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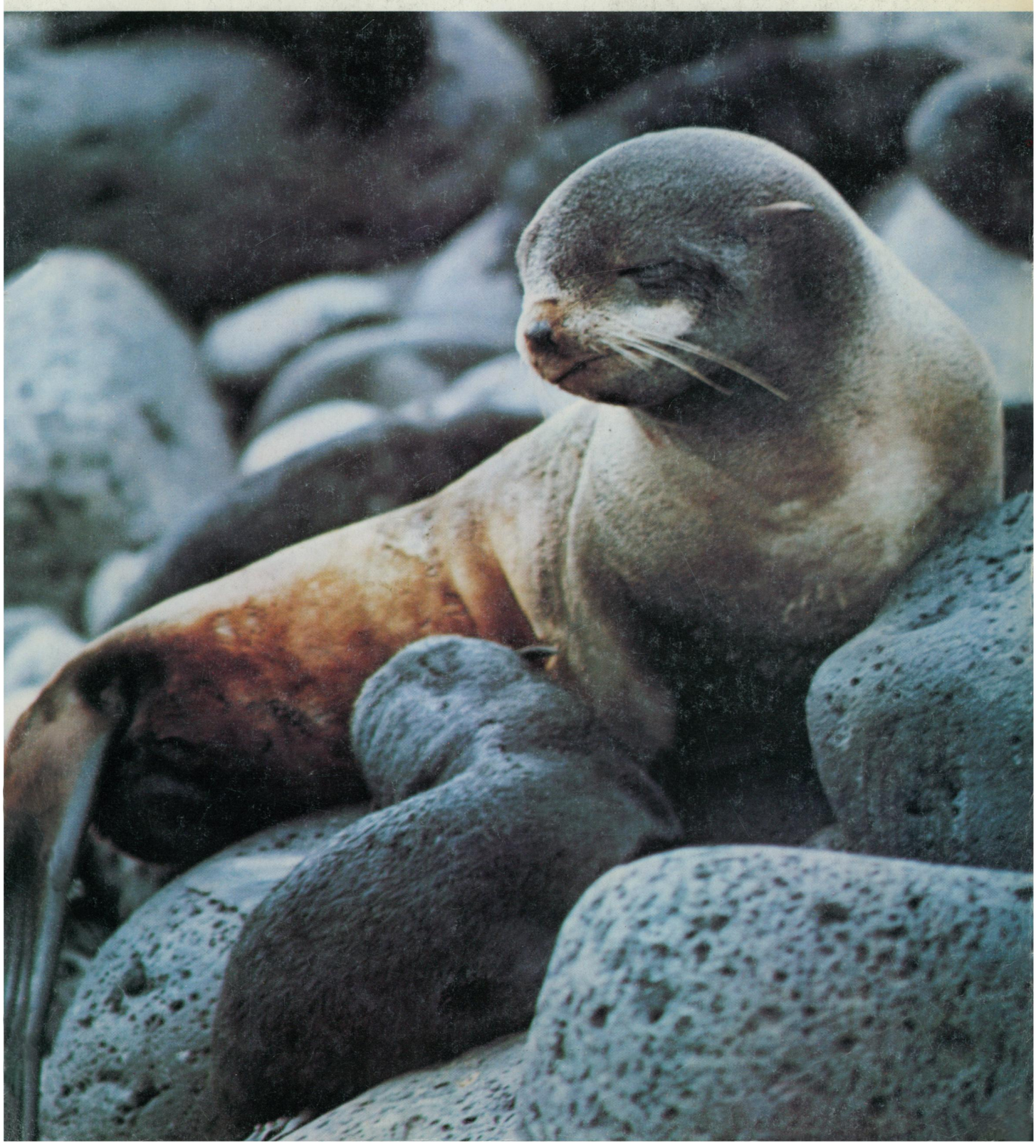
SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



One of the biggest gold strikes since Sutter's Mill.

The yield: 3,000 pounds of pure gold.

But it didn't come from a mine. It came from a Western Electric factory.

A new kind of Midas Touch

That's where Western Electric's new process for plating gold is *conserving* the precious metal, through increased efficiency and precision. It's producing better switching components for the Bell System, to make your phone service clearer and more reliable than ever.

It must be gold that's plated to the switching components you see glittering in the photograph, because no other metal can provide the same kind of efficient, reliable, durable, and clear telephone transmission.

But until now, gold-plating had always been a messy and imprecise process. There had been no way to control it accurately. No way to avoid depositing excess gold on the places it was intended to go. And on the places it wasn't.

So Western Electric, working with Bell Labs, designed a totally new system to do the job. Combining the best of electro-chemical and programmed logic control technologies, the new system can plate gold with hair-thin precision. Depositing only the desired amount, only on the designated spot. With no waste whatsoever.

Gilt-edged savings

Besides producing a much better product, Western Electric has mined a savings of $9 million from the process. And that's another way we're helping your Bell Telephone Company hold down the cost of your phone service.

Even bigger benefits

And since the new process uses 55% less gold than the old one, we could more than double production of our improved switching component. Without consuming any more of the shiny natural resource.

But there are more environmental plusses. The new process has almost completely eliminated the gaseous wastes plating used to produce. It's cut the liquid wastes by 90%. And it runs on 67% less power.

This improved gold-plating technique is another way Western Electric is working to hold down the cost, while continually raising the quality of your phone service.

Keeping your communications system the best in the world.

Western Electric

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SCIENCE

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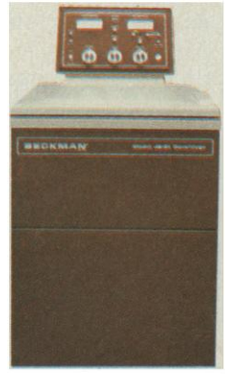
COVER

Female northern fur seal (*Callorhinus ursinus*) nursing her newborn pup at St. Paul Island, Alaska, in July 1975. See page 87. [A. S. Blix, Institute of Arctic Biology, University of Alaska, Fairbanks]

Announcing the Beckman J2-21... a centrifuge you'll love.

The J2-21 is an exciting new high-speed centrifuge. It keeps the components that made the 21,000-rpm J-21C so reliable—and adds proven features from other Beckman centrifuges. The result: by far the finest high-speed centrifuge ever built.

The J2-21 features: a fast-accelerating, high-torque drive; variable power-braking system; superior sound suppression; easy temperature setting; new, automatic vacuum system; rotor imbalance detector; easy-opening counterbalanced door; compact cabinet; built-in speed calibration; 2° to 40°C operation; electronic door interlock; and it is UL listed and CSA approved.



There are eleven J2-21 rotors to choose from, including the new JA-17 which spins fourteen 50-ml tubes, and the new JA-20.1 which spins thirty-two 15-ml tubes.

The J2-21: it gives you reliability, quiet efficiency unmatched by any other centrifuge, and it's backed by Beckman sales and service—worldwide.

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3. M. A. Bockuchava and N. I. Skobeleva, in *Advances in Food Research*, C. O. Chichester, E. M. Mrak, G. F. Stewart, Eds. (Academic Press, New York, 1969), vol. 17, pp. 215-292; W. H. Stahl, in *ibid.*, vol. 11, pp. 210-262; T. Eden, *Tea* (Longmans, London, ed. 3, 1976); G. W. Sanderson, in *Structural and Functional Aspects of Phytochemistry*, V. C. Runeckles and T. C. Tso, Eds. (Academic Press, New York, 1972), pp. 247-316.
4. Select Committee on GRAS *Evaluation of the Health Aspects of Tannic Acid as a Food Ingredient* (SCOGS-48, Federation of American Societies for Experimental Biology, Washington, D.C., 1977).

Antibiotics in Feeds

Eliot Marshall (News and Comment, 23 Feb., p. 732) indirectly quotes Richard Novick and others as saying that they agreed to join the CAST (Council for Agricultural Science and Technology) task force on antibiotics in animal feeds because "we were naïve." This is scarcely true in Novick's case: while the preliminary deliberations of the task force were in progress, he published a long article in the *Journal of Commerce* (*1*) devoted to claims that agricultural use of antibiotics was dangerous and ineffective. James McGinnis telephoned Novick on 18 October 1977 and furnished him with information about the continued efficacy of antibiotics in the state of Washington ever since 1949. Novick subsequently wrote to the *New York Times* (*2*) and stated that "frequently these days little or no effect can be obtained."

Concerning the ABC news documentary on antibiotics in animal feed, American Cyanamid purchased a full page in the *New York Times* to refute it, and the head of Cyanamid, James Affleck, appeared on ABC television in rebuttal. Accuracy in Media also protested. One statement in the ABC documentary was that their reporters had seen a "whole barrel of chloramphenicol" (CM) in a feed mill in North Carolina. This turned out to be chlortetracycline. The use of CM in animal feeds is illegal; it would foster development of CM resistance in *Salmonella*.

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1. R. Novick, *J. Commer.*, 23 Sept. 1977, p. 4.
2. ——, *New York Times*, 21 Nov. 1977, p. 36.

Pert and the Lasker Award

The National Institute on Drug Abuse (NIDA) Division of Research played a significant role in the events leading up to the flurry of current questions concerning the 1978 Lasker Award for Basic Medical Research to Hughes, Kosterlitz, and Snyder (News and Comment, 26 Jan., p. 341; Letters, 2 Mar., p. 834) (*1*).

At the 1977 39th Annual Scientific Meeting of the Committee on Problems of Drug Dependence, the NIDA Pacesetter Research Award was given to Avram Goldstein, John Hughes, Hans Kosterlitz, Eric Simon, Solomon Snyder, and Lars Terenius for the rapid development of the concept and characterization of the structure and function of enkephalins and endorphins, the endogenous morphine-like substances produced in the central nervous system. All six of the awardees had received NIDA support for the investigations leading to these discoveries.

In retrospect, we feel that it was a significant omission on our part that Dr. Candace Pert was not included. Her graduate student role was the issue at the time; subsequent increased awareness of her major contribution has led us to this revised conclusion.

Selecting recipients for prestigious awards is a complex social process in which "scientific merit," unfortunately, is often only one of many considerations. Sometimes, serious mistakes are made. This should not detract, however, from the satisfaction we can all share at the continuing dramatic progress in the opiate receptor and peptide research area.

WILLIAM POLLIN
Office of the Director,
Division of Research,
National Institute on Drug Abuse,
Rockville, Maryland 20857

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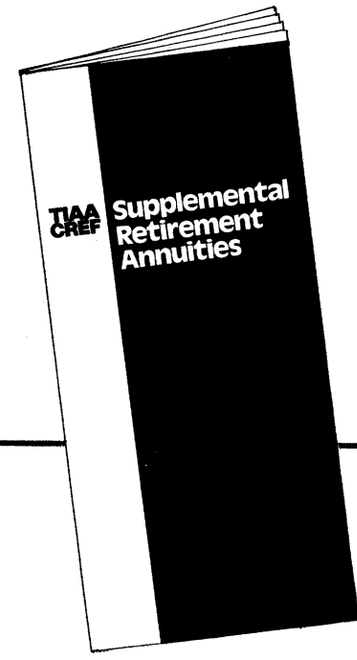
1. J. Arehart-Treichel, *Sci. News* **115**, 120 (17 February 1979).

Erratum: In the reply by J. W. Holaday and B. H. Natelson to the technical comment entitled "Ultradian cortisol rhythms in monkeys: Synchronized or not synchronized?" (1 Dec. 1978, page 1001), the second sentence of the last paragraph should have read: "Tannenbaum and Martin (*6*) have reported a light-entrained, synchronized ultradian growth hormone rhythm in rats."

Erratum: The article "American Physical Society panel gives a long-term yes to electricity from the sun" (News and Comment, 16 Feb., p. 629) contains an error in the fourth paragraph. The first sentence in the paragraph should read: "Ehrenreich portrayed the future of solar cells as bright, calling attention to a decrease in their costs by a factor of 5 in the past 5 years and citing the prospects for further advances."

Erratum: William Beaver was erroneously identified in a recent story about Darvon (News and Comment, 2 Mar., p. 857) as a professor at George Washington University; he is actually a professor at Georgetown University.

TIAA-CREF Supplemental Retirement Annuities



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Supplemental Retirement Annuities (SRA's) are new forms of TIAA and CREF contracts designed expressly for use by persons who want to set aside tax-deferred retirement funds over and above amounts being accumulated under their institution's basic retirement plan. They are available for employees of colleges, universities, private schools and certain other nonprofit educational organizations with tax-deferred annuity (salary-or-annuity option) programs. Through a properly drawn agreement with their institution, staff members may divert part of their compensation before taxes to the purchase of these new contracts.

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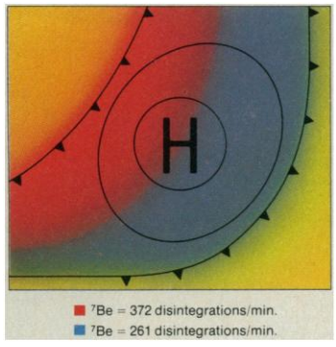
When the Environmental Protection Agency (EPA) originally set the standard for ozone in air at 0.08 parts per million, it assumed that this major smog ingredient is formed primarily from man-made hydrocarbons and nitrogen oxides reacting in sunlight.

Since then, however, air quality studies have revealed frequent rural violations of that standard. The suspected sources of ozone are the stratosphere, drift from urban areas, and, indirectly, natural vegetation. To evaluate each source, scientists at the General Motors Research Laboratories analyzed air at five rural sites.

Average Beryllium-7 Concentrations in High Pressure Systems at Busick, N. Carolina



What did they find? Not only was the ozone standard violated at all five sites, but *average* ozone levels at those sites exceeded average levels in urban areas previously monitored (although *peak* urban levels were higher).

Furthermore, using beryllium-7 as a tracer of stratospheric ozone, our scientists found that such ozone is distributed *throughout* high pressure weather systems and, in fact, is most concentrated in the trailing sector.

This evidence refutes the assumption that stratospheric ozone contributes only near the leading edge of these systems, where measurements show lower ozone levels. And it thus indicates that the stratospheric contribution to ground-level ozone has been seriously underestimated.

The results aren't all in. But enough has been learned to question a goal requiring cleaner air than what nature itself provides.

Recently, based on a reassessment of health effects data, the EPA raised the ozone standard to 0.12 ppm — a level still very close to the natural ozone level.

Mother Nature will take her own course no matter how she scores on EPA tests. It's up to us — industry *and* government — to adapt to her standards.

We currently have openings for Ph.D.s in engineering or the physical, mathematical, or biomedical sciences. If interested, please send your resume to: GMR Personnel, Dept. 415. An Equal Opportunity Employer.

6 April 1979, Volume 204, Number 4388 **SCIENCE**

Informed Consent May Be Hazardous to Health

Before human subjects are enrolled in experimental studies, a variety of preliminary rituals are now required. These include an explanation of the nature of the experimental procedure and a specific elaboration of possible adverse reactions. The subjects, in turn, can either withdraw from the experiment or give their "informed consent." These rituals are said to increase the subjects' understanding of the procedures but, perhaps more important, they came into existence because of a strong belief in the fundamental principle that human beings have the right to determine what will be done to their minds and bodies.

Some, on the other hand, consider that the purpose of informed consent is not protection of subjects, but rather protection of investigators and sponsoring institutions from lawsuits based on the charge of subject deception should a misadventure result. But lawsuits arise in any case; subjects simply claim that they did not understand the rituals. It is reasonable, then, to ask whether the putative beneficiary, the subject, might be harmed rather than helped by the current informed consent procedure.

A considerable body of psychological evidence indicates that humans are highly suggestible. Information has been found to change people's attitudes, to change their moods and feelings, and even to make them believe they have experienced events that never in fact occurred. This alone would lead one to suspect that adverse reactions might result from information given during an informed consent discussion.

An examination of the medical evidence demonstrates that there is also a dark side to the placebo effect. Not only can positive therapeutic effects be achieved by suggestion, but negative side effects and complications can similarly result. For example, among subjects who participated in a drug study after the usual informed consent procedure, many of those given an injection of a placebo reported physiologically unlikely symptoms such as dizziness, nausea, vomiting, and even mental depression. One subject given the placebo reported that these effects were so strong that they caused an automobile accident. Many other studies provide similar data indicating that to a variable but often scarifying degree, explicit suggestion of possible adverse effects causes subjects to experience these effects. Recent hypotheses that heart attack may follow coronary spasm indicate physiological mechanisms by which explicit suggestions, and the stress that may be produced by them, might prove fatal. Thus, the possible consequences of suggested symptoms range from minor annoyance to, in extreme cases, death.

If protection of the subject is the reason for obtaining informed consent, the possibility of iatrogenic harm to the subject as a direct result of the consent ritual must be considered. This clear cost must be weighed against the potential benefit of giving some people an increased sense of freedom of choice about the use of their bodies. The current legalistic devices, which are designed in part to limit subject recourse, intensify rather than solve a dilemma.

The features of informed consent procedures that do protect subjects should be retained. Experimental procedures should be reviewed by peers and public representatives. A statement to the subject describing the procedure and the general level of risk is reasonable. But detailed information should be reserved for those who request it. Specific slight risks, particularly those resulting from common procedures, should not be routinely disclosed to all subjects. And when a specific risk is disclosed, it should be discussed in the context of placebo effects in general, why they occur, and how to guard against them. A growing literature indicates that just as knowledge of possible symptoms can cause those symptoms, so can knowledge of placebo effects be used to defend against those effects. A move in this direction may ensure that a subject will not be at greater risk from self-appointed guardians than from the experiment itself.—ELIZABETH F. LOFTUS *and* JAMES F. FRIES, *Center for Advanced Study in the Behavioral Sciences, Stanford, California 94305*