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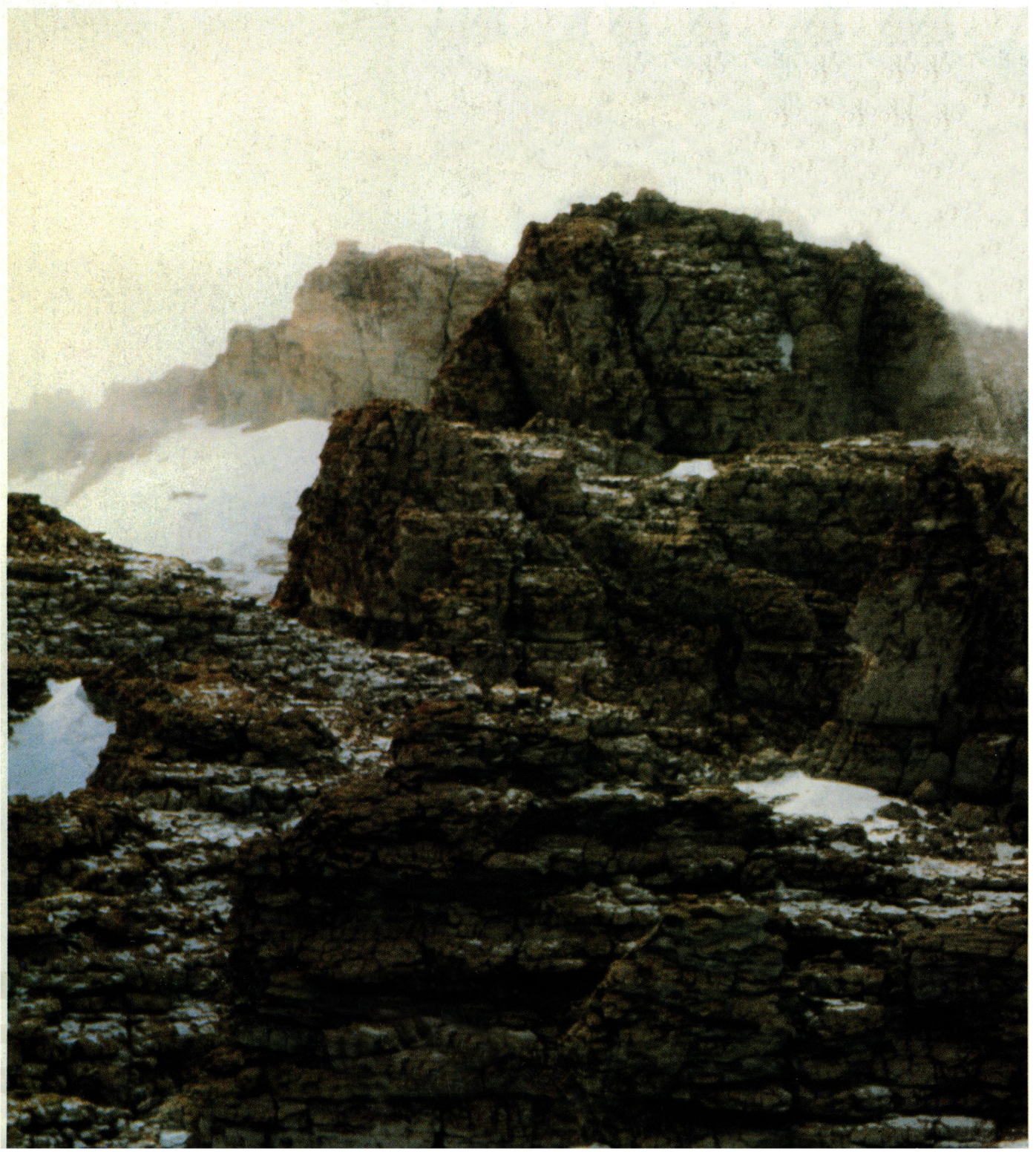

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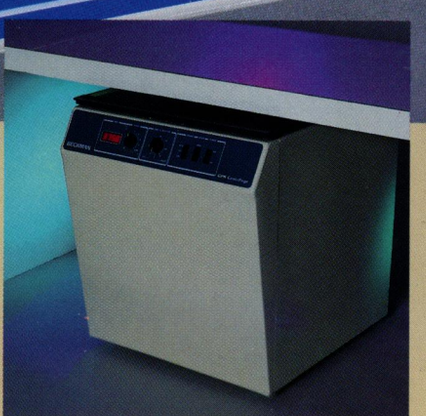

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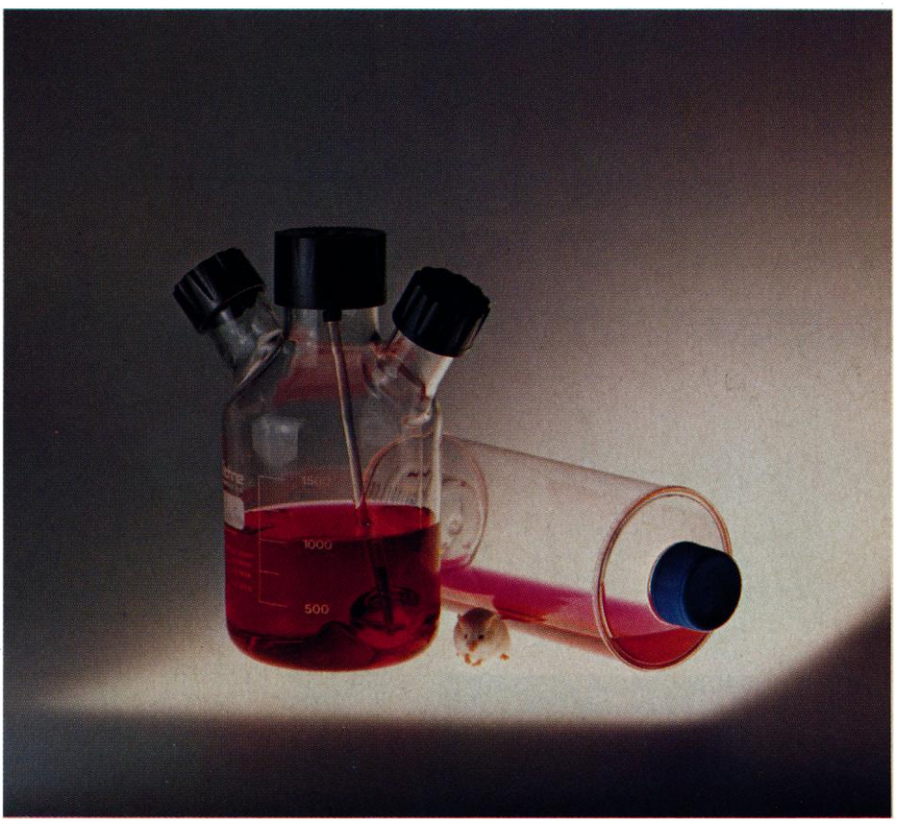

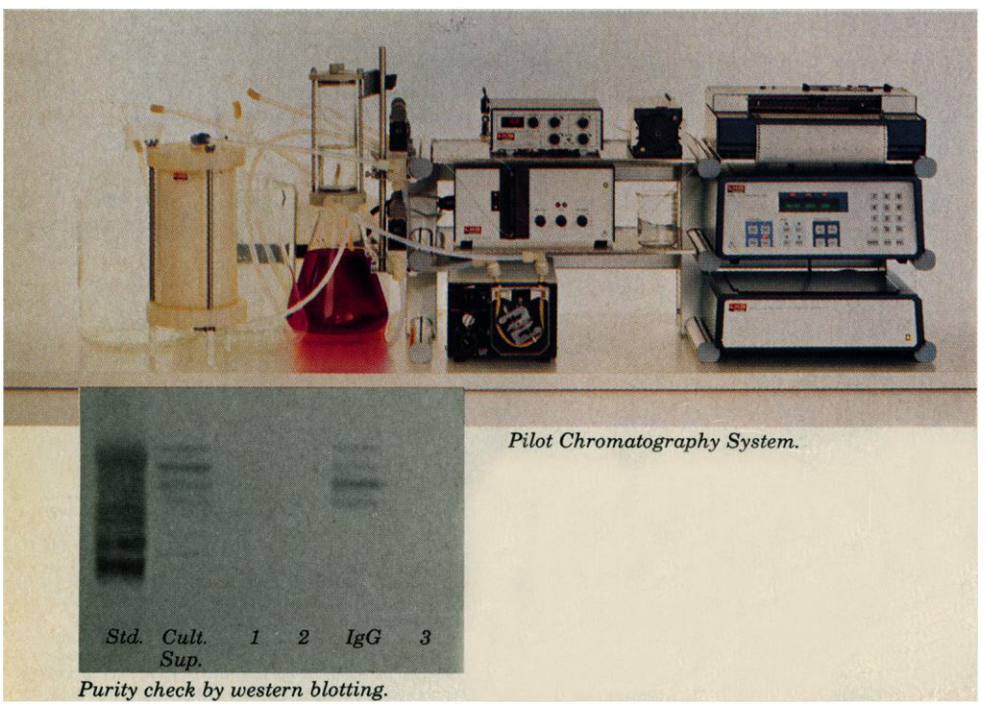

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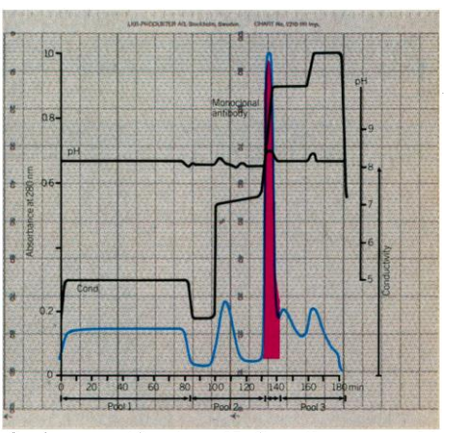

Scale-up purification of IgG antihuman urokinase using a QAE ZetaPrep 800 cartridge. Yield: 1300 mg IgG. Flow rate: 160 ml/min. Sample volume: 10,000 ml cell culture supernatant.

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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 Battleship Promontory in the Convoy Range, southern Victoria Land, Antarctica. The surface of the rugged sandstone rocks is colonized by crypto-endolithic microorganisms that cause extensive weathering on the surface. The characteristic weathering pattern may be preserved as trace fossil when changes in the environment result in the death of the community. See page 703. [E. Imre Friedmann, Florida State University, Tallahassee, FL 32306]

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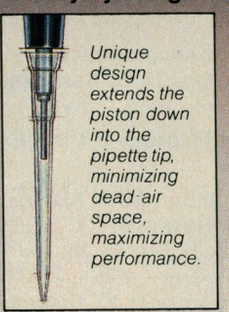

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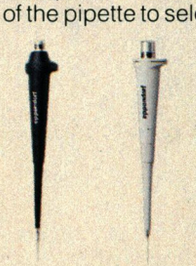

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This Week in SCIENCE

Chernobyl

ONE year has passed since nuclear fission went out of control at the Chernobyl power plant, pressure raised a 1000-ton protective slab of concrete and the plant's roof, and radioactive fuel escaped into the atmosphere (page 673). About 50 million curies of noble gases and 50 million curies of other radionuclides were released. Ahearne describes what happened at Chernobyl and compares this accident to the one at Three Mile Island 7 years earlier. It is with human error that the major blame for both accidents apparently lies. In each case, operators and managers had grown complacent, believing, as a result of years of smooth operations, that accidents could not happen. Operators were not trained sufficiently in emergency procedures, and when each accident began, personnel were found to have taken deliberate steps to defeat safety systems that could have prevented the dire outcomes. In the United States, the accidents caused erosion of public support for nuclear power and have affected the activities of agencies concerned with development, regulation, and design of nuclear power facilities. The effects on the people who were exposed to high doses of radioactive materials will not be clear for decades.

Structure of β-lactamase

FOR almost 50 years, penicillin and other β-lactam antibiotics have been in wide use for treating bacterial infections; during this time, many pathogenic bacteria, once sensitive, have become resistant to these antibiotics (page 694). Resistance stems from the production by bacteria of β-lactamases, enzymes that inactivate the antibiotics and thereby protect the bacteria from the antibiotics' lethal effects. Herzberg and Moult determined the three-dimensional structure at 2.5-angstrom resolution of β-lactamase from *Staphylococcus aureus* PC1. From details of the enzyme's organization, particularly in the active site, and with a penicillin analog as substrate, a model was built from which enzyme-substrate interactions could be inferred and steps in the catalytic process predicted. It should now be possible to design new antibiotics to treat resistant bacterial strains that work better than the enzyme inhibitors and penicillin analogs that are currently available.

Minimalist microorganisms

LICHENS and other photosynthetic microorganisms have lived just below the surface of porous sandstone in the frigid Antarctic dry valleys during the last few million years (cover); the evidence for their existence is a snow-white layer in the rocks where iron compounds have been leached away by the microorganisms (page 703). The survival of these microorganisms is precarious, affected by both geologic and biologic processes. Communities survive only as long as local conditions remain favorable. The region is subjected to extreme conditions, but the microenvironment for the organisms must be warm and wet enough for growth: heat from the sun is crucial as is water that becomes available in the rock pores when snow melts. The organisms grow so slowly that metabolic activity may occur for only hundreds of hours a year. Friedmann and Weed point out that, early in its evolution, Mars may have had an environment much like that in the Antarctic dry valleys and similar life-forms may have been present in porous rocks; thus, traces of such microorganisms might someday be found in martian rocks.

Shocking end to Cretaceous period

THE theory that a large bolide hit the earth 66 million years ago at the end of the Cretaceous period (resulting in mass extinction of life) has gained additional support (page 705). In Cretaceous/Tertiary boundary clays (marked by an anomaly of iridium, a metallic element enriched in meteorites) from marine rocks in Denmark, Italy, Spain, New Zealand, and the north Central Pacific basin, Bohor *et al.* found that grains of quartz had multiple sets of shock lamellae. Various features of the shocked quartz are peculiar to rocks that have experienced strong impacts, but they are not characteristic of volcanic rocks; furthermore, pressures far above those that would be generated by a volcanic explosion are required to produce the observed effects. Iridium anomalies have already been found at more than 75 sites around the world; shocked quartz grains, the ejecta from an impact, can now be sought at these sites. Kerr elaborates on the continuing debate about whether such shocked quartz grains could be explained as consequences of a volcanic eruption instead of an impact and on the significance of the global distribution of quartz grains for the impact model (page 666).

Transkaryotic implantation

AN ideal gene delivery system for treating a genetic disease would be one in which some defective cells are removed from the affected individual, the missing gene is stably incorporated into them, and the cells are reimplanted into the host and go on to produce the missing gene product (page 714). Steps have been taken by Selden *et al.* toward development of such a system. The human growth hormone (hGH) gene was inserted into cultured mouse fibroblasts; the engineered cells were then injected into mice, and production of "reporter" hGH molecules followed. Cells actively secreted hGH for about 2 weeks before being destroyed by the immune system; with immunosuppressive agents, the cells could survive and produce hGH for longer than 3 months. Cell survival and production of hGH varied at different implantation sites; various agents could modulate the expression of hGH by the implanted cells. The strengths and weaknesses of this approach for inserting genes into cells are compared with those of retrovirus-based gene delivery systems.

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The Trade Deficit

The failure of the United States to compete successfully in world trade is emerging as a hot political issue. Recognition of the growing trade deficit was slow in coming, and a cure for it may not be quick or easy. It has been estimated that changes in the value of the dollar will lead to a reduction of the 1986 $170-billion trade deficit by $30 billion in 1987, with another $30-billion drop in 1988. That is not enough.

In the meantime, C. Fred Bergsten, writing in the spring issue of *Foreign Affairs*, has asked some pointed questions. "Can the world's largest debtor nation remain the world's leading power? Can the United States continue to lead its alliance systems as it goes increasingly into debt to the countries that are supposed to be followers? Can it push those countries hard in pursuit of its economic imperatives while insisting on their allegiance on issues of global strategy?"

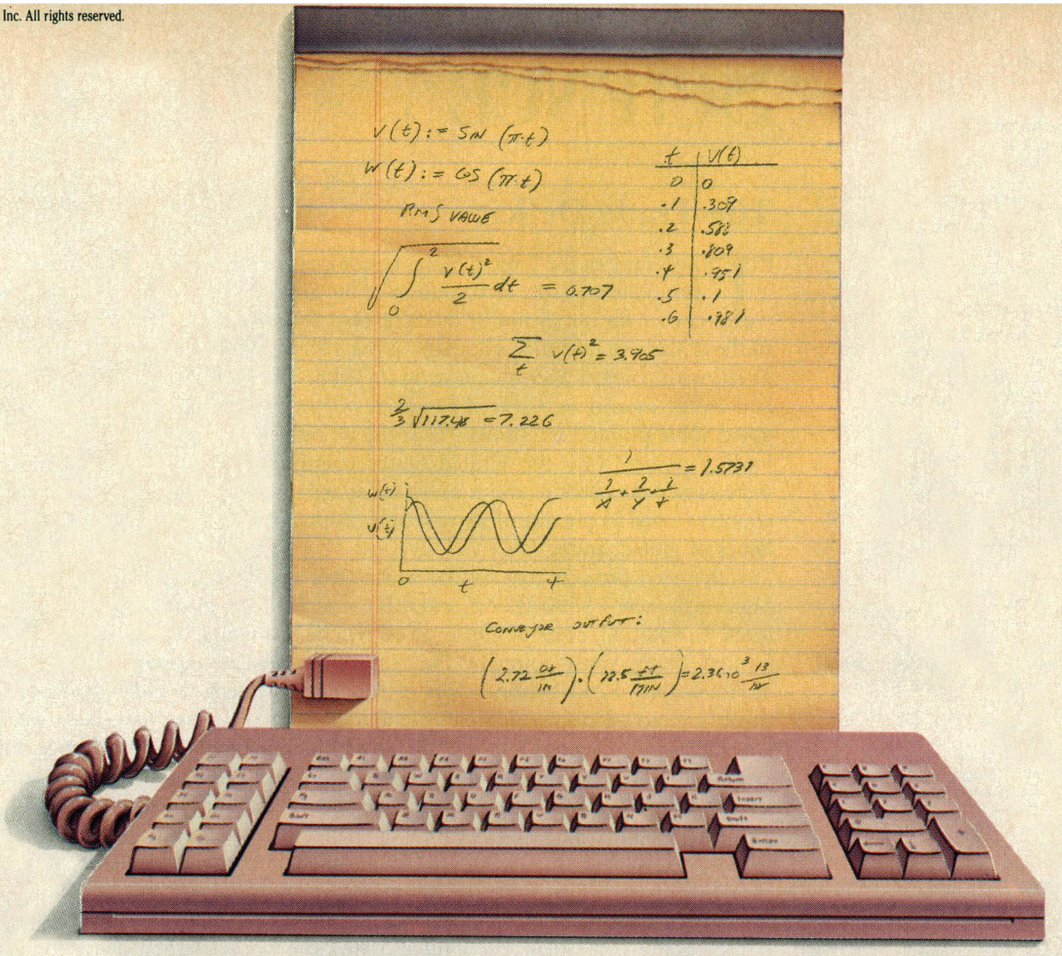
Bergsten projects that by the end of this decade the net indebtedness of the United States will exceed $500 billion, and this country will be paying huge sums in debt-servicing costs. In addition, costs of imported oil will be mounting. To achieve balance by 1990, the United States must improve the rest of its annual current-account performance by approximately $200 billion. Most of this improvement would have to come in trade in manufactured products, an area of competition in which we have been weak lately. Japan would have to accept a decline of $100 billion in its annual trade balance. Japan and West Germany, which are big exporters, have been under political pressure to stimulate internal consumption. But will they? In particular, Japan, defeated in World War II, is winning the global economic conflict. Why should it change its way of doing business? Japan is deficient in natural resources and must manufacture and export to survive. Its manufacturing capacity is designed to serve an international market, not a domestic one.

Bergsten points out an important psychological factor in the relations between the United States and Japan. The United States, the world's largest debtor, continues to think like a "creditor—dispensing advice to the rest of the world (particularly the other, largely Latin American debtors) while its own budget remains in huge deficit. Japan is the world's largest creditor, but continues to think of itself as a debtor, seeing itself as a vulnerable island nation."

In a talk on Japanese science policy at the AAAS R&D Colloquium on 9 April 1987, Ezra F. Vogel provided insights that are relevant to estimates of future developments. He pointed out that the Japanese are not supermen, but that Westerners tend to underestimate what the Japanese can do when they are determined. They are a proud and strongly patriotic people who formulate important national goals and then work patiently to achieve them. They now have a goal to excel in scientific research, and they have the resources necessary to implement a major effort. They are likely to succeed and thus reinforce their technological capabilities.

In our relations with the Japanese, we set a pattern shortly after World War II that persists to this day. To facilitate economic recovery in Japan we did not object strenuously to protectionist measures on their part. They have been skillful in erecting intricate import control restrictions on all kinds of goods and services and especially those of high technology. We have not erected barriers of anywhere near comparable magnitude. One is reminded of a coin-flipping game in which "heads I win; tails you lose." The Japanese act as if the existence of these historic asymmetrical trade policies are guaranteed. They are skilled at promising changes and in avoiding substantive implementation. One of the side effects of the Japanese tactics is that these are being adopted by other countries such as Korea and Taiwan.

Aroused public opinion is likely ultimately to result in tough measures against Japan and other countries that have large trade surpluses with us. We should not identify them as scapegoats and count on protectionism as a sole cure for our problems. Rather, we should move vigorously to correct some of our deficiencies of foresight and policy such as in education, the chronic budget deficit, and the current practice of many companies to emphasize short-term goals over long-term objectives.—PHILIP H. ABELSON



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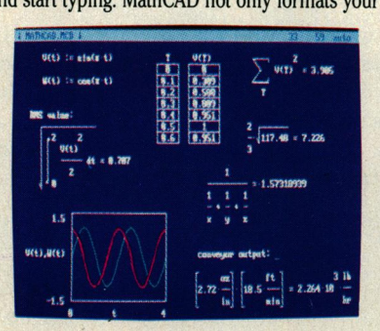

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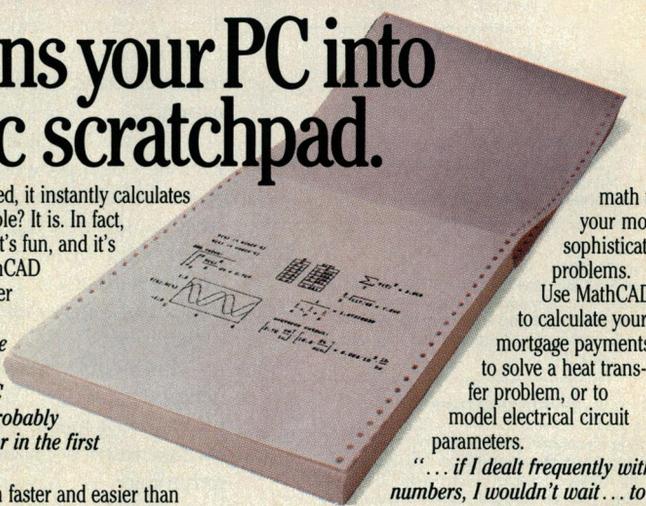

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an "extreme position," as Miller describes. I also disagree with Miller that the editorial board "was responsible for creating the manuscript."

It should be noted that the Library of Congress has now changed the credits on the volumes such that I am listed, correctly in my view, as the first name. However, I was notified by Lippincott on 15 April that I have been terminated as editor.

Michels is quoted in the 24 April issue of the *Duke Chronicle* as saying in regard to the credit given: "Everyone who has looked at the agreement who is competent, including the entire editorial board, thought it was fine." Since a federal judge and I do not concur, is this a reflection on our competence?

JESSE O. CAVENAR, JR.
Department of Psychiatry,
Duke University,
Durham, NC 27705

Stereo Viewing

In his letter of 6 February (p. 623) Donn C. Young explained how he viewed stereo. I would like to add my method, which may be easier.

Go to a toy store and buy a pair of binoculars (actually field glasses) for about $3. Remove both eyepieces and the platform on which they are attached. The objectives on my unit are 35 millimeters in diameter; the overall length of the tubes are 9.5 centimeters, and these dimensions may be somewhat critical. It is good if they also swivel. Now with the objectives closest to your eyes and open end near stereo images, it takes only a moment to find the right distance. Beautiful stereo will pop right out at you. Try it, it really works.

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Erratum: In Table 1 (p. 897) of the report "Recombinant interferon enhances monoclonal antibody–targeting of carcinoma lesions in vivo" by John W. Greiner *et al.* (20 Feb., p. 895), the first value under the heading "Plasma Hu-IFN-αA level (antiviral unit/ml)" should have been <30.

Erratum: Dalesbred sheep, which were tested by K. M. Kendrick and B. A. Baldwin (Reports, 24 Apr., p. 448), are a horned breed. They do not lack horns, as stated in This Week in Science (24 Apr., p. 371).

Erratum: In Eliot Marshall's article "California's debate on carcinogens" (News & Comment, 20 Mar., p. 1459), the last sentence of the third paragraph, which refers to fines to be imposed under Proposition 65, should have read, "Companies found guilty of violating it will be charged $2500 a day and legal costs." The article gave the incorrect figure of "$25,000 a day."