

## OF THE WEEK

auto emissions delay	252
molecular energy monitor	253
ban on live-fetus research	253
geophysical prediction	254
drinking water and illness	254
oldest meteorite material	255
a hitch with salyut	255
fighting hepatitis virus	255
death of a research plane	256
physical constants pass tests	256
education briefs	256
piaget honored	256

## NOTES

chemistry	257
natural sciences	257
aerospace	263
astronomy	263

## ARTICLES

x-ogen mystery	258
behavior modifications	260

## DEPARTMENTS

books	250
letters	251

**COVER:** Controlled environments and contingency management are among the tools being used to modify behavior. From delinquent juveniles to graduate students, in institutions and mental health clinics, behavior technology is spreading. See p. 260. (Drawing: M. C. Escher, Escher Foundation, Haags Gemeentemuseum—The Hague)

<b>Publisher</b>	E. G. Sherburne Jr.
<b>Editor</b>	Kendrick Frazier
<b>Aerospace</b>	Everly Driscoll
<b>Behavioral Sciences</b>	Robert J. Trotter
<b>Medical Sciences</b>	Joan Arehart-Treichel
<b>Natural Sciences</b>	Jonathan Eberhart
<b>Physical Sciences</b>	Dietrick E. Thomsen
<b>Science and Society</b>	John H. Douglas
<b>Copy Editor</b>	Nadine Clement
<b>Assistant to the Editor</b>	Esther Gilgoff
<b>Production Manager</b>	David Daemon
<b>Books</b>	Margit Friedrich
<b>Circulation Manager</b>	Lawrence Cope
<b>Advertising</b>	Scherago Associates, Inc. 11 W. 42nd St., New York, N.Y. 10036 Fred W. Dieffenbach Sales Director

Copyright © 1973 by Science Service, Inc., 1719 N St., N.W., Washington, D.C. 20036. Republication 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<sup>®</sup> 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 21, 1973

## Science education

John H. Douglas' articles on science education (SN: 4/24/73) had elements of optimism and of pessimism. I'd like to offer a mild antidote to Professor Zacharias' despair over the possibility of reforming or modifying college science education.

Last semester I conducted, in my living room, as an experiment, a student-centered seminar in the Calculus of Variations for seniors.

Next semester I shall conduct an experimental class in sophomore calculus in a way that encourages and nurtures creativity, if that is possible. As a control, I shall teach a parallel section of the same course. The effect of the experimental approach will be ascertained by longitudinal studies, tests and interviews of the students involved.

Although the college administration has not encouraged me, neither have they discouraged me. In fact, my chairman has been rather cooperative. One might guess that there is more opportunity for innovation in a small college than in a large university, but I don't think that that has been proven.

It remains to be seen how successful or how widespread the impact of the experiment will be. But every successful non-traditional class adds to our experience and encourages others to try new approaches.

Alvin M. White, Ph.D.  
Associate Professor of Mathematics  
Harvey Mudd College  
Claremont, Calif.

Your recent special issue on science education deserves recognition for its excellent in-depth coverage on such a vital issue in today's society. This series of articles represents a fine example of how recent attitudes and policies directed toward science have to be brought into perspective so that the hidden inconsistencies can be recognized and remedied.

James Hoerter  
Graduate Student  
Program of Genetics  
Pennsylvania State University  
State College, Pa.

As a professional engineer with some 20 years experience, I would like to comment on the article "Turning from science: Shortages ahead" by John H. Douglas. You spoiled an otherwise fine treatment on science education by succumbing to the tired old saw about impending shortages of trained professionals, with particular emphasis on engineers. . . .

It is my feeling that the present oversupply of engineers is a direct result of many thousands of yesterday's youth being lured into the study of engineering by these same prophets of doom and their cries of "engineering shortage." Through the worst period of engineering unemployment their war cry did not slacken

by a single decibel, and even today they continue to beat their drum as loud as ever! The engineering community has long since ceased to take these people seriously and it is unfortunate that your author provided a sounding board for their propaganda in your otherwise fine magazine.

The present rate of engineering unemployment, together with the widespread under-utilization of engineers who are employed, indicate that this country is a long way from an engineering shortage. The decline in enrollment in engineering schools, far from being a danger sign, is in fact an indication that we are finally re-adjusting toward a more realistic supply of new engineers for tomorrow's needs.

William A. Robinson P.E.  
Solon Mills, Ill.

(Readers may be interested in an editorial in the April 6 SCIENCE noting, as did our article, the dramatic drop in freshmen engineering enrollments, and concluding: ". . . A severe shortage of young engineers may now be projected four years hence. . . . We may well come to regret bitterly the fact that we have been unable to do better than follow destructive blow-hot, blow-cold educational policies."—Ed.)

## Lunar science analysis

As we move from the period of intense lunar flight activity so fittingly highlighted by the Apollo 17 mission, NASA is preparing a comprehensive lunar science Data Analysis and Synthesis Program to bring us closer to the goal of understanding the origin and evolution of the moon and our solar system.

An announcement of research opportunities in the Data Analysis and Synthesis Program has been made by Dr. Naugle in a letter to members of the scientific community.

Many of your readers are not on our mailing list, or for other reasons are not aware of the announcement: They may obtain a copy by written request to:

Lunar Programs Office  
Lunar Synthesis Program  
Code SM  
National Aeronautics and  
Space Administration  
Washington, D.C. 20546

William T. O'Bryant  
Director  
Lunar Programs Office  
NASA  
Washington, D.C.

Address communications to Editor,  
Science News, 1719 N Street, N.W.  
Washington, D. C. 20036