

# SCIENCE NEWS®

The Weekly Newsmagazine of Science

A Science Service Publication  
Volume 141, No. 8, February 22, 1992

Alfred Scott McLaren	Publisher
Patrick Young	Editor
Laurie Jackson	Managing Editor
Vaughan	Editor
Janice Rickerich	Production/Design Director
Blair B. Potter	Associate Editor
Janet Raloff	Senior Editor
	Environment/Policy
Ron Cowen	Astronomy
Bruce Bower	Behavioral Sciences
Elizabeth Pennisi	Chemistry/ Materials Science
Richard Monastersky	Earth Sciences
Carol Ezzell,	Life Sciences/ Biomedicine
Kathy A. Fackelmann	Biomedicine
Ivars Peterson	Mathematics/Physics
Larry Norland	Editorial Assistant
Michael Stroh	Science Writer Intern
Connie Williams	Books/Resource Manager
Donald R. Harless	Advertising/Business Manager

SCIENCE NEWS (ISSN 0036-8423) is published weekly on Saturday, except the last week in December, for \$39.50 for 1 year or \$68.00 for 2 years (foreign postage \$6.00 additional per year) by Science Service, Inc., 1719 N Street, N.W., Washington, DC 20036. Second-class postage paid at Washington, DC, and additional mailing office. **POSTMASTER:** Send address changes to SCIENCE NEWS, 231 West Center Street, Marion, OH 43305. Change of address: Four to six weeks' notice is required — old and new addresses, including zip codes, must be provided.

Copyright © 1992 by Science Service, Inc. Title registered as trademark U.S. and Canadian Patent Offices. Printed in U.S.A.

**Editorial and Business Offices:**  
1719 N St., N.W., Washington, DC 20036  
(202-785-2255)  
Republication of any portion of SCIENCE NEWS without written permission of the publisher is prohibited.

**Subscription Department:**  
231 West Center Street, Marion, OH 43305  
For new subscriptions only, call 1-800-247-2160.  
For customer service, call 1-800-347-6969.

## Letters

### Edgy arguments

"Shadows and Symmetries" (SN: 12/21 & 28/91, p.408) gives only the slightest taste of fivefold symmetry. For instance, there is no mention of Leonardo Fibonacci's series with his breeding rabbits, which increase in the divine proportion each generation.

The cube with its three edge-zones suggests the standard grid. The question "Where are you?" has one three-word answer — the distance along each zone to reach the address.

The dodecahedron is not so economical, but it can be more fun. Its 30 edges point in 15 directions. "Where are you?" could be answered in 455 ways — except the dodecahedron's edges flatten into six families of five lines and 10 families of three lines. These deflate the addresses to leave 385.

While the cube suggests a block length with which to measure addresses, the six families of five dodecahedral edges caught flat in a plane argue endlessly over proper block length as

## This Week

- 116 Adult Attitudes: Share and Share Alike
- 116 Making sense of the disorder inside viruses
- 117 *Glasnost* offers oil-and-gas dividend
- 117 Low-level radiation has delayed effects
- 118 Ulysses: A magnetic odyssey, by Jove
- 118 Babies adapt to low-fat mother's milk
- 119 Achieving control of chaotic laser output
- 119 In Antarctica, scientists go with the floe

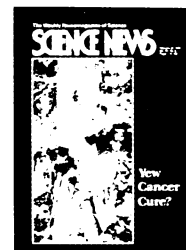
## Research Notes

- 123 Anthropology
- 123 Biomedicine
- 127 Chemistry

## Articles

- 120 Chaos in the Clockwork
- 124 The Adjuvant Advantage

Cover: Bark from the rare Pacific yew tree, *Taxus brevifolia*, yields an experimental drug that may assist in the battle against breast cancer. (Photo: Michael D. Ellis)



## Departments

- 114 Books
- 115 Letters

**Science Service**, a nonprofit corporation founded in 1921, gratefully accepts tax-deductible contributions and bequests to assist its efforts to increase the public understanding of science, with special emphasis on young people. More recently, it has included in its mission increasing scientific literacy among members of disadvantaged groups.

**Board of Trustees** — *Chairman*, Glenn T. Seaborg; *Vice Chairman*, Gerald F. Tape; *Treasurer*, Willis Harlow Shapley; *Joseph W. Berg Jr.*; *Robert W. Fri*; *David A. Goslin*; *J. David Hann*; *Leon M. Lederman*; *Shirley M. Malcom*; *Elena O. Nightingale*; *Ben Patrusky*; *H. Guyford Stever*; *Sanford J. Ungar*; *Deborah P. Wolfe*. *Honorary Trustees* — *Edward Bliss Jr.*; *Bowen C. Dees*; *O. W. Riegel*; *John Troan*.

*President*: Alfred Scott McLaren; *Vice President and Business Manager*: Donald R. Harless.

they intersect each other not at endpoints or even midpoints, but where one length is in the divine proportion to the remainder. This quarrel among five lines over proper block length descends to smaller and smaller intervals like today's popular fractals. The fivefold symmetry enthusiast is bored by the convenient cube. He enjoys the patterns of arguing lines, finding that the intervals form Fibonacci series.

Might our study of fivefold symmetry reveal that matter is composed not of quarks and gluons, but finally of just very, very tiny Fibonacci rabbits?

Steve Baer  
Albuquerque, N.M.

### Blame the messenger?

"More evidence of a solar neutrino shortfall" (SN: 12/21 & 28/91, p.406) illustrates the remarkable tenacity with which scientists cling to popular theories.

The successful detection of neutrino bursts two years ago from a supernova thousands of light-years away would seem to affirm neu-

trino-detection capability. However, in rejecting the validity of their own solar neutrino counts, patiently collected over a span of decades from a source just a few minutes away, they blame the messenger for the nature of the message. Once again, we are left with the feeling that if the data do not support the current theory of solar energy, they really ought to.

Ralph Pacini  
Grand Junction, Colo.

### Aggression in Israel

I was taken aback to read that Carol Lauer's report on the aggression of Israeli children was researched at "an Israeli kibbutz" ("Females show strong capacity for aggression," SN: 11/30/91, p.359). Only 2 percent of Israel's residents live on a kibbutz of one sort or another, and individual kibbutzes differ so sharply in ideology, philosophy and practice that no one kibbutz should — or can — furnish

Letters continued on p.127

FEBRUARY 22, 1992

115

## Sugars turn supple in solution

Most people don't care whether the white stuff that sweetens coffee holds its shape in solution. But the rigidity of sugars that are part of larger molecules such as glycoproteins may help determine their biological function.

Researchers had thought that sugar stayed stiff, but now two carbohydrate chemists have shown that the bonds between sugar units flex quite rapidly in solution. Leszek Poppe and Herman van Halbeek of the University of Georgia in Athens used nuclear magnetic resonance spectroscopy to gauge the distances between protons in sucrose, a sugar molecule made up of a fructose and a glucose sugar unit. In rigid molecules, these distances stay constant, but in sucrose, different temperatures and magnetic field strengths cause the distances between protons of the two units to change, the researchers report in the Jan. 29 *JOURNAL OF THE AMERICAN CHEMICAL SOCIETY*. Van Halbeek says he envisions molecules with these sugar-to-sugar connections tumbling every few billionths of a second but flexing 10 to 100 times as fast.

## Chemistry by computer

Organic chemists keep looking for new ways to achieve reactions. Sometimes they find novel approaches by accident, but two German chemists have found several by computer. Rainer Herges and Christoph Hoock of the Erlangen-Nürnberg University in Germany wanted to find a new way to make a diene—a carbon compound containing two double bonds—by rearranging the bonds in a ringed molecule. To make sure they would not overlook any possibilities, they used a computer program to generate and screen all potential pathways.

First the computer found and evaluated the 44 reactions involving four to six atoms, but the five options it identified had been tried before, Herges and Hoock report in the Feb. 7 *SCIENCE*. So they had the computer check through the 72 possibilities involving seven atoms and eight electrons.

The computer turned up 26 options, which the scientists narrowed to three reactions they could try in the lab, two of them new to chemistry. With one, they found they could use simple starting materials and get high yields, suggesting that "our fragmentation reaction is probably superior to alternative methods," they say. Herges and Hoock think this reaction may prove useful for creating important but hard-to-make dienes, such as those involved in steroid synthesis.

## Wiggly gel makes a muscle

Japanese scientists have made a polymer gel that moves in a lifelike way. Yoshihito Osada and his fellow chemists at Ibaraki University first made a gel of negatively charged polymers. They cut out a strip about the size of a matchstick, attached small hooks to it and suspended the gel strip in water. Because of its charged insides, the polymer swelled. The water also contained a surfactant, whose molecules had a positively charged end.

The researchers set up an electric field across the solution, changing its direction every 2 seconds. The polymer bent and straightened with each change, wiggling forward at 10 inches per minute, they report in the Jan. 16 *NATURE*.

The polymer wiggles because alternate sides of the strip lose, and then regain, the ability to absorb water. The electric field causes surfactant molecules to migrate toward one end of the container. As these molecules encounter the polymer, they coat the near side of the strip. The positive charge of the surfactant cancels some of the gel's negative charge, causing that side of the polymer to lose osmotic pressure, purge water and shrink inward. When the scientists reverse the electric field, the surfactant molecules head in the opposite direction; thus, those attached to the polymer leave, while others link up to the other side of the gel, causing that side to shorten. As a result, the polymer straightens.

### Letters continued from p.115

the basis for a report on Israeli children or adults. The sample is simply too narrow and specialized.

I would also question the selection of the research population in connection with Lauer's statement that Israelis readily defend themselves physically and often fight over such things as places in line. I have been here some years and have yet to see this. If fighting is done, it is done Samson-style (remember, he slew his Philistines with the jawbone of an ass)—jawing away at 90 decibels and giving off a lot of heat. It doesn't happen with Israelis who are past the immigrant stage, because there is a very tidy etiquette on lines and places in line, and all the locals observe it. If Lauer saw fighting in lines, it is likely that the kibbutz she chose is also a base for immigrant absorption. If so, the presence of these new, unacculturated Israelis in the preschool would also tend to skew her results.

F.J. Bursten  
Rehovot, Israel

### Reeds as weeds

I enjoyed your article on woodwind reeds ("Good Vibrations," SN: 12/14/91, p.392). Dr. Lawton should be aware, however, that in California, *Arundo donax* has escaped cultivation and is an invasive weed. It can be found displacing native plants, particularly along natural waterways, degrading valuable wildlife

habitat. It is extremely expensive to control and appears impossible to eradicate. Wildlife habitat in California is already under extreme duress, and the introduction of an invasive weed is an additional blow.

I hope Dr. Lawton will pursue her interest in the cultivation of *A. donax* not only with enthusiasm but also with caution.

Marguerite DiGiorgio  
Davis, Calif.

### In defense of Rex

Oidipous Tyrranos may be a better transliteration than Oedipus Rex ("Oedipal objections," Letters, SN: 12/21 & 28/91, p.403), but it is not good usage.

While Oidipous is the proper transliteration from the Greek, the English form—Oedipus—is taken from the Latin spelling. Hence, Oedipus Rex is a perfectly proper and consistent term that has the weight of many years' usage.

Rev. Martin Buote  
New Bedford, Mass.

### Homosexual evolution

Psychologist J. Michael Bailey states that no good explanation exists for the evolution of genes for homosexuality ("Gene influence tied to sexual orientation," SN: 1/4/92, p.6). I suggest that a family pool that produced some homosexual males, productive but not reproductive, would be more likely to survive hard times than would a family that produced only

reproductive males.

There are two plausible reasons: (a) reduced competition over females with its subsequent conflict leading to loss of useful energy, expulsion of a productive individual or even injury and death; and (b) an optimum number of babies per productive member of the family. The latter would also predict non-reproductive females; however, in earlier societies a female may have been impregnated independent of her sexual orientation.

Sexual orientation should have little, if any, effect on the productivity of an individual if he/she is accepted as a member of the family or tribe. Although the homosexual individual's genes would not be directly transmitted, the family genetic character could be significantly enhanced.

Bernard Baldwin  
Bartlesville, Okla.

### Bum wrap?

Consumable coatings ("Sealed in Edible Film," SN: 1/4/92, p.12) threaten to present yet another hazard to those of us with food sensitivities and allergies. What may be edible for most can be poison for some; this is especially the case with milk- and grain-derived products. My concern is not so much that products containing such additives are on the market as that they become ubiquitous, making avoidance increasingly difficult.

Elizabeth S. Oscanyan  
Purcellville, Va.