

# AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

*Science* serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

## Editorial Board

1974

ALFRED BROWN	FRANK W. PUTNAM
JAMES F. CROW	MAXINE F. SINGER
SEYMOUR S. KETY	GORDON WOLMAN
FRANK PRESS	

1975

HERBERT S. GUTOWSKY	DONALD LINDSLEY
N. BRUCE HANNAY	RUTH PATRICK
DONALD KENNEDY	RAYMOND H. THOMPSON
DANIEL E. KOSHLAND, JR.	

## Editorial Staff

**Editor:** PHILIP H. ABELSON

**Business Manager:** HANS NUSSBAUM

**Managing Editor:** ROBERT V. ORMES

**Assistant Editors:** ELLEN E. MURPHY, JOHN E. RINGLE

**Assistant to the Editors:** PATRICIA ROWE

**News and Comment:** JOHN WALSH, LUTHER J. CARTER, DEBORAH SHAPLEY, ROBERT GILLETTE, NICOLAS WADE, CONSTANCE HOLDEN, BARBARA J. CULLITON, SCHERRAINE MACK

**Research News:** ALLEN L. HAMMOND, WILLIAM D. METZ, THOMAS H. MAUGH II, JEAN L. MARX, ARTHUR L. ROBINSON, GINA BARI KOLATA, FANNIE GROOM

**Book Reviews:** KATHERINE LIVINGSTON, LYNN MANFIELD, JANET KEGG

**Cover Editor:** GRAYCE FINGER

**Editorial Assistants:** MARGARET ALLEN, ISABELLA BOULDIN, ELEANORE BUTZ, MARY DORFMAN, SYLVIA EBERHART, JUDITH GIVELBER, CORRINE HARRIS, NANCY HARTNAGEL, OLIVER HEATWOLE, CHRISTINE KARLIK, MARGARET LLOYD, ERIC POGGENPOHL, JEAN ROCKWOOD, LEAH RYAN, LOIS SCHMITT, RICHARD SEMIKLOSE, YA LI SWIGART, ELEANOR WARNER

**Guide to Scientific Instruments:** RICHARD SOMMER

**Membership Recruitment:** GWENDOLYN HUDDLE;  
**Subscription Records and Member Records:** ANN RAGLAND

## Advertising Staff

<b>Director</b>	<b>Production Manager</b>
EARL J. SCHERAGO	MARGARET STERLING

**Advertising Sales Manager:** RICHARD L. CHARLES

**Sales:** NEW YORK, N.Y. 10036: Herbert L. Burkland, 11 W. 42 St. (212-PE-6-1858); SCOTCH PLAINS, N.J. 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); CHICAGO, ILL. 60611: Jack Ryan, Room 2107, 919 N. Michigan Ave. (312-DE-7-4973); BEVERLY HILLS, CALIF. 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772); DORSET, VT. 05251: Fred W. Dieffenbach, Kent Hill Rd. (802-867-5581)

**EDITORIAL CORRESPONDENCE:** 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phones: (Area code 202) Central Office: 467-4350; Book Reviews: 467-4367; Business Office: 467-4411; Circulation: 467-4417; Guide to Scientific Instruments: 467-4480; News and Comment: 467-4430; Reprints and Permissions: 467-4483; Research News: 467-4321; Reviewing: 467-4440. Cable: Advancesci. Washington. Copies of "Instructions for Contributors" can be obtained from the editorial office. See also page xv, *Science*, 28 June 1974. **ADVERTISING CORRESPONDENCE:** Room 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE-6-1858.

## A Sense of the History of Discovery

Far too many physicians and scientists, as well as laymen, look upon the history of discovery as an entertaining pastime, a tiresome academic exercise, or merely the record of egotistical aspirations. But it is essential to understand the successes and failures of others. Take three well-known examples of success.

Alexander Fleming made probably the most important medical discovery of the century, through a combination of almost ludicrous circumstances. He was favored by fortune in have a mycologist working on *Penicillium notatum* on the floor above his laboratory. Fleming's laboratory was primitive, and outside air circulated in a way that only a rugged Scotsman would tolerate. Furthermore, he failed to wash his petri dishes before he went on vacation. Using common sense, Fleming followed up on an observation that many had made before him. He looked at the petri dishes when he returned from vacation and did something about what he saw. Had Fleming been an active committee attendee, with plenty of dishwashers and technicians, it is unlikely he would ever have noted the clear zone around the bacterial colony, because a dutiful technician would long since have destroyed the evidence even if it had been allowed to develop.

A second example—the discovery of liver extract for the treatment of pernicious anemia resulted from work by Whipple, Minot, and Murphy. The pathologist Whipple was trying to determine the hematopoietic efficiency of diets. The clinician Minot was broadly enough read not only to know of Whipple's basic work, but to see its applicability. This led to its clinical use by Murphy, and the award of three Nobel prizes.

The discovery of insulin by Banting and Best tells another story. Even though it had been conclusively shown that the pancreas was crucially involved in diabetes, none of the major research centers did much about it. It took a young unknown surgeon with avid curiosity and an equally eager young medical student to do what should long since have been done. Note that government grants and major planning committees representing consumers, economists, sociologists, *et al.* played no part.

Today many investigators fail to appreciate that knowledge of the history of discovery is vital if wise policies are to be generated. Instead the young are being taught, by example, that status and celebrity-seeking promote their careers. Serving on important committees, belonging to the right societies, associating with the right people, and seeking discreet but maximum public exposure pay handsomely—if this is the way of life that is sought.

Government, with the power of money at its disposal, plays a critical part. The power-oriented among us find it easy to accept the hegemony of government over practice and research, forgetting that a sense of the history of discovery is almost wholly absent in those making policy. Are such important decisions to be left in the hands of those so innocent?

I am certain that the conduct of research will ultimately triumph over the business and politics of discovery. I am less certain about the practice of medicine, to the politically powerful a much larger plum. It is especially difficult to disentangle those practicing medicine in the broad sense from those who would control it but without experience to guide them.

Perhaps the most we have the right to expect is that some people may heed a twinge of conscience. But the issue is now clear: if greatness is a goal, it will take great thinking and consummate honesty to achieve it. History has shown us and formulated the guidelines.—IRVING H. PAGE, former Director, Research Division, Cleveland Clinic, Cleveland, Ohio 44106