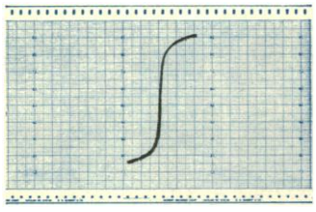
SCIENCE

8 July 1966

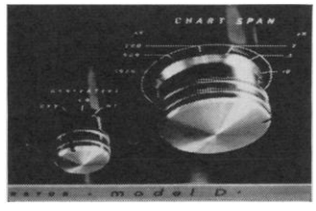
Vol. 153, No. 3732

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

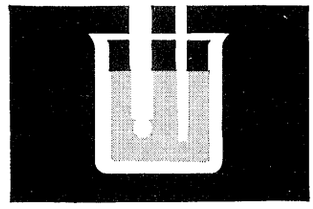
When your work demands a recording titrator



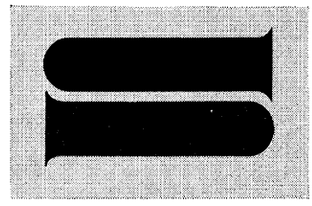
that has to be remarkably accurate (mv or pH accuracy = 0.25%; burette and volume accuracy = 0.1%) and precise (with a 240-mm chart span readable to as little as 0.002 ml and to 0.01 pH units when the 10-ml burette is used),



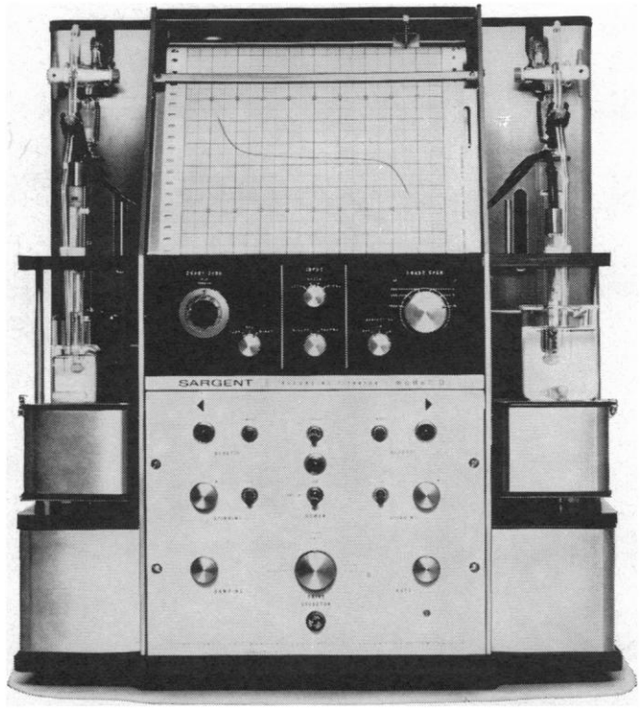
and that is designed for automatic operation (convenient, front-panel settings for chart span, titrant delivery rate, stirring rate, burette rapid flush-and-fill) with built-in titrant deceleration as endpoint is approached,



and that is versatile (accommodating any electrode, for aqueous or nonaqueous media, for semi-micro, micro, or macro work) to perform all potentiometric titrations, including those carried to predetermined endpoints, or indicated by the first derivative of the titration curve,



then the automatic recording titrator for you is the Model D (designed and manufactured by E. H. Sargent & Co.). It has two independent titrating stations and costs $2850, less electrodes. To see the Model D at work in your lab, call your Sargent man for a demonstration at your convenience.



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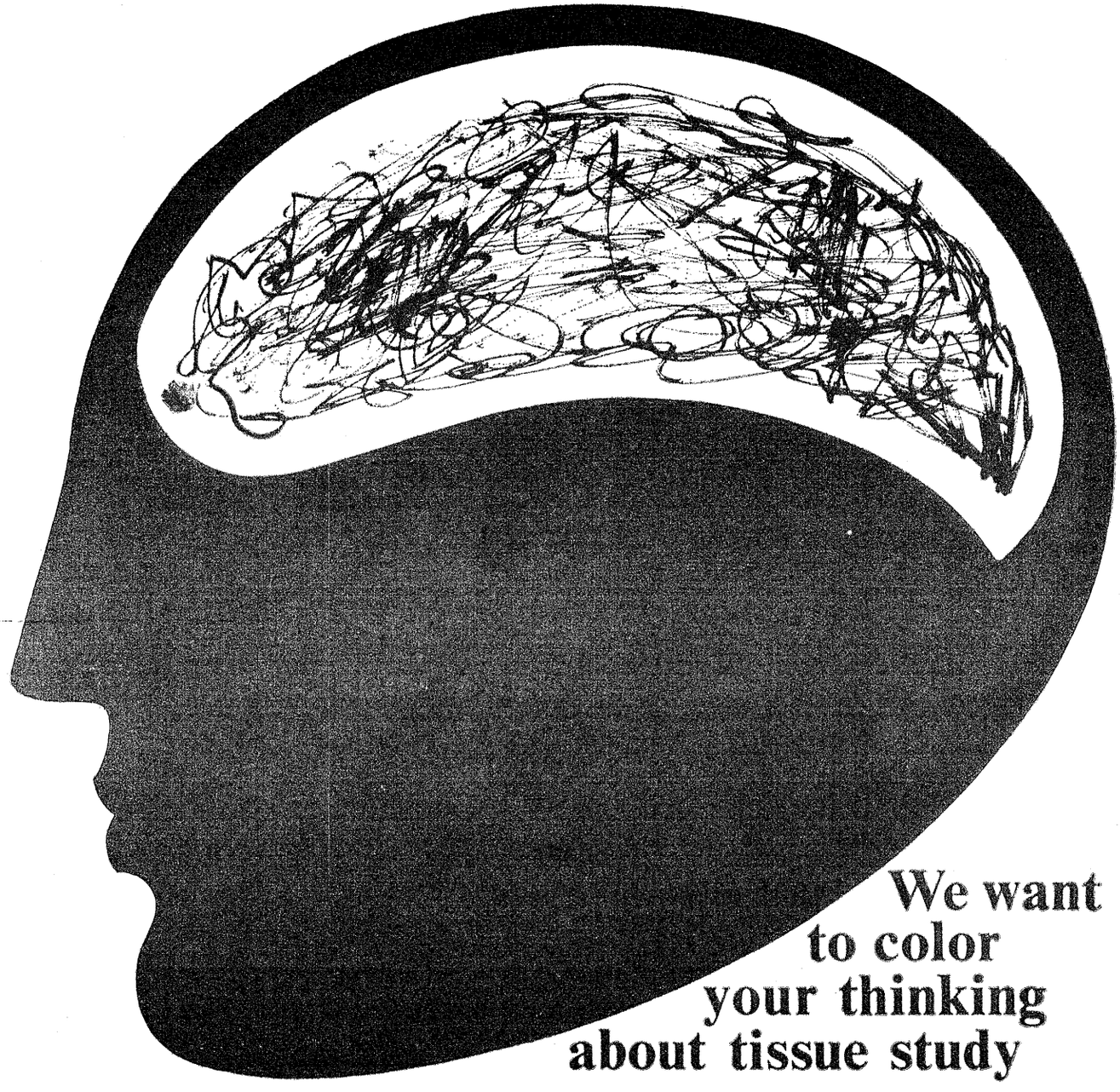

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8 July 1966
Vol. 153, No. 3732

SCIENCE

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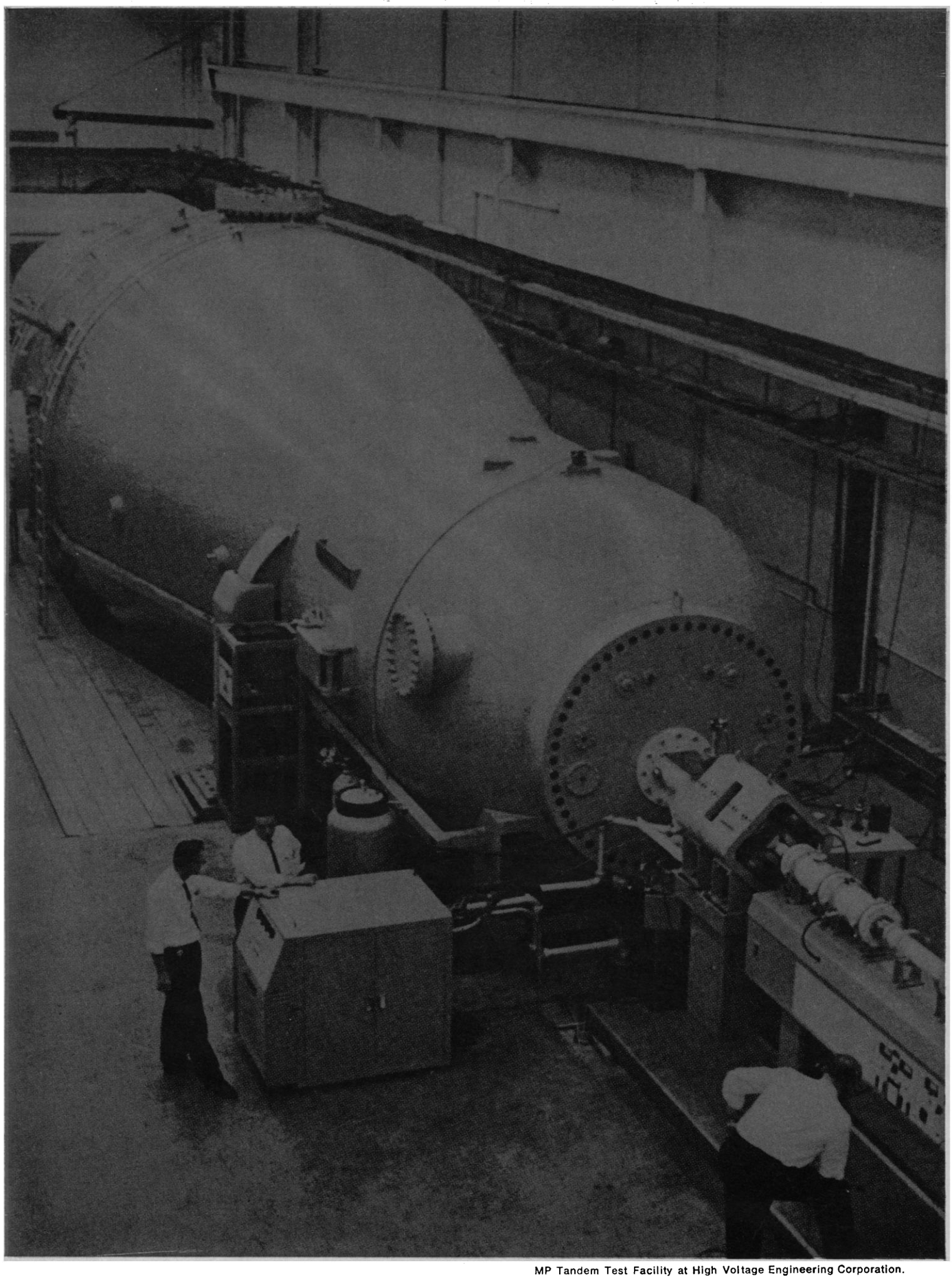
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

A Mexican freetail bat (*Tadarida brasiliensis mexicana* as it emerges from Carlsbad Caverns at dusk. The camera was timed by a signal from a photomultiplier tube when the bat intercepted a beam of light. See page 201. [Harold E. Edgerton, Massachusetts Institute of Technology]



MP Tandem Test Facility at High Voltage Engineering Corporation.

New opportunity for heavy element research:

Uranium ions accelerated to 200 MeV by HVEC Emperor Tandem.

Uranium ions have been accelerated to record-high energies exceeding 200 MeV during heavy-ion performance tests of the first completely assembled Model MP "Emperor" Tandem. The tests were carried out at HVEC's MP Tandem Test Facility at Burlington.

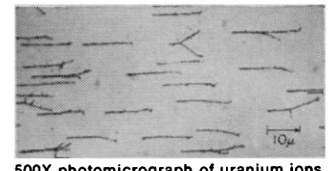
Calculations indicate that uranium ions at the energies achieved can create coulomb excitation in the nucleus of stationary uranium atoms. This is the first instance of uranium ion acceleration to energy levels sufficiently high for bombardment and examination of the nuclei of even the heaviest naturally occurring elements.

The MP heavy-ion performance tests were initial. We believe that further optimization of the system will allow demonstration of the machine's capability to accelerate uranium ion beams to energies of several hundred MeV . . . and the possibility of causing other interactions, including nuclear fission.

Such significant achievements are opening up entirely new fields of heavy element research . . . and offer the promising prospect that, with the Tandem Van de Graaff, nuclear scientists will soon be free to choose *any* specific pair of nuclei from among the multitude of possible pairs for controlled collisions and precise experimental examination.

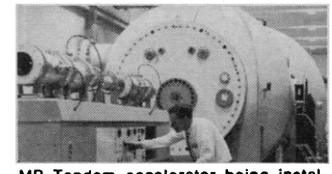
Seven MP Tandems have already been ordered from HVEC. Five are now being installed. They will join the more than 30 Tandem Van de Graaffs now engaged in important research throughout the world. This wide acceptance of the Tandem as a basic tool for nuclear research is due to its inherent precision, versatility and ease of particle choice for nuclear experimentation. The MP Tandem is the most recent embodiment of the Tandem concept. It offers, for the first time, a proven and comprehensive approach to heavy element research.

A new booklet describing the MP heavy-ion performance tests contains a number of very interesting photomicrographs of recorded particle tracks. For a free copy and detailed information about HVEC particle accelerator systems and components, write to our offices at Burlington, Massachusetts or Amersfoort, The Netherlands.



500X photomicrograph of uranium ions accelerated by MP Tandem striking photographic emulsion plate at 10 degree incidence. Note frequent collisions with atomic nuclei in emulsion.

MP Tandem accelerator being installed at Yale University has accelerated proton beams of 20 microamperes in the range from 10 to over 20 MeV. Acceptance tests are now in progress.



MP Tandem accelerator being installed at Atomic Energy of Canada Ltd. Chalk River Laboratories achieved 15 MV terminal voltage during initial test of the electrostatic structure.

HIGH VOLTAGE ENGINEERING

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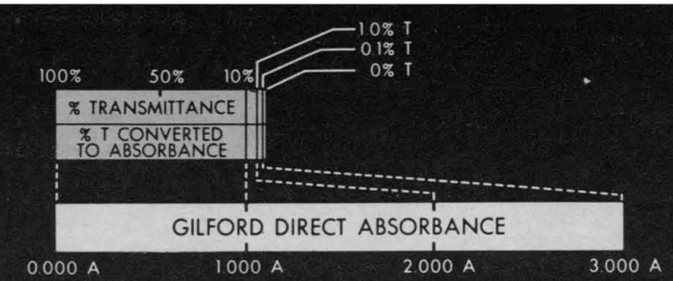
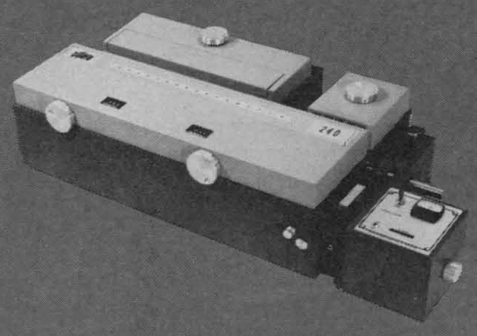
SPECTROPHOTOMETERS

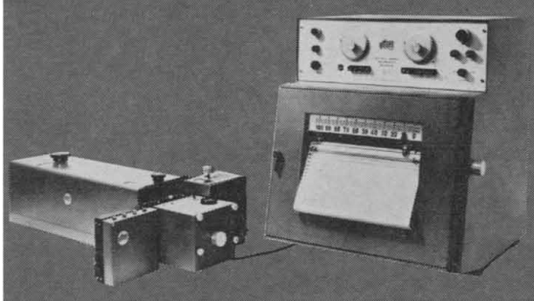


Gilford Spectrophotometers utilize a unique principle to measure Absorbance ***directly.*** The second and third decades, severely compressed in %—transmittance instruments, are fully expanded in Gilford Instruments—for equal accuracy and resolution throughout the complete range. Absorbance is presented digitally to 0.001 **A** —from 0.000 **A** to 3.000 **A** — or it can be readily recorded. Concentration is measurable directly over a 1000:1 range.



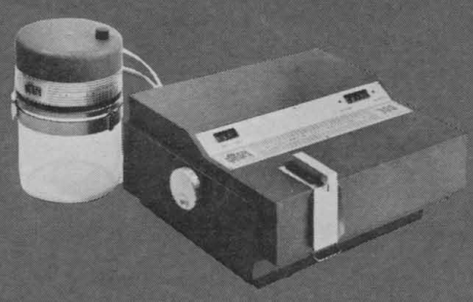
MODEL 240 SPECTROPHOTOMETER

The Model 240 spectrophotometer combines a quality Gilford-designed monochromator with the dependable Gilford photometric system. This combination has produced an instrument of unusual accuracy, range, and versatility—simple to operate and highly productive. The optical system, characterized by low stray light and high UV efficiency, features linear wavelength and slit width controls with numerical indication. A rugged optical-bench accessory mount and clear, uncluttered exit aperture plane promote easy alignment and quick interchange of attachments. The wide range—0.000 to 3.000 A—photometer is a linear absorbance measuring system of high resolution. Stabilizers for the photometer and dual-lamp source are contained in a single solid state supply module. Equipped with a four-position manual cell positioner.



MODEL 2000 AUTOMATIC SPECTROPHOTOMETER

The Model 2000 is a versatile, all-purpose spectrophotometer of superior range, stability, and photometric resolution. It is packaged into two self-contained units: (1) The lamp source, monochromator, automatic cuvette positioner, and photometer/indicator unit. (2) The main console with controls, recorder, power source, photometric circuit, line-voltage regulator, extended cuvette dwell-timer (up to 15 minutes), and circuitry and connections for additional accessories. The Model 2000 is particularly suited for determining time-dependent reaction rates and for automatic, quantitative monitoring of effluents from multiple chromatographic columns or density gradient tubes. Other applications include observation of dissolution and polymerization changes, spectrophotometric titration, precision turbidimetry and colorimetry, large-scale clinical testing, and industrial process and quality control.



MODEL 300 MICRO-SAMPLE SPECTROPHOTOMETER

The Model 300 is a new concept in precision absorbance spectrophotometry. It is a moderately priced, compact, integrated system whose photometric range and accuracy, combined with a unique rapid sampling system, provide a versatility and simplicity of operation unmatched by complex and costly instruments. The unusual capability of the Model 300 is achieved through the use of three new Gilford elements: a solid-state photometer, an excellent optical system, and a vacuum-driven sampling system coupled to a digital absorbance indicator. Accurately metered samples of 500 microliters or less may be analyzed at a rate of 4 to 6 per minute. The sample cell is filled, the absorbance measured, and the cell flushed by means of a single control lever. Absorbance range extends from 0.000 to 2.000A.

Write or call for specifications and quotation.

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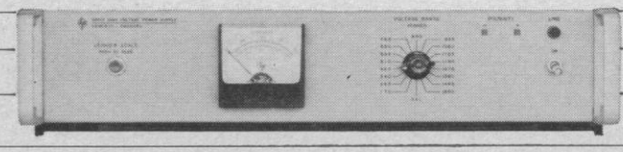

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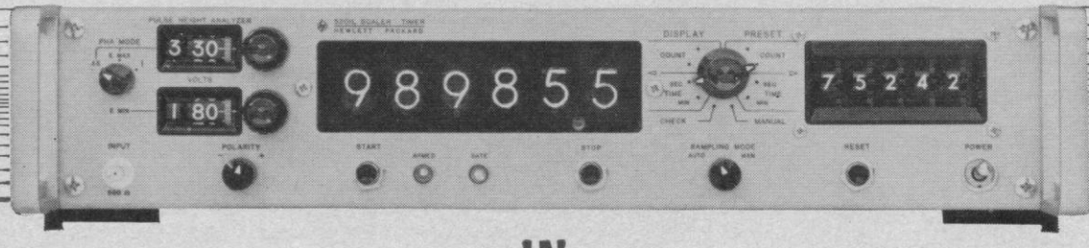

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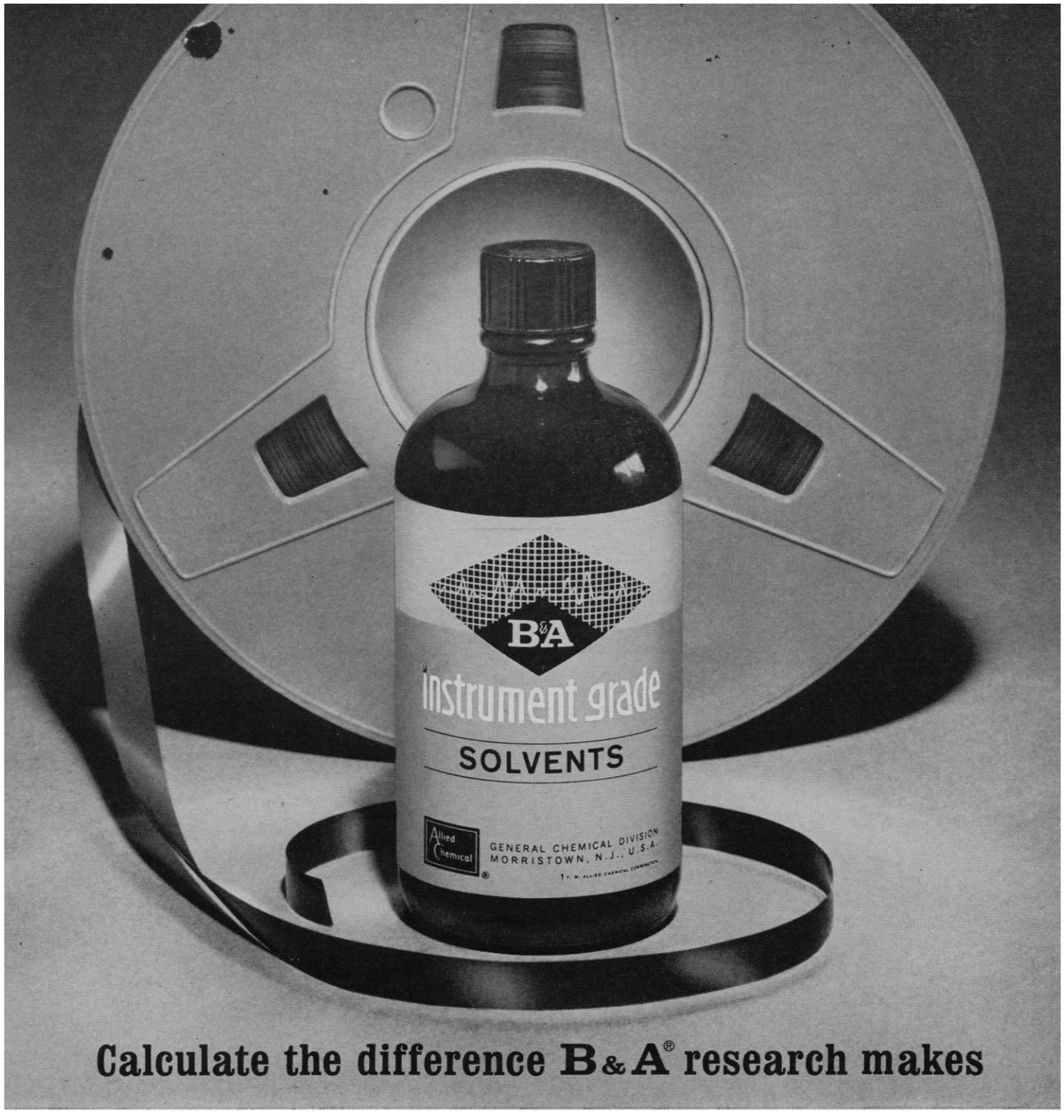

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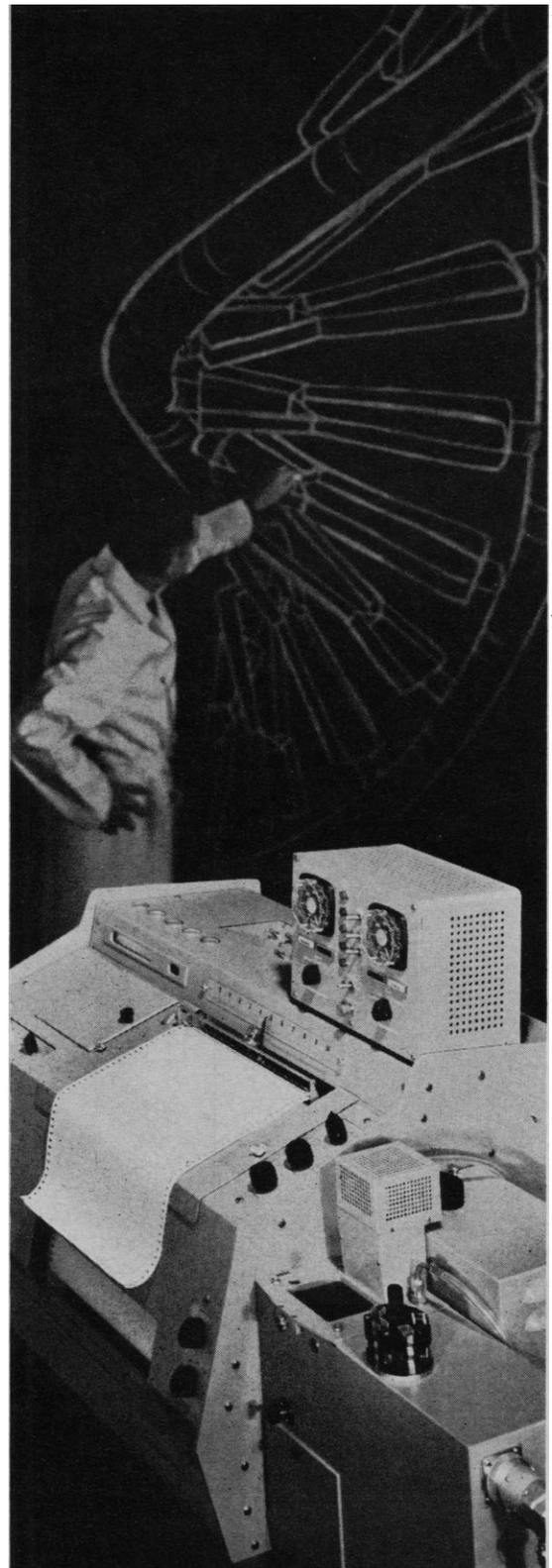

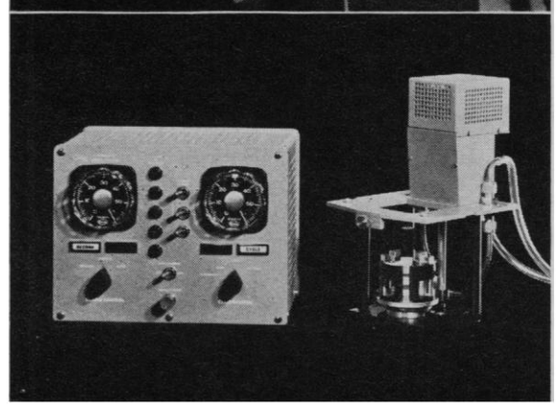

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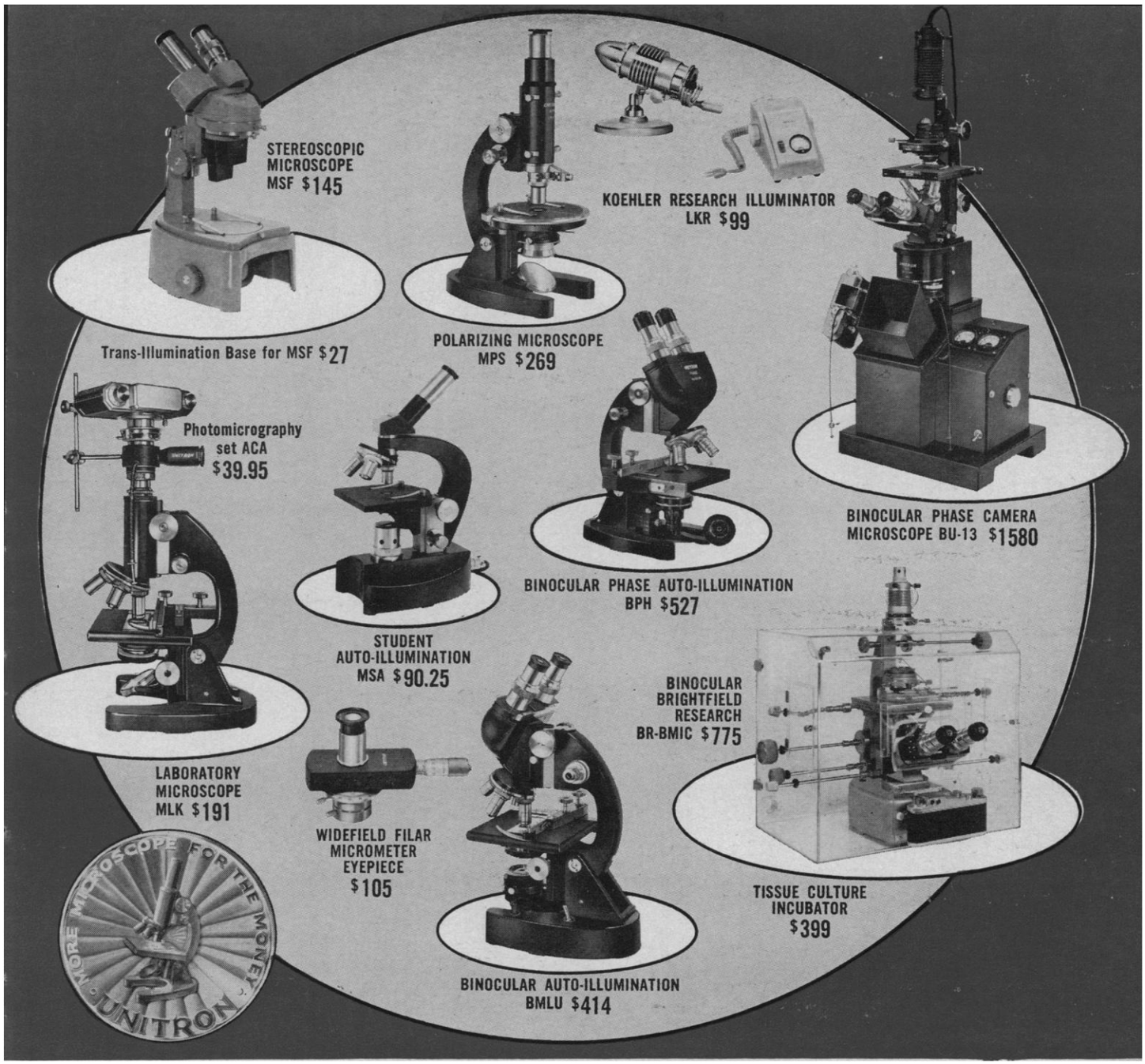

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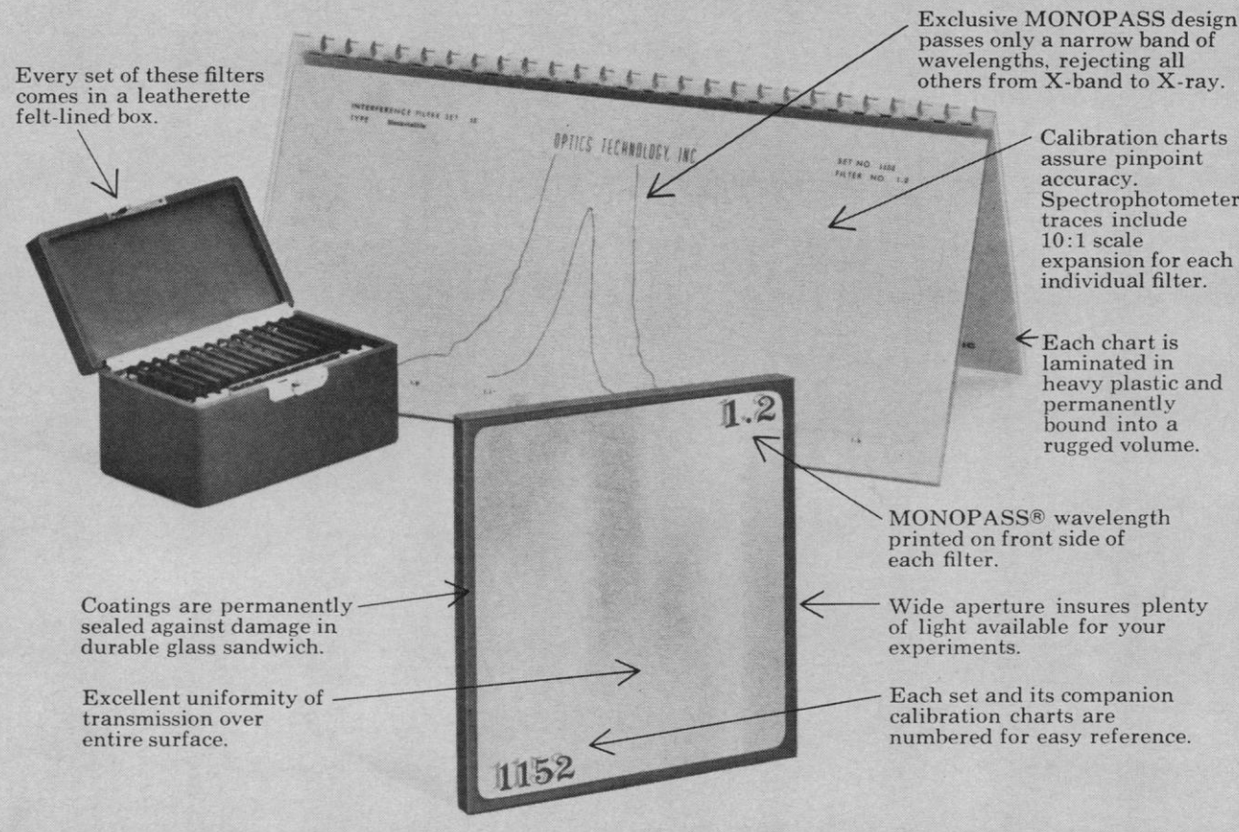

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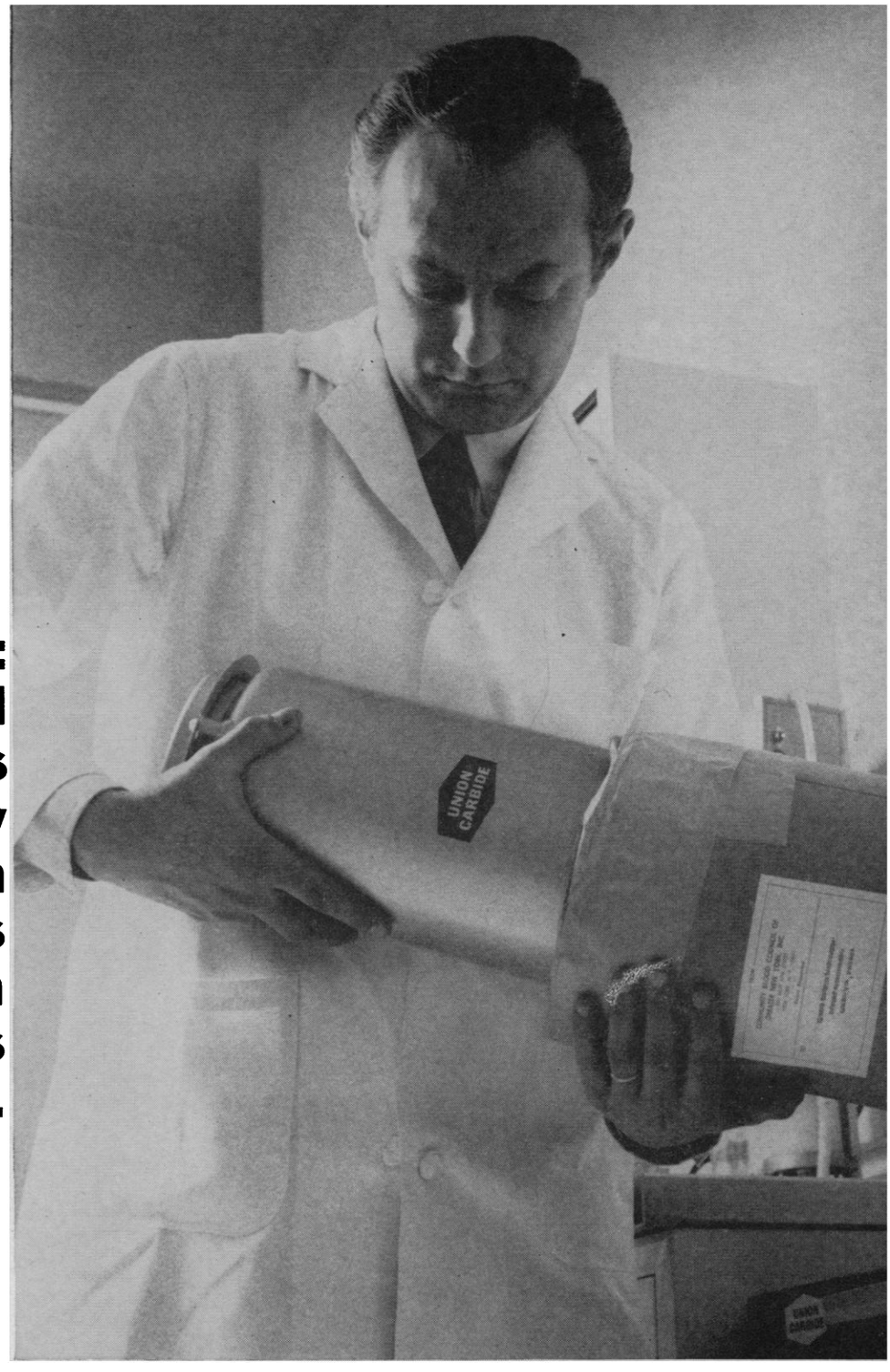

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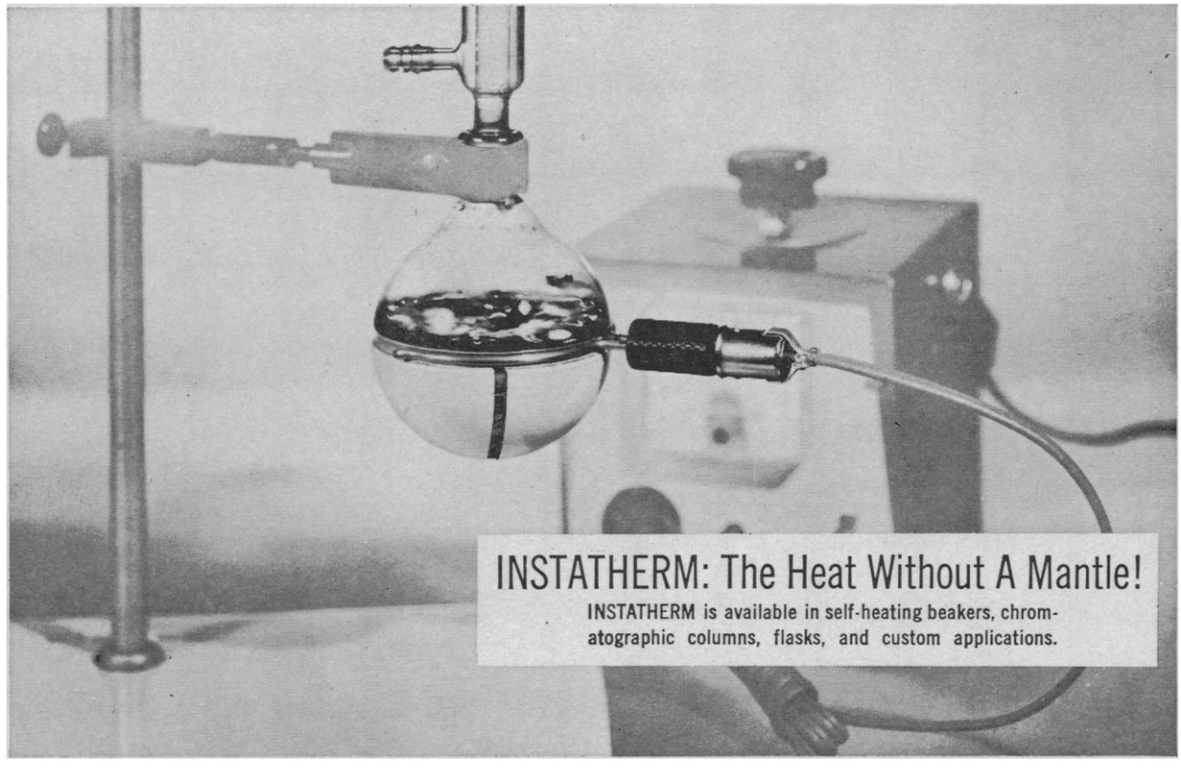

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The "eye," a sensitive CdS cell, measures the aggregate light passing through the specimen. It is coupled to the shutter speed selector ring and a meter needle. As the ring is rotated, the needle moves. The correct setting is indicated when the needle is centered, at which point the exposure is made.

The EFM accepts Nikon F and Nikkormat camera bodies, and the Nikon M-35 camera back. It can be adapted for use with other 35mm cameras, as well. Three large-format camera backs are also available: a Graflok back which accepts 4 x 5 film pack and sheet film holders, a 120 roll film back for 2¼ x 3¼, and the Polaroid M-100 back for making instant 3¼ x 4¼ photomicrographs.

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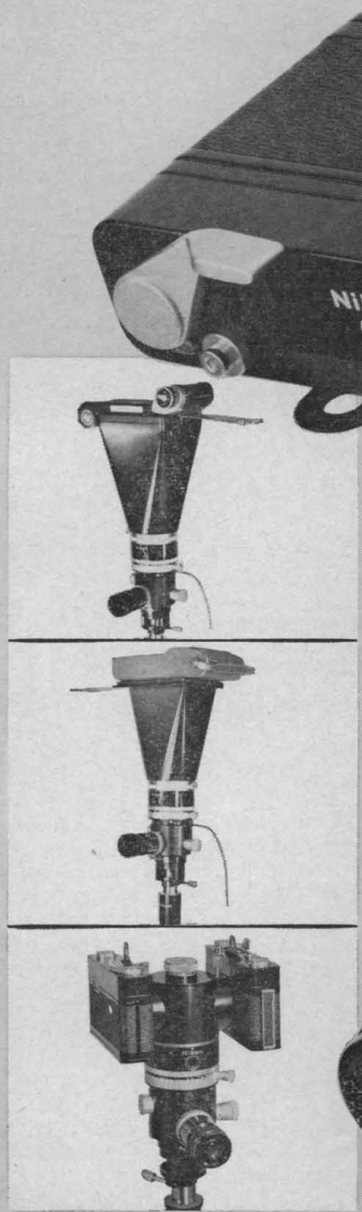

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(Simpson thinks $R = 100$ is a convenient choice.) The equation is, of course, the same as Calloway's, with the unit of time taken as $A_{max}/R = A_{std}$. It can also be put into the familiar form

$$A_n = A_{std}\, e^{n\lambda},$$

with $\lambda = (\ln R)/N$. (With Simpson's choice of $R = 100$, $A_n = 0.01\, A_{max} e^{n\lambda}$, $\lambda = 4.605/N$.)

The following table shows the ages of the members of a set for which $A_{max} = 70$ years, $R = 100$, and $N = 10$. (Note that the Calloway unit of time for this case is 0.70 year.)

n	A_n (yr)	n	A_n (yr)
1	1.10	6	11.0
2	1.75	7	17.5
3	2.80	8	28.0
4	4.40	9	44.0
5	7.00	10	70.0

A. HERSCHMAN

The Physical Review,
Brookhaven National Laboratory, Upton, Long Island, New York 11973

Computer-Time Allocation

In suggesting that a computation center, like a library, should provide its services free, Anthony Ralston (Letters, 29 April) has oversimplified a complex and increasingly important problem.

The demand for computing on any university campus is virtually unlimited if the service is free. When a university's computing power is multiplied by an order of magnitude, the new facilities are saturated within 2 or 3 years. Therefore, computing services must be allocated—the price mechanism being, of course, only one of several possible mechanisms. To simplify the problem, the "library" principle may be applied up to a limit: say everyone could be allowed $100 worth of free service per year. Allocation would then limit only large users. Some such policies are already in effect on many campuses.

The real question about large users, however, is not whether the accounting should be done in dollars or hours but who should make the allocations. One alternative is to create a process on the campus for weighing the competing claims of quantum calculations for large molecules, research in artificial intelligence, statistical analysis of the business cycle, and concordances of Goethe's works. Spare me from participation in that process!

A second alternative is to have the value of computing judged in relation to its value to the research projects it is supposed to serve—that is, as part of the regular foundation and government processes for making research grants. Chemical computing would then be evaluated by chemists, construction of concordances by humanists. There needs to be (and already is, of course) a substantial allocation for the development of computer science itself. This alternative is in the spirit of "program budgeting" or "cost-benefit analysis," now popular in the federal government.

It may be objected that the problem of balancing the chemist against the humanist simply reappears at a higher level—at the level of the federal budget for NSF and the Humanities Foundation. So it does, but that is unavoidable, and it is better that we make use of existing arrangements for these political decisions than that every campus duplicate such arrangements.

HERBERT A. SIMON

Graduate School of Industrial Administration, Carnegie Institute of Technology, Pittsburgh, Pennsylvania

Safety: A Parallel

Many individuals who have been following the accounts in *Science* of the current controversy over automobile and traffic safety will, I believe, be interested in reading "Bursting boilers and the federal power," by John G. Burke [*Technology and Culture* **7**, No. 1, 1–23 (winter 1966)].

The story in a nutshell is this: "Marine boiler explosions . . . provoked a crisis in the safe application of steam power, which led to a marked change in American political attitudes. The change, however, was not abrupt but evolved between 1816 and 1852" and culminated in Congress passing "the first positive regulatory legislation and [creating] the first agency empowered to supervise and direct the internal affairs of a sector of private enterprise."

I found Burke's detailed account of the story to be fascinating reading against the background of current events.

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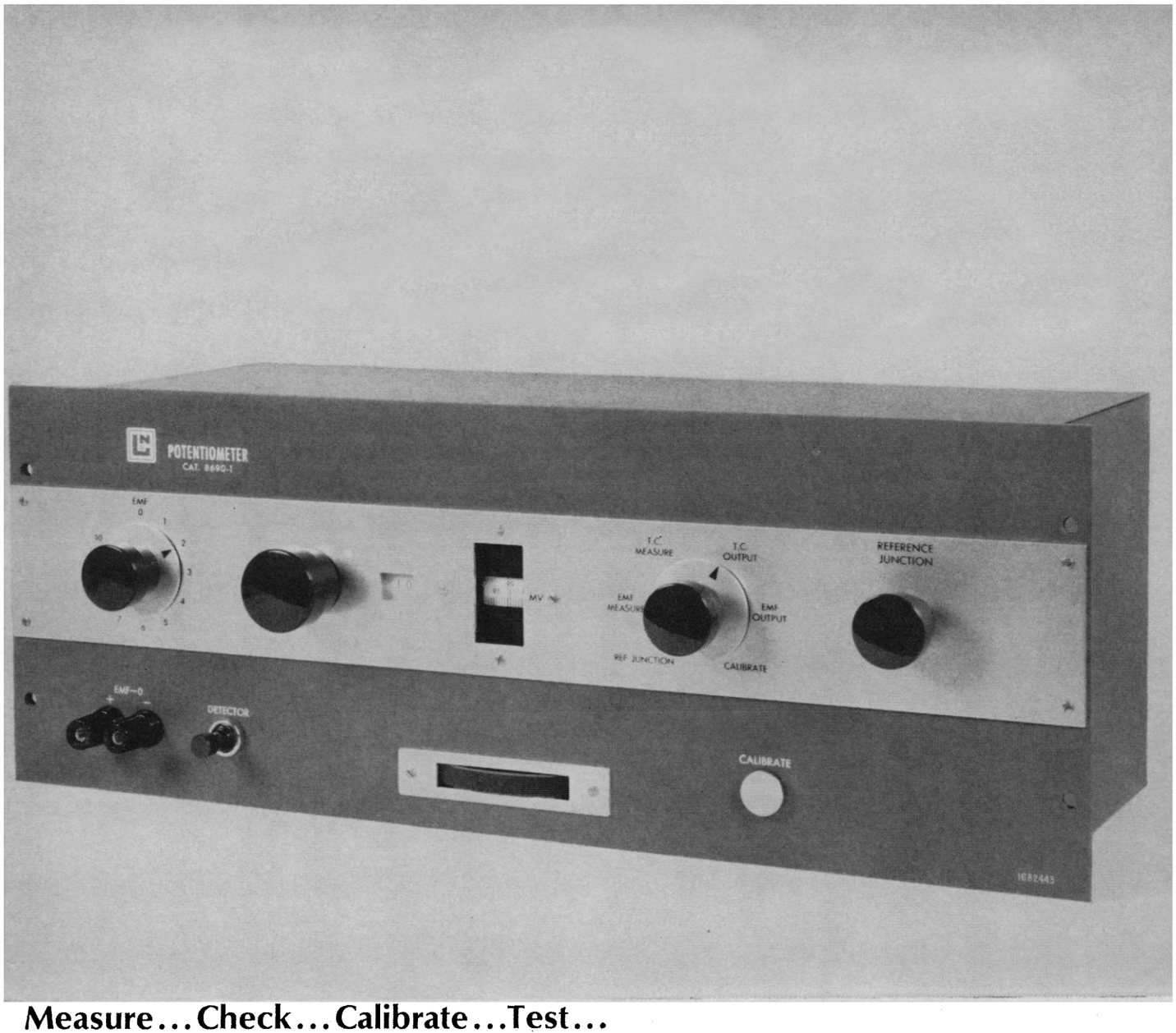

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8 July 1966, Volume 153, Number 3732

SCIENCE

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Stable Federal Support

Has the Federal Government acquired any responsibility for the continuing and general support of higher education in the United States? The answer may be debatable, but the amount of federal money going to institutions of higher education has reached a level that makes it necessary to consider the question.

Federal assistance provides research support, new equipment, building aid, library improvements, student assistance, and other forms of help to a college or university that can qualify. Other federal money flows to universities that assist federal agencies in meeting their obligations for training programs, demonstrations, assistance to other countries, and other services or action programs.

Despite important differences, the financing of all these activities comes in the form of individual grants or contracts that are made for specific purposes, for a limited period, without commitment for the future, and with some restrictions on use. Such funds have often had an emergency character and have been appropriated to meet needs that were considered temporary. The result is that a university often includes a substantial number of independently planned and temporarily financed extensions or "subagencies" of a variety of federal agencies.

This kind of financing is in marked contrast with the reasonably stable funds that colleges and universities have traditionally counted on for most of their annual budgets. State appropriations, student fees, and income from endowment, in varying proportions, have provided the solid core of academic budgets. Although none of these sources has been fully guaranteed for the future, all have been sufficiently stable to permit long-term commitments and planning. Moreover, the nature of these sources has encouraged prudent use of the funds. Income from fees and endowment can be used where needed most, and if not spent this year is available next. Many state colleges and universities receive lump-sum appropriations, and those states which require more detailed budgets usually allow appropriations to be used quite flexibly.

These more flexible funds now provide for about three-fourths of higher-education expenditures. The more inflexible federal grants and contracts supply about a quarter of the national total. The percentage varies greatly from one institution to another, however. In some it is close to zero; in others it is far more than half.

Higher education and the Federal Government have both benefited greatly from their financial and intellectual collaboration. The partnership will continue. But the amount of money now involved and its highly segmental character strain the ability of many institutions to plan and use their other resources most constructively, and these strains are most acute in the institutions that receive the most federal dollars.

The question therefore arises: has the Federal Government acquired a responsibility for contributing to the continuing and general support of higher education? The institutional grant programs of some agencies indicate a limited acceptance of such responsibility. But no general policy decision has been made, and no very effective one can be made by individual agencies. Decision at a higher level will be necessary, and that decision will be difficult, for constitutional, religious, regional, and educational issues are all involved in a matter of national policy. This whole problem is likely to become more vexatious before it is settled.

—DAEL WOLFLE

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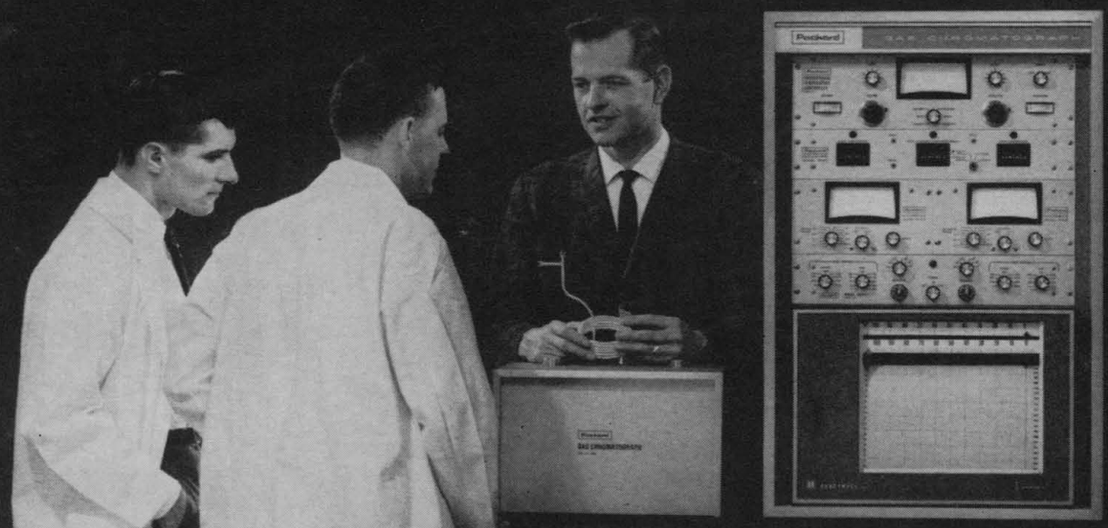

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cycle and during development. Brown summarized data from a variety of developmental systems in which early stages of embryogenesis are characterized by the absence of a nucleolus and lack of synthesis of ribosomal RNA. In these systems there appears to be a sufficient supply of maternal ribosomes to satisfy the early metabolic needs of the embryos. When nuclei from later stages are transplanted into unfertilized eggs, there is a disappearance of nucleoli and no further synthesis of ribosomal RNA until the embryo again reaches the later stage. Such experiments are believed to constitute evidence of a cytoplasmic control over the expression of the ribosomal cistrons. H. Barr (Wisconsin) speculated that this might be related to the much higher concentration of magnesium ions in unfertilized eggs as compared to the later stages. Adrienne Ficq (Brussels) described how the synthesis of cytoplasmic RNA, presumed to be predominantly ribosomal, occurs in the nucleolus of echinoderm oocytes prior to maturation and dissolution of the germinal vesicle.

Evidence that the nucleolus is active in RNA synthesis throughout most of interphase, with the possible exception of a brief period in early S phase, was provided by F. Kasten (Pasadena Foundation for Medical Research). N. Das (Berkeley) found that in certain organisms nucleoli continued to actively synthesize RNA well into mitotic or meiotic prophase.

In the closing session C. H. Waddington (Edinburgh) provided an incisive and much appreciated summary of the symposium. Swift presented the report of a special nomenclature committee who undertook the task of attempting to assimilate the totality of morphological and biochemical data into a unified terminology. Final remarks were made by A. Hollaender (Oak Ridge) and F. Saez (Montevideo), president and vice president of the symposium.

This conference was the fifth in a series of biological meetings sponsored by various Latin American institutions with the cooperation of the Biology Division of the Oak Ridge National Laboratory. Sponsors for the Montevideo meeting were the Departmental Council of Montevideo, National Council of Scientific and Technical Research of Uruguay, Organization of American States, United States Atomic Energy Commission, United States National Science Foundation, and the University of Pittsburgh. Proceedings of the conference, including a full transcript of the discussions, will be published as a monograph of the National Cancer Institute. It is intended that this volume, which is scheduled to appear before the end of the year, will serve as a valuable reference source and guide for present and future generations of nucleolophiles.

ROBERT P. PERRY
Institute for Cancer Research, Philadelphia, Pennsylvania 19111

Forthcoming Events

August

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)

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.)

Animal **Behavior** Soc. (E. M. Banks, Dept. of Zoology, Univ. of Illinois, Urbana)

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.)

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, Ústredni ústav geologicky, 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 technical symp., St. Louis, Mo. (R. T. Hedden, 16 Harneywold Dr., St. Louis 63136)

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. (F. F. Lee, Dept. of Sociology and Anthropology, Northeastern Univ., Boston, Mass. 02115)

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. Warekois, 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)

29–2. American **Physiological** Soc., fall mtg., Baylor Univ., Houston, Tex. (The Society, 9650 Wisconsin Ave., Washington, D.C. 20014)

29–2. **Solar-Terrestrial Physics**, inter-Union symp., Belgrade, Yugoslavia. (E. Herbays, Intern. Scientific Radio Union, 7, pl. Emile Danco, Brussels 18, Belgium)

29–3. Problems of **Animal Nutrition and Feed Production**, symp., Brno, Czechoslovakia. (Vlad. Sevcik, Research Inst. for Animal Nutrition, Feed Science and Technology, Ministry of Agriculture, Pohorelice, Czechoslovakia)

29–3. **Palynology**, 2nd intern. conf., Utrecht, Netherlands. (F. P. Jonker, State Univ., Botanical Museum and Herbarium, Lange Niewatraat 106, Ultrecht)

29–23. **Photogrammetry in the Measurement of the Earth's Surface**, symp., Prague, Czechoslovakia. (L. Skladal, Intern. Soc. for Photogrammetry, Hybernska 2, Prague 1)

30–1. Association for **Computing Machinery**, 21st natl. conf., Los Angeles, Calif. (B. R. Parker, P.O. Box 4233, Panorama City, Calif. 91412)

30–1. Society of **General Physiologists**, Marine Biological Laboratory, Woods Hole, Mass. (E. E. Clark, Box 43 Pupin, Columbia Univ., New York 10027)

30–2. **Collection and Processing of Field Data**, symp., Canberra, Australia. (E. F. Bradley, Div. of Plant Industry, P.O. Box 109, Canberra)

30–2. Institute of **Mathematical Statistics**, annual mtg., Rutgers Univ., New Brunswick, N.J. (J. R. Rosenblatt, A337 Admin., Gaithersburg, Natl. Bureau of Standards, Washington, D.C. 20234)

30–3. International **Mineralogical** Assoc., 5th general mtg., Cambridge, England. (C. E. Tilley, Dept. of Mineralogy and Petrology, Downing Pl., Cambridge)

31–2. **Synthesis**, symp., Chemical Inst. of Canada, organic div., Banff, Alta. (R. W. Bachelor, Dept. of Chemistry, Univ. of Alberta, Calgary)

31–3. German Soc. for the History of **Medicine, Physical Science, and Technology**, 49th annual mtg., Braunschweig, West Germany. (A. Hermann, The Society, Deutsches Museum, 8 Munich 26, West Germany)

31–3. Society of **General Physiologists**, annual mtg., Marine Biological Laboratory, Woods Hole, Mass. (Miss E. E. Clark, The Society, Marine Biological Lab., Woods Hole 02543)

31–6. **Low Temperature Physics,** 10th intern. conf., Moscow, U.S.S.R. (V. P. Peshkov, Inst. for Physical Problems, Acad. of Sciences of the U.S.S.R., Lenin Prospekt, Moscow)

31–7. **High Energy Physics**, 13th intern. conf., Univ. of California, Berkeley. (T. H. Chenoweth, Lawrence Radiation Laboratory, Univ. of California, Berkeley 94720)

September

1–3. **Genetics** Soc. of America, Chicago, Ill. (R. P. Wagner, Dept. of Zoology, Univ. of Texas, Austin)

1–5. International College of **Angiology**, 8th annual mtg., Madrid, Spain. (H. E. Shaftel, 50 Broadway, New York, N.Y. 10004)

2–4. **Czechoslovak Soc. of Arts and Sciences in America**, 3rd congr., New York, N.Y. (R. Sturm, Skidmore College, Saratoga Springs, N.Y. 12866)

2–6. American **Psychological** Assoc., 74th annual mtg., New York, N.Y. (A. H. Brayfield, 1200 17th St., NW, Washington, D.C. 20036)

2–6. **Psychometric** Soc., mtg., New York, N.Y. (W. G. Mollenkopf, Procter and Gamble Co., Box 599, Cincinnati, Ohio 45201)

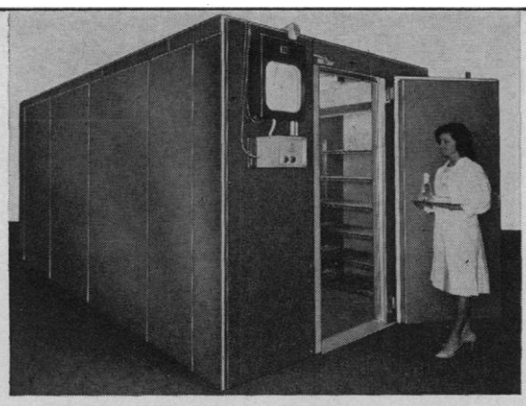
3–5. International Soc. for the **History of Pharmacy**, 40th conf., Heidelberg, Germany. (W. Luckenbach, Friederich-Ebert-Anlage 23a, Postfach 1109, 69 Heidelberg 1 West Germany)

3–7. **Solid State Science**, intern. conf., American Univ., Cairo, Egypt. (A. Bishay, Dept. of Physical Sciences, American Univ. in Cairo, 113 Kasr El Aini St., Cairo, UAR)

4–9. American **Phytopathological** Soc., Caribbean Div., 6th annual mtg., Maracay, Venezuela. (G. Malaguti, Centro de Investigaciones Agronomicas Apartado Postal 4690, Maracay)

4–11. **Sociology**, 6th world congr., Evian, France. (G. G. Reader, Dept. of Medicine, Cornell Univ. Medical College, 1300 York Ave., New York 10021)

5–7. **Rare Earths**, conf., Inst. of Physics and the Physical Soc., Univ. of Durham, Durham, England. (Meetings Officer, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London S.W.1)



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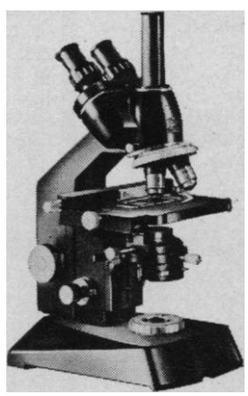

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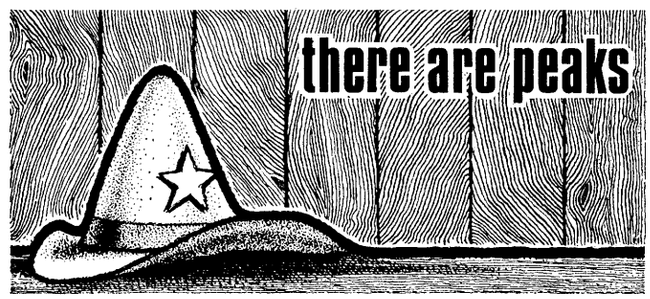

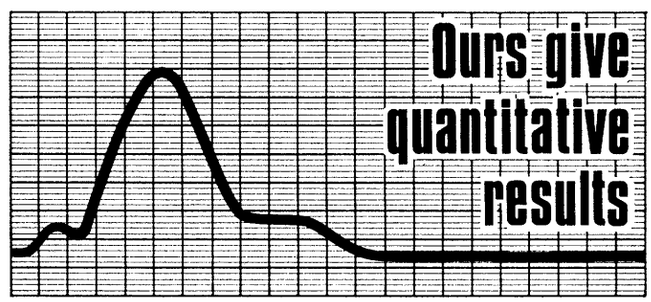

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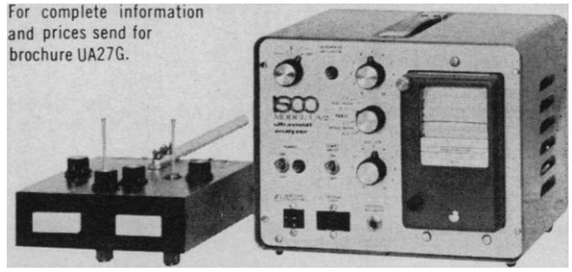

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