.

Magnetic transfer
Higher contrast can be obtained in magnetic resonance imaging (MRI) if the nuclei being studied have a greater fraction of spins aligned “up” versus “down.” Recently, optical pumping methods have been used to align spins in the noble gases, such as ⁴He and ¹²⁹Xe. Navon et al. (p. 1848; see the news story by Service, p. 1810) now show that when spin-polarized ¹²⁹Xe is introduced into solution, it can efficiently transfer magnetization to solvent protons through the nuclear Overhauser effect. This effect may find use in conventional MRI and in protein and surface nuclear magnetic resonance.

Not quite connected
Nose whiskers are an important part of the mouse sensory system. Each whisker projects through the thalamus into barrel structures in the cortex, which respond primarily to their “center” whisker but can also integrate signals from neighboring barrels. Welker et al. (p. 1864) have identified a naturally occurring mutant in which the barreloid structures of the thalamus are altered and individual cortical barrels are absent. Although sensory processing still occurs and overall input topology is preserved, spatial and temporal discrimination between individual whisker responses is reduced.

Nerve and muscle
Formation of the neuromuscular junction occurs when the growth cone of a developing neuron contacts its muscle target and forms a synapse. Kopczynski et al. (p. 1867; see the news story by Roush, p. 1807) identified a gene (late bloomer, or lb) in Drosophila that encodes a member of the tetraspanin family of cell surface proteins. In embryos with mutant lb genes, synapse formation is delayed and other neurons form abnormal connections to the muscle cell targets.

Linking cell growth and elongation factors
One form of myeloid leukemia in humans is associated with a chromosomal translocation that has a breakpoint in the ELL gene, but the function of ELL has been unknown. Shilatifard et al. (p. 1873) found that ELL encodes a transcriptional elongation factor that increases the catalytic rate of RNA polymerase II transcription by suppressing the transient pausing of polymerase. Recently, the product of the von Hippel–Lindau tumor suppressor gene was also found to be an elongation factor.

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And then, there's the fact that Macintosh brand loyalty is the highest of any PC in the world: 90% of Macintosh customers buy a Mac the next time around. Which leads people like Andrew Laham, MIS Director at the law firm Fleming, Hovenkamp & Grayson, to say, "There would be a major crisis if we had to do without Macs. In fact, there would be an open revolt." Indeed, if the mail we've received lately is any indication, more than a few CFOs out there would revolt, too, if their companies didn't use Macintosh computers.

"NASA saved $800,000 a year on maintenance alone when we replaced their legacy system with a Macintosh system," says Steve Monteith, a member of the Research Triangle Institute TechTracS' team.

And if you replace a Windows system with a Mac? According to a recent study by the Gartner Group, technical support costs for Macintosh tend to be 25% lower than support costs for Windows.*

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## Letters

### Objects of Study

The planet Earth (at right) is indeed a proper object of study for NASA, says this week's first letter writer, Congressman Robert S. Walker (R-PA). Readers suggest that K-12 science education could be improved by opening teaching careers to Ph.D.'s, by enrolling teachers in university courses, and by better exploiting natural history museums. Conventions that might clarify the duty of confidentiality during peer review are offered. Concerns about interpreting clinical AIDS data and developing "live attenuated HIV-1 vaccines" are discussed. And whistleblowers not polled in a survey about whistleblowing might (it is pointed out) have something to say.

### "Earth" Not Omitted Intentionally

The draft Omnibus Space Commercialization Act that was discussed at the 5 March Space Commercial Roundtable contains an inadvertent omission. Section 107 of the draft bill amends section 102(d) of the National Aeronautics and Space Act of 1958. It should read, "The expansion of human knowledge of the Earth and of phenomena in the atmosphere and space."

In staff submissions to the House of Representatives' legislative counsel office, the words "of the Earth" were inadvertently omitted. There was no intention to delete reference to the expansion of human knowledge of the Earth. There was no discussion among the staff or with me about excluding this important goal.

The ScienceScope item "Taking the Earth out of NASA" (15 Mar., p. 1485) indicates that there was some thought involved in leaving those particular words out and that, as a result, there is concern among the scientific community. I am happy to set the record straight.

Robert S. Walker
Chairman, Committee on Science, U.S. House of Representatives, Washington, DC 20515-6301, USA

### Good Teaching

Richard L. Hinman (Editorial, 15 Dec., p. 1739) prescribes "good programs for teachers," echoing Bruce Alberts' hope that Ph.D. scientists and young people should consider kindergarten through grade 12 (K-12) teaching careers (1). He is right.

It is time for real "action" to show that "good teachers produce good students." The politics and bureaucracy of school districts diffuses the enthusiasm considerably. Let us not add to it. Above all, the obstruction facing Ph.D.'s who lack a "teaching credential" should be removed. Restructuring is necessary to encourage Ph.D.'s to seek K-12 teaching careers.

Training teachers who are already employed is equally vital. They must take real university courses in the subject matter. The Josephine Mills Fellows Program for K-12 teachers was created at the University of California, Berkeley, in support of such an idea. It is imperative that we emphasize content and true excellence in teacher training. Good teachers with depth and breadth of knowledge are the architects of those minds who will shape and continue the progress of humankind.

Shoumen Datta
Director of Development, Office of the Superintendent, San Francisco Unified School District, 135 Van Ness Avenue, San Francisco, CA 94102-5299, USA

### References


Collections-based natural history museums should fall under Hinman's definition of "science museums." While the term "science museum" often refers to a hands-on science technology center, rather than a collections-based natural history museum, natural history museums are in the unique position of being able, in many instances, to integrate their scientific research activities with exhibitions and education programs, the latter including curriculum guides to dioramas for K-12 teachers and their classes; in-service
Teacher training: interactive, hands-on tools to enhance the knowledge value of exhibit components; and family-oriented learning experiences. Thus these museums play a key role in promoting scientific literacy, including exposure to the scientific process, for the young.

Allen M. Young
Vice President for Collections,
Research and Public Programs,
Milwaukee Public Museum,
800 West Wells Street,
Milwaukee, WI 53233-1478, USA

Confidentiality

There is a pending proposal pertinent to the unresolved confidentiality of submissions to peer-reviewed journals ("Suit alleges misuse of peer review," E. Marshall, News & Comment, 22 Dec., p. 1912). The definition of "research misconduct" recently recommended by the Commission on Research Integrity includes the intentional or reckless "use of any information in breach of any duty of confidentiality associated with the review of any manuscript or grant application." The word "any" leaves open whether a duty obtains.

The situation presents the following anomalies.

1) Authors make submissions voluntarily, and usually without entering into agreements about confidentiality with editors. (They sometimes even assign copyright shortly after submission.) When X voluntarily provides a document to Y, we expect confidentiality from Y only to the extent that X and Y have so agreed before Y's receipt. To what confidential treatment are journals willing to agree?

2) The nub of confidentiality is that a recipient not divulge the information. But journals are allowed to disclose submissions to referees as they choose.

3) Whether a duty of confidentiality is undertaken by a referee is merely contingent. It often rests on no more than an editor's transmittal letter, to which a referee usually does not expressly assent. Nor are such letters uniform.

4) A referee does not, and in virtue of anonymity, cannot, become bound to the author, the person whose ideas any duty protects.

Bentley Glass once observed that, to avoid using information in breach of its confidentiality, a referee or study section member would have to attempt noble self-deception, purporting to forget all, which is nearly impossible. Hence he proposed that study sections consist only of senior scientists no longer doing research in the pertinent field. All this confirms the truism that science depends on the trustworthiness of colleagues. Still it remains essential to clarify the duty of confidentiality if breach thereof is to be misconduct. One sensible convention would stipulate that (i) there is a duty not to effect or allow the appropriation of the contents of a submission; and (ii) a journal is answerable for the conduct of its anonymous referees unless it chooses, in the event of a dispute, to present to the author the explicit agreement of each referee to abide by (i). Such convention would induce journals to reach such agreements with referees.

Louis M. Guenin
Division of Medical Ethics,
Harvard Medical School,
Boston, MA 02115, USA

Attenuated HIV Vaccine: Caveats

Candidate human anti-AIDS vaccines should be safe and effective. In their report "Genomic structure of an attenuated quasi...
species of HIV-1 from a blood transfusion donor and recipients" (10 Nov., p. 988), N. J. Deacon et al. state (p. 991)

The strain of human immunodeficiency virus—type 1 (HIV-1) that infected the eight members of the Sydney Bloodbank cohort has not caused disease, even in the members affected by the immunosuppressive effects of age, drug therapy, and [systemic lupus erythematosus] SLE. This attenuated strain of HIV-1, therefore, could perhaps be the basis for a live attenuated vaccine.

We would like to state two caveats about this proposal.

The death of the HIV-infected patient C83, who died with Pneumocystis carinii pneumonia (1), is attributed to her underlying autoimmune disease, SLE, which required immunosuppressive therapy. However, neither CD4+ T cell counts nor data on viral load are provided in the report. Deacon et al. mention that DNA extracted from the only blood sample of patient C83 available did not yield HIV nef gene sequences, even though single copy cellular genes could be amplified. The sensitivity of the polymerase chain reaction (PCR) assays is not given in the report. As patient C83 died with an opportunistic infection, readers need to see all CD4+ T cell counts available, more information regarding the intactness of this DNA sample, and the time of its collection during the patient's illness. Thus, the data presented by Deacon et al. for patient C83 are inconclusive and do not exclude the possibility that nef-deleted HIV contributed significantly to her death.

The pathogenicity observed in infant macaques infected with SIVΔ3, a mutant of the simian immunodeficiency virus (SIV) containing large deletions in the nef and vpr genes and in the negative regulatory element of the long terminal repeat (2), is not discussed by Deacon et al. Two of the original four SIVΔ3-infected macaque infants have died of AIDS, and the survivors now have high viral loads.

Although we have concerns regarding the safety and efficacy of the proposed use of nef-deleted viruses as anti-AIDS vaccines, nef-deleted, live attenuated viruses still could play a major role in determining the correlates of immune protection in animal models, which could contribute to the design of safer, more effective vaccines.

Ruth M. Ruprecht
Timothy W. Baba
Vladimir Liska
Dana-Farber Cancer Institute,
44 Binney Street,
Boston, MA 02115, USA

References

Response: Ruprecht and her collaborators state two caveats regarding our recent report. Our response follows.

Patient C83 died with SLE only 4.25 years after infection and 8 days after HIV seropositivity was reported to the New South Wales Red Cross Bloodbank. This was 2 years before the initial discovery of the first two long-term "nonprogressors" was made and before our undertaking any laboratory studies. A single lymphocyte subset analysis was performed shortly before death at a time when she had active SLE nephritis and was being treated with large doses of glucocorticoids, azathioprine, and cyclophosphamide. She had a CD4+ lymphocyte count of 91 per microliter (CD4:CD8 = 0.15) (1). This would be compatible with either advanced HIV-1 infection, severe immunosuppression resulting from drug therapy, or the patient's underlying disease.

The information on viral load was based on a small sample of DNA extracted from unfractionated peripheral blood mononuclear cells (PBMCs) obtained 2

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years before the patient’s death (with an unknown CD4+ cell count). The sensitivity of the nef-LTR region PCR method was determined to be 1 to 10 copies of HIV-1 DNA per 10^5 CD4+ T cells (with the use of a dilution series of SE5 cells) (2). That we could not amplify HIV DNA from this PBMC DNA sample, therefore, suggests that the patient’s viral load was very low; the data on successful amplification of a single-copy gene were provided to show that the DNA sample had not been degraded. We agree that while the possibility that patient C83 died of progressive HIV infection cannot be completely excluded, we believe it is highly unlikely.

We agree that Ruprecht’s data on infection of infant macaques with multiply deleted SIV raises concerns about the use of similar strains of HIV as vaccines in human infants. However, these data apply to SIV with a different constellation of genomic defects than the HIV strain described in our report; the effect of the latter mutations on pathogenicity of SIV for infant macaques is unknown. Further studies of the transmission of different doses of nef-defective SIV from mother to offspring are required. In addition, infants are not the most logical target population for an HIV vaccine.

We share the concern of Ruprecht and her colleagues about the safety and efficacy of live attenuated HIV-1 vaccines, and we thank them for raising some important issues in this regard. However, we stand behind our original contention that “This attenuated strain of HIV-1 . . . could perhaps be the basis for a live attenuated vaccine.” All live attenuated vaccines currently licensed are pathogenic in at least some immunocompromised individuals; that has not precluded their widespread use, nor has it vitiated their efficacy.

N. J. Deacon
D. A. McPhee
S. Crowe
J. Learmont
J. Mills
National Centre for HIV
Virology Research,
Macfarlane Burnet Centre
for Medical Research,
Post Office Box 254,
Fairfield, Victoria 3078,
Australia, and
Look Back Unit,
New South Wales Red Cross Blood
Transfusion Service,
153 Clarence Street,
Sydney, New South Wales 2000,
Australia

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1. R. Garzia, personal communication.
2. A. Solomon and N. J. Deacon, unpublished data.

Structural Change Mechanisms in Regulatory Proteins

The Research News article “Flexing muscle with just one amino acid” (R. F. Service, 5 Jan., p. 31) describes recent work by Sykes and colleagues and correctly emphasizes the fundamental importance of discovering that a single amino acid plays a key role in controlling structural changes in calcium (Ca)-binding regulatory proteins like troponin-C. Earlier observations indicate that single amino acid residues can control large shape changes in troponin-C and calmodulin. These two Ca-binding proteins have similar molecular architectures but different functional properties. Yet a combination of mutational and simulation studies have shown that replacement of one amino acid, the arginine in position 11 (Arg 11) of skeletal troponin-C by alanine, conferred calmodulin-like functional and dynamic behavior on the mutant (1). The analysis from molecular dynamics simula-

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tions revealed how the mutant, but not the wild-type, protein exhibited a dynamic behavior more characteristic of calmodulin than of tropinin-C in its ability to bring about structural changes that have been shown to be important for calmodulin complexes with protein targets in the cell (2). The ability of this tropinin-C mutant to bind calcium was shown not to be significantly affected by the mutation (1). The conjoint simulations suggested that Arg 11 in wild-type tropinin-C forms water-mediated hydrogen bonds that may help maintain a more rigid structure than that found for calmodulin (3, 4). In the mutant, these hydrogen bonds are not present. The dynamic properties of calmodulin had been characterized from a computational molecular dynamics study of its structural flexibility (3, 5), which implicated a single residue, Arg 74 (5), in the major configuration changes that subsequently were shown to be important for the binding of this protein to its targets (6).

Harel Weinstein
Ernest L. Meijler
Department of Physiology and Biophysics,
Mount Sinai School of Medicine,
One Gustave Levy Place,
New York, NY 10029-6574, USA

References

Whistleblowers Not Polled

A Random Samples item (5 Jan., p. 35) and Lawrence J. Rhoades of the Office of Research Integrity (ORI) (Letters, 8 Mar., p. 1345) describe the results of a poll of whistleblowers done for ORI to learn how they thought whistleblowing had affected their careers. Neither Holden nor Rhoades notes that the survey excluded most of the whistleblowers who brought complaints to ORI and its predecessor offices.

ORI’s contractor polled only whistleblowers whose cases led to reports. In 1994, ORI received 185 queries (ORI’s term), of which 24 were referred to other agencies (1). Of the remaining 161, 38 resulted in inquiries or investigations and reports. The rest, 123, were rejected with neither formal investigation nor formal reports, branding the complainants, right- ly or wrongly, as having made charges that were obviously false or frivolous and rendering them defenseless against retaliation. These whistleblowers were not polled.

Charles W. McCutchen
5213 Acacia Avenue,
Bethesda, MD 20814, USA

References

Letters to the Editor

Letters may be submitted by e-mail (at science_letters@aaas.org), fax (202-289-7562), or regular mail (Science, 1333 H Street, NW, Washington, DC 20005, USA). Letters are not routinely acknowledged. Full addresses, signatures, and daytime phone numbers should be included. Letters should be brief (300 words or less) and may be edited for reasons of clarity or space. Letter writers are not consulted before publication.

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Asking for the Money Up Front

The Navy can get the funds it needs to build an aircraft carrier in one lump sum, but agencies like the Department of Energy (DOE) and the National Aeronautics and Space Administration (NASA) generally must ask Congress every year to continue building an expensive piece of research equipment or a new laboratory. The result can be higher costs to the taxpayer as projects get stretched—or even a slow and painful death, as proponents of the canceled Superconducting Super Collider can attest.

The White House wants to change that. Its 1997 budget request asks Congress to set aside $1.4 billion to fully fund a handful of buildings, satellite programs, and environmental projects that have struggled to win annual budgets from Congress despite broad bipartisan support. The biggest chunk—$558 million—would go to NASA's Tracking and Data Relay Satellite System, while the agency's New Millennium program, which uses new technology to cut satellite costs, would receive $342 million. Most of the remainder is split among DOE facilities, including $35 million for the B-factory at the Stanford Linear Accelerator Center, $37 million for upgrading the Fermilab Main Injector, and $131 million to help complete the Relativistic Heavy Ion Collider at Brookhaven National Laboratory. In a separate but related request, the National Institutes of Health is asking for the entire $310 million needed to build its new clinical research center. The approach is meant to force agencies to plan projects more sensibly, and then to let program managers do their job without worrying about the next year's budget. "We've done it in defense, so this is just catching up with the rest of the government," the official says. The plan may not prevent cost overruns, the official adds, "but it is a good thing to do." The question is whether Congress will agree to cede its annual power of the purse.

NAS to Spread Word On Value of Science

In a new foray into public education, the National Academy of Sciences (NAS) is about to launch a series of booklets and articles about how basic research benefits society.

The Basic Science Initiative, as it's called, was dreamed up about 2 years ago and is being overseen by NAS Vice President Jack Halpern, a chemist at the University of Chicago. The plan, Halpern says, is to "develop several case studies" of research that has led to "important practical developments" and describe "how these developments came about and in particular the role scientific research has played."

The articles are being written by prominent scientists, reviewing research in their fields that has led to new technologies. Writers and editors are then adapting the material—on topics ranging from the Global Positioning System to genetic testing and cholesterol-lowering drugs—for various audiences and adding illustrations. The final products will be distributed among scientists, policy-makers, science educators, and the public.

Halpern says the project is meant to further the public's understanding of science, not to lobby for science funding, which the NAS isn't supposed to do. But sometimes the same words can do double duty: The first brochures to be released this spring will discuss the implications of stratospheric ozone depletion, a research topic that some House Republicans say has been tainted by politics.

A Russian NIH In the Cards?

A plan intended to bolster support for the cream of Russia's biomedical research institutes by creating a Russian version of the U.S. National Institutes of Health may become reality if President Boris Yeltsin wins re-election in June.

The proposal, the brainchild of Evgeny Chazov, director of the Russian Academy of Medical Sciences' Cardiology Research Center in Moscow, would allow 10 to 12 existing institutes in Moscow and its suburbs to receive a joint appropriation directly from the Duma, Russia's lower house of parliament. At present, the institutes are among 75 funded individually by the academy's presidium, or ruling body. But the academy has been struggling with drastic budget cuts. Carving out an independent confederation of the top biomedical institutes, Chazov believes, might improve the odds that the Duma would adequately fund the institutes.

Not surprisingly, the prospect of losing these crown jewels riles academy leaders. "The presidium has accused me of being unpatriotic," Chazov says. However, he claims, "the majority of scientists think this is the right idea."

Chazov pitched his idea last fall to Prime Minister Viktor Chernomyrdin, who is said to support it. Indeed, according to the administration official, the biggest barrier to the center's establishment is Yeltsin's wish not to offend the academy before the election. But the new center "could be the first major science policy initiative of 1997," says the official, if Yeltsin wins the election.

Matter of Degrees

Faced with student angst about poor job prospects, national science policy-makers want to lay down the law—or at least offer it as a model for the opportunities awaiting newly trained researchers. "We need to think of the Ph.D. the same way we see a law degree," Bruce Alberts, president of the National Academy of Sciences, told the National Science Board last month in a typical comment. "Lots of people go to law school that don't intend to practice law."

But in fact, most lawyers do practice law, and do so at a higher rate than researchers do research. A 1994 survey by the American Bar Association, for example, shows that 89% of the working 770,000 law degree holders in the United States are pursuing their profession either in private practice, industry, or the courts. About 9% work in other parts of government, many of them in the Department of Justice, and only 2% fall outside these categories.

In contrast, the latest figures from the National Science Foundation on the country's 462,000 employed Ph.D. scientists and engineers show that 30% hold jobs outside science. Sliced another way, only 41% are engaged primarily in research and 22% in teaching. Some 18% perform management, sales, or administrative duties, 4% are in computer applications, and 15% do "other" things.

NSF officials aren't backing off their general argument. "The point still holds," says Deputy Director Anne Petersen. "We want faculty to take a broader view of the opportunities for their students." But she acknowledges that the legal analogy "may not be the right way to go."
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Pamela A. Williams-Russo, Cornell University Medical Center

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Gastroenterology/Hepatology/Nutrition
Tadahiko Yamada, University of Michigan School of Medicine

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Modest Gain for Irish Science

The Irish government last week approved a budget that includes a £4.2 million ($6 million) increase for science—a 20% hike over the original 1996 allocation. But the country's basic researchers are still dissatisfied with what they perceive as their government's failure to appreciate the value of basic research. "I am very disappointed," says Mike Hopkins, a physicist at Dublin City University and former head of the Irish Scientist's Research Association (IRSA), which he founded 2 years ago to push for more basic research funding.

The increase, which appears in the budget of the Department of Enterprise and Employment, raises the department's total spending on science, technology, and innovation to about £24 million ($36 million). But of this, only £2 million will go to scientists in the form of grants for basic research. The largest chunk of the money goes for applied research and promoting technology in industry.

The situation for Ireland's basic researchers is thus still dire, according to David McCullen, head of genetics at Trinity College. McCullen recently sat on a committee evaluating 59 research proposals in genetics that were competing for a pot of £340,000. "This is what you should be spending on a single research proposal," he says, adding that without the Wellcome Foundation and the European Union there would be very little science in Ireland.

Scientists had hoped that the government would change its attitude after IRSA persuaded it to establish a panel of scientists, chaired by Dan Tierney, chair of Cross Chemicals, to look at government science policy. The so-called Tierney report recommended that the government put an additional £25 million into science, technology, and innovation in 1996, and £245 million over the succeeding 4 years. Currently, the total spent throughout the government is £750 million. Hopkins now says he considers IRSA to have failed in its mission. Tierney, however, sees the glass as half full. Of the £4.2 million that did materialize from the government's coffers, he says: "We're quite happy that government is taking the problem a little bit seriously."

The Mesquite Mystique

Mesquite, once considered a nuisance by farmers and ranchers, with wood best suited for grilling chicken, may become a balm for developing countries. Mesquite, or Prosopis, which thrives in hot, dry places, can rejuvenate soils, stabilize land, and provide food and fuel, according to speakers at a conference* held last week in Washington, D.C.

After a decade of research on mesquite trees around the world, scientists have identified one, for example, in Peru, that is fast-growing, compact, free of the plant's trademark tire-piercing thorns, and amenable to cultivation. "For the first time, we have erect, thornless material that we can grow in three continents," says Peter Felker from Texas A&M University, Kingsville.

There are many reasons why someone would want to plant these trees, he and other scientists say. For example, in India, agronomist Gurbachan Singh, from the Central Soil Salinity Research Institute in Karnal, has demonstrated that nitrogen-fixing Prosopis not only raises the acid content of alkaline soil, but also dramatically increases crop yields of wheat and oats. Others reported that mesquite's ability to become a deep-rooted, sprawling ground cover can slow desert expansion by stabilizing sand dunes, as it does in Mauritania and Somalia.

And because mesquite is harder than oak and resists warping better than most other wood, Texas and Argentina are both nurturing nascent mesquite timber industries for flooring and furniture. "It's ironic, but the very same Texas ranchers whose grandparents spent all this money and time trying to eradicate Prosopis are now planting it," notes Mike Benge with the U.S. Agency for International Development. And animal feed manufacturers have started buying up mesquite pods for fodder—something people did in pre columbian days, Felker notes.

Lene Poulsen from the United Nation's Development Program says she hopes this meeting will lead to even more mesquite projects like Singh's. "I don't think we've taken sufficient advantage of the possibilities it offers," she says.

Honoraria Ban Lifted

High-level U.S. government scientists can start accepting payments for making speeches and writing articles unrelated to their government duties, thanks to an opinion from the Justice Department's Office of Legal Council.

The opinion, issued late last month, frees nearly all government employees from an honoraria ban enacted in 1989. In February 1995, the Supreme Court declared the law unconstitutional for employees below a high civil service level (GS-16, in government-speak). Now any scientist interested in teaching a chemistry class, for example, or giving a speech about 12th-century pottery can be paid so long as it doesn't have anything to do with the performance of his or her government job—and so long as the institution paying the honorarium is not also a recipient of funds over which the scientist has charge.

The ban "was somewhat demoralizing," says Anthony S. Fauci, director of the National Institute of Allergy and Infectious Diseases. It was "a real disincentive to recruit people."

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Project Expands Access to Science

Margaret Tunstall is known at AAAS as someone who doesn't throw much out. Her office abuts a closet piled with recycled milk jugs, yogurt cartons, ice cube trays, and other items used in the workshops she does around the country to train teachers and community volunteers in “hands-on” science experiments for young people.

Now, in a project Tunstall calls “the most exciting thing I've been involved in during my 4 years at AAAS,” those experiments are being modified for children with disabilities.

The 2-year pilot project, “Access Science,” was launched last year by the AAAS Program on Science, Technology, and Disability in collaboration with the National Easter Seal Society. Funding comes from the National Science Foundation. The experiments, developed by AAAS around 12 themes in the natural sciences, will be published and disseminated by Easter Seals.

“It's real science, adapted to the way all kids can do it,” says Tunstall, a former teacher whose major focus has been the development of AAAS programs designed to promote greater interest in science among girls and minorities.

Exposure to science in school is “almost non-existent” for children with disabilities, Tunstall explains, because of scheduling conflicts with special classes and a lack of adapted activities. So the informal, out-of-school “Access Science” activities are a new adventure for many of the students involved so far. “The kids love it. Their response is remarkable,” Tunstall says.

Her colleague Laureen Summers, a woman with cerebral palsy, says she had no science growing up because of a common attitude that people with disabilities couldn't do science. Her excitement about the project stems from “directly contradicting so many of the assumptions that people carry.”

The experiments, which use inexpensive materials, are designed to be family-oriented. Children with multiple disabilities and their families organized by two Easter Seals chapters in the Washington, D.C., area act as “research assistants,” testing the activities and suggesting needed changes. In a chemistry experiment, for example, small water bottles too rigid for some children to squeeze led Tunstall searching for a softer plastic substitute.

Ann King, D.C.-area program director of an Easter Seals project called Family Friends, helps coordinate the “Access Science” workshops. “The parents are as excited as the kids,” she says, “I don’t think anything would keep some of these families away.”

For information, contact Tunstall in the AAAS Education and Human Resources Directorate, by phone at 202-326-6674 or by e-mail at mtunstall@aaas.org.

Manpower Update

After two decades of major strides in broadening the diversity of people in science and engineering, progress is slowing down and parity with white males remains a long way off for women and minority groups, according to a series of status reports prepared for AAAS.

The five papers focus on conditions for women, African Americans, Hispanics, Native Americans, and people with disabilities, who are underrepresented in science and engineering. Accomplishments of the groups are cited, along with lingering barriers that limit educational and career opportunities and advancement.

The findings have far-reaching implications because present-day minority groups are expected to make up about half of the U.S. population by the middle of the next century. Yet African-American and other minority scientists and engineers are in short supply, “and their numbers are not growing at a rate that would promise parity even over a generation or two,” one report notes.

AAAS’s Science Linkages in the Community Initiative commissioned the reports. They were done by Betty M. Vetter, who headed the Commission on Professionals in Science and Technology until her death in November 1994.

Some of the findings:

- Despite improvement over time, mathematics achievement levels for African-American students “are not good enough to prepare them for careers in science and technology.” One bright note: a surge of black students with B.A. degrees in computer science.

- Women in engineering receive slightly higher starting salaries than their male counterparts, but the advantage quickly disappears as the men are promoted faster. For doctoral scientists and engineers, the salary gap begins with the very first job and widens over time.

- Low levels of education drastically hinder career opportunities for Hispanics. The 1990 census found that only 44 percent of Mexican Americans—the largest U.S. Hispanic group—and 51 percent of American Hispanics overall completed at least high school.

Copies are available from the AAAS Distribution Center at 1-800-222-7809, or 301-490-0056 for local and international calls. The cost is $7.50 per report or $25 for the full set.
Kit Characterizes DNA Differences
The CFLPScan Kit can rapidly characterize single-base differences between DNA molecules. The assay is more sensitive than either single-stranded conformational polymorphism or restriction fragment length polymorphism analyses. With a simple 2- to 3-min enzymatic reaction, this economical method can detect a single-point mutation in fragments as large as 2 kb. It also simplifies the localization of mutations since differences are revealed as the appearance or disappearance of bands, band shifts, or changes in band intensity near the site of the actual mutation. Boehringer Mannheim. Circle 139.

Radiation-Blocking Chambers
The Beta Finger Block is a radiation-safe minichamber for β-emitting radioisotopes. It holds four 1.5-ml microcentrifuge tubes and allows clear viewing of samples. Its compact size allows easy one-handed pipetting and transporting of samples. Concentrated source isotopes can be safely stored in the Beta Cubee Chamber. Radioisotope shipping vials are protected by sturdy half-inch thick acrylic for maximum protection against emissions. The chamber is equipped with a hinged lid and removable insert intended to fit all standard radioisotope shipping vials. Nalge Nunc International. Circle 140.

Iliac Artery Endothelial Cell System
EndoPack-IA is a complete cell system containing cryopreserved or proliferating normal human iliac artery endothelial cells, optimized cell growth medium, and subculture reagents for the propagation and subculture of the cells in vitro. The system can be used for experimental applications in cardiovascular pharmaceutical development and vascular pathology, including atherosclerosis. Clonetics. Circle 141.

Gel Analysis Software
SigmaGel is Windows-based software for fast, accurate, low-cost gel analysis. It permits researchers to make lane, spot, and molecular weight measurements directly from an IBM-compatible personal computer. The only other equipment required is a TWAIN compliant scanner. SigmaGel reduces gel analysis to a five-step, icon-driven procedure: (i) scan the gel or load a previously digitized image, (ii) calibrate the image, (iii) select the measurement mode, (iv) transfer the measurements to a spreadsheet window, and (v) output the spreadsheet data, graphs, and images to a Windows-supported device. Sigma Chemical Co. Circle 142.

Optical Trapping and Micromanipulation
The Cell Robotics Workstation is a complete system for optical trapping, micromanipulation, and microsurgery involving cells or submicron particles. Featuring proprietary laser-based optical trapping technology, the computer-controlled workstation can be mounted on Zeiss, Nikon, or Olympus inverted microscopes. User-friendly software allows an...
The SEPA CF unit consists of a test cell body and rigid holder. The cell body is available in acrylic, polypropylene, or stainless steel, and accommodates any 6 inch by 8 inch flat sheet membrane. Single or assortment packs of precut membrane are available. In addition, mesh or tubular feed spacers can be loaded in the cell body with membrane and permeate carrier to simulate the flow characteristics of a wide variety of commercially available spiral-wound membrane elements. Osmonics. Circle 146.

Literature

Integrated Separation Systems 1996 Catalog features an expanded line of protein electrophoresis and molecular biology products. New types of precut polyacrylamide gels in single and gradient percentages are now available to suit a variety of protein and nucleic acid separations. Integrated Separation Systems. Circle 147.

Spectrum 2000 FT-IR Spectrometer is a brochure on a modular system that is the next step in Fourier transform infrared (FT-IR) spectroscopy performance and usability. Advances include new optical and sampling features; control enhancements; and faster ways to generate, display, and interpret spectra. Perkin-Elmer. Circle 148.

The World of Immunological Excellence: 1996/7 Product Guide is a catalog detailing monoclonal antibodies to human, rat, and mouse antigens; cytokines and growth factors; cytoskeletal, extracellular, and other cell components; hormones; antibodies for flow cytometry; reagents for immunochemistry, sera, and blood products; and more. Harlan Bioproducts for Science and Serotec. Circle 149.

Selecting the Right Shaker for Your Laboratory is a 16-page booklet covering topics ranging from design features that minimize vibrations to the need for shielded wiring, electronic enclosures, and catch basins to protect against corrosive spills. New Brunswick Scientific. Circle 150.
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**RESEARCH INVESTIGATOR.** Lead a group of 10 individuals responsible for the production of recombinant proteins at up to 2-10 grams per batch to be released to discovery scientists for animal studies; production of cell culture supernatant and fermentation cell paste to release to process design scientists for purification development; operation of bank of small scale cell culture reactors, small cell fermentators and of bank of BIOCAD units as specified by process design scientists to support design studies. Minimum M.S. in Chemical Engineering, Biochemical Engineering or Biotechnology with 5 yrs. or greater experience in biopharmaceutical manufacturing setting and at least 2 yrs. of leading a mid-sized technical staff. Expertise in cell culture reactor operation, both at bench scale and at scales up to 100L; expertise in fermentation operation. Ref. #39.

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**Human Genetics** - Three molecular geneticists with research interests in developmental genetics, DNA diagnosis and human disease gene mapping/positional cloning are being recruited to enhance human genome research at the College. Candidates are sought who can interact with a wide range of researchers in clinical and basic sciences and who can contribute to the development of a Ph.D. program in genetics.

**Oral Biology** - Recruitment of two clinical and two basic scientists is aimed at further development of a Regional Research Center for Minority Oral Health (RRCMOH) at Meharry Medical College. Preference will be given to clinical scientists with training and research experience in periodontics, endodontics, and prosthodontics. Candidates using current cell and molecular biology approaches to elucidate underlying mechanisms of dental caries, periodontal disease, and tissue development and repair are of particular interest, although individuals whose research interests are in other areas of oral biology, including pain and dental biomaterials will also be considered.

**Environmental Health and Toxicology** - Two toxicologists and one environmental health scientist are being recruited to complement existing expertise at the College. Individuals are sought with research interest in reproductive and/or developmental, immunological, neurological/behavioral toxicology, general toxicology of specific agents, environmental exposure, risk assessment or environmental epidemiology.

**HIV and HIV-Associated Infections** - Two individuals are being recruited to expand a cadre of individuals at Meharry with expertise and commitment to HIV/AIDS research. Recruitment of a virologist studying the molecular biology of HIV or HIV-related viruses and a microbiologist studying the pathogenesis of mycobacteria are of particular interest. However, applications from individuals studying DNA or RNA viruses whose pathogenic mechanisms may help elucidate the progression of HIV infection or HIV-associated opportunistic organisms other than mycobacteria will also be considered.

For all of the positions, individuals are sought who can interact with a wide range of researchers in both clinical and basic sciences. Candidates must have a Ph.D. and/or M.D. or D.D.S. degree(s) and postdoctoral experience in one of the areas targeted for expansion. Candidates for senior faculty positions must have a record of excellence in research and teaching. Applicants for junior faculty positions must demonstrate evidence of their ability to conduct independent research and show potential for excellence in teaching. Appointments, start-up funds, and laboratory space in appropriate basic and/or clinical science departments are available for establishing a vigorous research program. All appointees will be expected to develop and sustain productive externally funded research programs and to participate in the professional and graduate teaching programs of the College. These positions are expected to be filled during the 1996-97 and 1997-98 academic years.

Meharry Medical College, founded in Nashville, Tennessee in 1876, is a historically black health sciences center that enrolls approximately 800 students in programs leading to the M.D., D.D.S., M.S., and Ph.D. degrees. Meharry's commitment to students from underrepresented groups is expressed in its mission statement. In light of its special concern for the health of minorities and the disadvantaged, Meharry emphasizes diseases and health conditions that disproportionately affect ethnic minority populations in its programs of basic, clinical and applied research.

A curriculum vitae, description of research interests, and three letters of reference should be sent by May 31, 1996 to: Fred Jones, Ph.D., RCMI Program Director, and Vice President for Research, Meharry Medical College, 1005 D.B. Todd Blvd., Nashville, TN 37208. Applications will be evaluated by the search committee appropriate to specific targeted areas. Meharry Medical College is an Equal Opportunity/Affirmative Action Employer. Women and members of underrepresented minority groups are especially encouraged to apply.
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Please forward resumes to our global headquarters: Wyeth-Ayerst Research, Human Resources, P.O. Box 8299, Philadelphia, PA 19101. Or you may fax your resume directly into our centralized research resume database at (610) 989-4854. Principals only. Equal Opportunity Employer, M/F/D/V.
Years from now, people will read about breakthroughs in recycling, the solution to ozone depletion, the discovery of revolutionary alternative fuels and manufacturing advances. Who knows? They could be reading about you.

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For additional information please refer to Argonne's Home Page on the Internet—http://www.anl.gov/welcome.html.

A Great Discovery Awaits You.
Fellowships for Biological and Biomedical Sciences

The Howard Hughes Medical Institute announces the 1997 competitions for fellowship programs that support training in fundamental biological and biomedical research. Awards, based on international competitions, focus on research directed to understanding basic biological processes and disease mechanisms. Fellowships may be held at academic or nonprofit research institutions.

Predoctoral Fellowships in Biological Sciences
Up to five years of support for full-time graduate study toward a Ph.D. degrees in the areas of biostatistics, cell biology, epidemiology, genetics, immunology, neuroscience, or structural biology. Applicants must not have completed the first year of postbaccalaureate graduate study in biology. Application deadline: early November.

Postdoctoral Research Fellowships for Physicians
Three years of support for training in fundamental research subsequent to at least two years of postgraduate clinical training and no more than two years of postdoctoral research training. Application deadline: mid-December.

Research Training Fellowships for Medical Students
An opportunity for medical students in the United States to explore a burgeoning interest in fundamental research. Support is awarded for one year of full-time fundamental research in a laboratory at the student’s medical school or another institution (except NIH in Bethesda, Maryland). Application deadline: early December.

Research Scholars at the National Institutes of Health
Under this joint HHMI-NIH program, medical students in the United States spend an intensive year in research in the intramural program at the NIH in Bethesda, Maryland. Residence is provided at the Cloister on the NIH campus. Application deadline: early January.

1997 Program Announcements and Applications

For Predoctoral Fellowships:
Hughes Fellowship Program
The Fellowship Office
National Research Council
2101 Constitution Avenue
Washington, DC 20418
United States of America
Telephone: (202) 334-2872
Fax: (202) 334-3419
E-mail: infofell@nas.edu

For Other Programs:
Howard Hughes Medical Institute
Office of Grants and Special Programs
Department AL97
4000 Jones Bridge Road
Chevy Chase, MD 20815-6789
United States of America
Telephone: (301) 215-8889
Fax: (301) 215-8888
E-mail: fellows@hq.hhmi.org

The Howard Hughes Medical Institute, an Equal Opportunity Employer, welcomes applications from all qualified candidates and encourages women and members of minority groups to apply.