

Science[®] News

A Science Service Publication
Vol. 107/April 5, 1975/No. 14
Incorporating Science News Letter

Of the Week

Warning on jets and cancer	220
The current research effort	220
Exploring the coral reefs	221
A larger interferometer	222
Lead and mental retardation	222
Looking for supernovas	223
Women's group	223
Lesbian fruit flies	223

Research Notes

Space	224
Zoology	224
Environment	225
Behavior	225

Articles

Intrauterine devices	226
Schemes for plant power	228

Departments

Books	218
Letters	219

COVER: With evidence supporting both sides of the controversy, intrauterine devices have become one of medicine's most debated topics. If Congress acts on a bill presented last week, the FDA may soon have the power to regulate the sale of what some physicians feel are inadequately tested contraceptive devices. See p. 226. (Illustration: Ann Lunsford)

Publisher	E. G. Sherburne Jr.
Editor	Kendrick Frazier
Senior Editor and Physical Sciences	Dietrick E. Thomsen
Senior Editor and Behavioral Sciences	Robert J. Trotter
Biomedical Sciences	Joan Arehart-Treichel
Chemistry and Biology	Janet H. Weinberg
Science and Society	John H. Douglas
Space Sciences	Jonathan Eberhart
Writer/Copy Editor	Lisa J. Shawver
Science Writer Intern	Deedee Pendleton
Art Director	Dale Appleman
Assistant to the Editor	Esther Gilgoff
Books	Margit Friedrich
Advertising	Scherago Associates, Inc. 11 W. 42nd St. New York, N.Y. 10036 Fred W. Dieffenbach Sales Director

Copyright © 1975 by Science Service, Inc., 1719 N. St., N.W., Washington, D.C. 20036. Reproduction of any portion of SCIENCE NEWS is strictly prohibited.

Subscription Department
231 West Center Street
Marion, Ohio 43302

Subscription rate: 1 yr., \$10; 2 yrs., \$18; 3 yrs., \$25. (Add \$2 a year for Canada and Mexico, \$3 for all other countries.) Change of address: Four to six weeks' notice is required. Please state exactly how magazine is to be addressed. Include zip code.

Printed in U.S.A. Second class postage paid at Washington, D.C. Established as Science News Letter ® in mimeograph form March 13, 1922. Title registered as trademark U.S. and Canadian Patent Offices.

Published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington, D.C. 20036. (202-785-2255). Cable SCIENSERV.

April 5, 1975

To the Editor

The math of physics

We scientists can only chuckle at the problems of mathematicians regarding the foundations of mathematics (Steen's article, SN: 2/15/75, p 108). Fortunately, we do not have to rely on internal consistency as the test of validity, but rather turn to the real world for testing. From this point of view the "reality" of infinitesimals is beyond doubt, since the applied calculus is well confirmed in its physical predictions.

I agree with Demys's remarks (letter: SN: 3/8/75, p. 147) on this subject, but would take exception to his remark about integers. He says it has been obvious for centuries that they have no upper limit. Pure mathematics is a game where one can make up any rules. Only internal consistency is required. Thus cyclic integer systems such as $N + 1 \equiv 0$, where N is the largest integer, are "valid" mathematical objects. It is a different question as to which describes the real world of physics.

It is rather surprising that the existence of antimatter can be taken as an indication that the infinite integer system is the math system of physics. Dirac's relativistic electron equation has the solutions $E = \pm mc^2$. The $E = -mc^2$ solutions have been found to correspond to anti-electrons (positrons). If a cyclic number system were used then $A + (-A) = 0$ would mean that $(-A)$ is to be found among the integers 0, 1, 2, . . . N . There would be no separate "class" of objects $-1, -2, -3, \dots$. It now appears that every particle in high energy physics has a corresponding antiparticle. There is a natural "match" to the real number line. A few particles are their own antiparticle (e.g., photons of light) and thus sit on the fence between the worlds of matter and antimatter. There may be no such thing as infinity in the real world, but the natural number system appears to be the usual fractional number system (the rationals), which contains countable infinity in an essential way.

James D. Edmonds Jr., Ph.D.
Joint Sciences Dept.
Claremont Colleges
Claremont, Calif.

Tropical giganticumes?

In the very excellent article "Supernovas: Quickie Tropical Storms" (SN: 3/8/75, p. 152), I was surprised to read

that these newly studied storms are referred to as supernovas, a word already used in astronomy, and well established, for a far different entity in their own field of study. With this confusion, how is anybody going to explain the word "supernova" to a high-school student?

These cloud formations need a descriptive name unique to their action and function as super-rapid, threatening, nocturnal, tropical accumulations of cumulus clouds, the name employing either derivation of initials, descriptive name, or even a combination of shortened descriptive names. Scientists should be able to come up with something better than my own suggestion of "tropical, oceanic giganticumes."

Mrs. Marcia G. Norton
Orient, Wash.

Moral judgment

Unfortunately, the conclusions expressed in your research note "Moral Judgment in Children" (SN: 3/1/75, p. 136) seem hardly the result of any experimentation. The basic definitions of terms such as "sociopathic child," "well-adjusted child," and "moral judgment," entail the results. So it seems that we have learned nothing that wasn't already there once the child had been defined as sociopathic.

It was just as objectionable that your article also implied the causal relationship in one direction, between cognitive development and moral development. While the Campagna-Harter experiment may have shown a correlation between the two, I doubt seriously that this correlation could be shown to have causal relationships.

The entire issue of the relationship between cognitive development and moral development is too complex to be adequately discussed in this letter. It should be noted, however, that, in actual practice, deviant behavior in a child very often disrupts the child's education on a daily basis. This disruption is, in part, a function of the child itself, but it is also a function of the attitude and treatment of the child by its peers, teachers and community.

After many years of reading SCIENCE NEWS, I apologize for my first letter being critical. But experiments designed to amplify, clarify and spend time on definitional tautologies hardly seem worth the effort.

Gerald H. Larsen
President
Unicorn Systems Co.
Los Angeles, Calif.

MORE LETTERS ON PAGE 230

SCIENCE SERVICE

Institution for the Popularization of Science founded 1921; a nonprofit corporation

Board of Trustees—Nominated by the AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE: Deborah P. Wolfe, Queens College of City University of New York; Bowen C. Dees, The Franklin Institute; Athelstan Spilhaus, National Oceanic and Atmospheric Administration. Nominated by the NATIONAL ACADEMY OF SCIENCES: Gerald F. Tape, Associated Universities; Allen V. Astin, National Academy of Sciences; Glenn T. Seaborg (President), University of California, Berkeley. Nominated by the NATIONAL RESEARCH COUNCIL: Gerald Holton, Harvard University; Joseph W. Berg Jr., National Research Council; Aaron Rosenthal, National Academy of Sciences. Nominated by the JOURNALISTIC PROFESSION: Norman Cousins, "World"; Julius Duschka, Washington Journalism Center; O. W. Riegel (Secretary), Washington and Lee University. Nominated by E. W. SCRIPPS TRUST: Milton Harris (Treasurer), Washington, D.C.; Edward W. Scripps II (Vice President and Chairman of the Executive Committee), Edward W. Scripps Trust; John Troan, Pittsburgh Press.

Director: E. G. Sherburne Jr.; Assistant Director: Dorothy Schriver; Business Manager: Donald R. Harless; Things of Science: Ruby Yoshioka.

219