

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.

Publisher: WILLIAM D. CAREY

Editor: DANIEL E. KOSHLAND, JR.

Deputy Editors

PHILIP H. ABELSON (*Engineering and Applied Sciences*), JOHN I. BRAUMAN (*Physical Sciences*), GARDNER LINDZEY (*Social Sciences*)

Editorial Board

PHILIP W. ANDERSON, DAVID BALTIMORE, ANSLEY J. COALE, JOSEPH L. GOLDSTEIN, LEON KNOPOFF, SEYMOUR LIPSET, WALTER MASSEY, OLIVER E. NELSON, ALLEN NEWELL, RUTH PATRICK, VERA C. RUBIN, HOWARD E. SIMMONS, SOLOMON H. SNYDER, ROBERT M. SOLOW

Board of Reviewing Editors

JAMES P. ALLISON, LUIS W. ALVAREZ, DON L. ANDERSON, KENNETH J. ARROW, C. PAUL BIANCHI, ELIZABETH H. BLACKBURN, FLOYD E. BLOOM, MICHAEL S. BROWN, NINA V. FEDEROFF, GARY FELSENFELD, DOUGLAS J. FUTUYMA, THEODORE H. GEBALLE, STEPHEN P. GOFF, PATRICIA S. GOLDMAN-RAKIC, RICHARD M. HELD, GLORIA HEPNER, ERIC F. JOHNSON, KONRAD B. KRAUSKOPF, PAUL E. LACY, JOSEPH B. MARTIN, JOHN C. MCGIFF, MORTIMER MISHKIN, JOHN S. PEARSE, YESHAYAU POCKER, FREDERIC M. RICHARDS, JAMES E. ROTHMAN, RONALD H. SCHWARTZ, OTTO T. SOLBRIG, ROBERT T. N. THIAN, VIRGINIA TRIMBLE, GEORAT J. VERMEI, MARTIN G. WEIGERT, GEORGE M. WHITESIDES, WILLIAM B. WOOD, HARRIET ZUCKERMAN

Editorial Staff

Managing Editor: PATRICIA A. MORGAN
Assistant Managing Editors: NANCY J. HARTNAGEL, JOHN E. RINGE
Production Editor: ELLEN E. MURPHY
News Editor: BARBARA J. CULLITON
News and Comment: COLIN NORMAN (deputy editor), MARK H. CRAWFORD, CONSTANCE HOLDEN, ELIOT MARSHALL, R. JEFFREY SMITH, MARJORIE SUN, JOHN WALSH
European Correspondent: DAVID DICKSON
Research News: ROGER LEWIN (deputy editor), RICHARD A. KERR, GINA KOLATA, JEAN L. MARX, ARTHUR L. ROBINSON, M. MITCHELL WALDROP
Administrative Assistant, News: SCHERRAINE MACK; **Editorial Assistant, News:** FANNIE GROOM
Senior Editors: ELEANORE BUTZ, RUTH KULSTAD
Associate Editors: MARTHA COLLINS, SYLVIA EBERHART, CATHILIN GORDON, WILLIAM GREAVES, BARBARA JASNY, STEPHEN KEPPEL, EDITH MEYERS, LOIS SCHMITT
Assistant Editor: LISA MCCULLOUGH
Book Reviews: KATHERINE LIVINGSTON, *Editor:* LINDA HEISERMAN, JANET KEGG
Letters Editor: CHRISTINE GILBERT
Contributing Editor: RUTH L. GUYER
Production: JOHN BAKER, HOLLY BISHOP, KATHLEEN COSIMANO, ELEANOR WARNER; ISABELLA BOULDIN, SHARON RYAN, BEVERLY SHIELDS
Covers, Reprints, and Permissions: GRACEY FINGER, *Editor:* GERALDINE CRUMP, CORRINE HARRIS
Guide to Scientific Instruments: RICHARD G. SOMMER
Manuscript System Analyst: WILLIAM CARTER
EDITORIAL CORRESPONDENCE: 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Telephone: 202-467-4400. For "Information for Contributors" see page xi, *Science*, 29 March 1985.

Business Staff

Chief Business Officer: WILLIAM M. MILLER III
Business Manager: HANS NUSSBAUM
Assistant to Chief Business Officer: ROSE LOWERY
Business Staff Supervisor: DEBORAH JEAN RIVERA
Membership Recruitment: GWENDOLYN HUDDLE
Member and Subscription Records: ANN RAGLAND

Advertising Representatives

Director: EARL J. SCHERAGO
Production Manager: DONNA RIVERA
Advertising Sales Manager: RICHARD L. CHARLES
Marketing Manager: HERBERT L. BURKLUND
Sales: NEW YORK, N.Y. 10036: J. Kevin Henebry, 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. Dieffenbach, Kent Hill Rd. (802-867-5581).
ADVERTISING CORRESPONDENCE: Tenth floor, 1515 Broadway, New York 10036 (212-730-1050).

The Undesirability Principle

In physics, the Uncertainty Principle states that the product of the uncertainties in two related quantities—the momentum of a particle and its position in space—is equal to or greater than a constant. This means that any choice that investigators make to increase the certainty in one variable is automatically paid for by increased uncertainty in the other variable. If one determines the position of the particle to high accuracy, one can only know the velocity of the particle to very low accuracy. There seems to be an equivalent principle operating in society, which I shall call the Undesirability Principle. It states that the product of the costs of two or more conflicting courses of action is a constant. Society, therefore, can obtain one goal to whatever degree of desirability it wishes provided that it is willing to pay the price in loss of desirability in other goals.

The newspaper headlines illustrate daily the importance of this principle, which is usually ignored by special-interest groups who lobby for their own particular commitments. Some industrial companies, for example, would like to dump toxic wastes for the lowest cost possible and with minimum government regulation. Some environmental groups would like to place severe restraints on dumping to prevent any conceivable pollution in this and future generations. Consumer groups would like to buy the products of industry at the lowest possible prices. Trial lawyers want the greatest possible freedom for individuals to sue companies for damages. Society can have any one or two of these factors to a high degree of desirability, but only at a price of undesirability in some other part of the system. We can enact, for instance, strict environmental standards to reduce almost all chance of contamination now and in the indefinite future. We can establish standards stating that if these limits prove, at some later time, inadequate, an individual who becomes ill can sue a company even if that company conformed to all of the original standards. In fact, just such a bill is before Congress at this moment, loudly supported by its protagonists. It can, of course, go into effect, but only at a substantial price to the consumer.

On balance, it seems obvious that companies must continue to bear restraints on the dumping of toxic chemicals. We live together too closely and there are too many chemicals to allow careless waste disposal. Responsible chemical companies would and do agree. Moreover, a company that flagrantly or willfully disregards the laws should be punished by the legal system and be vulnerable to lawsuits by victims. On the other hand, is it reasonable to write into a law that victims should be allowed to sue a company when it has conformed to all the existing rules because later the limits change as a result of new scientific evidence? Or should companies with the expertise be expected to foresee possible effects? Environmentalists and industrialists will argue their viewpoints with passion, denouncing each other for recklessness or impracticality of what, in fact, is a matter of economics. Contingency funds can be set aside at any level by industry or government. It just means that current customers will be paying a high price to protect customers of the future. It is not simply a matter of right and wrong. There is a point at which the desirability of one goal has created an out-of-proportion undesirability in another goal.

The solution is clear. Congress should enact an Undesirability Impact Law requiring protagonists of one desired goal to state clearly to society the undesirable aspects of their proposal. For example, chemical companies advocating less regulation would be required to detail the dangers to water supplies of minimal regulation. Environmentalists advocating stringent precautions would be required to state the cost to the consumer. A society educated to the Undesirability Principle would become skeptical of single-minded advocates. The process of applying the Undesirability Principle might even introduce a welcome degree of uncertainty into the more closed-minded political lobbyists.—DANIEL A. KOSHLAND, JR.