

# 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

1979: E. PETER GEIDUSCHEK, WARD GOODENOUGH, N. BRUCE HANNAY, MARTIN J. KLEIN, FRANKLIN A. LONG, NEAL E. MILLER, JEFFREY J. WINE  
1980: RICHARD E. BALZHISER, WALLACE S. BROECKER, CLEMENT L. MARKERT, FRANK W. PUTNAM, BRYANT W. ROSSITER, VERA C. RUBIN, MAXINE F. SINGER, PAUL E. WAGGONER, F. KARL WILLENBROCK

## Publisher

WILLIAM D. CAREY

## Editor

PHILIP H. ABELSON

## Editorial Staff

**Managing Editor** ROBERT V. ORMES  
**Business Manager** HANS NUSSBAUM  
**Assistant Managing Editor** JOHN E. RINGLE  
**Production Editor** ELLEN E. MURPHY  
**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, FREDERICK F. 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, JUDITH GOTTLIEB, RUTH KULSTAD  
**Assistant Editors:** CAITILIN GORDON, LOIS SCHMITT, DIANE TURKIN  
**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, JEAN ROCKWOOD, LEAH RYAN, SHARON RYAN  
**Covers, Reprints, and Permissions:** GRACEY FINGER, **Editor:** CORRINE HARRIS, MARGARET LLOYD  
**Guide to Scientific Instruments:** RICHARD SOMMER  
**Assistant to the Editors:** RICHARD SEMIKLOSE  
**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*, 29 September 1978.  
**BUSINESS CORRESPONDENCE:** Area Code 202. Business Office, 467-4411; Circulation, 467-4417.

## Advertising Representatives

**Director:** EARL J. SCHERAGO  
**Production Manager:** MARGARET STERLING  
**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-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)  
**ADVERTISING CORRESPONDENCE:** Tenth floor, 1515 Broadway, New York, N.Y. 10036. Phone: 212-730-1050.

## Solar Power Satellite: A Plea for Rationality

The solar power satellite (SPS) is a much-talked-about means of collecting solar energy in space. It would carry photovoltaic arrays or solar thermal power plants and transmit electric power to Earth-based receivers for delivery to the utility grid.

The SPS is about to become a political football.

Three bills have been submitted and at least three more will be submitted by congressmen and senators in early 1979 proposing various SPS programs or goals. The Administration is plagued by opposing views, both internally and through external groups and Congress. Choosing up sides has already begun among environmental, industry, and consumer groups.

The SPS concept represents an orders-of-magnitude growth in space operations, which its opponents find difficult to grasp. It is controversial, however, because virtually all factions see it as either all good or all bad. For instance, it is solar (good), but it is centralized (bad). It eliminated hydrocarbon combustion products and radioactivity, but it introduces upper-atmosphere water vapor and microwaves. It eliminates second-law thermal pollution on Earth and moves the power plant thousands of miles from its nearest neighbor, but it requires large ground-based receiving antennas. The space environment provides unobstructed sun, which means no storage and hence base-load capability, and it eliminates corrosion, rain, wind, earthquakes, or gravity as factors, but space transportation and construction are expensive.

Although everyone seems to agree that the SPS is technically feasible, there are great disagreements concerning its future economic practicality, its environmental acceptability compared with other long-term alternative energy sources, and a host of political, societal, military, and international regulatory questions. The one unfortunate aspect of all the arguments is that nobody has enough sound information on which to base a rational case. The only rational questions, then, are (i) does the concept have sufficient future promise to warrant finding out whether it is practical, and (ii) if so, what type of research and how much of it should be done?

The answer to the first question seems clear. A sizable amount of federal funding is being devoted to alternative future energy sources that are faced with essentially the same questions (for example, fusion, central tower solar energy, photovoltaics, ocean thermal energy, and possibly even breeder reactors). The SPS appears to have enough potential advantages that it merits at least comparable consideration.

The answer to the second question is not really difficult either. Certainly a major demonstration effort, even of a prototype SPS, would be premature at this time. In fact, it is even too soon to establish a firm baseline design, as the Department of Energy seems to be doing; there are still too many promising but unexplored technical options. What is needed is an in-depth examination, not only analytical but in the laboratory, to verify and advance the technology to the point at which rational comparisons with the other long-range alternatives can be made.

Two technical committees of the American Institute of Aeronautics and Astronautics have explored the question of the level and type of support needed for SPS research (on the ground, not in space). They have concluded that a proper level of support would be on the order of \$30 million per year for about 5 years. If subsequent space experiments are called for, they can in large part be "piggybacked" on other programs that have more immediate economic returns; for instance, large orbital antenna complexes for communications.

Once we know what we are talking about, then it will be time to decide whether to proceed with development of the SPS.—JERRY GREY, *American Institute of Aeronautics and Astronautics*, 1290 Avenue of the Americas, New York 10019