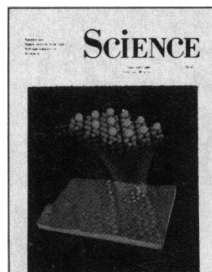


	7	This Week in <i>Science</i>
<b>Editorial</b>	9	Let Us Meander
<b>Letters</b>	11	Publication: Numbers and Quality: D. STETTEN, JR. ■ Vegetables, Fruits, and Oncologists: T. H. JUKES; V. HERBERT
<b>News &amp; Comment</b>	12	Imported Chips: A Security Risk?
	13	Gene-Splicing Debate Heats Up in Germany
	14	President Awards Science and Technology Medals
	15	Larger Public Sector Role Sought on Biotech ■ EPA Suspends Biotech Permit
	16	Antagonists Agree on Pesticide Law Reform
	17	<i>Briefing</i> : OMB Offers to Delay Indirect Cost Cuts ■ NSF Designates Five New Engineering Centers ■ House Science Committee Chairman Leaving Congress ■ NSF to Establish Computer Directorate ■ British Telescope Dogged by British Weather ■ New French Government Scraps Research Ministry ■ Comings and Goings
<b>Research News</b>	20	Obese Children: A Growing Problem
	22	Can Synchrotron Light Save the Chip Industry?
	24	Why Dynamiting Vampire Bats Is Wrong ■ Case Studies in Ecology
	26	<i>Briefing</i> : The Currents of Space
<b>Articles</b>	27	High-Resolution Climatic Analysis and Southwest Biogeography: R. P. NEILSON
	34	A Receptor-Mediated Pathway for Cholesterol Homeostasis: M. S. BROWN and J. L. GOLDSTEIN
	48	The Tunneling Microscope: A New Look at the Atomic World: J. A. GOLOVCHENKO
<b>Reports</b>	54	The Geochemical Behavior of Aluminum in Acidified Surface Waters: D. K. NORDSTROM and J. W. BALL
	56	Interannual Variability of Atmospheric Methane: Possible Effects of the El Niño-Southern Oscillation: M. A. K. KHALIL and R. A. RASMUSSEN
	58	Role of Platelet-Activating Factor-Acether in Mediating Guinea Pig Anaphylaxis: H. DARIUS, D. J. LEFER, J. B. SMITH, A. M. LEFER
	61	Recombinant Human Granulocyte Colony-Stimulating Factor: Effects on Normal and Leukemic Myeloid Cells: L. M. SOUZA, T. C. BOONE, J. GABRILOVE, P. H. LAI, K. M. ZSEBO, D. C. MURDOCK, V. R. CHAZIN <i>et al.</i>
	65	Electrophoretic Separations of Large DNA Molecules by Periodic Inversion of the Electric Field: G. F. CARLE, M. FRANK, M. V. OLSON
	68	Stimulation of Gonadotropin Release by a Non-GnRH Peptide Sequence of the GnRH Precursor: R. P. MILLAR, P. J. WORMALD, R. C. DE L. MILTON
	71	Lectin Activation in <i>Giardia lamblia</i> by Host Protease: A Novel Host-Parasite Interaction: B. LEV, H. WARD, G. T. KEUSCH, M. E. A. PEREIRA
	73	Living <i>Nautilus</i> Embryos: Preliminary Observations: J. M. ARNOLD and B. A. CARLSON

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**COVER** Atomic structure of a silicon crystal surface obtained from a tunneling microscope. The atomic reorganization at the surface of both flat atomic (111) planes and the atomic steps are seen in a 100 by 100 angstrom region. A unit cell of the 7×7 surface reconstruction is highlighted with an expanded computer-generated model above, which accounts for the observed structure. See page 48. [R. S. Becker, J. A. Golovchenko, and B. S. Swartzentruber; artistic assistance provided by J. Drobny and C. Jernstedt, AT&T Bell Laboratories, Murray Hill, NJ 07974]

- 76 In Vivo Competition Between a Metallothionein Regulatory Element and the SV40 Enhancer: H. SCHOLER, A. HASLINGER, A. HEGUY, H. HOLTGREVE, M. KARIN
- 80 Activation of Smooth Muscle Contraction: Relation Between Myosin Phosphorylation and Stiffness: K. E. KAMM and J. T. STULL
- 83 Development of Visual Pattern Discrimination in the Fly Depends on Light Experience: K. MIMURA
- 85 Differential Conditioning of Associative Synaptic Enhancement in Hippocampal Brain Slices: S. R. KELSO and T. H. BROWN
- 87 Vasoconstriction: A New Activity for Platelet-Derived Growth Factor: B. C. BERK, R. W. ALEXANDER, T. A. BROCK, M. A. GIMBRONE, JR., R. C. WEBB
- 90 Extended Oxygen Delivery from the Nerve Hemoglobin of *Tellina alternata* (Bivalvia): D. W. KRAUS and J. M. COLACINO
- 92 Nitrogen Fixation by *Azotobacter vinelandii* Strains Having Deletions in Structural Genes for Nitrogenase: P. E. BISHOP, R. PREMAKUMAR, D. R. DEAN, M. R. JACOBSON, J. R. CHISNELL, T. M. RIZZO, J. KOPCZYNSKI
- 95 Mechanisms of Human Motion Perception Revealed by a New Cyclopean Illusion: M. SHADLEN and T. CARNEY
- 97 Receptor-Coupled Activation of Phosphoinositide-Specific Phospholipase C by an N Protein: C. D. SMITH, C. C. COX, R. SNYDERMAN
- 100 Anti-Idiotypic Antibodies Bear the Internal Image of a Human Tumor Antigen: D. HERLYN, A. H. ROSS, H. KOPROWSKI
- 102 Perturbation of Red Cell Membrane Structure During Intracellular Maturation of *Plasmodium falciparum*: T. F. TARASCHI, A. PARASHAR, M. HOOKS, H. RUBIN
- 105 Thallophtic Allelopathy: Isolation and Identification of Laetisarinic Acid: W. S. BOWERS, H. C. HOCH, P. H. EVANS, M. KATAYAMA

## AAAS News

- 108 AAAS Project Begins Work with Disability Groups in China ■ Grants to Self-Sponsored Foreign Graduate Students to Attend AAAS Annual Meeting ■ Causality in Heredity and Aging ■ Report from Indian Science Congress Association ■ Reminder for Members

## Book Reviews

- 110 Andean Ecology and Civilization, *reviewed by* R. L. BURGER ■ Sweetness and Power, W. R. WRIGHT ■ Evolutionary Ecology of Marsupials, B. S. LOW ■ Ecology and Genetics of Host-Parasite Interactions, R. C. VRIJENHOEK ■ Astrophysics of Active Galaxies and Quasi-Stellar Objects, M. G. SMITH ■ Some Other Books of Interest ■ Books Received

## Products & Materials

- 115 Antibody Screening ■ Wash Module for Sample Handling ■ Balances ■ TLC Sample Applicator ■ Ion Chromatographs ■ Gel Filtration Chromatography Columns ■ Affinity Chromatography Support ■ Literature

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## Let Us Meander

When this column is finished, the saying, "When Demosthenes spoke, men commented on his eloquence; when Pericles spoke, they said, 'Let us march,'" will be amended to include, "When Koshland spoke, they said, 'Let us meander.'" Science policy is in need of more than eloquence these days. Marching would be appropriate if the enemy were identified and the battle lines were clear. If, however, a highly diverse constituency is faced with a new set of conditions, some purposeful meandering may be appropriate.

The era of the balanced federal budget is at hand regardless of the constitutional questions raised about parts or all of Gramm-Rudman. The soundness of science policy and the persuasiveness with which it can be presented may be crucial to the continued health of science.

How, then, should we act? Do we send a battalion marching north to the trumpet call, "Science will save the economy"? Dangerous. Scientific research will certainly help the economy, but do we wish to attach our banner to the promise of a foreseeable practicality? The greatest discoveries often come from the unplanned. The transistor, the laser, and recombinant DNA were not foreseen by either bureaucrats in Washington or scientific seers.

Do we march west to the banner, "Research for its own sake, pure and basic"? Even more dangerous. Farmers, city governments, and transportation systems, to name a few, are also needed for their own sake. Perhaps we should meander in the general direction of north-northwest, explaining as we go that basic researches are always ultimately relevant, but some are more relevant than others.

Should other heroic scientists march south to stirring choruses of "Don't rock the boat"? In times of crises (some will say) we must stick to the procedures of the past. Funding allocations for disciplines, the spheres of influence of universities and government agencies, and the methods of peer review that have brought us this far cannot be changed, because changes will generate divisiveness.

Should we march east, singing from the hymnals of reform? A willingness to criticize ourselves, to discard the fetters of the past, are the kinds of born-again policies likely to melt legislative hearts and lead to the promised land. A compromise, meandering south-southwest, exploring the advantages of the tried and true while adjusting to new realities may be the best approach to this destination.

Meandering must have a goal, or we may get lost in the wilderness. How can policy be formed in this new era? Committees of peers, manifestos from learned societies, and decisions of program managers are valuable and conventional procedures, but it may be rewarding to examine other ways to define our goals.

One might be to advance science policy the same way that we advance scientific discovery: by publication of novel ideas. The genetic code was not solved by assembling all the best geneticists in the world and agreeing on the next experiment. Rather, individuals devised their own experiments, and those that were good provided a basis for further advances; those that were less good were forgotten without damage to the system. Eventually, to have political clout, the best ideas will have to earn the consensus of larger groups who must march, but the seeking of consensus too early can lead to the stifling of truly original ideas. Ideas should be considered the basic research of science policy, the generation of consensus as its applied research.

To aid in the process, *Science* has invited various individuals to make suggestions in the science policy area. Frank Press, president of the National Academy of Sciences, courageously presented an idea in the 21 March issue that is both innovative and controversial. Others have been invited to contribute ideas on subjects ranging from evaluation of big science and little science, levels of indirect costs, amounts of salaries on grants, and the hazards of conformism in peer review. Volunteer contributions also are welcome and will be evaluated for originality, succinctness, and scholarship—comparable to the evaluation of scientific articles. In a sense, we are embarked on a social experiment the hypothesis of which is that science policy can proceed by incremental steps in ideas similar to the process of science itself.

Scientists of the world, unite! The battle of the budget looms. Let us meander!

—DANIEL E. KOSHLAND, JR.