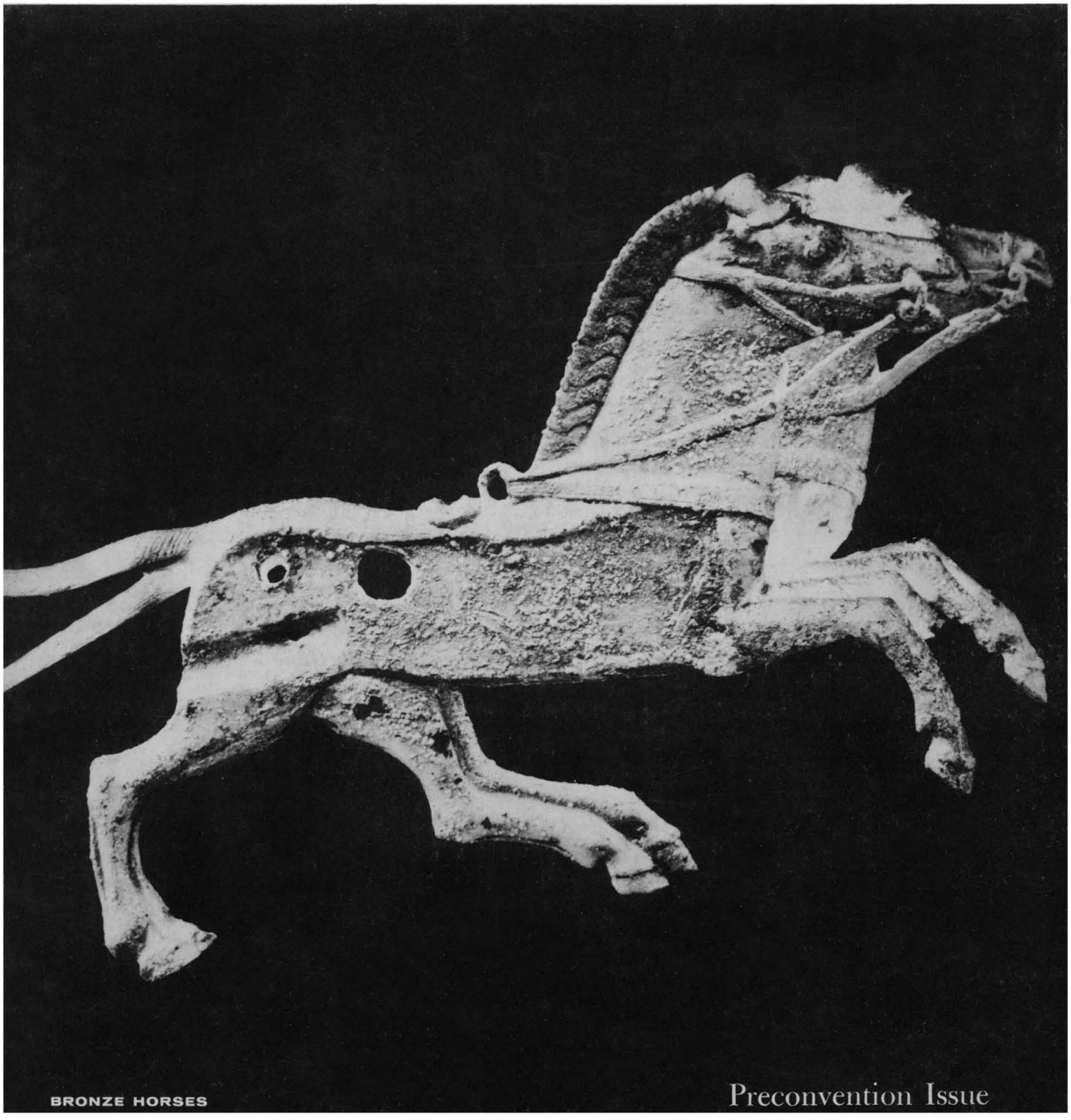
SCIENCE

4 December 1964
Vol. 146, No. 3649

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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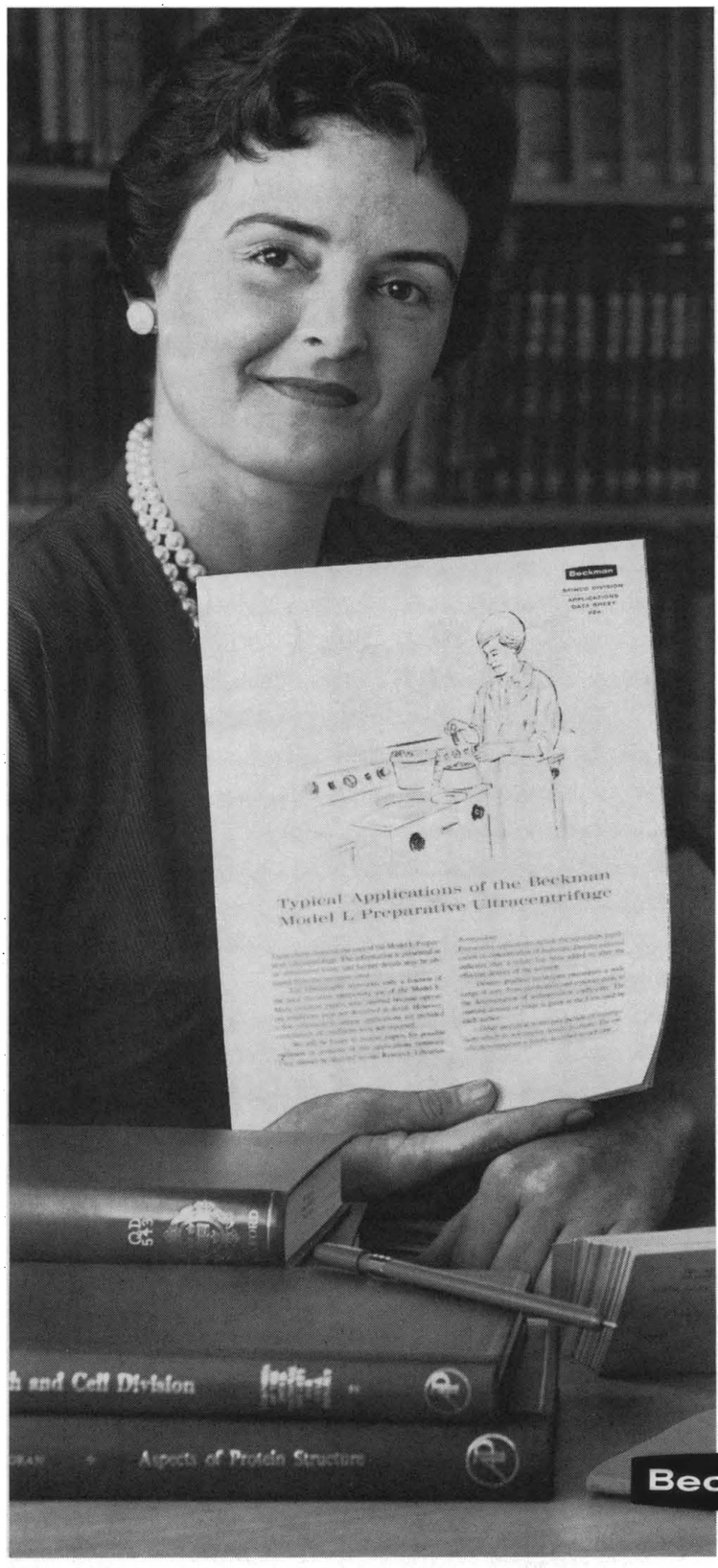

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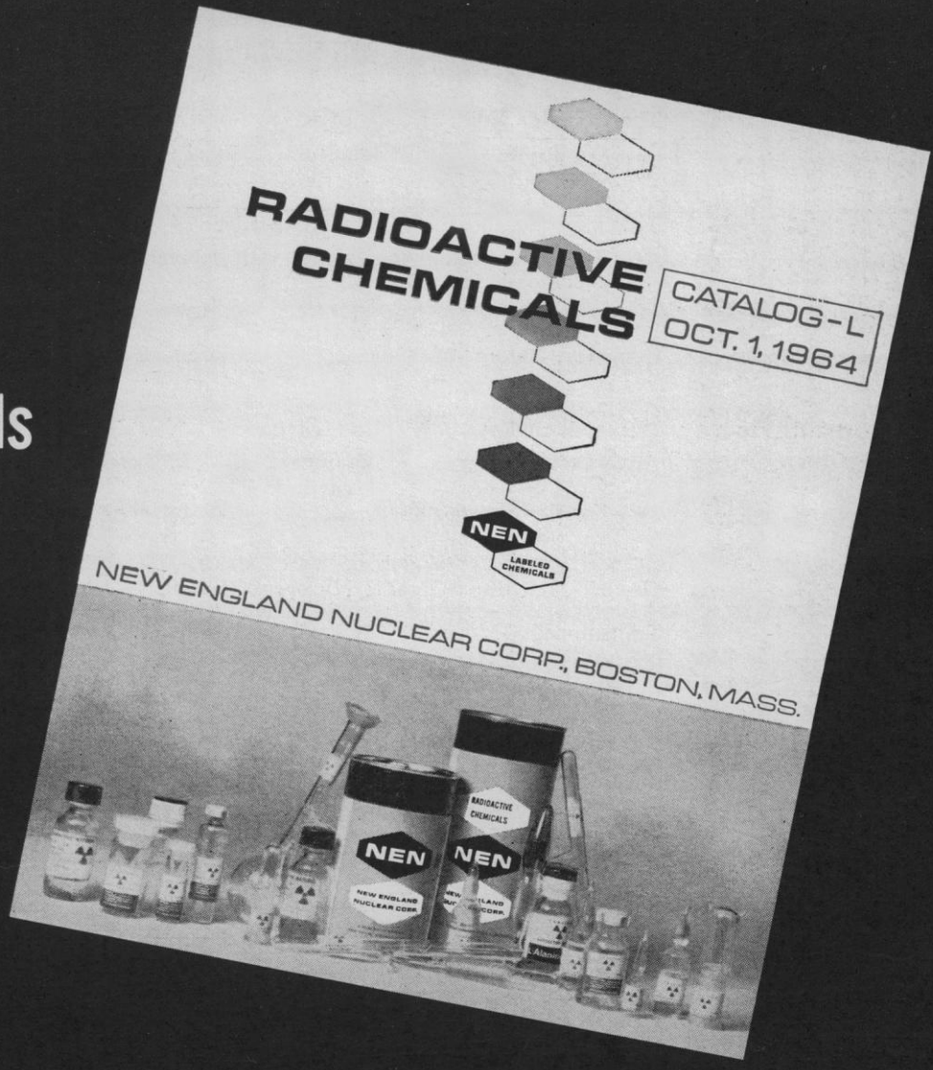

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4 December 1964
Vol. 146, No. 3649

SCIENCE

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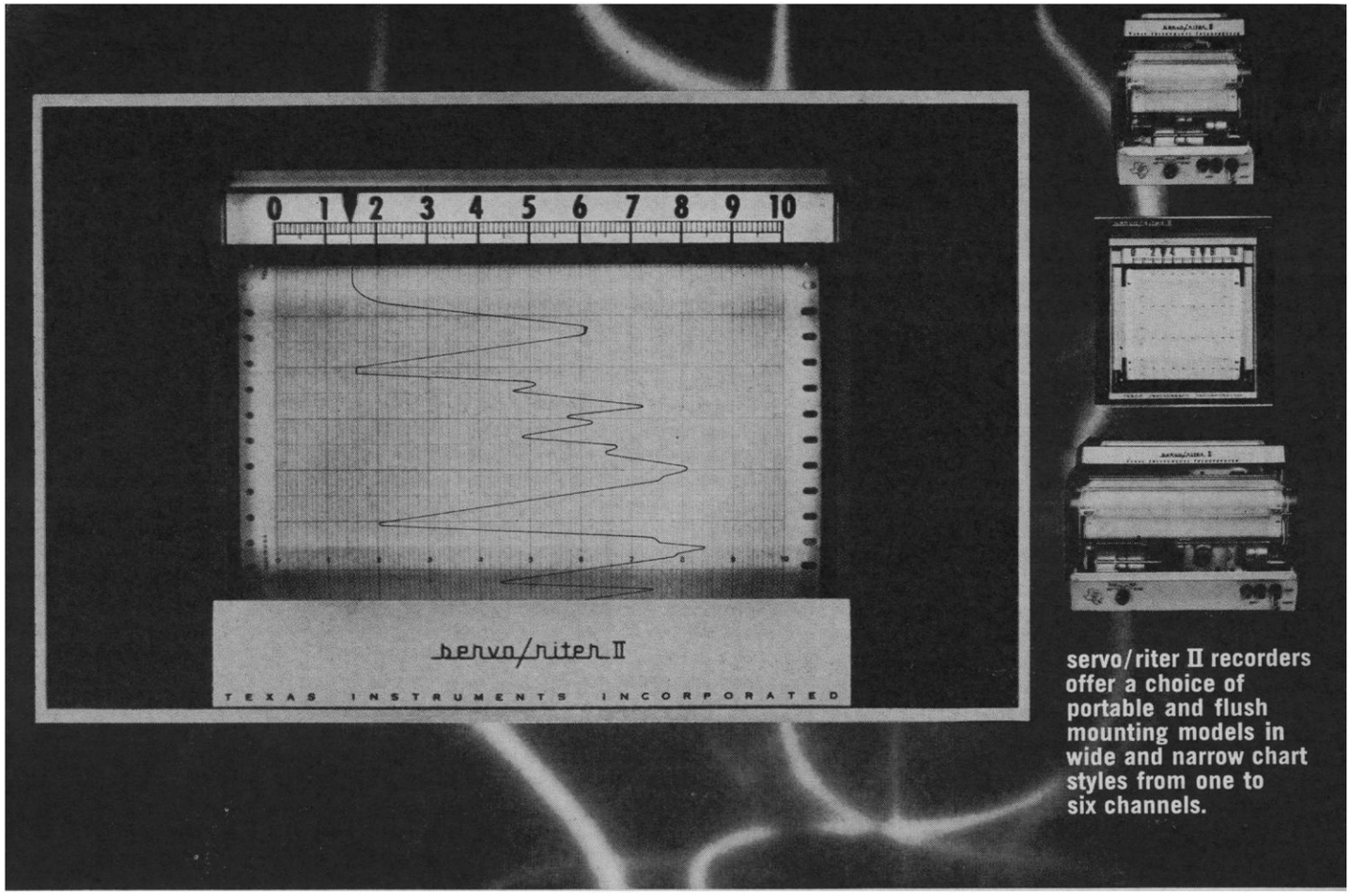
COVER

Prancing Achaemenid horses from the ancient Persian capital of Persepolis exemplify the synthesis of technology, art, and life possible through the medium of metals. The breed may well be that of a famous Median steed. However, the liquid style of presentation—so unlike the usual Persian bas-reliefs—is Greek. See page 1257. [Archeological Museum Tehran]



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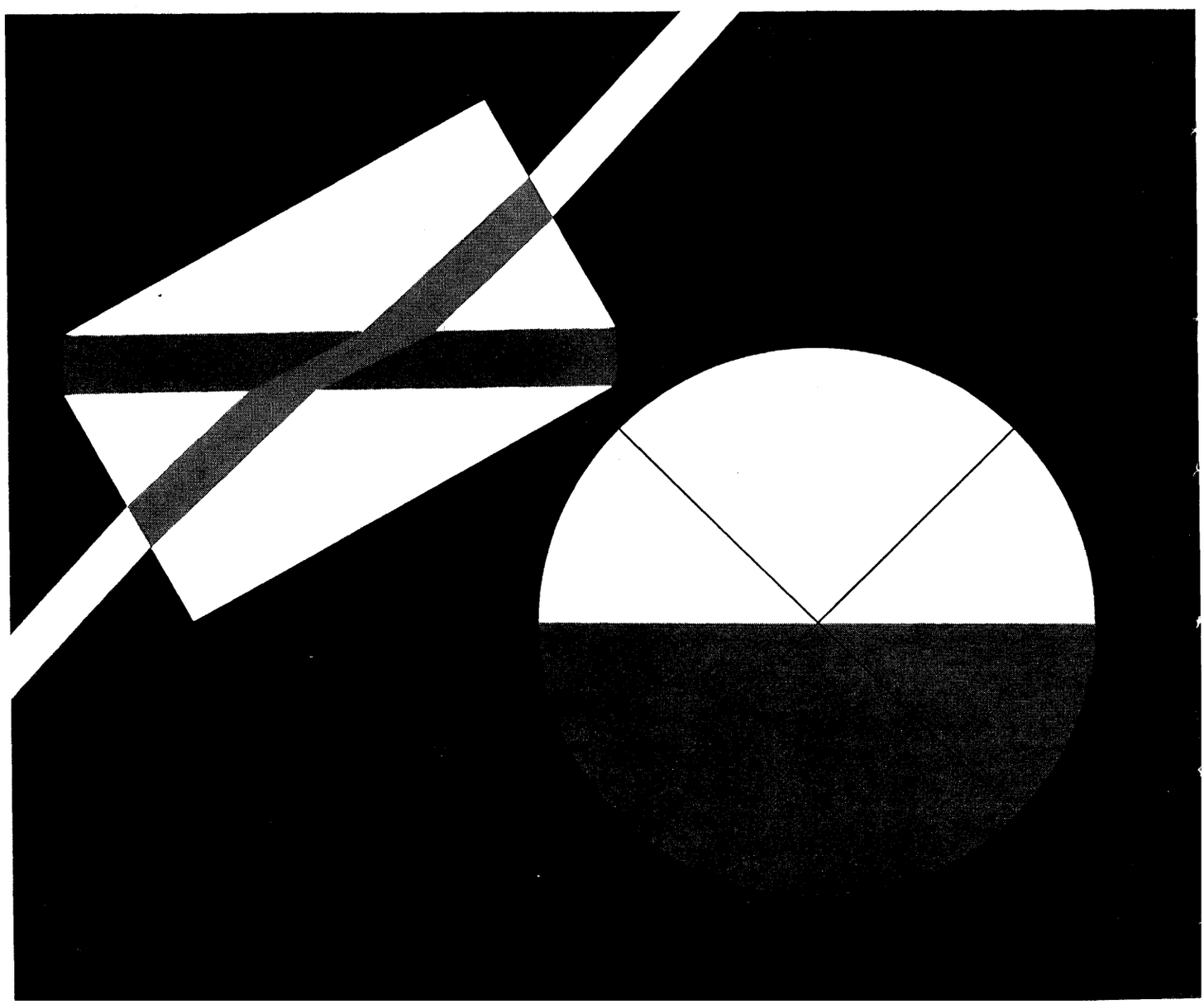

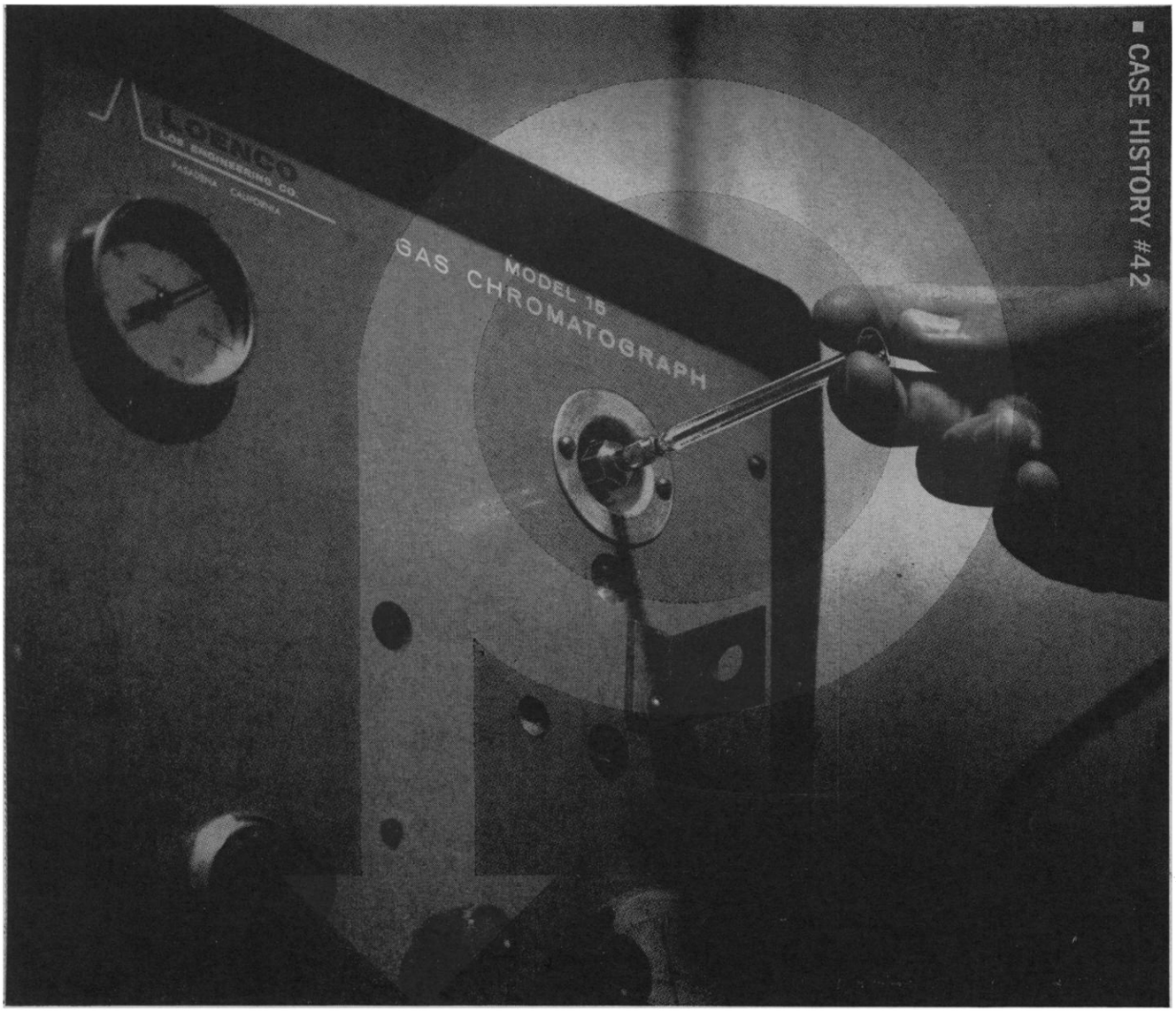

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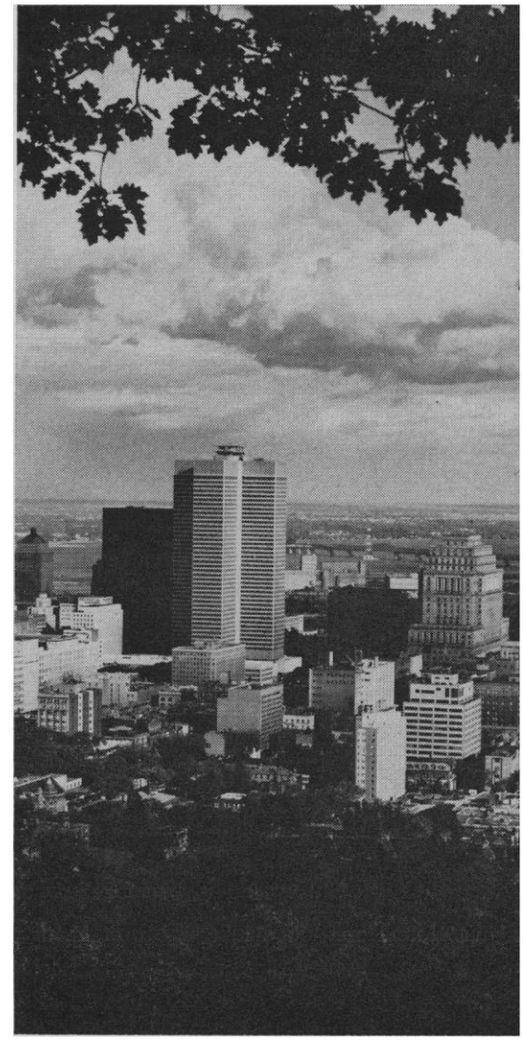

Program Highlights

Moving Frontiers of Science V. C. Wynne-Edwards on self-regulating systems in animal populations; J. M. Harrison on nonrenewable world resources; Philip Morrison, "New Channels in Astronomy"; and Clement L. Markert on role of genes in embryonic development.

Interdisciplinary Symposia Possible meteoric or lunar influences on meteorological phenomena; basic concepts of biochemical differentiation; medical geology and geography; history of the popularization of science.

Special Sessions AAAS Presidential Address by Alan T. Waterman; the Joint Address of Sigma Xi and Phi Beta Kappa by René Dubos; the George Sarton Memorial Address by Lloyd G. Stevenson; the National Geographic Society Illustrated Lecture; and the AAAS Distinguished Lecture by Lord Brain, retiring president, British AAS.

International Conference on Primate Behavior Three AAAS sections and the combined ESA and ASZ Section on Animal Behavior and Sociobiology are sponsors. Six sessions, open to the public, will include 37 speakers from four continents.

AAAS Committees Sessions of the AAAS Committee on Meetings, including two sessions on the sociology of science arranged and chaired by Robert K. Merton; and the Commission on Science Education.

Sections and Societies The 20 AAAS Sections and some 76 participating societies are scheduling specialized symposia; some have sessions for contributed papers.

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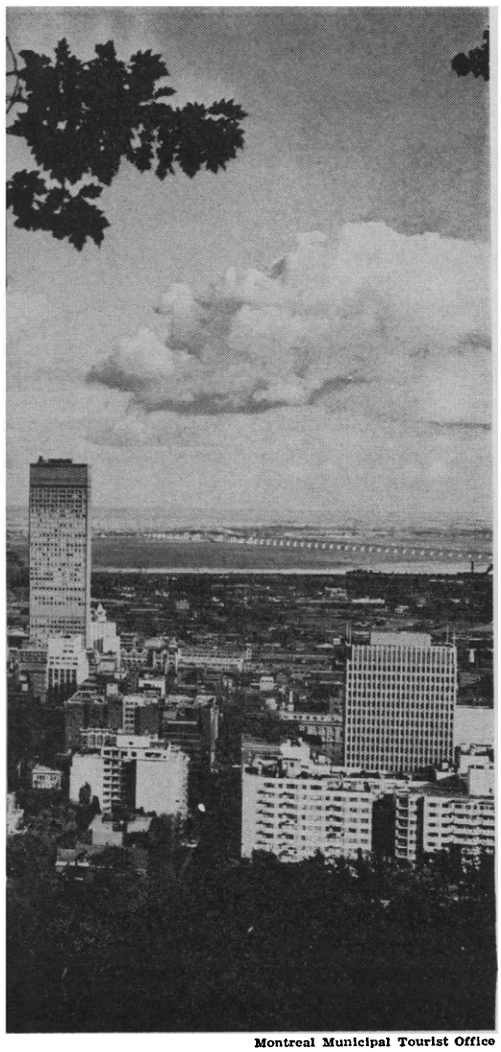

Montreal Municipal Tourist Office

Make sure you have the accommodations you prefer. A list of headquarters hotels of participating societies appears on page 299, 17 July, SCIENCE. The AAAS headquarters is the Queen Elizabeth.

The hotels for the AAAS Montreal meeting have established special, low rates and have reserved large blocks of rooms for the meeting.

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For a list of the headquarters of each participating society and section, see page 299, 17 July, SCIENCE.

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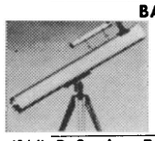

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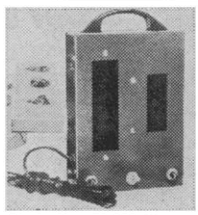

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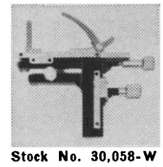

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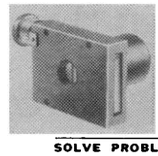

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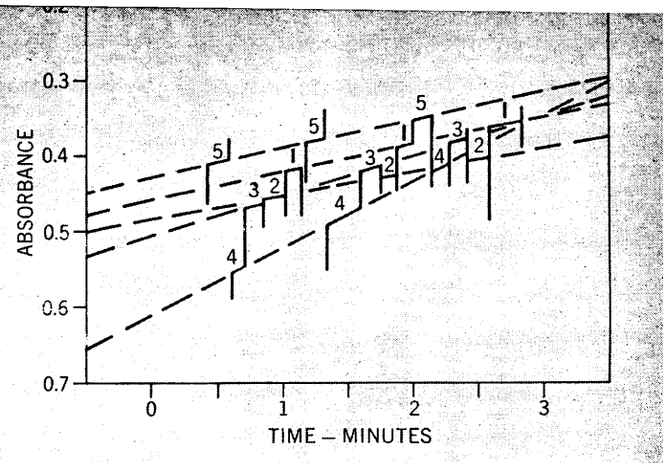

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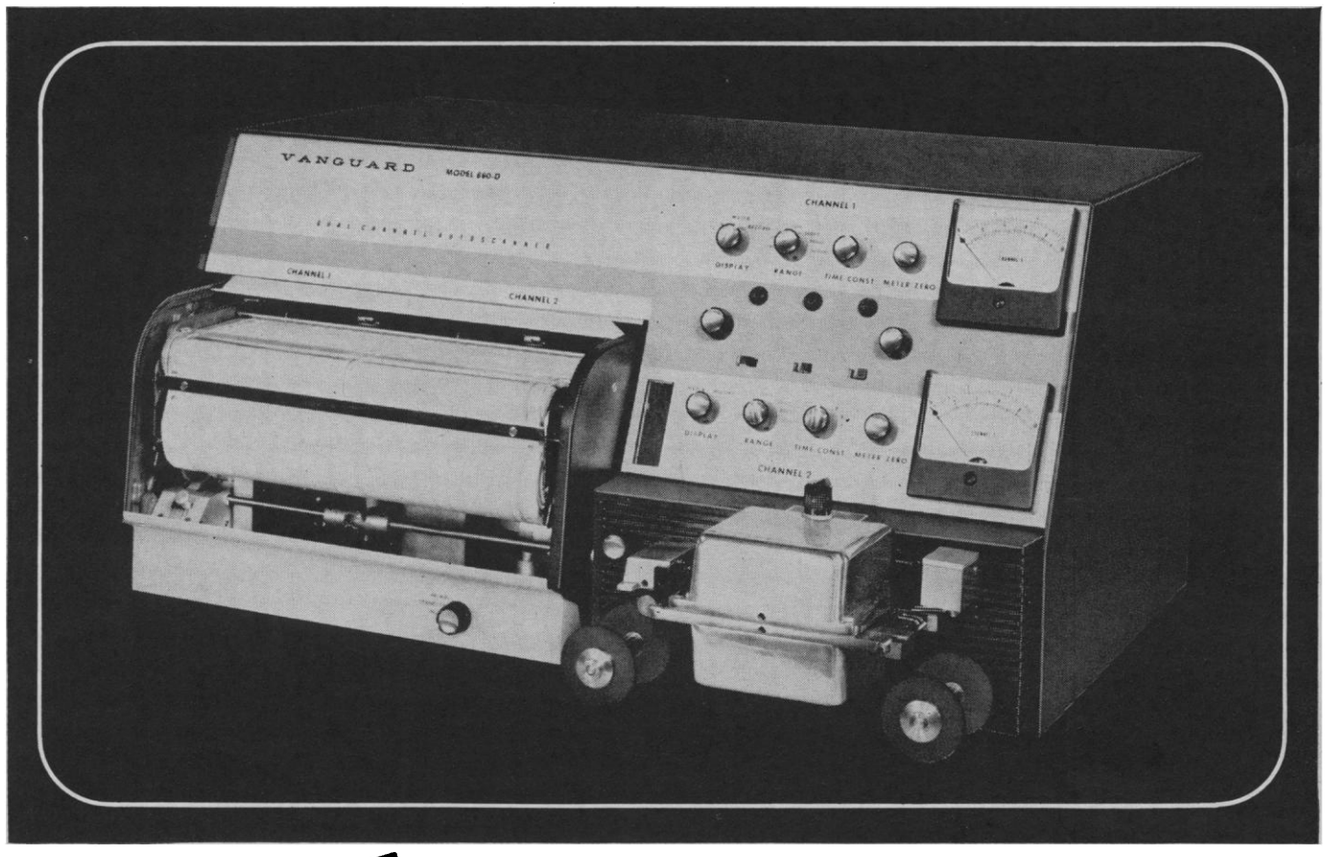

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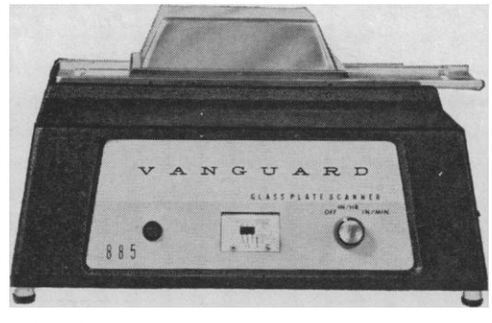

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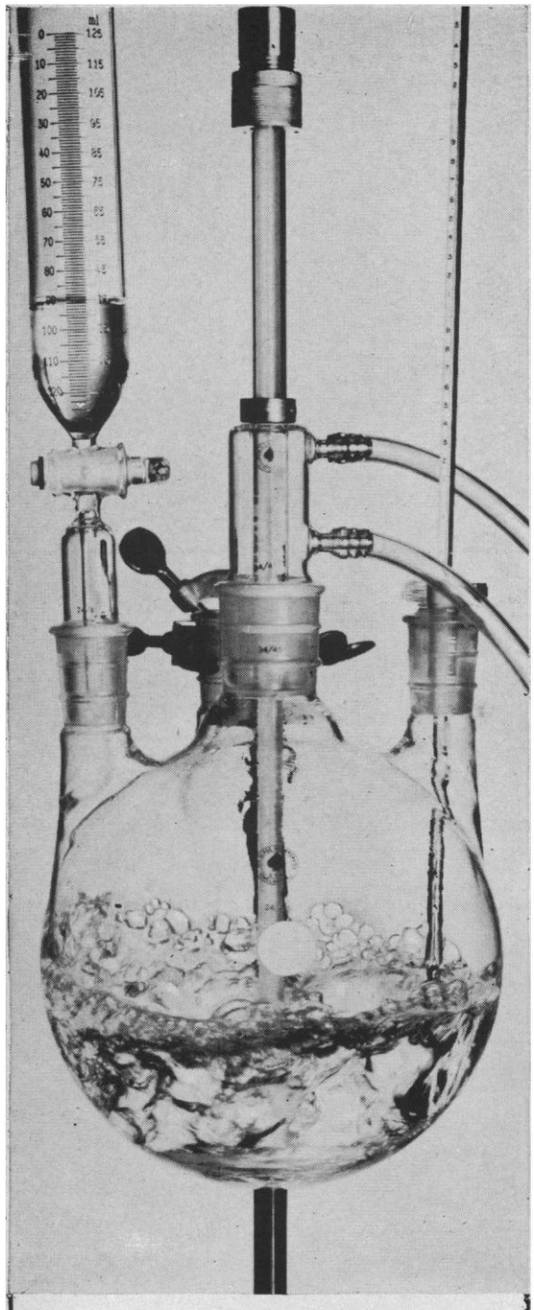

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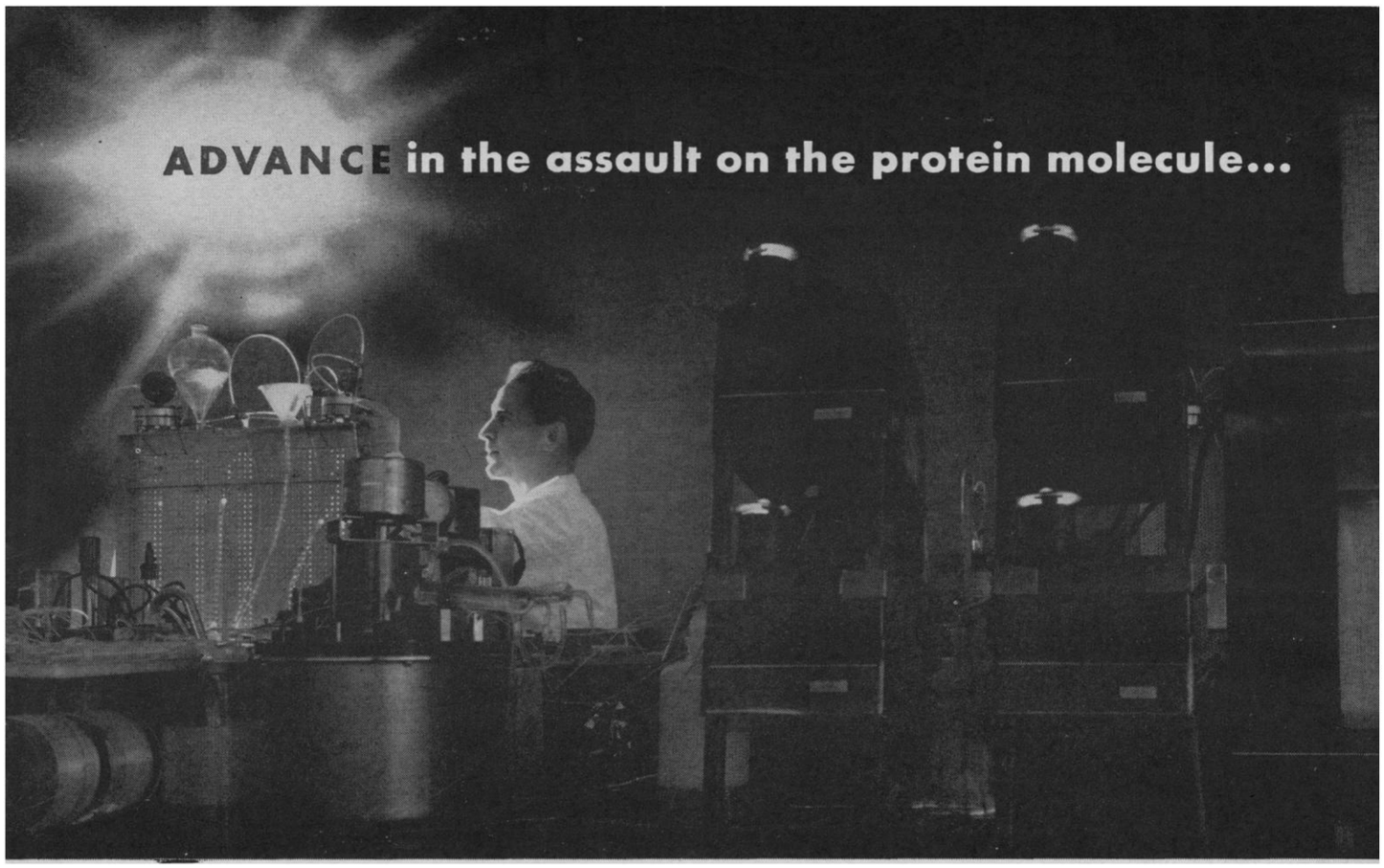

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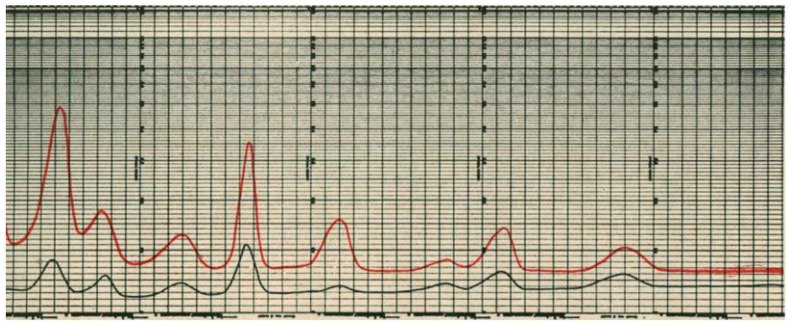

Section of a chromatogram showing tryptic hydrolyzate of performic acid oxidized bovine pancreatic Ribonuclease before and after alkaline hydrolysis.

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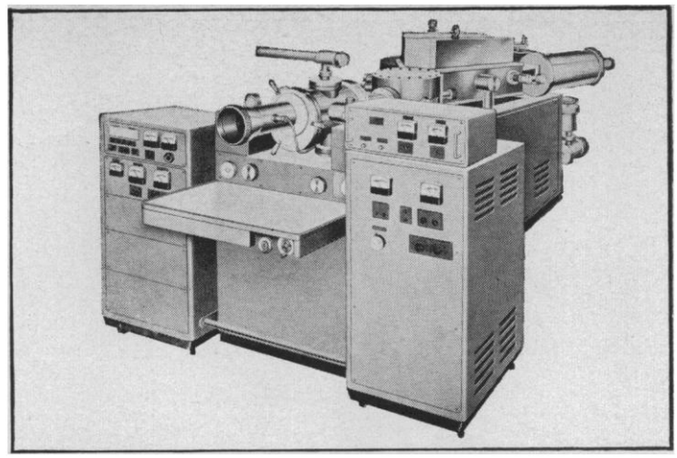

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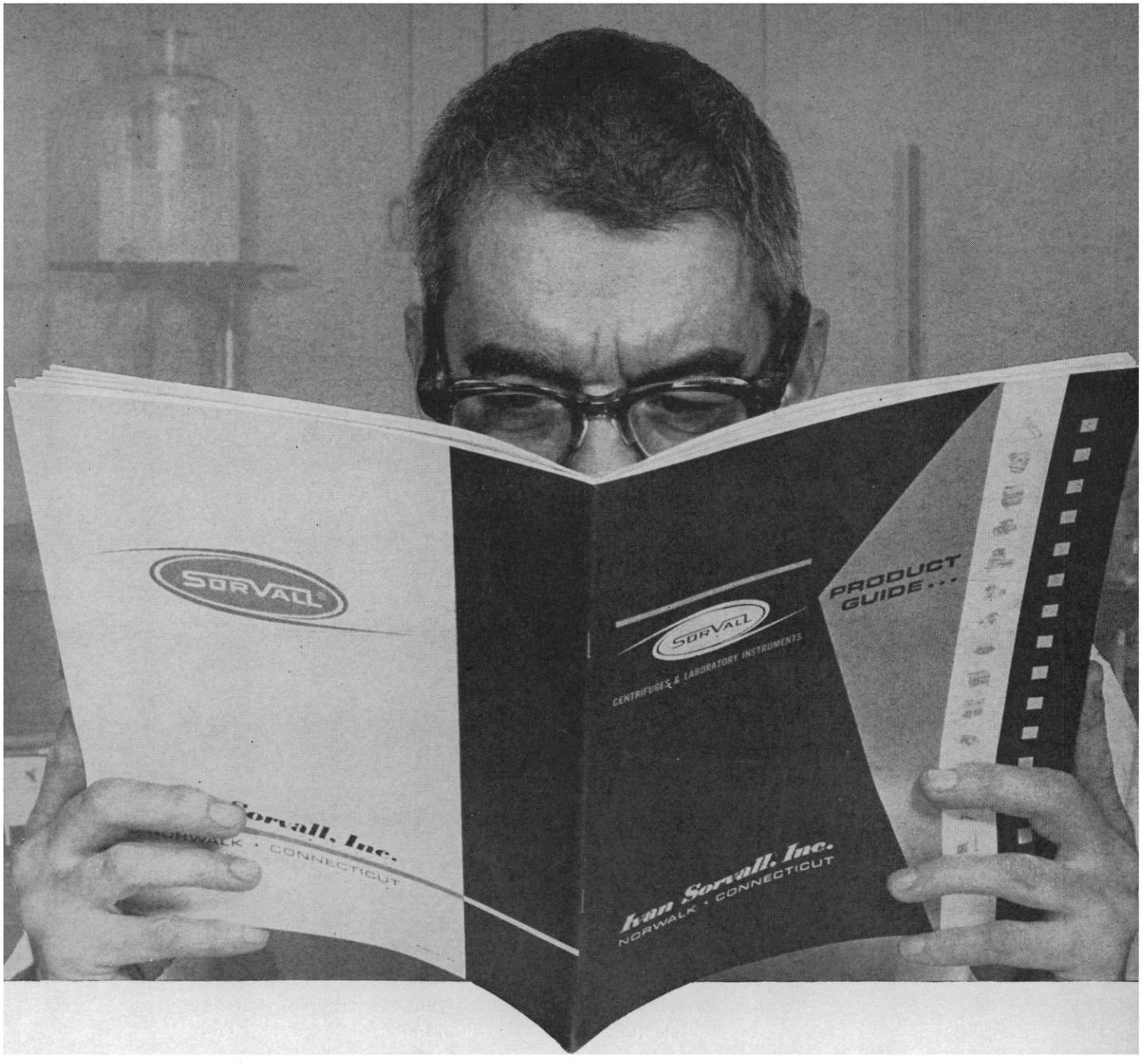

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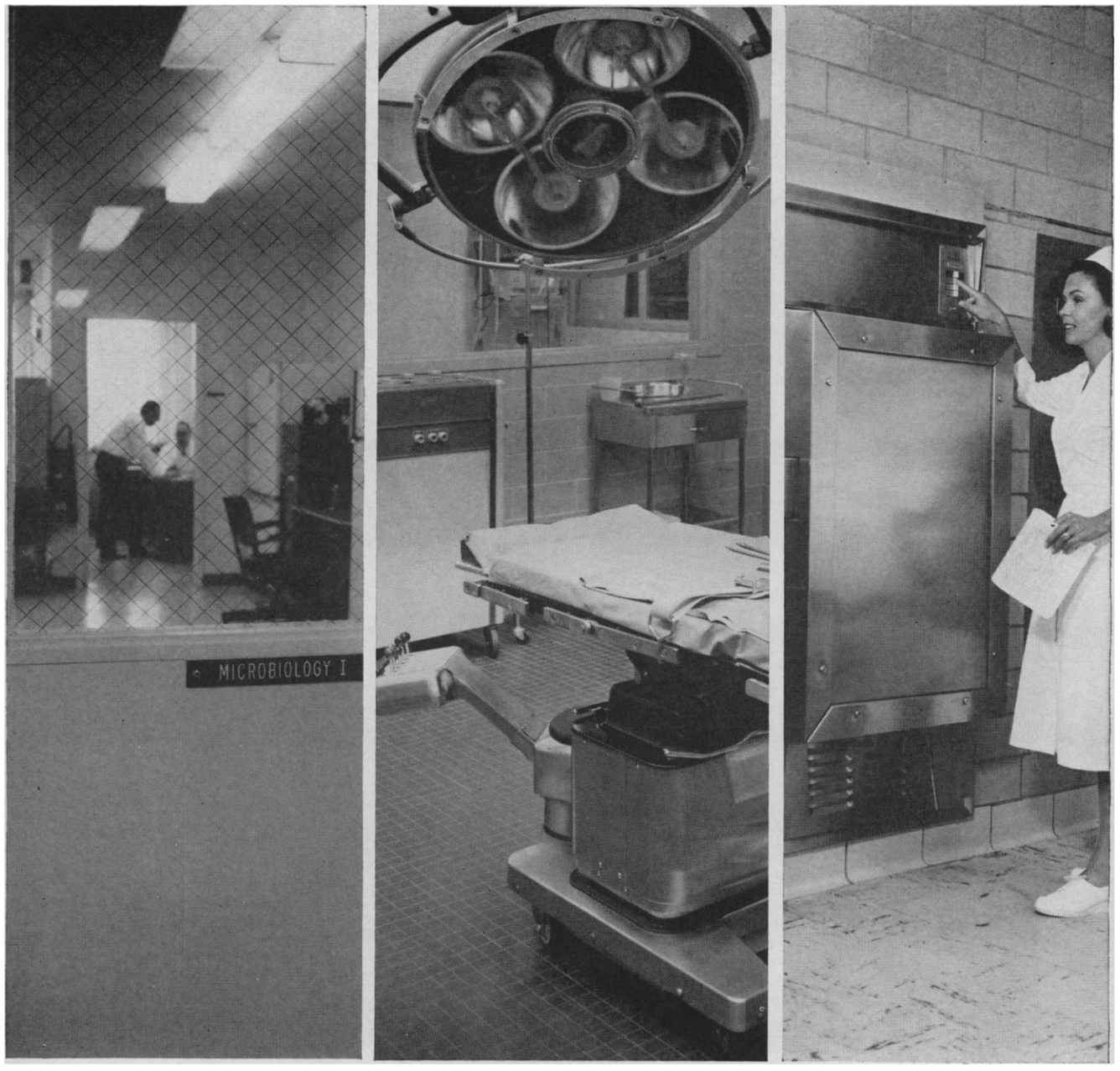

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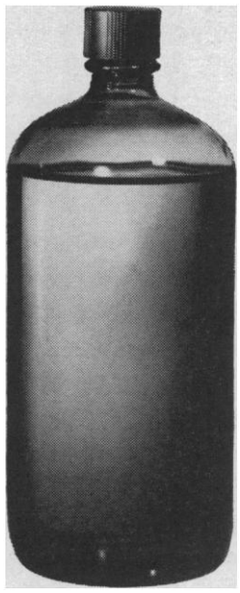

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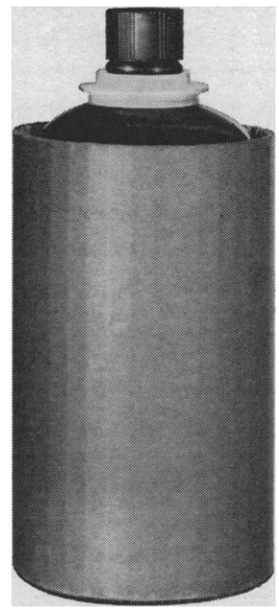

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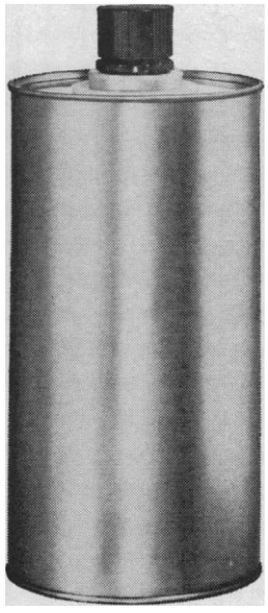

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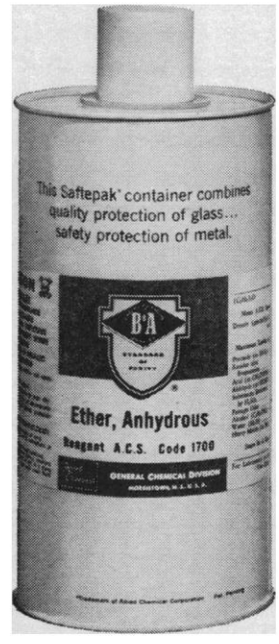

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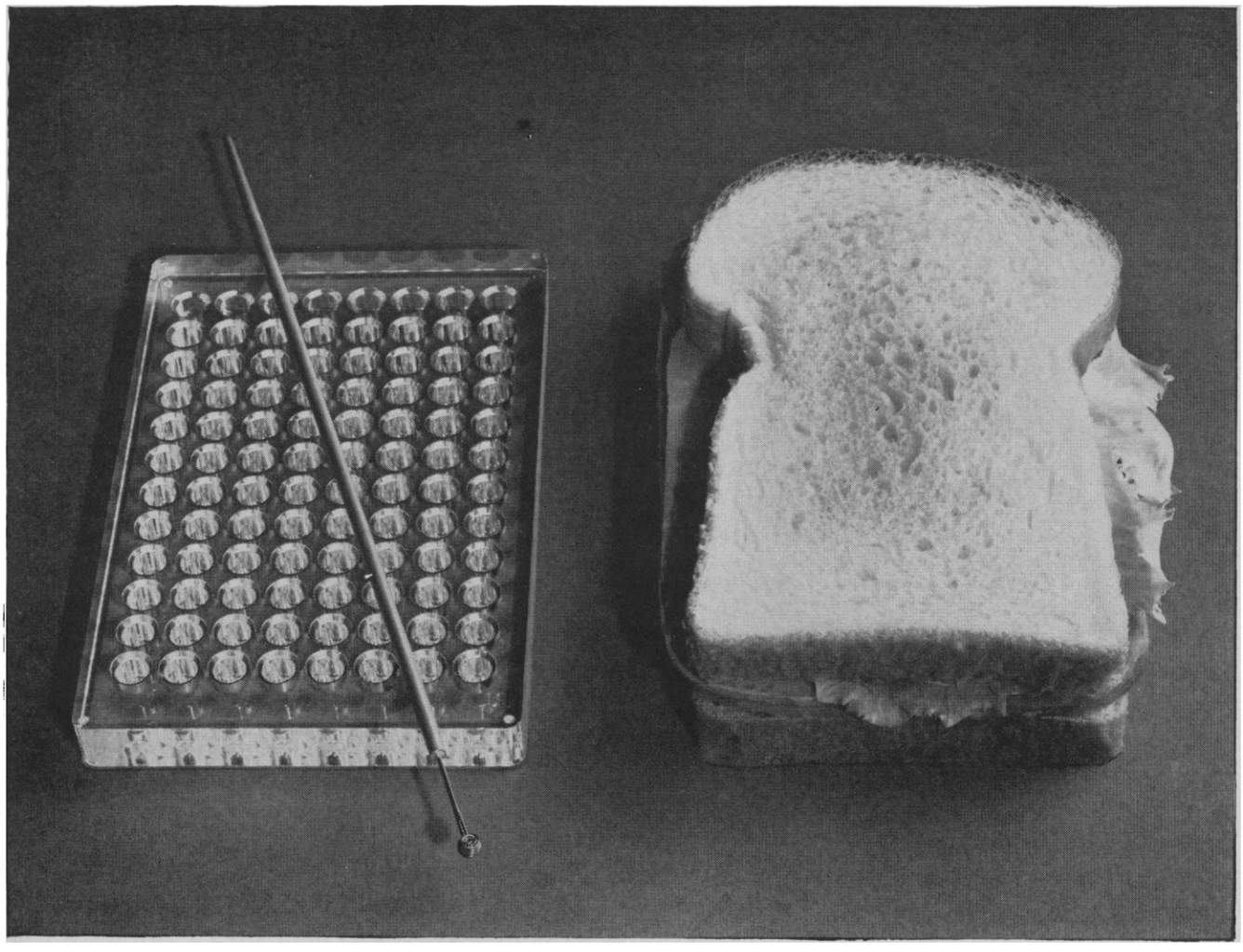

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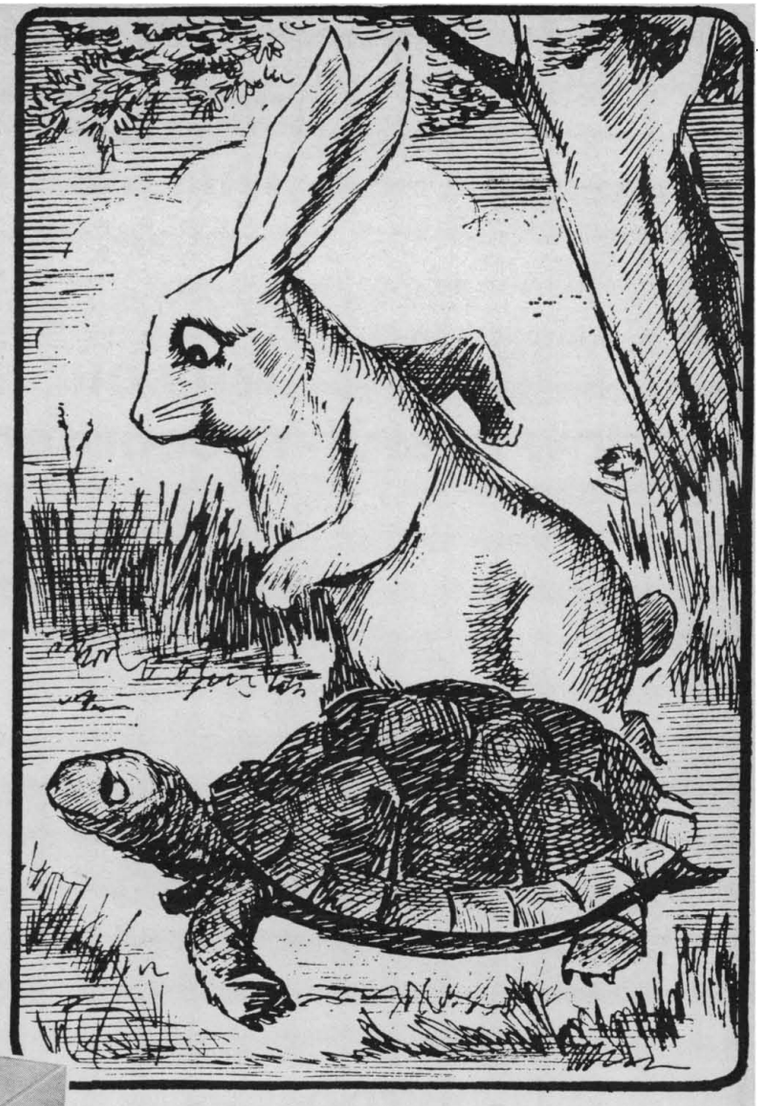

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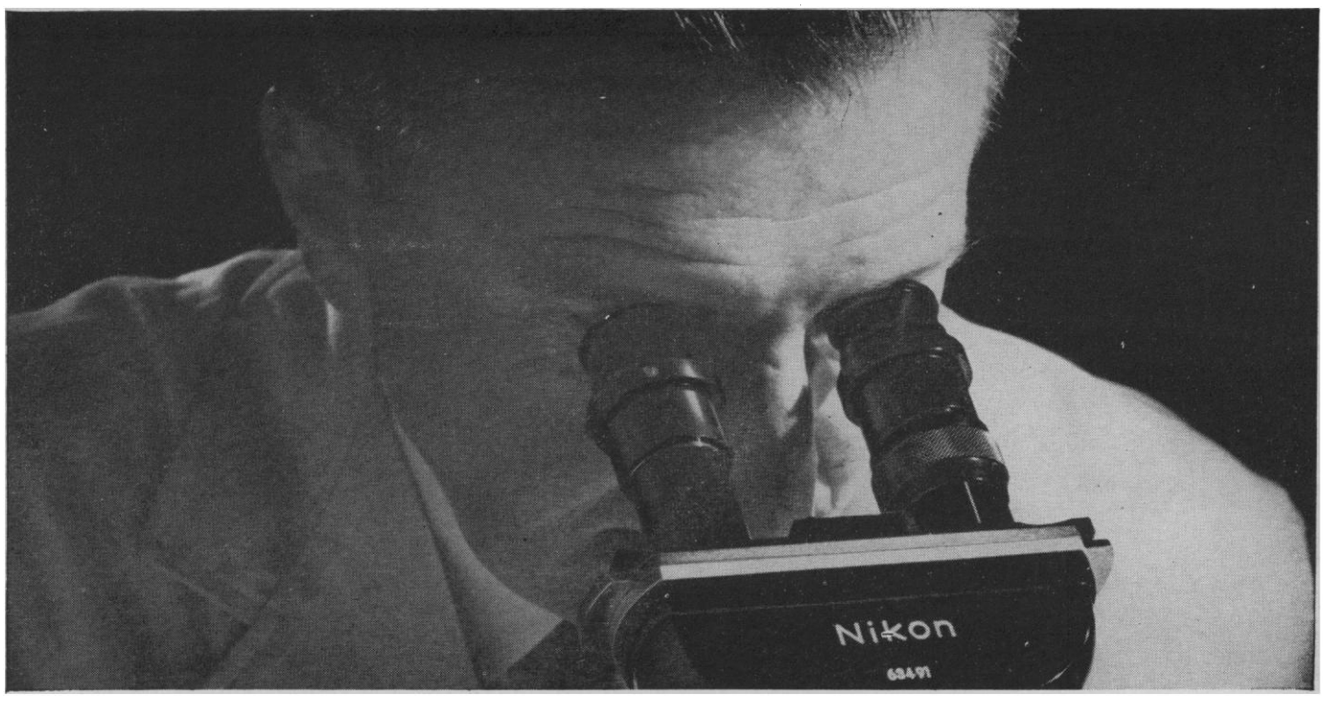

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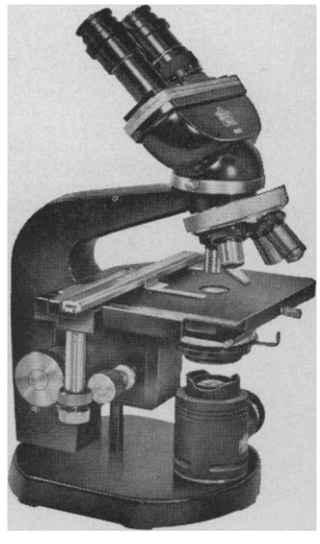

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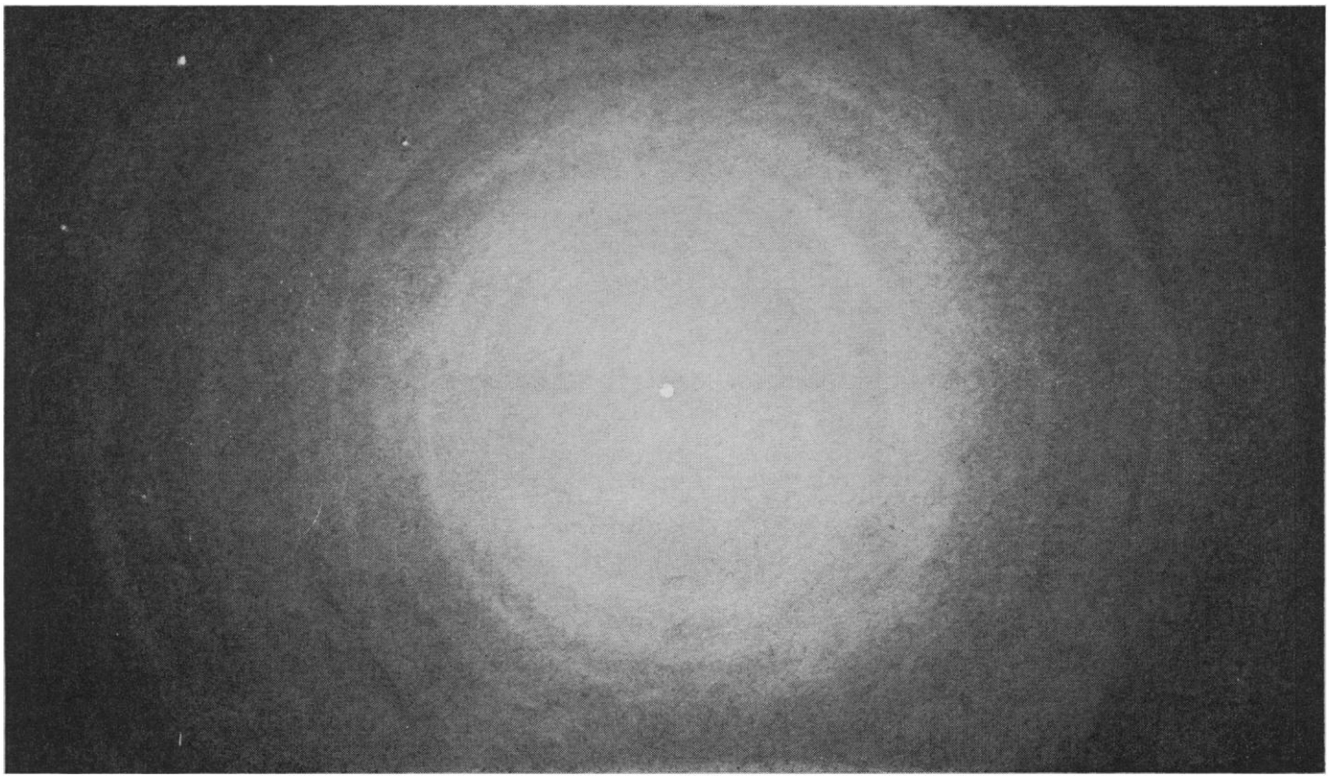

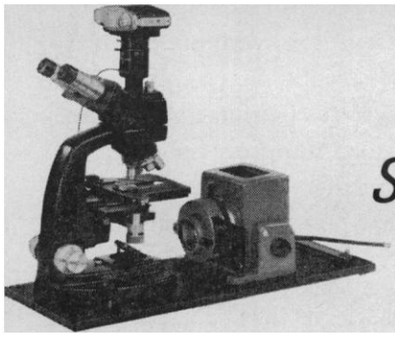

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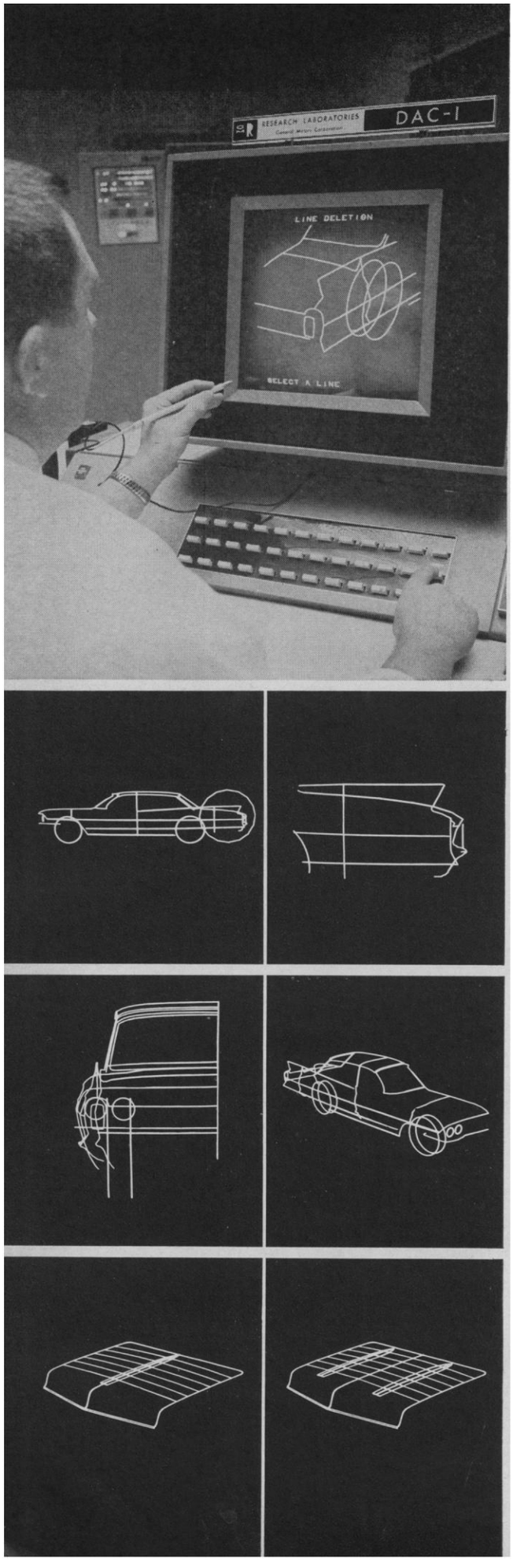

One of a series briefly describing GM's research in depth

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. . . is a current important focus of research at the General Motors Research Laboratories. Recently, for example, we announced our experimental GM DAC-I system (Design Augmented by Computers), a large computer complex under development since the late 1950's.

Still in the prototype stage, this new design system enables the designer to walk into our man-computer communication laboratory with a drawing . . . work on a design problem using an immense reservoir of programs and data stored in the computer . . . and walk out with one or more new drawings under his arm.

These amazing capabilities have come from a string of noteworthy advances in computer hardware and software tied neatly into an operational on-line system. For example, a program-controlled image processor can read free-form curves from drawings directly into the computer. A graphic console permits dynamic two-way "conversational communication" of graphic information between designer and computer. Intricate programming systems permit efficient time-sharing of the computer's central processing unit and space-sharing of its core memory. Permanent photographic copies of new designs are available within 30 seconds.

The General Motors DAC-I system is currently being studied by GM's Fisher Body and Styling Staff designers to determine the feasibility of utilizing man-computer teams in the design of automobiles. It's another example of how General Motors is opening the door to a more productive, more creative tomorrow.

General Motors Research Laboratories

Warren, Michigan

Top photo shows a designer at the graphic console of the GM DAC-I system. Underneath are computer-produced displays of what he sees when he enlarges, changes views or modifies a design stored in the computer memory.

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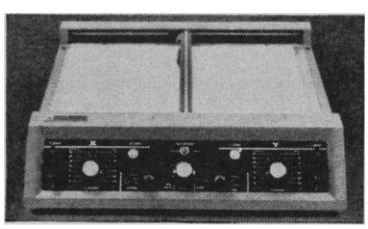

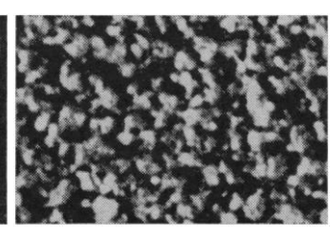
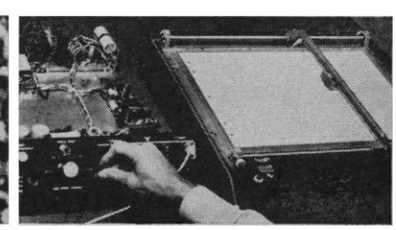

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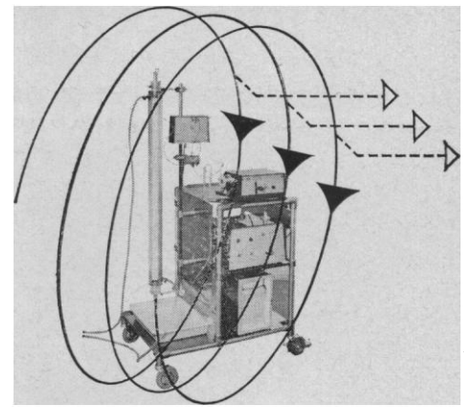
RECYCLING CHROMATOGRAPHY

NEW INSTRUMENTATION FOR A NEW TECHNIQUE* IN CHROMATOGRAPHIC SEPARATION



The ReCyChrom is equally applicable for preparative and analytical separation of mixtures of large-sized or of small-sized molecules. These molecules do not have to be electrolytes and restrictions on the type of buffer used are less than with other types of chromatography. Components within a narrow range of molecular sizes, usually not resolved on simple gel filtration columns, are separated in the ReCyChrom by allowing the sample to pass repeatedly through the bed, thereby multiplying its effective height many times. Separated fractions and uninteresting or disturbing parts of the effluent may be bled out of the stream after any cycle without interrupting the separation of the remaining components.

The apparatus is especially suitable for grading homologous series of polymers, e.g., dextrans; for routine control of the purity of biochemical preparations such as serum proteins, enzymes and hormones; and for separation of heat labile substances.

One unique advantage of recycling chromatography is the need for columns of only moderate length. Columns in two standard lengths, 60 cm and 100 cm, both with 32 mm bore are available at present. The range of sample volumes accommodated by these columns depends greatly on the nature of the sample. For simple desalting operations or for separation of peptides and amino acids from proteins, a sample of up to *150 ml* is not unusual, whereas for purity controls of radioactively tagged concentrated preparations, quantities down to 1/100 of this volume are feasible. Sample application by pipette is eliminated. The pump sucks sample through a selector valve with a holdup of 150 µl—a reproducible and non-critical method.

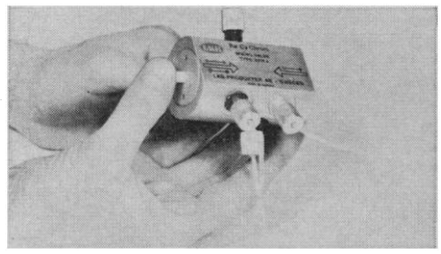
The four main components of the ReCyChrom, namely, a separation column, a peristaltic pump, a selector valve and a flow analyzer are available separately for incorporation into other instrument setups. The specially constructed columns with adjustable plungers at both ends can be sealed completely to eliminate the pressure of water head and permit liquid flow in either direction. Closed system operation and ascending flow maintains even packing and prevents the flow rate from falling off with use, even when beds of material with low mechanical strength (gels) are used.

LKB's specially designed peristaltic pump has a very high flow constancy—0.5% over a period of a week—and a continuously variable pumping rate from 0-390 ml/hr.

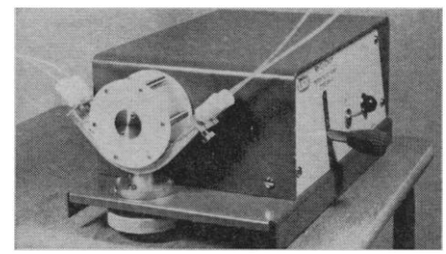
A choice of three flow analyzers, cooling jackets, terminal box, connections and a cart comprise the remainder of the assembly.

Request literature file 4900S12 for details.

*According to J. Porath and H. Bennich



The simple push of a button on the Selector Valve alters the flow circuit from injection or bleeding to recycling.



The Peristaltic Pump has many other uses when not in service for the ReCyChrom.

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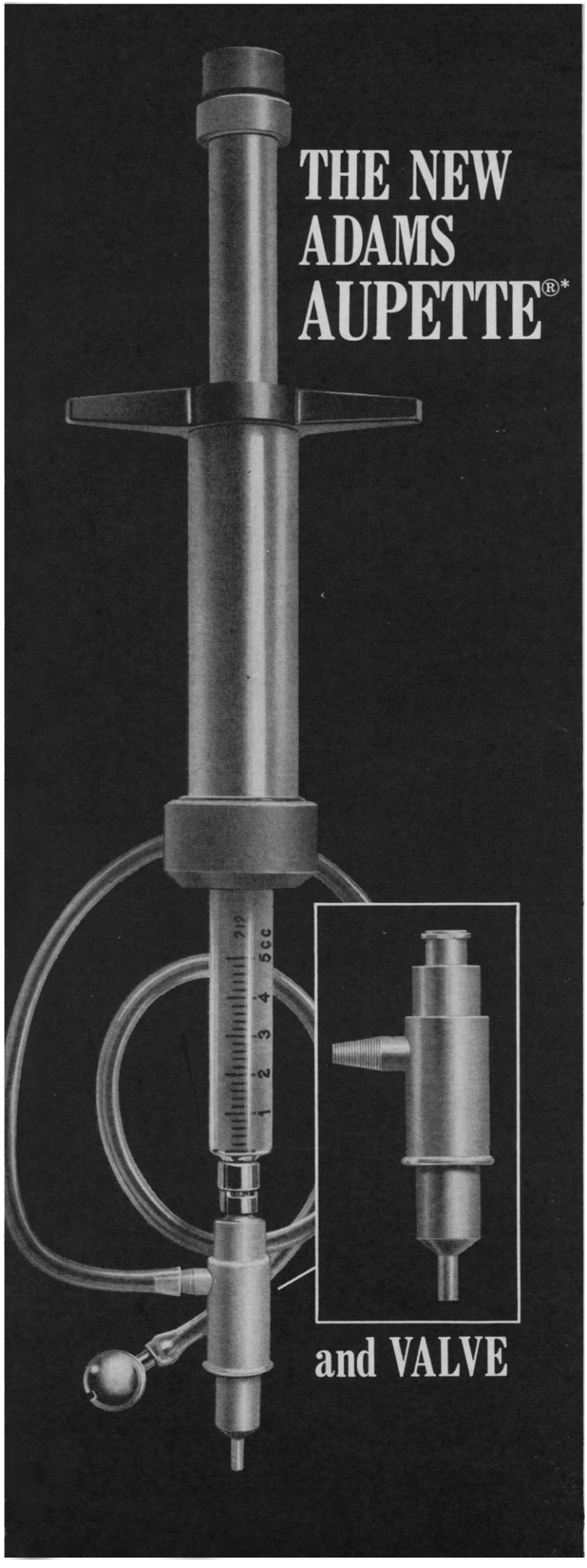

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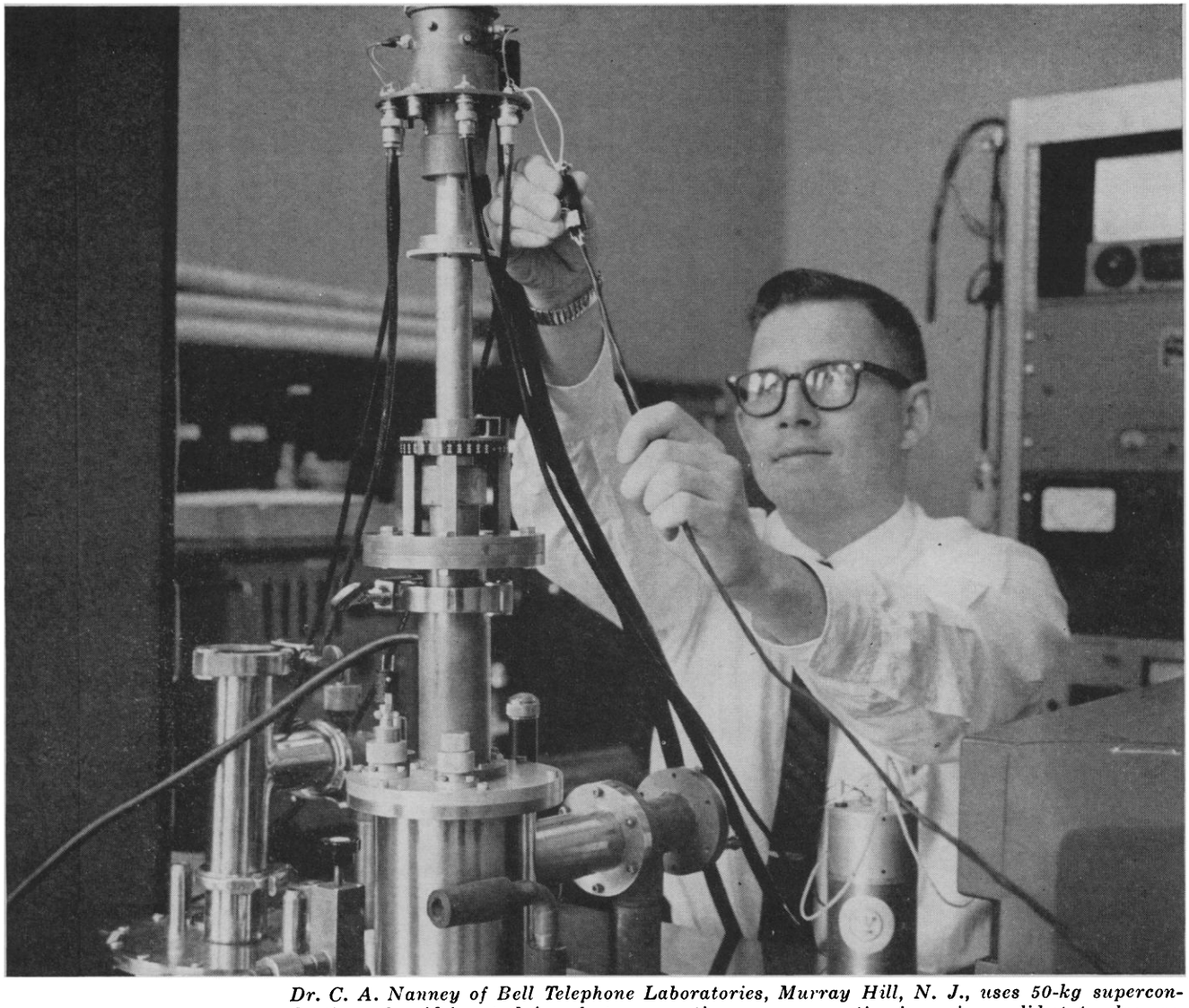

Dr. C. A. Nanney of Bell Telephone Laboratories, Murray Hill, N. J., uses 50-kg superconducting solenoid for studying electromagnetic wave propagation in various solid-state plasmas.

Westinghouse superconducting magnets produce stable field intensities, with high homogeneities, up to 100 kilogauss. They are completely safe, portable, easy to handle, fully guaranteed—and bring new flexibility to many important research areas. Their initial and operating costs, compared with conventional electromagnets, are surprisingly low.

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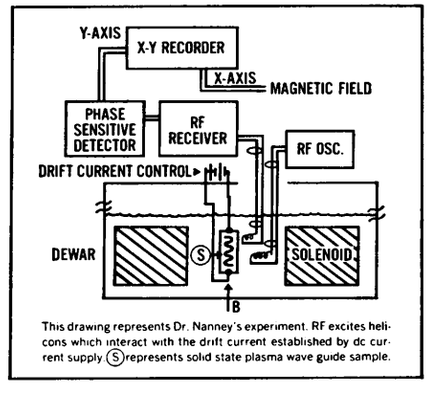

This drawing represents Dr. Nanney's experiment. RF excites helicons which interact with the drift current established by dc current supply. (S) represents solid state plasma wave guide sample.

Write for applications report: A new booklet describes key superconducting magnet applications in the fields of physics, chemistry and biology. For your copy, write Westinghouse Cryogenic Systems Department, P.O. Box 868, Pittsburgh, Pa. 15230.

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Linde Cryobiology NEWS

REPORT NO. 5 FROM UNION CARBIDE CORPORATION, LINDE DIVISION

Recovery of microorganisms, viable platelets, and leukocytes using liquid nitrogen storage techniques.

Papers read at the 1964 meeting of the American Society for Microbiology and other recent reports indicate significant new advances in the science of cryogenic preservation of tissue and cells.

A paper by Sokolski et al. (1) discussed the preservation of *Lactobacillus leichmanii* in liquid nitrogen for direct inoculum in the vitamin B_{12} assay. Complete recovery of viable cells was obtained when the suspensions were rapidly frozen by direct immersion in liquid nitrogen and then rapidly thawed by agitating in a 40°C water bath. Assay results on a number of test materials indicated good correlation between freshly prepared suspensions and frozen suspensions stored 3 months in basal medium.

Stapert et al. (2) reported on the preservation of *Sarcina lutea* in liquid nitrogen for direct inoculum in the bioassay for lincomycin. The dose-response slope of the liquid-nitrogen-preserved organism remained relatively constant over a 68-day period and the inhibition zone edges were sharp throughout. The authors further stated that the preparation and storage of one *S. lutea* suspension [in liquid nitrogen] would reduce day-to-day variation in the test organism for inoculum.

Rapid deterioration of viable platelets under ordinary conditions of storage led Djerassi and Roy (3) to experiment on rat platelets frozen in liquid nitrogen. After storage at −196°C, the platelets did not lose their morphologic integrity or their ability to circulate in thrombocytopenic recipient animals. The simultaneous presence of 5% dextrose and 5% dimethylsulfoxide in plasma was a key to a circulating yield of frozen platelets as high as 70% to 87% (compared to the numbers observed when fresh platelets were given).

Cohen and Rowe (4) reported on preservation of leukocytes taken from patients with lymphocytic leukemia. The cells were frozen in 10% to 15% dimethylsulfoxide at a controlled rate of 1°C per minute and stored in liquid nitrogen for 5 months at −196°C. During this time a total of 768 leukoagglutinin tests were performed. The experimenters concluded that cryogenic preservation appears practical for storage of leukocyte panels used for immunogenetic and routine leukoagglutinin testing.

New Products from LINDE

Our new LR-10A-6 portable refrigerator is designed both for economical shipping and small quantity storage of biological specimens. It will hold six canisters with a capacity of 115 cu. in. and has a minimum holding time of 3 weeks at −196°C between refills of liquid nitrogen. Lightweight, rugged, vibration-and-shock resistant, the new LR-10A-6 features a bucket type handle for easy carrying and a special metal foot ring to provide a stable base.

Another new product, the LINDE LD-4 Liquefied Gas Container, is particularly suitable for use in laboratories, classrooms and other locations requiring small portable cryogenic containers. Weighing only 11½ lb. when full, it can hold up to 4 liters of liquid nitrogen or liquid argon. A large pitcher-type handle makes it easy to pour and lift.

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The full line of LINDE liquid nitrogen equipment includes storage tanks, refrigerators, controlled-rate freezer units, biological transports, and auxiliary equipment.

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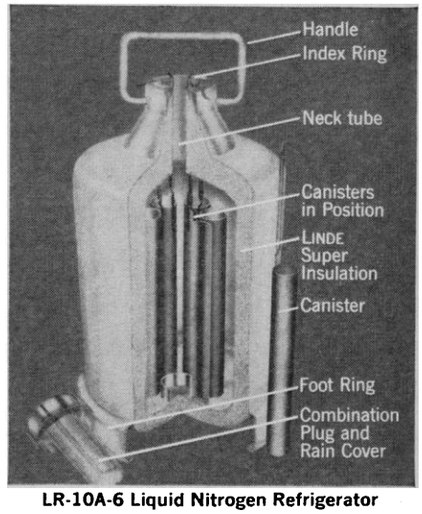
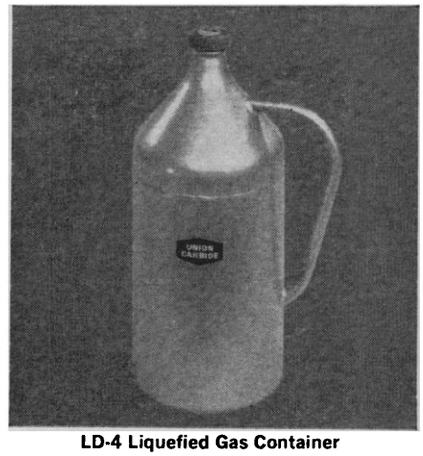


LR-10A-6 Liquid Nitrogen Refrigerator



LD-4 Liquefied Gas Container

(1) Sokolski, W. T., Stapert, E. M., Ferrer, E. B., and Hanka, L. J., *Bact. Proc.*, RT4, 1964. (2) Stapert, E. M., Sokolski, W. T., Kaneshiro, W. M., and Cole, R. J., *Bact. Proc.* RT5, 1964. (3) Djerassi, I. and Roy, A., *Blood XXII*, 703-717, 1963. (4) Cohen, H. and Rowe, A. W., *Transfusion 3*, 427, 1963.

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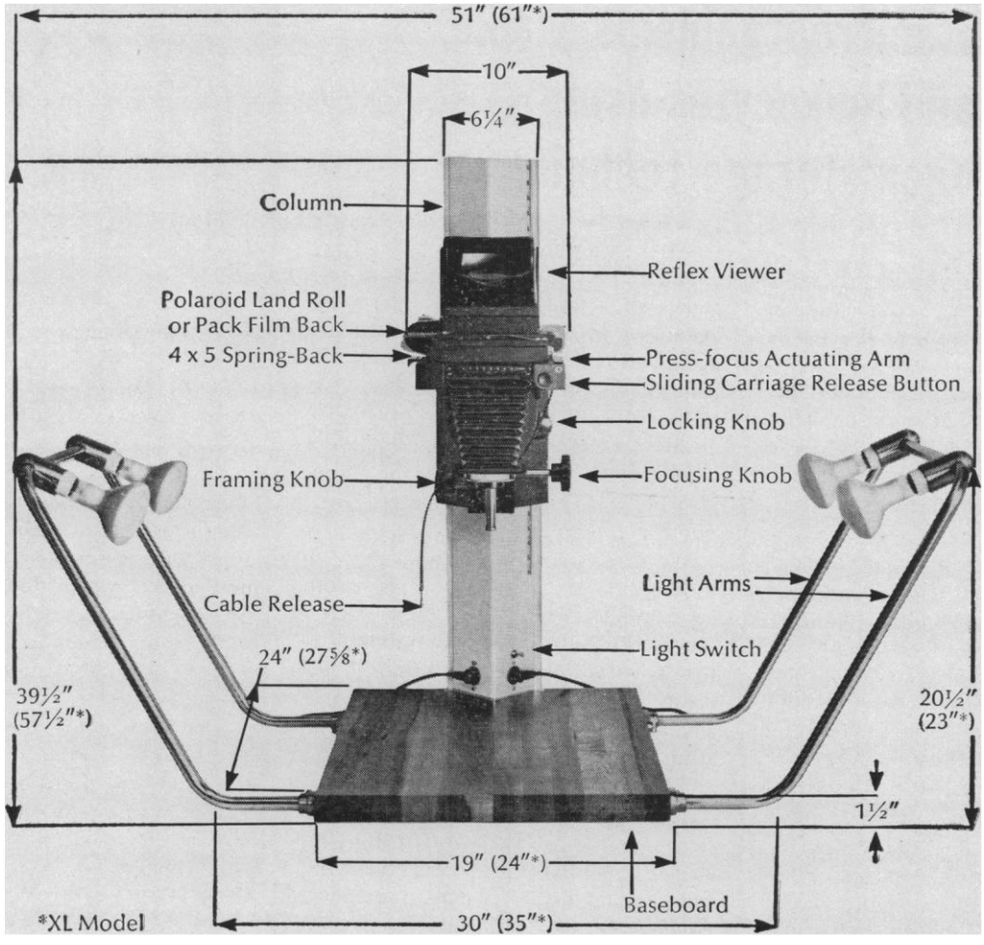

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borrow equipment for use in my basement from sympathetic university professors at three different universities. Some of the studies resulted in publishable material. As an upstairs scientist now in a university, I occasionally have interested people like Fox—perhaps younger and certainly not so well educated—working in my laboratory evenings and weekends. I can see no reason why his mentors Arthur W. Thomas, Lucy Hayner, and Polykarp Kusch could not underwrite and foster his studies by supplying some equipment and even funds.

Without condoning the actions of granting agencies, I would say that Fox's desire to be "independent" to the point of isolation precludes his desire to continue his research. Perhaps he wants to have his cake and eat it too.

HAROLD L. ROSENTHAL
Department of Physiological Chemistry, School of Dentistry, Washington University, St. Louis, Missouri

Standardized Tests: A Third Possibility

La Fave's suggestion (Letters, 9 Oct., p. 171) that "objectively" scored essay tests be used as alternatives to multiple-choice examinations has merit but overlooks another suggestion he mentions later, namely problem solving. He suggests the virtue of a "problem-solving attitude," but he does not explicitly suggest a problem-solving activity.

Those of us who are experienced in teaching engineering students are aware of the value of problem solving as a student exercise and as an examination technique. Perhaps it is a suitable alternative to the multiple-choice–essay dichotomy. In a problem-solving activity on an exam, a student is given certain data and is required to use the relevant portions of the data to work to the answer requested. The final answer usually consists of a number and some qualitative designation—215 apples, 3.14 cm, 3.14 cm^2. While most problems of this sort have more than one possible method of solution, there are not usually more than two or three suitable ways to solve for the requested answer. Problem solving as a testing technique is neither "multiple choice" nor "essay," but combines some of the better features of each.

J. W. HASLETT
Department of Physics, University of Illinois, Chicago 11

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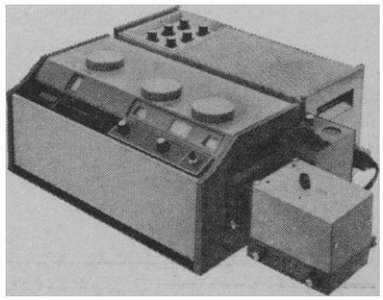

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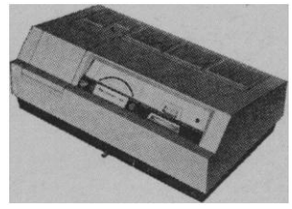

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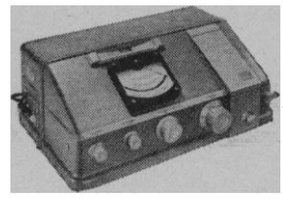

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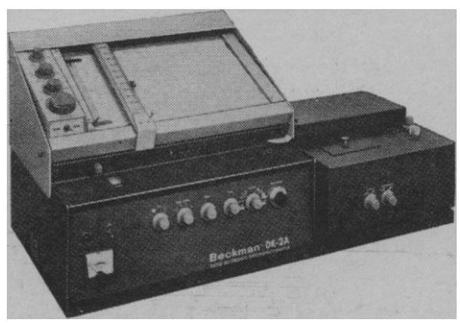

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4 December 1964, Volume 146, Number 3649 **SCIENCE**

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phone: 202-387-7171. Cable: Advancesci, Washington. Copies of "Instructions for Contributors" can be obtained from the editorial office. ADVERTISING CORRESPONDENCE: Rm. 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE 6-1858.

Ground-Based Astronomy

Astronomy is in the midst of a vital era.* During the 1950's came the discovery by optical methods that the abundance of heavy chemical elements varied from star to star and was related to stellar age. This finding suggested that the elements were continuously synthesized in the stars and distributed by stellar explosions. Other major discoveries have come from radio astronomy. One of these is the observation that some galaxies emit great quantities of radio energy. The radio emission is due to synchrotron radiation resulting when high-energy electrons encounter a magnetic field. Associated with the electrons must be heavy particles. Thus, the discovery of these radio explosions shows that magnetic fields exist in interstellar space and that large numbers of high-energy particles are moving through these fields.

Simultaneous optical and radio observations recently have led to identification of a new class of astronomical objects. These are quasi-stellar sources whose presence was originally signaled by strong radio emission. In optical studies the objects appear similar to ordinary stars. The radiations have large red shifts indicating that distant objects are radiating energy at an enormous rate. Calculations suggest that a new type of energy source is required—perhaps the release of energy stored in a gravitational field of a collapsing body.

As a kind of sideline to consideration of these great cosmological phenomena, ground-based astronomy has made significant discoveries concerning our solar system. Recent optical studies have yielded new information about the atmosphere of Mars. A total atmospheric pressure of about 25 millibars is indicated, with about 14 microns of precipitable water. Warm spots on the moon and unevenly hot regions in the atmosphere of Venus also have been observed. Radio astronomy has yielded a more accurate measurement of the distance to the sun, estimates of the composition and roughness of the lunar surface and of the temperature and structure of the surface of Venus. Fluorescent radiation from the lunar surface has been observed. Spectroscopic study of this light promises to reveal the nature of attendant chemical events. These contributions relate importantly to the space effort. For instance, the new estimates of the density of the Martian atmosphere have affected designs of equipment for landing capsules.

The potentialities of existing equipment have been only partially exploited. Improvements in auxiliary equipment are opening new opportunities. It was exploitation of new infrared detectors that led to the discovery of warm spots on the moon. Development of new devices such as image tubes promises extension of the effective range of telescopes.

A conspicuous potentiality in radio astronomy is the improvement in resolution to be obtained by constructing extended arrays of moderate-size radio telescopes. Such an array could detect and resolve radio sources even at the bounds of the observable universe.

The total cost of a 10-year program designed to provide important new facilities and additional astronomers has been estimated at $227 million. The Panel* is conservative when it states, ". . . an investment in ground-based astronomical facilities of the order of one-half of 1 per cent of that going into the space effort would be consistent with a balanced program of federal support for science."

—PHILIP H. ABELSON

*The material contained in this editorial was largely derived from an excellent report entitled "Ground-Based Astronomy. A Ten Year Program," prepared by the Panel on Astronomical Facilities for the Committee on Science and Public Policy of the National Academy of Sciences.

Science Teaching Societies

Sunday 27 December

Science Teaching Films. Part I.

Science Teaching in North America —A Historical View. Symposium, joint program I of American Nature Study Society (ANSS), Central Association of Science and Mathematics Teachers (CASMT), National Association of Biology Teachers (NABT), and National Science Teachers Association (NSTA). Arranged by Richard B. Beidleman (Colorado College). Myrl Lichtenwalter (Wells High School, Chicago, Illinois) will preside. Speakers: David G. Barry (State University of New York, Albany), James F. Lotze (Bellarmine School of Theology, North Aurora, Illinois). Stanley Norris (University of Alberta), and Jerry Stannard (Rutgers University).

Joint Mixer of All Science Teaching Societies.

Monday 28 December

Science Teaching Films. Part II.

What's Current in American and Canadian Science Teaching. Symposium, joint program II of ANSS, CASMT, NABT, and NSTA. Arranged by Verne N. Rockcastle (Cornell University). E. Laurence Palmer (Cornell University) will preside. Science teaching in the Montreal area—elementary and high school, H. R. Matthews and H. D. Lead (Protestant School Board of Greater Montreal). Biology and elementary school science, Charles Walcott (Harvard University). International views on biology teaching: the Heelback Conference, Denmark, Helen J. Martin (Pointe Claire High School, Quebec). New astronomy materials for elementary grades, Alvin Hertzberg (Great Neck Public Schools, New York).

Tuesday 29 December

Science Teaching Films. Part III.

Evaluating Outcomes of Science Teaching. Symposium, joint program of ANSS, CASMT, NABT, and NSTA. Arranged by Albert F. Eiss (NSTA). J. Darrell Barnard (New York University) will preside. The role of objectives and evaluation in science, J. Darrell Barnard. A suggested program for evaluating outcomes in science teaching, Clarence H. Nelson (Michigan State University). Forms and sources of feedback in UICSM curriculum evaluation, John Easley, Jr. (University of Illinois). Evaluation of a specific science pro-

gram, Henry Walbesser (AAAS and University of Maryland). Discussion.

Guided Tour of Redpath Museum.

American Nature Study Society

Sunday 27 December

Bringing Nature to the Classroom. Session I. Verne N. Rockcastle will preside. An experiment with aquatic animals in an elementary school, Joanna Burger (State University of New York at Buffalo). The acorn mystery, Deann Evangelist (Rush-Henrietta Public Schools, New York). The Cold Spring Harbor Laboratory Summer School, Otto Heck (Island Trees High School, Levittown, New York). Nature study and city children, Arthur Howard (Highlands School, White Plains, New York). Teacher-trainees bring nature to the in-service teacher, Richard B. Fischer (Cornell University). Nature study in the training of teachers, Paul Hafer (Potsdam State College, New York).

Monday 28 December

Luncheon, Presidential Address, and Business Meeting. Speaker: John Brainerd (Springfield College; president ANSS).

Publications: An Effective Medium for Teaching Nature Study. Session II. Stanley J. Mulaik (University of Utah) will preside. Le jeune scientifique: les jeunes explorateurs, un camp d'étude des sciences naturelles, Frère Léo Brassard (rédacteur, Joliette, Québec). The Cornell science leaflet—science or nature study?, Verne N. Rockcastle. The curious naturalist—small, but effective, Charles Roth (Massachusetts Audubon Society, Lincoln, Massachusetts). Study nature and books, Robert McClung (Amherst, Massachusetts).

Naturalists "At Home."

Tuesday 29 December

Extracurricular Organized Support for Nature Study. Session III. Ralph Dexter will preside. The nature study program of the Redpath Museum, Alice Johannsen (McGill University Museums). The program of the Pinchot Institute for Conservation Studies, Matthew J. Brennan (The Pinchot Institute, Milford, Pennsylvania). Les cercles des jeunes naturalistes, Père Oliva Fournier and J. Alphonse Lapointe (Cercles des Jeunes Naturalistes, Sherbrooke, Québec). Nature study at the Lorado Taft Field Campus, Douglas Wade (North-

ern Illinois University, De Kalb). The program of the Cape Cod Museum, Marshal T. Case (Cape Cod Museum of Natural History, Brewster, Mass.).

Annual Showing of Kodachromes. John Brainerd (Springfield College) will preside.

Field Trip. Joint field trip of ANSS and NABT. Albert Courtemanche (Department of Fish and Game, Province of Quebec) will act as leader.

National Association of Biology Teachers

Monday 28 December

Contributed Papers. Research in high school, Nancy Stees (Kennett Junior-Senior High School, Kennett Square, Pennsylvania). The culturally disadvantaged student and the science fair, Mother M. Sebastian (Loretto Academy, Chicago). An ecological food web demonstration, Richard G. Beidleman. Keeping the high school biology teacher knowledgeable and inspired, Mother M. Sebastian. Chromatography and electrophoresis on paper and thin layers —a teacher's guide, Ivor Smith (Courtauld Institute of Biochemistry, London).

Tuesday 29 December

NABT Luncheon. Invited speaker: Louis-Philippe Audet (Province of Quebec).

National Science Teachers Association

Sunday 27 December

Planning a Unified Science Program. Symposium, program of the NSTA, cosponsored by CASMT. Arranged by Albert F. Eiss. Joseph D. Novak (Purdue University) will preside. The value of basic conceptual schemes in planning a unified science program, Victor M. Showalter (Ohio State University). Possible alternative schemes for science prepared by H. Bentley Glass, Ted F. Andrews (University of Colorado). Values of a unified science program in the classroom, James V. DeRose (Marple-Newton High School, Newton Square, Pennsylvania). Achieving a balanced science program, Paul B. Weisz (Brown University). Discussion.

Monday 28 December

Preparing for Science in the Elementary School Classroom. Symposium, program of NSTA, cosponsored by

CASMT. Arranged by Albert F. Eiss. Stanley E. Williamson (Oregon State University) will preside. The nature of the problem, Stanley E. Williamson. New developments in elementary science, Arthur H. Livermore (AAAS and Reed College). Recommendations for the preparation of elementary teachers, Gerald Rising (University of Minnesota). How one college has planned a science program for elementary teachers, Edwin B. Kurtz, Jr. (AAAS and University of Arizona). In-service education for elementary teachers, Richard McBride (Lincoln School, Newark, New York).

Information and Communication

Sunday 27 December

Current Issues in Communication of Science, I: Editor-Scientist Panel. The Scientific Paper, Can It Survive? Arranged by Phyllis V. Parkins. Robert Anderson (Robert Anderson Associates, Ltd., Aylmer, Quebec) will act as moderator. Panel members: Philip H. Abelson (editor, *Science*), Pierre Dansereau (New York Botanical Garden, New York, New York), Belver C. Griffith (American Psychological Association), Peter Gray (University of Pittsburgh), A. Q. Mowbray (editor, *Materials Research and Standards*), and Charles Overberger (Polytechnic Institute of Brooklyn).

Monday 28 December

Symposium in the Historical and Communication Sciences: Science and the Public Mind—Past and Present (History of the Popularization of Science). Joint program of sections on History and Philosophy of Science (L) and Information and Communication (T). See details under General Sessions.

Wednesday 30 December

Panel: Effective Science Communication in Today's Research Environment. Joint program of section on Information and Communication (T) and the Society of Technical Writers and Publishers. Arranged by Gunther Marx (Illinois Institute of Technology Research Institute, Chicago) who will also preside. From the viewpoint of the industrial research scientist, Ambros P. Speiser, IBM, Yorktown Heights, New York. From the viewpoint of the science editor, Irving H. Jenks (Aluminium Laboratories Ltd., Kingston, Ontario).

From the viewpoint of the academic scientist, Arthur J. Samuels (Hunter College). Discussion.

Luncheon and Address. A talk about talk: some barriers to communication, M. W. Thistle (National Research Council of Canada).

Vice-Presidential Address of Section T. Foster Mohrhardt (National Agricultural Library, Washington, D.C.) will preside. Who speaks for science?, Wallace R. Brode (past president of AAAS; vice president for Section T).

National Association of Science Writers

Sunday 27 December

Business Meeting and Address. Martin Mann (Thomas Y. Crowell Co., New York, New York) will preside. Speaker: Percy H. Tannenbaum (University of Wisconsin).

Awards. Annual dinner and announcement of AAAS-Westinghouse Science Writing Awards.

Statistics

Vice-Presidential Address of Section on Statistics (U). Daniel B. Delury (University of Toronto) will preside. The rise and fall of the principle of the arithmetic mean, Churchill Eisenhart (National Bureau of Standards; vice president for Section U).

American Statistical Association

The Association is a cosponsor of Section U's entire program.

BIO (Biomedical Information-Processing Group) Association for Computing Machinery

Sunday 27 December

Classification Techniques in Medical Diagnosis. Symposium, joint program of BIO and section on Statistics (U). Arranged by Max A. Woodbury who will also preside. Medical diagnosis by computer using analog and digital input, Homer Warner (University of Utah). Differential diagnosis of hematological diseases, Martiń Lipkin (Cornell University Medical College). Talk by Joseph Mount (University of Alabama). Discussants: Murray Eden (Massachusetts Institute of Technology)

and G. Stanley Woodson (University of Michigan).

Biometric Society (Eastern North American Region)

Tuesday 29 December

Estimation of Biological Populations. Part I. Symposium, joint program of the Biometric Society (ENAR) and the American Fisheries Society, cosponsored by sections on Statistics (U) and Zoology (F). Arranged by Douglas S. Robson (Cornell University). Kenneth D. Carlander (Iowa State University of Science and Technology). Some vital statistics for a population of the chestnut lamprey in a Michigan river, James D. Hall (Oregon State University). The influence of trout predation on the population dynamics of the crayfish, Walter T. Momot. Agreement among independent estimates of trout populations in a small lake, Roger P. AuClair and Robert S. Rupp (Maine Department of Inland Fisheries and Game). Schooling and population estimates, J. E. Paloheimo (Fisheries Research Board of Canada). Schooling as a factor underlying heterogeneity in length compositions of samples of fish populations, L. M. Dickie (Fisheries Research Board of Canada).

Estimation of Biological Populations. Part II. Daniel B. Delury will preside. Estimate of annual mortality when marked individuals can be identified without recapture, Richard Cormack (University of Washington). On estimating a misclassification matrix and its inverse, W. Scott Overton (Emory University). Statistical tests of the tag-recapture model, Douglas S. Robson (Cornell University). Estimating population density from cursory, incomplete counts, William R. Hanson (California State College at Los Angeles). Finding the standard deviation of a sex or age ratio formula by the use of Deming's equations, George H. Kelker (Utah State University).

Institute of Mathematical Statistics

The Institute is a cosponsor of Section U's program.

Science In General

The following are the programs of organizations not affiliated with any one AAAS section.

Academy Conference

Sunday 27 December

Business Meeting. J. Teague Self (president, Academy Conference) will preside. Reports of officers and committees. Discussion of Academy programs and problems. Election of officers. Special program: The Academy executive duties and functions. The salaried, full-time executive. John H. Melvin (Ohio Academy of Science). The non-salaried, part-time executive, Richard G. Beidleman (Colorado-Wyoming Academy of Science).

Academies of Science between Meetings, I. Teacher Certification. Karlem Riess (Tulane University) will preside. The problems of teacher certification on a nationwide basis. The role of an academy of science in teacher certification, Ted F. Andrews (Kansas State Teachers College).

Academy Conference Dinner and Presidential Address. Gerald Acker (past president, Academy Conference) will preside. Presentation of distinguished service awards. New horizons, J. Teague Self.

Monday 28 December

American Junior Academy of Science Program. Robert C. Fite (Oklahoma State University) will preside. Analysis of Caucasian-Christian influence at West Des Moines Indian burial, Kevin R. Binns (Des Moines High School, Des Moines, Iowa). Prejudice and insecurity, Bonnie Jeanne Tinker (Des Moines High School, Des Moines, Iowa). Creativity in writing, Donna Rabin (Fair Lawn High School, Fair Lawn, New Jersey). Photo effects on the behavior of human spermatozoa, Perry M. Nealis (Columbus High School, Marshfield, Wisconsin). The function of thyroid hormones, Joseph W. Bell, Jr. (Robert E. Lee High School, Springfield, Virginia). The effect of an increased level of brain serotonin on learning ability of white mice, Carolyn Sue McCrory (Natchitoches High School, Natchitoches, Louisiana). Sensitivity mechanisms in the sensitive pea, *Cassia nictitans*, Mary Ann Lawrence (Mena High School, Mena, Arkansas). The theory and construction of a freon bubble chamber, Billy Joe Fornero (Texarkana High School, Texarkana, Arkansas). See with sound, Larry D. Flatt (Central High School, Columbia, Tennessee). Astrophotography, Thomas Kochakji (Bergenfield High School, Bergenfield, New Jersey). Sine wave-square wave lissajous patterns, Lionel Earl

Deimel, Jr. (Benjamin Franklin High School, New Orleans, Louisiana). Spectrophotometric colorimetry, Michael Hagerty (St. Edward Central Catholic High School, Elgin, Illinois). The isolation of *Cryptococcus neoformans* in Oklahoma City, Robert D. Lonian (Douglass High School, Oklahoma City, Oklahoma). Mutation of *Proteus vulgaris* by enzymatic action of *Staphylococcus aureus*, Robert J. Pariser (Norfolk Academy, Norfolk, Virginia). Effects of 742 solution on *Brachidanio rerio embryos*, Donna Brown (C. E. Donart High School, Stillwater, Oklahoma).

Association Canadienne-Francaise pour l'Avancement des Sciences

Wednesday 30 December

The Program and Activities of the Association canadienne-française pour l'Avancement des Sciences. Maurice L'Abbé (Université de Montréal) will preside.

Baccalaureate Education Project

Open Discussion. Science courses for baccalaureate education. V. L. Parsegian (Rensselaer Polytechnic) will preside.

Sigma Delta Epsilon

Monday 28 December

Vice-Presidential Address. Seed technology—a specialized field of applied botany, Eltora M. Schroeder (U.S. Department of Agriculture; vice president for Sigma Delta Epsilon).

The Society of the Sigma Xi

Tuesday 29 December

Sixty-fifth Annual Convention of the Society of the Sigma Xi, Part I. Frederick D. Rossini will preside.

Luncheon.

Sixty-fifth Annual Convention of the Society of the Sigma Xi, Part II. Frederick D. Rossini will preside.

Joint Annual Address of the Society of the Sigma Xi and the United Chapters of Phi Beta Kappa. H. Bentley Glass (member, AAAS Board of Directors) will preside. Sigma Xi representative: Frederick D. Rossini (University of Notre Dame). Phi Beta Kappa representative: H. Bentley Glass. Humanistic biology, René Dubos (Rockefeller Institute).

rents, and turbidity. This "semi-portable" tower represents a marked departure from conventional design. The large concrete anchor blocks can be removed and the tower floated to a different location. The design is economical both in construction and in maintenance and operation.

The detailed proposals for cooperation on individual, institutional, and governmental levels are included in the final report of this planning meeting submitted to the Japanese Society for the Promotion of Science and to the National Science Foundation. Persons interested in participating in this program may request copies of the final report from the Office of International Science Activities, National Science Foundation, Washington, D.C., 20550. Proposals have already been submitted to the official Japanese and American committees for the exchange of four oceanographers under this program. It is hoped that this report of the success of this meeting will encourage many oceanographers to actively participate in the United States-Japan Cooperative Science Program.

MARGARET K. ROBINSON
Scripps Institution of Oceanography
La Jolla, California

Forthcoming Events

December

15–18. **High Energy Astronomy**, symp., Univ. of Texas, Austin. (Office of Aerospace Research, SW, Washington, D.C. 20233)

15-18. **Relativistic Astrophysics**, symp., Univ. of Texas and Southwestern Center for Advanced Studies, Austin. (Mrs. J. Wardlaw, Dept. of Physics, Physics Bldg. 438, Univ. of Texas, Austin 78712)

16–21. Inter-American Congr. of **Psychology**, 9th annual, Miami, Fla. (V. D. Sanua, Yeshiva Univ., 110 W. 57 St., New York 10019)

20–24. **Theoretical and Applied Mechanics**, congr., Kanpur, India. (M. K. Jain, Indian Inst. of Technology, Kharagpur)

21–23. American **Physical** Soc., Berkeley, Calif. (W. Whaling, California Inst. of Technology, 1201 East California St., Pasadena)

21–23. **Biology of Marine Microorganisms**, conf., Univ. of California, Berkeley. (R. Newton, Letters and Science Extension, Univ. of California, Berkeley 94720)

26–29. Society of **Systematic Zoology**/American Soc. Zoologists/Herpetologists' League, annual, Univ. of Tennessee, Knoxville. (J. G. Rozen, Jr., Dept. of Entomology, SSZ, American Museum Natural History, Central Park West and 79th St., New York, N.Y.; A. G. Richards, ASZ, Dept. of Entomology, Univ. of Minnesota, St. Paul 55101; J. M. Legler, HL,

Dept. of Zoology, Univ. of Utah, Salt Lake City)

26–31. **American Assoc. for the Advancement of Science**, annual, Montreal, Canada. (R. L. Taylor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

The following 45 organizations will meet in conjunction with the AAAS annual meeting in Montreal, Canada, 26–31 December:

Academy Conference (J. T. Self, Dept. of Zoology, Univ. of Montreal, Montreal)

Academy of Psychoanalysis (M. Ullman, Maimonides Hospital, 4802 Tenth Ave., Brooklyn 19, N.Y.)

Alpha Epsilon Delta (M. L. Moore, 7 Brookside Circle, Bronxville, N.Y. 10708)

AAAS Commission on Science Education (J. R. Mayor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

American Astronautical Soc. (E. van Dreist, Director, Space Science Laboratory, North American Aviation, Downy, Calif.)

American Astronomical Soc. (G. C. McVittie, Univ. of Illinois Observatory, Urbana)

American Economic Association (H. E. English, Private Planning Assoc., 712 Sun Life Bldg., Montreal 2)

American Meteorological Soc. (K. C. Spengler, AMS, 45 Beacon St., Boston, Mass.)

American Nature Study Soc. (V. Rockcastle, Cornell Univ., Ithaca, N.Y.)

American Soc. of Naturalists (S. Granick, Rockefeller Inst., 66th St. and York Ave., New York 10021)

American Political Science Assoc. (E. B. Skolnikoff, Massachusetts Inst. of Technology, Cambridge)

American Soc. of Criminology (W. C. Reckless, Dept. of Sociology, Ohio State Univ., Columbus)

American Soc. for Microbiology (S. J. Ajl, Director of Research, Albert Einstein Medical Center, York and Tabor Rds., Philadelphia 41, Pa.)

American Soc. of Zoologists, Animal Behavior and Sociobiology Div. (G. W. Barlow, Vivarium Bldg., Wright and Healey Sts., Univ. of Illinois, Champaign)

American Sociological Assoc. (W. E. Moore, Russell Sage Foundation, 230 Park Ave., New York, N.Y.)

Animal Behavior Soc. (J. P. Scott, Jackson Laboratory, Hamilton Station, Bar Harbor, Maine)

Association canadienne-française pour l'Avancement des Sciences (M. J. Beauregard, ACFAS, C.P. 6128, Univ. of Montreal, Montreal)

Association for Computing Machinery, Bio-group (M. Woodbury, New York Univ. Medical Center, New York, N.Y.)

Biometric Soc. (D. S. Robson, Cornell Univ., Ithaca, N.Y.)

Canadian Aeronautics & Space Inst. (H. C. Luttman, CASI, 77 Metcalf St., Ottawa 4)

Canadian Assoc. of Geographers (J. T. Parry, Morrice Hall, McGill Univ., Montreal)

Canadian Assoc. of Physicists (A. C. H. Hallett, Dept. of Physics, Univ. of Toronto, Toronto 5)

Canadian Science Fairs Council (H. I. Bolker, Pulp & Paper Research Inst. of Canada, 3420 University St., Montreal 2)

Canadian Soc. Zoologists (J. Marsden, McGill Univ., Montreal, Canada)

Ecological Soc. of America (G. M. Woodwell, Brookhaven Natl. Laboratory, Upton, L.I., N.Y.)

Engineering Institute of Canada (G. T. Page, EIC, 2050 Mansfield St., Montreal)

Entomological Soc. of Canada (I. S. Lindsay, Defence Research Board, 125 Elgin St., Ottawa)

History of Science Soc. (J. E. Murdoch, Harvard Univ., Cambridge, Mass.)

Institute of Management Sciences (B. V. Dean, Dept. of Management, Case Inst. of Technology, Cleveland, Ohio)

Metric Assoc. (R. P. Fischelis, Ohio Northern Univ., Ada)

National Assoc. of Biology Teachers (R. Beidleman, Colorado College, Colorado Springs)

National Assoc. of Science Writers (L. S. Zahn, Hill & Knowlton, Inc., 150 E. 42 St., New York, N.Y.)

National Council of Teachers of Mathematics (J. Gates, NCTM, 1201 16th St., NW, Washington, D.C.)

National Geographic Soc. (R. W. Gray, NGS, 16th and M Sts., NW, Washington, D.C.)

National Inst. of Social and Behavioral Science (D. P. Ray, NISBS, 863 Benjamin Franklin Station, Washington, D.C.)

National Science Teachers Assoc. (A. F. Eiss, NSTA, 1201 16th St., NW, Washington, D.C. 20006)

Pharmacological Soc. of Canada (C. W. Nash, Dept. of Pharmacology, Univ. of Alberta, Edmonton)

Sigma Delta Epsilon (S. C. Stevens, VA Hospital, Lincoln, Neb.)

Society for Computer Science in Biology and Medicine (R. S. Ledley, Natl. Biomedical Research Foundation, 8600 16th St., NW, Silver Spring, Md.)

Society for Economic Botany (Q. Jones, New Crops Research Branch, Plant Industry Station, Beltsville, Md.)

Society for General Systems Research (J. H. Milsum, Dept. of Electrical Engineering, McGill Univ., Montreal)

Society for the History of Technology (J. J. Beer, Dept. of History, Univ. of Delaware, Newark)

Society of the Sigma Xi (T. T. Holme, Sigma Xi, 51 Prospect St., New Haven, Conn. 06511)

Society of Technical Writers and Publishers (G. Marx, Director of Communications, Illinois Inst. of Technology, Research Inst., Chicago)

27–29. American **Philosophical** Assoc., Boston, Mass. (L. E. Hahn, Dept. of Philosophy, Southern Illinois Univ., Carbondale 62903)

27–30. American **Statistical** Assoc., Chicago, Ill. (D. C. Riley, ASA, 810 18th St., NW, Washington, D.C. 20006)

28–30. American **Economic** Assoc., annual, Chicago, Ill. (H. F. Williamson, AEA, 629 Noyes St., Evanston, Ill.)

28–30. American **Geophysical** Union, Seattle, Wash. (W. W. Kellogg, Rand Corporation, 1700 Main St., Santa Monica, Calif.)

28–30. **Linguistic** Soc. of America, New York, N.Y. (A. A. Hill, Post Office Box 8120, University Station, Austin, Tex.)

28–30. Western Soc. of **Naturalists**, Univ. of Washington, Seattle. (I. A. Abbott, Hopkins Marine Station of Stanford Univ., Pacific Grove, Calif.)

30. **Scientific Research** Soc. of America, Cleveland. Ohio. (D. B. Prentice, 51 Prospect St., New Haven 11, Conn.)

January

5–7. **Glass Formation, Phase Equilibria, Nucleation and Crystal Growth**, symp., Sheffield, England. (D. Hawksworth, Soc. of Glass Technology, Thorton, 20 Hallam Gate Rd., Sheffield 10)

5–8. **Solid State Physics**, 2nd annual conf., H. H. Wills Physics Laboratory, University of Bristol, England. (Administrative Assistant, Inst. of Physics and Physical Soc., 47, Belgrave Square, London, S.W.1)

6–8. **Industrial Electronics and Control Instrumentation**, 13th annual conf., Philadelphia, Pa. (E. Weiss, Sun Oil Co., Marcus Hook, Pa.)

6–9. **Psychopharmacological** Conf., Czechoslovak Medical Soc., Psychiatry Section, Jesenik Spa. (M. Vojtechovsky, Budejovicka 800, Pavilion A1, Prague, Czechoslovakia)

8–9. **Orthopaedic** Research Society, New York, N.Y. (R. A. Calandruccio, 869 Madison Ave., Memphis, Tenn.)

9–14. American Acad. of **Orthopedic Surgeons**, annual, New York, N.Y. (H. K.

Hart, AAOS, 29 E. Madison, Chicago 2, Ill.)

11–14. **Civilian and Military Uses of Aerospace**, conf., New York, N.Y. (I. B. Laskowitz, New York Acad. of Sciences, 2 E. 63 St., New York)

12–14. **Reliability and Quality Control**, symp., Miami, Fla. (H. D. Hulme, Westinghouse R&D Center, Bldg. 601-1346, Churchill Boro, Pittsburgh, Pa.)

12–15. **Crustacea**, symp., Cochin, India. (Marine Biological Assoc. of India, Marine Fisheries P.O., Mandapam Camp, S. India)

14. American **Genetic** Assoc., Washington, D.C. (W. R. Singleton, Biology Bldg., Univ. of Virginia, Charlottesville)

18–20. **Solar Radiation Simulation**, intern. conf., Los Angeles, Calif. (H. F. Sander, Inst. of Environmental Science, 34 S. Main St., Mount Prospect, Ill.)

19. **Cor Pulmonale**, New York Heart Assoc., annual medical conf., New York, N.Y. (NYHA, 10 Columbus Circle, New York 10019)

19–20. **Die Design and Press Tooling** Conf., American Soc. of Tool and Manufacturing Engineers, Hartford, Conn. (M. Zapico, Asst. Conf. Director, ASTME, 10700 Puritan Ave., Detroit 38, Mich.)

20–22. **Instrumentation**, College Station, Tex. (P. T. Eubank, Chemical Engineering Dept., Texas A&M Univ., College Station)

20–23. National Soc. of **Professional Engineers**, New Orleans, La. (P. H. Robbins, 2029 K St., NW, Washington, D.C.)

22. **Bibliographical** Soc. of America, New York, N.Y. (Mrs. H. C. Ralph, P.O. Box 397, Grand Central Station, New York 10017)

22–1. **Earthquake Engineering**, 3rd world conf., Auckland and Wellington, New Zealand. (Administrative Secretary, Third World Conf. on Earthquake Engineering, P.O. Box 5180, Wellington)

22–23. **Blood**, annual symp., Detroit, Mich. (W. H. Seegers, Dept. of Physiology and Pharmacology, Wayne State Univ. College of Medicine, Detroit)

22–23. **Hydrocarbon Analysis,** symp., American Soc. for Testing and Materials, Houston, Tex. (ASTM, 1916 Race St., Philadelphia 3, Pa.)

25–26. **Fundamental Phenomena in the Material Sciences,** 3rd annual symp., Boston, Mass. (D. B. Fay, Ilikon Corp., Natick Industrial Centre, Natick, Mass.)

25–26. **Viruses of Laboratory Rodents**, symp., Atlanta, Ga. (R. Holdenried, Natl. Cancer Inst., NIH, Bethesda, Md. 20014)

25–27. American Inst. of **Acronautics and Astronautics**, New York, N.Y. (J. Bidwell, AIAA, 1290 Avenue of the Americas, New York 10019)

25–28. American **Meteorological** Soc., annual, New York, N.Y. (K. Spengler, AMS, 45 Beacon St., Boston 8, Mass.)

25–28. American Society of **Heating, Refrigerating and Air-Conditioning Engineers**, Chicago, Ill. (R. C. Cross, 345 E. 47 St., New York 10017)

25–28. Modern Methods of **Analytical Chemistry**, 18th annual intern. symp., Baton Rouge, La. (P. W. West, Dept. of Chemistry, Louisiana State Univ., Baton Rouge)

25–28. **Cardiovascular Diseases**, 2nd natl. conf., Washington, D.C. (C. H. Maxwell, 9650 Wisconsin Ave., NW, Washington, D.C. 20014)

25–29. American **Mathematical** Soc., Denver, Colo. (G. L. Walker, AMS, 190 Hope St., Providence, R.I.)

25–29. American Soc. for **Testing and Materials,** steel meeting, Mexico City, Mexico. (H. H. Hamilton, Public Relations, ASTM, 1916 Race St., Philadelphia, Pa. 19103)

25–30. American **Library** Assoc., Washington, D.C. (D. H. Clift, ALA, 50 E. Huron St., Chicago, Ill.)

26. Quasi Stellar **Radio Sources**, American Inst. of Physics, New York, N. Y. (E. H. Kone, AIP, 335 E. 45 St. New York 10017)

26. **Mossbauer Effect Methodology,** symp., New York, N.Y. (M. Ress, New England Nuclear Corp., 575 Albany St., Boston, Mass.)

27–30. American **Group Psychotherapy** Assoc., annual, San Francisco, Calif. (AGPA, Inc., 1790 Broadway, Room 516, New York, N.Y. 10019)

27–30. American **Physical** Soc., New York, N.Y. (K. K. Darrow, Pupin Physics Laboratory, Columbia Univ., New York)

Meeting Notes

The following are scientific and technical meetings scheduled in the U.S.S.R. and satellite nations. Similar lists will appear regularly in this section. In cases where no other source of information is known, the Academy of Sciences of the nation involved is listed. The address of the Academy of Sciences of the U.S.S.R. is Lenin Prospekt 7, Moscow.

December 1964

3–5. Sociological Questions Pertaining to the **Medical Field**, East German Hygiene Soc., symp., Berlin. (German Acad. of Sciences, Mohrenstrasse 39, Berlin W.8)

7–9. **Welding**, symp., Scientific Soc. for Mechanical Engineering, Hungary. (Scientific Soc. for Mechanical Engineering, Szabadsag ter 17, Budapest 5, Hungary)

15–16. **Periodic Functions in Live Matter**, Czechoslovak Meteorological Soc., Prague. (J. Novak, Dermatology Clinic, Prague 2, Apolinarska 4)

December 1964 (dates unknown)

Theoretical Bases of the Regulation of **Mineral Nourishment** under Controlled Conditions, Moscow, U.S.S.R. (Inst. of Plant Physiology, Leninskiy Prospekt 33, Moscow V-71)

1964 (dates unknown)

Animal Blood Group, 9th conf., Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague)

Czechoslovak-Polish **Medical** Conf., annual, Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague)

Czechoslovak **Scientific-Technical** Soc., conf., Prague. (Czechoslovak Scientific-Technical Soc., Central Council, Siroka 5, Prague 1-Stare Mesto)

Economic and Administrative Applications of **Digital Computers**, colloquium, Hungary. (A. Prekopa, "Bolyai Janos"

Mathematical Soc., Szabadsag ter 17, Budapest 5)

China **Electrical Engineering** Soc., conf., Mukden, Communist China. (Acad. of Sciences of China, Peking)

Electronics, 3rd biennial natl. conf., Prague, Czechoslovakia. (Czechoslovakia Acad. of Sciences, Narodni tr. 3, Prague)

International Council for **Educational Films**, 14th annual, Dubrovnik, Yugoslavia. (Yugoslav Acad. of Sciences and Arts, Zrinski trg. 11, Zagreb 1, Yugoslavia)

Methods of **Obtaining and Analyzing Extra Pure Substances**, Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Fracture Reservoir, 3rd all-union conf., L'vov, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

International Union of **Geodesy and Geophysics**, Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

Infectious Disease Conf., Czechoslovak Medical Society, Brno. (J. Stejskal, Infectious Diseases Dept., Faculty Pediatric Hospital, Cernopolni 22a, Brno, Czechoslovakia)

Laboratory Technique, 4th annual, Chamber of Technology, East Germany. (Fachverband Chemiche Technik, Kammer der Technik, Ebertstrasse 27, Berlin W.8, East Germany)

Principles of **Marxist History of Science and Engineering**, conf., East Germany. (East Germany Chamber of Technology, Ebertstrasse 27, Berlin W.8)

Problems of Vibrations of **Mechanical Systems**, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Analysis of **Nucleic Acids**, symp., Bulgaria. (Czechoslovak Acad. of Sciences, Nardoni tr. 3, Prague 1, Czecholovakia)

Obstetricians-Gynecologists, 12th all-union conv., U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Microelements and Natural **Radioactivity in Soils**, 4th conf., U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Study of **Snow Cover**, conf., Tashkent, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Spectroscopy, conf., Leningrad, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Zoologists, 2nd conf., Krasnodarsk, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

1964–65 (dates unknown)

Physiological Principles of Complex Forms of **Behavior**, conf., U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Electrophysiology, symp., U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

January 1965

6–9. **Psychopharmacological** Conf., Czechoslovak Medical Soc., Jesenik Spa. (M. Vojtechovsky, Budejovicka 800, Pavilion A1, Prague, Czechoslovakia)

January 1965 (dates unknown)

Economic **Geography and Geomorphology**, Geographical Soc. of China, Canton, Communist China. (Acad. of Sciences of China, Peking)

High Energy **Nuclear Physics**, 12th in-

tern. conf., Moscow, U.S.S.R. (Ig. E. Tamm, Acad. of Sciences of the U.S.S.R., B. Kaluzhskaya 14, Moscow)

February 1965

23–25. **High Polymer** conf., East German Chemical Soc., Magdeburg. (East German Chemical Soc., Unter den Linden 68/70, Berlin W.8)

March 1965 (dates unknown)

Calibration, 2nd intern. conf., Leipzig, East Germany. (German Acad. of Sciences, Mohrenstrasse 39, Berlin W.8)

Synthetic Fibers, 2nd symp., Weimar, East Germany. (H. Klare, Inst. für Faserstoff-Forschung, Deutsche Akademie der Wissenschaften, Kantstrasse 55, Teltlow-Seehof, East Germany)

May 1965

6–9. **Rheumatologists**, 9th congr., Bydoszcz, Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

11–14. **Gas Chromatography**, symp., East German Acad. of Sciences, Berlin. (Unterkommission für Gas Chromatographie, Permoserstrasse 15, Leipzig, Germany)

26–29. Electrochemical Methods and Principles in **Molecular Biology**, 2nd symp., Jena, East Germany. (Inst. for Microbiology and Experimental Therapy, German Acad. of Sciences, Mohrenstrasse 39. Berlin W.8)

May 1965 (dates unknown)

Polish **Orthopedic and Traumatology** Soc., congr., Lodz, Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

Computers for **Structural Analysis of Crystals**, Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

June 1965

9–11. Genetics in **Ophthlamology,** conf., Czechoslovak Medical Soc., Brno. (J. Vanysek, Eye Clinic, Faculty Hospital, Pekarska 53, Brno)

27–4. Applications of **Mathematics in the Engineering Sciences**, 3rd intern. colloquium, Weimar, East Germany. (H. Matzke, Hochschule für Architekture und Bauwesen, Karl Marx-Platz 2, Weimar)

28–1. **Surgical** Congr., Czechoslovak Medical Soc., Bratislava. (L. Kuzela, M.D.C. Sc., Partizanska 2, Bratislava)

June 1965 (dates unknown)

Animal Nutrition and Industrial Feed Production, symp., Brno, Czechoslovakia. (M. Krska, Research Inst. for Animal Nutrition, Feed Science and Technology, Pohorelice, Czechoslovakia)

History of Medicine, conf., Soc. of the History of Medicine, Bucharest, Rumania. (J. Gelehrter, Soc. of the History of Medicine, 10, rue Progresului, Bucharest)

Microwave Communications, 3rd colloquium, Hungary. (Microwave Research Inst., Hungarian Acad. of Sciences, Technika Haza, Szabadsag ter 17, Budapest 5)

Neurology Conf., Rumanian Soc. of Neurology and Neurosurgery, Bucharest. (N. Vasilesco, Soc. of Neurology and Neurosurgery, 10, rue Progresului, Bucharest)

July 1965

12–18. International Union of Pure and Applied **Chemistry**, 20th congr., Moscow, U.S.S.R. (R. Morf, c/o F. Hoffman-La Roche, Grenzacherstrasse 124, Basel, Switzerland)

August 1965

4–7. G. J. **Mendel Memorial** Symp., Czechoslovak Acad. of Sciences, Brno. (M. Sosna, Na Cuicisti 2, Prague 6, Czechoslovakia)

24–29. International Union of the **History and Philosophy of Science**, 11th intern. congr., Warsaw and Krakow, Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

27–4. Ionization Phenomena in **Gases**, 7th intern. congr., Belgrade, Yugoslavia. (Mme. B. Perovic, Boris Kidric Inst. of Nuclear Science, P.O.B. 522, Belgrade)

30–31. History of Science and Its Relation to Present-Day Planning of **Scientific Research**, symp., Krakow, Poland. (Inst. of the History of Science and Technology, Polish Acad. of Sciences, Nowy Swiat 72, Room 19, Warsaw 1)

30–10. **Population**, 2nd world conf., Belgrade, Yugoslavia. (United Nations Population Commission, New York, N.Y.)

August 1965 (dates unknown)

Limnology, 16th intern. congr., Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

August–September 1965 (dates unknown)

Soil Erosion Problems, Szczecin and Krakow, Poland. (S. Ziemnicki, Melioration and Grassland Inst., Lublin, Poland)

September 1965

2–5. International Medical Assoc. for the Study of **Living Conditions and Health**, 4th world congr., Karlovy Vary (Carlsbad), Czechoslovakia. (J. Lukas, 18 Apolinarska, Prague 2, Czechoslovakia)

7–11. **Hydraulic Research**, 11th congr., Leningrad, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

11–17. Research on **Moors**, 9th congr., Budapest, Hungary. (Hungarian Acad. of Sciences, Academiautca 2, Budapest)

12–25. **Speleology**, 4th intern. congr., Ljubljana, Yugoslavia. (Office of the Editor, *National Speleology Soc. News*, P.O. Box 649, State College, Pennsylvania)

13–18. **Foundry**, 32nd intern. congr., Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

13–29. International **Statistical** Inst., Belgrade, Yugoslavia. (The Institute, 2 Oostdiunlaan, The Hague, Netherlands)

15–30. **Electrical Engineers**, 11th annual, Weimar, East Germany. (Fachverband Elektrotechnik, Kammer der Technik, Ebertstrasse 27, Berlin W.8)

23–25. Polish Soc. of Physicians in **Internal Medicine**, 23rd congr., Krakow, Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

September 1965 (dates unknown)

Investigations of **Mineral-Forming Solutions and Fusions**, symp. Novosibirsk, U.S.S.R. (Acad. of Sciences of the U.S.S.R., Inst. of Geology and Geophysics, Siberian Dept., Novosibirsk, U.S.S.R.)

Nematology, 8th intern. symp., Aschersleben, East Germany. (J. van Brande, Soc. of European Nematologists, Rijslandbonwhage-school, Coupure links 235, Ghent, Belgium)

Organo-Silicon Chemistry, symp., Prague, Czechoslovakia. (Organizing Committee, The Symposium, 2 Na Civicisti, Prague 6)

Industrial Power, conf., East German Chamber of Technology, Berlin. (East German Chamber of Technology, Ebertstrasse 27, Berlin W.8)

October 1965 (dates unknown)

Microwire and Resistance **Instruments**, conf., U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

November 1965

18–20. General **Textile Engineering**, conf., East German Chamber of Technology, Leipzig. (Technical Assoc. of Textile, Clothing and Leather, Sekretariat, Clara-Zetkin-Strasse 115/117, Berlin W.8)

1965 (dates unknown)

Actinometry and Atmospheric Optics, 6th conf., Tartu, Estonia. (Acad. of Sciences of the U.S.S.R.)

Invariance in **Automatic Control**, conf., U.S.S.R. (Inst. of Automatics and Telemechanics, Dept. of Technical Sciences, Acad. of Sciences of the U.S.S.R.)

Bioclimatology Commission, intern. conf., Czechoslovak Acad. of Sciences, Czechoslovakia. (J. Novak, Dermatology Clinic, Prague 2, Apolinarska 4)

International **Brain Research** Organization, symp., Hungary. (UNESCO, Place de Fontenoy, Paris 7°, France)

Cardiologists, 1st all-union congr., U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Chemical Fibers, 2nd symp., East German Chemical Soc., Weimar, East Germany. (German Acad. of Sciences, Mohrenstrasse 39, Berlin W.8)

Czechoslovak-Polish **Medical** Conf., annual, Poland. (Polish Acad. of Sciences, Dworkowa 3, Warsaw)

Problems of the Study of **Evaporation**, Valday, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Obtaining and Analysis of **Extra-Pure Substances**, conf., Gor'kiy, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

International Commission to Coordinate **Fasciolar Research**, Bucharest, Rumania. (J. Hovorka, Director, Helminthological Inst. of the Slovak Acad. of Sciences, Ul. Dukelskych hrdinov 11, Kosice, Czechoslovakia)

Problems of **Fatigue and Restoration**, congr., U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Various Problems of **Genetics**, 4th symp., Gatersleben, East Germany. (German Acad. of Sciences, Mohrenstrasse 39, Berlin W.8)

Geographic Soc. of the U.S.S.R., 4th congr., U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Methodology of **Hydrogeological** Work, conf., Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

Information Theory, Statistical Decision Functions and Random Processes, 4th conf., Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

Macromolecular Chemistry, intern. symp., Intern. Union of Pure and Applied Chemistry, Prague, Czechoslovakia. (O. Wichterle, Inst. of Macromolecular Chemistry, Petriny, Prague 6)

Problems of Vibrations on **Mechanical Systems**, conf., Riga, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Medical Geography, 2nd conf., U.S.S.R. (Geographical Soc. of the U.S.S.R., Leningrad, Tsentr. Pereulok Grivirova, 10, U.S.S.R.)

X-ray Diffraction of **Mineral Raw Materials**, 3rd conf., U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Natural Foci of Diseases and Parasitology, 5th conf., Dushanbe, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Non-Destructive Methods of Testing, Sverdlovsk, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Nuclear Spectroscopy, meeting, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Numerical Weather Prediction, conf., World Meteorological Organization, Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Czechoslovak **Ophthalmological** Soc., congr., Czechoslovakia. (Czechoslovak Medical Soc., Albertov 7, Prague 2)

Pharmaceutical Sciences, 25th intern. congr., Prague, Czechoslovakia. (J. Hovorka, Inst. of Helminthology, Ul. Dukelskych hrdinov 11, Kosice, Czechoslovakia)

Physico-Chemical Analysis, 5th all-union conf., Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

International Union of **Pure and Applied Chemistry**, Intern. Committee of Electrochemical Thermodynamics and Kinetics, Budapest, Hungary. (Hungarian Acad. of Sciences, Akademiautca 2, Budapest)

Purest Substances in Science and Technology, 2nd intern. symp., East German Chemical Soc., Dresden. (East German Chemical Soc., Unter den Linden 68/70, Berlin W.8)

International **Scientific Film** Assoc., 19th annual congr., Bucharest, Rumania. (Acad. of the Rumanian People's Republic, Calea Victoriei 125, Bucharest)

Mineralogy and Geochemistry of **Sedimentary Rocks**, conf., Leningrad, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Scientific Council on **Tectonics** of Siberia and the Far East, conf., Vladivostok, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Telemechanics and Remote Control, symp., Bucharest, Rumania. (Inst. of Math-

ematics, Acad. of the Rumanian People's Republic, Calea Victoriei 125, Bucharest)

1965–1966 (dates unknown)

Pugwash Conf., Warsaw, Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

April 1966 (dates unknown)

Mechanical Vibration and Shock, conf., Intern. Organization for Standardization, Prague, Czechoslovakia. (H. M. Trent, U.S. Naval Research Laboratory, Washington, D.C.)

June 1966

6–10. Interkamera, **Optics and Film Technology**, symp., Prague, Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

August 1966 (dates unknown)

International Union of **Crystallography**, 7th intern. congr., Moscow, U.S.S.R. (N. V. Belov, Inst. of Crystallography of the Acad. of Sciences of the U.S.S.R., Leninskiy Prospekt 59, Moscow B-333)

September 1966

12–17. **Food Science and Technology**, 2nd intern. congr., Warsaw, Poland. (Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

September 1966 (dates unknown)

Czechoslovak **Ophthalmological** Soc., congr., Bratislava. (Czechoslovak Medical Soc., Albertov 7, Prague 2)

1966 (dates unknown)

Alicyclic Compounds, symp., Intern. Union of Pure and Applied Chemistry, Prague, Czechoslovakia. (Czechoslovak Acad. of Sciences, Narodni tr. 3, Prague 1)

International Assoc. of **Applied Psychology**, 16th congr., Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Aviation and Space Medicine, 15th congr., Prague, Czechoslovakia. (Czechoslovak Medical Soc., Albertov 7, Prague 2)

Geodesic Calculations, symp., Intern. Union of Geodesy and Geophysics, Krakow, Poland. (O. Poczobutt, Polish Acad. of Sciences, Palace of Culture and Sciences, Dworkowa 3, Warsaw)

International **Laboratory Medical** Soc., 1st conf., Budapest, Hungary. (Hungarian Acad. of Sciences, Akademiautca 2, Budapest)

International **Mathematical** Union, intern. congr., U.S.S.R. (Acad. of Sciences of the USSR)

Metallic Corrosion, 3rd intern. congr., Moscow, U.S.S.R. (Y. M. Kolotyrkin, Physico-Chemical Inst., imeni L. Ya. Karpov, Moscow)

International Assoc. of **Microbiological** Societies, 9th intern. congr., Moscow, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)

Use of **Microelements in Agriculture and Medicine**, Novosibirsk, U.S.S.R. (Acad. of Sciences of the U.S.S.R.)