

SCIENCE NEWS®

The Weekly Newsmagazine of Science

A Science Service Publication
Volume 125, No. 26, June 30, 1984

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Subscription Department
231 West Center Street, Marion, Ohio 43302

Subscription rate: 1 yr., \$27.50; 2 yrs., \$47.50;
3 yrs., \$67.00. (Foreign postage \$5.00 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 (t) 800-247-2160. Printed in U.S.A. Second
class postage paid at Washington, D.C. 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

Letters

Warm idea

Ms. J. Raloff's article on coal burning ("Coal
burns best in pipes that hum," SN: 5/5/84, p. 278)
relates nicely Ben Zinn's findings of "superior
combustion" and of "increasing the transfer of
heat ... to the walls of the chamber" due to
acoustic vibration.

What Zinn probably hasn't realized is that the
vibration of the grid on which the coal rests
simply serves to shake off the insulating layer of
ash that forms on its surface as it burns, allow-
ing better heat outflow.

I discovered this principle many years ago
during a backyard barbeque. I had noticed that
the heat output always diminished somewhat
after the coals had burned awhile. By stirring
them a bit, the heat increase was impressive ...

Steve Ring
Johnson Space Center
Houston, Texas

JUNE 30, 1984

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Cover: The bright glow of grape bud beetles under ultraviolet light can indicate to grape growers when and where their vineyards need insecticide. (Photo: CALIFORNIA AGRICULTURE, Univ. of Calif./Max Badgley)



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Memories are made of this?

I read with great interest Dietrick E. Thomsen's article entitled "Swimming for the Good Life" (SN: 5/12/84, p. 298). I was particularly captivated by the concept that the lowly *E. coli* bacterium might be equipped with "something like a memory" to allow it the temporal span necessary to compare its relative well-being "before" and "after" as it tastes the additives to its substratum.

Would not understanding *E. coli*'s memory help us to understand our own?

The required time lag might be neither more nor less than the time delay of osmosis. It surely takes some finite period for the additives to the substratum to diffuse through the cell membrane into the cytoplasm. In the interlude, the relative concentrations inside and outside the cell differ. Could the bacterium not detect the differential—whether by separate internal and external sensors, or by internal and external components of the same sensor—and react to it? When the concentration of good stuff is

higher outside, the organism must be improving its position, moving toward it, so it "runs" longer. When the outside concentration is lower, its position is getting worse, so the bacterium increases its "tumbling"....

The internal-external comparison seems to me to explain all the behavior described in the article, including the inexplicable lengthy "running" when the good stuff is first added to the broth, and the "tumbling" when it is withdrawn. Outside is always the functional equivalent of "before," and inside "after." Moreover, the mechanism is so simple it may consist of no more than an electrical potential across the sensor or the cell membrane itself.

My first reaction to this simple explanation was that I had lost something important just before it was attained. On reflection, however, I began to wonder if memory in higher animals— at least short-term memory— might also be rooted in the osmotic time factor. Intriguing.

Richard S. Platf
Blue Lake, Calif.

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