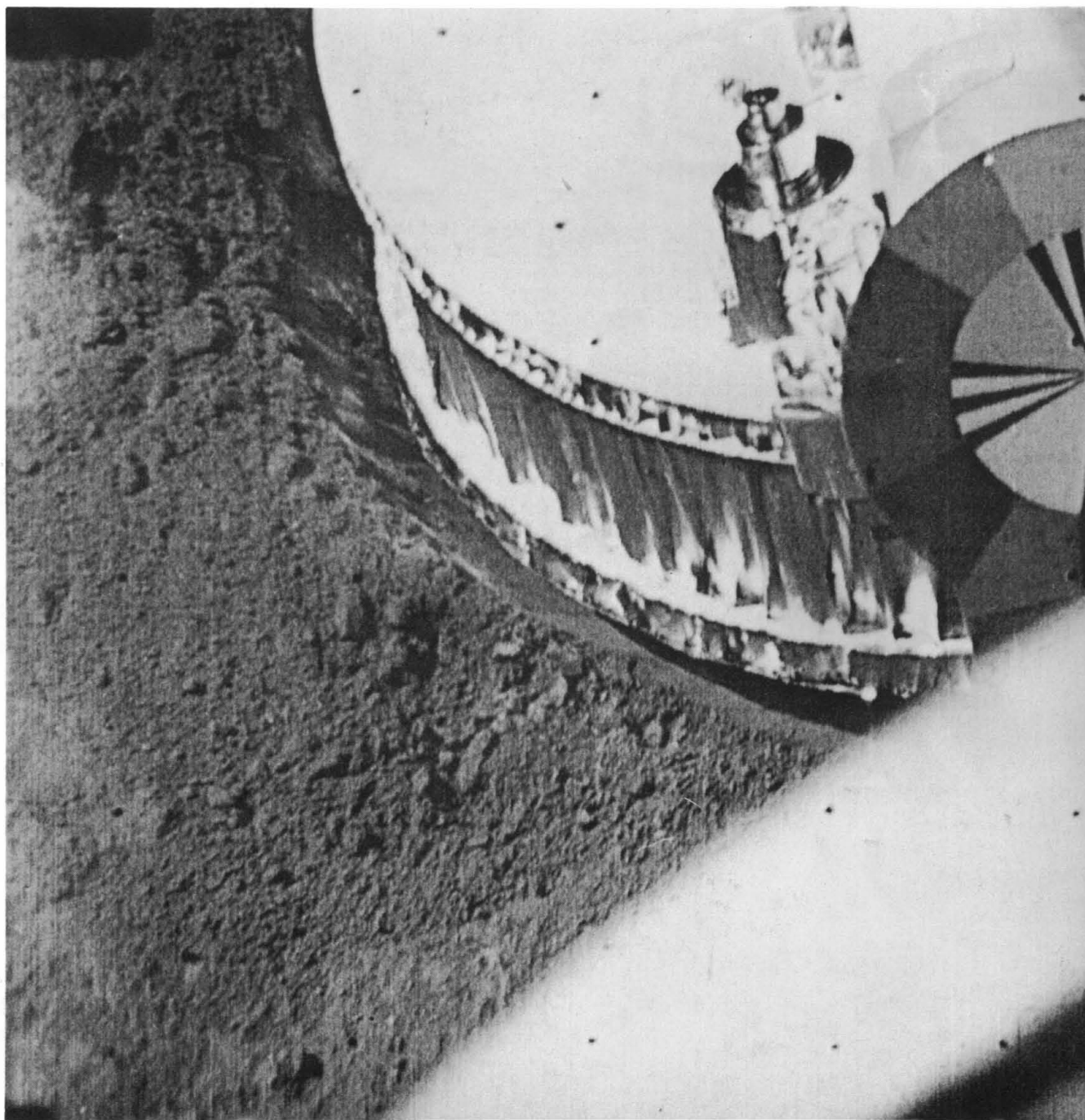


SCIENCE

24 June 1966

Vol. 152, No. 3730

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



FOOTPAD ON THE MOON

Index Issue



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The ticket presented by the Beckman Model 125 Digital Integrator entitles the user to hours of free time—all those hours formerly spent measuring peak heights, counting dots, and doing lengthy calculations. Particularly designed to work with Beckman Model 120 Amino Acid Analyzers, the Integrator prints out the relative concentration of each amino acid as the Analyzer is printing the chromatogram. For an absolute reading, one quick calculation—applying a constant established for the Analyzer in a calibration run—is all that is required. The Inte-

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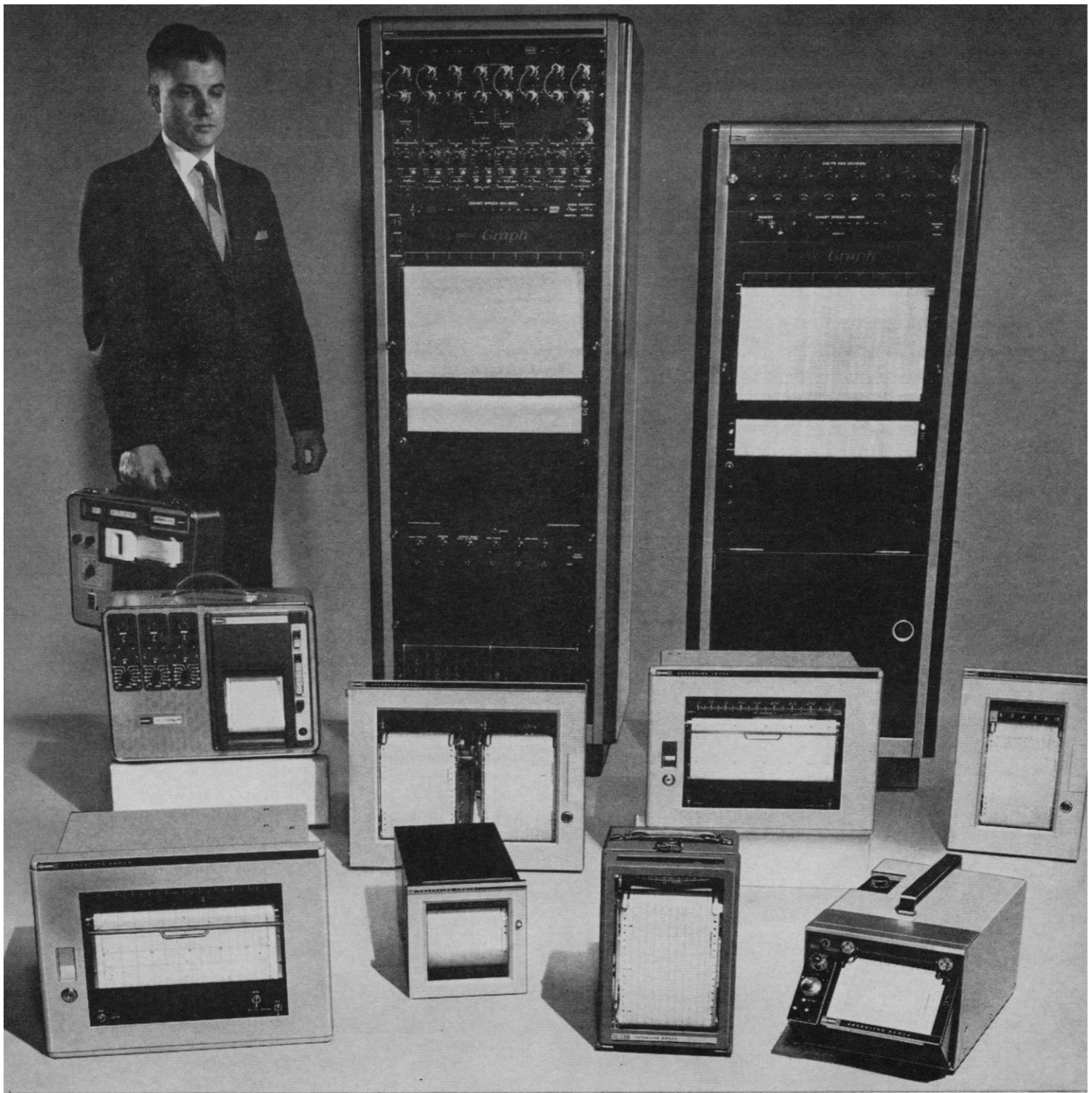
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COVER

Footpad of Surveyor I spacecraft resting on the lunar surface. Depression in soil caused by impact of pad is apparent. Surface material has been pushed up and thrown out to form a raised rim. The disturbed soil is apparently fine-grained and aggregates into chunks. At top of pad are television test target and an attitude-control jet which was used in test to blow gas against the surface. The photograph has been digitized and corrected by computer for the frequency response of the television system. See page 1737. [JPL-NASA photograph]

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CONTROL NO.: MA 1078

SPECIFIC ACTIVITY: 34.7 mc/mM
222.0 uc/mg

PACKAGING:
0.05 mc, 0.1mc: In water: conc. = 1.0 mc/4.0 ml
In serum vials, Under nitrogen, Sterilized

0.5mc, 1.0mc: Crystals, In screw cap vials

SPECIAL STORAGE OR HANDLING INSTRUCTIONS:
Keep sterile and under nitrogen
Radiation decay 1.0% after 6 months storage

ANALYST: Danielle E. Von

SUPERVISOR: E. Hess

DATE: 2-14-66

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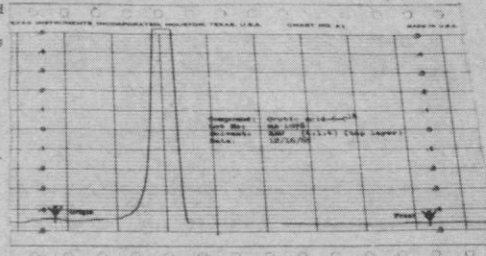
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Whatman No.1 Paper; Ascending

Solvent Systems:

1. sec-Butanol:3.3% NH₄OH (5:2)
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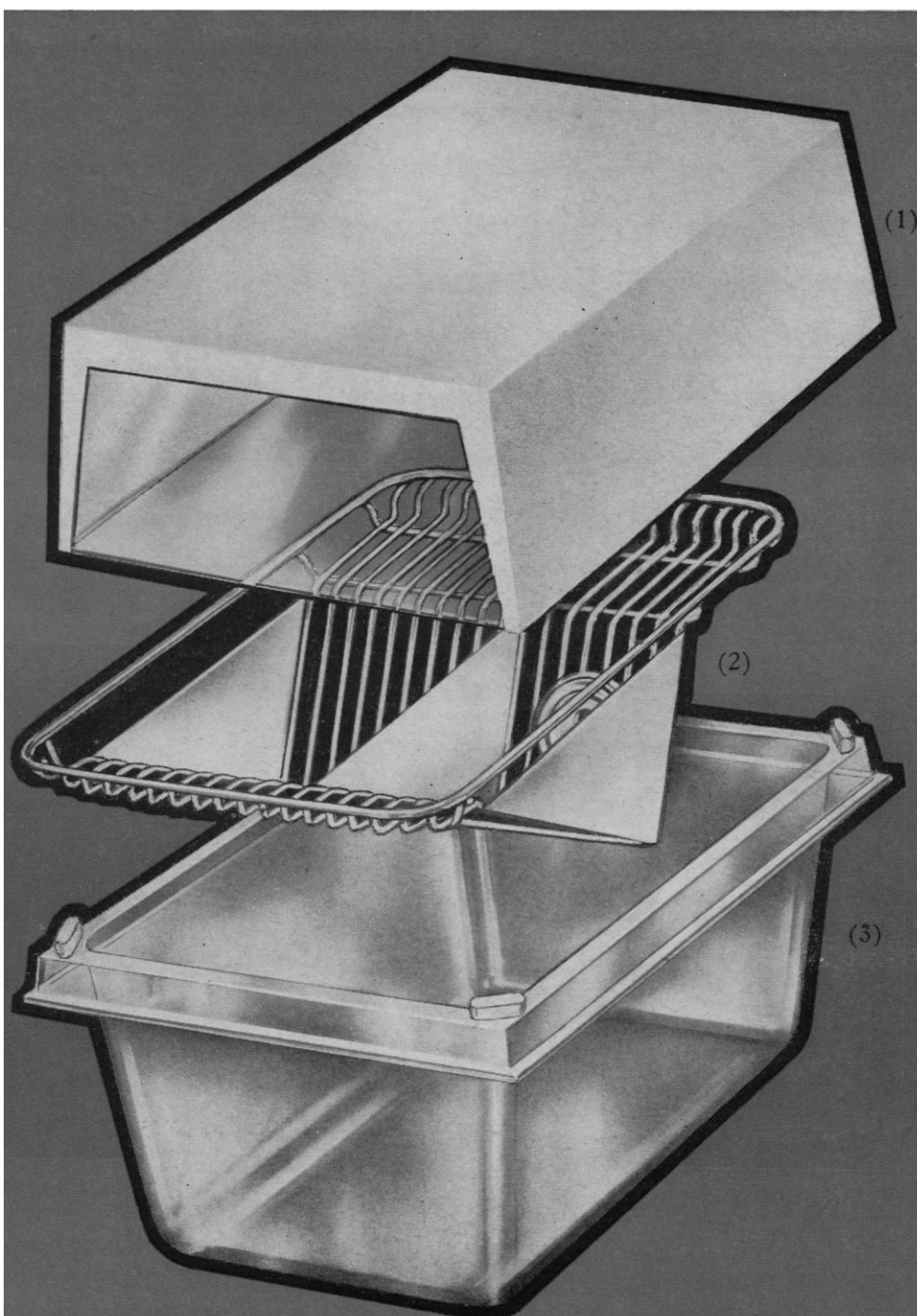
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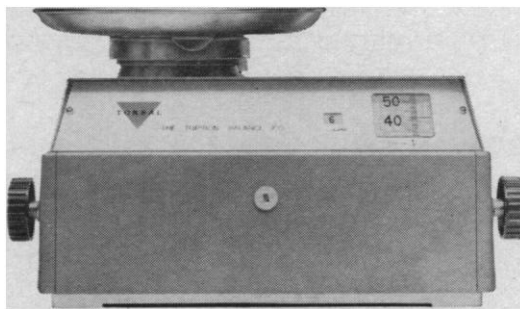
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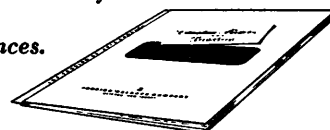
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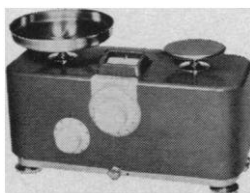
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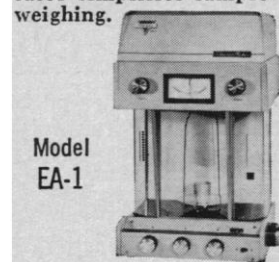
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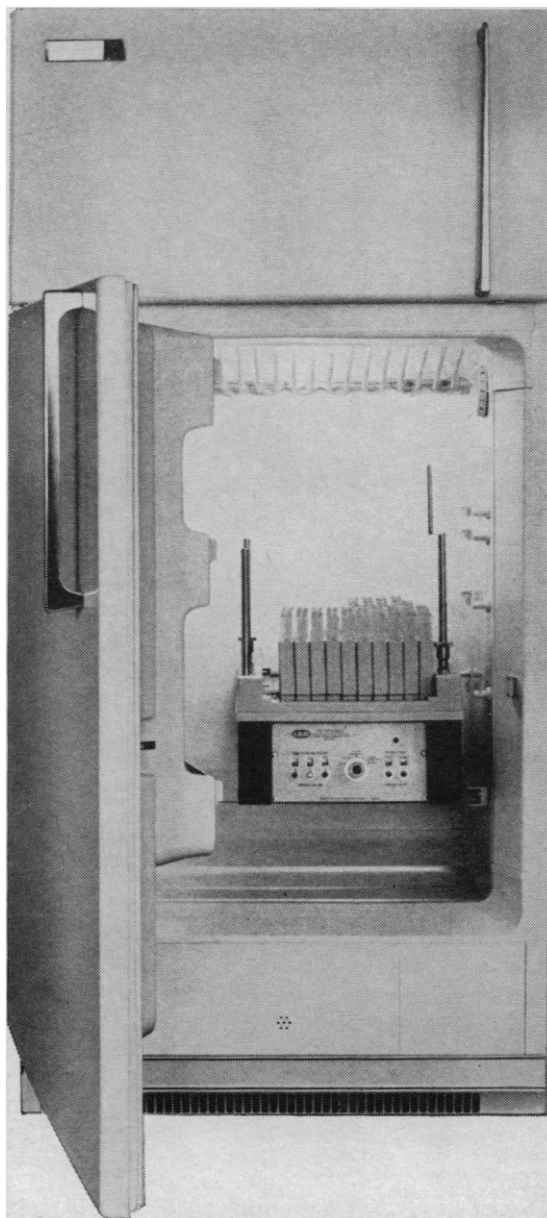
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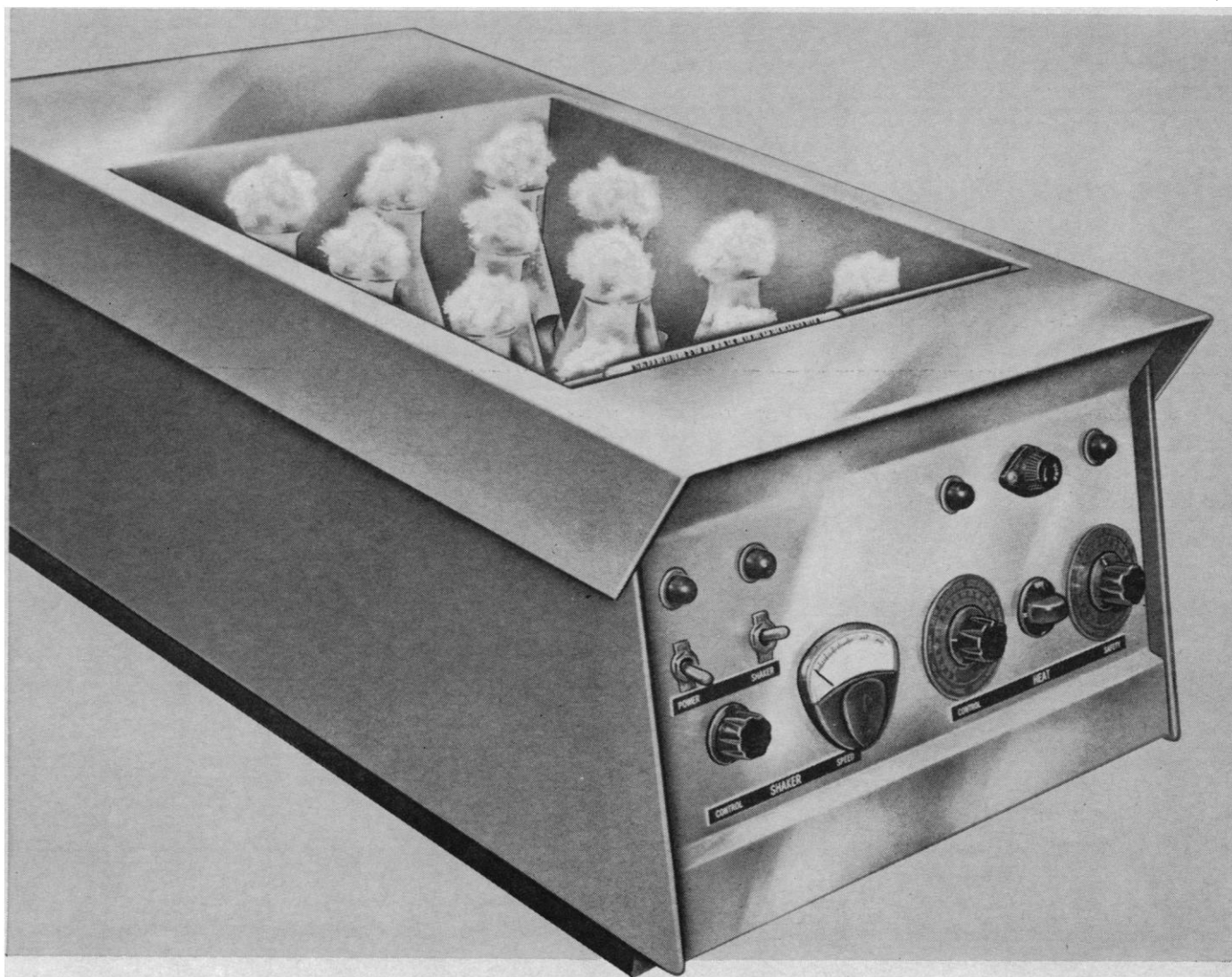


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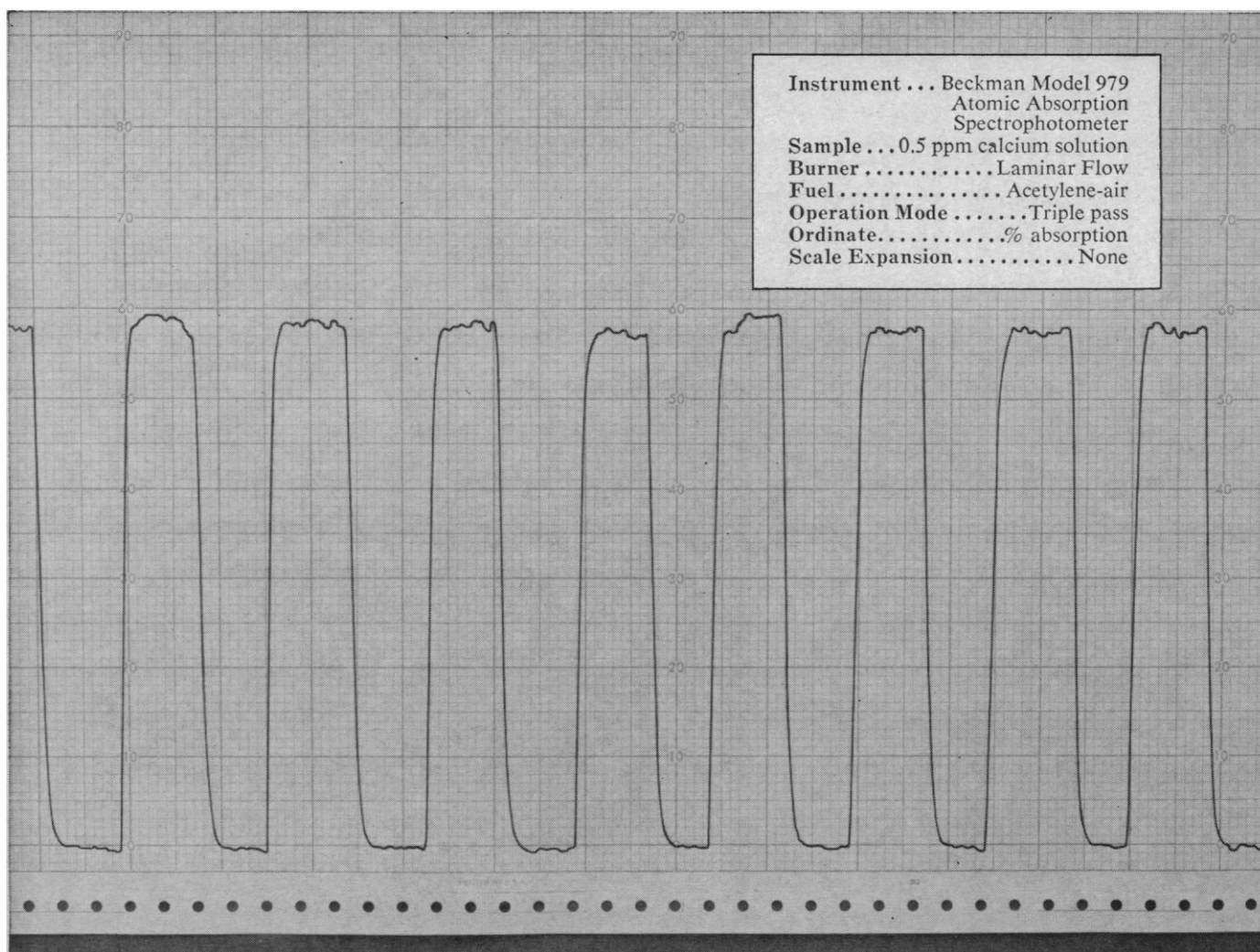
The image shows the Victoreen Research 4000 Series Instrument System, a modular gas chromatograph. It consists of a large, light-colored main unit on the left and a smaller, multi-bay modular unit on the right. The main unit has four injection ports at the top and a control panel at the bottom with various knobs and switches. The modular unit is divided into several sections, each with its own controls and displays. The background is dark, and the word "VICTOREEN" is printed in large, bold, white letters across the top. Below the main unit, the text "Research 4000 Series Instrument System" is printed. At the bottom, the company name and address are listed, along with a small logo.

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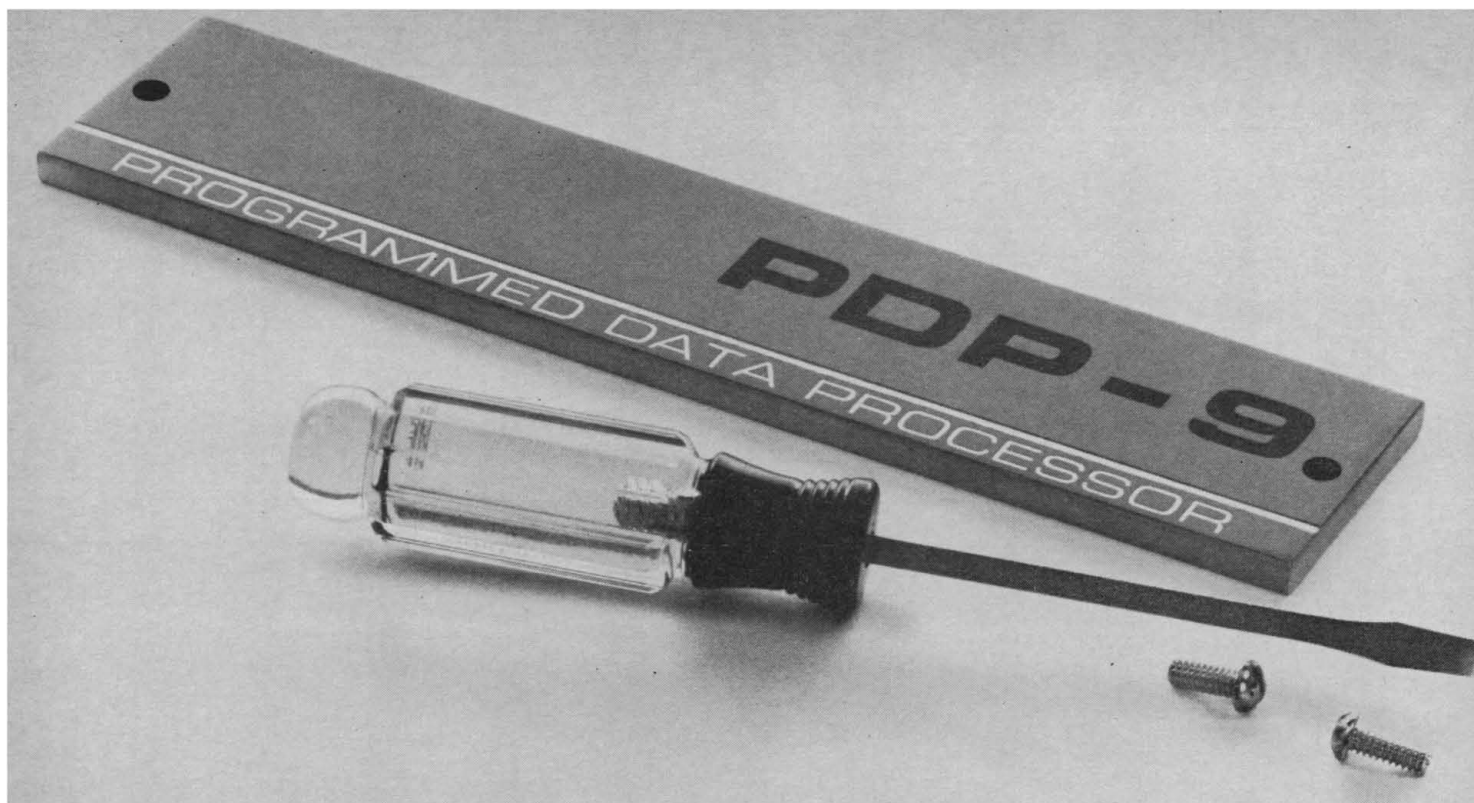
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Noteworthy Monographs for Your Science Library

- **CIVIL WAR MEDICINE** by Stewart Brooks, *Auburndale, Mass.* Jan. '66, 160 pp., 22 il., 16 tables, \$6.00.
- **THE TRAIL OF THE INVISIBLE LIGHT: From X-Strahlen to Radio(bio)logy** by E. R. N. Grigg, *Cook County Hosp., Chicago.* '65, 1,016 pp. (8½ x 11), 1,404 figs., (Amer. Lec. Roentgen Diagnosis edited by Lewis E. Etter), \$36.75
- **PERSONNEL SAFETY FOR PUBLIC EMPLOYEES** by Verne K. Hipskind, *Dallas Police Dept., Texas.* '65, 196 pp., 19 il., \$6.75
- **UNDERACHIEVEMENT** compiled and edited by Milton Kornrich, *North Shore Child Guidance Center, Manhasset, N.Y.* (78 Authors) '65, 692 pp., 12 il., \$18.50
- **ENGLISH FOR THE FOREIGN PHYSICIAN (3rd Ptg.)** by José Murilo Martins, *Univ. of Ceara, Fortaleza-Ceara, Brazil.* '65, 136 pp., 27 il., \$5.75
- **CHILDREN IN COLLECTIVES: Child-Rearing Aims and Practices in the Kibbutz** edited by Peter B. Neubauer, *Child Development Center, New York City.* (41 Participants) '65, 416 pp., \$11.50
- **THE EVOLUTION OF PHARMACY IN BRITAIN** edited by F. N. L. Poynter, *The Wellcome Historical Medical Library, London.* (11 Contributors) '65, 240 pp., 6 il., \$7.75
- **THE PATHOLOGY OF LABORATORY ANIMALS. A Conference Sponsored by the Section on Microbiology of The New York Academy of Medicine and The New York Pathological Society.** Compiled and edited by William E. Ribelin, *American Cyanamid Company, Princeton, N.J., and John R. McCoy, Rutgers Univ., New Brunswick.* (22 Contributors) '65, 448 pp., 292 il., 36 tables, \$14.75
- **BIOLOGICAL CLOCKS IN MEDICINE AND PSYCHIATRY** by Curt Paul Richter, *The Johns Hopkins Medical School, Baltimore.* '65, 120 pp. (7 x 10), 119 il., 6 tables, (A Salmon Lecture), \$8.50

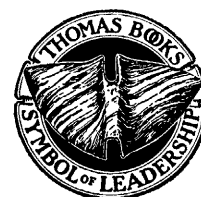
THE POLYGRAPH IN PRIVATE INDUSTRY by Robert J. Ferguson, Jr., *Scientific Security Service, Fort Worth.* An informative text objectively revealing for the first time the true facts behind the ethical application and purposes of the polygraph examination in private industry. The author carefully guides the reader, the examiner, and the individual being tested through the intricate steps of an actual pre-employment test to an effective test conclusion. *March '66, 352 pp., 95 il., 91 charts, \$11.50*

ORAL CONTRACEPTION: Mechanism and Management by Joseph W. Goldzieher, *Southwest Foundation for Research and Education, San Antonio, and Edris Rice-Wray, Center for Investigation of Reproductive Physiology of the Association Pro-Salud Maternal, Mexico City.* Places in concise perspective both the theoretical and clinical aspects of oral contraceptives. Chemistry and physiological action are discussed in detail. *June '66, 160 pp., 35 il., 18 tables, (Amer. Lec. Living Chemistry edited by I. Newton Kugelmass), \$7.50*

THE DISADVANTAGED AND POTENTIAL DROPOUT: Compensatory Educational Programs. A Book of Readings. Compiled and edited by John Curtis Gowan, *San Fernando Valley State College, Northridge, Calif., and George D. Demos, California State College at Long Beach.* (45 Contributors) Noted experts in theory and practice set forth new techniques for handling dropouts. Discusses definitions and statistics, diagnosis and theory, curriculum change, guidance efforts, and educational and vocational rehabilitation. *May '66, 644 pp., 10 tables, \$18.50*

THE FEMALE ALCOHOLIC: A Social Psychological Study by Barry A. Kinsey, *Oklahoma State Univ., Stillwater.* This study includes a review and evaluation of existing hypotheses concerning unique or distinctive characteristics of female alcoholism . . . an examination and critique of various theories of alcoholism . . . a discussion of important social-cultural factors associated with female alcoholism . . . and the development of a conceptual scheme for the study of alcoholism within the framework of the symbolic-interactionist school of social psychology. *May '66, 232 pp., 39 tables, \$8.75*

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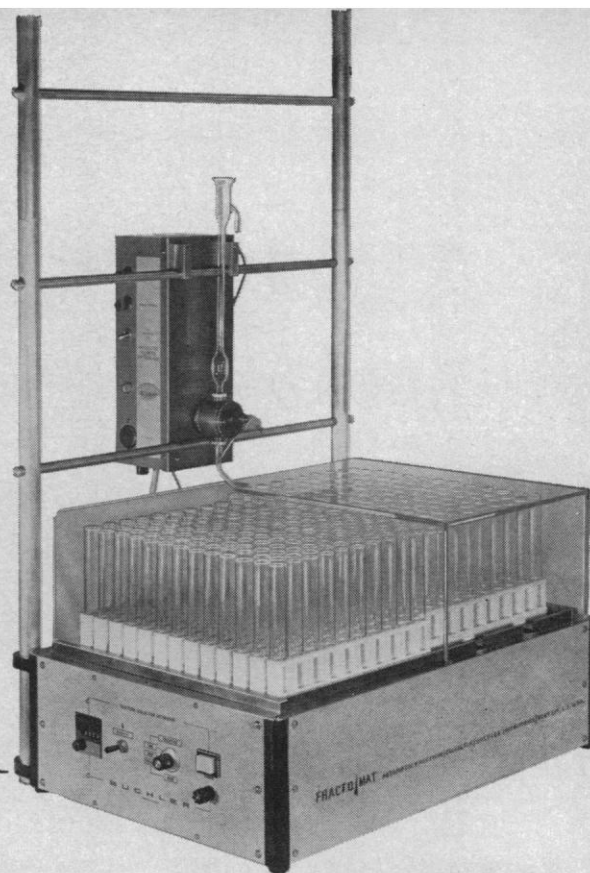
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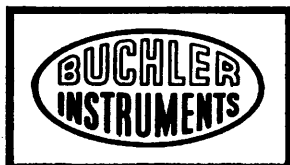
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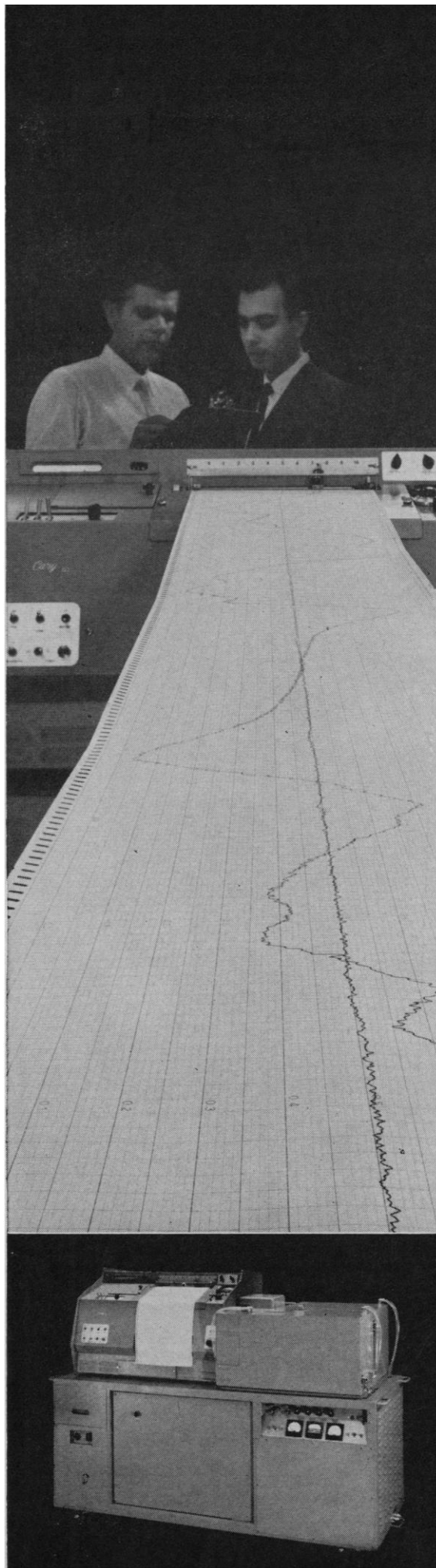
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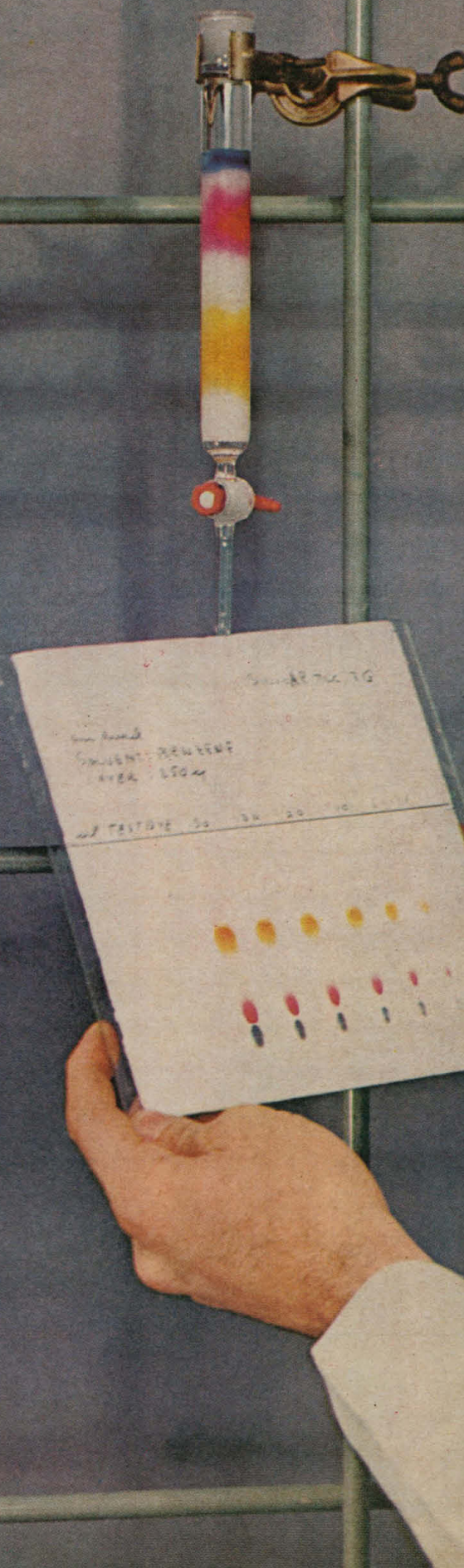
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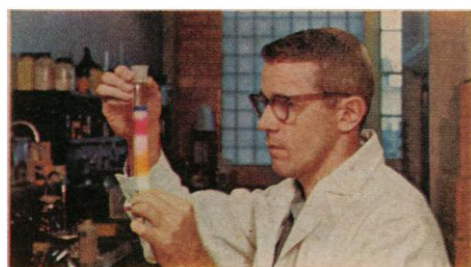
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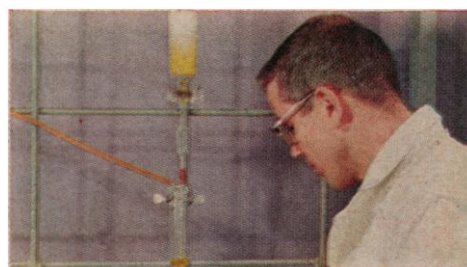
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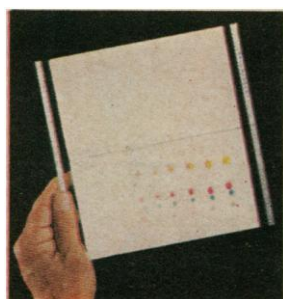
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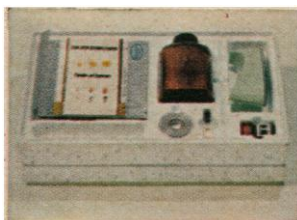
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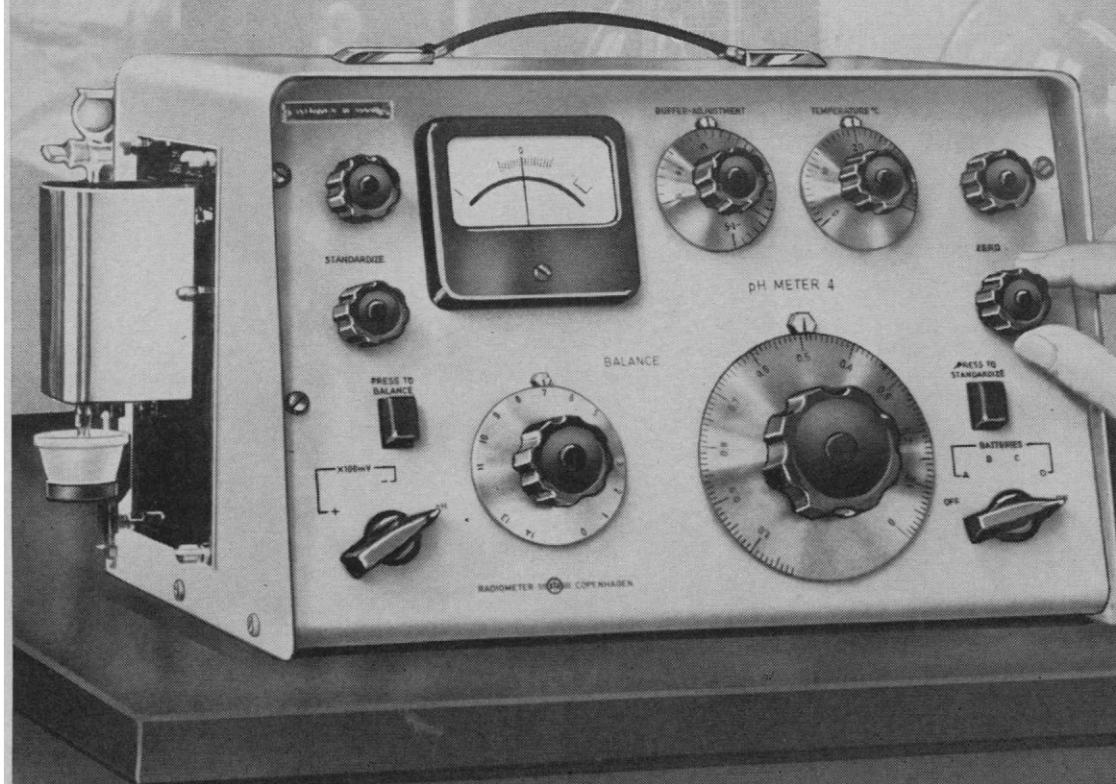
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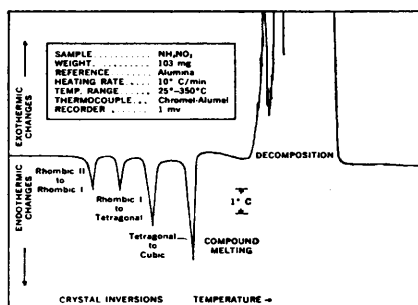
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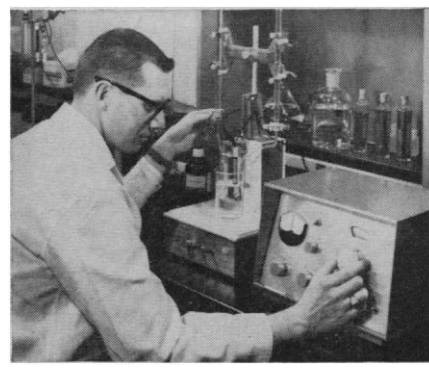
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CONSTANCY						
At 100°C	±0.8°C	±1.0°C	±1.3°C	±1.0°C	±1.5°C	±1.0°C
At 200°C	±1.8°C	±1.1°C	±2.2°C	±0.5°C	±0.9°C	±1.3°C
UNIFORMITY						
At 100°C	±0.5°C	±1.0°C	±2.0°C	±0.2°C	±0.5°C	±1.4°C
At 200°C	±1.4°C	±1.9°C	±2.8°C	±1.0°C	±1.5°C	±1.9°C
OVER-ALL DIMENSIONS						
Width	16½ in	22¼ in	41¼ in	16½ in	22¼ in	41¼ in
Front/Back	16½ in	19 in	20 in	16½ in	19 in	20 in
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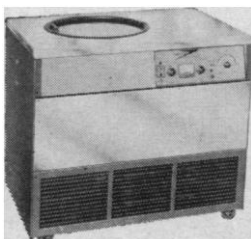
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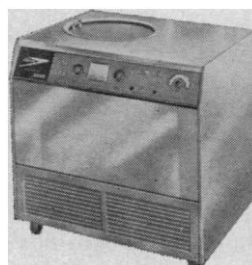
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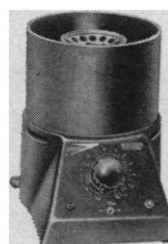
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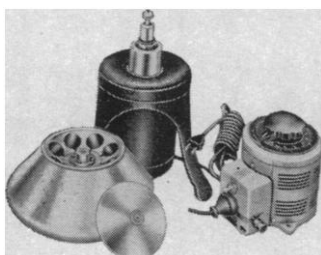
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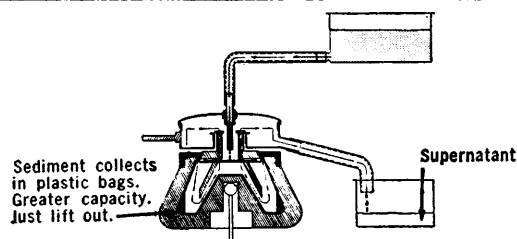
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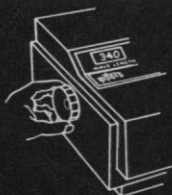
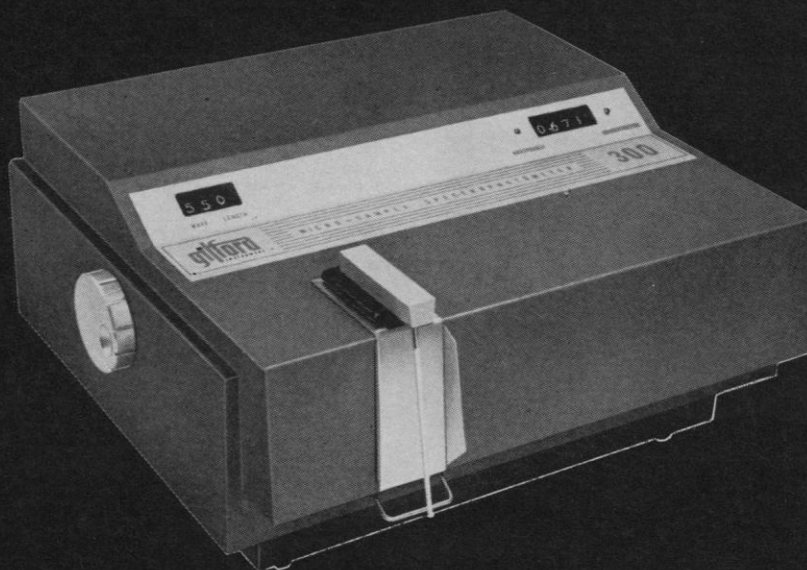
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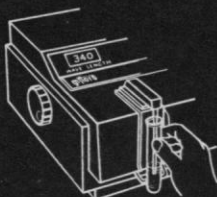
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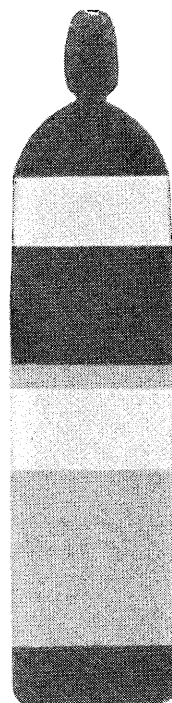
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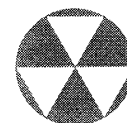
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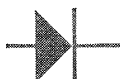
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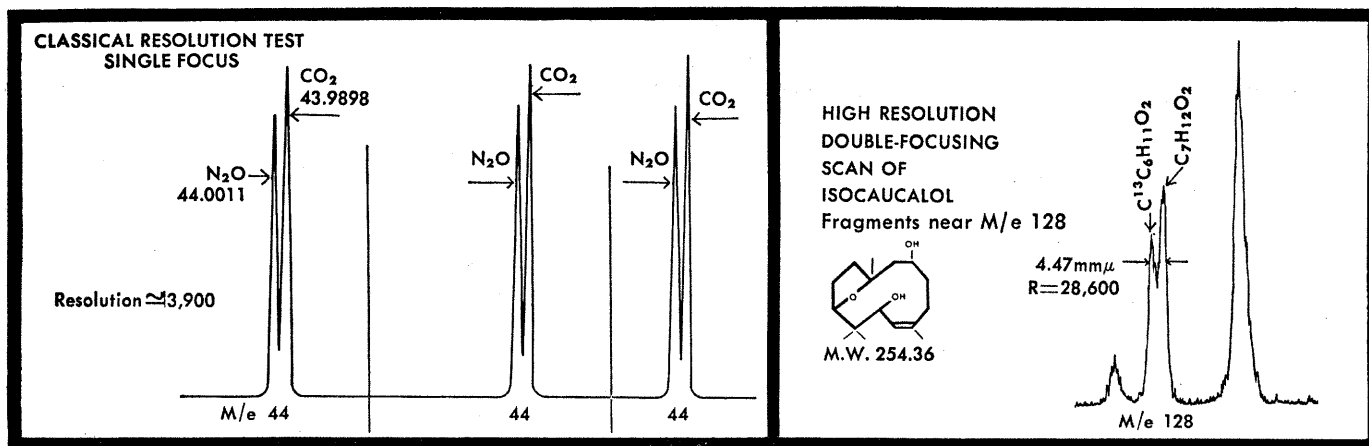
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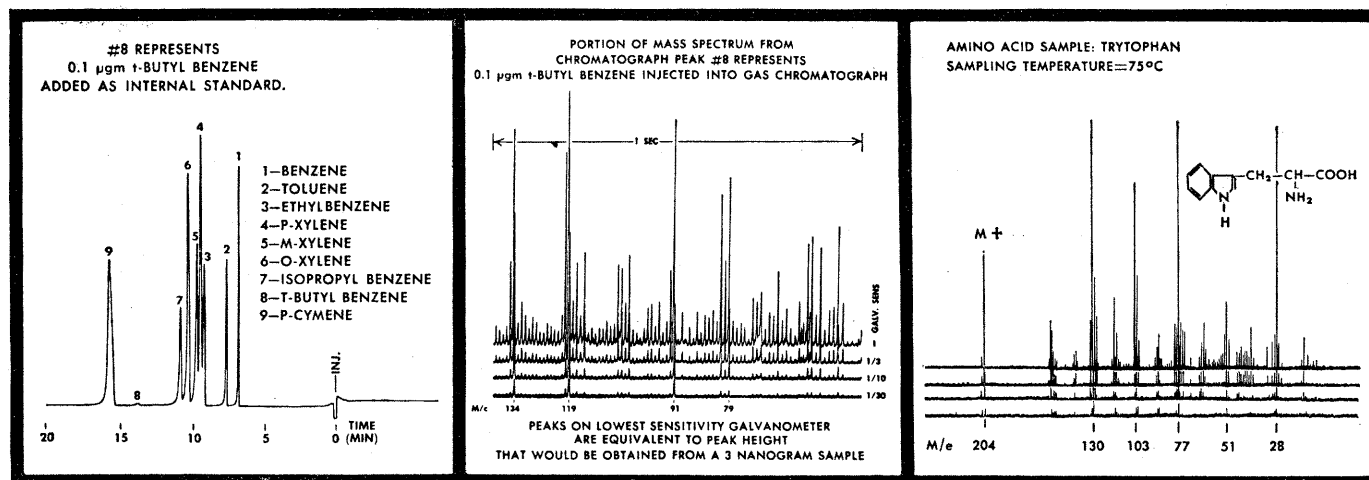
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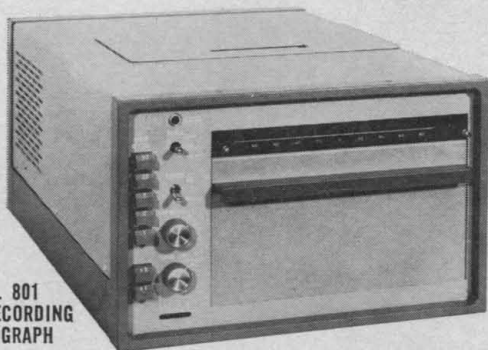
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ANALOG MONOLOGUE

On Means for Modelling, Measuring, Manipulating, & Much Else

ANALOG ELECTRONICS & OPERATIONAL AMPLIFIERS

Surely we are at least thirty years too late to justify the use of electronics—in *measuring* almost any physical or chemical parameter; in *manipulating* the measured data; or in *computing, simulating*, or otherwise *predicting* the behavior of a physical system. After three decades, however, the outlines of any discipline become blurred—hence this refresher.

One process is at the root of every contribution electronics ever made to its sister sciences: *Amplification*. There are many ways to characterize this effect, but perhaps the most general is to say that electronic circuits raise the energy level of data—that they are inherently very *sensitive*—and can be made to respond, with *reliability* (stability) and *fidelity* (accuracy) to very small changes in the input parameter. If the input is not already an electrical signal, it must be converted to an equivalent electrical parameter, by a “transducer.”

The need for amplification—for high sensitivity—is apparent from first principles. For example, we may restate Heisenberg's Exclusion Principle as follows: “*The accuracy of a measurement is a direct function of the observer's ability to make it with a minimum of disturbance to the system observed.*” If we read “loading”, or “burden” for “disturbance”, the need for sensitive circuits is apparent. Unfortunately, electronic amplifiers are not ideal. Left to itself, the sensitivity of a simple electronic amplifier circuit will vary so much (in response to both external influences and the instability of its own component parts) as to render it useless for all but the crudest of applications. For this reason, among others, we have had to invent ways of stabilizing amplifier gain. The most convenient, powerful, and successful of these ways is called *Feedback*.

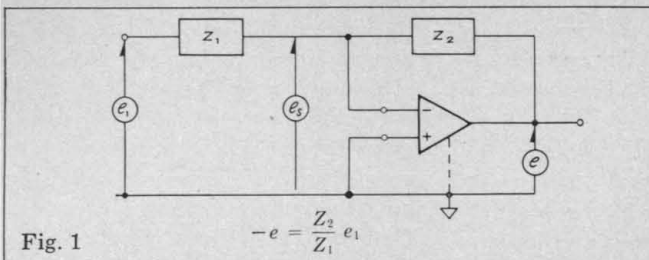


Fig. 1

There are many ways to describe feedback. We shall use a simple example. To obtain a particular value of amplification, with a specific degree of stability and fidelity, one first designs an unstabilized amplifier having much higher “raw” amplification than is required; then one interconnects the output and input circuits of the amplifier by means of a more-readily-stabilized electrical circuit, called a feedback loop, or feedback network (see Figure 1) in such a way that this feeding back of output energy *reduces* the apparent amplification, but gives to that modified amplification characteristic the inherently-higher stability of the feedback network. Thus, we can trade excess amplification for superior stability—and superior fidelity, by the way. Because this kind of feedback *reduces* the apparent amplification, it is called “negative” feedback.

The feedback “network” may be as simple as a pair of resistors. The cost of such a circuit is modest, and its data-measurement and data-manipulation capabilities are impressive. . . but it is only the beginning.

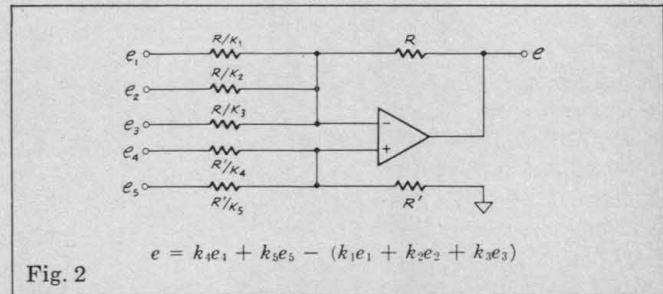


Fig. 2

By modifying the feedback network, so as to include *reactances* (capacitors or inductors) as well as resistances, you may create circuits that perform important and useful *mathematical operations* on a signal; for example one can differentiate or integrate it. Differentiation will convert velocity signals into acceleration, or position into velocity; or, with two differentiators, in cascade, position into acceleration. By integrating, one may reverse the process.

There is almost no limit to the ingenious behavioral variations one may create and control, merely by choosing appropriate feedback network configurations. Nowadays, using inexpensive standard “hardware”, one may quickly assemble circuits that respond logarithmically, exponentially, or trigonometrically and circuits that multiply and divide too—almost as faithfully as the circuit of Figure 2 adds and subtracts.

Remember—all of this is done with equipments that cost, generally, hundreds of dollars or less, and not the thousands or more one might expect, from their capabilities and potential usefulness.

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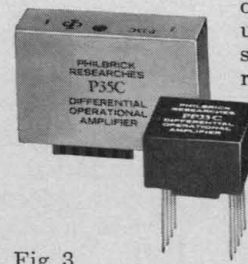
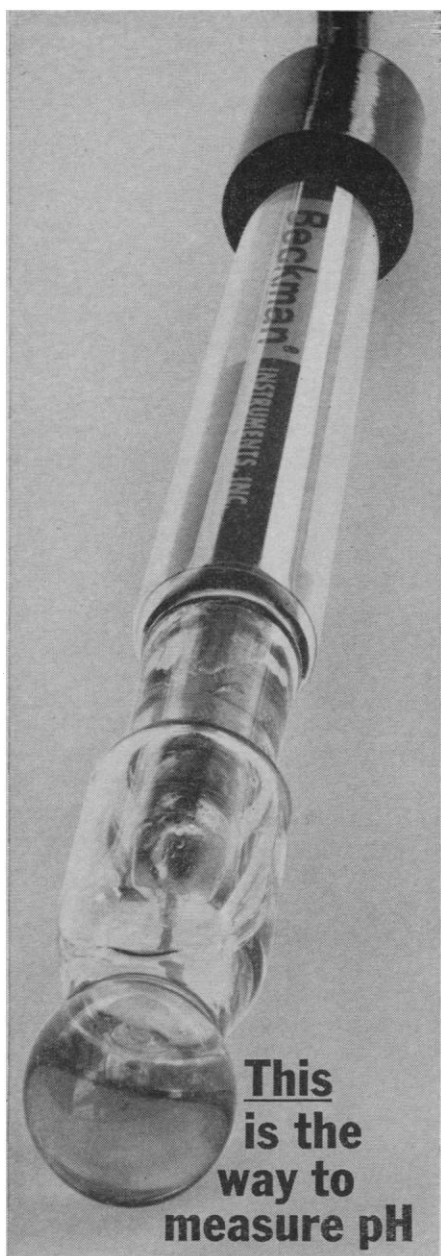


Fig. 3



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acy; and, "in any case, they cannot have the specialized backgrounds required in the many technical fields under their jurisdiction. Second, day-to-day management of a modern university requires a vast number of nonacademic administrators who have no special orientation toward the university or its purposes and who could just as well keep the vital "paper gas" flowing in business or government. In many cases they make decisions which impinge strongly on scientific or academic issues. It is symptomatic of this situation that the study "The Administration of Government Supported Research at Universities" (News and Comment, 29 April) was carried out by the Budget Bureau rather than by the universities. Inaction by the universities on this matter would be expected if the government were engaged in trying to reduce support and curtail the freedom of universities to manage federal funds. The reverse is true, and we now have the Budget Bureau suggesting "research agreements" to replace research grants or contracts. The research agreement presumably would fit the nature of most university research more appropriately than the grant or contract does and would enlarge the area of freedom of the research scientist or at least legalize the freedom he already exercises. It may also serve to shift responsibility for allocation of funds from the granting agency to the university administration.

But in order for the proposed system to operate effectively there must be an impedance match between federal and university administrations; at present many scientists have reason to believe that the match is poor indeed. There is widespread doubt that universities are capable of managing research funds wisely or of making the crucial decisions which will influence science in fundamental ways.

Universities would do well to borrow a page from the book of the federal agencies written since World War II. This book teaches that a proper impedance match between the scientific community and government agencies has been achieved when active and leading scientists have a significant role in policy and in budget allocations and when the government administrator has training and background in the field for which he is responsible, knows the scientists in his field and their work, and is encouraged by his agency to seek new ways to advance his science. The paral-

lel in the university would find for each broad and active research field a dean who knows the overall field closely. The dean would work closely with an advisory panel of scientists, including members from other universities, and they would jointly be responsible for allocation of funds for education and research and for decisions affecting the future of the field in other crucial ways. A structure of this sort, combining specialized knowledge and administrative responsibility, is essential if universities are to assume the more important role which is implied in the Budget Bureau study.

ROBERT G. FLEAGLE

*Department of Atmospheric Sciences,
University of Washington, Seattle*

International Education Dialogue

The recent congressional hearings on the International Education Bill show the growing interest of the U.S. government in funding programs for international studies. All persons concerned with the crisis in education in developing countries welcome our widening interests, but they wonder if our new plans offer a genuine dialogue.

They demand both technical assistance and associated science-teaching programs, but rarely can we give assistance without adding our social ideas as part of the package. Much as the developing countries call for a wide variety of assistance programs to become effective, it is hoped, before they and we are overwhelmed by problems of survival, they need dignity and acceptance as colleagues working for the common good. Other nations see much of our international dialogue polarized into an offensive parochialism as a price for assistance. Our ideas of science education are exported, and much of this is right, but in this process there is little humble search for new ways of seeing others and understanding ourselves.

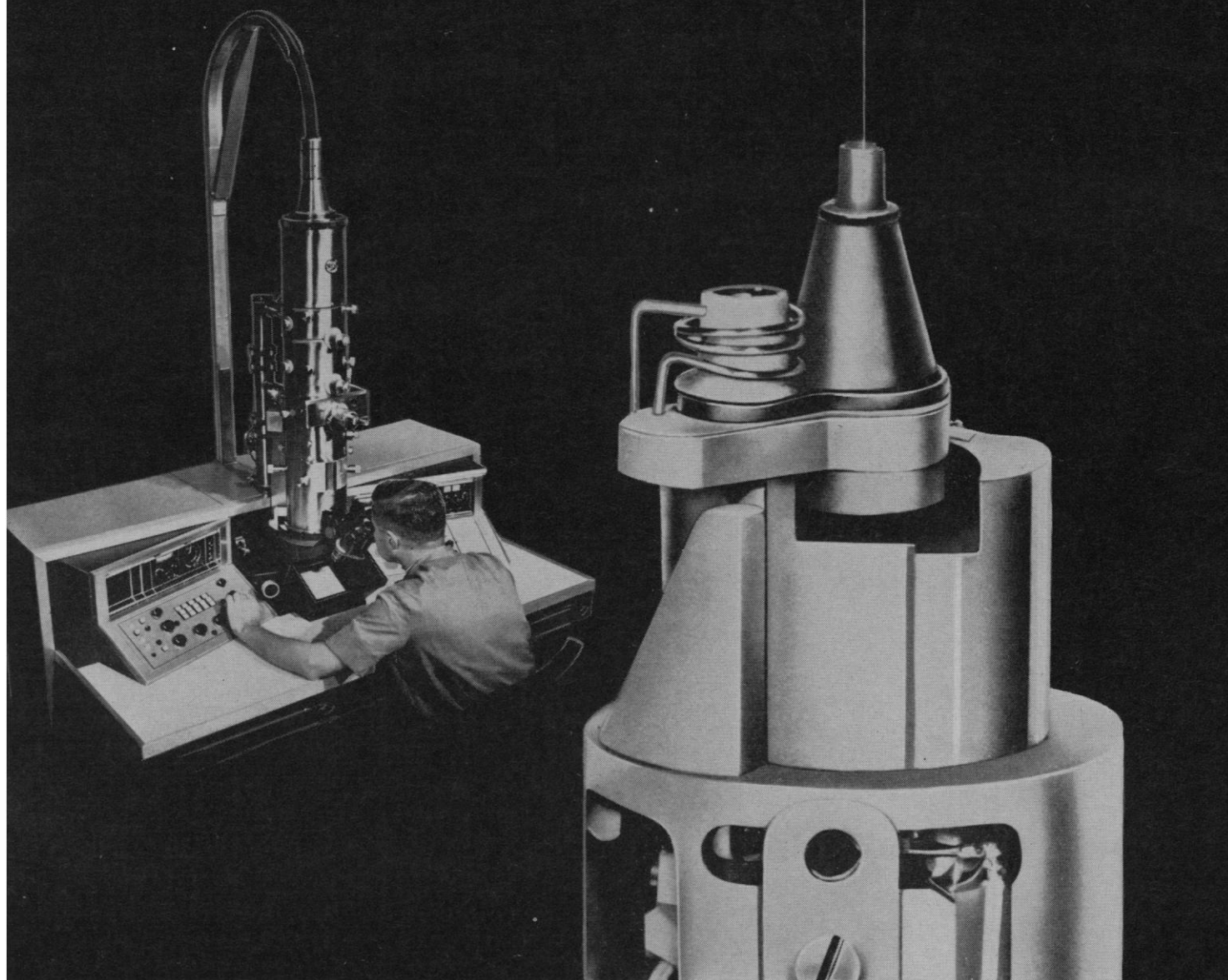
There are now several centers, in addition to the Division of Science Teaching at UNESCO, for collecting information on science education programs in various countries, but none is based on service as a means to obtain information and create the needed climate of friendly inquiry between different peoples and between physical sciences and the social sciences such as cultural anthropology.

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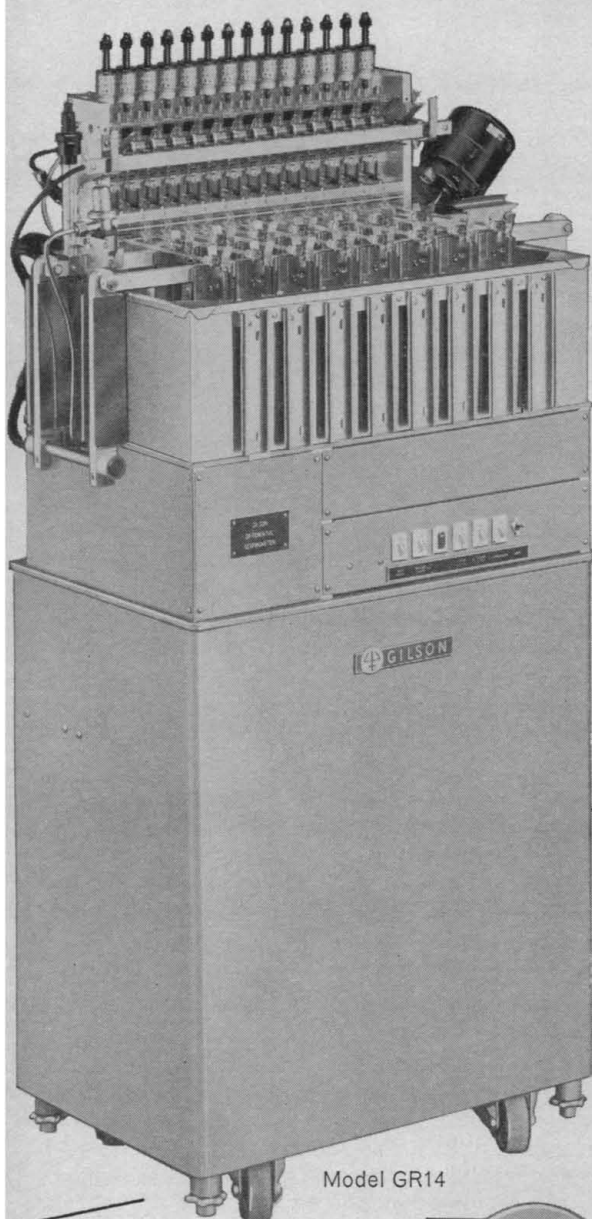


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The Spirit of Science

School and college enrollments are increasing. Students are using better texts and teaching materials. Team teaching, television, language laboratories, and other innovations are coming into wider use. More attention is being given to how children learn and to how learning and teaching can be improved. Nations are helping other nations to reform and improve their educational systems. Now, into the midst of all this change, comes a proposal for a more fundamental and sweeping change than any yet seen. The Educational Policies Commission (of the National Education Association and the American Association of School Administrators) offers the radical proposal that education—all of education—be infused with the spirit of science.*

The spirit of science is defined in terms of seven underlying values: longing to know and to understand; questioning of all things; search for data and their meaning; demand for verification; respect for logic; consideration of premises; and consideration of consequences. The authors call these the values of science; one might also call them the values of rational thought.

In discussing these values, they are not talking about the education of scientists or the subject matter of science, but about the basic objectives or methods of thought that should characterize all education. What is advocated is "the understanding that the spirit of science applies to other facets of man's existence. . . . The values of which the spirit of science consists should permeate the educative process, serving as objectives of learning in every field, including the humanities and practical studies."

So great a change will require a revolution in attitudes and methods of teaching and in the methods of educating teachers. Perhaps the revolution will fail; the Educational Policies Commission speaks only for its 20 members. Some of their past statements, however, have become influential parts of the educational literature, and perhaps this one will also. If it does, the change will be revolutionary indeed, for the goal is no less than "the development of persons whose approach to life as a whole is that of a person who thinks—a rational person." The spirit and values of science "can enable each person to free himself from blind obedience to the dictates of his emotions, of propaganda, of group pressures, of the authority of others. . . . It can enable him to sift through the forces which act upon him and, to some degree, to determine and to become his own ideal self." The spirit underlying science "can enable entire peoples to use their minds with breadth and dignity and with striking benefit to their health and standard of living. It promotes individuality. It can strengthen man's efforts in behalf of world community, peace, and brotherhood. . . . Insofar as an individual learns to live by the spirit of science, he shares in the liberation of mankind's intelligence and achieves an invigorating sense of participation in the spirit of the modern world. To communicate the spirit of science and to develop people's capacity to use its values should therefore be among the principal goals of education in our own and every other country."

It is easy to criticize these lofty goals as being too idealistic, to say that other persons have espoused similar ideals, or to point out that we do not yet know how to foster the development of rational thought in all students and may never be able to do so in some. No matter, it is good to have a banner held high. And great significance can be attached to the fact that this banner has been raised in the heartland of the educational establishment.—DAEL WOLFLE

* *The Spirit of Science* can be obtained from the Educational Policies Commission, National Education Association, 1201 16th Street, NW, Washington, D.C. 20036.

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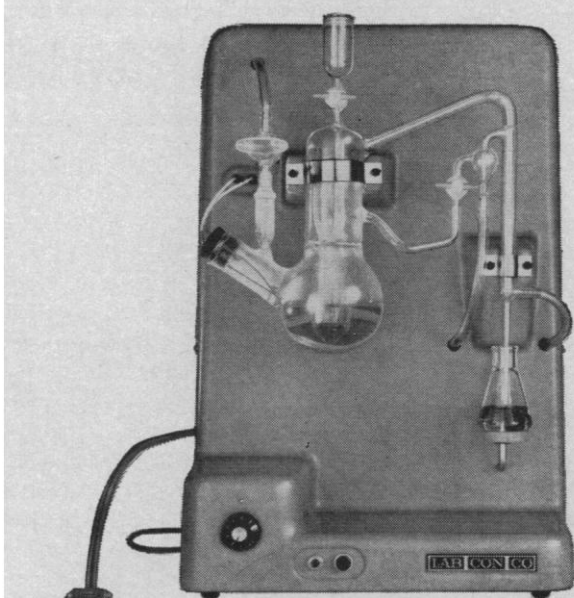


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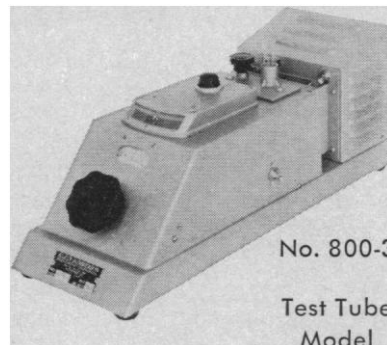
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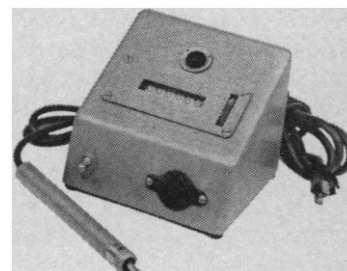


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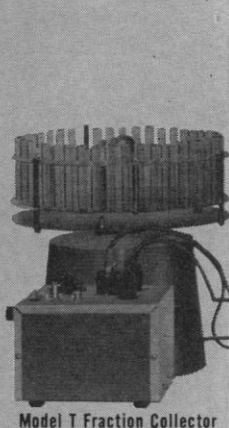


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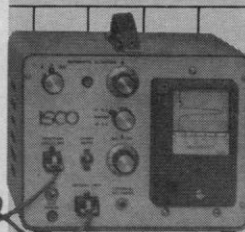
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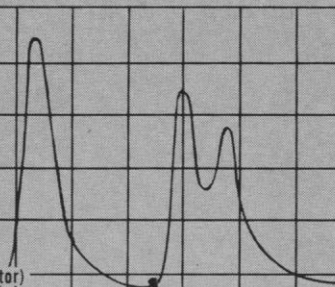
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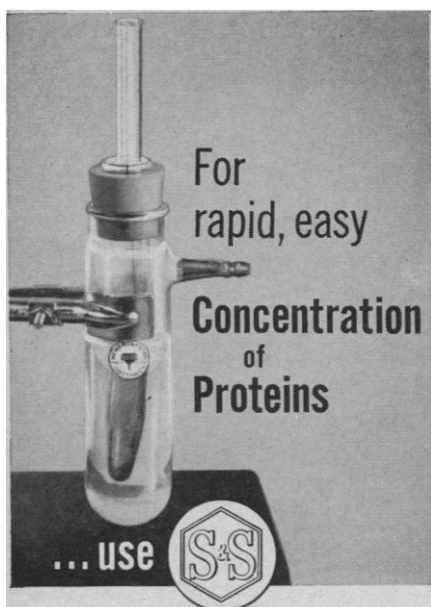
Photometric Scanning of Centrifuged Density Gradient Columns, Analytical Biochemistry, 5, 271, (April 1963). We will send a reprint of Dr. Brakke's paper on request. ISCO Density Gradient Fractionators are priced at \$395 and \$1350.

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4) Drugs administered for prolonged periods (for example, tranquilizers, agents for substitution therapy, "the pill" for contraception) may affect almost any system of the body, generally in unpredictable ways. The thalidomide tragedy dramatically highlights effects on reproductive performance.

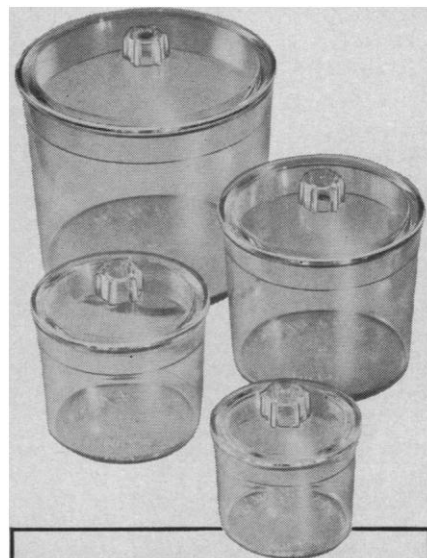
5) Carcinogenesis remains high on the list of the leading causes of death. Studies of chronic toxicity offer advantages (for example, predictability of calendar and of costs). The disadvantages are well-known—the empirical results, the fallibility of predictions based on animal data. The responses of many species and strains must be related to those of man. New statistical procedures can strengthen chronic studies. An international center of toxicological information should be established; the World Health Organization might logically serve as the repository.

Although there was no specific grouping on any one day of papers emphasizing general physiology, the interests of this group were represented throughout the program. Areas covered included excitable membranes, molecular physiology, cell physiology, and subcellular structures. There was also a perceptible and welcome trend in papers dealing with comparative physiology in connection with functions of all systems.

The relatively small number of papers presented in other fields may have been due to the fact that many other meetings and symposia were held before, during, and after the congress meetings, and their programs and proceedings were not included in the congress program or in the official registration lists. Thus, symposia on the physiology of the activity of the "AMA" were held on 31 August and 1 September in Tokyo, on comparative neurophysiology on 10-12 September in Tokyo, on olfaction and taste on 11-13 September at Lake Yamanaka (together with a conference on food and water intake), and on environmental physiology in Kyoto to 13-17 September. There was also a symposium on structure and function of the limbic system in Hakone on 10-12 September which supplemented the papers given at the congress meetings.

The congress was also the occasion for meetings of other groups which now

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have established programs of their own. A typical example is the group of investigators working in respiratory physiology who, at the previous congress in Leiden, held an excursion and dinner in honor of Wallace Fenn. A similar program was developed in Tokyo where the VA/Q Club of Japan arranged a tour to Mt. Fuji and Hakone on 5 September.

An important by-product of the congress meetings was the opportunity for the various groups in Japanese schools to have the privilege of visits and lectures from the many scientists attending the meetings. Many of the participants visited the medical schools in Tokyo, Osaka, Kyoto, and in other cities.

The congress was held under the auspices of the International Union of Physiological Sciences. The lectures and symposia are available in a monograph published by the Excerpta Medica Foundation as International Congress Series No. 87.

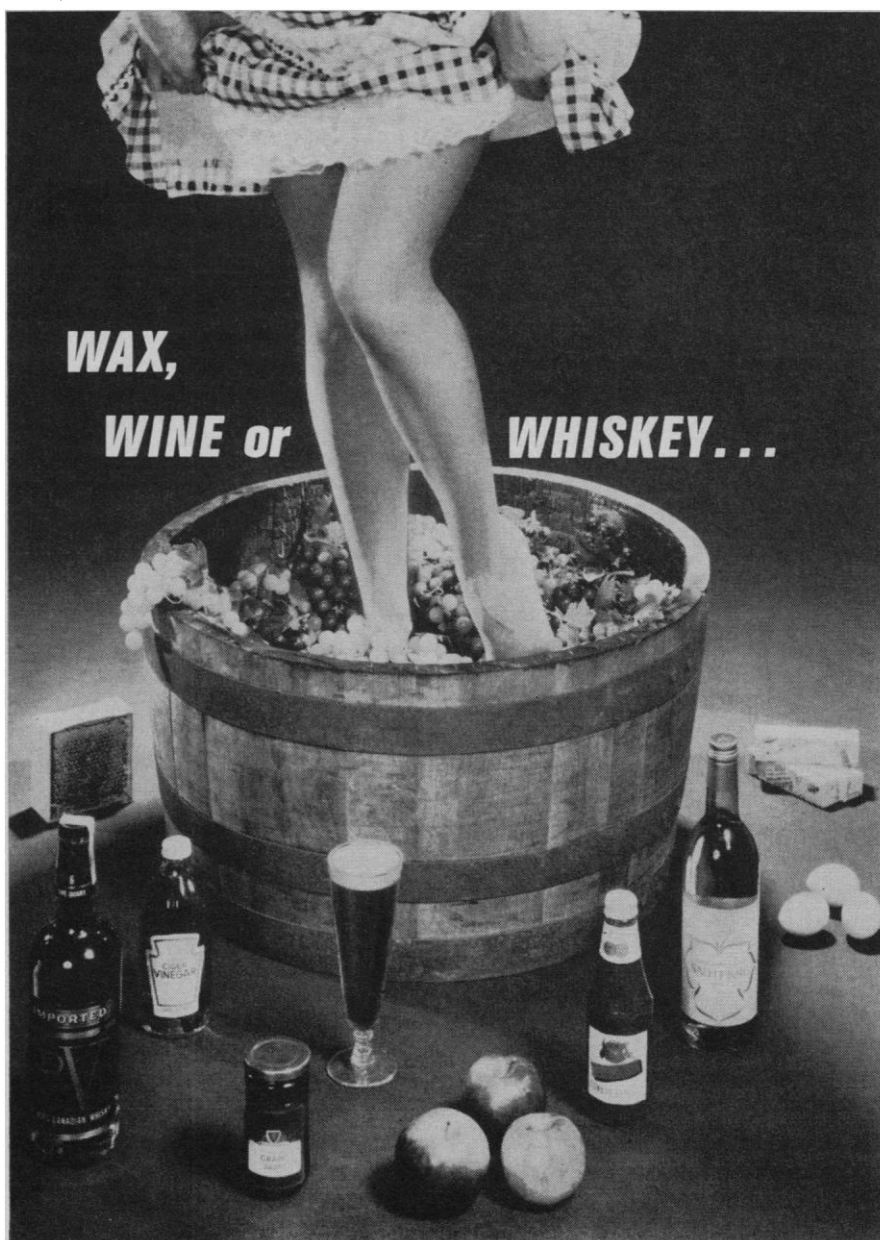
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Great Lakes Research

The Great Lakes contain about 30 percent of the world's fresh water, and their basin is estimated to be capable of supporting about 3 billion people. However, much of the water in the lakes is not referred to as fresh, and we are experiencing difficulties in supporting 1/100 as many people. The 9th conference on Great Lakes Research was held at IIT Research Institute in Chicago, 28-30 March 1966. Over 400 persons attended to listen to 120 papers and panel discussions. The topics included water budget and quality, biology, physical limnology, air-water interactions, marine geophysics, geology, and inorganic materials, as well as some economic and legal aspects.

Introductory remarks by B. M. McCormac (IIT Research Institute) emphasized that in planning this conference he concluded that, (i) no single U.S. government agency was responsible for the total Great Lakes problem; (ii) there is poor management of water, but no water shortage; (iii) current pollution control steps are based on very fragmentary information; (iv) the failure of industrial organizations to present papers at the conference was due to fear that the data might be used



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against them; (v) there is insufficient multidisciplinary research; and (vi) that although it seems likely that municipalities will eventually be forbidden to inject any sewage effluent into the lakes, the issue is not being faced directly.

The welcoming address was delivered by T. F. Bates (science adviser and assistant to the Secretary of the Interior). When the Federal Water Pollution Control Administration is transferred to the Department of Interior on 1 May 1966, Interior will have a vast responsibility in the Great Lakes. Bates believes that this transfer will improve the U.S. government's role in the support of Great Lakes research. The Cabinet and the White House are going to give more attention to the Great Lakes. The emphasis will reflect the transportation, recreation, municipal, and industrial needs. Much more scientific limnological data must be generated and intelligibly communicated before an effective lake management program can be expected.

A number of papers and discussions were devoted to water quality and budget. Although great interest was shown in T. W. Kieran's (Gibb, Underwood, and McLellan, Sudbury) grand canal scheme for recycling Canadian waters for both Canadian and U.S. use, it was generally believed that there is not a water shortage, but very poor water management. Bates suggested that if there is a water shortage, weather modification might prove more feasible than mass maneuver of North American water flow. It is difficult to study the water budget properly because evaporation has never been adequately measured. It was pointed out by C. R. Ownbey (Federal Water Pollution Administration) that water standards must be precisely specified. Different parts of the lakes will have different standards. These standards are very difficult to establish because of a lack of information about many of the pollutants.

The papers on physical limnology emphasized mass movements of water, temperature distribution, and dissolved oxygen content. As attempts are being made to obtain synoptic data, experimenters are being faced with a large data collection and processing task. Most of these studies were undertaken to investigate the health of the lakes. Dissolved oxygen content provides a good measure of water quality. The dissolved oxygen is in turn dependent upon temperature distribu-



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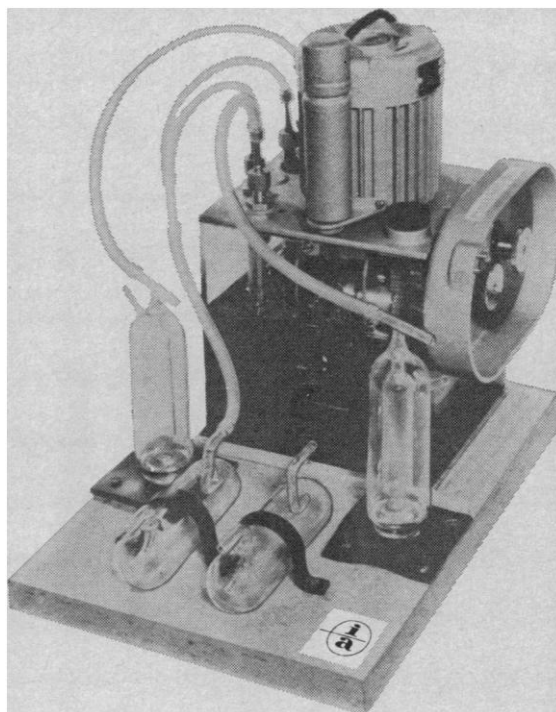
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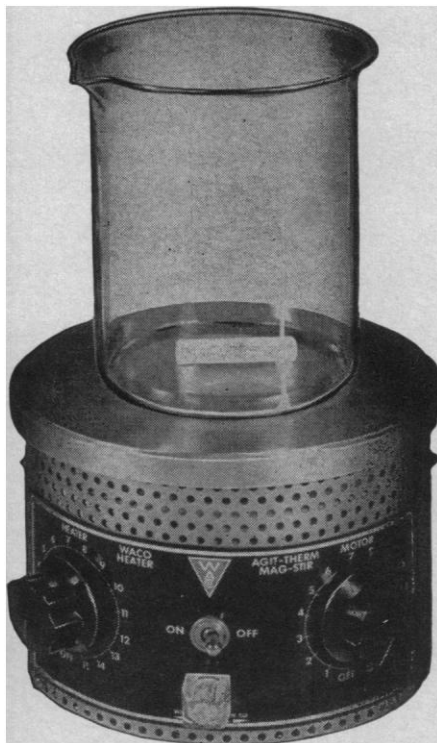
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tions and the motion of water masses. The dispersal of effluent by lake currents and eddies has been investigated by G. T. Csanady (University of Waterloo). Although one is interested in probability distributions, only some mean-value data exists. Preliminary results indicate that horizontal diffusion is related to the complex current system and vertical diffusion to eddies. J. L. Verber (Federal Water Pollution Administration) has made extensive current measurements in the lakes which show that complex inertial currents are found in all the lakes at all depths, and at all times of the year.

Several papers covering the whole field of biology from microorganisms to fish were presented. The dominant species are constantly changing. Many parts of the lakes and the contiguous stream and river systems are extremely hazardous because of contamination with the intestinal disease-producing bacteria, salmonella, according to L. E. Scarce (Federal Water Pollution Administration). It is hazardous to swim, fish, or even get the water spray in the face. Tests show that many types of salmonella are not completely removed by the treatment plants of the Chicago Sanitary District. The inland waters of the Chicago area are especially contaminated, as are parts of southern Lake Michigan from time to time.

Many experimenters have been examining benthic mud samples. The dominant species vary with time. Especially in Lakes Michigan and Erie, the present dominant forms of midge larvae are indicative of pollution. N. W. Britt (Ohio State University) showed that 15 years ago the dominant benthic organism in western Lake Erie was the Mayfly, *Hexagenia*. Many of us remembered how they would collect knee-deep around the base of street lamps near the lake. The Mayfly has almost disappeared to be replaced by the *Chironomidae*, which is now declining in favor of the *Tubificidae*.

An excellent panel on eutrophication was monitored by A. D. Hasler (University of Wisconsin). Eutrophication tends to be used to mean productivity and is a general indicator of the pollution of a lake. The indices of eutrophication were discussed by A. M. Beeton (University of Wisconsin). Not enough indicators of the ecological state of the lakes are being monitored. More research is needed to select the proper indicators. There is also some confusion about the trends of those indices that have been measured, such as ni-

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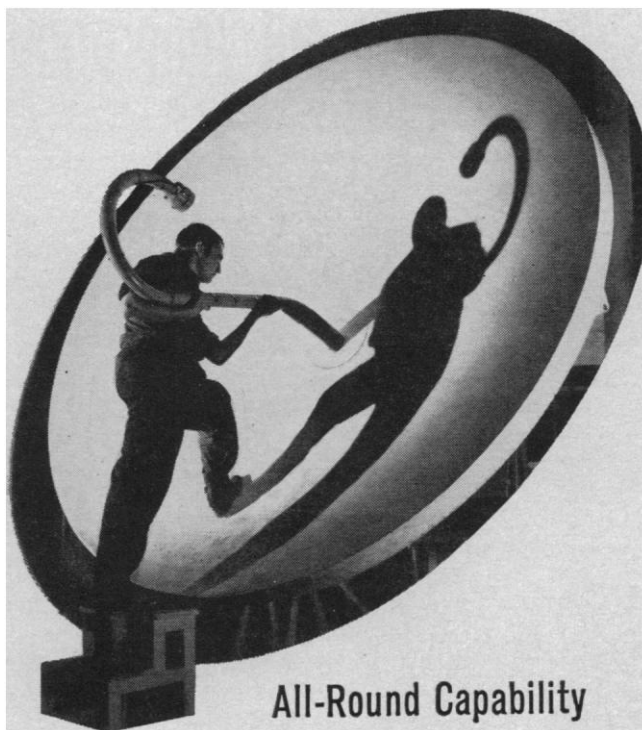
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trates and phosphates. It is apparently difficult to compare data because of variations in experimental techniques and uncertainty as to whether a specific phosphorus compound or total phosphorus was measured.

G. L. Harlow (Federal Water Pollution Administration) discussed the sources of nutrients. At certain times of the year, phosphate measurements can be significantly biased by runoff from farmland; however, the major source of nutrients is from sewage effluent. Nutrients in Lakes Erie, Michigan, and Ontario are showing significant increases. These results are compatible with the measurements of the distribution of biological species as reported by C. F. Powers (University of Michigan). The dominant species reflect the increased pollution in the last 30 to 40 years and the spatial distribution reflects the injection of sewage effluent by the various lake border towns. J. C. Ayers (University of Michigan) checked to see if water temperature changes could stimulate the eutrophic plankton species now being observed. He concluded that this is not the case after a very detailed study of the available weather records for the last century. Although the air temperatures over Lakes Erie and Michigan are rising, Lake Erie's water temperature has an upward trend, while Lake Michigan's has a downward trend. Lake Erie, being a shallow lake, more closely follows the air temperature, whereas the deeper Lake Michigan depends on storms for mixing. The number of storms over Lake Michigan has been decreasing.

The removal of pollutants in treatment plants was discussed by G. A. Rohlich (University of Wisconsin). Much more research is required in order to be able to remove more than 99 percent of the effluent. Current techniques of removing 50 to 75 percent of the phosphates are not adequate when the total remaining quantity is considered. Research is continuing on techniques to remove various organic and inorganic compounds. This research should lead to a building block design of a treatment plant depending on the types of pollutants to be removed.

Pollution control programs are being developed under the supervision of W. Kehr (Federal Water Pollution Administration). The Lake Michigan and Lake Erie plans should be ready about 1 January 1967, with the other plans expected within the following 12

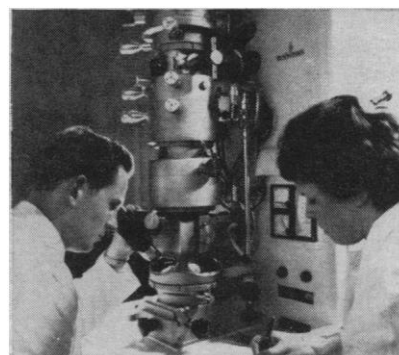


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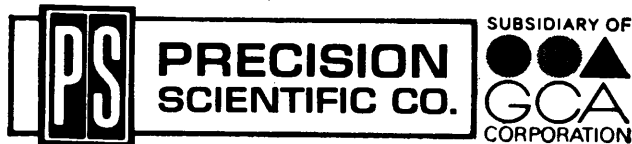
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months. The standards are difficult to select; however, they will be flexible, that is, they will vary with locale. When more research has been accomplished, the standards will be modified, if necessary. Peter Kuh (Enforcement Branch of the Federal Water Pollution Administration) discussed the enforcement policies. It is hoped that his branch will do most of their enforcement through informal discussions rather than formal hearings or court actions.

There does not seem to be any doubt that Lakes Erie, Michigan, and Ontario are seriously polluted and are getting worse year by year. There are insufficient data on which to base decisions. The biological cycles, chemical cycles, and physical properties of the lakes are not adequately known. There is no doubt that the lakes can be restored to a desirable ecology, but it will require much research, time, and money. Although Lake Erie is more polluted than Lake Michigan, it can probably be improved easier because there is a significant water flow in Lake Erie, whereas Lake Michigan is a cul-de-sac. These lakes will probably require some positive action, such as the introduction of specific biological species, recovering the bottom with sand, injection of oxygen, and other actions. It seems to be only a matter of time until it is realized that no sewage or other waste can be deposited into the lakes.

In the last session J. L. Verber conducted a review of future Great Lakes research plans. Additional cooperation and exchange of information are required. Although there will be more research accomplished next year than last, it will not be adequate. The Universities of Michigan and Toronto have outstanding research programs, and the University of Wisconsin gives indication of significant growth. The U.S. government agencies have a large amount of research but the only significant State research program is conducted by Ontario. In the United States only Illinois seems to have an active program.

This conference was sponsored by IIT Research Institute in cooperation with the Great Lakes Research Division, University of Michigan, which will publish the proceedings. The next conference will be held at the University of Toronto in April 1967.

BILLY M. MCCORMAC
JAMES E. ASH

IIT Research Institute,
Chicago, Illinois 60616

Forthcoming Events

July

20-21. **Crystal Growth**, symp., Moscow, U.S.S.R. (N. V. Belov, Inst. of Crystallography, Academy of Sciences of the U.S.S.R., Lenin Prospekt 59, Moscow B-333)

21-24. **Data Processing**, intern conf., Chicago, Ill. (Data Processing Management Assoc., 524 Busse Highway, Park Ridge, Ill. 60068)

22-23. **Pennsylvania Acad. of Science**, summer mtg., Pennsylvania State Univ., University Park. (E. W. Miller, Dept. of Geography, Pennsylvania State Univ., University Park 16802)

23-28. **Anatomy**, 1st Pan American congr., Mexico, D.F. (Congress Secretariat, Apt. Postal 25279, Admon. de Correos 70, Mexico 20)

24-30. **Microbiology**, 9th intern. congr., Moscow, U.S.S.R. (N. E. Gibbons, Intern. Assoc. of Microbiological Soc., Div. of Applied Biology, Natl. Research Council, Ottawa 2, Ont., Canada)

24-30. **Ornithology**, 14th intern. congr., Oxford, England. (N. Tinbergen, Dept. of Zoology, Oxford Univ., Oxford)

24-30. **Pharmacology**, intern. congr., São Paulo, Brazil. (M. Roche e Silva, Dept. of Pharmacology, Faculty of Medicine, Univ. of São Paulo, Ribeirão Preto, São Paulo)

25-27. **Data Acquisition and Processing in Biology and Medicine**, conf., Univ. of Rochester, Rochester, N.Y. (Office of Technical Activities Board, Inst. of Electrical and Electronics Engineers, 345 E. 47 St., New York 10017)

25-29. **Interpretation and Therapy of Cardiac Arrhythmias**, conf., Hahnemann Medical College and Hospital, Philadelphia, Pa. (L. S. Dreifus, Hahnemann Medical College, 230 N. Broad St., Philadelphia)

25-30. **Animal Husbandry**, intern conf., Göttingen, West Germany. (Intern. Agency Liaison Branch, Office of the Director General, Food and Agriculture Organization, Via delle Terme di Caracalla, Rome, Italy)

25-31. **Genetics**, intern, symp., São Paulo, Brazil. (G. Pavan, Dept. of Biology, Univ. of São Paulo, Caixa Postal 8105, São Paulo, Brazil)

26-28. **American Astronomical Soc.**, Cornell Univ., Ithaca, N.Y. (G. C. McVittie, Univ. of Illinois Observatory, Urbana)

26-30. **Clinical Chemistry**, 6th intern. congr., Munich, Germany. (O. Wieland, 11. Medizinische Universitätsklinik, Ziemssenstr. 1, 8 Munich)

27-30. **International Primatological Soc.**, mtg., Frankfurt-am-Main, Germany. (D. Stark, Ludwig-Rehnstr. 14, Frankfurt)

28-31. **Psychosomatic Medicine in Obstetrics and Gynecology**, 3rd intern. congr., Vienna, Austria. (A. H. Palmrich, Vienna Acad. of Medicine, Alserstr. 4, Vienna 9)

29-30. **Linguistic Society of America**, Univ. of California, Los Angeles. (A. A. Hill, Box 8120 University Station, Austin, Tex.)

31-4. **American Soc. of Animal Science**, annual mtg., Rutgers Univ., New Brunswick, N.J. (A. M. Pearson, Dept. of Food

See 3 June issue for comprehensive list

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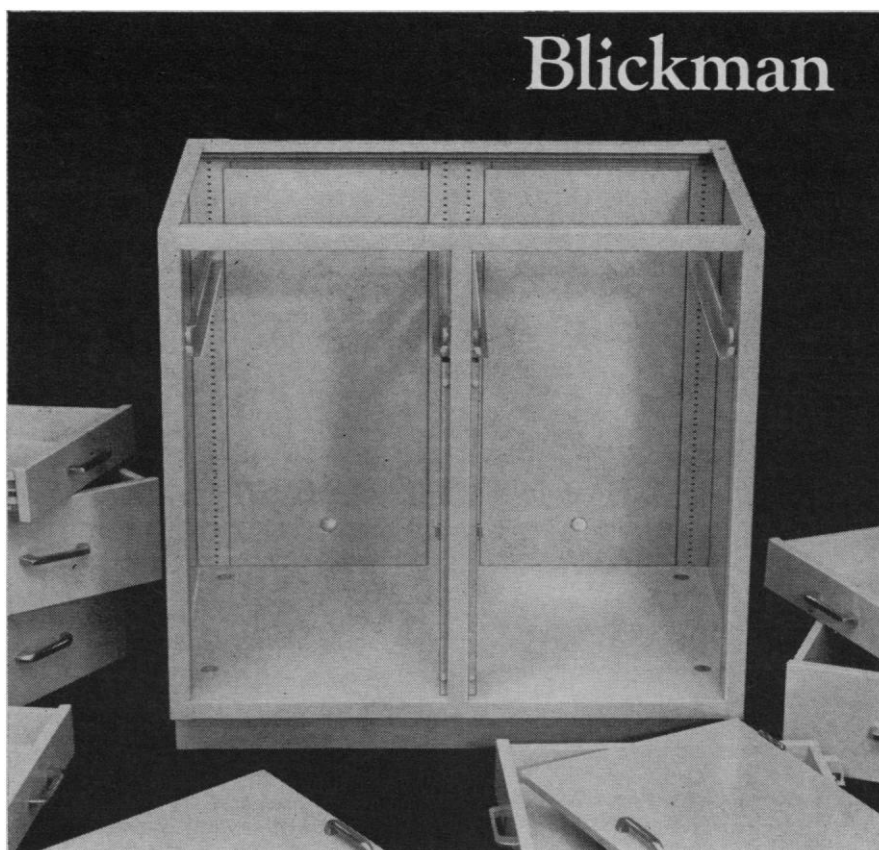
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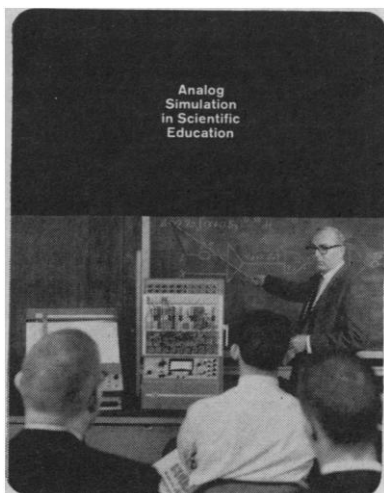
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31-5. **Dermatology**, 13th intern. congr., Munich, West Germany. (C. G. Shirren, Frauenlobstr. 9, Munich)

31-6. **Mycology**, 4th European congr., Warsaw, Poland. (Intern. Union of Biological Sciences, General Secretariat, Dept. of Zoology, Univ. of Washington, Seattle 98105)

August

1-3. **Electron Spin Resonance Spectroscopy**, symp., American Chemical Soc. Div. of Physical Chemistry, Michigan State Univ., East Lansing. (M. T. Rogers, Dept. of Chemistry, Michigan State Univ., East Lansing 48823)

1-4. **Psychoanalysis**, 2nd Pan American congr., Buenos Aires, Argentina. (M. Heiman, 1148 Fifth Ave., New York, N.Y. 10028)

1-4. **Toxicology and Occupational Medicine**, 5th inter-American conf., Miami, Fla. (W. B. Deichmann, Univ. of Miami School of Medicine, Coral Gables, Fla. 33134)

1-5. **Instrumentation Science**, 3rd research conf., Instrument Soc. of America, William Smith College, Geneva, N.Y. (K. B. Schnell, ISA, 530 William Penn Pl., Pittsburgh, Pa. 15219)

1-6. **Nuclear Physics**, intern. seminar, Joensuu, Finland. (Research Inst. for Theoretical Physics, Univ. of Helsinki, Helsinki, Finland)

1-6. **European Seismological Commission**, mtg., Copenhagen, Denmark. (E. Peterschmitt, Inst. de Physique du Globe, 38, boulevard d'Anvers, Strasbourg, France)

1-6. **Upper Mantle**, symp., Copenhagen, Denmark. (H. C. Smith, Upper Mantle Commission, Geological Survey of Canada, Ottawa, Ont.)

1-7. **International Union of Scientific Psychology**, 18th congr., Moscow, U.S.S.R. (Secretary-General, Dept. of Psychology, Univ. of Moscow, Marx Ave. 18, Moscow)

2-4. **Vaso-Active Polypeptides**, symp., Ribeirão Preto, Brazil. (M. Rocha e Silva, Dept. of Pharmacology, Faculty of Medicine, Ribeirão Preto)

2-5. **Synaptic Mechanisms**, symp., Rio de Janeiro, Brazil. (C. Chagas, Inst. of Biophysics, Natl. Faculty of Medicine, Avda. Pasteur 458, Rio de Janeiro)

3-8. **International Geographical Union**, Latin American regional conf., Mexico City, Mexico. (A. Bassols Batalla, Mexican Soc. of Geography and Statistics, Justo Sierra 19, Mexico City 1)

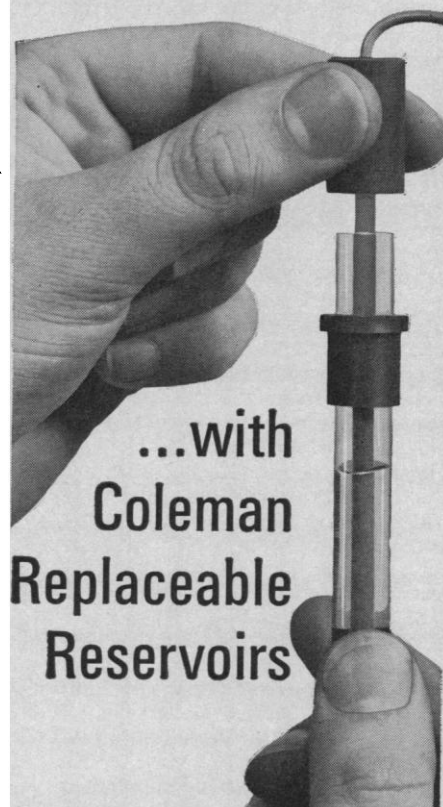
3-10. **Nutrition**, 7th intern. congr., Hamburg, West Germany. (U. Ritter, 1st Medical Clinic of the University, Martinistr. 52, Hamburg 20)

4-11. **Psychology**, 18th intern. congr., Moscow, U.S.S.R. (A. R. Luria, Univ. of Moscow, 13 Frunze Str., Moscow G. 19)

7-12. **Latin American Assoc. of Physiological Sciences**, 7th mtg., Mar del Plata, Argentina. (V. G. Foglia, Paraguay 2155 7th flr., Buenos Aires, Argentina)

8-10. **Society for Cryobiology**, annual mtg., Boston, Mass. (I. Wodinsky, A. D. Little Co., 30 Memorial Dr., Cambridge, Mass.)

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8-11. **Biometry and Statistics in Food, Population, and Health Research**, mtg., Mexico City, Mexico. (General Secretariat, Intern. Union of Biological Sciences, Dept. of Zoology, Univ. of Washington, Seattle 98105)

8-12. **Heat Transfer**, 3rd intern. conf., Chicago, Ill. (T. F. Irvine, College of Engineering, State Univ. of New York, Long Island Center, Stoney Brook)

8-12. **National Medical Assoc.**, 71st annual session, Chicago, Ill. (J. T. Givens, 2400 Corprew Ave., Norfolk, Va.)

8-13. **Anesthesiology**, 2nd European congr., Copenhagen, Denmark. (H. Poulson, Dept. of Anesthesia, University Hospital, Aarhus, Denmark)

10-11. **European Assoc. for Animal Production**, study commissions, mtgs., Edinburgh, Scotland. (K. Kállay, Corso Trieste 67, Rome, Italy)

10-12. **Applications of X-ray Analysis**, 15th annual conf., Denver, Colo. (J. B. Newkirk, Metallurgy Div., Denver Research Inst., Univ. of Denver, Denver 80201)

11-18. **Animal Production**, 9th intern. congr., Edinburgh, Scotland (Congress Secretary, 5 Hope Park Sq., Edinburgh 8)

14-17. **Cryobiology**, intern. conf., Sapporo, Japan. (Z. Yosida, Inst. of Low Temperature Science, Hokkaido Univ., Sapporo)

14-17. **Soil Conservation Soc. of America**, Albuquerque, N.M. (H. W. Pritchard, 7515 NE Ankeny Rd., Ankeny, Iowa)

14-18. **Canadian Pharmaceutical Assoc.**, 59th conv., St. John, New Brunswick. (P. W. Bell, 175 College St., Toronto 2B, Ont.)

14-19. **American Inst. of Biological Sciences**, 17th annual, Univ. of Maryland, College Park. (AIBS, 3900 Wisconsin Ave., Washington, D.C.)

The following societies will meet in conjunction with the AIBS. Additional information is available from AIBS or from the program chairmen listed below.

American Bryological Soc. (W. B. Schofield, Dept. of Botany, Univ. of British Columbia, Vancouver, Canada)

American Fern Soc. (I. Knobloch, Dept. of Botany and Plant Pathology, Michigan State Univ., East Lansing)

American Fisheries Soc. (L. E. Cronin, Natural Resources Inst., Administration Bldg., Univ. of Maryland, College Park)

American Genetic Assoc. (S. Burhoe, American Univ. Graduate School, Washington, D.C.)

American Microscopical Soc. (R. M. Cable, Dept. of Biological Sciences, Purdue Univ., Lafayette, Ind.)

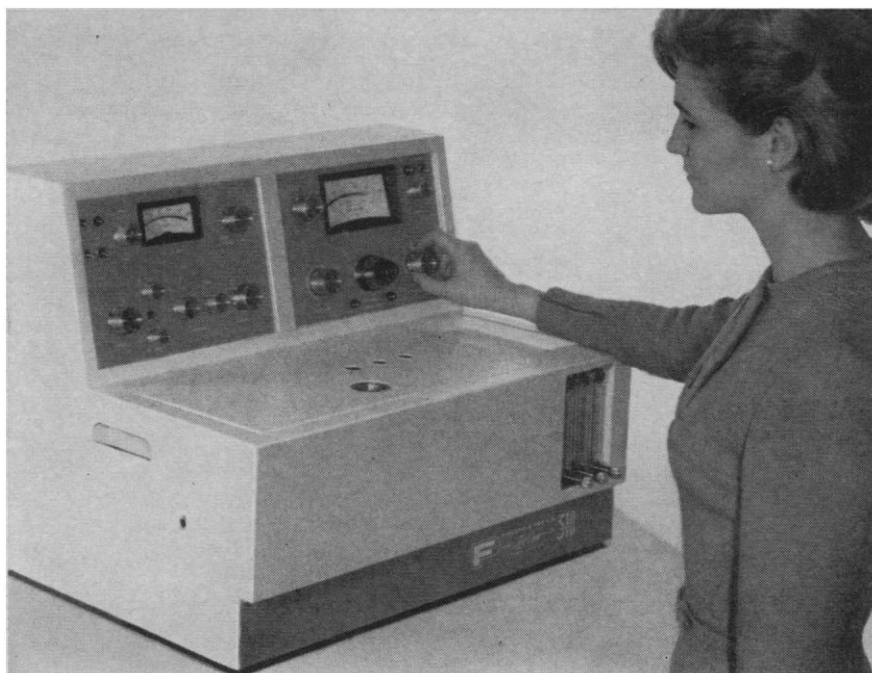
American Soc. for Horticultural Science (A. H. Thompson, Dept. of Horticulture, Univ. of Maryland, College Park)

American Soc. of Plant Physiologists (R. S. Loomis, Dept. of Agronomy, Univ. of California, Davis)

American Soc. of Plant Taxonomists (L. R. Heckard, Dept. of Botany, Univ. of California, Berkeley)

American Soc. of Professional Biologists (A. Dickman, 1415 W. Erie Ave., Philadelphia, Pa.)

American Soc. of Zoologists (L. E. DeLanney, Wabash College, Crawfordsville, Ind.)



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Biometric Soc.-ENAR (J. Meade, Univ. of Arkansas Medical School, Fayetteville)

Botanical Soc. of America (W. A. Jensen, Dept. of Botany, Univ. of California, Berkeley)

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

Mycological Soc. of America (P. L. Lentz, Crops Research Div., USDA, Beltsville, Md.)

Natl. Assoc. of Biology (W. K. Stephenson, Earlham College, Richmond, Ind.)

Nature Conservancy (Local Representative: W. Van Eck, Dept. of Agronomy and Genetics, West Virginia Univ., Morgantown)

Phi Sigma (Local Representative: R. G. Stross, Dept. of Zoology, Univ. of Maryland, College Park)

Phycological Soc. of America (B. C. Parker, Dept. of Botany, Washington Univ., St. Louis, Mo.)

Society for Industrial Microbiology (J. Coats, Upjohn Co., Kalamazoo, Mich.)

Society of Protozoologists (R. W. Hull, Dept. of Biological Sciences, Florida State Univ., Tallahassee)

Tomato Genetics Cooperative (Local Representative: F. Angell, Dept. of Horticulture, Univ. of Maryland, College Park)

Wildlife Disease Assoc. (C. Herman, Patuxent Wildlife Disease Assoc., Laurel Md.)

14-19. Ophthalmology, 20th intern. congr., Munich, West Germany. (The Congress, Beethovenstr. 8, Munich 15)

14-20. Combustion, 11th intern. symp., Univ. of California, Berkeley. (Combustion Inst., 986 Union Trust Bldg., Pittsburgh, Pa. 15219)

14-21. American Assoc. of Clinical Chemists, natl. conv., Miami Beach, Fla. (G. T. Lewis, Univ. of Miami Medical School, Coral Gables, Fla.)

15-17. Guidance and Control Specialists, conf., Seattle, Wash. (D. B. DeBra, Dept. of Aeronautics and Astronautics, Stanford Univ., Stanford, Calif.)

15-17. Institute of Mathematical Statistics, Los Angeles, Calif. (G. E. Nicholson, Jr., Univ. of North Carolina, Chapel Hill)

15-17. German-Speaking Mycological Soc., 6th scientific mtg., Vienna, Austria. (H. Rieth, The Society, Univ. Hautklinik, Martinistr. 52, 2 Hamburg 20, West Germany)

15-18. Forensic Immunology, Medicine, Pathology, and Toxicology, 4th intern. mtg., Copenhagen, Denmark (J. Voight, Dis Congr. Service, Skindergade 36, Copenhagen K)

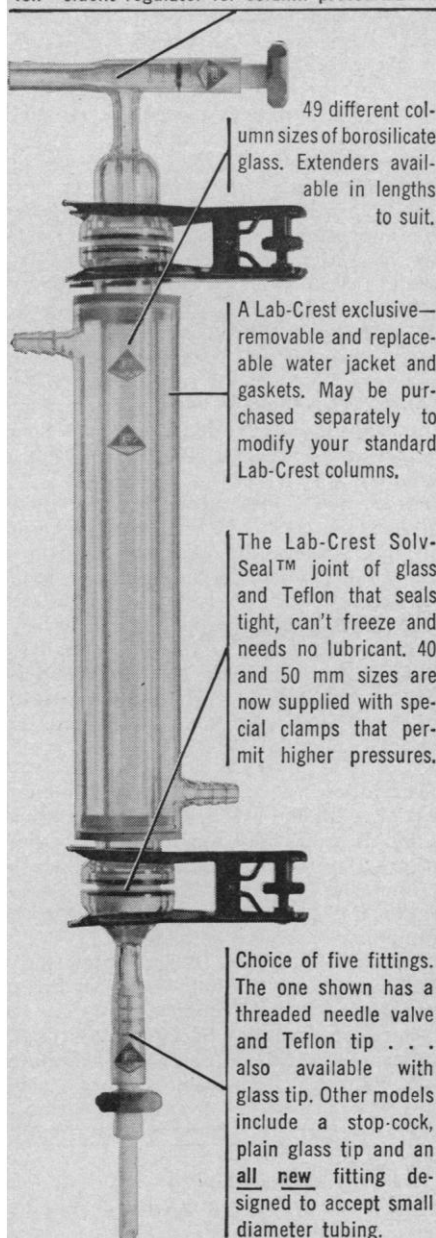
15-18. Physics of Snow and Ice, conf., Sapporo, Japan. (Z. Yosida, Inst. of Low Temperature Science, Hokkaido Univ., Sapporo)

15-19. New England Assoc. of Chemistry Teachers, 28th summer conf., Dartmouth College, Hanover, N.H. (E. B. Moore, Science Dept., Hanover High School, Hanover, N.H.)

15-19. Microscopy, 13th intern. symp., Chicago, Ill. (W. C. McCrone, Research Inst., 451 E. 31 St., Chicago 60616)

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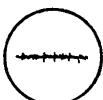
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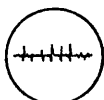
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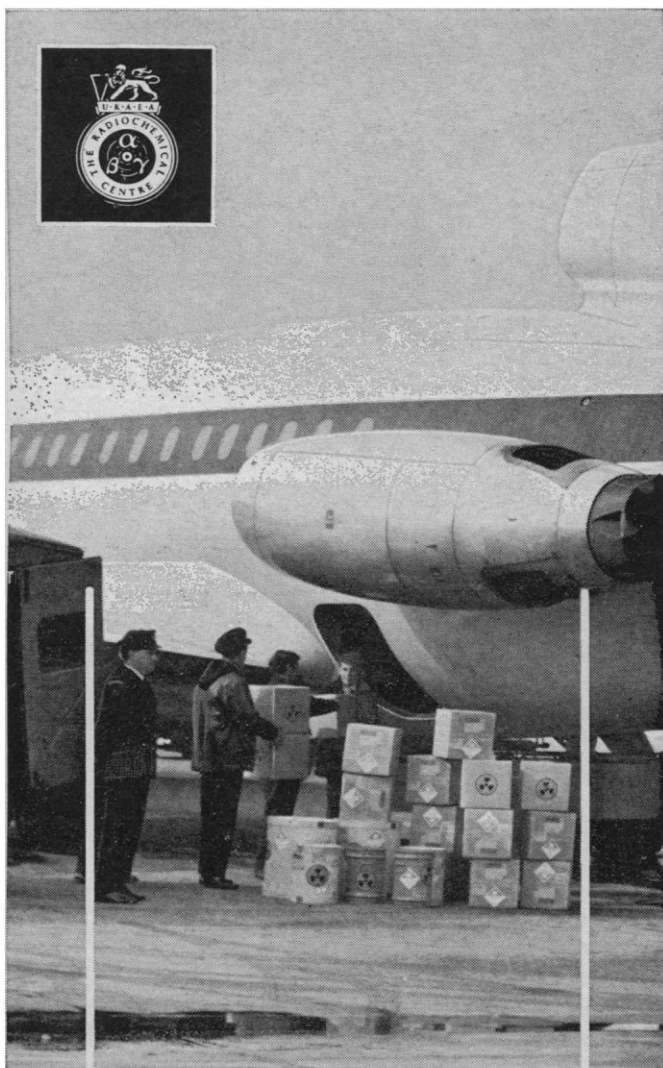
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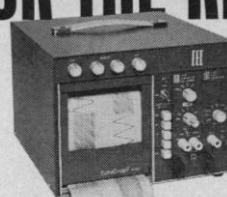
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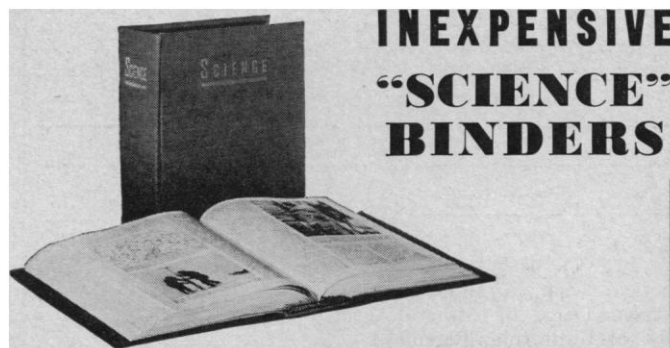
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SCIENCE, VOL. 152

15-19. American **Statistical Assoc.**, Los Angeles, Calif. (D. C. Riley, The Association, 810 18th St. NW, Washington, D.C. 20006)

16. International Assoc. for the **Prevention of Blindness**, general assembly, Munich, West Germany. (J. P. Baillart, 47, rue de Bellechasse, Paris 7, France)

16-17. Central Nervous System Effects of **Analgesic Drugs**, symp., Santiago, Chile. (J. Mardones, Inst. of Pharmacology, Univ. of Chile, Casilla 12967, Santiago)

16-19. International Assoc. of **Milk, Food, and Environmental Sanitarians**, Minneapolis, Minn. (H. L. Thomasson, P.O. Box 437, Shelbyville, Ind. 46176)

16-26. **Mathematicians**, intern. congr., Moscow, U.S.S.R. (V. G. Karamanov, Acad. of Sciences of the U.S.S.R., Lenin Prospekt, Moscow)

17-19. Joint **Automatic Control Conf.**, 7th annual, Univ. of Washington, Seattle. (G. Kovatch, NASA, Electronics Research Center, 575 Technology Sq., Cambridge, Mass. 02139)

19-26. Applied **Geography**, symp., Intern. Geographical Union Commission on Applied Geography, West Greenwich, R.I. (P. H. Nash, Graduate School, Univ. of Rhode Island, Kingston 02881)

19-28. **Geology**, 23rd intern. congr., Prague, Czechoslovakia. (Organizing Committee, Ústřední ústav geologický, Malostranské náměstí 19, Prague 1)

20-24. American **Phytopathological Soc.**, Denver, Colo. (C. J. R. Shay, Dept. of Botany and Plant Pathology, Purdue Univ., Lafayette, Ind. 47907)

20-25. **Diseases of the Chest**, 9th intern. congr., Copenhagen, Denmark. (M. Kornfeld, American College of Chest Physicians, 112 E. Chestnut St., Chicago, Ill. 60611)

21-24. **Free Radicals in Solution**, intern. symp. Ann Arbor, Mich. (R. C. Elderfield, Dept. of Chemistry, Univ. of Michigan, Ann Arbor 48104)

21-25. American Soc. of **Agronomy**, Oklahoma State Univ., Stillwater. (M. Stelly, The Society, 677 S. Segoe Rd., Madison, Wis. 53711)

21-25. **Electron Microscopy Soc. of America**, San Francisco, Calif. (G. Thomas, Dept. of Mineral Technology, Univ. of California, Berkeley)

21-26. **Hematology**, 11th intern. congr., Sydney, Australia. (F. P. Walsh, 1 York St., Sydney)

21-26. **Illuminating Engineering Soc.**, natl. technical conf., Minneapolis, Minn. (A. D. Hinckley, The Society, 345 E. 47 St., New York 10017)

21-7. British Assoc. for the **Advancement of Science**, 128th annual mtg., Nottingham, England. (Secretary, 20 Great Smith St., 3 Sanctuary Bldg., London S.W.1)

22-24. **Computer and Information Sciences**, symp., Columbus, Ohio. (J. T. Tou, Communication Science Research Center, Columbus Laboratories, Battelle Memorial Inst., 505 King Ave., Columbus, Ohio 43201)

22-24. **Physiology**, 12th Scandinavian congr., Turku, Finland. (K. Hartiala, Dept. of Physiology, Turku Univ., Turku)

22-26. Society of **Photo-Optical Instrumentation Engineers**, 11th annual techni-

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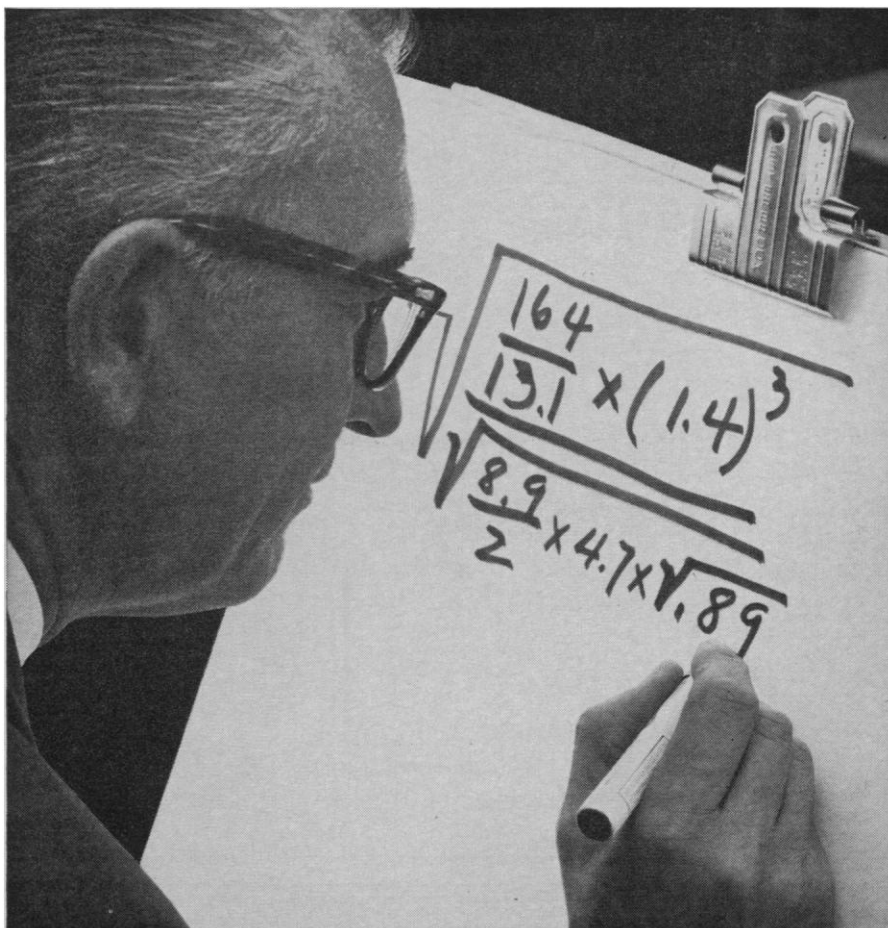


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22-26. **Poultry Science Assoc.**, Utah State Univ., Logan. (C. B. Ryan, Dept. of Poultry Science, Texas A&M Univ., College Station 77843)

22-27. **Food Science and Technology**, 2nd intern. congr., Warsaw, Poland. (A. Borys, Inst. Przemyslu Miesnego, Rakowiecka 36, Warsaw 12)

22-27. **History of Medicine**, 20th intern. congr., Berlin, Germany. (Secretariat, Augustastr. 37, 1 Berlin 45)

22-27. **Pan American Federation of Associations of Medical Schools**, 1st general assembly, Bogota, Colombia. (E. Braga, Caixa Postal 26-ZC-39, Rio de Janeiro, GB, Brazil)

22-10. **Science**, 11th Pacific congr., Tokyo, Japan. (Pacific Science Assoc., Bishop Museum, Honolulu, Hawaii 96819)

23-25. **Biological Photographic Assoc.**, 36th annual mtg., Lexington, Ky. (P. Brook, The Association, Cornell Univ. Medical College, 1300 York Ave., New York, N.Y.)

23-26. **Electronics**, western show and conv., Los Angeles, Calif. (S. Sensiper, WESCON, 3600 Wilshire Blvd., Suite 1920A, Los Angeles 99005)

23-30. **Luminescence**, intern. congr., Budapest, Hungary. (G. Szigeti, Research Inst. for Technical Physics, Hungarian Acad. of Sciences, P.O. Box Ujpest 1, No. 76, Budapest)

23-1. **Radio Astronomy and the Galactic System**, symp., Noordwijk, Netherlands. (J. H. Oort, University Observatory, Leiden, Netherlands)

24-26. **Principles of Radiation Protection**, conf., Oak Ridge, Tenn. (Special Projects Office, Oak Ridge Associated Univs., P.O. Box 117, Oak Ridge, Tenn. 37830)

24-29. **International Soc. of Blood Transfusion**, 11th biennial congr., Sydney, Australia. (G. T. Archer, 1 York St., Sydney)

24-29. **Prehistoric and Protohistoric Sciences**, 7th intern. congr., Prague, Czechoslovakia. (S. J. De Laet, Seminaire d'Archéologie de l'Université, 2 Blandijnberg, Ghent, Belgium)

25. **Scandinavian Pharmacologists**, mtg., Turku, Finland. (K. Hartiala, Dept. of Physiology, Turku Univ., Turku)

25-27. **Inter-Union Commission on Solar and Terrestrial Relationships**, mtg., Belgrade, Yugoslavia. (C. W. Allen, Univ. of London Observatory, Mill Hill Park, London N.W.7, England)

26-29. **Low Temperature Calorimetry**, conf., Otaniemi, Finland. (O. V. Lounasmaa, Dept. of Technical Physics, Inst. of Technology, Otaniemi)

26-29. **Rural Sociological Soc.**, annual mtg., Miami, Fla. (J. A. Beegle, Dept. of Sociology and Anthropology, Michigan State Univ., East Lansing)

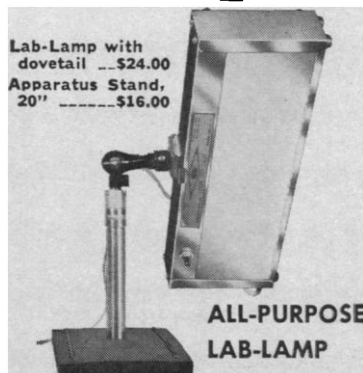
26-2. **Biometeorology**, 4th intern. congr., Rutgers Univ., New Brunswick, N.J. (F. Sargent, II, 524 Burrill Hall, Univ. of Illinois, Urbana 61801)

27. **American Assoc. of Electromyography and Electrodiagnosis**, San Francisco, Calif. (M. K. Newman, 16861 Wyoming Ave., Detroit 21, Mich.)

27-28. **Society for the Study of Social Problems**, annual mtg., Miami Beach, Fla.

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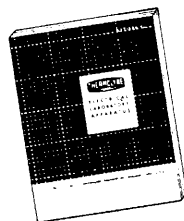
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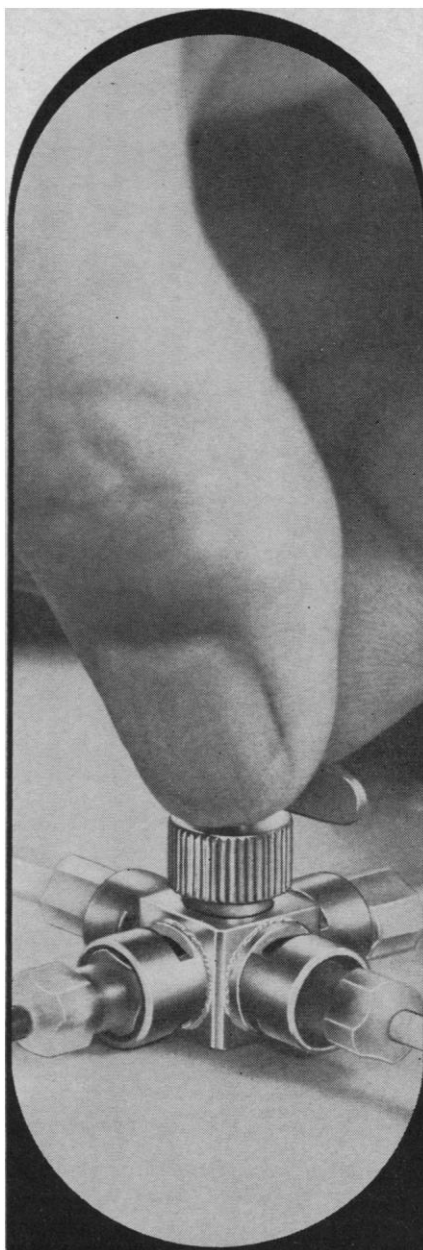
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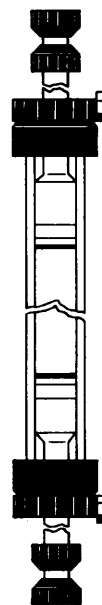
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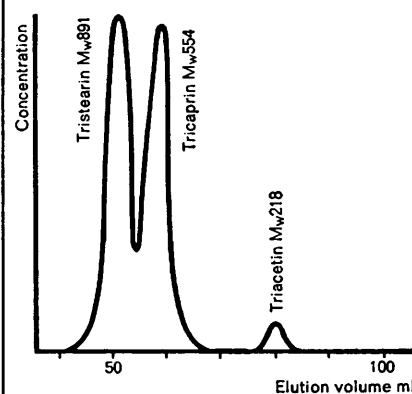
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Ethanol	1.8	3.0-3.5
Chloroform*	1.8	3.0-3.5
n-butanol	1.6	3
Dioxane	1.4	2.5-3.0
Tetrahydrofuran	1.4	2.5-3.0
Acetone	0.8	1.5

*Containing 1% ethanol.

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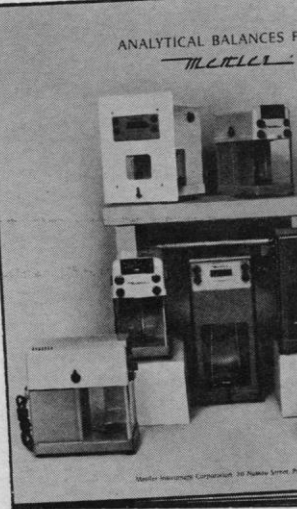
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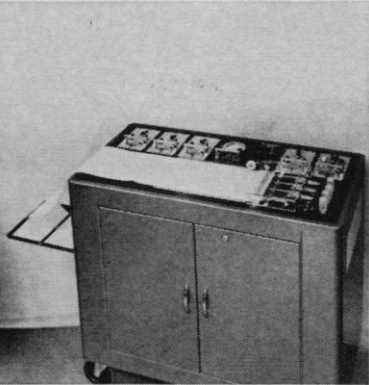
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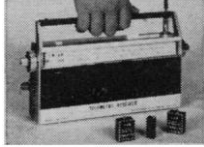
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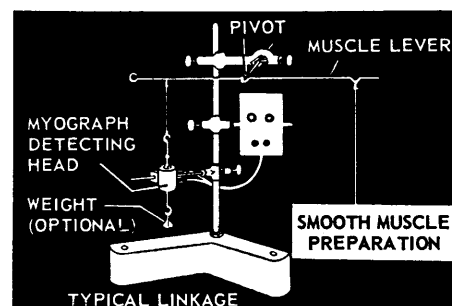
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28-1. Association of American Geographers, Toronto, Ont., Canada. (J. K. Hart, 1146 16th St., NW, Washington, D.C. 20036)

28-2. Hormones, Laurentian conf., Mont Tremblant, P.Q., Canada. (J. Sanford, 222 Maple Ave., Shrewsbury, Mass. 01545)

28-4. Electron Microscopy, 6th intern. congr., Kyoto, Japan. (Chairman of the Organizing Committee, Inst. for Virus Research, Kyoto Univ., Kyoto)

29-1. Technical Information Center Administration, 3rd annual conf., Philadelphia, Pa. (M. Warrington, Graduate School of Library Science, Drexel Inst. of Technology, Philadelphia 19104)

29-31. Preparation and Properties of Electronic Materials for Control of Radiative Processes, conf., Boston, Mass. (E. P. Warekoi, MIT Lincoln Laboratory, Lexington, Mass. 02173)

29-31. Electronic Materials, conf., Boston, Mass. (American Inst. of Mining, Metallurgical and Petroleum Engineers, 345 E. 47 St., New York 10017)

29-31. Instrumentation in Aerospace Simulation Facilities, 2nd intern. congr., Stanford Univ., Stanford, Calif. (P. L. Clemens, VKF/AP, Arnold Air Force Base Station, Tenn.)

29-31. Mathematical Assoc. of America, Rutgers Univ., New Brunswick, N.J. (H. M. Gehman, State Univ. of New York at Buffalo, Buffalo 14214)

29-31. Metallurgists, 5th annual conf., Toronto, Ont., Canada. (Canadian Inst. of Mining and Metallurgy, 906 Drummond Bldg., 117 St. Catherine St., W., Montreal 2, P.Q.)

29-31. Physical Chemistry of Solids, symp., Univ. of Montreal, Montreal, P. Q., Canada. (W. C. Cooper, Noranda Research Centre, 240 Hymus Blvd., Pointe Claire, P.Q., Canada)

29-31. Solvent Extraction Chemistry, intern. conf., Göteborg, Sweden. (The Conference, Dept. of Chemistry, Gibraltargatan 5 H, Göteborg S)

29-31. Textiles, Canadian seminar, Queens Univ., Kingston, Ont. (Textile Technical Federation of Canada, 4795 St. Catherine St., W. Westmount, Montreal, P.Q.)

29-1. American Sociological Assoc., Miami Beach, Fla. (E. H. Volkart, 1001 Connecticut Ave., NW, Washington, D.C. 20036)

29-2. Internal Medicine, Czechoslovak congr., Prague, Czechoslovakia. (O. Riedl, 4th Medical Clinic, Faculty of General Medicine, Charles Univ., U Nemocnice 2n, Prague 2)

29-2. American Mathematical Soc., Rutgers Univ., New Brunswick, N.J. (G. L. Walker, The Society, P.O. Box 6248, Providence, R.I.)

29-2. Neutron Monitoring for Radiological Protection, symp., Vienna, Austria. (S. Somasundaram, Div. of Health, Safety, and Waste Disposal, Intern. Atomic Energy Agency, Vienna)

29-2. Operations Research, 4th intern. conf., MIT, Cambridge, Mass. (K. D. Tocher, United Steel Co., Cybor House, 1-5 Tapton Hall Rd., Sheffield, England)

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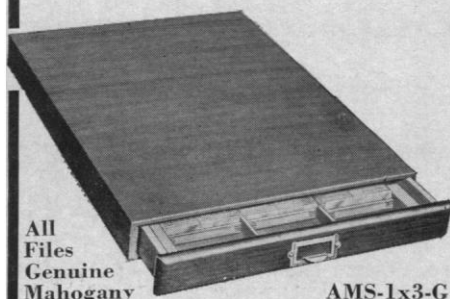
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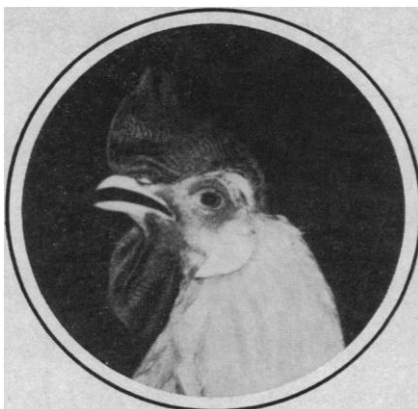


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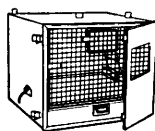
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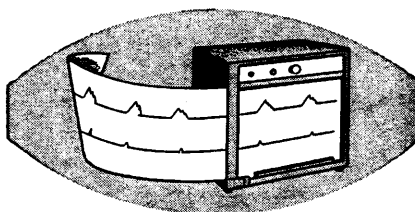
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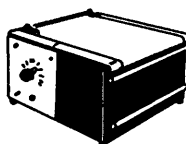
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of Dental Schools, Chicago, 1965. 99 pp.
Illus.

Crystals, Diamonds, and Transistors.
L. W. Marrison. Penguin Books, Balti-
more, 1966. 311 pp. Illus. Paper, \$1.95.

Death of the Sweet Waters. Donald E.
Carr. Norton, New York, 1966. 257 pp.
Illus. \$5.95.

A Dictionary of Astronautics. J. L.
Naylor. Hart, New York, 1965. 320 pp.
Illus. Paper, \$2.65; cloth, \$6.95.

**Educational Therapy in the Elementary
School.** An educational approach to the
learning problems of children. Patrick
Ashlock and Alberta Stephen. Thomas,
Springfield, Ill., 1966. 118 pp. Illus. \$6.75.

The English Paracelsians. Allen G. De-
bus. Watts, New York, 1966. 222 pp.
Illus. \$5.95. Watts History of Science
Library.

ESP: A Scientific Evaluation. C. E. M.
Hansel. Scribner, New York, 1966. 285
pp. Illus. \$6.95.

**The Evolution of Urban Society: Early
Mesopotamia and Prehispanic Mexico.**
Robert McC. Adams. Aldine, Chicago,
1966. 203 pp. Illus. \$5.95. The Lewis
Henry Morgan Lectures.

**Explorer of the Universe: A Biography
of George Ellery Hale.** Helen Wright.
Dutton, New York, 1966. 480 pp. Illus.
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**Five-Year Bibliography on Fatigue
1955-1959 (with Index).** Prepared by
Committee E-9 on Fatigue. Walter S.
Hyler, chairman. American Soc. for Test-
ing and Materials, Philadelphia, 1966. 108
pp. Paper, \$17; members, \$11.90. Con-
tains a list of references covering the
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Western and Eastern European countries,
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Flight to the Stars. An inquiry into
the feasibility of interstellar flight. James
Strong. Hart, New York, 1965. 190 pp.
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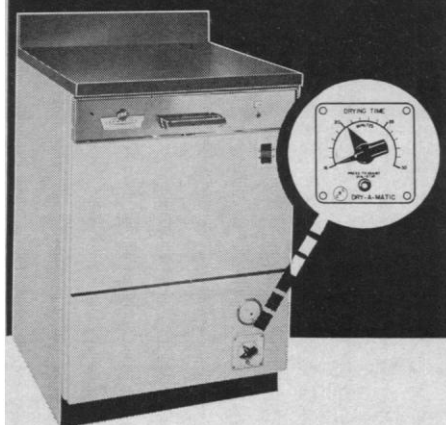
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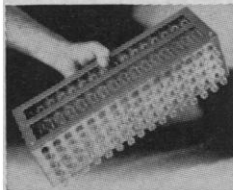


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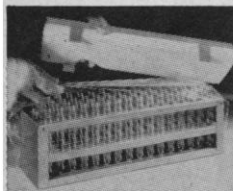
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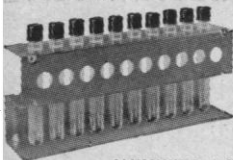
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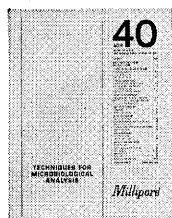
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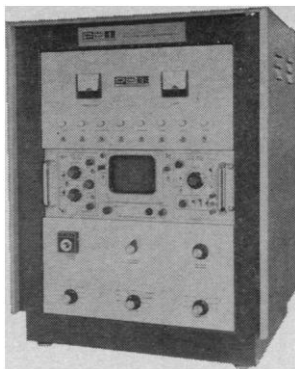
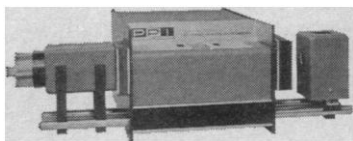
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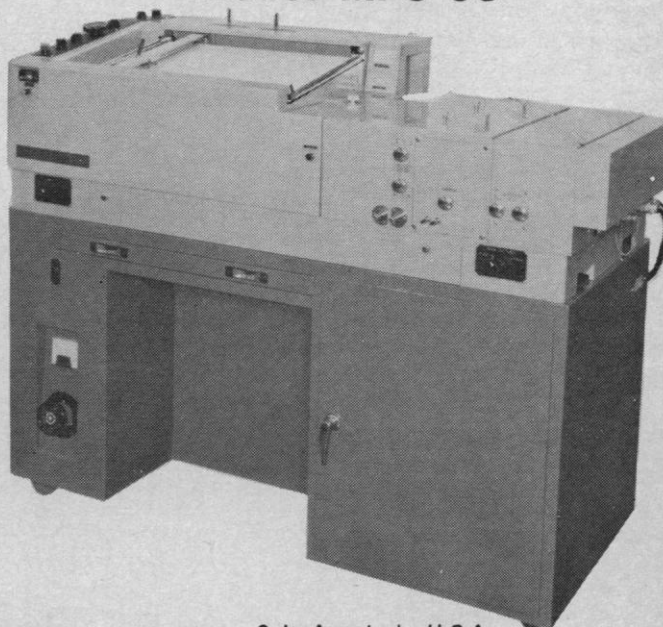
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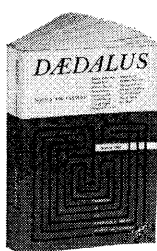
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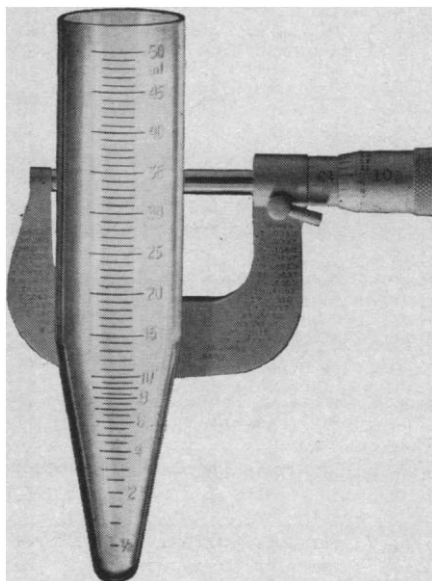
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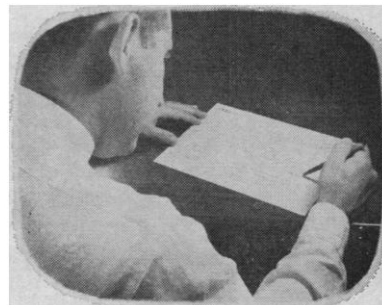
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