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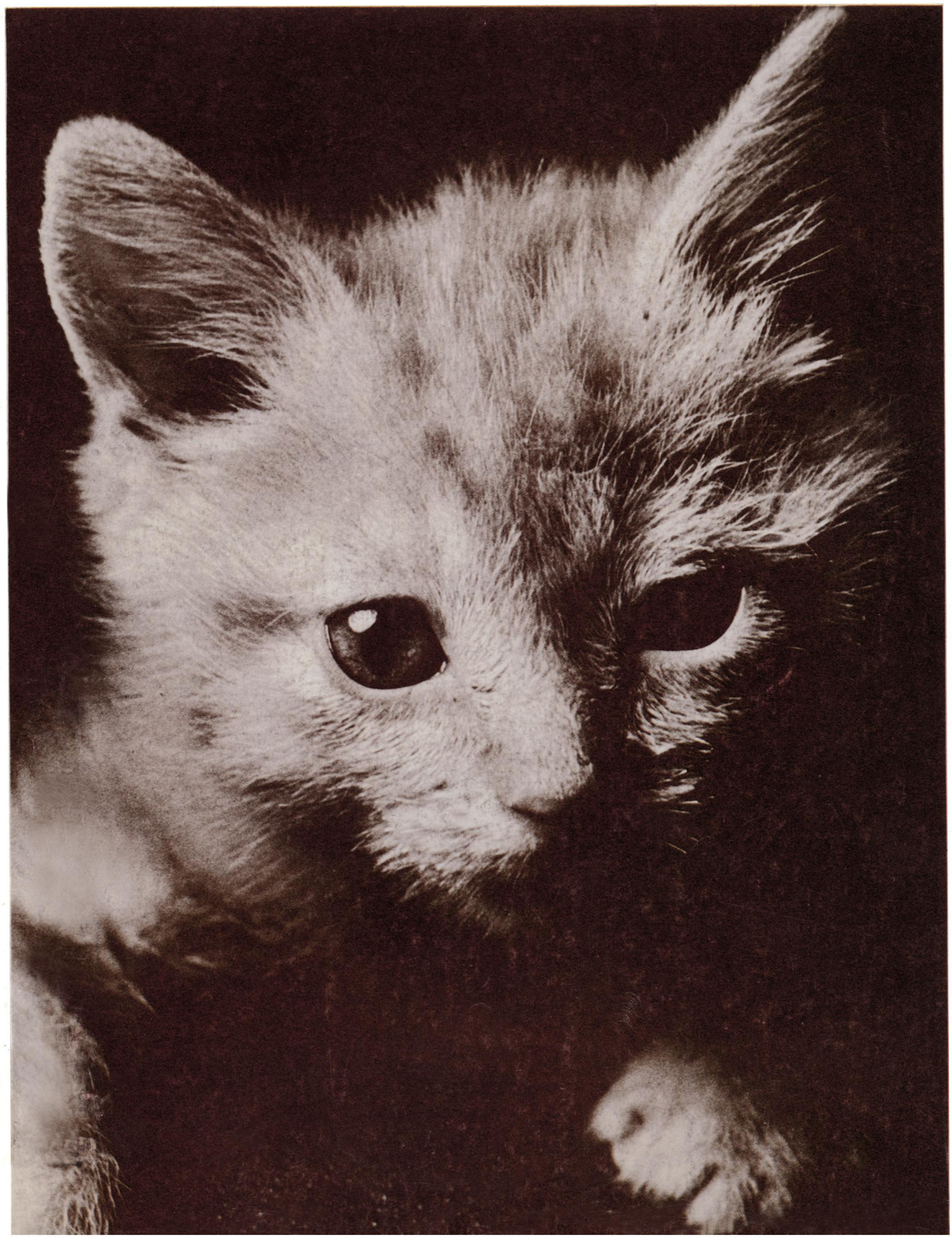

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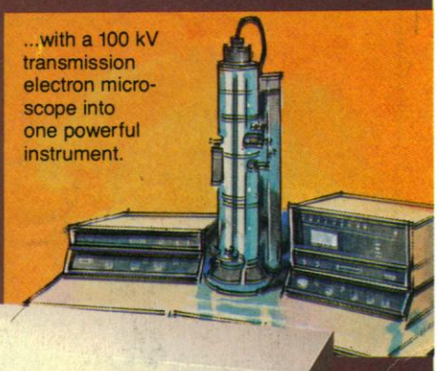

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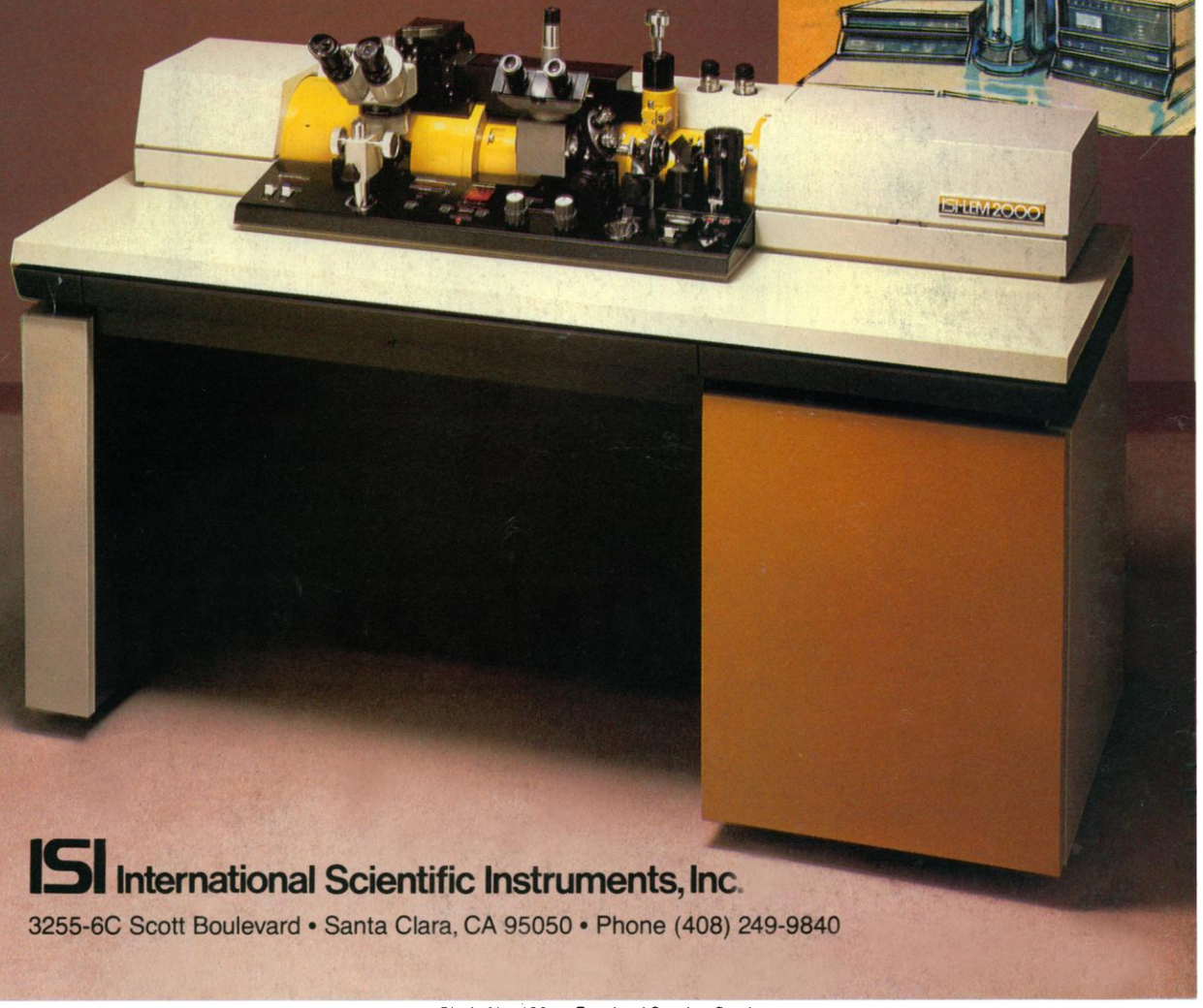

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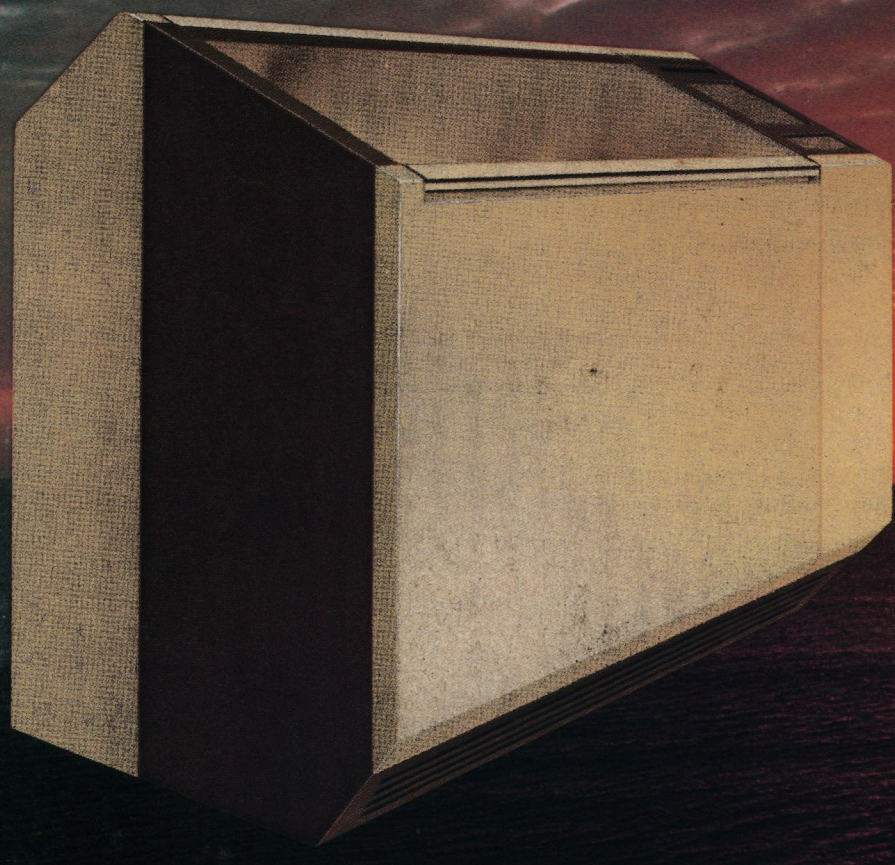

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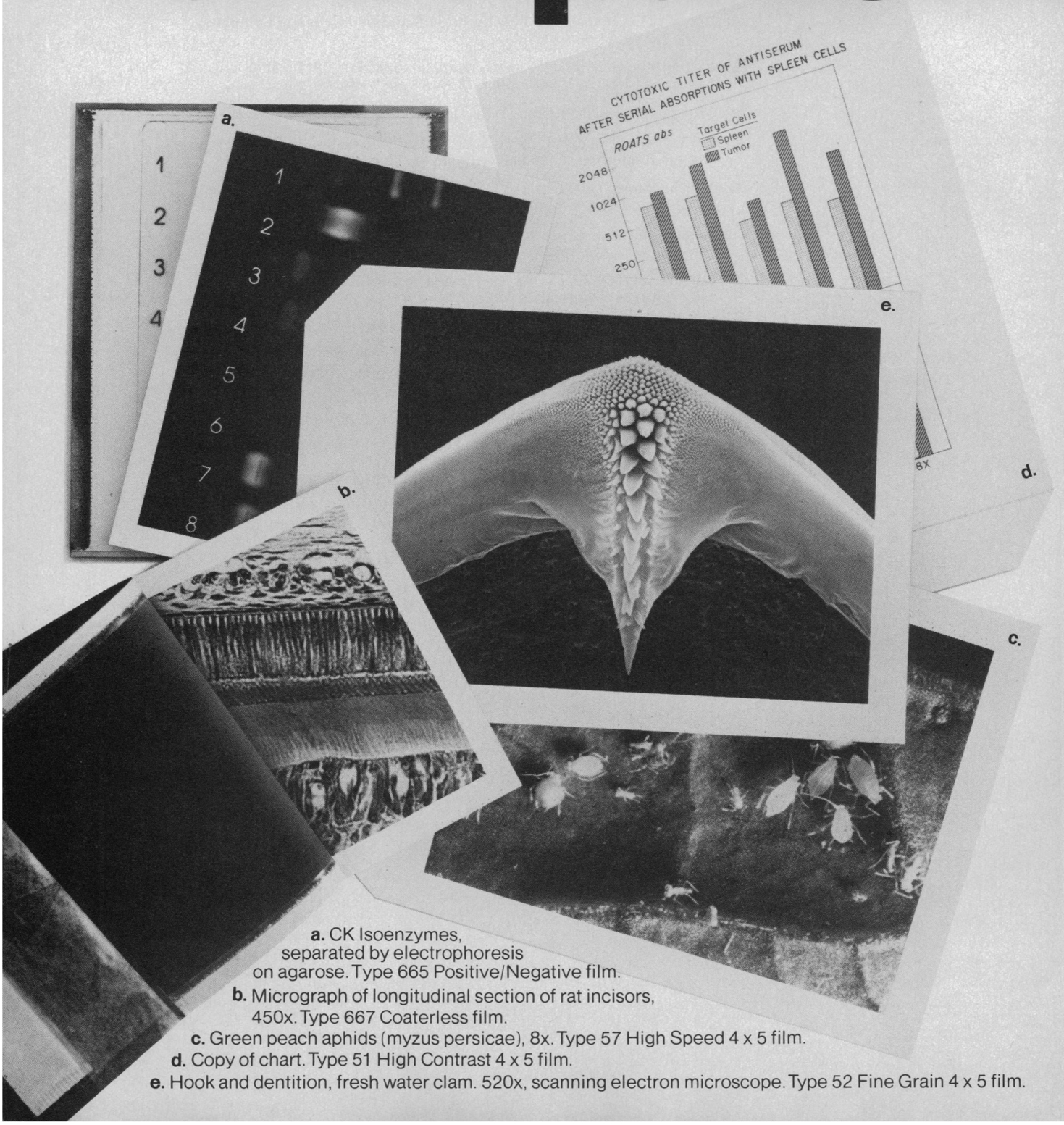
COVER

Kitten with left eye immobilized by section of the cranial nerves serving the ocular muscles. Studies with animals in which the eye is immobilized either before or after exposure in light reveal the role of eye movement in developing visual-motor coordination. See page 1321. [Charles G. Taylor, Newton, Massachusetts]

Research for impatient



a. CK Isoenzymes, separated by electrophoresis on agarose. Type 665 Positive/Negative film.

b. Micrograph of longitudinal section of rat incisors, 450x. Type 667 Coaterless film.

c. Green peach aphids (myzus persicae), 8x. Type 57 High Speed 4 x 5 film.

d. Copy of chart. Type 51 High Contrast 4 x 5 film.

e. Hook and dentition, fresh water clam. 520x, scanning electron microscope. Type 52 Fine Grain 4 x 5 film.

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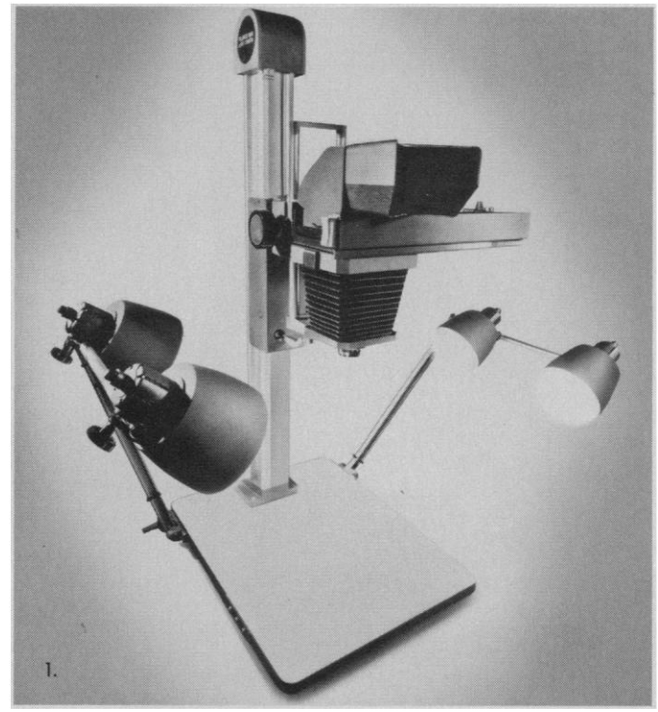
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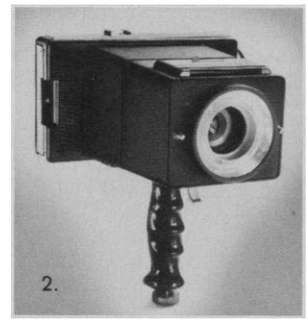
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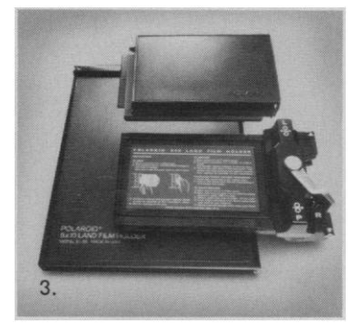
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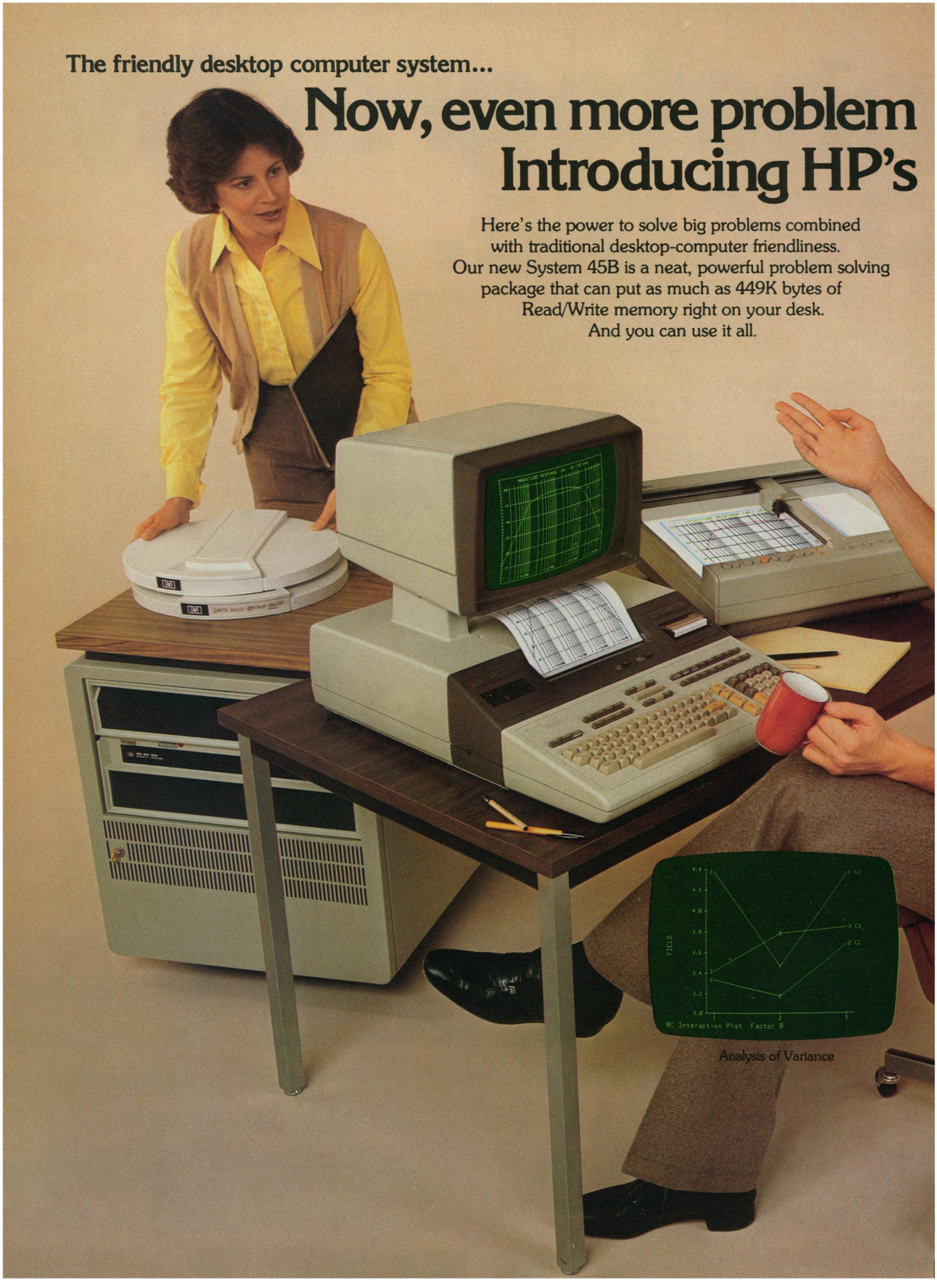

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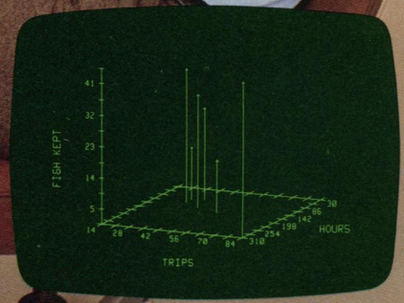
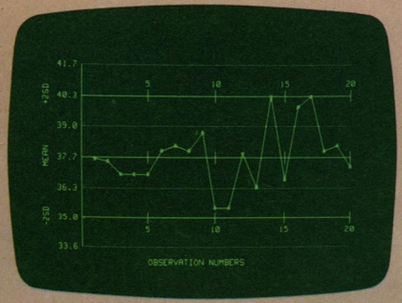
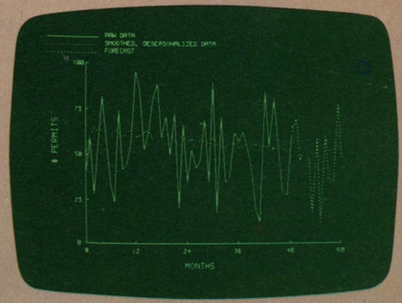


X Y Z Plot



Levey-Jennings Plot



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"Reactor Captains"

I wish to comment from my background as a member and chairman of the General Advisory Committee to the U.S. Atomic Energy Commission in the early 1960's. At that time the committee considered the human organizational aspect for safe operation of nuclear reactors and recommended the concept of "reactor captains," somewhat analogous in role to the captain of a ship. We were concerned lest reactor operations be left in the hands of operators with insufficient depth of knowledge and sense of responsibility and that unnecessary mistakes or carelessness might then occur, as apparently did at Three Mile Island.

The essential elements of the "reactor captain" concept include an appropriate professional education providing real understanding of the complexities of a nuclear reactor with government examinations and licensing, and clearly recognized responsibility with the corresponding full authority for the safe operation of the reactor. This concept also implies subordinate but comparably trained and licensed reactor officers, an accurate "log" of the condition and operation of the reactor, and so forth.

I still believe that this concept is appropriate, indeed necessary, and urge its renewed consideration.

KENNETH S. PITZER
Department of Chemistry,
University of California,
Berkeley 94720

Oceanographic Research: Sailing Vessels

In his review (18 May, p. 753) of Susan Schlee's book *On Almost Any Wind* (*1*), Dale C. Krause says that the notable sailing vessel *Atlantis*, built in 1931 for the Woods Hole Oceanographic Institution, was "the first American ship specially designed for oceanographic research." (Schlee did not say that.)

In 1907 *Alexander Agassiz* was designed and built in San Diego "especially for the purposes of" the West Coast marine station that was the forerunner of Scripps Institution of Oceanography. The 85-foot *Agassiz* was also a sailing vessel, with twin gasoline engines. She was built for use in the 12,000-square-mile area from Point Conception to the Mexican border and seaward to about 120 miles, which region included depths to 1100 fathoms. She was outfitted with "apparatus" designed in some cases by the hardy researchers of the oceanic areas of northern Europe: dredges, trawls, closing nets, current meters, and so forth (*1*). *Alexander Agassiz* served the institution for 10 years.

Identifying the first American ship designed for oceanographic research is complicated by the matter of defining such early research. Considerable effort went into designing two U.S. Navy "exploring vessels" for the U.S. Exploring Expedition of 1838–1842, but the ships were found to be too slow and so did not take part. In 1838 the Coast Survey schooner *Nautilus* was built specifically for surveying. So was the steamer *Blake* in 1874. Surveying was one of the oceanographic arts in those days, and a great deal of significant oceanography was carried out from *Blake*—some of it by Alexander Agassiz. In 1879 the coal-burning steamer *Fish Hawk*, complete with a floating fish hatchery, was built for the U.S. Fish Commission, headed by Spencer F. Baird. She was found quite suitable for dredging and trawling, at least in coastal waters (*2*).

A qualified claim can be made that *Alexander Agassiz* was the first American ship designed for oceanographic research by a nongovernmental institution. However, *Atlantis* certainly left a greater legacy to American oceanography.

ELIZABETH N. SHOR
Scripps Institution of Oceanography,
La Jolla, California 92093

References and Notes

1. W. E. Ritter, *Univ. California Publ. Zool.* **9**, 175 (1912).
2. S. B. Nelson, *Oceanographic Ships Fore and Aft* (Government Printing Office, Washington, D.C., 1971), pp. 10–19.

College Entrance Standards

City College has been defamed, this time in the editorial (p. 1199) in the 23 March issue of *Science* entitled "Can meritocracy in academe be saved?," written by John D. Palmer of the Department of Zoology of the University of Massachusetts in Amherst. In the interest of City College, and of truth, I would like to put the facts in perspective.

Palmer states that "the once great City College of New York, which for 54 years produced more graduates who went on to earn doctorates than all but one other American college, dropped all entrance standards in 1969." The first part of this sentence is correct. The second part is false.

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in public higher education, was adopted by City University, of which City College is a part, in 1970. And that policy, admission to City College and the other senior colleges of City University, required students to have a high school grade average higher than 80 percent, or to be in the upper half of the graduating class; otherwise students were admitted only to one of the community colleges of City University. This is a far cry from "dropping all entrance standards."

Recent studies by the Office of Institutional Research at City College show that academic *exit* standards at City College have not been lowered as a result of the open access policy. This conclusion is supported by some interesting statistics: (i) City College premed students rank 10 percent above the national average in acceptance to medical schools; (ii) City College engineering graduates enter the professions with salaries that are well above the national average; (iii) 100 percent of City's Nursing School graduates are employed; (iv) all graduates of our School for Biomedical Education are accepted into the third year of medical school after 4 years at City College—having passed Part I of the National Medical Boards; and (v) City College graduates constitute the largest percentage of architecture candidates who pass the Design and Site Planning Section of New York State National Licensing examination. High school averages of entering freshmen at City College have been on the *increase* since 1976. And, the mean grade point average at City College of New York *declined* between the years of 1966 and 1976. It is true that substantial numbers of City College's well-educated graduates entered the college in need of remediation and encouragement. But this is simply testimony to the fact that the American dream of upward mobility continues to be a reality at City College.

ROBERT E. MARSHAK
Office of the President, City College, City University of New York, New York 10031

Palmer states that "The Superintendent of Schools for Hawaii announced that a diploma should be given on attendance—only." Nothing could be farther from the truth.

The fact is that Hawaii's Department of Education has taken steps to ensure that the high school diploma represents demonstrated achievement. We have developed and adopted expectations for student performance from the primary grades on through high school, and graduation requirements have been upgraded to include demonstrated mastery of 15 identified essential competencies and an additional year each in science and mathematics.

When I became Superintendent of Education in January 1976, Hawaii's schools were, like others throughout the country, subject to increasing public criticism for an apparent lack of standards, as reflected in declining standardized test scores. Explanations advanced nationally for the decline in test scores undoubtedly were relevant to us, and I acknowledged that there may have been instances where students who attended class regularly, behaved themselves, and appeared to be trying were passed on from grade to grade and finally graduated without evidence that they had really learned anything in school. To acknowledge what *is*, however, is not to say what *should be*.

The decline in scores on the Stanford Achievement Test was halted statewide last year, and gains began to appear, but this is not our main goal. Instead, we are moving into a competency-based curriculum and developing criterion-referenced tests for various grade levels which eventually should enable us to report to the public exactly how well each student demonstrates achievement of the desired objectives.

While I take strong exception to the facts presented by Palmer, I concur with his view that "the most important task ahead for all educators is that of reinstating standards and reestablishing credibility with the public," and beyond that, of challenging every student to academic achievement commensurate with his or her ability.

CHARLES G. CLARK
Department of Education, State of Hawaii, Honolulu 96804

Palmer's editorial rightfully deplores the falling academic standards in American higher education. It seems unlikely that the massive forces of social egalitarianism, which are responsible in part at least for this degradation, will abate in the near future. However, the editorial may point toward a partial solution to the problem of restoring the public's confidence in college credentials and diplomas. Why not confer more than one kind of diploma: one to certify attendance, the others to certify academic achievement?

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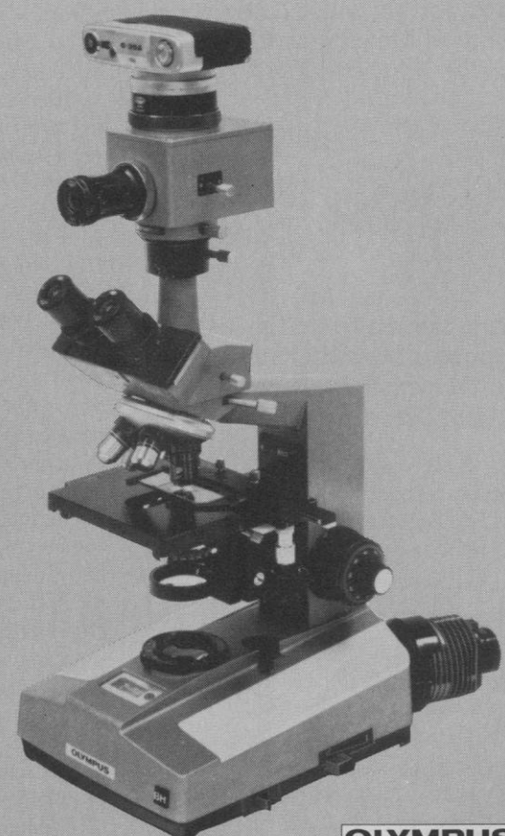

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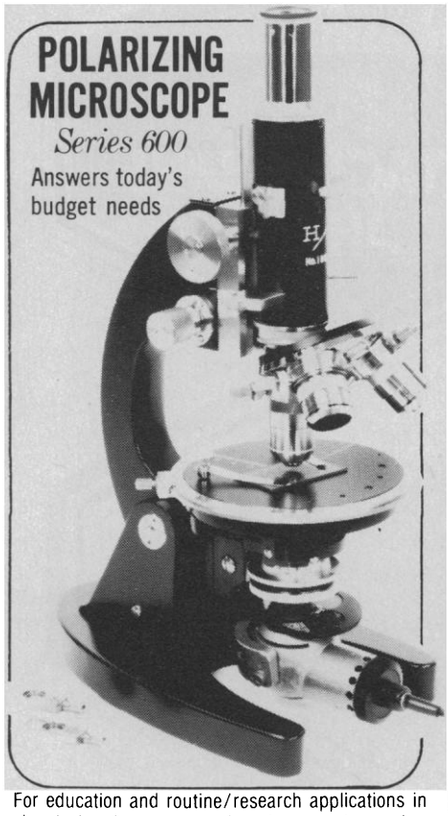

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The point of my editorial was that educators are not doing their jobs properly and that the public is fully aware of their shortcomings. In attempting to make this point I cited some examples. two of which precipitated the above comments. Note that neither of the "rebuttals" focuses on my issue; they are, instead, mainly defenses of a college, and a school system and its superintendent. This being the case, the present discussion is somewhat unfortunate since it may tend to divert attention away from the important point of my editorial.

City College President Marshak argues that the entrance standards were not dropped as far as I indicated, and that the exit standards were not lowered at all. I hope the latter is true, but I wonder if it could have been in a place where politics so clearly dictated educational policy. The "open access" standards outlined above by Marshak do not sound too bad but, in fact, the quality of the new entering freshman class was but a scrim of previous ones. The precipitous decline resulted from two causes: (i) some students who did not meet the new requirement were admitted anyway (*1*) and (ii) the New York high school system *graduates* many illiterate students. The, following summary of some of the changes that occurred will give a flavor of what the first few years under the new entrance standard were like.

The English Department had to hire 21 additional full-time faculty to teach basic writing (in fact, 70 percent of the teaching effort of the department had to be directed toward the teaching of fundamental writing), nearly 90 percent of City College's first-year students took some form of remedial instruction (*1*), and the City University of New York (CUNY) system as a whole had to spend an additional $30 million on remediation (*2*). Over the next 6 years, the CUNY budget jumped 55 percent, to a total of $585 million in 1975, and this increase appears to have been stimulus for the establishment of a new, tougher entrance standard: now an "eighth-grade level in both reading and math" would be required for entrance (*2*). Many of the better students and faculty left City College. Thus one of the best colleges in the country had been converted into an illusory, surrogate elementary school. Clearly, the 1970 entrance standards were far lower than Marshak admits above; and I suggest it was not I who "defamed" City College and its parent system, it was their Board of Education, the administration, and the others who lacked a sufficient conviction to academic excellence to withstand outside political pressures. A very informative and telling account of this era, entitled "How to kill a college" (*1*), was written by Theodore L. Gross, City College's dean of humanities.

Superintendent Clark's "rebuttal" leads the reader away from my claim; he focuses mainly on the improved student performance in Hawaii. This change is laudable. I am also pleased by the comments in his last paragraph because, unless the press previously misquoted him, his educational philosophy has improved too. The following is a direct quote from a United Press International story entitled "School chief OKs illiterates" (*3*):

> Charles G. Clark, Hawaii's new school superintendent, contends students who cannot read should be awarded high school diplomas anyway.
>
> Clark says a diploma should be based on attendance and not on academic achievement. He says some students "will never learn to read in spite of everything that has been done for them" and they should not be "punished" for their failures.

But all of the above is just a digression from the point of my original editorial. I chose to mention City College's drop in standards, its subsequent ascent to eighth-grade entrance requirements, and Clark's educational philosophy simply because they are blatant contradictions of the ideals of our profession. Actions and attitudes like these are all too common in modern education and are widely reported by the press. The result is a justified disillusionment in us by the public. While touting our accomplishments—as Marshak and Clark do above—may be one way to help return the respect we have lost, it is a far cry from remediation that our profession now requires. And that was the thrust of my original message: Let us return integrity to pedagogy, meritocracy to academe, and thus again produce educated men and women.

JOHN D. PALMER
Department of Zoology,
University of Massachusetts,
Amherst 01003

References

1. T. L. Gross, *Sat. Rev.*, 4 February 1978, p. 12.
2. *Time* **106**, 40 (29 December 1975).
3. Cape Cod *Standard-Times*, 28 May 1976.

Errata: In the issue of 13 April, in the News and Comment article, "Low-level radiation: A high-level concern" (p. 155), *Health Physics* was incorrectly referred to as the *Journal of Health Physics*. It was also stated that Oak Ridge Associated Universities runs Oak Ridge National Laboratory. In fact, the laboratory is run by the Union Carbide Corporation. In that same issue, in the Research News article, "Low-level radiation: Just how bad is it?" (p. 160), the name of the *American Journal of Public Health* was transmogrified to the *American Journal of Health Physics* the second time the journal was mentioned.

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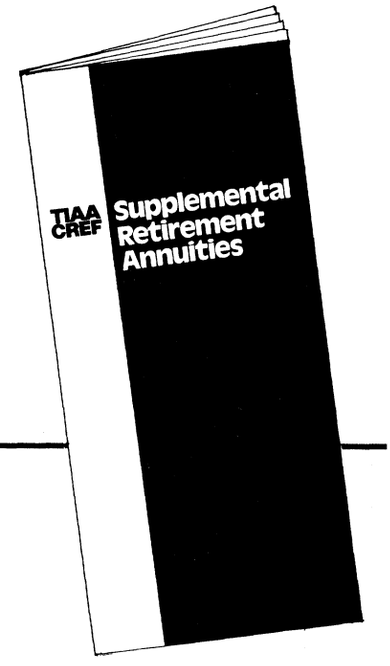

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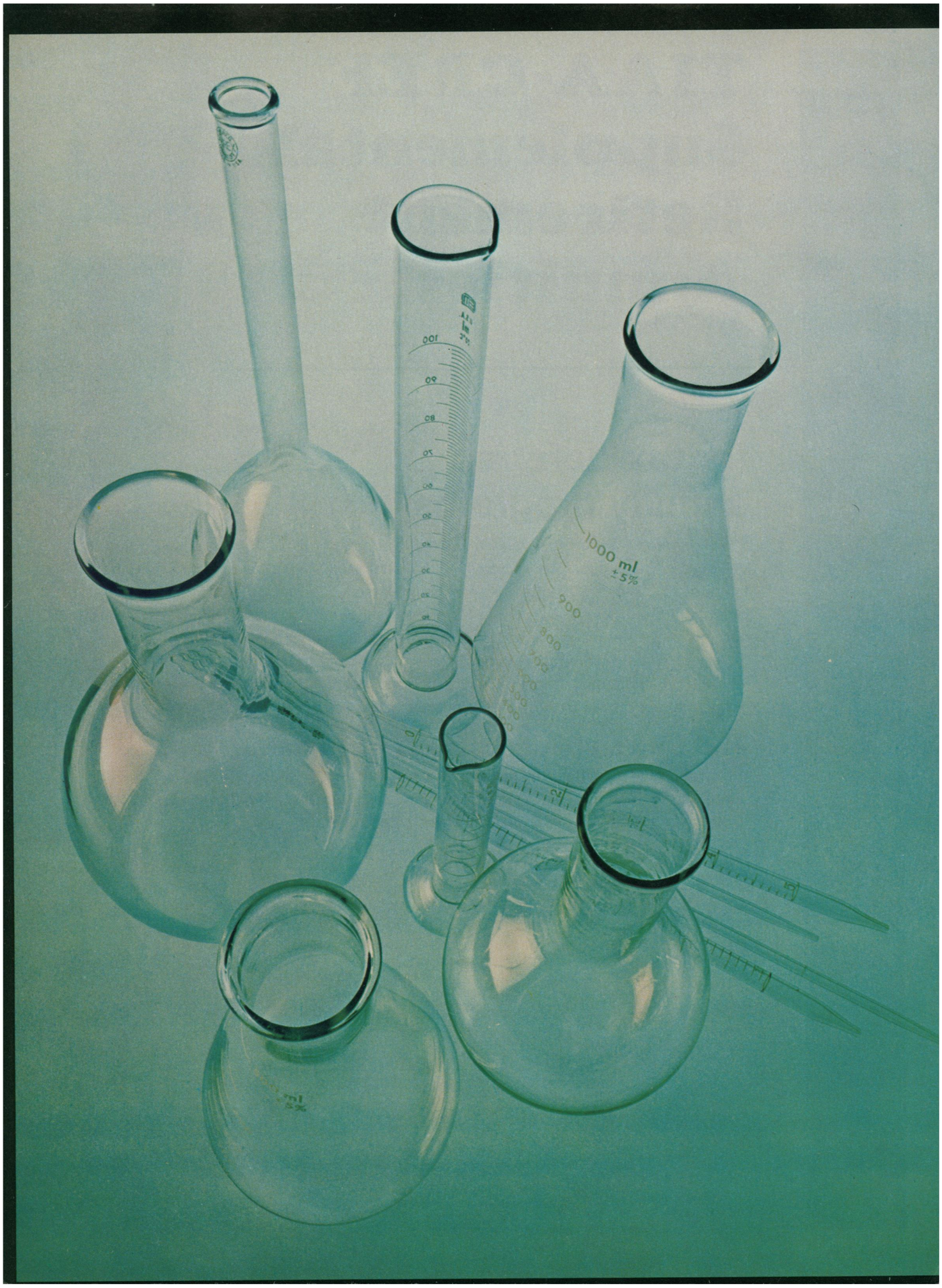
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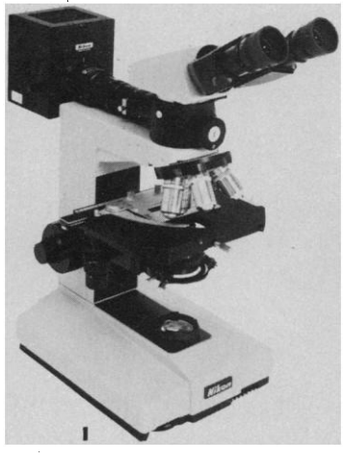

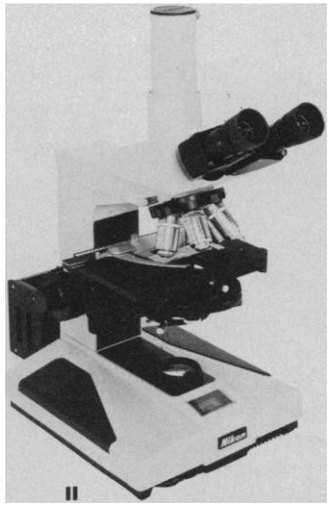

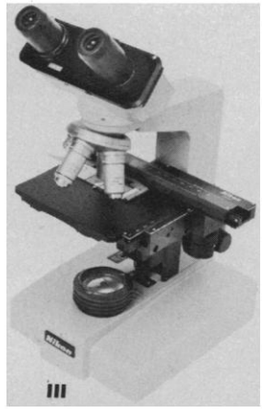

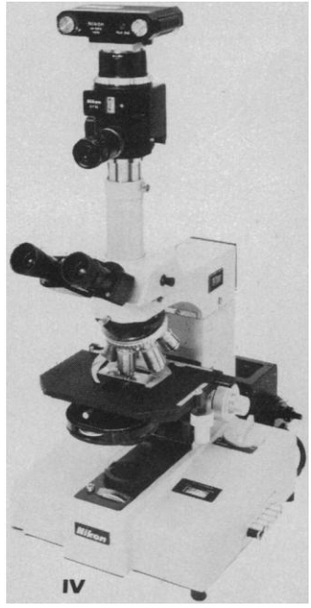

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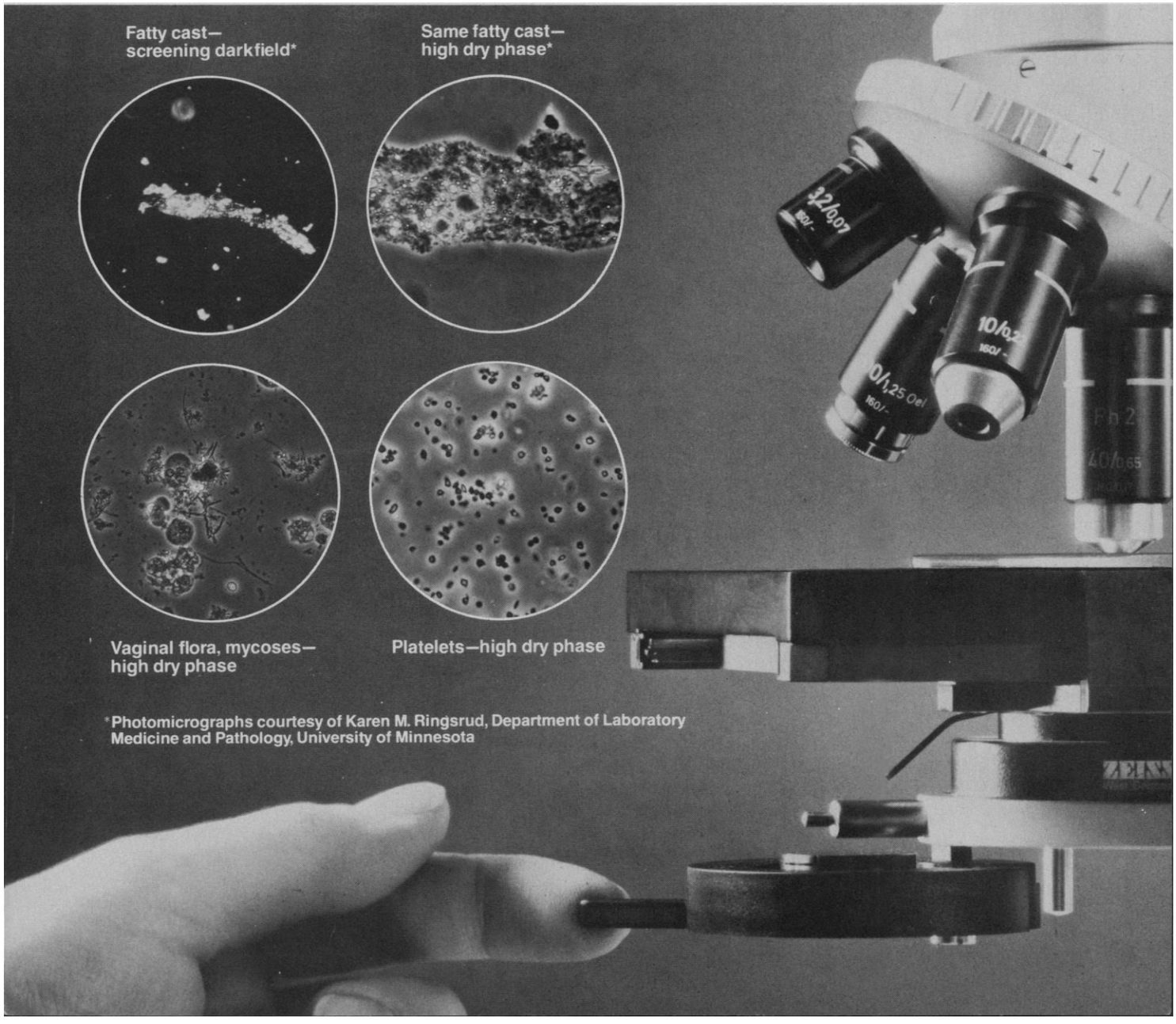

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Social Science Exchanges with China

Ten Chinese social scientists who recently toured the United States received unparalleled and enthusiastic attention from the social science community. Hundreds of distinguished social scientists disrupted their teaching and research schedules to meet with this delegation, eagerly attending National Academy programs, presenting briefings at the Social Science Research Council, and participating in carefully designed programs describing the substance and the institutions of the social sciences at leading research universities and institutes around the country. Foundations, universities, and research councils picked up the heavy tab for a month of seminars, lectures, tours, receptions, and dinners.

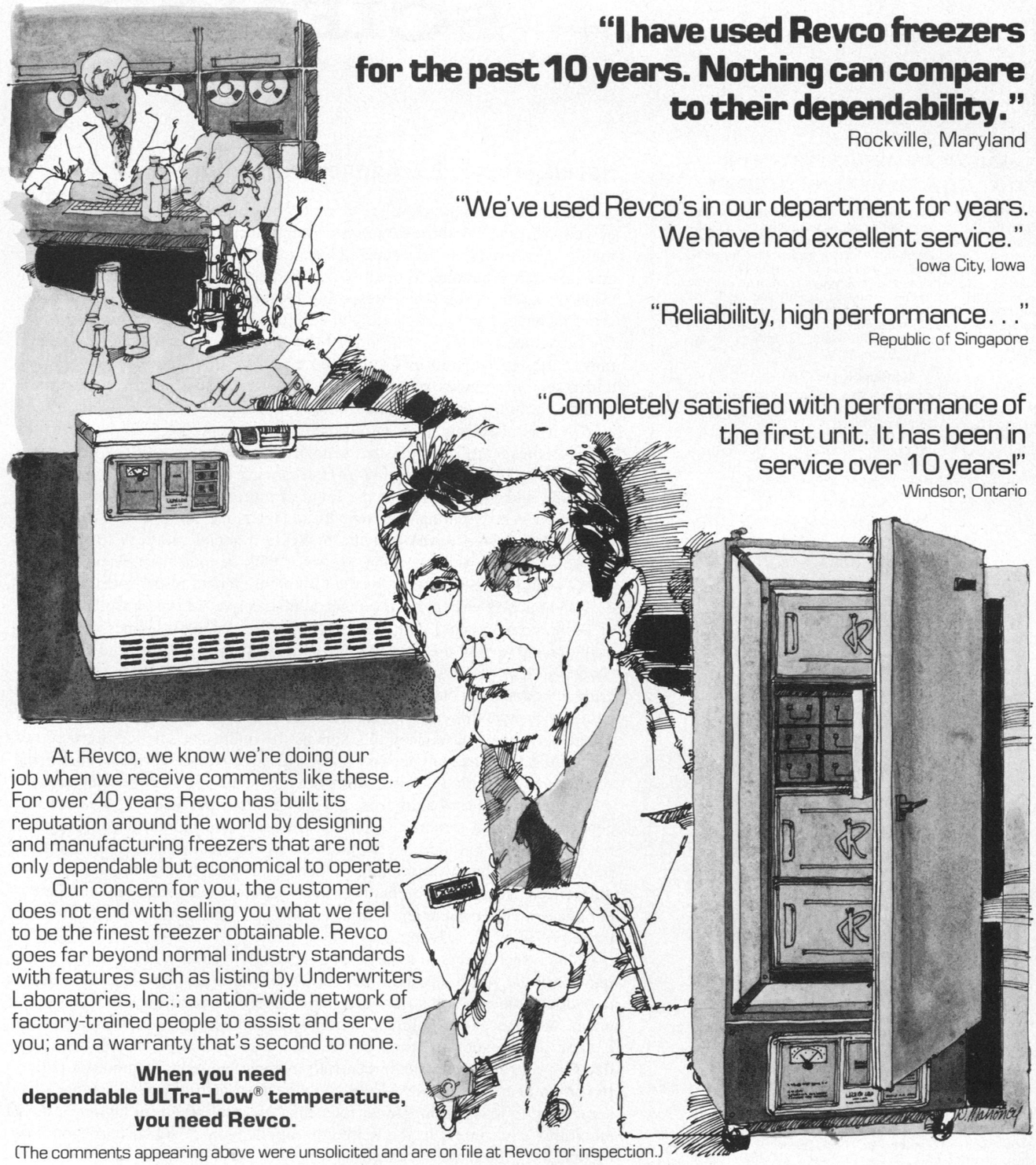
Why this attention, this enthusiasm, this expenditure? To be sure, the Chinese guests are distinguished scholars, representative of the best talent of the new Chinese Academy of the Social Sciences. They were also charming and intelligent. But the level of attention and investment in this delegation is exceptional for any group, let alone for ten men who have been isolated from developments in Western social sciences for some 30 years. To explain this attention, we must look beyond the delegation itself to ask what the visit signifies for the future enrichment of the social sciences.

A comparison with natural science is instructive. Massachusetts Institute of Technology Provost Walter Rosenblith, discussing exchanges with China at the recent annual meeting of the American Council of Learned Societies, observed that the laws of nature are invariant across jurisdictional and geographic boundaries. Scholarly exchange with China will encourage an international partnership in the natural sciences. Physicists, biologists, and mathematicians will journey to China as the quality of science there allows for mutual learning. Or perhaps they will go as missionaries, transferring science and technology from centers of knowledge to less developed areas.

The social sciences start from a very different perspective. The laws of economics, social structure, political process, and human psychology are not invariant across national boundaries. In the social sciences and humanities we accept the profound importance of cultural, historical, and national differences. Social science findings in one society are tested against the experience of other societies. Variation through time and across cultures is turned to scientific advantage.

China's significance for the future of social science is clear. China has a quarter of the world's population. Isolation from the history and contemporary development of this rich, diversified civilization cripples the social sciences. An inaccessible China can only stunt inquiries into such topics as the decline of bureaucratic empires, the anatomy of peasant revolutions, the decision-making processes in centrally planned economies, and the collectivization of rural societies. Even the emerging field of policy sciences has something to learn from China, for China has embarked on history's most ambitious experiment in the deliberate application of social and economic theory and systematic research to strategies for national development.

History, anthropology, economics, and sociology—just as physics, biology, and mathematics—can proceed on their scholarly courses without China. But for the social sciences the costs will be high, higher than those paid by our natural science colleagues. Students of social behavior must account for those variations that are sensitive to jurisdictional and geographic boundaries. The Chinese experience can contribute so substantially to an understanding of these variations, now and throughout recorded history, that a serious social science needs to incorporate that experience. I believe the enthusiastic reception of the Chinese social science delegation is recognition of this need. Moreover, this recognition establishes principles to guide future scholarly exchanges with China, principles premised on the requirement of reciprocity between the social science communities in both China and the United States.—KENNETH PREWITT, *President, Social Science Research Council, 605 Third Avenue, New York 10016*



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