

SCIENCE NEWS®

The Weekly Newsmagazine of Science

A Science Service Publication
Volume 132, No. 9, August 29, 1987

E. G. Sherburne Jr.	Publisher
Joel Greenberg	Editor
Dietrick E. Thomsen	Senior Editor/ Physical Sciences
Laurie Jackson	Managing Editor
Wendy McCarren	Production/Design Director
Bruce Bower	Behavioral Sciences
Richard Monastersky	Earth Sciences
Stefi Weisburd	General Science
Diane D. Edwards	Life Sciences/ Biomedicine
Janet Raloff, Ivars Peterson	Policy/Technology
Jonathan Eberhart	Space Sciences
Susan L. Arns	Assistant to the Editor
Karen Hartley, Rick Weiss	Science Writer Interns
Jane M. Livermore	Books
Donald R. Harless	Advertising/Business Manager

Copyright © 1987 by Science Service, Inc.,
Editorial and Business Offices,
1719 N St., N.W., Washington, D.C. 20036.
Republication of any portion of SCIENCE NEWS
without written permission of the publisher is
prohibited.

Subscription Department
231 West Center Street, Marion, Ohio 43305

Subscription rate: 1 yr., \$34.50; 2 yrs., \$58.00.
(Foreign postage \$6.00 additional per year.) Change of
address: Four to six weeks' notice is required. Please
state exactly how magazine is to be addressed.
Include zip code. For new subscriptions only call
(1) 800-247-2160. Printed in U.S.A. Second class
postage paid at Washington, D.C., and additional
mailing offices. 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)
ISSN 0036-8423

This Week

- 132 A Bunch of Little Comets — But Just a Little Bunch
- 132 Shrinking silicon chips down to size
- 133 RNA satellites confer viral resistance
- 133 Taking a vacuum to extraterrestrial dust
- 134 Parasitic wasps keep on ticking
- 134 Punching holes in a sticky defense
- 135 The fifth force: Pulling both ways

Research Notes

- 136 Biomedicine
- 136 Paleontology
- 137 Science & Society
- 137 Technology

Articles

- 138 Beyond the Cutting Edge of Cold

Cover: These mouse embryos, shown at -3°C and on their way to -150°C , are among a number of cell types that researchers have been able to vitrify, or freeze without the formation of biologically harmful ice. Someday, scientists may be able to vitrify and revive whole human organs donated for transplant, preventing the spoilage that currently ruins up to 20 percent of donated organs. (Photo: Rall)



Departments

- 131 Letters
- 142 Science on the Air
- 142 Books

Science Service Institution for the public understanding of science founded 1921; a nonprofit corporation.
Board of Trustees — *President*, Glenn T. Seaborg; *Vice President*, Gerald F. Tape; *Treasurer*, Willis Harlow Shapley; *Secretary*, Hilleary F. Hoskinson; Joseph W. Berg Jr.; Edward Bliss Jr.; Bowen C. Dees; David A. Goslin; J. David Hann; Milton Harris; Elena O. Nightingale; O.W. Riegel; H. Guyford Stever; John Troan; Deborah P. Wolfe.
Director: E. G. Sherburne Jr.; Assistant Director: Dorothy Schriver; Business Manager: Donald R. Harless.

Letters

Perception without manipulation

Michael Kuperstein's ideas on depth perception ("Robots With a Lot of Nerve," SN: 6/6/87, p.362) may be good robotics but are bad physiology.

Hein and Held's study, as reported, was insufficient to support their conclusion. Since the kittens were neither able to see their limbs *nor to walk*, it cannot be concluded that their subsequent inability to navigate was due solely, or even partially, to their inability to see their limbs.

Even if such results *had* been found, they would not have implied what Kuperstein asserts. His assumption that all objects can

be represented by how they are manipulated ignores the obvious fact that we can perceive objects stereoscopically *without* manipulation. Our perception of a cup held in the hand and moved into view is identical to that of the same cup placed into view by someone else, or the placement of which was unobserved. We can also stereoscopically perceive intricate surface details of such a cup, even without muscular cues from eye motion. We can similarly view objects out of reach — across the room, across the road or across the river.

And of course we can view stereo photographs, where the possibility of manipulation is precluded. Furthermore, as demonstrated in several experiments by Sir Charles Wheatstone early in the 19th century, stereoscopic viewing can be done without

differences in muscularly produced convergence of the optical axes. In 1856, Sir David Brewster described the fact that an observer can view a stereo pair stereoscopically without the aid of an optical device ("free viewing") by placing the pair side by side and *diverging* the optical axes ("uncrossing" the eyes) or by transposing the pair and *converging* the axes ("crossing" the eyes). Brewster preferred the latter method; nowadays the former method is most widely used, and I have been able to use either.

These results contradict absolutely Kuperstein's assertion that "we [do not] recognize [an object] by its visual registration on our senses."

Jeffrey D. Mueller
Stereo photographer and computer scientist
Finksburg, Md.

AUGUST 29, 1987

131