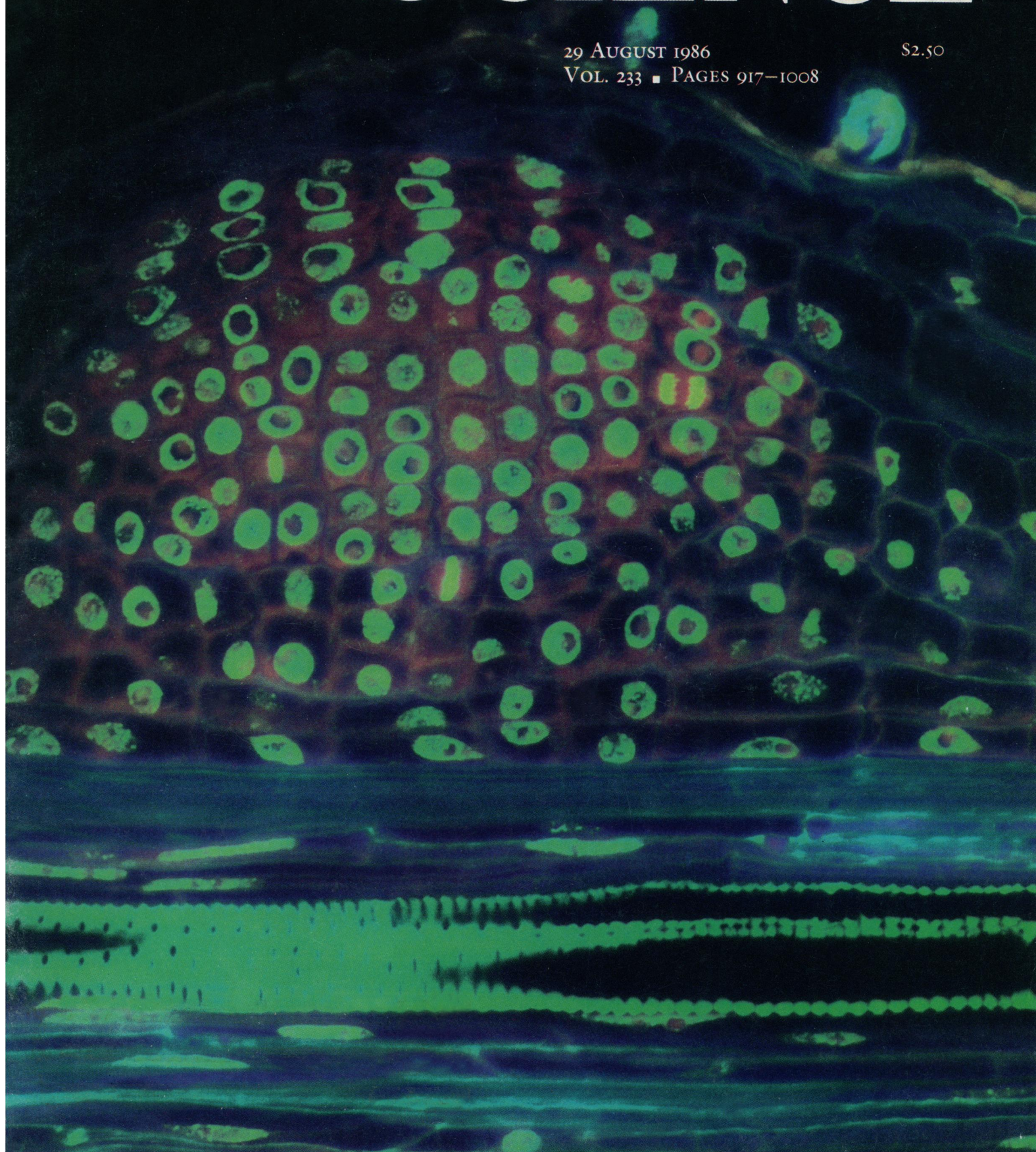


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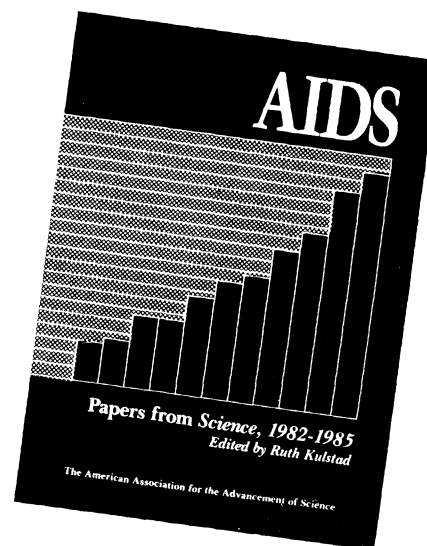


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Edited by
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Some of the most frequently cited papers on acquired immune deficiency syndrome (AIDS) that appeared in *Science* between August 1982 and September 1985 are included in this volume. Arranged chronologically, these 108 research papers and *Science* news reports show how far AIDS research has come and provide an indication of the directions in which it might go.

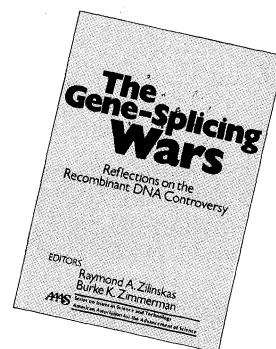
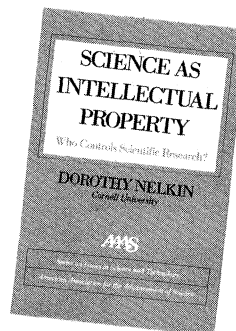
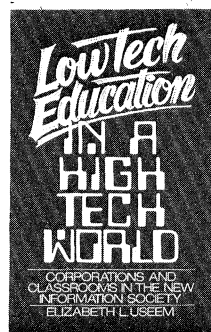
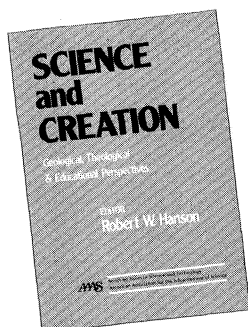
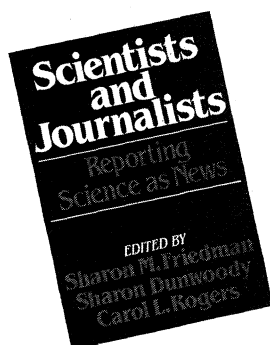
This fully indexed collection is useful not only for the experimental data and conclusions, but also as an excellent source of references to AIDS work in other major journals worldwide. An overview of research in AIDS to date is provided in the introduction by Dr. Myron Essex, chairman of the Department of Cancer Biology, Harvard University School of Public Health.

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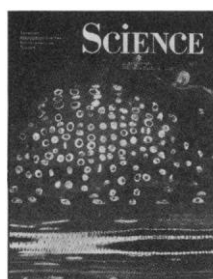
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COVER Emerging alfalfa root nodule, resulting from *Rhizobium meliloti* infection. The bacteria stimulate plant cortical mitoses, cause deformation of epidermal root hairs, and invade the root through an infection thread (blue-staining cell, upper right). The *R. meliloti nodABC* genes, required for all these events, are transcriptionally controlled by a plant-synthesized flavonoid, luteolin. See page 977. [Photograph by Mark Dudley and Sharon Long, Department of Biological Sciences, Stanford University, Stanford, CA 94305]

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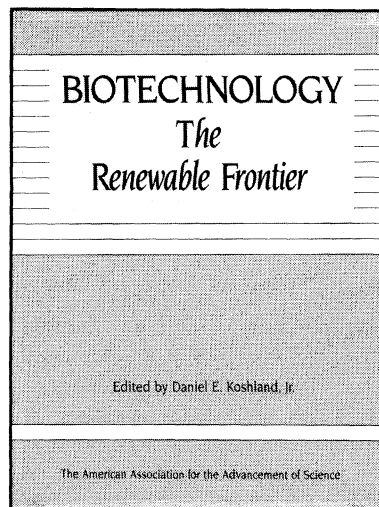
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The new frontiers in biology today are the frontiers of biotechnology tomorrow

BIOTECHNOLOGY: The Renewable Frontier

Edited by
Daniel E. Koshland, Jr.
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Discoveries in the modern biology laboratory are of great practical importance in industry today, as they have been in medicine for many years. This volume clearly illustrates the extraordinary cross-disciplinary aspects of modern biology and its tremendous impact on the future. Like its 1984 predecessor, this collection presents the latest and most important topics at the forefront of biological research. Compiled from papers in *Science*, 1985.

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This Week in SCIENCE

Colombian eruption

TWENTY-FIVE thousand people were killed the night of 13 November 1985 when volcanic mudflows (lahars) triggered by the explosive eruption of Nevado del Ruiz buried two towns (pages 961 and 964). One year before the disastrous eruption, precursory events were noted at the volcano, which had remained quiet for 140 years. Then, on 13 November, a small explosion followed by several larger explosions ejected a lake at the top of the mountain, produced a Plinian eruption column 27 kilometers above the volcano, and caused the mountain to spew forth dust, ash, cinders, pumice, other materials, and gases. A portion of the glacier atop the volcano broke up and melted, and several lahars formed, moved down the mountain, and inundated the towns. (The Roman author and orator, Pliny the Younger, first described this explosive type of volcano in his account of the events that occurred when the cities of Pompeii, Herculaneum, and Stabiae were destroyed by Vesuvius in the year 79.) Naranjo *et al.* recount the sequence of events at Nevado del Ruiz and Williams *et al.* report on the geochemistry at the summit, in the lahars, and elsewhere before and after the eruption. Because new magma apparently entered the volcano some months before the eruption and has been degassing but has not erupted, and because 90% of the glacier remains at the summit, continued volcanic activity could result in the formation of new lahars. Nevado del Ruiz is thus being watched so that new eruptions can be predicted and destruction and loss of life can be limited.

Insulin action

How does insulin work (page 967)? Saltiel *et al.* followed incorporation of radioactively labeled precursors into cellular components of mouse myocytes, compared effects with those observed in other systems, and propose a molecular mechanism for insulin's action. When insulin

binds to a cell surface receptor, it may stimulate an endogenous phospholipase C that cleaves a glycolipid in the membrane. The glycolipid is rapidly depleted, and three products are coordinately produced: the actions of diacylglycerol (an endogenous activator of protein kinase C) and two complex carbohydrates (regulators of cyclic adenosine monophosphate phosphodiesterase activity) then may cause the metabolic changes that regularly occur in response to insulin.

Signals of symbiosis

THE soil bacterium *Rhizobium meliloti* lives in association with alfalfa (cover); each derives nutritional benefit from the relationship (page 977). Early in their interaction, plants and bacteria are thought to send signals to each other; their interactions make possible bacterial invasion through root hairs, formation of nodules on the roots, and nitrogen fixation (mediated by the bacteria). Peters *et al.* show that luteolin, a compound released by the plants, stimulates *Rhizobium* nodulation genes. When these genes are activated, the earliest known changes in the plant cortical cell division and root hair curling occur. Luteolin is a widespread plant metabolite chemically related to pigments and to compounds involved in plant defenses.

Survivors of Permian extinction

NINETY-SIX percent of marine invertebrate species (and 50% of all marine families) may have been extinguished in the mass extinction at the end of the Permian period (245 million years ago), but conodont species diversity was somehow spared (page 984). Conodonts—toothlike microfossils thought to be remnants of ancient soft-bodied free-swimming invertebrates—showed as much diversity before as after the extinction; only their abundance diminished. Clark *et al.* studied conodonts in the Changxing

section of China where one of the most complete sequences of Permian/Triassic (P/Tr) boundary clay, rocks, and fossils is found. It is from this region that many of the data characterizing the P/Tr extinction have been obtained. Low concentration of iridium in the layers indicates that impact of an extraterrestrial object (bringing iridium to the earth) is unlikely to have caused the P/Tr extinction; other elemental analyses suggest that a major volcanic eruption may have been responsible for killing organisms living in the region's sea. What shielded the conodonts from extinction is not known.

Sperm and EGF

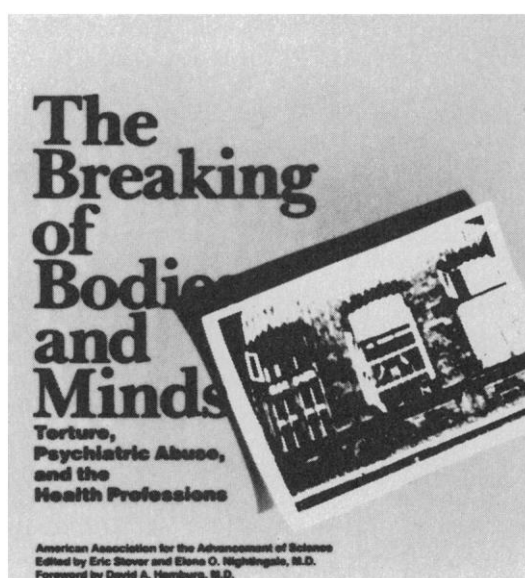
EPIDERMAL growth factor (EGF) promotes sperm production in male mice, probably by stimulating the meiotic phase of spermatogenesis (page 975). Sperm are produced in the testis in a process that can be divided into three major stages: during the mitotic phase (8 days), spermatogonia divide to form primary spermatocytes; in the meiotic phase (13 days), primary spermatocytes form round spermatids; and during spermiogenesis (13.5 days), round spermatids are transformed into sperm. Tsutsumi *et al.* removed the EGF-producing submandibular glands of mice. Within 3 weeks, EGF was not detectable in plasma; by 4 weeks, spermatids in the testis and mature sperm in the epididymis (which stores sperm until ejaculation) decreased by about 50%; primary spermatocytes in the testis increased by about 20%. EGF injections restored sperm counts to normal. A physiologic function for EGF (an important growth factor for various mammalian cells in culture) was previously unknown. Its role in male reproductive functioning is supported by several other observations: EGF production is stimulated by androgens, and it is produced in increasing amounts in male mice up to 7 weeks of age in parallel with sexual maturation. It is possible that EGF abnormalities may be involved in some cases of male infertility.

The Breaking of Bodies and Minds

Torture, Psychiatric Abuse, and the Health Professions

A documentation of systematic use and effects of physical and mental torture throughout the world

Edited by Eric Stover
and Elena O. Nightingale
With a Foreword by
David A. Hamburg



This eye-opening book brings together for the first time writings on the role of medical personnel in cases of torture and psychiatric abuse. Through analyses and case histories, psychiatrists and other health care professionals, political scientists, ethicists, and other writers discuss the systematic use and effects of physical and mental torture in the Soviet Union, Latin America, and other parts of the world.

The book also details the complicity of an alarming number of medical personnel in torture and psychiatric abuse and examines the ways in which governments use a medical rationale to seek legitimacy for human destruction. Finally, it describes efforts by medical and other associations both to combat offensive practices and treat victims.

The Breaking of Bodies and Minds is important reading for anyone concerned with the preservation of basic human rights.

1985 352 pages

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A Changing China

One of the many initiatives fostered by William Carey, Executive Officer of AAAS, has led to friendly interactions with the Peoples' Republic of China (PRC). There have been visits of delegations from the respective countries and symposia with presentations by Chinese at AAAS annual meetings including the recent one in Philadelphia. These contacts have provided perspectives on enormous changes that have occurred and are in process in the PRC. Were recent progress to continue, the country might emerge as a leading world power early in the next century.

To reach such a status, China has a long way to go. In 1984, its gross national product was about \$450 billion, corresponding to an annual income per capita of about \$450. In addition, the country must recover from nearly 30 years of mismanagement under the leadership of Chairman Mao. Mao's lifelong ambition was to serve the people, but his economic and political leadership led to less food in the stomach of the average Chinese; per capita grain consumption in 1976 was less than in 1952. This was occurring at a time when grain yields elsewhere were increasing dramatically. The ruling party's ideas about the class struggle led it to exalt and to give favored treatment to workers, peasants, and soldiers. Intellectuals and technocrats were called "the stinking ninth class." During the Cultural Revolution of 1966–1976, many of the best scientists were sent to do menial labor in the countryside. When a delegation from AAAS visited China in 1978, the scientists had been brought back to the universities, but they seemed still in a daze and uncertain about what the future might bring. The years 1966–1976 were also times of near total loss for the production of new scientists and engineers.

But after the death of Mao in 1976, rigid egalitarian policies were gradually modified. Reforms were introduced first in the rural areas. The commune system was modified and individual initiative encouraged. From 1979 to 1982, agricultural production increased at an annual rate of 7.5 percent. In 1984, the production value generated by small rural firms exceeded \$46.5 billion, an increase of 24 percent over 1983, and accounted for 40 percent of the national agricultural output value. In business egalitarianism is also in the process of abandonment while private initiative is being permitted. Most units are still owned by the state, but managers are rewarded for good performance and workers in efficient plants get higher wages.

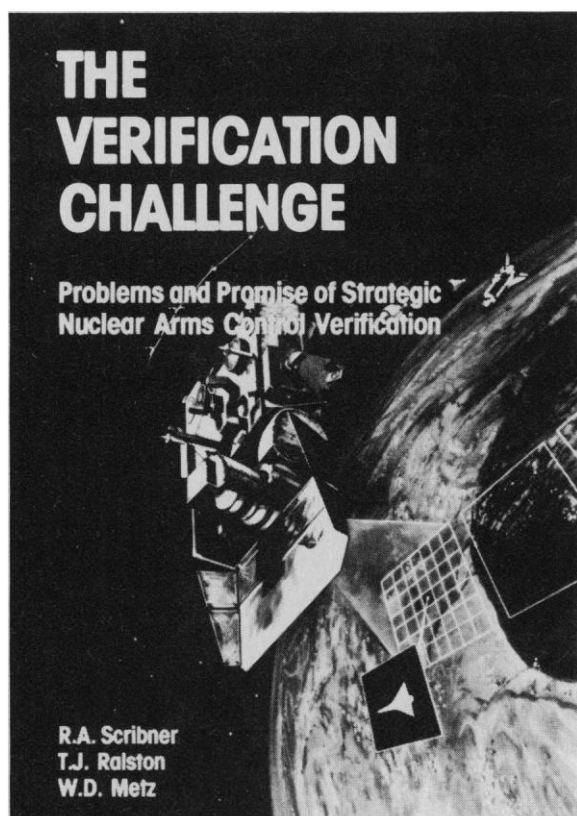
The effect of these and related measures has been to improve industrial production. Annual percentage increases were: in 1981, 3.5; in 1982, 7.8; in 1983, 10.5; in 1984, 13.6; and in 1985, 17.7. In the first half of 1985, production was at an even higher rate, and authorities found it necessary to slow the economy somewhat.

In view of the zigzags that have occurred in Chinese political and economic policies, the future is unpredictable. However, leaders of the Chinese Communist party have repeatedly stated that in the future, their country must effectively utilize science and technology. Fundamental basic research is to be supported by a science foundation, but principal emphasis is to be on applied science and technology. To help make up for the shortfall in expertise caused by the Cultural Revolution, China has sent about 30,000 students abroad, as well as more senior scholars.

The Chinese leadership is also completely aware of the relative competence of various nations in science and technology and seems bent on learning from the best. In consequence, the United States and Japan are most closely studied as possible models. The Soviet Union is not. In their drive to improve the status of their country, the Chinese wish to develop a system of their own, but it will resemble more closely the model of the West than that of Chairman Mao.

There is no doubt of the competence and high intellectual capacity of many Chinese. The question that remains is: Will China create and maintain a system that permits the potential of its citizens to be manifest?—PHILIP H. ABELSON

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