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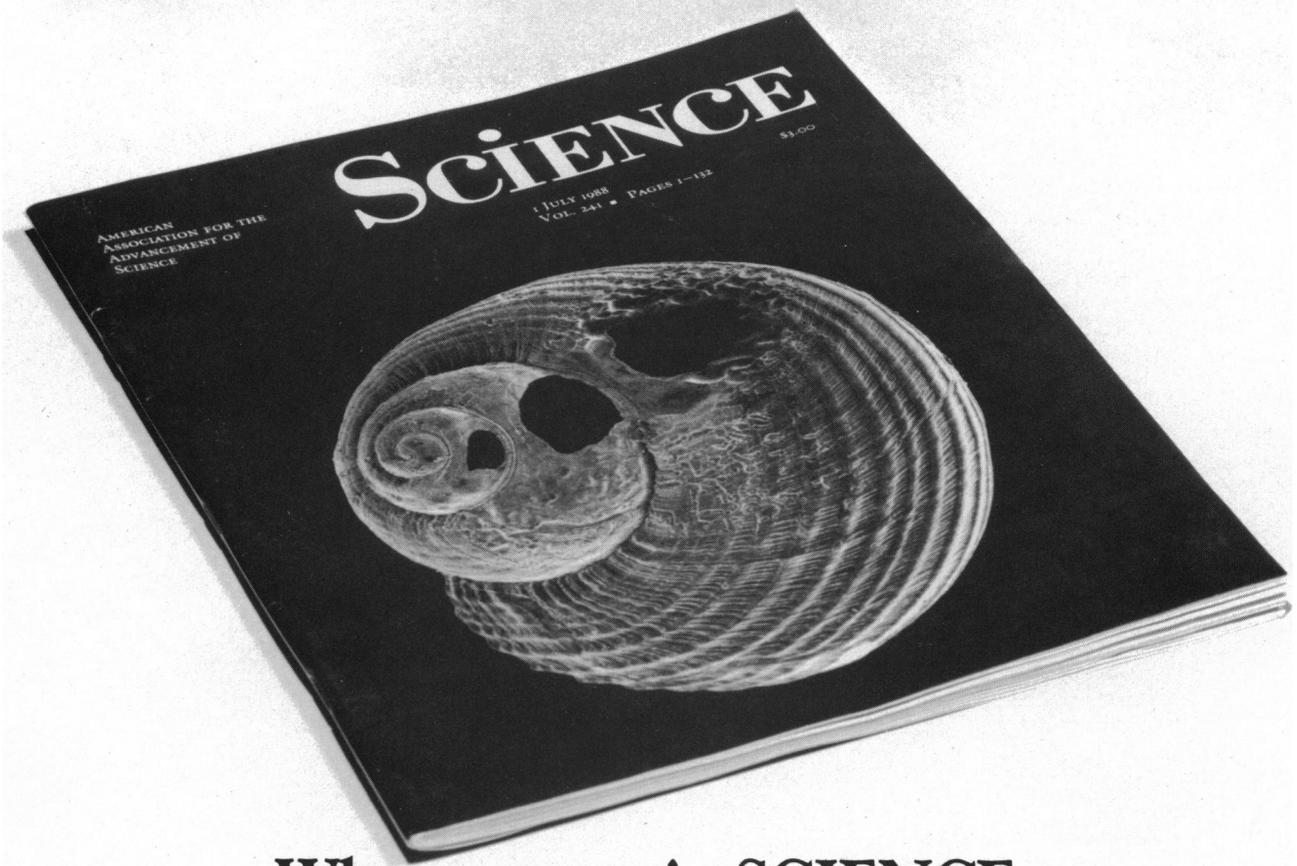

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■ The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

COVER An arctic ground squirrel, *Spermophilus parryii*, newly emerged from its hibernaculum in Alaska. During hibernation, arctic ground squirrels spontaneously and reversibly adopt core body temperatures as low as −2.9°C without freezing. See page 1593. [Photo by Steve Moffitt, Department of Biology and Wildlife, University of Alaska, Fairbanks, AK 99775]

Reports

Book Reviews

Author Index to Volume 244 is found on pages I–X.
Information for Contributors is found on XI–XII.

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If you are a AAAS member or fellow, or are sponsored by one, submit an abstract of your research paper (as specified below) by 9 November 1989. Appropriate topics span the physical, life, behavioral, and social sciences. Accepted abstracts will be published and distributed to all Meeting registrants. Each contributor will be assigned, by general discipline, to a poster session, and will be provided with a bulletin board on which to display graphics (charts, graphs, photos) and large, easy-to-read text for 1½ hours.

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Above the 5″ square, type the name of the broad discipline that encompasses the subject matter and provide 3 index words to describe the area within that discipline. Below and to the left of the square, type the full name, address, and phone number of the person to be contacted regarding status and scheduling. Below and to the right, type the name, affiliation, and complete membership number (appearing above the name on SCIENCE mailing labels) of the member or fellow endorsing the paper with his/her signature.

Send the original plus one copy of the abstract no later than 9 November 1989 to

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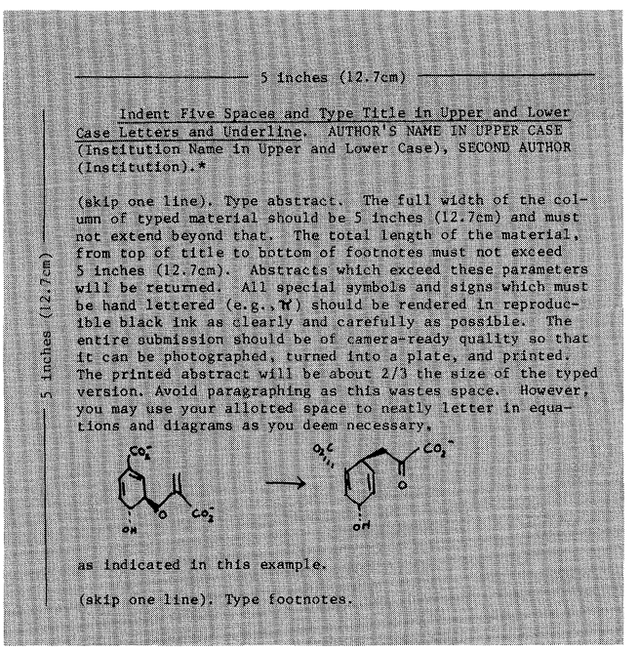

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Cetaceans

WHALES and dolphins (cetaceans) evolved from meat-eating ancestors that lived on land some 50 million years ago. The marine life became possible as a result of a number of physical and functional adaptations. For example, the hindlimbs of the ungulate forebears were replaced by powerful propellers that made (and make) possible long-distance travel from calving grounds in warm waters to feeding areas in cooler waters. Layers of blubber hold in body heat in an otherwise warmth-sapping environment. Plentiful proteins store and carry oxygen in the bloodstream. And, enlarged kidneys handle and filter the concentrated solutes that are ingested with sea water. Würsig describes these and the social adaptations of cetaceans—their organization, sexual activities, and communication patterns—that either highlight the links between cetaceans and their land-dwelling relatives or distinguish the two (page 1550). Although cetaceans can hold their breath for long periods of time, they are ultimately dependent on air; their vital tie to the sea surface makes them trackable and useful as informants of pollution and other changes that are occurring in water habitats that cannot be easily or directly sampled.

Iowa impact site

A bolide, or perhaps several, may have hit the earth at the end of the Cretaceous period (some 65 million years ago) and caused the mass extinction that included extinction of the dinosaurs. If a large bolide hit the land, it would have left a large crater in the earth. Kunk *et al.* provide evidence from studies of argon isotopes that the Manson impact structure in north-central Iowa may have been a site of such an event (page 1565). The crater is situated near an area of North America where the largest and most abundant shocked grains have been found in the layer marking the Cretaceous-Tertiary boundary. Such grains are thought to be typical impact products. The Manson impact structure is covered by 30 to 90 meters of glacial deposits; the crater's diameter is 35 kilometers, making it the largest known impact structure in the United States. The center of the crater is uplifted, and it is from the centrally uplifted material that potassium feldspar samples were taken and dated by argon-isotope dating techniques. Evidence was obtained for a dramatic, single degassing event around 65.7 million years ago; the loss of most of the ^{40}Ar from the Manson granites at that time was most likely caused by the shock-induced (impact-induced) heating of the rock.

Secretory cells

WHAT regulates the secretion of saliva? Acinar cells, the salivary gland cells that secrete saliva, were evaluated with optical techniques after they were stimulated with the secretion-inducing substance carbachol (page 1582). Three linked effects were noted: fluid was secreted, the concentration of calcium ions inside the cell shot up, and the cells shrank. An increase in the intracellular concentration of calcium was both necessary and sufficient for the volume changes in the cells, and there remained a tight correlation between calcium ion concentrations and cell volumes as calcium levels fluctuated. Foskett and Melvin point out that cell volume changes may be important in modulating secretion and that cell volume may therefore be an accurate indicator of the cell's secretory status. The techniques used in this study may be generally applicable for studying the responses of cells in various secretory systems.

Fickle neuron

ALTHOUGH the physical configuration or "wiring" of the nervous system appears fixed, its functioning or "firing" is not. This is illustrated in studies of a nerve cell—the ventricular dilator—that can participate in the firing of two neural networks (groups of nerve cells that fire coordinately) in lobsters (page 1587). The versatile neuron described by Hooper and Moulins is an integral part of the pyloric neural network; it fires in this network and with the cardiac sac network whenever that network is active. These networks and two others comprise the lobster's stomatogastric nervous system; each network is associated with a different region of the foregut. The firing pattern of the ventricular dilator is different and distinctive in each network. When the ventricular dilator switches to the cardiac sac network, its membrane regenerative properties change, and it cannot readily return to fire with the pyloric network in the required rhythmic manner. The switch can be induced by both mechanical and electrical stimuli and appears to be physiologically relevant.

Cold comfort

ARCTIC ground squirrels (cover) hibernate for 8 months each year in spherical straw nests in burrows beneath the surface (but above the permafrost); their long periods of torpor are broken up by short periods of arousal. When body temperatures of hibernating ground squirrels were followed with implanted temperature-sensitive radiotransmitters, they were found to fall as low as −2.9°C and to remain below 0°C for at least several weeks (page 1593). There was nothing overtly unusual about the ground squirrels' blood: below-zero parts of the body quickly bled when wounded, solute concentrations were normal, and so were plasma freezing and melting curves; in addition, there was no evidence for circulating antifreeze molecules comparable to those that keep certain polar and north temperate fishes from freezing. Barnes speculates that these mammals may endure below-freezing habitats by supercooling—their temperature drops below freezing but ice crystals do not form—and that supercooling may be an energy-conserving metabolic strategy.

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Interview with a Risk Expert

Science. Dr. Noitall, you are the ultimate world authority on all types of risks, a revered figure who has just appeared in national television.

Noitall. A vast understatement of my true value.

Science. You must have a large laboratory to uncover so many facts not available to the regulatory agencies.

Noitall. Facts are no longer created in laboratories, they are created by the media. Any pronouncement of mine repeated in three periodicals, four newspapers, or one television program is considered a fact. My appearance on three talk shows is enough to qualify me as an expert. It is no longer necessary to have a laboratory in my profession.

Science. Could you give examples of how to avoid risk?

Noitall. Stay out of the home. More than 3 million people in the United States were injured in 1987 in home accidents; 90% of all automobile accidents occur within 10 miles of home. It is imperative that you stay away from home.

Science. But I've heard that many accidents occur on highways.

Noitall. That is true. There is one fatality for every 10 minutes of driving on the highways in the United States. I have developed a rigorous formula that shows that the more time spent on the highway, the greater the chance of an accident. Therefore, I recommend driving 80 miles per hour as a way of reducing the time spent on highways and thus reducing your chance of an accident.

Science. If one stays away from home, is there not an increased chance of infectious diseases?

Noitall. One has to give up sexual intercourse entirely. The danger of disease from that source is far greater even than from eating an apple, and it should be avoided at all costs.

Science. Are there other dangers about which the Environmental Protection Agency has failed to advise us?

Noitall. Breathing. All breathing generates oxygen radicals, which are the main sources of mutations in DNA, leading to cancer, birth defects, and very peculiarly shaped molecules in the urine. Breathing has been observed 3 minutes before death in 100% of all fatalities. We urge everyone to stop breathing until the proper research has been carried out. The EPA has been told about this relation and has failed to act on it, a scandalous display of irresponsibility.

Science. What about hazards from crime?

Noitall. A third of all homicides are committed on intimates, about a third on acquaintances, and about a third on strangers. Hence, it is imperative to avoid intimates, acquaintances, and strangers in order to reduce your risk of homicide significantly.

Science. Can one ever completely eliminate a given risk?

Noitall. One can reduce a risk to essentially zero by adopting what I call "the riskier alternative strategy." For example, one could take up hang gliding, as it has been conclusively demonstrated that fewer hang gliders die of passive cigarette smoke than those who never participate in the sport. People who bicycle without a helmet need not worry about a little nuclear reactor nearby. People who have a cocktail before dinner or wine with a meal need never worry about a little trichloroethylene in their drinking water. By the proper choice of alternative strategies, it is possible to reduce one's chance of dying of any particular disorder to any desired level. It has relieved many people of risk anxiety syndrome.

Science. This seems so sensible, I am surprised people don't follow your advice.

Noitall. Most ignoramuses are in fact following my formula without knowing it. Millions of people commute 20 miles to work, take airplanes, and choose hopelessly short-lived grandparents and still worry about clean drinking water. These people are secret admirers of peptic ulcers.

Science. We can't thank you enough for the time you are spending with us, but I have one last question. Do you practice what you preach?

Noitall. Sadly, the answer is no. My family on the paternal side has a hereditary weakness whose clinical manifestation is the "eat, drink, and be merry" psychosis. As a result, all my ancestors on that side of the family have died prematurely, in their early nineties. I doubt whether I will escape the family curse.

—DANIEL E. KOSHLAND, JR.

Revised 23 December 1988

Information for Contributors

THE EDITORS OF *SCIENCE*

Manuscripts should be addressed to the Editor, *Science*, 1333 H Street, NW, Washington, DC 20005. Submit three copies together with a letter of transmittal giving

1) the names and telephone numbers of the authors;

2) the title of the paper and a statement of its main point;

3) three to eight keywords to be used for indexing;

4) the names, addresses, telephone numbers, and fields of interest of four to six persons outside your institution who are qualified to referee the paper;

5) the names of colleagues who have reviewed the paper;

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It is assumed that all those listed as authors of a work have agreed to be so listed, have seen and approved the manuscript, and are responsible for its content.

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In selecting papers for publication, the editors give preference to those of general significance that are well written, well organized, and intelligible to scientists in different disciplines. An attempt is made to balance the subject matter in all sections of *Science*. Membership in the AAAS is not a factor in selection.

Accepted papers are edited to improve the accuracy and effectiveness of communication and to bring them within the specified length limits. When the author's meaning is not clear, the editor may consult the author by telephone; when editing is extensive, the manuscript may be returned for approval and retyping before the type is set.

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General articles should include a note giving the authors' names, titles, and addresses; a summary (50 to 100 words); an introduction that outlines for the general reader the main point of the article; and brief subheadings to indicate the main ideas. The reference list should not be exhaustive; a maximum of 50 references is suggested. Figures and tables should occupy no more than one printed page.

Research Articles. A research article (up to 4000 words) is expected to contain new data representing a major breakthrough in its field. The article should include an author note, abstract, introduction, and sections with brief sideheads. A maximum of 40 references is suggested. Figures and tables together should occupy no more than one printed page.

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Summaries or abstracts. These should include a sentence or two explaining to the general reader why the research was undertaken and why the results should be viewed as important. The abstract should convey the main point of the paper and outline the results or conclusions.

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Symbols and abbreviations. Define all symbols, abbreviations, and acronyms.

Units of measure. Use metric units. If measurements were made in English units, give metric equivalents.

References and notes. Number references and notes in the order in which they are cited, first through the text and then through the table and figure legends. List a reference only one time. References that are *always* cited together may be grouped under a single number. Use conventional abbreviations for well-known journals; provide complete titles for other journals. For references with up to five authors provide all the names; for more than five, provide the name of the first author only. See issues of the journal for examples.

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Acknowledgments. Gather all acknowledgments into a brief statement at the end of the references and notes.

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Animal welfare. Authors using experimental animals must state that their care was in accordance with institutional guidelines. For animals subjected to invasive procedures, the anesthetic, analgesic, and tranquilizing agents used, as well as the amounts and frequency of administration, must be stated.

Figures. For each figure submit three high-quality glossy prints or original drawings of sufficient size to permit relettering but not larger than 22 by 28 centimeters (8½ by 11 inches). On the back of every figure write the first author's name and the figure number and indicate the correct orientation. *Manuscripts with oversized figures will be returned to the author without review.* Photocopies of figures are not acceptable; transparencies, slides, or negatives cannot be used because they cannot be sent to reviewers.

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Equations and formulas. Use quadruple-spacing around equations and formulas that are to be set off from the text. Define all symbols.

Uncertainties and reproducibility. Evidence that the results are reproducible and the conditions under which this reproducibility (replication) was obtained should be explicitly stated. The effect of limitations in experimental conditions on generalizability of results should be discussed. Uncertainties should be stated in terms of variation expected in independent repetitions of the experiments; they should include an allowance for possible systematic error arising from inadequacies in the assumed model and other known sources of possible bias. Probabilities from statistical tests of significance should be subordinated to the reporting of results and associated uncertainties.

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