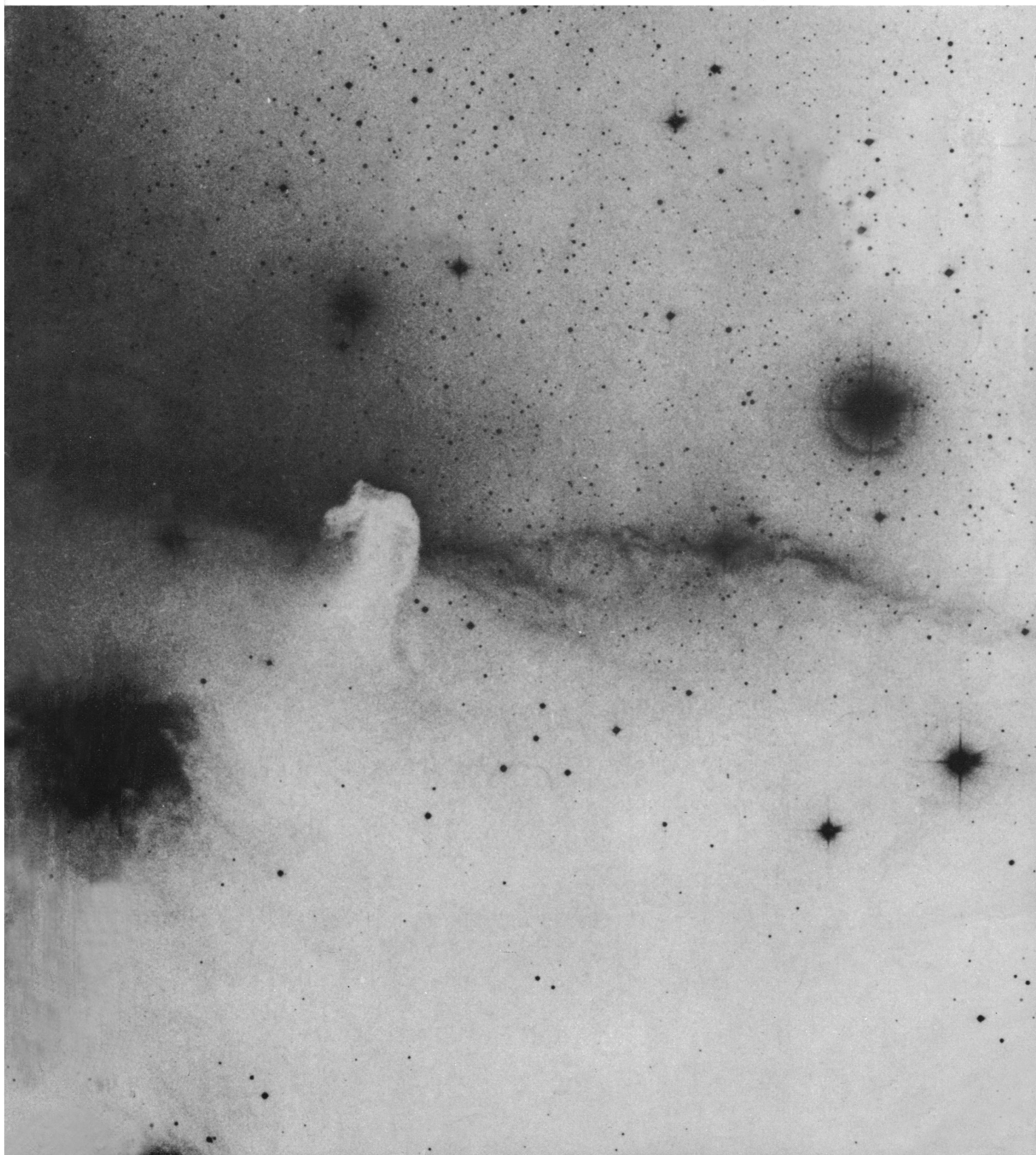


# SCIENCE

11 February 1977

Volume 195, No. 4278

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE





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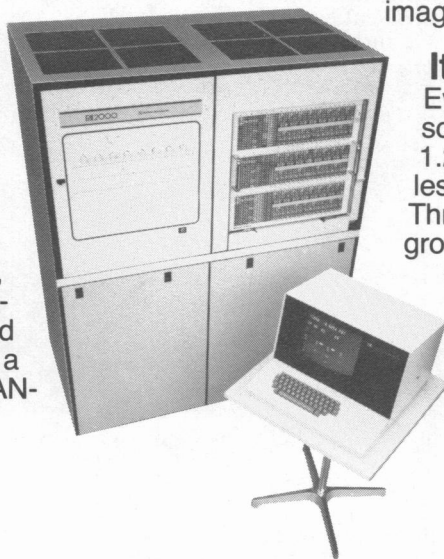
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The American Association for the Advancement of Science was founded in and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

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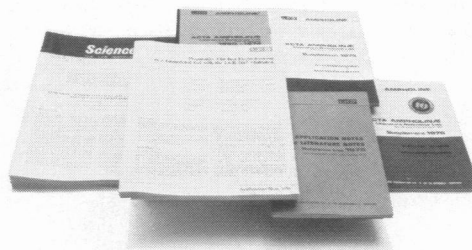
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LKB supplies equipment necessary for growing and disintegration of microorganisms through to the final characterisation of a purified substance. Probably the most important techniques in biochemistry are those involving separation and analysis, and there we have our greatest experience.

## LKB helps science advance, and serves the scientist

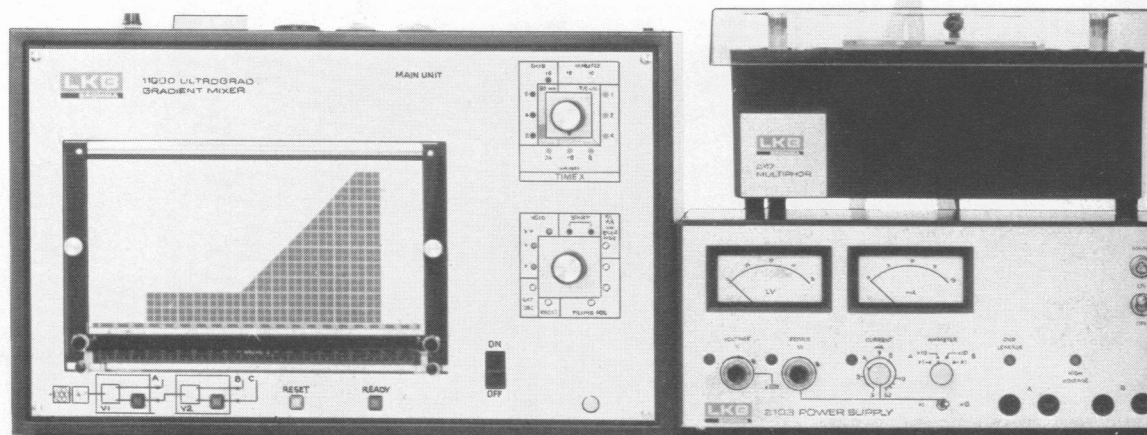
For science to advance, knowledge must be shared. At LKB knowledge comes from our experience and research and from our many worldwide contacts. We share our knowledge in several ways: in the quality of our instruments, as Workshops and Seminars, literature such as *Acta Ampholinae*, Application Notes and SCIENCE TOOLS.



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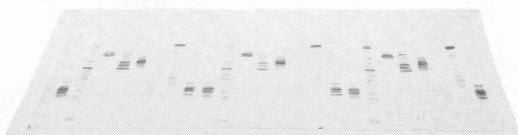




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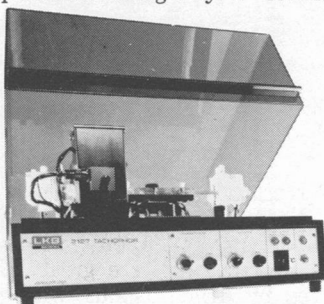
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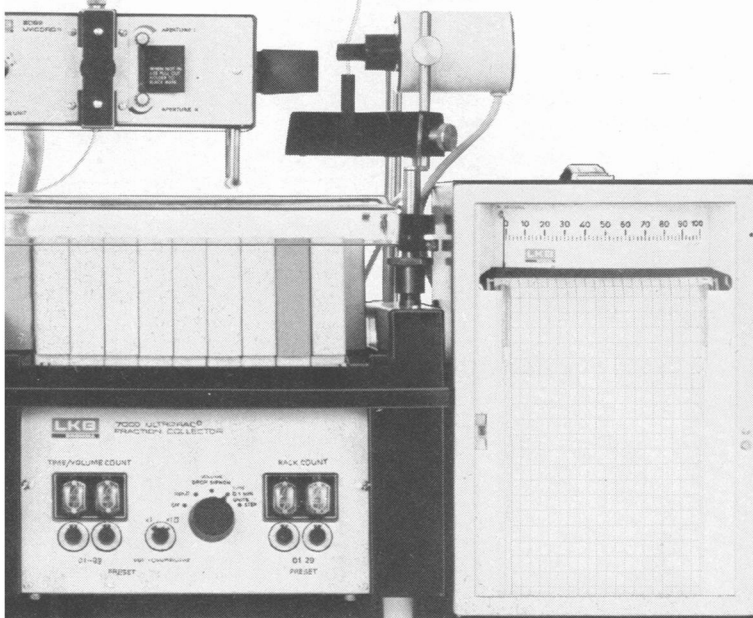


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This summary of LKB equipment is necessarily short. Our new 58-page colour booklet “LKB Systems and Methods for Biochemical Research” illustrates all LKB equipment and describes in some detail the methods for which they are used. Our colour poster “Preparative Separation Principles in Biochemistry” is a worldwide attraction: like the booklet you can get a free copy by writing or phoning to us.

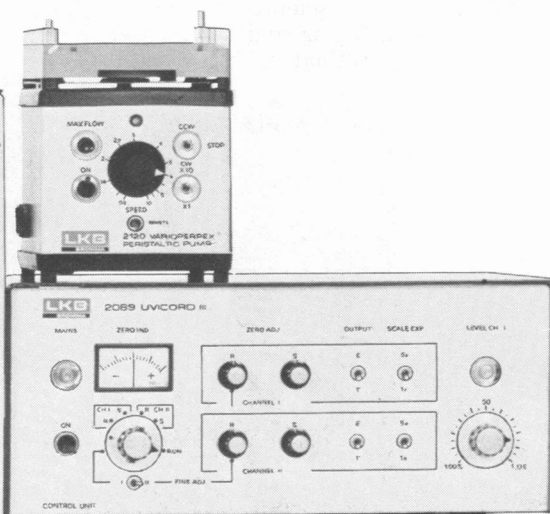
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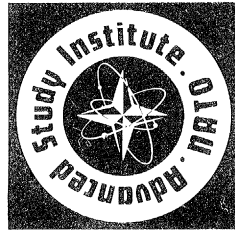
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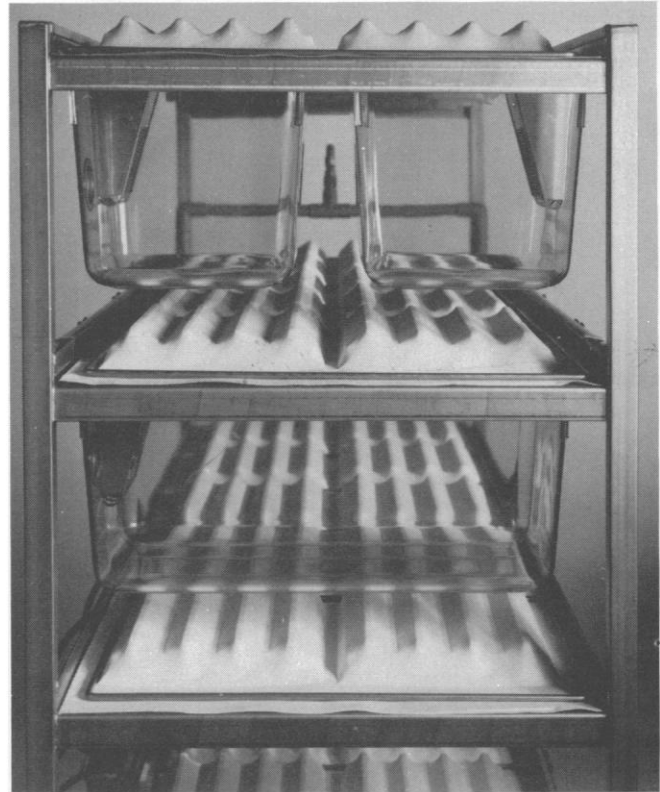
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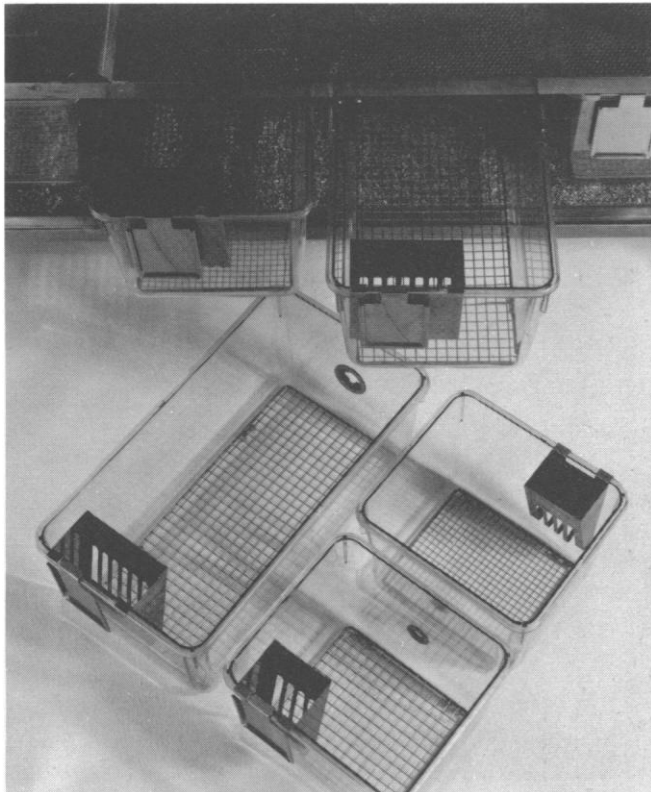
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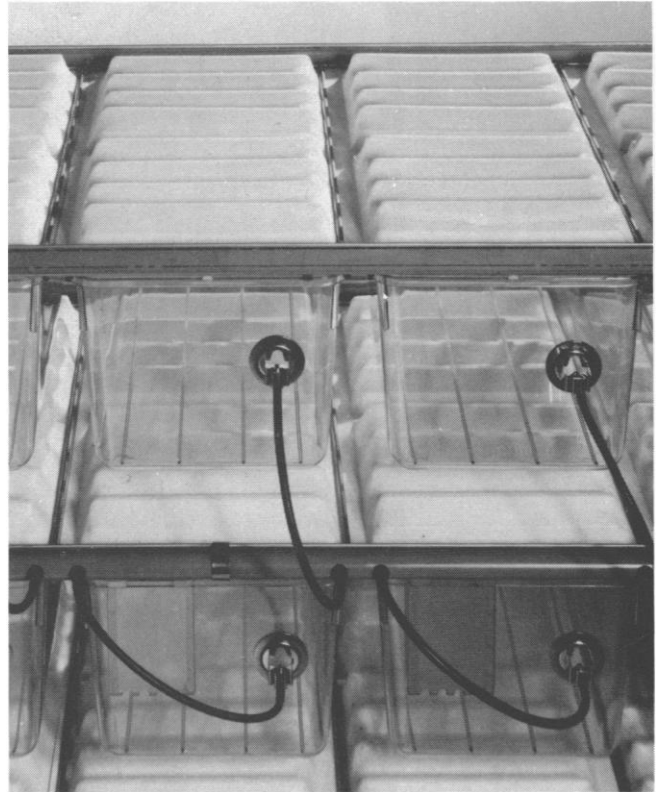
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- 3.** Rack accommodates small or large cages or combinations of both.



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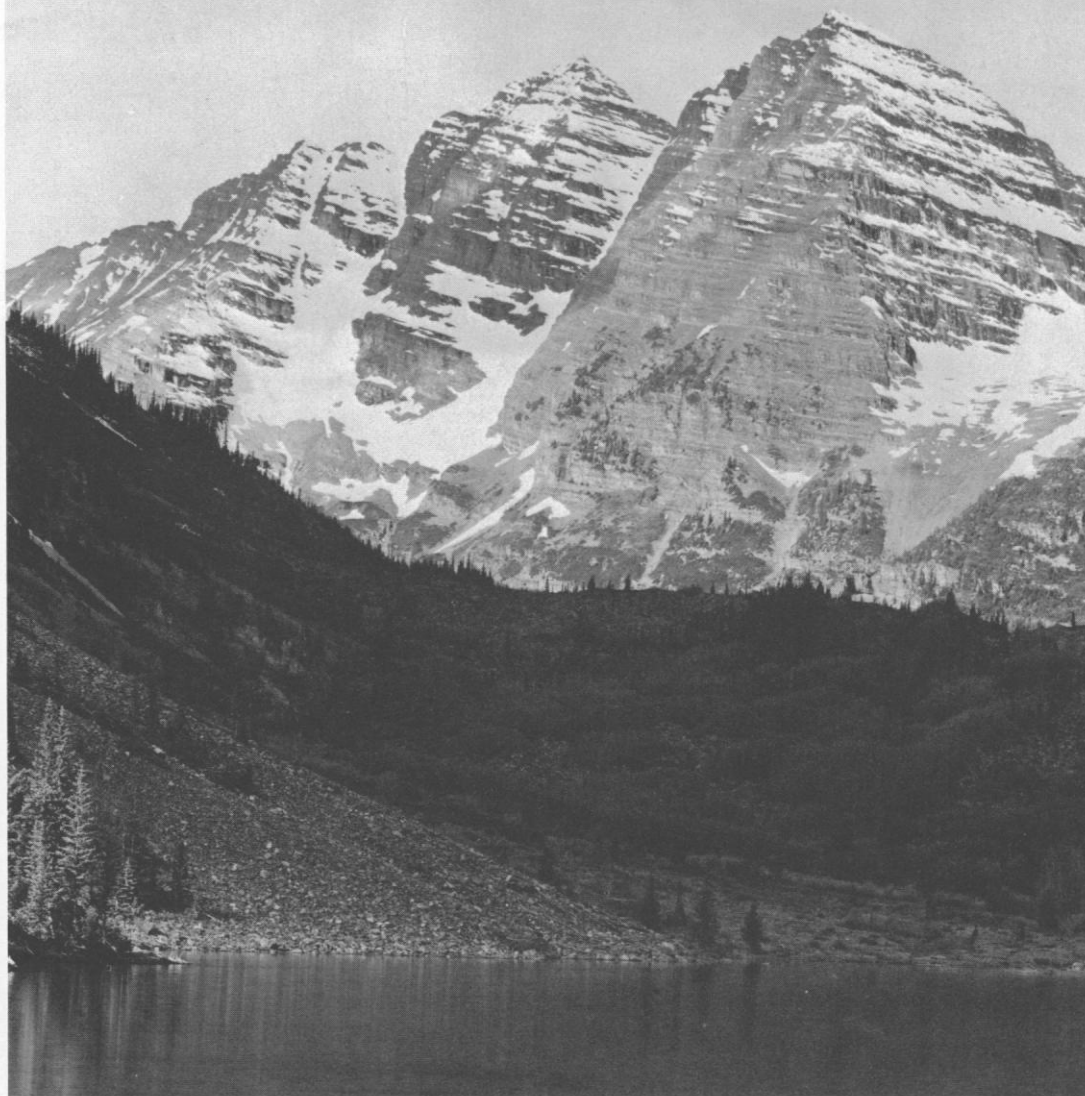
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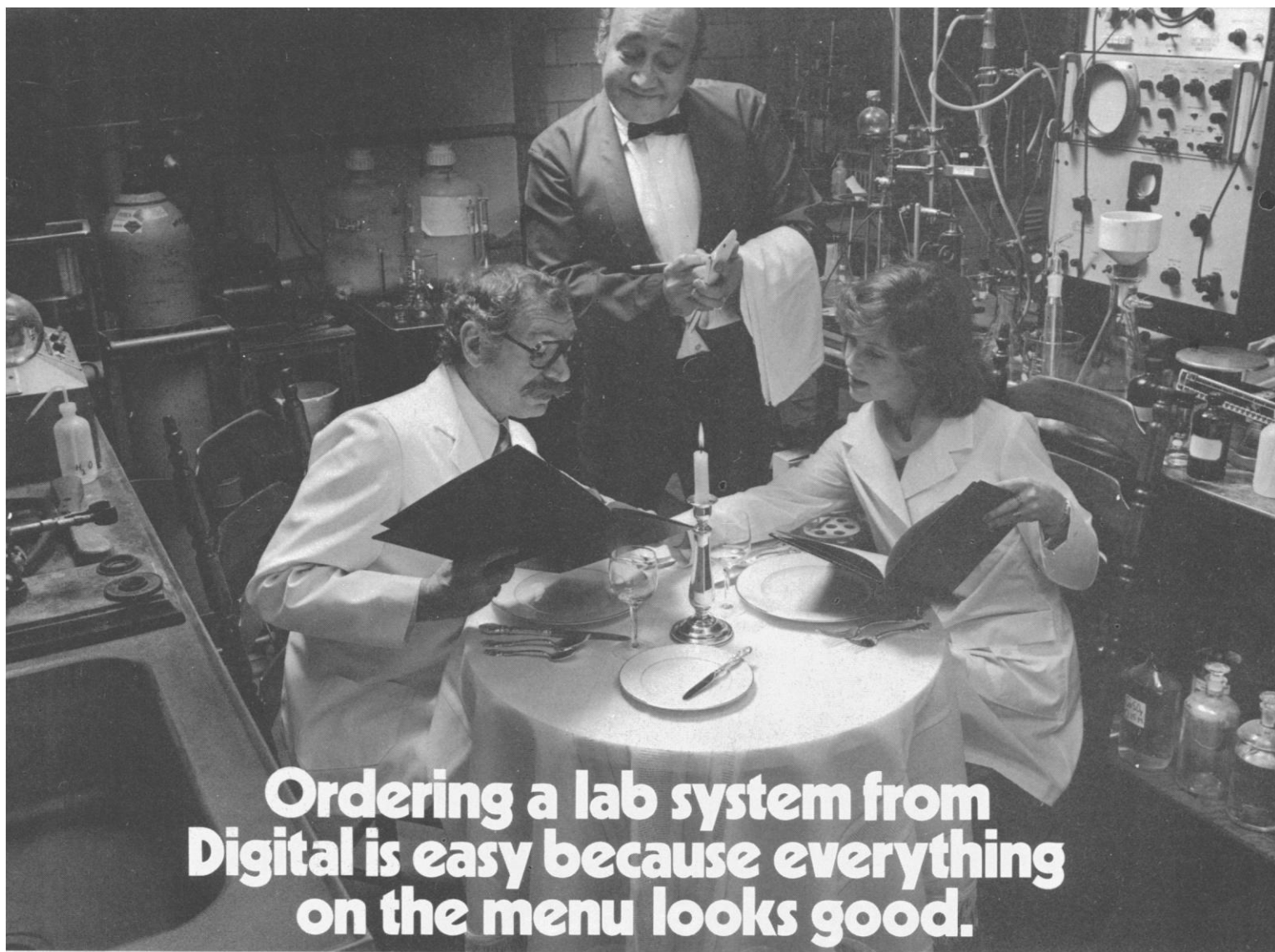
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scription and analysis of the methods used in training the chimpanzee and her ultimate acquisition of various linguistic skills (e.g., learning names and attributes); the chimpanzee's conversations, both spontaneous and manipulated, are detailed. Implications for the language training of the mentally retarded are discussed. Finally, using the data obtained from their experimentation, the authors consider the possible relationship between communication in general and language in particular from an evolutionary perspective.

1977, 304 pp., \$17.50/£12.40 ISBN: 0-12-601850-2

## **Biotelemetry III**

PROCEEDINGS OF THE THIRD INTERNATIONAL SYMPOSIUM ON BIOTELEMETRY, 1976

Edited by THOMAS B. FRYER, HARRY A. MILLER, and HAROLD SANDLER

Based upon a four-day international symposium held in Pacific Grove, California in May 1976, this book contains the numerous technical papers, workshops, and in-depth discussions presented by the participants, who represented the latest basic research and clinical applications of telemetry throughout the world. Beginning with a history of the past 50 years of biotelemetry, the speakers devote themselves to a characterization of the status of

telemetry from the viewpoints of engineering design, fabrication, and applications to man in the areas of: transducers; transmission and receiving systems; surgical implants; emergency medical care; patient monitoring (cardiac, respiratory, fetal, neuropsychiatric); sports medicine; studies of free roaming animals.

1976, 408 pp., \$19.00/£13.50 ISBN: 0-12-269250-0

## **Population Cytogenetics** Studies in Humans

PROCEEDINGS OF A SYMPOSIUM ON POPULATION CYTOGENETICS SPONSORED BY THE BIRTH DEFECTS INSTITUTE OF THE NEW YORK STATE DEPARTMENT OF HEALTH, HELD IN ALBANY, NEW YORK, OCTOBER 14-15, 1975

Edited by ERNEST B. HOOK and IAN H. PORTER

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Human population cytogenetics encompasses study of the rate of cytogenetic abnormalities and variants, their phenotypic consequences, their segregation, and their causation. The theme common to such studies is that in one way or another they all involve study of human populations with defined characteristics.

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1976, 394 pp., \$17.50/£12.40 ISBN: 0-12-355460-8

## **The Modern Rise of Population**

By THOMAS McKEOWN

In this volume, the author examines initially the experience of animals and early man, but relies mainly on nutritional, medical, environmental and behavioral data from populations in England and Wales in the eighteenth, nineteenth, and twentieth centuries. The author concludes that the modern rise of population was due essentially to a decline in mortality resulting from infectious diseases and

he examines fully the reasons for this decline. Contrary to what one would expect, improvements in nutrition and environment, and changes in reproductive behavior were much more important than medical science.

1976, 168 pp., \$14.50 ISBN: 0-12-485550-4

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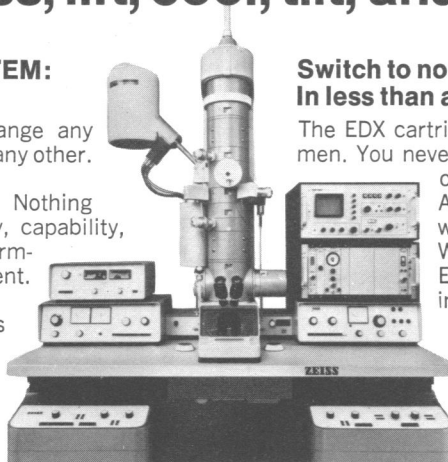
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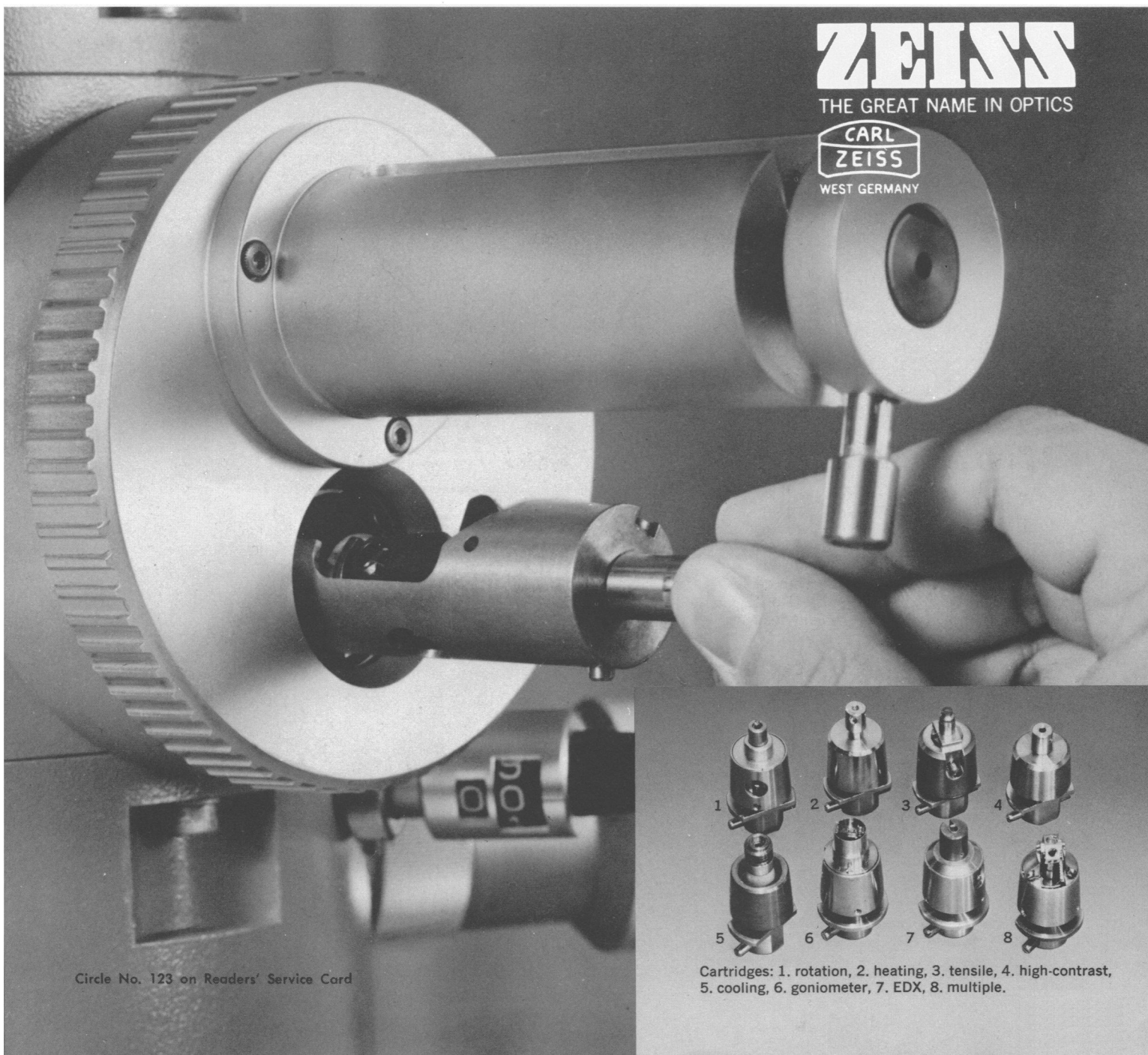
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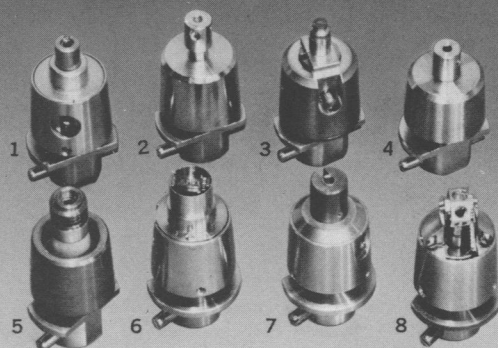
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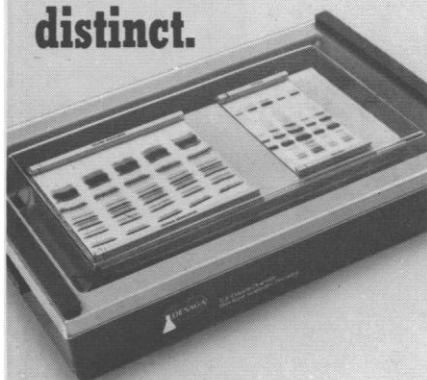
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## LETTERS

### Gray Whale Behavior

After 40 years of protection by international agreement, the population of the California gray whale has grown from an estimated maximum of 500 to  $11,000 \pm 3,000$ , heartening evidence that effective remedial conservation action is possible. Charges that the whales are now being harassed, that their normal migration pattern is being seriously disrupted by whale-watching boats as the animals pass close to the Southern California coast en route to their Baja California breeding lagoons, are thus particularly disturbing.

The first suggestion that gray whales were being pressured by human activities was advanced in 1965 as one explanation of data indicating that a significant percentage of the herd was migrating south offshore, rather than in sight of land. So meticulously had the migration been described, that any deviation from the shore-hugging route was adjudged both abnormal and man-induced. Since then the "aberrant" route has continued to be used, possibly by an even larger proportion of the animals; its use has generally been interpreted as a retreat from the increasingly heavily trafficked coastal lanes.

Although our knowledge of gray whale behavior derives almost entirely from periods when the animals were under extreme stress—first when they were being constantly hunted and more recently as they were recovering from almost complete annihilation—observations made during those abnormal times came to be accepted as immutable truths. It was assumed, for instance, that along the southern California coast only a corridor 5 kilometers wide skirting the shore was "acceptable" to gray whales traveling south. It now appears that the availability of alternative routes may be but one example of a range and variety of behaviors open to an expanding or stabilizing population. Others include the presence of individual gray whales in San Diego waters and even farther south, "out of season" and for considerable periods of time, and the unprecedented series of episodes in San Ignacio Lagoon last winter, in which an unknown number of whales, singly or in small groups, approached whale-watching cruise boats with evident curiosity and every appearance of seeking human attention.

These and other recent observations suggest a versatility that may only be beginning to proliferate in a population

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that is today overwhelmingly young; they further suggest that we must not continue to overlook the dynamic and fluid character of natural processes. But while they also indicate that we need not automatically interpret every new behavioral occurrence as a response to deleterious human pressures, the fact that few, if any, gray whales living today can have any memory of harm at the hand of humans calls for the most special consideration of the effects of our activities on our fellow creatures.

FAY H. WOLFSON

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### Utilities and Nuclear Power: One System's Approach

Deborah Shapley (News and Comment, 19 Nov. 1976, p. 814) states (p. 816) that the American Electric Power Company (AEP) "says it will eschew building nuclear plants altogether in the future." I wish to deny the validity of the statement and to clarify the position of AEP in this regard.

It is our firm conviction that both nuclear and coal-fired plants will be needed in the future to meet the energy needs of this nation. Both coal and uranium are indigenous fuels, and neither can fulfill the demands for future electricity supply in the absence of the other.

While AEP has one nuclear unit in operation in southwestern Michigan and a second under construction and planned for commercial operation in early 1978, the fact any additional major generating plant now under construction or planned for operation in the next several years by the AEP system will be coal-fired does not imply AEP's "eschewing" the construction of new nuclear plants "altogether in the future."

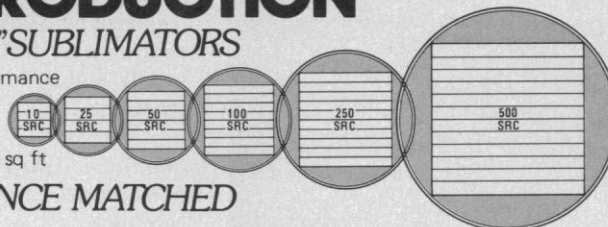
The choice of which type of plant to build on the AEP System is under continuing review. A decision in this regard does not rest simply on a long-term economic evaluation—which is increasingly difficult in the light of rapidly changing capital and fuel costs as well as other related uncertainties—but also on such factors as the type and composition of the territory to be served, together with the area's opportunities for and constraints against supporting a particular type of generation; the state of development of the company's generation technology; the company's financial resources at any point in time together with an evaluation of the financial risk and exposure in a specific commitment;

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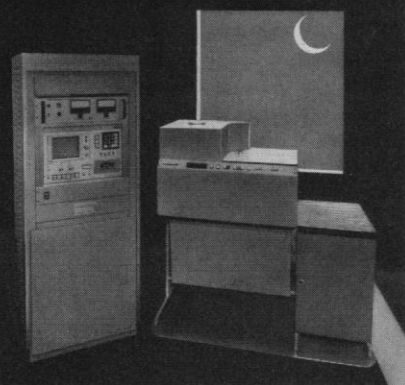
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### U.S. Science and Technology: A Prescription for "Health"

The congressional Office of Technology Assessment (OTA) has initiated a long-range program on R & D policies and priorities. Three separate advisory panels have been established, with their work to be coordinated through OTA's statutory Technology Assessment Advisory Council (TAAC), chaired by Jerome Wiesner of the Massachusetts Institute of Technology. The three panels are to deal, respectively, with the health of the scientific and technological enterprise; the applications of science and technology, including industrial research and innovation; and the decision-making processes whereby the nation sets its policies and priorities with respect to the allocation of R & D resources and the utilization of scientific inputs in government policy generally.

The panel on the health of the scientific and technological enterprise, which I chair, would like suggestions from the technical community and from other interested and concerned individuals. We are particularly interested in receiving views on (i) what issues should be given priority on our agenda; (ii) what some of the perceived problems and strengths of the present system of overall management and support of research and development in the United States are; and (iii) how the future system might look. Our purview includes, but is not restricted to, basic research in universities and the system of advanced education in the natural and social sciences. We have adopted a provisional working definition of "health"—"the capacity of the U.S. science and technology enterprise to develop new knowledge and insights both for their own intrinsic values and for the contribution they can and should make to the solution of some of the major problems which face mankind and the nation." However, the panel would welcome suggestions for a better definition.

Currently we are engaged in defining the scope of its work and setting priorities for its study agenda. Illustrative of some of the issues that may be considered are the following:

- The development of objective criteria for assessing the health and performance of the science and technology enterprise, including its ability to maintain its capacity into the future.

- The validity of current national R & D priorities including priorities in fundamental science, taking into account both future social needs and probable scientific and technological opportunities. The issue involves the development of more systematic criteria for assessing scientific and technological priorities.

- The functioning of the overall research enterprise as viewed from the perspective of the working scientist: whether he is working on the problems that he considers most important and interesting, whether he has the freedom and opportunity to use his maximum capacities and training, and how he views his relationship to society and to social priorities.

- What alternatives might and should exist to the present traditional basic research and teaching careers for scientists and engineers who are trained to the Ph.D. level primarily through research apprenticeship.

- The future role and form of broad-purpose national laboratories and the specific requirements for a healthy and socially useful national laboratory system, including relationships with universities and industry.

- The proper allocation of government support among specific project grants to individual investigators, general research support to institutions, and support for individual scientists on the basis of promise and accomplishment with review of performance largely after the fact.

- The equity of access to the career opportunities provided by the scientific and technological system on the basis of capacity to contribute.

Communications and suggestions from persons in the technical community or from the general public concerned with the health and impact of science and technology would be welcomed by the panel. Such communications should be addressed to me.

HARVEY BROOKS

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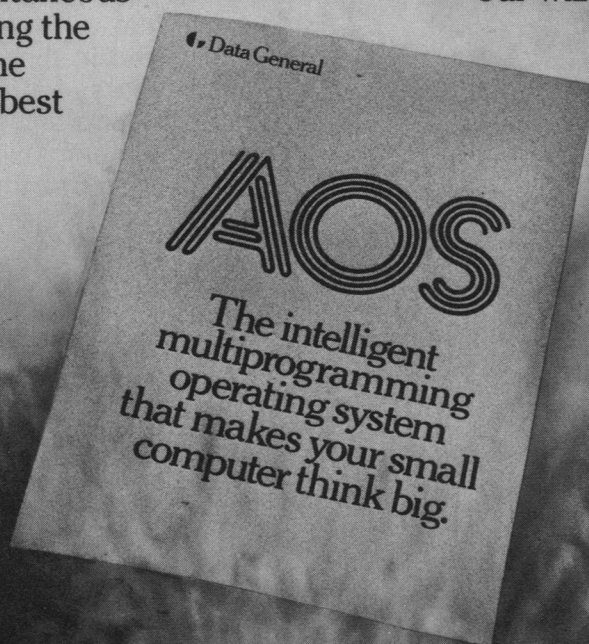
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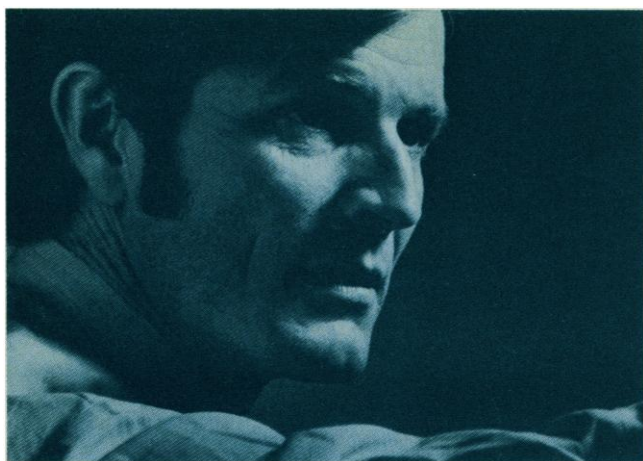


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## New Directions for AAAS

Last year the AAAS Board of Directors appointed a Committee on New Directions, chaired by Leonard Rieser. The Committee was asked to look ahead to 1980 and beyond, to anticipate the climate for science and technology in the United States and suggest new and meaningful roles and missions for AAAS.

The Committee has been holding spirited meetings, and in October its chairman made a progress report to the Board. The Committee has avoided both the trap of reinventing the objectives of the Association and the itch to spend its time reevaluating ongoing programs. What concerned it was the future and how AAAS could make the best of it.

A number of ideas have come to light which have the flavor of innovation and hint at a more rapid pulsebeat in the performance of AAAS. Each responds to the question of how AAAS can anticipate the needs of science and society and contribute to making a difference in how things turn out. Two broad priorities stand out thus far in the Committee's thinking. One concerns the role of AAAS in relation to public choices that have strong scientific or technological components or that carry strong implications for the future direction of science and technology. The other focuses on steps that AAAS could take to see that science and technology are presented accurately to the public, including informed commentary on borderline science.

Two of the Committee's proposals concern the style of AAAS behavior. One emphasizes the leverage that the Association has as a convenor of sectors and groups which now go their separate ways but which have strong voices in decisions that affect science policy. An example of the use of this role was the colloquium held by AAAS in Washington last summer on the federal R & D budget, in which representatives of Congress, the White House, industry, and academia took an active part. The second proposal of the Committee urges the Association to move increasingly toward collaborative relationships with other professional associations, following the precedent of the National Conference of Lawyers and Scientists, a joint venture of AAAS and the American Bar Association. The possibilities here are for similar joint relationships with groups representing such professions as journalism and industrial management.

Going beyond the area of style into that of substance, the Committee is suggesting two major departures. One would take AAAS closer to policy controversy, through selective publication of panel reports on disputed questions involving science or technology with public policy, with the aim not of throwing weight on one side or the other but of injecting clarification from a respected quarter. The second significant proposal would involve strengthening and extending AAAS efforts in public communication, including *Science* and the annual meetings, but with the addition of concern for improving science programming in commercial television and motion pictures. In the age of electronics, AAAS can no longer fail to take into account the influence, for better or worse, of commercial television and films in shaping social attitudes toward science and technology.

These ideas are timely and stimulating. They seem compatible with our character and objectives, and they suggest the development of momentum in the affairs of the AAAS. Putting them in the context of initiatives that AAAS is already taking—active concern for problems of scientific freedom and responsibility; new departures in the field of science and public policy; regional forums on the impacts of science on society; programs to improve the status of women, minorities, and the handicapped in science; congressional fellowships; outreach to international science; and the strengthening of *Science* as a preeminent journal—it all points to a lively design for the future.—WILLIAM D. CAREY





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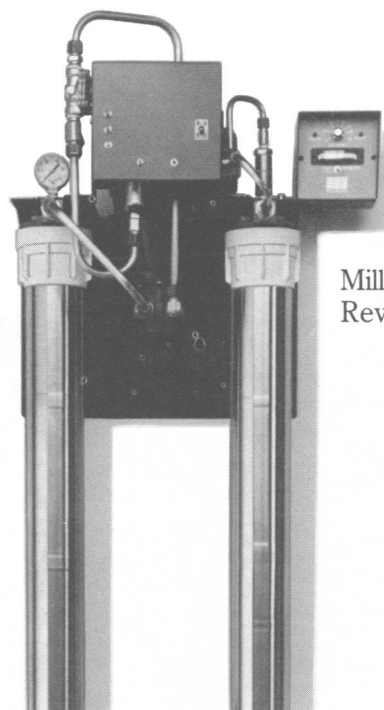
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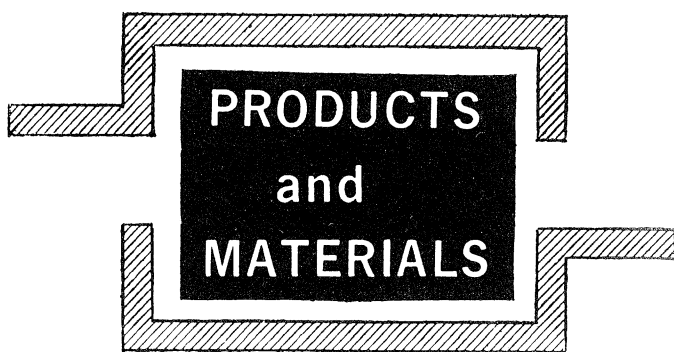
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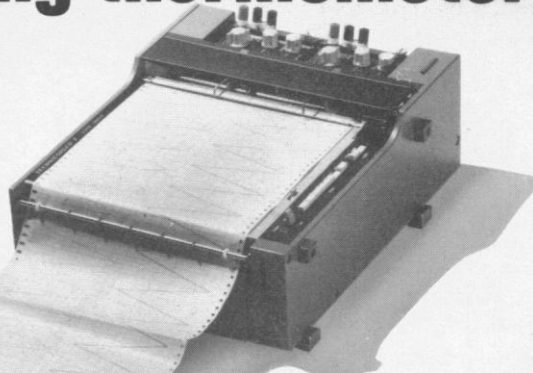


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**The Golden Door.** Artist-Immigrants of America, 1876-1976. Cynthia Jaffee McCabe. Published for the Hirshhorn Museum and Sculpture Garden by Smithsonian Institution

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**Introduction to the Physical Chemistry of the Vitreous State.** P. Baltá and E. Baltá. Translation and revision of the Romanian edition (Bucharest, 1971). Editura Academiei, Bucharest, and Abacus Press, Tunbridge Wells, Kent, England, 1976 (U.S. distributor, International Scholarly Book Services, Forest Grove, Ore.). 288 pp., illus. \$38.50. *To order this book circle No. 391 on Readers' Service Card.*

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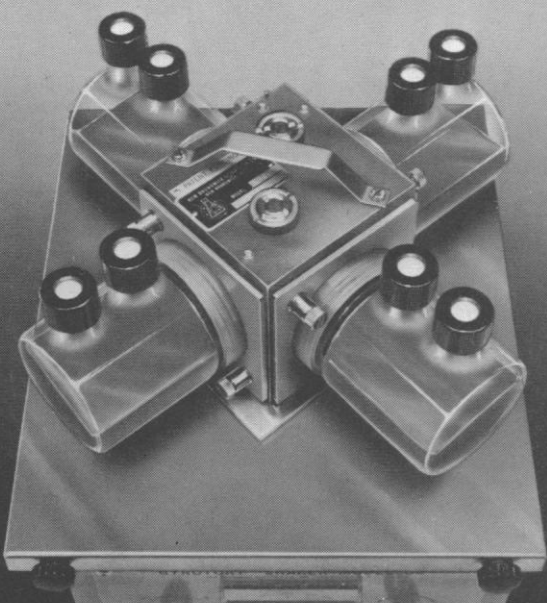
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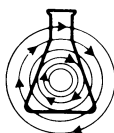
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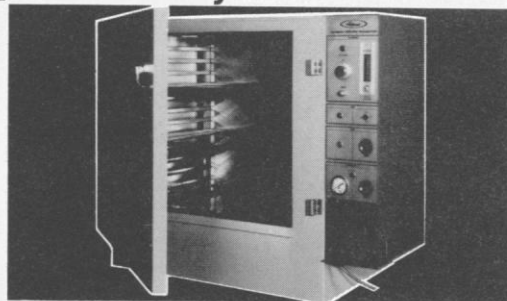
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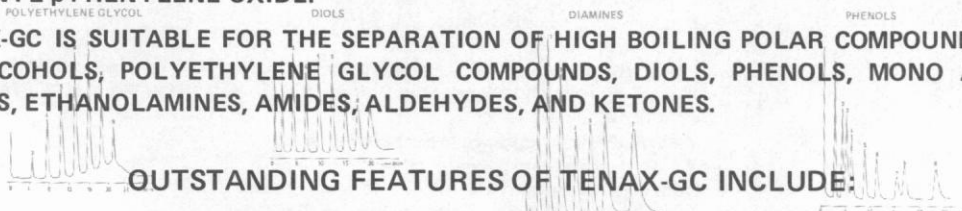
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**Plant Biophysics.** D. M. Grodzinskii. Translated from the Russian edition (Kiev, 1972). Israel Program for Scientific Translations, Jerusalem, 1976 (U.S. distributor, Halsted [Wiley], New York). x, 236 pp., illus. \$29. To order this book circle No. 395 on Readers' Service Card.

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**Prostaglandins.** An Introduction to Their Biochemistry, Physiology and Pharmacology. P. B. Curtis-Prior. North-Holland, Amsterdam, 1976 (U.S. distributor, Elsevier, New York). xiv, 160 pp., illus. \$16.25.

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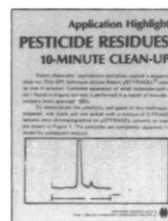
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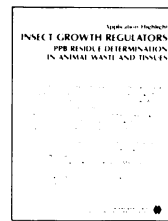
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