

SCIENCE

17 May 1963

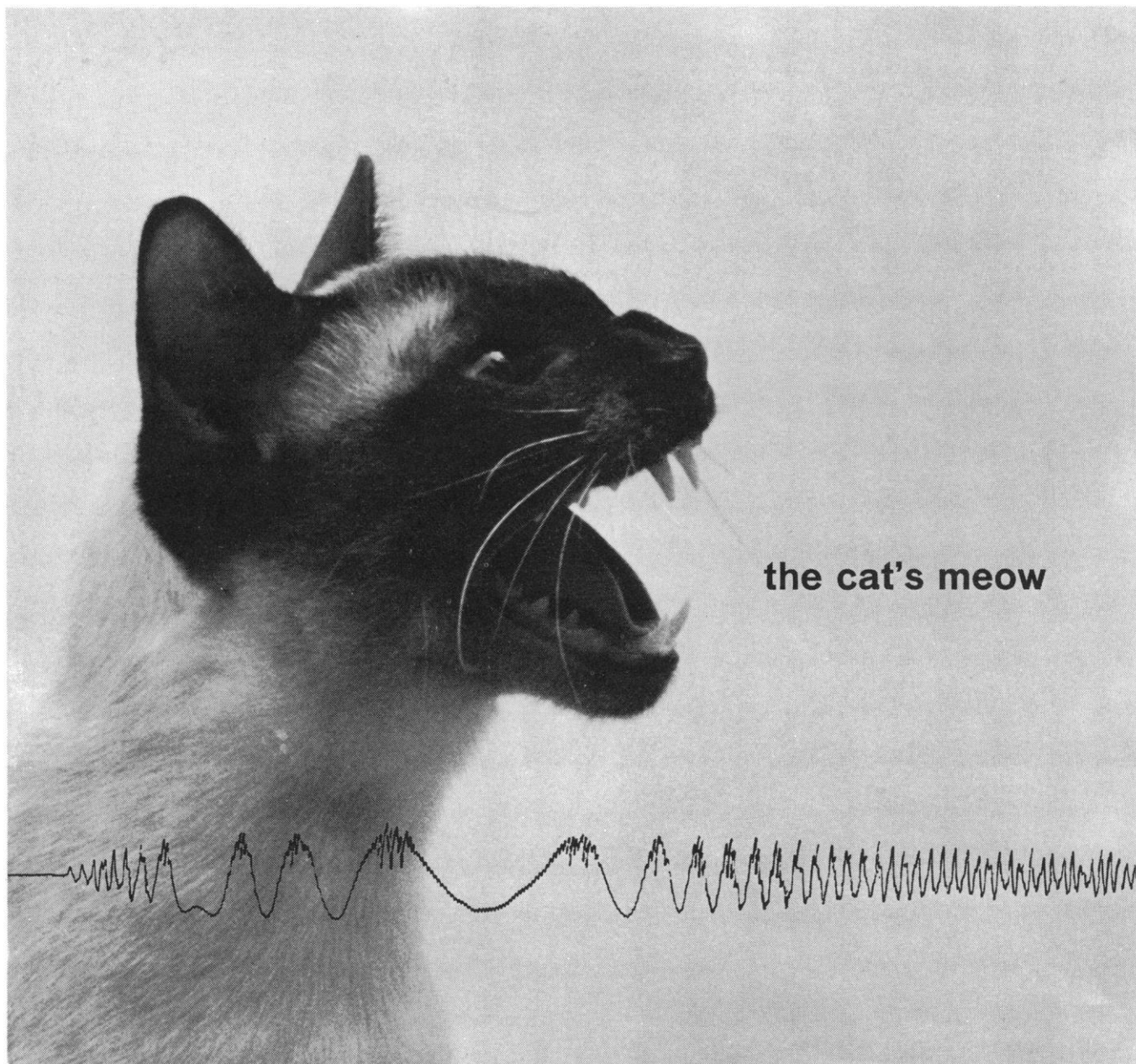
Vol. 140, No. 3568

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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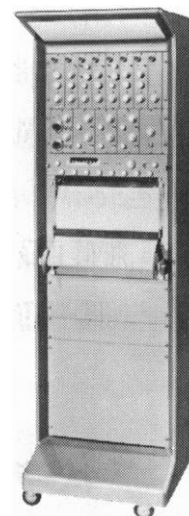
Ink tracing at 250 mm/sec shows the response of the Offner Dynograph® recorder when a heart microphone is held to a Siamese cat's throat. Note clean line prior to meow, high frequency ripple superimposed over very low frequency response early in meow, and clearly recorded 200-cycle component superimposed over basic 20 to 50 cycle response later in meow.

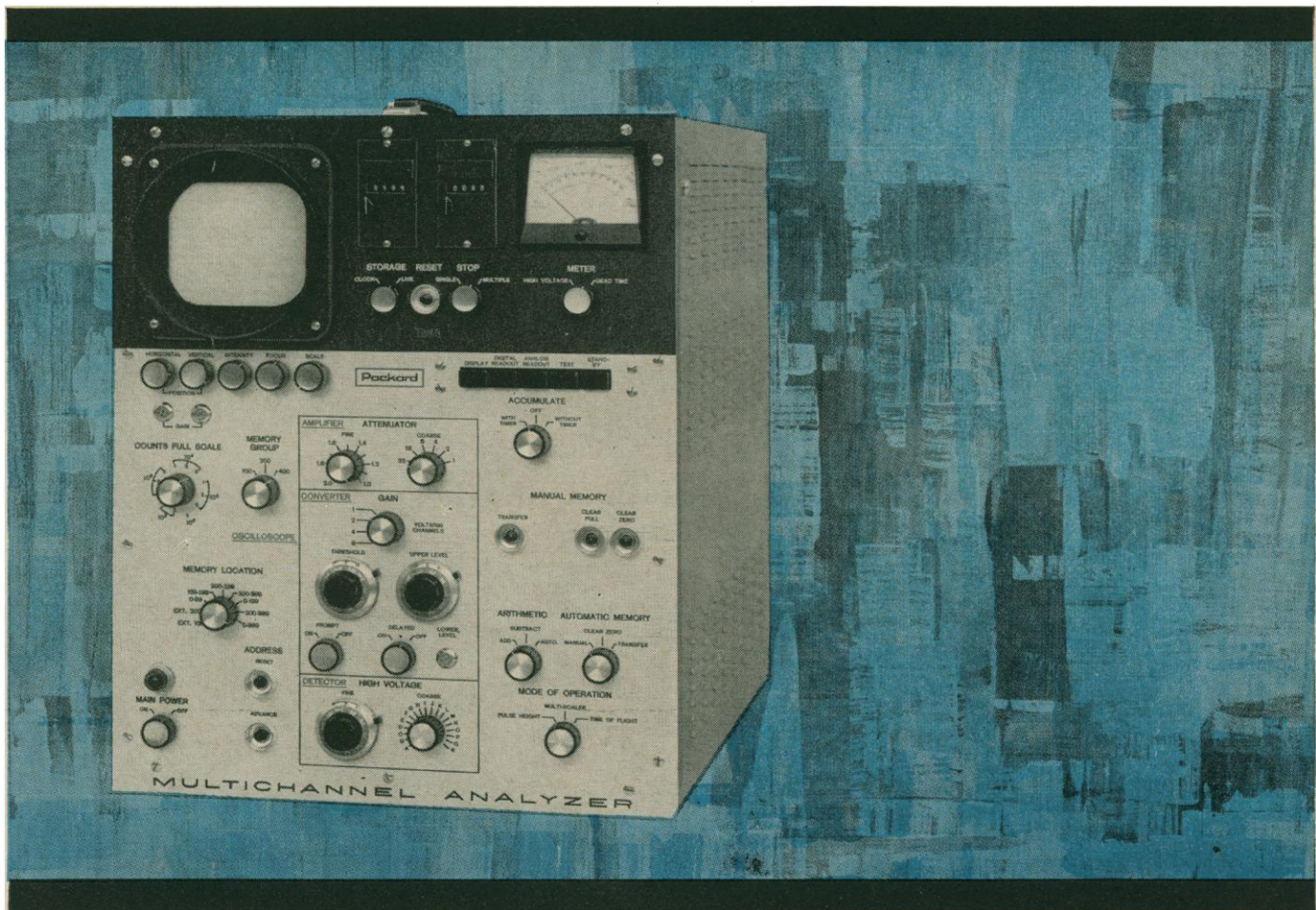
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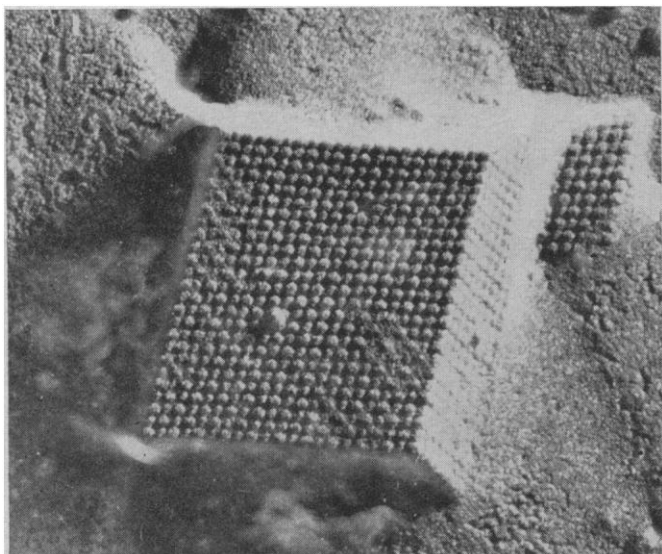
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COVER

Incomplete specimen of strange, spirally coiled new echinoderm from Early Cambrian (nearly 600 million years ago) of California. Oral pole is in center of spiral. The animal was capable of expanding like an accordion along an oral-aboral axis. Large plates of "interambulacral" columns, occasionally with prominent spines, form ridges that spiral out from the mouth. This specimen is in expanded state. Plates between rows with spines are parts of columns that fold in when the individual contracts (about $\times 9$). See page 820. [Porter M. Kier, Smithsonian Institution]

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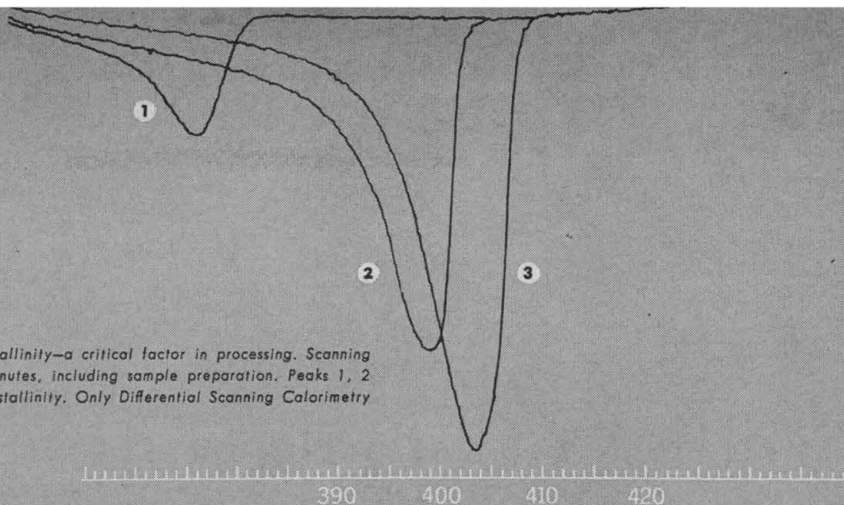
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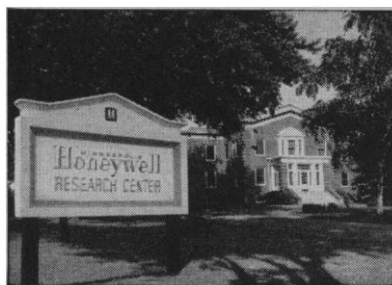
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Studies of Small Gap Semiconductors for Infrared Detection

The window in the atmosphere between 8 and 14 microns has stimulated work on devices that will detect longer wave lengths. New semiconductor materials may make practical the detection of longer wave lengths and therefore targets with far lower temperatures.

The atmosphere offers several windows for energy transmission in the infrared spectrum. One particularly good one occurs between 8 and 14 microns where energy is transmitted freely. However, radiation on either side of the window is blocked due to absorption by the molecules in the atmosphere.

All objects at temperatures above absolute zero give off radiations and the lower the temperature the longer the wave length. Therefore, if long wave lengths can be detected by a practical means, targets of much lower temperatures could be recognized.

Infrared detectors use either intrinsic or extrinsic semiconductors. Intrinsic detectors use electron transitions within the atoms that make up the semiconductor material itself. The extrinsic type utilizes electron transitions that occur due to the presence of impurity atoms introduced into the semiconductor material. (See Fig. A.)

While the extrinsic materials permit detection of infrared radiation beyond 6 microns, these materials require cooling to below 40°K. This calls for bulky, heavy apparatus undesirable for airborne applications and difficult to design into multi-element detectors.

Until now no one has been able to make an intrinsic conductor that will detect photons in the longer wave lengths. In an intrinsic detector the narrower the energy gap between the valence band and the conduction band the easier it is to excite an electron across the gap. This excitation occurs two ways: by photon excitation and by thermal excitation. The problem is to produce a material with a gap narrow enough to respond to long wave lengths (that is, low energy photons) but wide enough so

that practical cooling temperatures will be sufficient to minimize thermal excitation.

Honeywell scientists have performed a theoretical analysis which shows the feasibility of making an 8 to 14 micron intrinsic detector capable of operating at liquid nitrogen temperature, 77°K. (−320°F.)

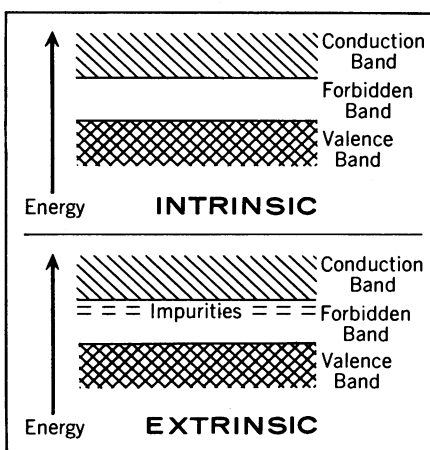


FIG. A

The analysis also shows that by the use of intrinsic material the detectors operating at 77°K could be made so sensitive that the only limitation is imposed by the randomness of the photons coming from the radiation background. Problems present themselves in selecting elements for the semiconductor. For example: while some narrow gap materials meet many of the requirements, their gap is so narrow that the required cooling is impractical. (This is the case with mercury telluride.)

Honeywell's contribution to the development of a suitable detector has been to prepare a compound semiconductor com-

posed of different proportions of mercury, cadmium and tellurium and to develop a theory capable of explaining the behavior of this material.

The compound is difficult to synthesize. Mercury evaporates readily at room temperature yet the compound requires heating to 800°C. At this temperature the pressure of mercury within the capsule is very high.

A number of different compositions have been formulated. Most promising is a compound of approximately 80% mercury telluride and 20% cadmium telluride. With this compound Honeywell scientists, for the first time, have been able to demonstrate photon detection at wave lengths out to 14 microns. Previous workers had been able to demonstrate only thermal effects in these materials.

Further work is under way at Honeywell's Research Center on purification of the material and improvement of its crystal structure. At the same time additional theoretical work is under way to further understand the very complex band structure of small gap semiconductors. If the transitions in these materials can be explained, new insights in semiconductor theory will be attained. This research is partially supported by the Aeronautical Systems Division, Air Force Systems Command.

If you are engaged in scientific work involving small-gap semiconductors and would like to have copies of papers on the subject by Honeywell scientists, you are invited to correspond with Dr. Paul W. Kruse, Honeywell Research Center, Hopkins, Minnesota.

If you are interested in a career at Honeywell's Research Center and hold an advanced degree, you are invited to write Dr. John Dempsey, Director of Research at this same address.

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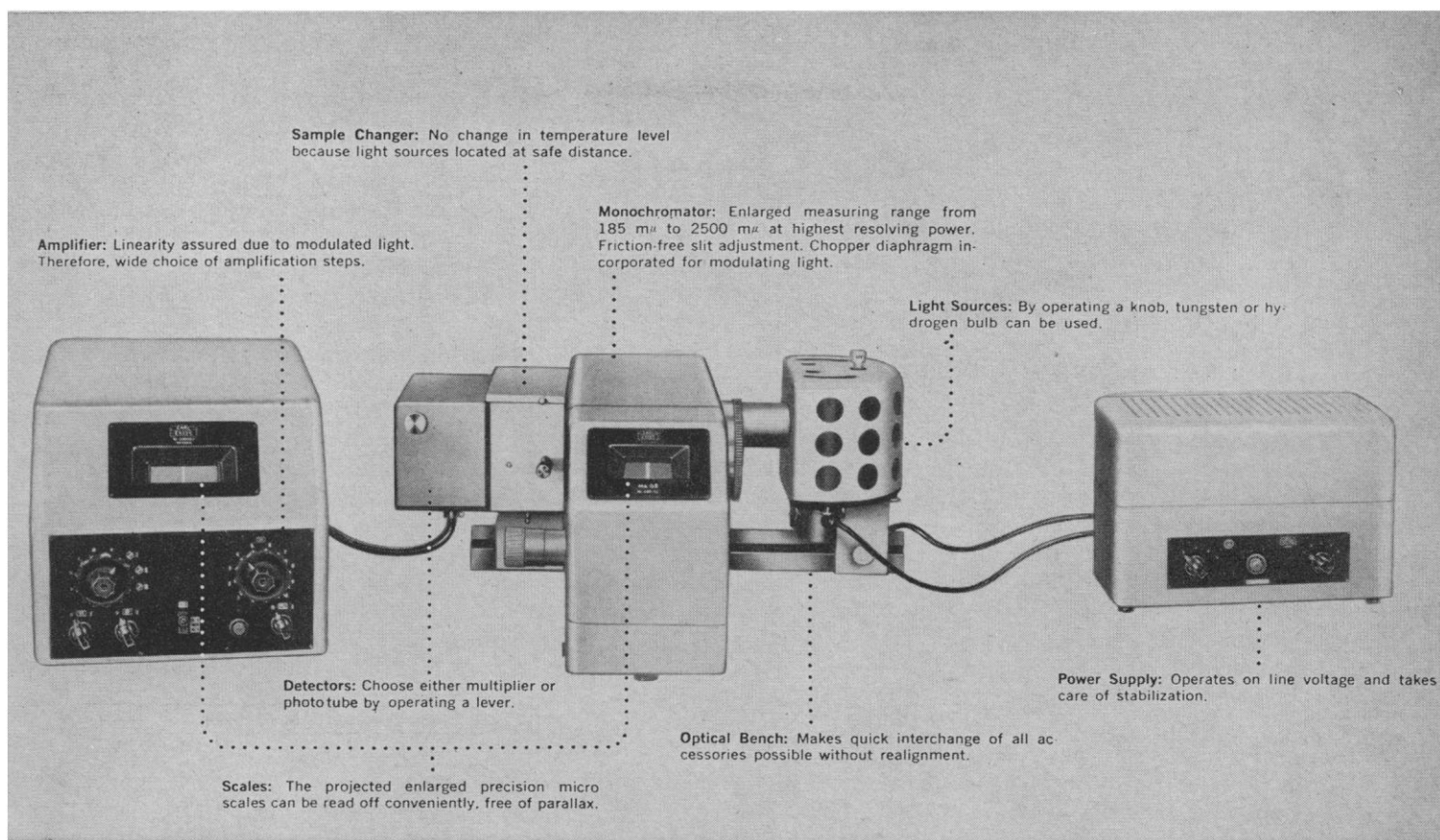
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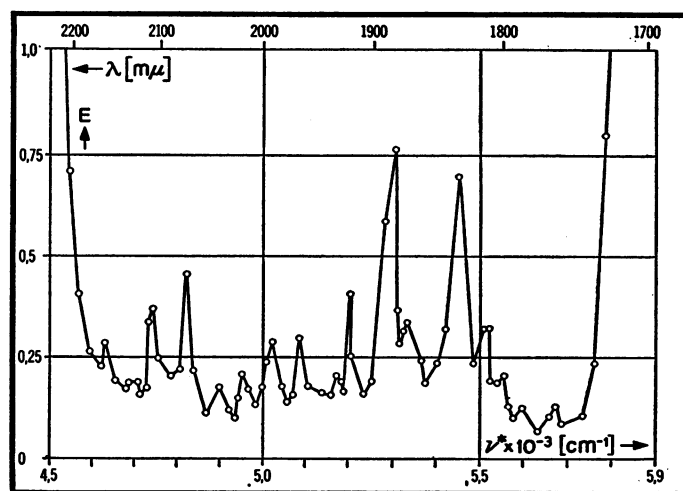
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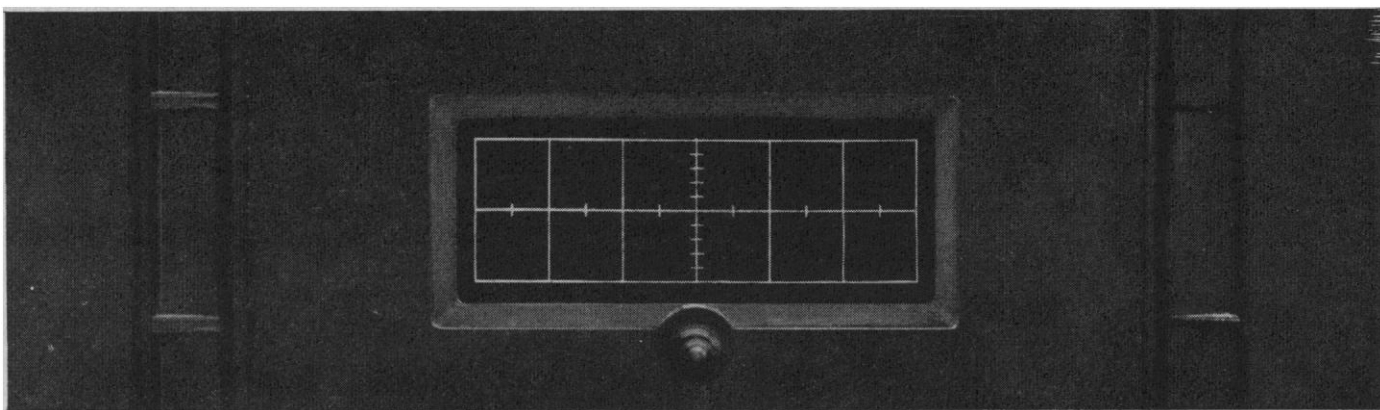
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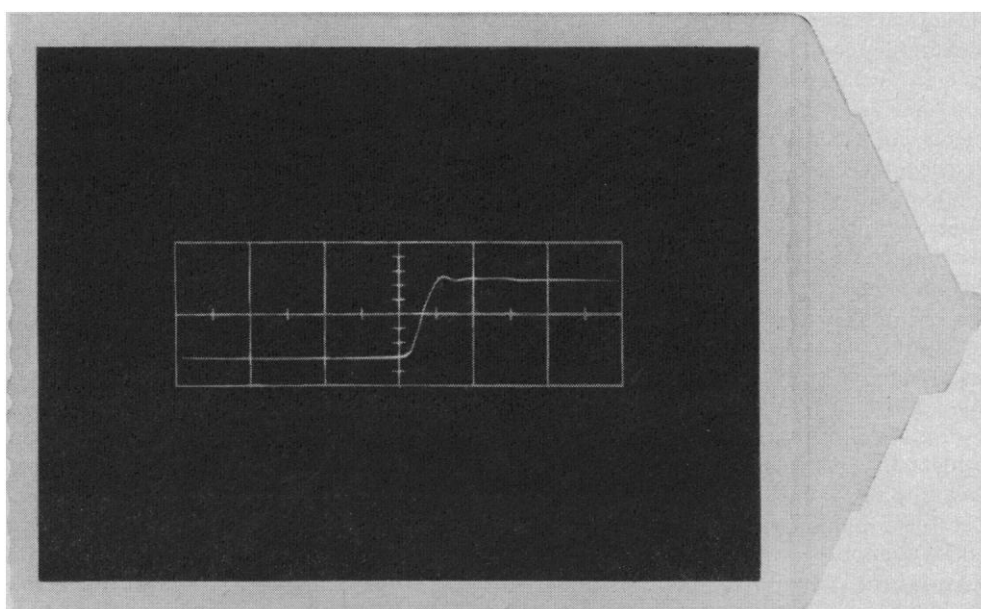
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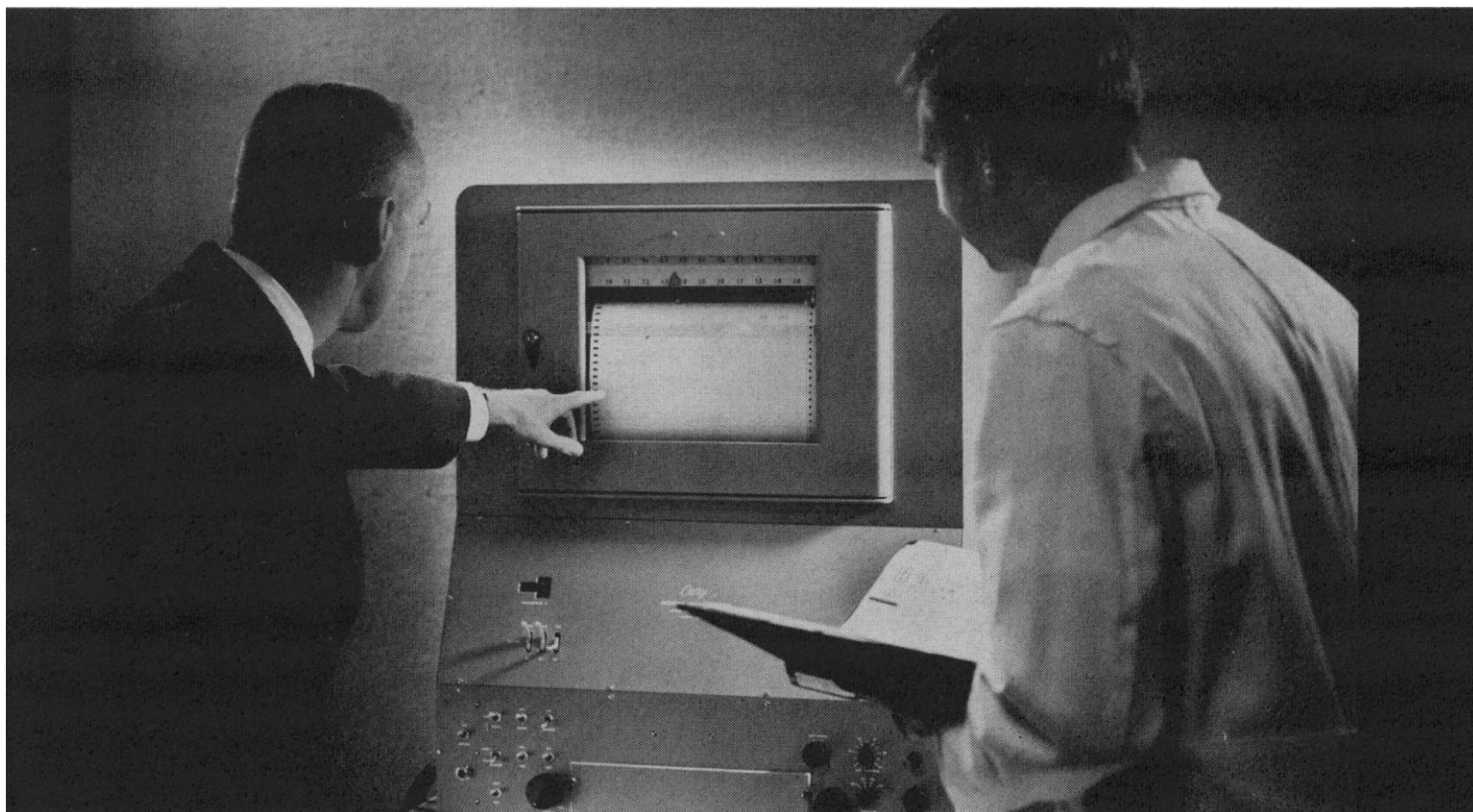
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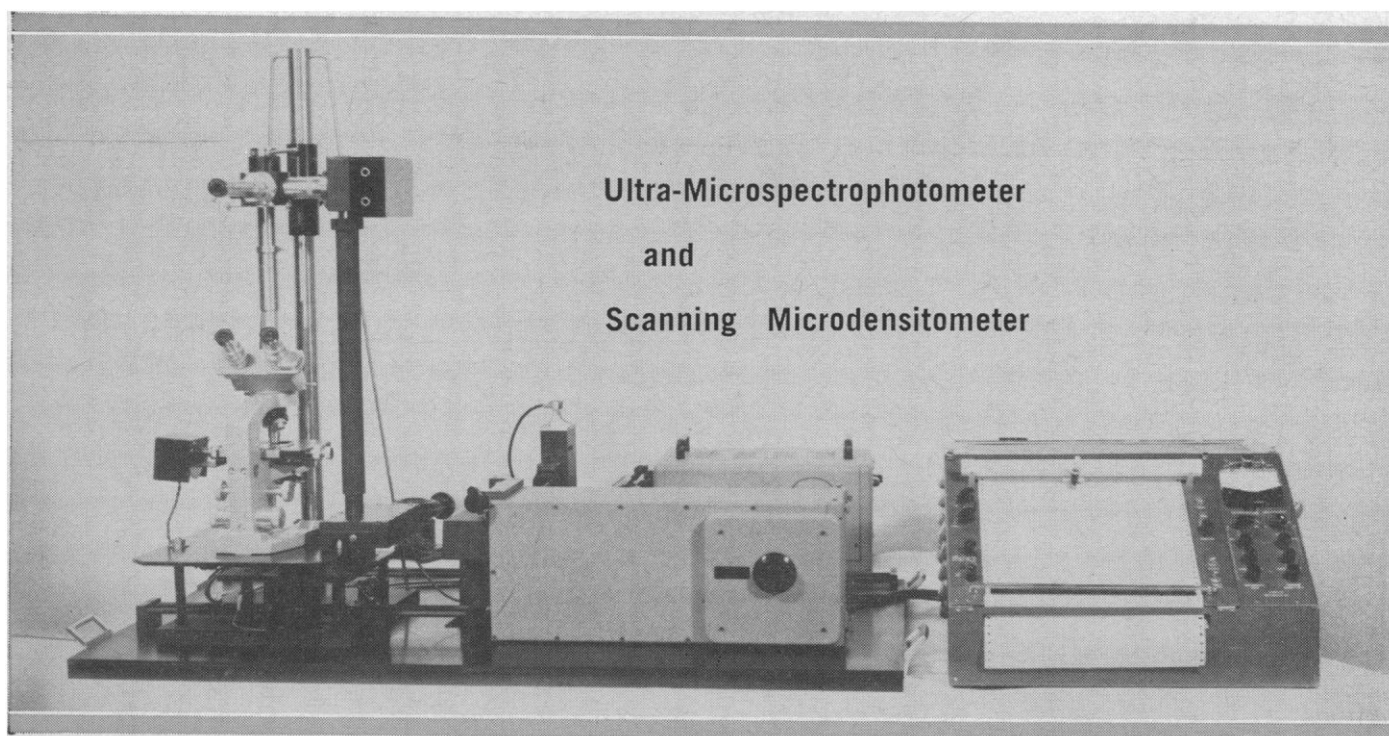
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TYPICAL APPLICATIONS

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- natural or stained fluorescence in tissues
- clinical colorimetric assays on 5-50 ul volumes
- natural eye pigments
- tissue extracts in picogram droplets
- autoradiographs
- air pollution particles
- micro-electrophoresis strips

Industrial

- diamond crystals
- powder colorimetry
- phosphors
- glass composition
- contaminant particles
- drug reactions
- pigment particles
- fibers and films

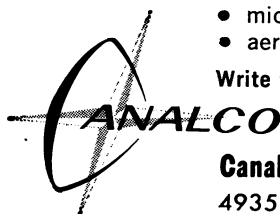
Forensic

- blood traces
- paint particles
- tissue particles
- ink analysis

Film Densitometry

- ultracentrifuge U.V. films
- electron micrographs
- diffraction patterns
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- Direct meter readout in milliequivalents per liter for routine clinical analysis.
- Null-indicating mode for research studies of Na and K in a wide range of concentrations.

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- Simultaneous single sample determinations.
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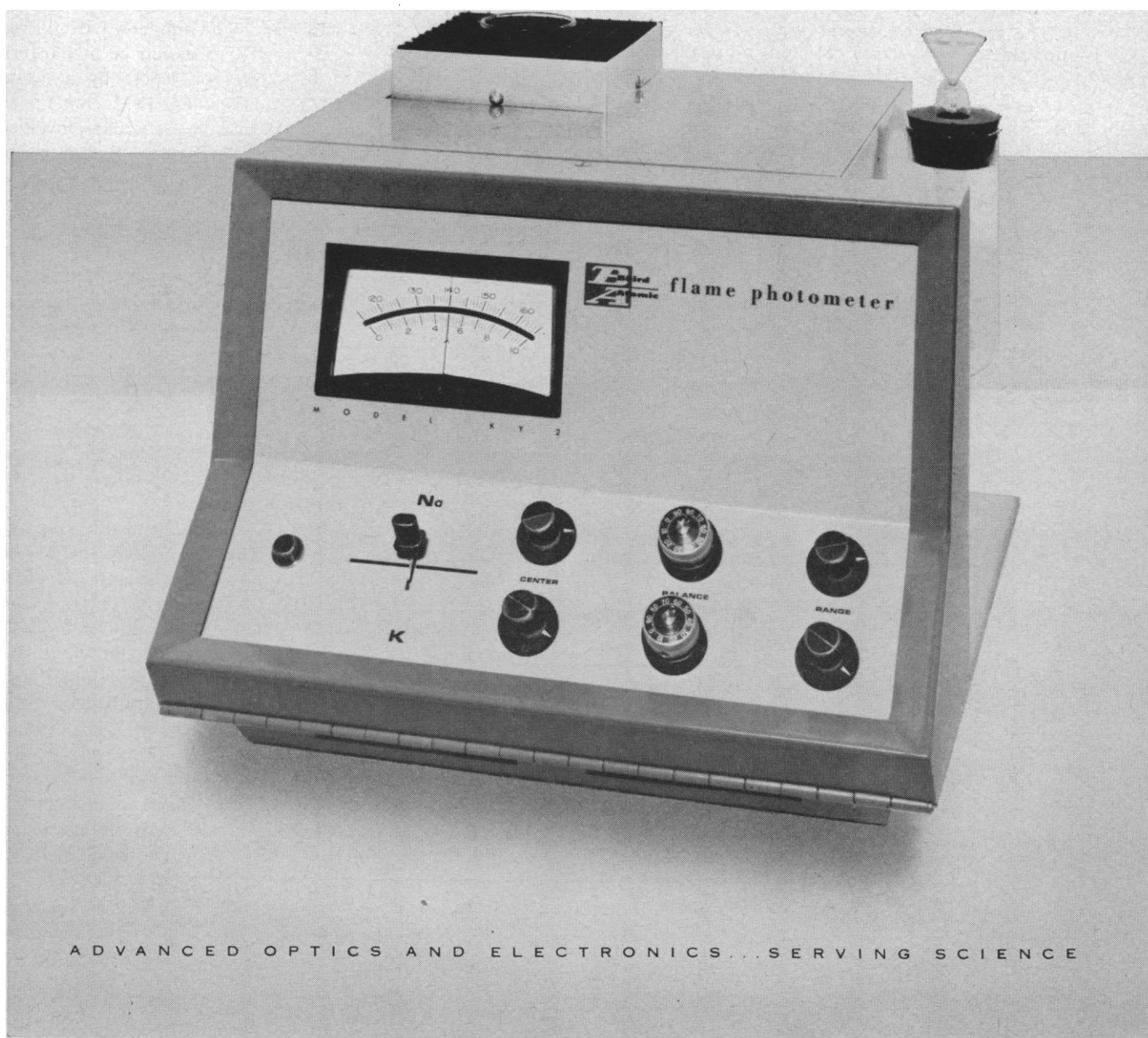
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Closing the Data Gap

After 3 decades of vigorous and rewarding work, the exact properties that make up the atomic nuclei still evade our understanding. It is possible to declare with some confidence, however, that we are well along in a concentrated effort to understand the true structure of the nucleus.

Historically the Van de Graaff accelerator has been a useful tool for the physicist. It is now becoming — in its more sophisticated forms — even more vital to these investigations.

1957 Development Lifted Ceiling to 12 MeV

The graph below depicting a population of d-c positive ion

accelerators illustrates the point. Up until recently, with one or two exceptions physicists were limited to homogeneous particles in the energy range below 8 MeV. Then in 1957, a High Voltage Engineering Tandem development lifted the ceiling to 12 MeV. Today there are 13 of these machines in actual operation, with an equal number being built or installed throughout the world.

Boost Above 20 MeV Now in Prospect

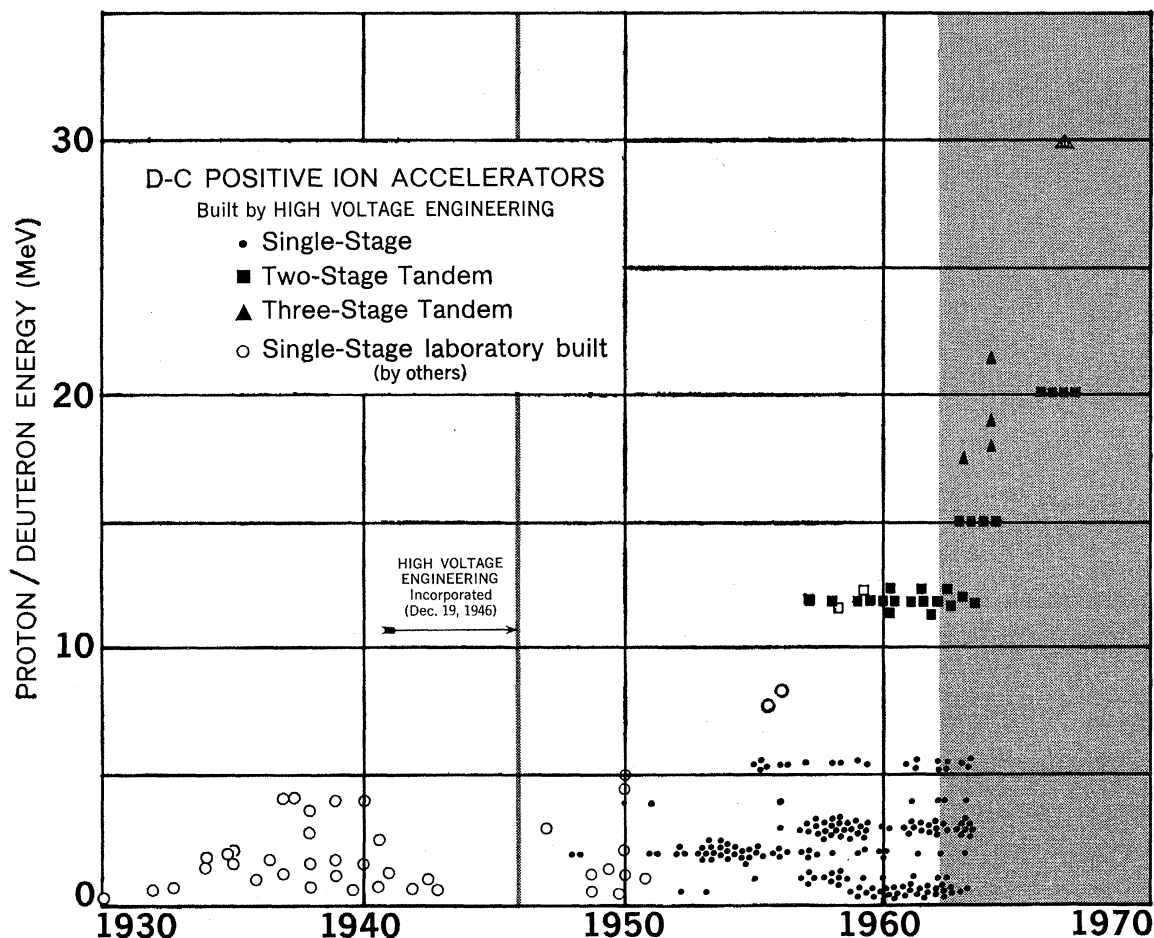
Now engineering developments are lifting the ceiling once again. 3-stage and MP Tandem Accelerators now on order will boost precise particle energy above 20 MeV — allowing physicists to go even

further toward clarifying some apparent conflicts that still exist between theory and experiment. The data gap of interest to the nuclear structure physicist is being closed.

Heavy Ion Capability

New opportunities, such as the availability of heavy ions from Tandems, are now receiving considerable attention. If you are not familiar with the varied capabilities of Van de Graaff Accelerators today, we hope you will inquire. If you would like a list of centers where this work is, or will be carried out with the new Tandem Accelerators, we will be happy to provide it. Write High Voltage Engineering Corporation, Burlington, Massachusetts.

POPULATION CHART OF D-C POSITIVE ION ACCELERATORS



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The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

International Competition in Science

The Soviet ability to launch large missiles has been misinterpreted as indicating superiority over the United States in scientific matters. Actually there are few areas of science in which the Russians excel. Despite their ability to place large pieces of hardware in orbit, their contributions to space research have been meager. They have nothing to match our Mariner II results, and their exploration of regions closer to the earth has been less intensive than ours. In high-energy nuclear physics our discoveries are unmatched, as is our progress in maser-laser studies and in semiconductors. In most areas of chemistry the Russians are behind us; plastics and petrochemicals are outstanding examples. In the exploitation of radioactive isotopes much of the Russian work is mere repetition of our research. In biochemistry, biophysics, and molecular biology we are superior. The Russians have achieved nothing like our progress in deciphering the genetic code or in determining amino acid sequences in proteins.

Innumerable examples could be given; we compete on countless frontiers of science which, in sum, are vastly more important than space. On many of these frontiers, such as solid-state physics, advances are crucial to future economic and military strength. Fundamental research is now often quickly followed by practical applications. A substantial fraction of today's commerce is based on discoveries of the last two decades. It is of interest to compare American and Russian competition in world markets in items involving science and technology. By this yardstick the Soviet Union is a third-class power. It is no match for Western Europe, the United Kingdom, or Japan.

The Japanese are competing in technological areas requiring first-class scientific competence. Their electronics products such as transistor radios and television sets are selling for less than ours on our own soil. To a degree this reflects cheaper labor, but only in part. The production of transistors and other solid-state electronic components involves sophisticated technology. Even the cheapest labor is no substitute for scientific ability in this field.

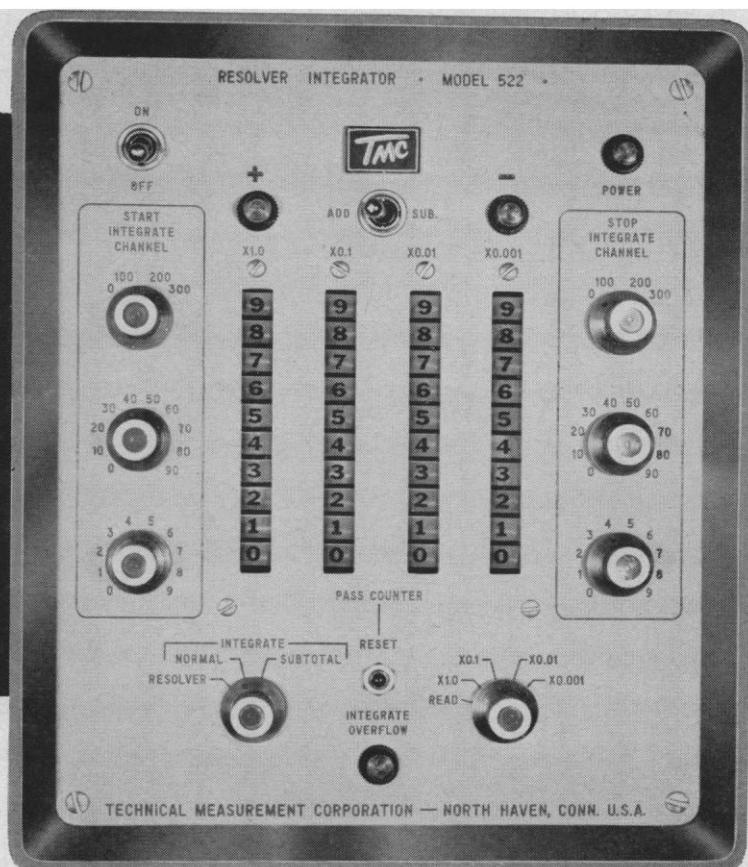
Western Europe is far stronger scientifically and technologically than the U.S.S.R., and the Western Europeans are rapidly closing in on us. If present trends continue, it will be only a matter of a few years before they achieve supremacy.

Western Europeans have long proved that they are, individually at least, as competent scientifically as we. They have made a remarkable recovery from the effects of World War II and are again in a position to challenge us. In the contest they have two advantages. Research costs them about one-fourth what it costs us, and proportionately less of their talent is occupied with military and space efforts. Leaders of industrial research in this country are increasingly concerned with the overpowering competition of government-financed programs for first-class scientific talent. One research director told me recently, "We need good people, but my company can't compete with projects paid for by the U.S. treasury."

We have chosen to stake our national prestige in a propaganda contest with the Russians in one of the few major areas of technology where they have an edge over us. In the meantime we fail to note that the Western Europeans are getting ready to walk away with the trophies which really count.—P.H.A.

Push-Button RESOLVER / INTEGRATOR

integrates any group (0-399)
in one step



This new all-electronic Model 522 Spectrum Resolver/Integrator may be used directly with TMC "400 Series" pulse analyzers to perform resolving and integration functions without the necessity of intermediate tape recording equipment.

As a Resolver the Model 522 takes information directly from any selected quarter or half of the analyzer memory and either adds it to or subtracts it from the data stored in an adjacent quarter or half of the memory. It is possible to remove individual components of a spectrum and leave only the desired elements by adding or subtracting 100%, 10%, 1% or 0.1% increments of reference spectra. The operator has precise control of the resolving process, and has an accurate visual record of the exact percentage removed.

As an Integrator, the Model 522 integrates memory-stored information within any band of channels from 0 to 399 in one operation. Two modes of integration are available:

NORMAL mode sums the counts in the preselected band and stores the total in the last channel.

SUBTOTAL mode adds each channel count to the previous one to provide a running subtotal.

With every operation, results are displayed on the analyzer scope and may be printed, recorded or punched out by the readout method of your choice.

Case design of the Model 522 Resolver/Integrator is identical to that of the compatible "400 Series" fully-portable, 400-channel Pulse Height Analyzers.

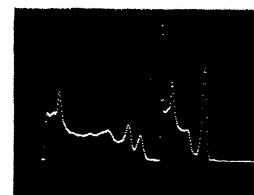
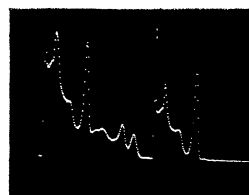
SPECIFICATIONS

Resolving Rate.....0.5 sec. for one add or subtract operation per 100 channels
% Resolved.....100%, 10%, 1% or 0.1%
Integration Rate.....0.5% sec. per quarter memory
Channel band.....Continuous 1 — 400 channels
Integrating ModesNormal, Subtotal
Blanking.....Only channels to be integrated are visible on Analyzers CRT display
Size.....8% w. x 10¼" h. x 21" d., 28 lbs. (approx.)

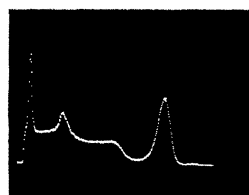
TYPICAL DISPLAYS

Step 1

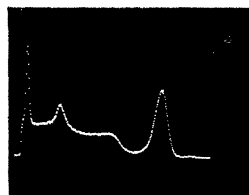
Step 2



RESOLVING



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SUBTOTAL INTEGRATION MODE

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Technical Writers and Publishers

The Society of Technical Writers and Publishers was one of the eight societies to be elected an affiliate of the AAAS at the Philadelphia meeting in December 1962. The society is composed of professional men and women dedicated to furthering the art of communicating technical information and developing the competence of its members.

To achieve these goals, the society sponsors technical-communication research at universities through a program of grants; publishes a professional journal; cooperates with other professional societies and government agencies in the establishment of writing and publishing standards; assists educational institutions in the development of technical communication curricula; and conducts an annual convention to keep members up-to-date on current developments in the profession. Each of its 50 chapters in the United States and Canada conducts monthly meetings and many chapters engage in activities that relate the profession to the community.

The society's nearly 3000 members span a wide range of occupational specialties within the technical communication field. They write, edit, illustrate, and produce reports, catalogs, handbooks, manuals, specifications, proposals, parts documentation, journal articles, technical, popular, and trade magazine articles, news releases and presentations. Other activities include managing publications groups and businesses, teaching, and undertaking research in all aspects of technical communications. The spectrum of subject matter fields spanned by the membership is also broad; it includes the biological, earth, medical, physical, and social sciences; all branches of engineering; and the various communication arts.

The society's officers are: president, H. C. McDaniel, Westinghouse Electric Corporation; first vice president, Robert O. Shockney, Mercury Publications; second vice president, Stello Jordan, Sperry Gyroscope Co.; secretary, Henrietta Tichy, Hunter College; and treasurer, Charles W. Thelen, General Dynamics. The society's representative on the AAAS Council is Dwight E. Gray, National Science Foundation.

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THE 34-12B

RIDL Analyzers are used in every known analyzer application from Activation Analysis to Zoology.

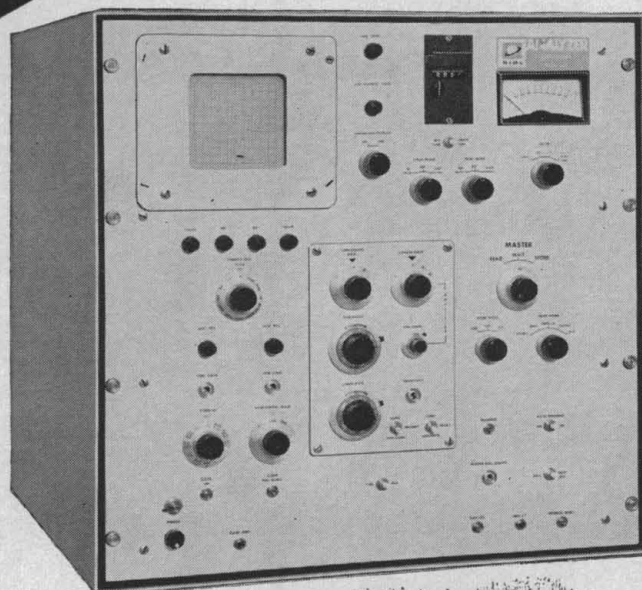
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The RIDL Model 34-12B 400 Channel Analyzer has the widest selection of flexible features and options available. These features and options, some of which are listed here, provide the most *economical* means to meet your requirements of today and the future.

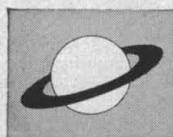
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1963 ANNUAL
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New York City

JUNE 10-13

EXHIBIT HOURS

TUES.-WED.-THURS.

8:30 a.m.-6:00 p.m.

Forthcoming Events

June

14-17. **Instrument Soc. of America**, Los Angeles, Calif. (W. H. Kushnick, 530 William Penn Place, Pittsburgh 19, Pa.)

15-16. **Advancement of Private Practice in Social Work**, 2nd conf., Denver, Colo. (P. Ledbetter, ACSW, Suite 1520, Medical Arts Bldg., Houston 2, Tex.)

16-19. **Northeastern Section, Botanical Soc. of America**, summer field meeting, Pittsburgh, Pa. (L. K. Henry, Section of Plants, Carnegie Museum, Pittsburgh 13, Pa.)

16-20. **American Medical Assoc.**, Atlantic City, N.J. (R. M. McKeown, 510 Hall Bldg., Coos Bay, Ore.)

16-21. **American Inst. of Electrical Engineers**, general meeting, Toronto, Ont., Canada. (R. M. Magee, Bendix Systems Div., Ann Arbor, Mich.)

16-22. **Medical Librarianship**, 2nd intern. congr., Washington, D.C. (R. MacDonald, Natl. Library of Medicine, Bethesda 14, Md.)

17-18. **Learning, Adaptation, and Control in Information Systems**, symp., Evanston, Ill. (J. T. Tou, Computer Sciences Laboratory, Technological Inst., Northwestern Univ., Evanston, Ill.)

17-19. **American Dairy Science Assoc.**, Lafayette, Ind. (H. F. Judkins, 32 Ridgeway Circle, White Plains, N.Y.)

17-19. **American Nuclear Soc.**, Salt Lake City, Utah. (O. J. DuTemple, 244 E. Ogden Ave., Hinsdale, Ill.)

17-19. **Canadian Federation of Biological Societies**, London, Ont. (A. H. Neufeld, CFBS, Faculty of Medicine, Univ. of Western Ontario, London, Ont., Canada)

17-19. **Hanford Symp. on Biology of Radioiodine**, Richland, Wash. (L. K. Bustad, Biology Laboratory, General Electric Co., Richland)

17-19. **Society for the Study of Development and Growth**, Storrs, Conn. (W. A. Jensen, Dept. of Botany, Univ. of California, Berkeley 4)

17-21. **American Soc. for Engineering Education**, Philadelphia, Pa. (W. L. Collins, American Soc. for Engineering Education, Univ. of Illinois, Urbana)

17-21. **Gas Chromatography**, 4th intern. symp., Ann Arbor, Mich. (Instrument Soc. of America, 530 William Penn Pl., Pittsburgh 19, Pa.)

17-22. **Pacific Division, AAAS**, San Francisco, Calif. (R. C. Miller, California Acad. of Sciences, Golden Gate Park, San Francisco)

17-22. **International Congr. of Engineers**, 4th, Munich, Germany. (Deutscher Verband Technisch-Wirtschaftlicher Vereine, Prinz-Georg-Str. 79, Düsseldorf, Germany)

17-23. **Nuclear Energy**, 8th intern. congr., Rome, Italy. (Ufficio Congressi e Mostre CNEN, Via Belisario 15, Rome, Italy)

18-20. **Chemistry and Biochemistry of Fungi and Yeasts**, symp., Dublin, Ireland. (T. S. Wheeler, Dept. of Chemistry, University College, Science Bldgs., Upper Merrion St., Dublin)

18-22. **American Soc. of Ichthyologists and Herpetologists**, Vancouver, B.C.,

Canada. (J. A. Peters, Biology Dept., San Fernando Valley State College, Northridge, Calif.)

19-21. **Joint Automatic Control conf.**, Minneapolis, Minn. (T. J. Williams, Monsanto Chemical Co., St. Louis, Mo.)

19-21. **Metal Chelates in Chemical Analysis**, natl. symp., Tucson, Ariz. (H. Freiser, Dept. of Chemistry, Univ. of Arizona, Tucson)

19-26. **World Petroleum Congr.**, 6th, Frankfurt-am-Main, Germany. (U.S. Natl. Committee, 15 W. 51 St., New York, N.Y.)

20-21. **Institute of Mathematical Statistics**, 96th, Eugene, Ore. (D. G. Chapman, Dept. of Mathematics, Univ. of Washington, Seattle 5)

20-21. **Nutrition Soc. of Canada**, 6th annual, London, Ont. (E. V. Evans, Dept. of Nutrition, Ontario Agricultural College, Guelph, Ont., Canada)

22-23. **Ukrainian Medical Assoc. of North America**, Kerhonkson, N.Y. (R. W. Sochynsky, UMA, 2 E. 79 St., New York 21)

23-26. **American Soc. of Agricultural Engineers**, Miami Beach, Fla. (J. L. Butt, P.O. Box 229, St. Joseph, Mich.)

23-26. **American Soc. of Mechanical Engineers**, Ithaca, N.Y. (A. B. Conlin, Jr., 345 E. 47 St., New York, N.Y.)

23-28. **American Soc. for Testing and Materials**, 66th annual, Atlantic City, N.J. (ASTM, 1916 Race St., Philadelphia 3, Pa.)

23-30. **American Soc. for Horticultural Science**, Caribbean region, 11th annual, Mexico City, Mexico. (E. H. Casseres, Calle Londres 40, México 6, D.F.)

24-26. **American Soc. of Heating, Refrigerating and Air Conditioning Engineers**, Milwaukee, Wis. (R. C. Cross, 345 E. 47 St., New York 17)

24-26. **Colloids**, 37th natl. symp., Ottawa, Ontario, Canada. (B. R. Ray, Dept. of Chemistry, Washington State Univ., Pullman)

24-26. **International Astrophysical Symp.**, 12th, Liège, Belgium. (M. Migeotte, Institut d'Astrophysique, Cointe-Sclessin, Belgium)

25-28. **American Home Economics Assoc.**, Kansas City, Mo. (D. S. Miller, 3705 Van Buren Ave., Corvallis, Ore.)

26-27. **Computers and Data Processing**, Estes Park, Colo. (W. H. Eichelberger, Denver Research Inst., Univ. of Denver, Denver 10, Colo.)

26-28. **Wind Effects on Buildings and Structures**, Teddington, Middlesex, England. (Mrs. S. M. Russell, Aerodynamics Div., Natl. Physical Laboratory, Teddington)

26-29. **American Assoc. of Bioanalysts**, annual, Chicago, Ill. (R. Thornburg, 720 N. Michigan Ave., Chicago 11)

26-29. **Society of Nuclear Medicine**, Montreal, Quebec, Canada. (S. N. Turiel, SNM, 333 N. Michigan Ave., Chicago 1, Ill.)

26-29. **National Soc. of Professional Engineers**, Cleveland, Ohio. (P. H. Robins, 2029 K St., NW, Washington, D.C.)

28-1. **Psychosomatic Approach to Chronic Illness**, congr., Chamonix, France. (French Soc. of Psychosomatic Medicine, 15, rue Santerre, Paris 12)

(See issue of 26 April for comprehensive list)

BACTRONIC COLONY COUNTER

All-Transistor Electronic Colony Counter
Marks as it Counts Automatically
In Open and Closed Petri Dishes

Four precision counting devices make this instrument indispensable for routine colony counting and in phage and bacterial genetics: an Electronic Marking Probe; A Plug-in Marking Grease Pencil or Plug-in Marking Pen; and a Pushbutton Counter.

Colonies are accurately recorded in a *single* probing action that leaves an identifying puncture in the agar. The Electronic Probe picks up radio impulses on contact with *any* agar medium and actuates the counting mechanism. Electrical splattering is completely eliminated by the low voltage input. Where puncturing is undesirable, the Plug-in Grease Pencil or Marking Pen is used to mark the back of the plate as it counts.

Plates are flooded with brilliant white light that is cool, soft and easy on the eyes. Specimens are illuminated in bold relief against a contrasting agar background, revealing colony morphology. Even pinpoint colonies are easily discerned.

The instrument has an automatic numerical reset to zero, a sterilizing Probe Well and a magnifying lens.



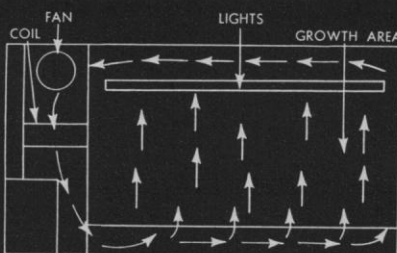
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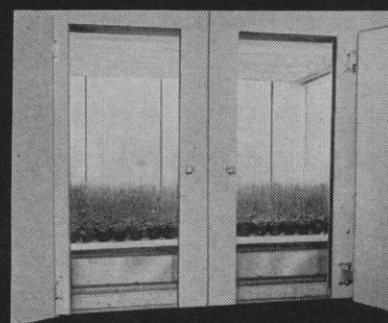
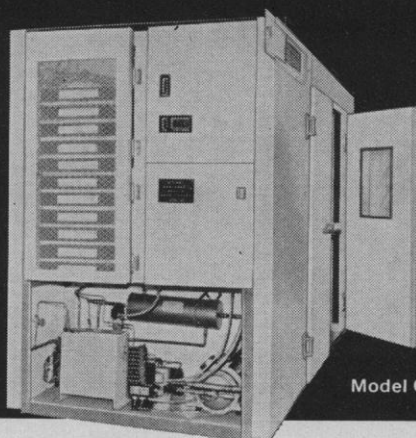
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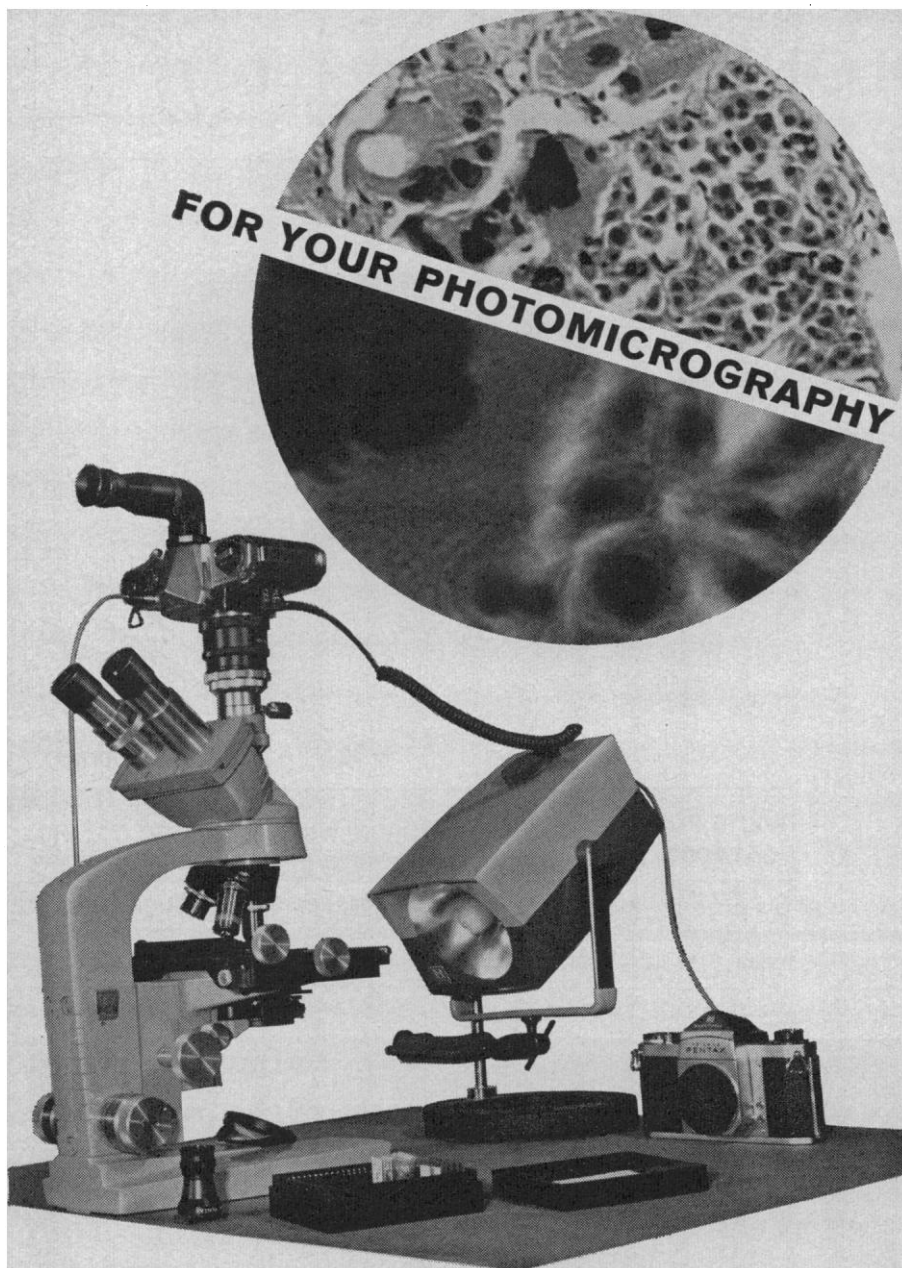
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NEWS AND COMMENT

(Continued from page 796)

emphasize biology will earn the M.A. from Clark. Undergraduates will also be eligible to participate in the program.

The University of Maryland will be the site of a **space communications** institute 23–28 June, sponsored by the university and NASA's Goddard Space Flight Center. The course will cover the theory and technology of radio transmission involved in space science and engineering. The registration fee of \$115 will include class materials, lunches, and social programs. Participation will be limited to 80 persons. (C. C. Veri, Div. of Institutes, Univ. of Maryland, College Park)

Publications

The U.S. Atomic Energy Commission has released a third annual report on research activities, entitled **Fundamental Nuclear Energy Research—1962**. The 405-page publication covers advances made on a sampling of projects carried out by the divisions of biology and medicine and of research. It includes descriptions of some unclassified research performed under the jurisdiction of the division of military application and of some work done for the division of reactor development. The appendices list major AEC research and development centers and show the extent of contracts awarded to colleges, universities, medical centers, and industrial organizations. (Superintendent of Documents, GPO, Washington 25)

The 1963 edition of the "Film Guide on Chemicals, Chemistry and the Chemical Industry" is available free of charge from the Manufacturing Chemists' Association. The bibliography lists 271 films in 16 categories, and indicates the audience level for which each film is intended. Films are included for elementary through college classes, and for adult groups. (MCA, 1825 Connecticut Ave., Washington 9)

The National Science Foundation has released its final report on the findings of a survey, "Scientific Research and Development in Colleges and Universities—Expenditures and Manpower, 1958." The report emphasizes the concentration of funds in relatively few institutions and the effects of the support

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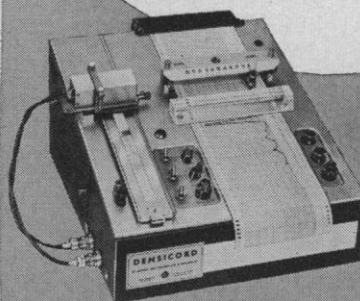
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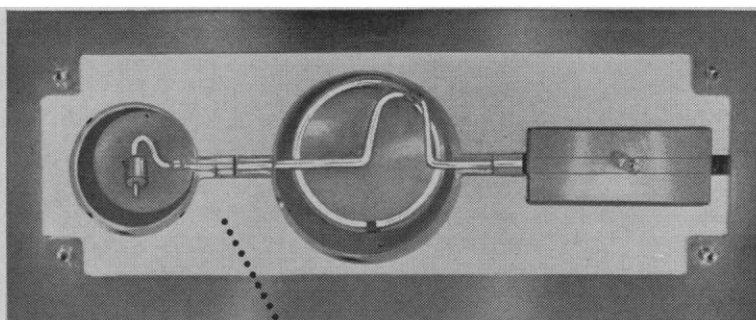
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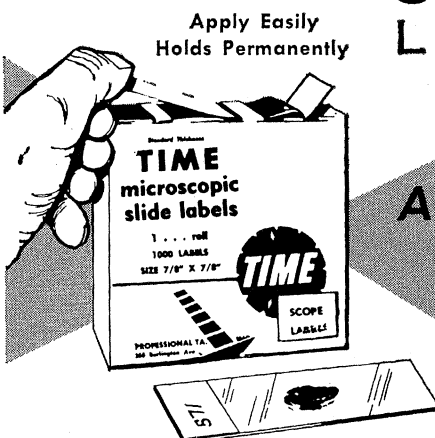


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of science on the total educational balance of a college or university. The survey is the second of its type to be carried out by NSF; the first covered 1954. (NSF 62-44, Superintendent of Documents, GPO, Washington 25. 140 pp. 70¢)

Scientists in the News

The American Psychiatric Association has awarded the Hofheimer prize for research to two teams of scientists. **Howard E. Freeman**, associate professor of social research at Brandeis University and **Ozzie G. Simmons**, sociology professor and director of the University of Colorado's institute of behavioral sciences, were cited for their study of mental patients during the first year after hospitalization. The results are published in the book, *The Mental Patient Comes Home* (Wiley, New York, 1963). **Jerome Kagan**, chairman of the psychiatry department at Fels Research Institute and **Howard A. Moss**, research psychologist in the child research branch of the National Institute of Mental Health, were honored for work reported in their book *Birth to Maturity, A Study in Psychological Development* (Wiley, New York, 1962).

At the University of Vermont, **Clinton Cook**, chairman of the chemistry department, has become dean of faculties, and **Warren Essler**, chairman of the electrical engineering department, has been appointed dean of the college of technology.

At last month's meeting of the **National Academy of Sciences** the following scientists received awards:

Maurice Ewing, director of Columbia University's Lamont Geological Observatory, the Carty medal for studies of the geology of the earth.

J. George Harrar, president of the Rockefeller Foundation, the Public Welfare medal for his contributions in the application of science to public welfare.

Matthew Meselson, associate professor of molecular biology at Harvard, the molecular biology award for his work with DNA molecules.

Roger Revelle, director of the Scripps Institution of Oceanography and dean of research at the University of California, the Agassiz medal, for outstanding achievement in oceanography.

Curt Stern, professor of genetics and zoology at the University of California,

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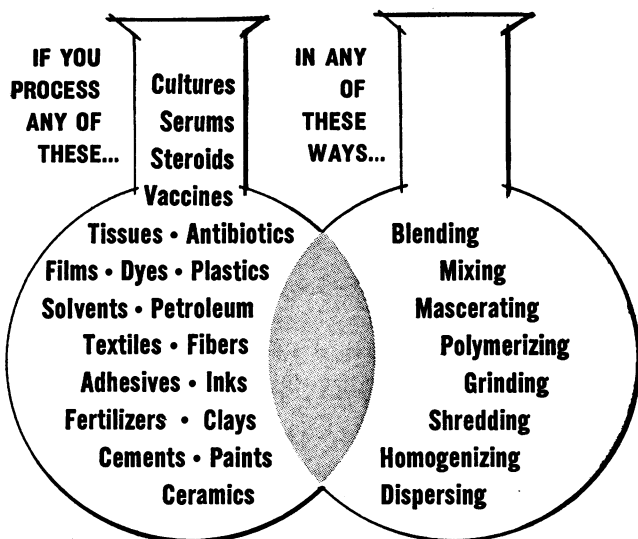
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