

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

FREDERICK R. BLATTNER, BERNARD F. BURKE, ARNOLD DEMAIN, CHARLES L. DRAKE, ARTHUR F. FINDEIS, E. PETER GEIDUSCHKE, GLYNN ISAAC, NEAL E. MILLER, FREDERICK MOSTELLER, ALLEN NEWELL, RUTH PATRICK, BRYANT W. ROSSITER, VERA C. RUBIN, WILLIAM P. SLICHTER, SOLOMON H. SNYDER, PAUL E. WAGGONER, JOHN WOOD

Publisher: WILLIAM D. CAREY

Associate Publisher: ROBERT V. ORMES

Editor: PHILIP H. ABELSON

Editorial Staff

Assistant Managing Editor: JOHN E. RINGLE
Production Editor: ELLEN E. MURPHY
Business Manager: HANS NUSSBAUM
News Editor: BARBARA J. CULLITON
News and Comment: COLIN NORMAN (deputy editor), JEFFREY L. FOX, CONSTANCE HOLDEN, ELIOT MARSHALL, R. JEFFREY SMITH, MARJORIE SUN, JOHN WALSH

European Correspondent: DAVID DICKSON
Contributing Writer: LUTHER J. CARTER
Research News: ROGER LEWIN (deputy editor), RICHARD A. KERR, GINA KOLATA, JEAN L. MARX, THOMAS H. MAUGH II, ARTHUR L. ROBINSON, M. MITCHELL WALDROP

Administrative Assistant, News: SCHERRAINE MACK;
Editorial Assistant, News: FANNIE GROOM
Senior Editors: ELEANORE BUTZ, MARY DORFMAN, RUTH KULSTAD

Associate Editors: MARTHA COLLINS, SYLVIA EBERHART, CAITILIN GORDON, LOIS SCHMITT
Assistant Editors: STEPHEN KEPPLER, EDITH MEYERS
Book Reviews: KATHERINE LIVINGSTON. **Editor:** LINDA HEISERMAN, JANET KEGG

Letters: CHRISTINE GILBERT
Copy Editor: ISABELLA BEGLDIN
Production: JOHN BAKER; HOLLY BISHOP, ELEANOR WARNER; JEAN ROCKWOOD, SHARON RYAN, BEVERLY SHIELDS

Covers, Reprints, and Permissions: GRAYCE FINGER, Editor; GERALDINE CRUMP, CORRINE HARRIS
Guide to Scientific Instruments: RICHARD G. SOMMER
Editorial Administrator: SUSAN ELLIOTT

Assistant to the Associate Publisher: ROSE LOWERY
Assistant to the Managing Editor: NANCY HARTNAGEL
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 "Information for Contributors," write to the editorial office or see page xi, *Science*, 30 September 1983.

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

Advertising Representatives

Director: EARL J. SCHLRAGO
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); SAN JOSE, CALIF. 95112: Bob Brindley, 310 S. 16 St. (408-998-4690); DORSET, VT. 05251: Fred W. Diefenbach, Kent Hill Rd. (802-867-5581).

ADVERTISING CORRESPONDENCE: Tenth floor, 1515 Broadway, New York 10036 (212-730-1050).

Mutual Deterrence or Nuclear Suicide

The phrase "nuclear winter" has already become a part of our language, but the completely new strategic implications of the nuclear winter scenarios* have not yet received any great public attention or discussion. The prospect of a nuclear winter has been greeted as just one more chapter (a final chapter?) in the story of Armageddon that has been told to us so often in the past 40 years. We believe the story, but it no longer moves us. So what's new about nuclear winter?

What is new is that the nuclear winter scenario replaces the prospect of mutual destruction through the failure of mutual deterrence by the prospect of assured self-destruction through nuclear attack. If the analysis of the climatic effects of a nuclear strike is correct, then no nation can make a major nuclear attack even against an unarmed opponent without committing suicide—without itself receiving punishment as severe as that imposed on its intended victim. Nuclear weapons, by their guarantee of suicide, become their own deterrent.

The plausibility of the current doctrine, that mutual deterrence by arming to the teeth is a preventive for nuclear war, has been steadily eroding. As the payload of each power increases, so do the demands of its opponent for redundancy of its nuclear force, in order that ability to reply to an attack may be ensured. As warning times decrease to the vanishing point, not only does reprisal against the aggressor become less certain, but Strangelove mentalities become fascinated again with the possibilities of a "surgical" preemptive strike. And, of course, the opportunities for all kinds of unintended triggerings of nuclear exchanges multiply. Mutual deterrence is increasingly viewed as a bankrupt policy, which we cling to for lack of an alternative.

If nuclear weapons are suicidal, guaranteed to cripple or destroy the user even without a response from the targeted victim, then the futility of mutual deterrence is complete. A second strike is no more appetizing than a first, and a preemptive strike loses any gambling appeal that it might have had. Both powers have supplied themselves with mountains of suicidal weapons for which there is now no discernible use, either for deterrence or aggression.

But in these questions of human survival, we must not be precipitous. Neither the scientific basis for the nuclear winter nor its strategic implications have been examined in the depth that they require. It is too early to draw firm conclusions about what strategy should govern the deployment of a presumptively suicidal weapon. A plausible inference is that such a weapon is worse than none, either for attack or deterrence, and that the way is now open for nuclear disarmament, even unilateral partial disarmament. But that conclusion may be simplistic. It would be rash to proceed on it without a more thorough analysis of the nuclear winter than has yet been made and a careful study of alternative strategies.

The terms of the nuclear standoff have been changed—fundamentally changed. Awakened to that fact, we must proceed at once to an examination of the scientific reality of the nuclear winter and of the implications of this reality for our policies of arming for suicide and our fears that a suicidal weapon might be used by an aggressor against us.—HERBERT A. SIMON, *Carnegie-Mellon University, Pittsburgh 15213*

*R. P. Turco, O. B. Toon, T. P. Ackerman, J. B. Pollock, C. Sagan, *Science* 222, 1283 (1983); P. R. Ehrlich *et al.*, *ibid.*, p. 1293.