
EDITORIAL  Science Advice for the Executive Branch .......................... 119

ARTICLES  Electron Microscopy of Irradiation Effects in Space: *M. Maurette and P. B. Price* ... 121
On the Specificity of Antibodies: *F. F. Richards et al.* .......................... 130
Prehistoric Agriculture in Tropical Highlands: *O. F. Linares, P. D. Sheets, E. J. Rosenthal* .......................... 137

NEWS AND COMMENT  National Institutes of Health: The Politics of Taste and Smell .......................... 145
Impact of Protocol Passage Diluted by Compromise .......................... 149
Robert W. Long: The Banker Who Heads Agricultural Research .......................... 150
Health Planning: New Program Gives Consumers, Uncle Sam a Voice .......................... 152

RESEARCH NEWS  Hemoglobin: Model Systems Shed Light on Oxygen Binding .......................... 154
Sociobiology (II): The Evolution of Social Systems .......................... 156

ANNUAL MEETING  The Quality of Science: *A. Herschman*; Programs of AAAS Sections .......................... 158

Downloaded from http://science.sciencemag.org/ on April 15, 2017
Book Reviews

Educability and Group Differences, reviewed by C. Denniston; The Social Behavior of the Bees, W. E. Kerr; Internal Rotation in Molecules, J. B. Lambert; Books Received ........................................ 161

Reports

Heat Flow and Convection Experiments aboard Apollo 17: P. G. Grodzka and T. C. Bannister .................................................. 165

Troponin and Parvalbumin Calcium Binding Regions Predicted in Myosin Light Chain and T4 Lysozyme: R. M. Tufty and R. H. Kretsinger ....................... 167

Daily Rhythm in Human Urinary Melatonin: H. J. Lynch et al. ............. 169

5-Methyltetrahydrofolic Acid Is Not a Methyl Donor for Biogenic Amines: Enzymatic Formation of Formaldehyde: E. Meller et al. .......................... 171

Chromatin Fragments Resembling v Bodies: M. B. Senior, A. I. Olins, D. E. Olins ........................................... 173

Coevolutionary Race Continues: Butterfly Larval Adaptation to Plant Trichomes: B. J. Rathcke and R. W. Poole .............................................. 175

Vesicular Binesis: Glucose Effect on Insulin Secretory Vesicles: K. H. Gabbay, J. Korf, E. E. Schneeberger ........................................ 177


When Left-Handed Mice Live in Right-Handed Worlds: R. L. Collins ........ 181

Cover

Stone statues from Barriles, El Hato basin, Volcán Barú, Panama. Height is 2.80 meters. See page 137. [Museo Nacional de Panamá]
LETTERS

The Future of Fusion: V. L. Parsegian; C. Starr and W. Häfele; R. F. Post and F. L. Ribe; Thiotic Acid and Mushroom Poisoning: F. R. Alleva; F. C. Bartter

ARTICLES

Chan Chan: Andean Alternative of the Preindustrial City: M. E. Moseley
DNA Modification Mechanisms and Gene Activity during Development: R. Holliday and J. E. Pugh
AGRIS: J. F. Caponio and L. Moran

NEWS AND COMMENT

Fetal Research: The Case History of a Massachusetts Law
Robert A. Goldwin: Bridge Between Thinkers and Doers
Air Force R&D Policy: More for Basic Research, Universities
Congress Strengthens Freedom of Information Act

RESEARCH NEWS

Exploring the Solar System (V): Atmospheres and Climates
The Uniqueness of the Earth's Climate

BOOK REVIEWS

The Logic of Social Systems, reviewed by R. F. Salisbury; Zen and the Art of Motorcycle Maintenance, G. Basalla; Books Received

BOARDS OF DIRECTORS

ROGER REVELLE Retiring President, Chairman
MARGARET MEAD President
WILLIAM D. MC ELROY President-Elect
RICHARD H. BOLT President
EMILIO O. DADDARIO EDWARD E. DAVID, JR.

CHAIRMEN AND SECRETARIES OF AAAS SECTIONS

MATHEMATICS (A) Victor L. Klen President Truman A. Botts

PHYSICS (B) Victor F. Weisskopf President Rolf M. Sinclair

CHEMISTRY (C) William E. Hanford President Leo Schubert

ASTRONOMY (D) Carl Sagan President Arlo U. Landolt

ENGINEERING (M) Edward Wenk, Jr. President Paul H. Robbins

HISTORY AND PHILOSOPHY OF SCIENCE (L) Roger C. Buck President George Basalla

INFORMATION AND COMMUNICATION (T) Ruth M. Davis President Joseph A. Schluette

PHARMACEUTICAL SCIENCES (S) James T. Deluissio President Raymond Jang

DIVISIONS

ALASKA DIVISION

William E. Davis Chairman, Executive Committee
Irma Duncan Executive Secretary

PACIFIC DIVISION

George A. Zentmyer President
Robert T. Orr Secretary-Treasurer

SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION

Joseph A. Schluette President
Max P. Dunford Executive Officer

SCIENCE is published weekly, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Now combined with The Scientific Monthly®. Second-class postage paid at Washington, D.C. Copyright © 1975 by the American Association for the Advancement of Science. Member rates: on request. Annual subscription $40; foreign postage: Americas $6, overseas $8, air lift to Europe $20. Single copies $1 (back issues $2) except Guide to Scientific Instruments which is $4. School year subscription: 9 months $30; 10 months $33.50. Provide 6 weeks notice for change of address, giving new and old address and zip codes. Send a recent address label. Science is indexed in the Reader's Guide to Periodical Literature.

Downloaded from http://science.sciencemag.org on April 15, 2017
Fossils of Uncertain Affinity from the Upper Devonian of Iowa: R. A. Davis and H. A. Semken, Jr. .................................................. 251
Cyclopentyl Ketones: Identification and Function in Azteca Ants: J. W. Wheeler et al. ................................................................. 254
Reduced Incidence of Spontaneous Mammary Tumors in C3H/He Mice after Treatment with Polyadenylate-Polyuridylate: F. Lacour, G. Delage, C. Chianale ............................... 256
F Factor Promotes Turnover of Stable RNA in Escherichia coli: Y. Ohnishi .................................................................................. 257
2,3-Diphosphoglycerate: A Physiological Inhibitor of Platelet Aggregation: S. G. Iatridis et al. ................................................................. 259
Collagenase Production by Lymphokine-Activated Macrophages: L. M. Wahl et al. ................................................................. 261
Heavy Cosmic-Ray Exposure of Apollo Astronauts: E. V. Benton, R. P. Henke, J. V. Bailey ........................................................................ 263
Auditory Discrimination and Recall in Monkeys: J. H. Dewson, III, and A. C. Burlingame ........................................................................ 267
Dynamic Random-Dot Stereograms Reveal Up-Down Anisotropy and Left-Right Isotropy between Cortical Hemifields: B. Breitmeyer, B. Julesz, W. Kropfl ................................................................. 269
Contradiction of Auditory and Visual Information by Brain Stimulation: D. Kleinnan and E. R. John ............................................................... 271
Anion and Cation Exchanger Columns; Tritium Labeling Service; Background Correction System; Spectrophotometers; Clinical Enzymology Assay; Micro-Iontophoresis Programmer; Radiation Survey Meter; Electric Current Interrupt Alarm; Carbohydrate Standards; Chlorine Test Kit; Cardiac Evaluation System; Coulometer; Gel Filtration Medium; Literature .................................................................................. 280

Rats transported through a patterned environment do not recover pattern vision after serial visual cortex lesion. Rats allowed free movement in such environments do recover. See page 265. [Michael J. Danley, Huntington Institute of Applied Medical Research, Pasadena, California]
LETTERS
Harvard XYY Study: J. Beckwith et al.; W. H. Davis; M. Mage; Protein Production: H. Kehl; Computer-Assisted Education: T. W. Easton; Preclinical Medical Education: L. K. Steinrauf; J. C. Rose; Biochemistry Registry: L. Leive 298

EDITORIAL
Women, Men, and the Doctorate: B. M. Vetter 301

ARTICLES
Photochemical Reactions as a Tool in Organic Syntheses: N. J. Turro and G. Schuster 303
Functional Adaptation to High Altitude Hypoxia: A. R. Frisancho 313
Beginnings of Fruit Growing in the Old World: D. Zohary and P. Spiegel-Roy 319

NEWS AND COMMENT
Strategic Arms Limitation (I): The Decades of Frustration 327
Karl Hess: Technology with a Human Face 332
Abortion and Manslaughter: A Boston Doctor Goes on Trial 334

RESEARCH NEWS
Leukemia: A Second Human Tumor Virus 335
Multiple Minicomputers: Inexpensive and Reliable Computing 337

BOOK REVIEWS
Cold Spring Harbor Symposia on Quantitative Biology, reviewed by P. L. Webster: Biology of Fibroblast, L. Hayflick; Electrons in Fluids, W. L. Jolly; Chemical Applications of Molecular Beam Scattering, E. F. Greene; Aqueous Dielectrics, H. L. Friedman; Physics and Chemistry of Ice, F. H. Stillinger; Books Received 339
REPORTS

A Large-Scale Hole in the Ionosphere Caused by the Launch of Skylab: M. Mendillo, G. S. Hawkins, J. A. Klobuchar ........................................ 343


Mercury Monitor for Ambient Air: T. Hadeishi et al. ........................................ 348

Type C RNA Tumor Virus Isolated from Cultured Human Acute Myelogenous Leukemia Cells: R. E. Gallagher and R. C. Gallo ......................... 350

Polypeptide Composition of Fraction 1 Protein from Parasexual Hybrid Plants in the Genus Nicotiana: S. D. Kung et al. ................................. 353

Sex Pheromone of the Oak Leaf Roller: A Complex Chemical Messenger System Identified by Mass Fragmentography: L. B. Hendry et al. ................. 355

Low Frequency Electric Field Induced Changes in the Shape and Motility of Amoebas: A. W. Friend, Jr., E. D. Finch, H. P. Schwan ........................ 357

Growth, Behavior, and Brain Catecholamines in Lead-Exposed Neonatal Rats: A Reappraisal: M. Golter and I. A. Michaelson ....................................... 359

Secretion of a Nerve Growth Factor by Primary Chick Fibroblast Cultures: M. Young et al. ................................................................. 361

Synaptonemal Complex Complement of Man in Spreads of Spermatocytes, with Details of the Sex Chromosome Pair: M. J. Moses, S. J. Counce, D. F. Paulson .................................................. 363

Evaporative Water Loss in Box Turtles: Effects of Rostral Brainstem and Other Temperatures: K. R. Morgareidge and H. T. Hammel ......................... 366

Dopamine β-Hydroxylase Activity in Brains of Chronic Schizophrenic Patients: R. J. Wyatt et al.; C. D. Wise and L. Stein.............................. 368

COVER

Chihuahua. [Lisa Lewis by Gary Laurish Photography, Washington, D.C.]

EDITORIAL President Ford’s Energy Initiatives ......................... 391

ARTICLES Physics and Calculus of Countercity and Counterforce Nuclear Attacks: K. Tsipis .................... 393
Sex Bias in Graduate Admissions: Data from Berkeley: P. J. Bickel, E. A. Hamnel, J. W. O’Connell ....................... 398
Crisis Management: Some Opportunities: R. H. Kupperman, R. H. Wilcox, H. A. Smith ......................... 404

S and COMMENT Fetal Research (II): The Nature of a Massachusetts Law ................. 411
NIE: Beleaguered Institute Has a Stormy Past, a Cloudy Future .... 413
Going Public with VX Formula—A Recipe for Trouble? ................. 414
Cruise Missiles: Air Force, Navy Weapon Poses New Arms Issues .... 416

RESEARCH NEWS Earthquake Prediction: Progress in California, Hesitation in Washington .......... 419
Nuclear Fusion: The Next Big Step Will Be a Tokomak .................. 421

AAAS NEWS States’ Role in Radioactive Material Management: W. A. Blanpied; A Request to Readers; Notes from the Offices; NOVA Program Schedule .......... 424


Continuous Random Network Model for Amorphous Solid Water: 
R. Alben and P. Boutron .............................................. 430

Enzymatic Characterization of Soluble Organic Phosphorus in Lake Water: 
S. E. Herbes, H. E. Allen, K. H. Maney .................................. 432

Drought in the Sahara: A Biogeophysical Feedback Mechanism: 
J. Charney, P. H. Stone, W. J. Quirk .................................. 434

Rubidium-87/Strontium-87 Age of Juvinas Basaltic Achondrite and Early 
Igneous Activity in the Solar System: C. J. Allègre et al. .............. 436

Mount St. Helens Volcano: Recent and Future Behavior: D. R. Crandell, 
D. R. Mullineaux, M. Rubin .............................................. 438

Callisto: Disk Temperature at 3.71-Centimeter Wavelength: G. L. Berge 
and D. O. Muhlenman ....................................................... 441

Morphine-Dependent Rats: Blockade of Precipitated Abstinence by 
Tetrahydrocannabinol: B. Hine et al. .................................. 443

Primitively Columellaless Pollen: A New Concept in the Evolutionary 

Growth Hormone: Independent Release of Big and Small Forms from Rat 
Pituitary in vitro: M. E. Stachura and L. A. Frohman .................... 447

Endogenous Cyclic Adenosine Monophosphate in Tissues of Rabbits Fed an 
Atherogenic Diet: J. M. Augustyn and F. D. Ziegler ...................... 449

Measles Virus: An Unwanted Variant Causing Hydrocephalus: 
M. V. Haspel and F. Rapp .................................................... 450

Aggressive Mimicry in Photuris Fireflies: Signal Repertoires by Femmes 
Fatales: J. E. Lloyd .............................................................. 452

Technical Comments: Erythrocytes in Human Muscular Dystrophy: T. D. Miale, 
J. L. Frias, D. L. Lawson; D. W. Matheson and J. Howland; Phosphorus 
Dynamics in Lake Water: Contribution by Death and Decay: R. A. Minear; 
D. R. S. Lean; Primate Evolution: Were Traits Selected for Arboreal 
Locomotion or Visually Directed Predation?: D. Raczkowski; M. Cartmill .... 453

MEETINGS

Theoretical and Practical Uses of Plant Cell and Tissue Culture: L. G. Nickell; 
Isozymes: The Third International Conference: G. S. Whitt ............... 457

COVER

Fatal embrace. Photuris female (left) has seized a male of another species 
and is chewing on his thorax. When she is finished, little will remain ex- 
cept his eyes, feet, and wings. These females attract foreign males to them 
by mimicking the mating signals of their females. See page 432. [J. E. 
Lloyd, Department of Entomology, University of Florida, Gainesville]
14 February 1975

Volume 187, No. 4176

LETTERS

EDITORIAL
Students, Careers, and the Recession: A. B. Grobman .................................................. 495

ARTICLES
Global Increase in Quaternary Explosive Volcanism: J. P. Kennett and R. C. Thunell ........ 497
Environmental Mutagenic Hazards ............................................................................. 503
Infectious Diseases in Primitive Societies: F. L. Black .................................................. 515

NEWS AND COMMENT
Ford's First Budget: DOD, Energy R & D Up, Health Is Ailing ........................................ 518
Phage in Live Virus Vaccines: Are They Harmful to People? ........................................ 520
Quiet AAAS Meeting Dominated by Science Policy Talk ............................................. 523
The CIA: Transportation Study Stirs New Charge of Impropriety ................................. 524

RESEARCH NEWS
Crystal-Growing in Space: Significance Still Up in the Air ............................................. 527
Mass Spectroscopy: Adaptation for Nonvolatile Samples .............................................. 529

BOOK REVIEWS
The Behaviour of Ungulates and Its Relation to Management, reviewed by E. O. Wilson; The Pituitary Gland, M. P. Schreibman; Free Radical Telomerization, E. S. Huys er; The Biology of the Oceanic Pacific, G. T. Row e; Science and Civilisation in China, C. S. Smith; Books Received .................................................. 530

BOARD OF DIRECTORS
ROGER REVELLE
Retiring President, Chairman

MARGARET MEAD
President

WILLIAM D. MC ELROY
President-Elect

RICHARD N. BOLT
President Executive Officer

EMILIO Q. DADDARIO
EDWARD E. DAVID, JR.

CHAIRMEN AND SECRETARIES OF AAAS SECTIONS

MATHEMATICS (A)
Victor L. Klee
Truman A. Botts

PHYSICS (B)
Victor F. Weisskopf
Roll M. Sinclair

QUANTUM MECHANICS (C)
G. T. Seaborg

SOCIAL AND ECONOMIC SCIENCES (K)
Seymour M. Lipset
Daniel Rich

ECONOMIC SCIENCES (K)
Seymour M. Lipset
Daniel Rich

EDUCATION (Q)
F. James Rutherford
Barbara P. Fordyce

DENTISTRY (R)
Clifton O. Dunnett
Shalom Pharma man

PHARMACEUTICAL SCIENCES (S)
James T. Dolinisco
Raymond Jang

ENGINEERING (M)
Edward Weik, Jr.
Paul H. Robbins

INFORMATION, COMPUTING, AND COMMUNICATIONS
Martin Greenberger
Joseph Becker

SCIENCE is published weekly, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Ave., NW, Washington, D.C. 20005. It combines with The Scientific Monthly second-class postage paid at Washington, D.C. Copyright © 1975 by the American Association for the Advancement of Science. Member rates on request. Annual subscription $40; foreign postage: Americas $5, overseas $8, air lift to Europe $20; single copies $1 (back issues $2). except Guide to Scientific Instruments which is $4. School year subscription: 9 months $30; 10 months $33.50. Provide 6 weeks notice for change of address, giving new and old address and zip codes. Send a recent address label. Science is indexed in the Reader's Guide to Periodical Literature.
REPORTS

Freon Consumption: Implications for Atmospheric Ozone: S. C. Wofsy, M. B. McElroy, N. D. Se.

Earthquake Prediction: Modeling the Anomalous $V_p/V_s$ Source Region: D. T. Griggs et al.

Folate Transport by the Choroid Plexus in vitro: R. Spector and A. V. Lorenzo

Toxicology and Pharmacological Action of Anabaena flos-aquae Toxin: W. W. Carmichael, D. F. Biggs, P. R. Gorham

Glucagon: Role in the Hyperglycemia of Diabetes Mellitus: R. Dobbs et al.

Increased Lever Pressing for Amphetamine after Pimozide in Rats: Implications for a Dopamine Theory of Reward: R. A. Yokel and R. A. Wise

Myogenic Defect in Acetylcholinesterase Regulation in Muscular Dystrophy of the Chicken: T. A. Linkhart, G. W. Yee, B. W. Wilson

Nitrogen Fixation in Marine Shipworms: E. J. Carpenter and J. L. Culliney


Sleep and Cardiac Rhythm in the Gray Seal: S. H. Ridgway, R. J. Harrison, P. L. Joyce

Technical Comments: Student Evaluation: M. Rodin; P. W. Frey; P. K. Gessner; Food Production and the Energy Crisis: A Comment: V. W. Ruttan; D. Pimentel

PRODUCTS AND MATERIALS

Liquid Dispensers; Incubator; Digital Timers; Photon Counter; Programmable Pocket Calculator; Magnetic Fluid Design Kit; Fluorescence Spectrophotometer; Inkless Chart Recorder; Video Disk Recording System; Cartridge Tape System; Scanning Polarograph; Holography System: Literature

COVER

Gray seal (Halichoerus grypus) spends most of its life in the sea and can sleep on the surface, underwater, and on land. The seal proceeds from active waking (upper left) to quiescent waking (upper center) to rapid eye movement sleep (upper right) to slow-wave sleep (lower six views). See page 553. (S. H. Ridgway and P. L. Romano, U.S. Navy, San Diego, California)
This is the first issue of volume 187. There is no 3 January issue of Science.


EDITORIAL Delays in Tapping Energy Sources

ARTICLES Reactions of Organic Crystals with Gases: I. C. Paul and D. Y. Curtin
Genetic Regulation: The Lac Control Region: R. C. Dickson et al.
Science Advice in the White House? Continuation of a Debate: E. B. Skolnikoff and H. Brooks

NEWS AND COMMENT In Energy Impasse, Conservation Keeps Popping Up
The Environment, a “Mature” Cause in Need of a Lift
FAS Attacks Politicization of NIH
Congress Gets on with Reform, Seeks to Reassert Itself

RESEARCH NEWS Sociobiology (I): Models of Social Behavior

AAAS NEWS Office of Science and Society Programs; Office of Science Education; Notes from Other Offices; NOVA Program Schedule

BOOK REVIEWS Frontiers in Catecholamine Research, reviewed by A. D. Smith; Genetics of Forest Ecosystems, J. L. Harper; The Physics of Phonons, A. A. Maradudin; Thomas Harriot, D. C. Lindberg
Microwave Emission Spectrum of the Moon: Mean Global Heat Flow and Average Depth of the Regolith: S. J. Keihm and M. G. Langseth ............ 64
The Postspinel Phases in the Mg$_2$SiO$_4$-Fe$_2$SiO$_4$ System: L. Ming and W. A. Bassett ................. 66
Deficient Ganglioside Biosynthesis: A Novel Human Sphingolipidosis: P. H. Fishman et al. ......................... 68
Polarizing Fucoid Eggs Drive a Calcium Current through Themselves: K. R. Robinson and L. F. Jaffe ......... 70
Spontaneous Regression of Friend Virus Induced Leukemia: Coinfection with Regressing and Conventional Strains of Virus: P. Furmaniski et al. ........... 72
Specific Elicitors of Plant Phytoalexin Production: Determinants of Race Specificity in Pathogens?: N. T. Keen .................. 74
Halogenated Hydrocarbons in New Orleans Drinking Water and Blood Plasma: B. Dowty et al. ................. 75
Retrograde Amnesia: Temporal Gradient in Very Long Term Memory Following Electroconvulsive Therapy: L. R. Squire, P. C. Slater, P. M. Chace ............... 77

PRODUCTS AND MATERIALS
Argon Ion Laser; Radiation Survey Meter; Spectrophotometer; Gaussmeter; Constant Temperature Circulators; Gas Chromatograph; Metering Pump for Liquid Chromatography; Seismic Profile Recorder; Pocket-Sized Calculator; Literature ......................... 89

COVER
Nickel screen whose holes are filled with the eggs of the seaweed Pelvetia. The eggs have a known orientation in the holes and such screens are used to measure the ion fluxes into and out of the two poles of these eggs. Each hole has a diameter of 75 micrometers. See page 70. [Kenneth R. Robinson, Purdue University, Lafayette, Indiana]
Editor's Summary

This copy is for your personal, non-commercial use only.

**Article Tools**
Visit the online version of this article to access the personalization and article tools:
http://science.sciencemag.org/content/187/4171

**Permissions**
Obtain information about reproducing this article:
http://www.sciencemag.org/about/permissions.dtl

*Science* (print ISSN 0036-8075; online ISSN 1095-9203) is published weekly, except the last week in December, by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. Copyright 2016 by the American Association for the Advancement of Science; all rights reserved. The title *Science* is a registered trademark of AAAS.