

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

1980: RICHARD E. BALZISER, WALLACE S. BROECKER, CLEMENT L. MARKERT, FRANK W. PUTNAM, BRYANT W. ROSSITER, VERA C. RUBIN, MAXINE F. SINGER, PAUL E. WAGGONER, F. KARL WILLENBROCK

1981: PETER BELL, BRYCE CRAWFORD, JR., E. PETER GEIDUSCHEK, SALLY G. KOHLSTEDT, EMIL W. HAURY, MANCUR OLSON, PETER H. RAVEN, WILLIAM P. SLICHTER, FREDERIC G. WORDEN

Publisher

WILLIAM D. CAREY
Editor

PHILIP H. ABELSON
Editorial Staff

Managing Editor
ROBERT V. ORMES

Assistant Managing Editor
JOHN E. RINGLE

News Editor: BARBARA J. CULLITON

News and Comment: WILLIAM J. BROAD, LUTHER J. CARTER, CONSTANCE HOLDEN, ELIOT MARSHALL, DEBORAH SHAPLEY, R. JEFFREY SMITH, NICHOLAS WADE, JOHN WALSH. Editorial Assistant, SCHERRAINE MACK

Research News: BEVERLY KARPLUS HARTLINE, RICHARD A. KERR, GINA BARI KOLATA, JEAN L. MARX, THOMAS H. MAUGH II, ARTHUR L. ROBINSON. Editorial Assistant, FANNIE GROOM

Consulting Editor: ALLEN L. HAMMOND

Associate Editors: ELEANORE BUTZ, MARY DORFMAN, SYLVIA EBERHART, RUTH KULSTAD

Assistant Editors: CAITILIN GORDON, STEPHEN KEPPLER, LOIS SCHMITT

Book Reviews: KATHERINE LIVINGSTON, Editor; LINDA HEISERMAN, JANET KEGG

Letters: CHRISTINE KARLIK

Copy Editor: ISABELLA BOULDIN

Production: NANCY HARTNAGEL, JOHN BAKER; YA LI SWIGART, HOLLY BISHOP, ELEANOR WARNER; MARY MCDANIEL, JEAN ROCKWOOD, LEAH RYAN, SHARON RYAN

Covers, Reprints, and Permissions: GRAYCE FINGER, Editor; CORRINE HARRIS, MARGARET LLOYD

Guide to Scientific Instruments: RICHARD G. SOMMER

Assistant to the Editor: JACK R. ALSIP

Membership Recruitment: GWENDOLYN HUDDLE

Member and Subscription Records: ANN RAGLAND
EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Area code 202. General Editorial Office, 467-4350; Book Reviews, 467-4367; Guide to Scientific Instruments, 467-4480; News and Comment, 467-4430; Reprints and Permissions, 467-4483; Research News, 467-4321. Cable: Advancesci, Washington. For "Instructions for Contributors," write the editorial office or see page xi, *Science*, 21 December 1979.

BUSINESS CORRESPONDENCE: Area Code 202. Membership and Subscriptions: 467-4417.

Advertising Representatives

Director: EARL J. SCHERAGO

Production Manager: GINA REILLY

Advertising Sales Manager: RICHARD L. CHARLES

Marketing Manager: HERBERT L. BURKLUND

Sales: NEW YORK, N.Y. 10036: Steve Hamburger, 1515 Broadway (212-730-1050); 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. (312-337-4973); 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).

ADVERTISING CORRESPONDENCE: Tenth floor, 1515 Broadway, New York, N.Y. 10036. Phone: 212-730-1050.

Science and Technology: A Five-Year Outlook

A 544-page book prepared under the auspices of the National Research Council and published in December 1979 is an especially informative, readable yet authoritative survey of much of science and technology.* It was prepared through the well-coordinated efforts of nearly 100 scientists and engineers. The book consists of 11 chapters, three of which are devoted to science—the planet Earth, the living state, and the structure of matter. Another three are devoted to technology—computers and communications, energy, and materials. Five chapters bearing on social matters are placed under the heading Science and the United States.

This document is part of a more comprehensive report that will be released shortly by the National Science Foundation (NSF) in response to a congressional mandate which directed the Office of Science and Technology Policy to prepare periodically a Five-Year Outlook on Science and Technology. The intent of Congress seems to have been to charge Frank Press, the President's science adviser, with the work. The task was far too large for his tiny staff, however, and Press transferred it to the NSF. In turn, the Foundation asked the National Academy of Sciences to do part of the job by providing a report describing the current state of research in significant areas and pointing out issues within those areas that could be relevant within the 5-year period.

In this task the most important ingredient for a useful result was judgment. For example, scientific research and technological development are being conducted on thousands of different frontiers. What are the most significant? How much attention should be devoted to each? The audience for the report is ostensibly Congress or perhaps members of its staff. At what level should the material be prepared to convey information readily while maintaining authenticity? The task force of the National Research Council came up with reasonable answers to these questions. A key factor was the administrative skill and effort of Ralph Gomory of International Business Machines Corporation who was the study chairman. Each chapter of the report was the responsibility of a chapter coordinator, who dealt with the individual scientists and engineers who prepared parts of the chapter. When these contributions were received, they were usually found to be much too long, uneven in content, and full of jargon; it was necessary to have competent editors smooth the rough spots. Each chapter was then sent to as many as 20 reviewers, whose comments led to deletions, shortening, simplification, and occasional additions. This process involved the study chairman, the chapter coordinator, and the editor. With authenticity and a balanced selection of content assured, further efforts were devoted to simplification based on suggestions from two groups—the assembled chapter coordinators and the governing board of the National Research Council.

There are some pages of limited comprehensibility, but most of the report can be read with profit by persons holding a bachelor's degree in science or engineering and by university juniors and seniors who are taking such courses. Of particular value and quality are the chapters on the planet Earth, the living state, and materials.

In order to limit the size of the report it was necessary to omit a number of important fields such as chemistry, economics, and mathematics. Chemists have a particular right to be unhappy with this omission. The major chapter in the report that bears closely on chemistry is one on toxic substances, and it does little to lighten the dark picture painted by detractors of chemistry. It is unfortunate that only such an image is presented to Congress.

This situation will in part be ameliorated in the second report in the series. In that volume, which is now in the beginning stages of preparation, two chapters will be devoted to chemistry. If the second outlook report matches the first one, it will be worth looking forward to.—PHILIP H. ABELSON

**Science and Technology: A Five-Year Outlook* (Freeman, San Francisco, 1979; paperback, \$9.95).