

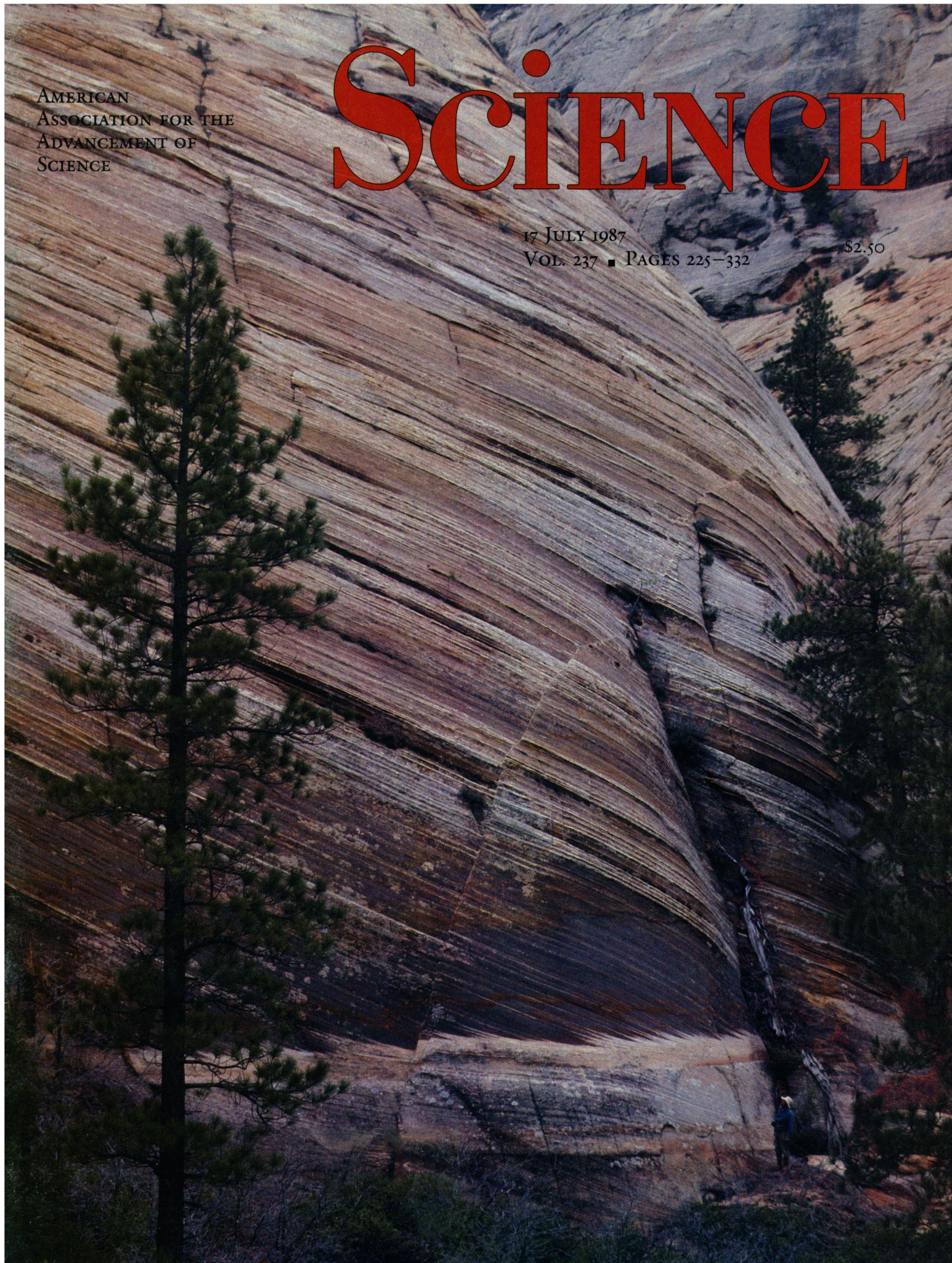
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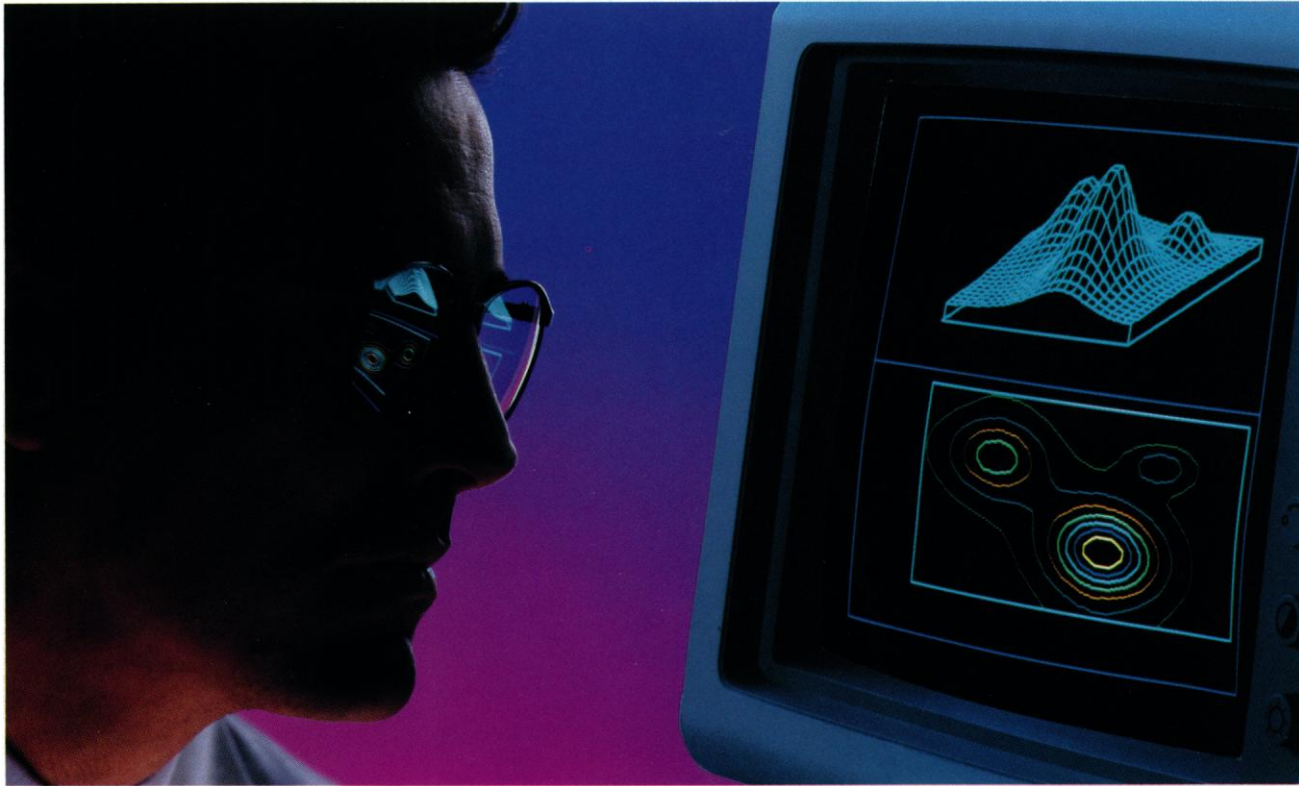
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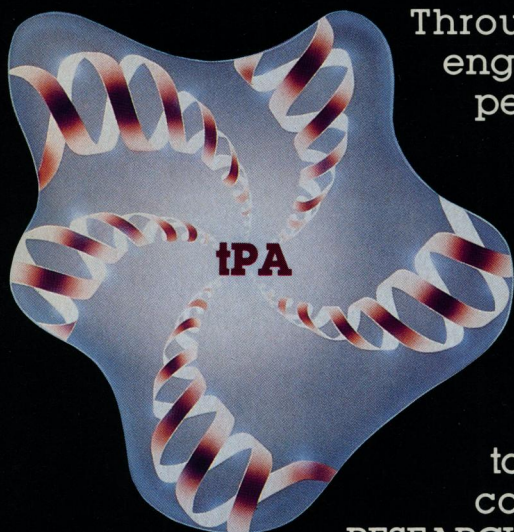
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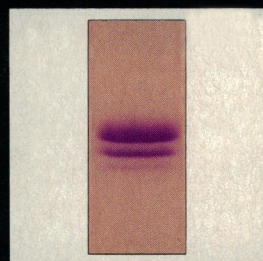
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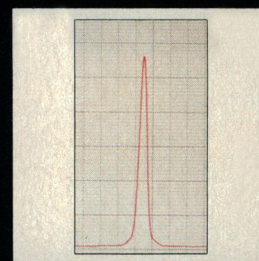
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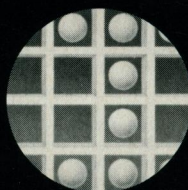
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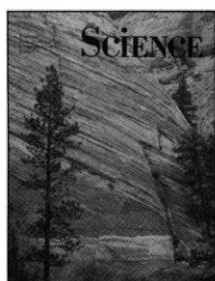
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COVER Cross-bedding in the Navajo sandstone in Zion National Park, Utah. These inclined beds formed when sand avalanched down the flank of a large dune. The dip direction of such beds commonly is used to infer paleotransport directions, but experiments demonstrate that bedforms often do not face toward the transport direction. See page 276. [David M. Rubin, U.S. Geological Survey, Menlo Park, CA 94025]

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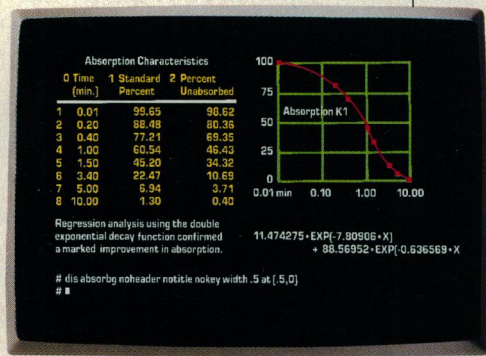
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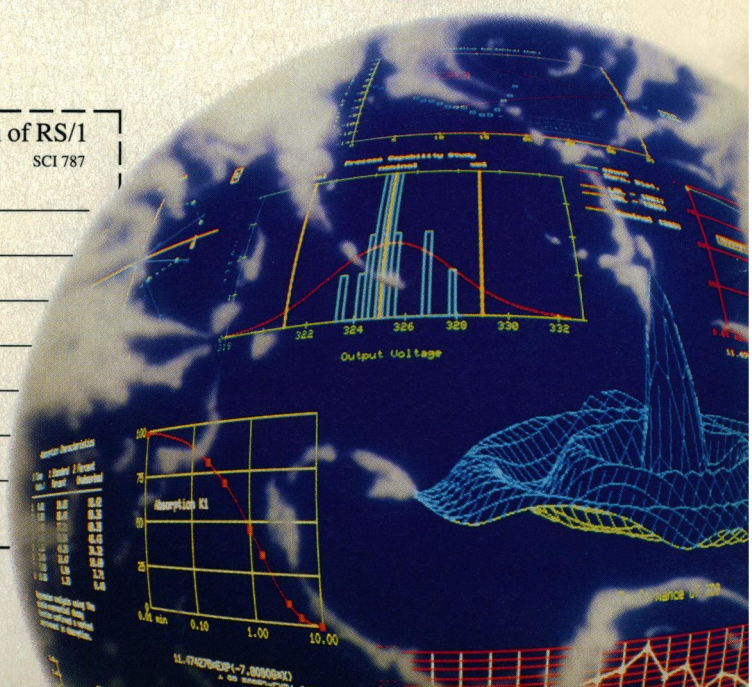
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This Week in SCIENCE

Transplants for diabetic mice

BLOOD sugar levels of diabetic mice can be restored to normal with transplanted islet of Langerhans cells (page 278). The transplants are accepted even across a major histocompatibility barrier if accompanied by antibody directed against the helper-inducer subset of T lymphocytes, and no other immunosuppression is required to ensure the long-term survival of the cells. Shizuru *et al.* used the compound streptozotocin to induce chemical diabetes in the mice; pancreatic islet cells were then transplanted from donors to the livers of diabetic mice, and a short course of specific antibody was given. Diabetic mice treated with antibody accepted the grafted cells and soon had normal blood sugar levels. Those that did not receive the antibody rejected the grafts, lost weight, and died within months. There were no spontaneous remissions among diabetic mice that received neither grafts nor antibody. While the exact mechanism has not been identified by which graft acceptance occurs in the presence of antibody, it appears that active suppression of helper-inducer T-cell functioning is involved. An approach of this sort, including transplants and suppressive antibodies, may have a clinical use for correcting sugar imbalances in human diabetics.

Genetics of mouse diabetes

INSULIN-DEPENDENT diabetes mellitus of humans is much like the disease that develops in nonobese diabetic (NOD) mice, and these mice are thus considered models in which to study the disease (page 286). An analysis of the genetic basis of susceptibility to the development of diabetes in NOD mice was carried out by Prochazka *et al.* They crossed NOD mice with mice of a closely related strain that does not develop diabetes (nonobese normal mice). The incidence of diabetes in the progeny of these crosses was consistent with a role for at least three genetic loci (three

unlinked autosomal recessive genes) in influencing disease susceptibility. One locus on mouse chromosome 17 is tightly linked to genes of the major histocompatibility complex. A second is on chromosome 9 near the region where two genetic markers, *Thy-1* and *Alp-1*, have previously been mapped. The chromosomal position of the third locus has not yet been determined. It is possible that multiple genes may similarly influence the susceptibility of humans to the development of insulin-dependent diabetes. Candidate chromosomes on which such genes might be found include human chromosome 6 which carries histocompatibility complex loci and human chromosome 11 which corresponds to mouse chromosome 9 and carries the human *Thy* and *Alp* markers.

Turtle evolution

SOME new details of turtle evolution are now available; they fill a large gap that has existed in the fossil record between the time of the most primitive fossils known (210 million years ago) and the time when features typical of modern turtles were first appearing (140 million years ago) (page 289). A fossil of a primitive aquatic turtle from the Early Jurassic (185 million years ago) was recently discovered in the Kayenta Formation in northeastern Arizona and is described by Gaffney *et al.* *Kayentachelys aprix* is a cryptodire, a member of one of the two groups of modern turtles (the other group is called pleurodire). *Kayentachelys aprix* has characteristic cryptodiran skull and shell features and the specific jaw mechanism—with a distinctive pulley-like structure that affects the direction of muscle action—specific to the cryptodiran group. It is the oldest known cryptodire and extends back the record of this group by 45 million years. Other features of *Kayentachelys aprix* are primitive and could be common to a shared ancestor of the cryptodires and the pleurodires. Thus the jaw mechanism, like the shell, appears to have been an early evolving feature of the turtles.

Growth factor affects mammary glands

TRANSFORMING growth factor- β (TGF- β) can inhibit growth and maturation of the ducts of developing mammary glands (page 291). TGF- β is a widely distributed growth factor for which a specific physiologic role is currently unknown. Its high-affinity receptors are also widely distributed in tissues. Silberstein and Daniel implanted into the mammary glands of young, virgin mice pellets of a copolymer from which TGF- β was slowly released. Growth of local ductal end buds was halted and elongation of the ducts ceased. When the pellets were removed, the ducts could resume elongation in a normal fashion. Thus it appears that TGF- β is either a negative growth regulator for the developing mammary gland or a peptide that imitates the action of a naturally occurring regulator.

Nile tributary

A region of the Sahara Desert that currently receives only 25 millimeters of rain annually was drained at one time by a large Nile tributary called Wadi Howar; the region had numerous freshwater lakes and was populated by diverse species of animals including humans (page 298). Field research by Pachur and Kröpelin in the northern Sudan has established the existence of an extensive drainage system (2700 kilometers long) during the early Holocene (between 9500 and 4500 years ago) in this part of Africa. Mineral, sediment, fossil, and artifact (stone implements and pottery) evidence and clues in the geologic formations indicate that freshwater species of animals and algae as well as large wild savanna mammals, domestic cattle, and humans once inhabited the region and that Wadi Howar was a major tributary of the Nile. Abundant rainfall in the area during the early Holocene may have resulted from tropical influences from the south. Today the region's arid climate is attributed to complex effects of the easterly jet stream.

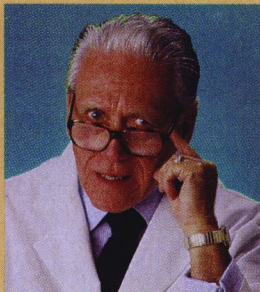
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The Pacific Century

The Pacific Rim—that vast stretch of nation-states along the eastern and western boundaries of the Pacific Ocean—makes up one of the most dynamic regions of the globe. Asia alone buys a third of our grain exports, a quarter of our chemical exports, almost a third of our civilian aircraft exports, and more than half of the lumber we send abroad. The Port of Los Angeles now exceeds the Port Authority of New York and New Jersey in terms of net income; in a few years, the annual tonnage shipped through Los Angeles and Long Beach harbors is expected to outstrip New York's as well.

But the potential is not just economic. As Professor Robert Scalapino of the University of California Berkeley's Institute of East Asian Studies put it, "More than one-half of the world's people live in the Asia-Pacific region. This vast area, moreover, contains a sizeable share of the world's natural resources. . . . Politically and strategically the world's major nations come into intimate contact in Asia, and here issues of global significance will be decided. In cultural and scientific exchanges as well, the center of gravity has unmistakably shifted to Asia. . . . As far as the United States is concerned, the 21st Century is its Pacific Century."

Another indicator that our Pacific Century has begun is our immigration statistics. The United States is experiencing a wave of immigration that rivals that of the turn of the century. But this time, most of the newcomers arrive from Pacific Rim countries: Mexico, Central and South America, and Asia.

These trends are influencing the United States in fundamental ways, and our colleges and universities need to play their parts in helping the country respond. Thus, it is reasonable to ask: What programs do our colleges and universities offer to prepare students for a world in which the influence of the Pacific nations will be an increasingly dominant force? What are we doing to give our students a more complete understanding of the nations to our south, to our west, and to our north?

The answer is, not much, at least compared with the scope and scale of our possibilities and the region of the world we seek to comprehend. And this is true even in the ethnically diverse San Francisco Bay area, for example, where one study found that only half the local colleges and universities surveyed require their students to study a foreign language or to take courses in international education. The result, the study concluded, is that it is entirely possible for undergraduates to complete their education with "no significant preparation for working in the international marketplace," or, for that matter, for comprehending the interdependency of nations.

In contrast to our spotty record in learning about different peoples and cultures, other countries are making an effort to learn about us. For example, there are some 10,000 persons representing Japanese business interests in the United States, most of whom speak fluent English, many of whom have studied at American universities. Compare their ability to function in a foreign society with that of their 600 American counterparts in Japan, most of whom speak little or no Japanese and are often unfamiliar with Japanese customs. In 1985–86 approximately 344,000 foreign students enrolled in American universities, compared with an estimated 50,000 U.S. students studying abroad. This is a real imbalance in trade.

What should we do to get ready for the Pacific Century? First, we should do more to acquaint the interested and the motivated with the wealth of scholarly resources related to the Pacific Rim that are already available. Second, our universities should expand their teaching, research, and public service programs concerned with the Pacific Rim. Third, we need to increase the number of professionals in business, government, and education who understand the languages, the cultures, and the social, political, and economic structures of that region. In sum, the United States must better prepare itself to play a pivotal role in what will surely be one of the greatest centers of trade, migration, commerce, and cultural exchange the world has ever known.—DAVID P. GARDNER, *President, University of California, Berkeley, CA 94720*

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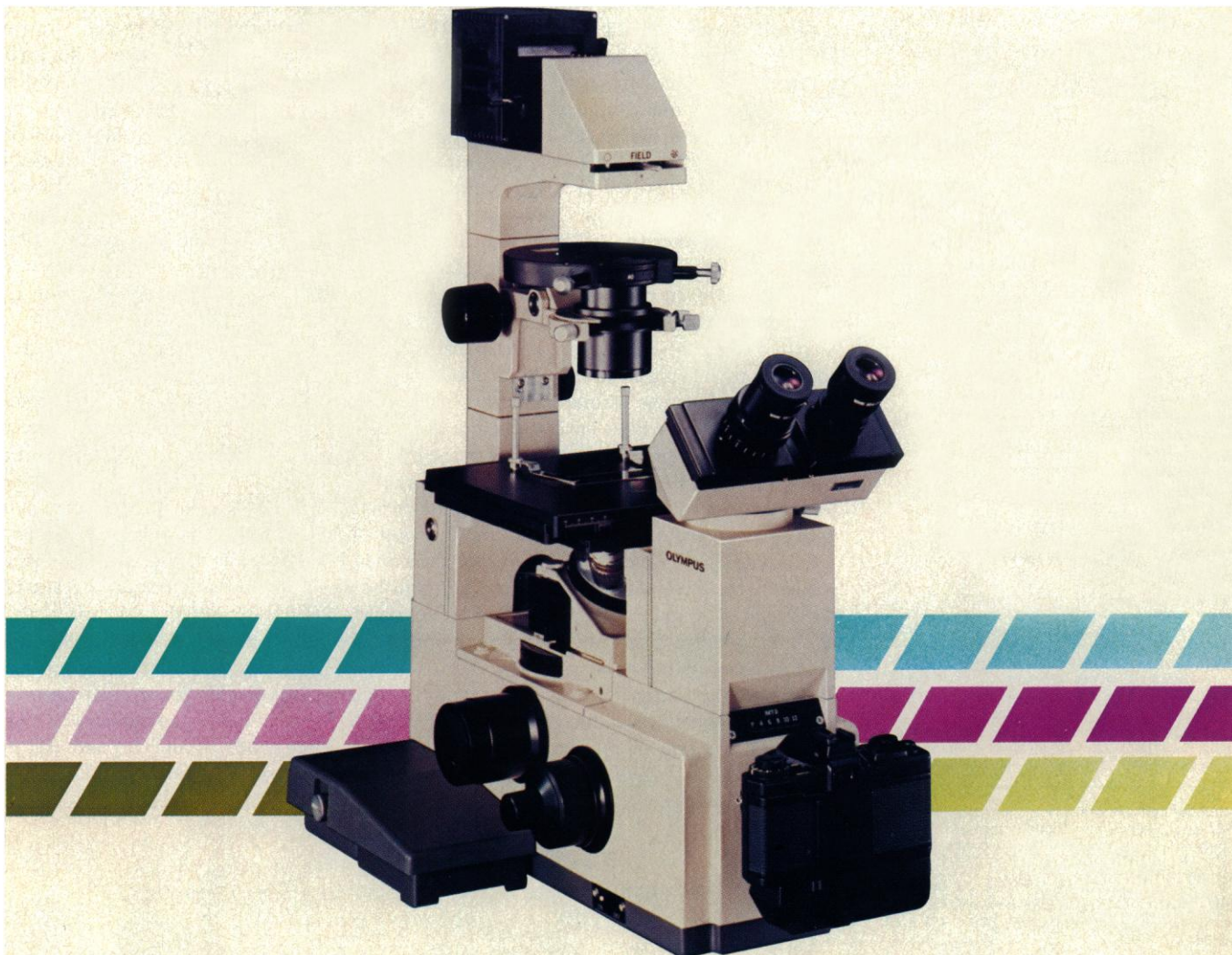
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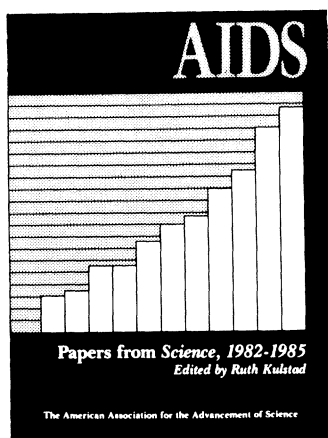
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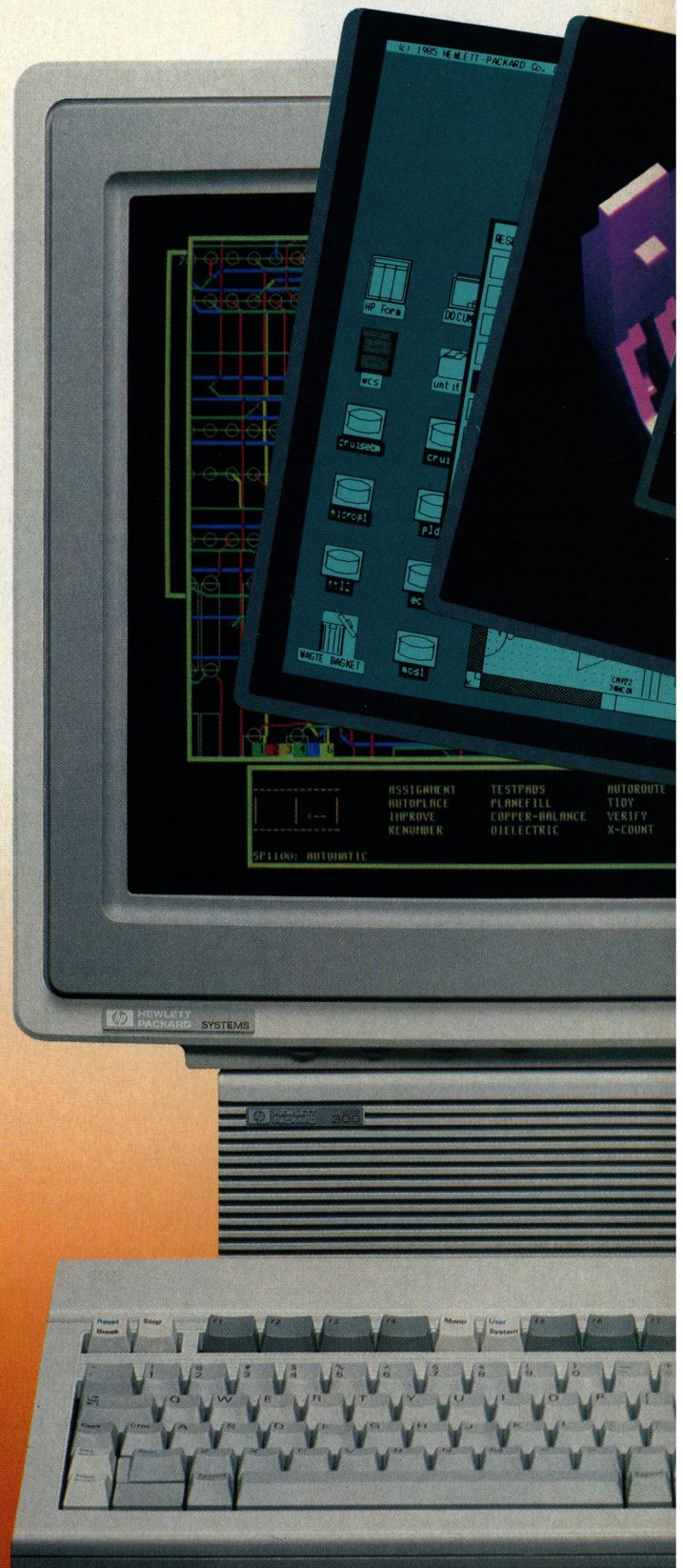
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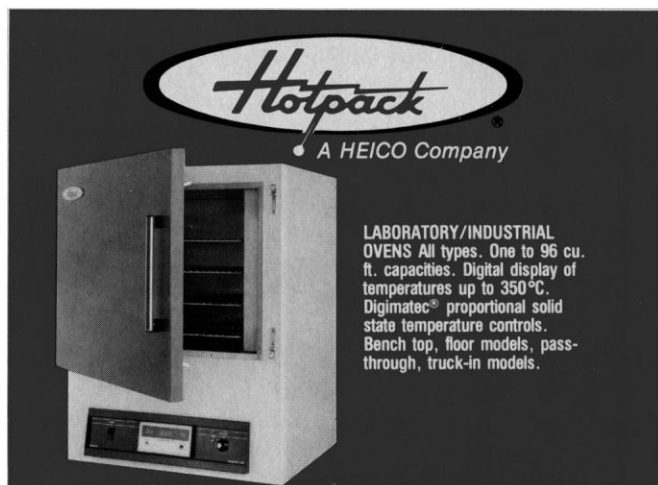
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