

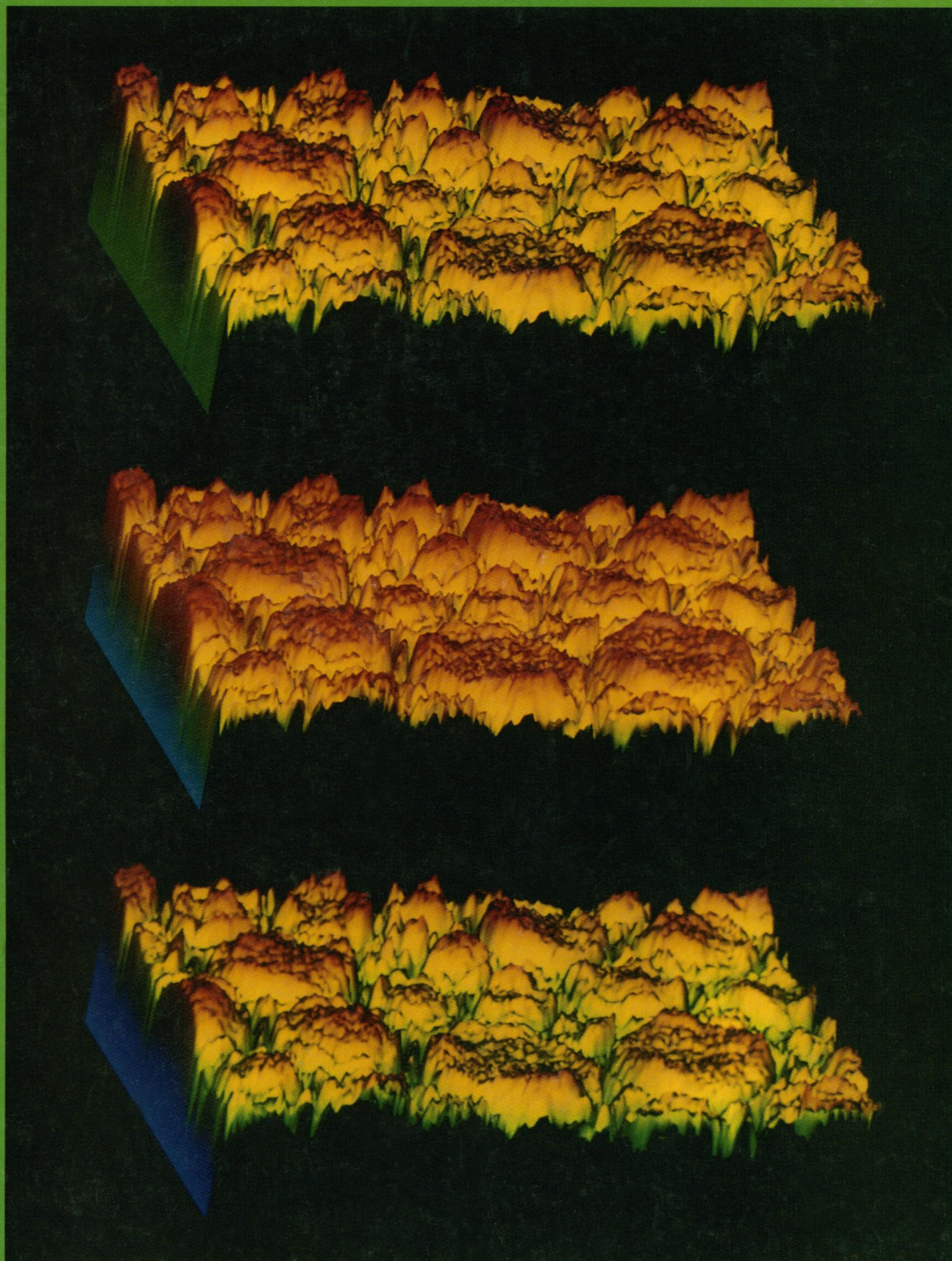
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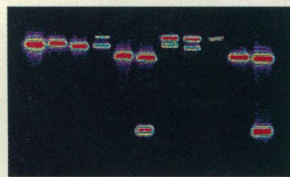
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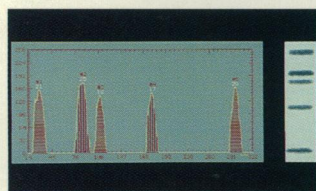
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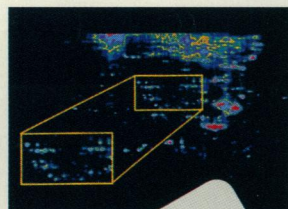
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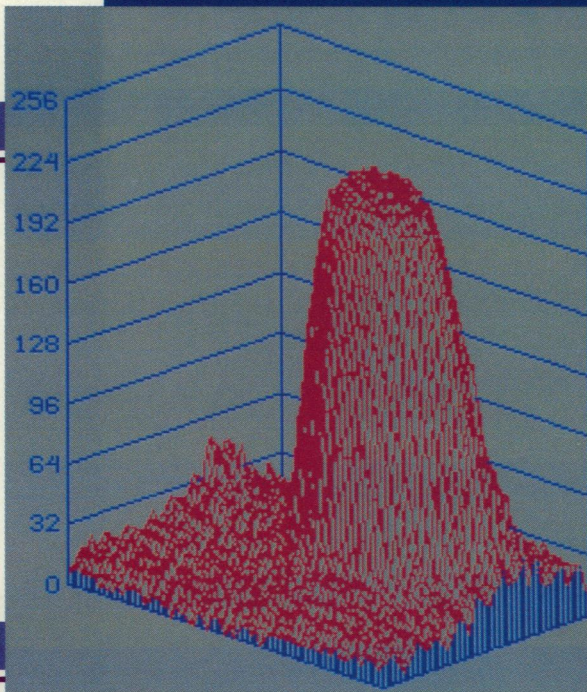
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2. Bauer, J.C., and Fox, J.S. (1991) *Strategies* 4: 6-7



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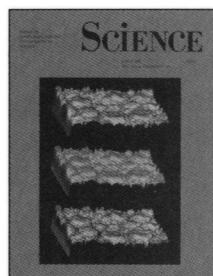
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**COVER** Computer-enhanced portrait of a foam surface in triplicate. False color and spatial filtering have been used to sharpen the appearance of bubbles and liquid walls observed in a commercial foam product consisting of water and surfactants. Even with digital enhancement, these optical images reveal bubble sizes and shapes only at the surface. To probe the structure and dynamics of bubbles inside the foam, techniques have been developed that exploit the strong scattering of laser light by liquid-vapor interfaces. See page 686. [Images created by H. Deckman and P. Deckman]

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## This Week in SCIENCE

### Ozone depletion potentials

**T**HE Montreal protocol, an agreement prepared at the United Nations and signed by 21 countries and nations of the European Community, bans the production and use of certain chlorofluorocarbons and bromocarbons (Halon) because of their damaging effects on the ozone layer. A compound that has been proposed for use in place of some of these destructive Halons is bromodifluoromethane ( $\text{CHF}_2\text{Br}$ ), which is a potent fire-extinguishing substance. How does this compound stack up against banned Halons with respect to its lifetime (and therefore ozone depletion potential) in the atmosphere? Talukdar *et al.* have examined the rates of two processes that affect the lifetime of  $\text{CHF}_2\text{Br}$  in the troposphere—photolysis of the compound and reaction of its hydrogen atom with OH free radical (page 693). When  $\text{CHF}_2\text{Br}$  or other Halons are destroyed in the troposphere they are no longer available for transport to the stratosphere. Estimates of atmospheric lifetimes based on the reaction rates indicate that  $\text{CHF}_2\text{Br}$  has an atmospheric lifetime of 7 years and would be a good substitute for  $\text{CF}_3\text{Br}$ , which has an atmospheric lifetime of 65 to 81 years. It would be a less effective substitute for  $\text{CF}_2\text{ClBr}$ , which is photolyzed and stays in the atmosphere only 12 to 18 years.

### Hyena siblicide

**N**EWBORN spotted hyenas are fiercely aggressive toward their siblings at birth (page 702). Twins are typically born one hour apart and within minutes of the birth of the second the first will begin attacking its twin. The intense neonatal fighting is supported by the physical precocity of the newborns, which have powerful and coordinated bodies, fully erupted teeth (canines and incisors), and strong jaws. Aggression, which is most intense on the first day, can go on for some time. In captivity, the aggression is not fatal, but this is not the case in the wild.

Observations of a population of spotted hyenas in the Masai Mara National Reserve in Kenya since 1979 suggest that siblings will fight to the death of one twin if the twins are of the same sex, whereas mixed-sex twins will eventually stop fighting and both will survive. In the wild, the narrow entrance to the natal den prevents the mother from protecting her weaker twin. Frank *et al.* discuss how the high levels of androgens—testosterone and androstenedione—in newborns may affect their behavior and how the high levels in females may explain their behavior and anatomy. They compare this first reported example of wild mammal siblicide with siblicide in birds and suggest factors that may have contributed to the evolution of this fatal form of sibling rivalry.

### Genetics of cardiac arrhythmia

**M**ORE than 300 families are known to have long QT syndrome (LQT); affected individuals are subject to fainting spells and sudden death from cardiac arrhythmias. Through linkage studies of 245 markers, Keating *et al.* have identified a candidate disease gene—the H-*ras* locus on human chromosome 11 (page 704). H-*ras* proteins are typically located inside cells on cell membranes and function in many different signal transduction pathways. One *ras*-encoded protein has been shown to work with another protein to regulate cardiac potassium channels. Thus a mutation in the H-*ras*-1 gene and a defective product could account for the cardiac arrhythmia of LQT. Individuals at risk for LQT are currently only identifiable by electrocardiogram abnormalities; the availability of a genetic marker for the syndrome should make identification of at-risk individuals more straightforward. Awareness of the risk could help to prevent some of the early sudden deaths, which not infrequently occur after periods of heightened exercise, anxiety, or excitement. Marx takes a closer look at this discovery and its clinical potential (page 647).

### Malaria vaccine

**S**UBUNIT vaccines containing portions of the immunogenic circumsporozoite (CS) protein of sporozoite-stage malaria parasites have been only partially effective at providing protection against malaria, whereas vaccination with whole attenuated sporozoites provides complete protection. The missing element of the subunit vaccines has now been identified (page 715). Khusmith *et al.* report that mice can be fully protected from fatal malarial infections if a second separate immunogenic substance normally found on the surface of the sporozoite, the SSP2 protein, is included in the vaccine along with CS protein components. The combined vaccine provided complete protection against subsequent challenge and elicited both antibodies and a type of T lymphocytic cell that is thought to kill infected liver cells.

### Artificial pancreas

**C**AN a "biohybrid" artificial pancreas effectively control diabetes? Such a device, consisting of pancreatic islets (the cells that make insulin) housed inside a tubular polymeric membrane, would be hooked up to the host's vascular system. The membrane would permit free flow of glucose, insulin, and blood components needed for maintaining the viability of the islet cells but would keep the transplanted tissue separate from the host's antibodies and killer cells. Experiments in dogs that were made diabetic show that biohybrid devices of this sort, containing canine or bovine islets, are effective at regulating blood glucose levels for periods up to 6 months (page 718). Sullivan *et al.* point out that the devices are potentially superior to human pancreas transplants because device implantation is less traumatic than the surgery involved in pancreas transplantation, generalized immunosuppression is not needed for survival of the islet cells, and animal islets (which are more readily available than are those of humans) may be suitable substitutes for human tissue.

■ RUTH LEVY GUYER

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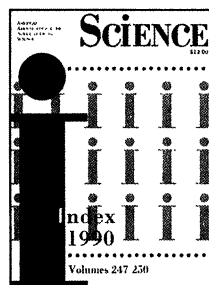
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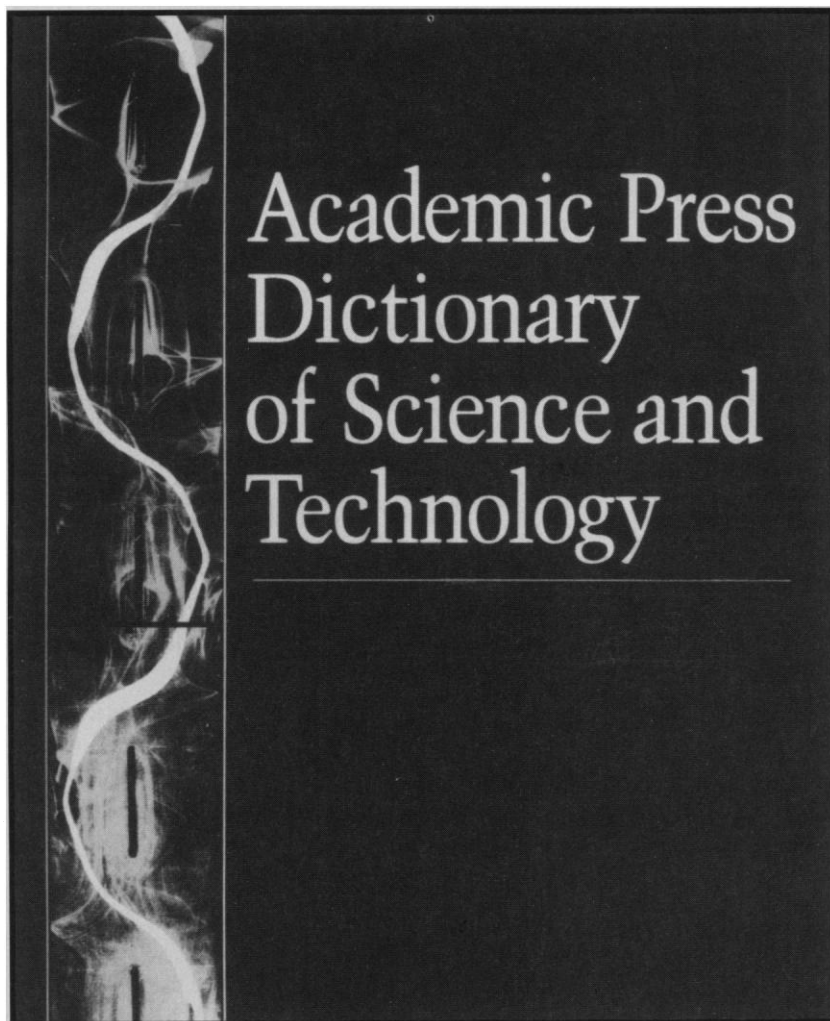
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