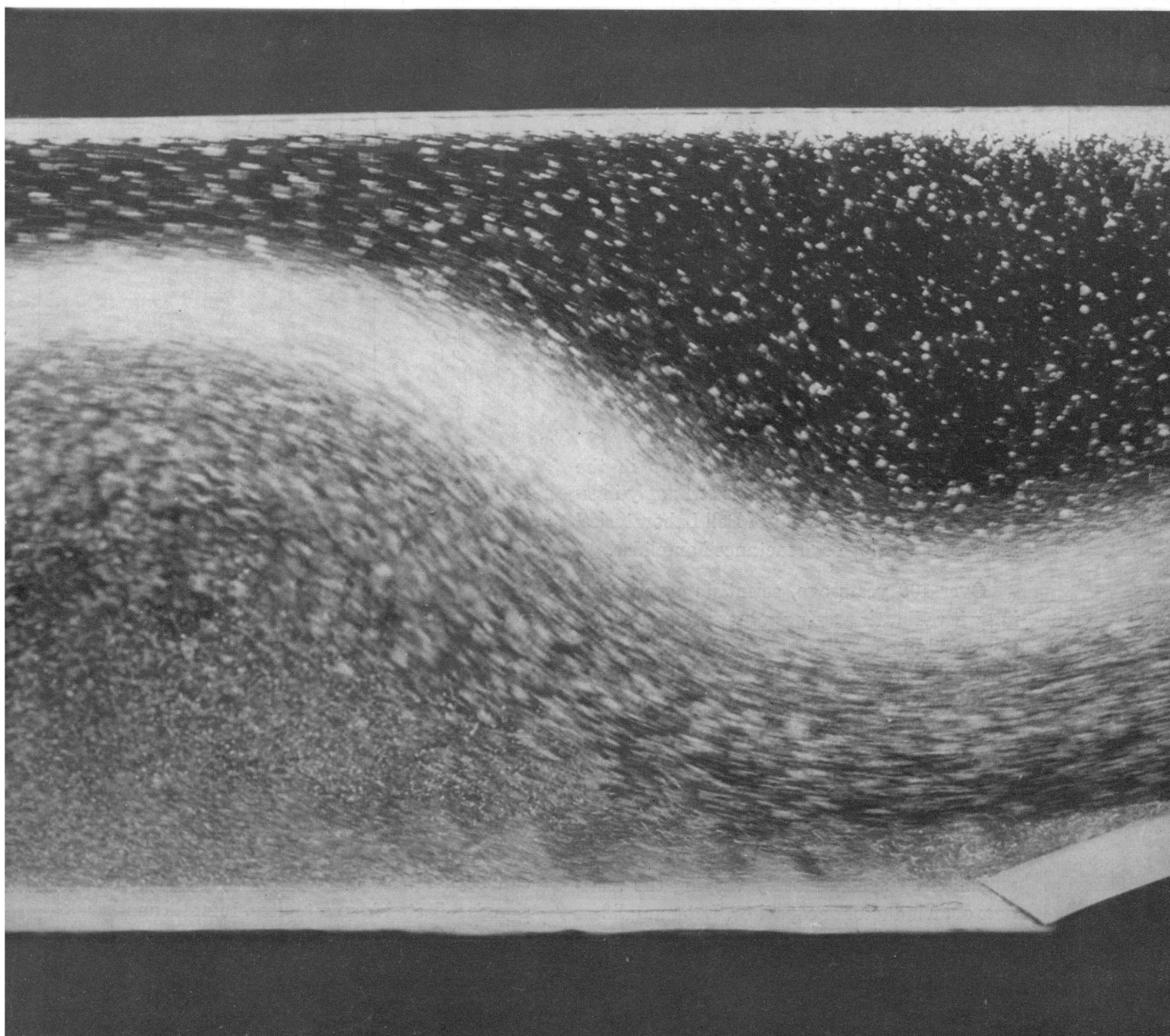


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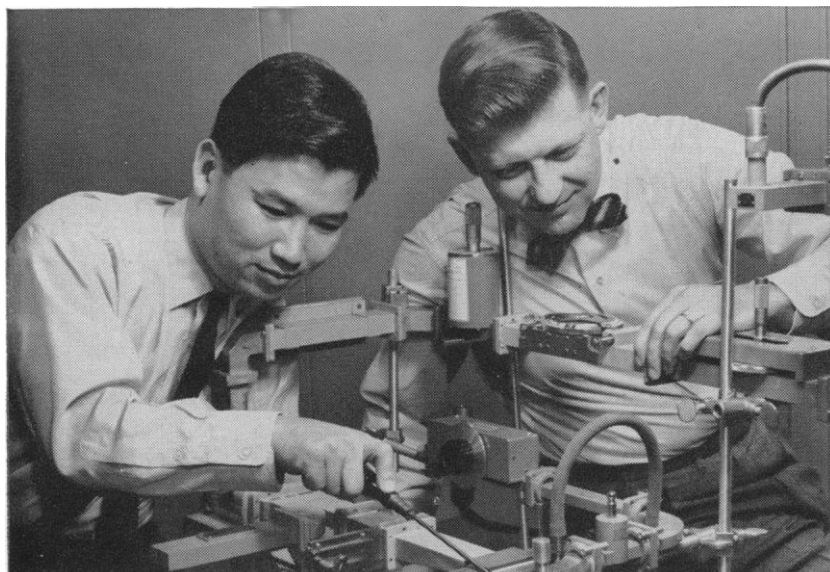
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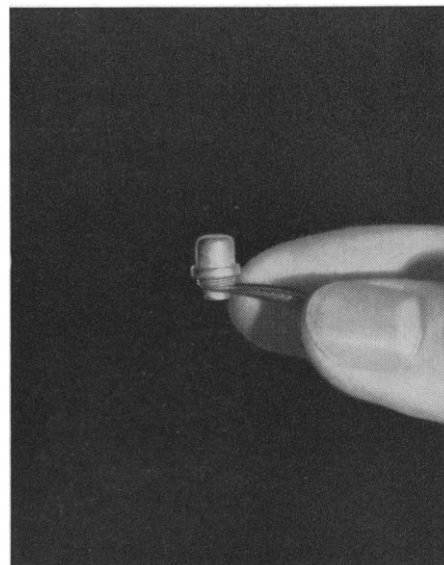


THE IDEA THAT GREW FOR 100 YEARS



At Bell Laboratories, M. Uenohara (left) adjusts his reactance amplifier, assisted by A. E. Bakanowski, who helped develop first suitable diode. Extremely low "noise" is achieved when certain diodes are cooled in liquid nitrogen.

First practical diode for amplifier, shown here held by tweezers, was jointly developed by A. E. Bakanowski and A. Uhler.



How basic scientific ideas develop in the light of expanding knowledge is strikingly illustrated by the development of Bell Laboratories' new "parametric" or "reactance" amplifier.

Over 100 years ago, scientists experimenting with vibrating strings observed that vibrations could be amplified by giving them a push at strategic moments, using properly synchronized tuning forks. This is done in much the same way a child on a swing "pumps" in new energy by shifting his center of gravity in step with his motion.

At the turn of the century, scientists theorized that *electrical* vibrations, too, could be amplified by synchronously varying the *reactance* of an inductor or capacitor. Later amplifiers were made to work on this principle but none at microwave frequencies.

Then came the middle 50's. Bell Telephone Laboratories scientists, by applying their new transistor technology, developed semiconductor diodes of greatly improved capabilities. They determined theoretically *how* the electrical capacitance of these new diodes could be utilized to amplify at *microwave* frequencies. They created a new microwave amplifier with far less "noise" than conventional amplifiers.

The new reactance amplifier has a busy future in the battle with "noise." At present, it is being developed for applications in tropospheric transmission and radar. But it has many other possible applications, as well. It can be used, for instance, in the reception of signals reflected from satellites. It is still another example of the continuing efforts to improve your Bell System communications.



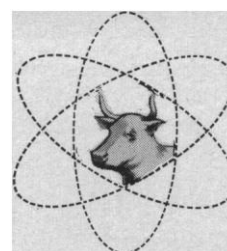
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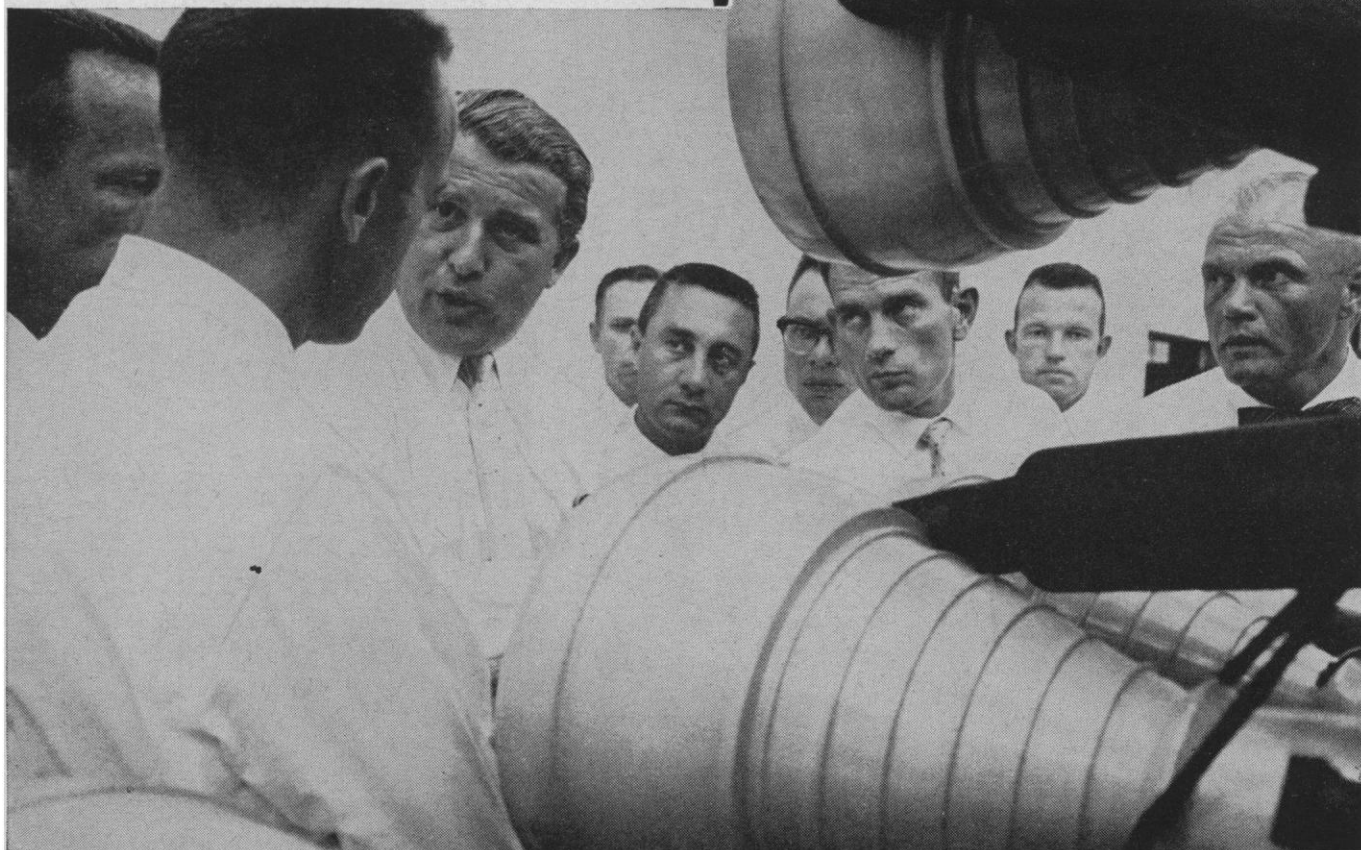
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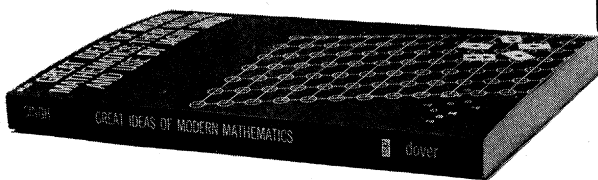
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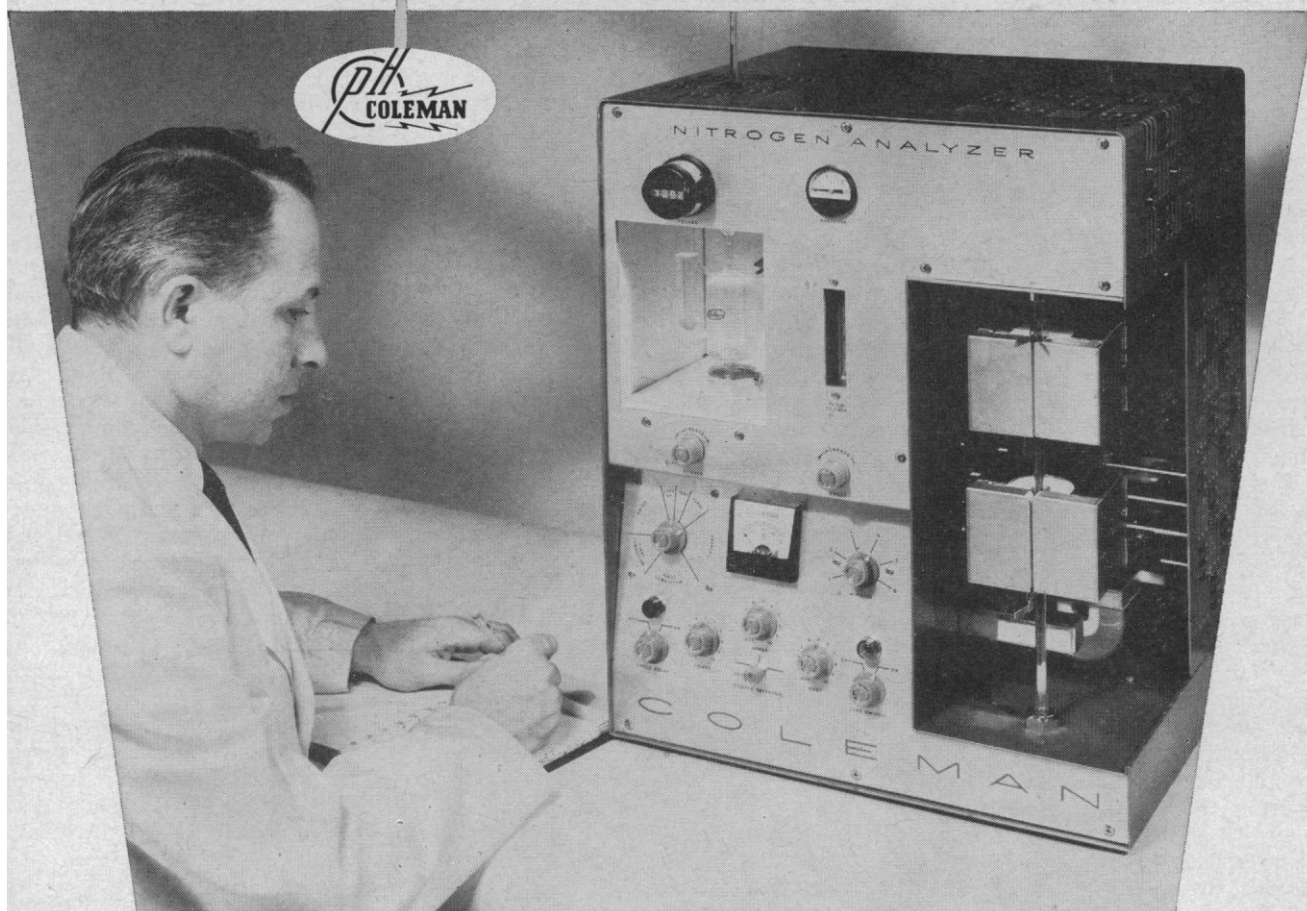
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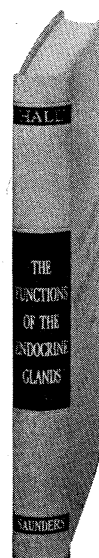
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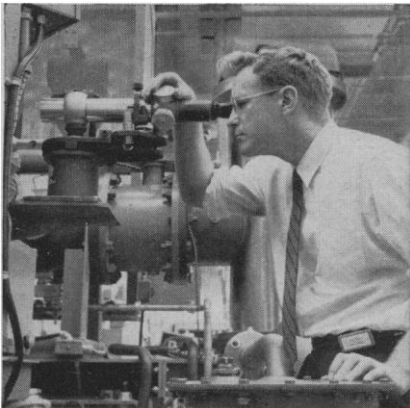
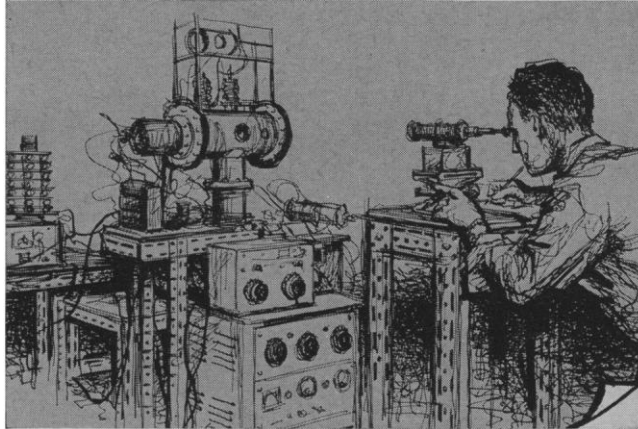
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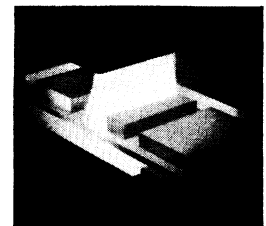
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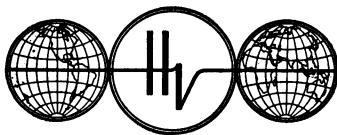
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Hazards of the '60's

Recent hearings before Representative John E. Fogarty's subcommittee of the House Committee on Appropriations brought out the difficulties inherent in getting congressional and public support for a broad-scale program in public health designed to meet the needs of the 1960's. Officials of the Public Health Service and other witnesses were in virtually complete agreement about what the hazards to health will be and about what will have to be done about them.

The hazards will increase as our expanding population concentrates more in urban areas. By 1970 the U.S. population will probably have increased by more than 30 million; the number of automobiles by some 20 million. Industry will undoubtedly increase at an even more rapid rate. The chemical industries, which pose special environmental problems, have grown exponentially in the last few decades and will probably continue to do so. From 1940 to 1959 the output of some representative chemicals increased as follows (in millions of pounds): plastics, 150 to 5000; detergents (which introduce special disposal problems), 15 to 1300; and insecticides and agricultural chemicals, 8 to 540. It is estimated that 400 to 500 new chemical products are put into use each year. In the production of these, new waste products are created. A continuing program of checking the toxicity of new products and by-products is a clear necessity.

The increasing use of x-rays in diagnosis and in industry, the rapidly expanding use of radioisotopes in industrial applications and research, and the increasing use of nuclear power will require control and monitoring. The disposal of radioactive wastes from nuclear facilities will demand more and more attention. All of these hazards, as well as others not mentioned, are designated environmental health problems by the Public Health Service.

What needs to be done? At present, according to Leroy E. Burney, surgeon general, the plans and activities developed by the Public Health Service for dealing with environmental hazards are carried out somewhat independently of each other, in response to special needs. "This has resulted in a loose grouping of related, but independently treated, problems, programs, and activities associated with the essential elements of our surroundings—the water we drink, the air we breathe, the food we eat, the shelter which protects us. . . ." Burney proposed—and all witnesses concurred—that what is needed is an organization to consider the interrelated problems as a whole, an "Environmental Health Unit," which would integrate biomedical and engineering activities and bring about close relations between operational and research activities. Such a unit should carry on an expanded research program of its own but should also support research in universities.

Two steps are required: first, legislation to establish an Environmental Health Unit within the service, and second, adequate financing. The first step is easy, the second hard. And it is obvious why this is so. A specific disease can be dramatized: "Fight cancer with a check-up and a check!" But the environmental hazards are diffuse and difficult to personify in a way that will loosen congressional or individual purse strings. Fogarty remarked, "Environmental health doesn't seem to ring a bell with many people. . . ." Burney agreed that the phrase lacked "drama or impact," but had no substitute to offer. Come in, Madison Avenue!—G.DuS.

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Forthcoming Events

May

21-22. Society for Economic Botany, 1st annual, Lafayette, Ind. (Q. Jones, New Crops Research Branch, Beltsville, Md.)

22. Maryland Acad. of Sciences, Baltimore. (J. W. Easter, Owings Mills, Md.)

22-26. Air Pollution Control Assoc., 53rd annual, Cincinnati, Ohio. (C. W. Gruber, 2400 Beekman St., Cincinnati 14)

22-26. Oil and Gas Power Conf., Kansas City, Mo. (D. B. MacDougall, ASME, 29 W. 39 St., New York 18)

23-25. American Soc. for Quality Control, annual conv., San Francisco, Calif. (W. P. Youngclaus, Jr., ASQC, 161 W. Wisconsin Ave., Milwaukee 3, Wis.)

23-25. National Telemetering Conf., Santa Monica, Calif. (A. F. Denham, American Rocket Soc., 925 Book Bldg., Detroit 26, Mich.)

23-25. Technical Assoc. of the Paper and Pulp Industry, Chicago, Ill. (J. Winchester, TAPPI, 155 E. 44 St., New York 17)

23-26. Design Engineering Conf., New York, N.Y. (D. B. MacDougall, ASME, 29 W. 39 St., New York 18)

23-28. American College of Cardiology, 9th annual conv., Indianapolis, Ind. (G. F. Greco, ACC, 114-08 Linden Blvd., Ozone Park 16, N.Y.)

23-28. Instruments, Electronics, and Automation Exhibition, Olympia, London, England. (Industrial Exhibitions Ltd., 9 Argyll St., London, W.1, England)

23-28. International Ceramic Cong., 7th, Great Britain. (G. N. Hodson, Organizing Council, c/o Hatherware Ltd., Loughborough, England)

23-28. International War—Prophylaxis Cong. for Physicians, Noordwijk ann Zee, Netherlands. (M. Knap, 46 Schubertstraat, Amsterdam, Netherlands)

24-29. International Council for Bird Preservation, 12th cong., Tokyo, Japan. (Miss P. Barclay-Smith, British Museum (Natural History), Cromwell Rd., London, S.W.7, England)

25-26. Refractory Metals and Alloys, symp., Detroit, Mich. (E. O. Kirkendall, AIIE, 29 W. 39 St., New York 18)

25-5. International Federation for Housing and Town Planning, cong., Puerto Rico. (IFHTP, Park Hotel, Molenstraat 53, The Hague, Netherlands)

26-27. Psychophysiological Aspects of Space Flight (School of Aviation Medicine, USAF Aerospace Medical Center), symp., San Antonio, Tex. (J. Harmon, Southwest Research Inst., 8500 Culebra Rd., San Antonio 6)

26-28. Society of Naval Architects and Marine Engineers, spring, Washington, D.C. (W. N. Landers, SNAME, 74 Trinity Pl., New York 6)

29-4. American Soc. for Horticultural Science, 8th annual of Caribbean Region, San Juan, Puerto Rico. (E. H. Cásseres, Londres 40, O.E.E., Mexico 6, D.F.)

29-5. International Commission on Irrigation and Drainage, 4th cong., Madrid, Spain. (D. Diaz-Ambrona, Comité Nacional Español, c/o Ministerio de Obras

Públicas, Agustín de Bethencourt, 4, Madrid, Spain)

30-1. American Gynecological Soc., Williamsburg, Va. (A. A. Marchetti, Georgetown Univ. Hospital, Washington 7)

30-2. American Orthopaedic Assoc., Hot Springs, Va. (L. R. Straub, 535 E. 70 St., New York 21)

30-3. Asian-Pacific Cong. of Cardiology, 2nd, Melbourne, Australia. (A. E. Doyle, Alfred Hospital, Melbourne, S.1, Victoria, Australia)

30-3. Fibre Science, annual conf., London, England. (A. W. Bennett, Textile Inst., 10 Blackfriars St., Manchester 3, England)

30-4. Reactivity of Solids, 4th intern. symp., Amsterdam, Netherlands. (Ir. G. van Gijn, Secretary, 4th Intern. Symp. on the Reactivity of Solids, Technisch Hogeschool, Eindhoven, Netherlands)

June

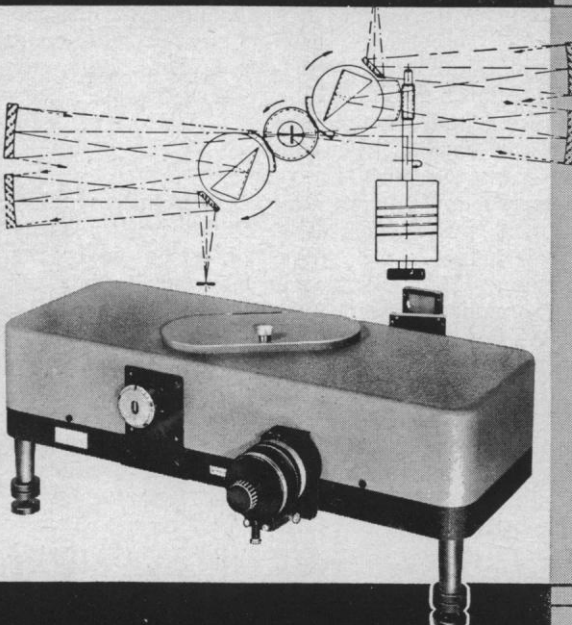
1-3. Instrumental Methods of Analysis, annual symp., Montreal, Quebec, Canada. (W. H. Kushnick, Instrument Soc. of America, 313 Sixth Ave., Pittsburgh 22)

1-3. Radar Symp., 6th annual, Ann Arbor, Mich. (W. A. Blikken, Willow Run Laboratories, P.O. Box 2008, Ann Arbor)

1-4. American Assoc. of Bioanalysts and California Assoc. of Clinical Laboratories, annual, San Francisco, Calif. (Mrs. M. K. Higgins, 75 Buena Vista Ave., San Francisco 17, Calif.)

1-5. Irrigation and Drainage, 4th intern. cong., Madrid, Spain. (D. Diaz-Ambrona,

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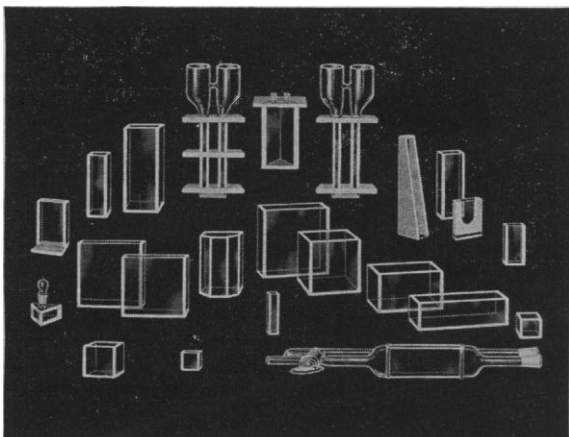
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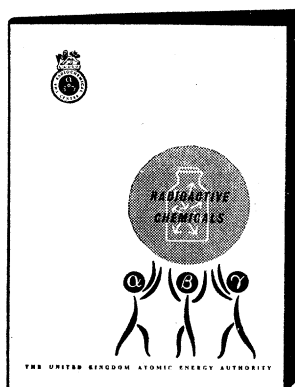


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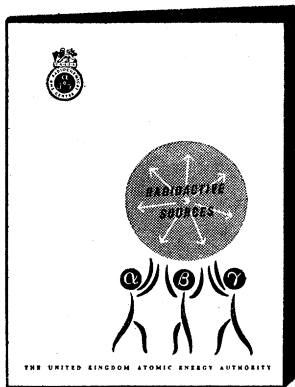


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2-4. Drugs Affecting Lipid Metabolism, intern. symp., Milan, Italy. (S. Garattini, c/o Institute of Pharmacology, Via del Sarto 21, Milan, Italy)

3-8. Pan American Medical Women's Alliance, 7th cong., San Juan, Puerto Rico. (Mrs. S. D. Rosekrans, 504 Newett St., Nullsville, Wis.)

5-8. Special Libraries Assoc., 51st annual, Cleveland, Ohio. (B. M. Woods, SLA, 31 E. 10 St., New York 3)

5-9. American Soc. of Mechanical Engineers, summer annual and aviation conf.,

Dallas, Tex. (L. S. Denegar, ASME, 29 W. 39 St., New York 18)

5-9. World Power Conf., Madrid, Spain. (D. J. Pérez, Pozualo, Spanish National Committee, General Pardinas, 55, Madrid, Spain)

5-10. National Conf. on Social Welfare, annual, Atlantic City, N.J. (Natl. Conf. on Social Welfare, 22 West Gay St., Columbus 15, Ohio)

5-14. XXV Cold Spring Harbor Symp. on Quantitative Biology, Cold Spring Harbor, N.Y. (A. Chovnick, Biological Laboratory, Long Island Biological Assoc., Cold Spring Harbor)

6-8. Protein Structure and Function, 13th symp. in biology, Upton, N.Y. (D.

E. Koshland, Jr., Dept. of Biology, Brookhaven National Laboratory, Upton, N.Y.)

6-10. International Conf. on Live Poliovirus Vaccines, Washington, D.C. (Secretariat, Pan American Health Organization/World Health Organization, 1501 New Hampshire Ave., NW, Washington 6, D.C.)

7-11. Microwave Tubes, intern. cong., Munich, Germany. (Nachrichtentechnische Gesellschaft im VDE (NTG), Frankfurt-am-Main, Osthafenplatz 6, Germany)

7-13. Dosimetry in Health Physics, symp., Vienna, Austria. (International Atomic Energy Agency, 11 Kärntner Ring, Vienna 1, Austria)

7-15. Partial Differential Equations and Continuum Mechanics, intern. conf., Madison, Wis. (R. E. Langer, Mathematics Research Center, U.S. Army, Univ. of Wisconsin, Madison 6)

8-9. Selenium in Nutrition, conf., Ithaca, N.Y. (K. C. Beeson, U.S. Plant, Soil, and Nutrition Laboratory, Ithaca, N.Y.)

8-10. Canadian Federation of Biological Societies (Canadian Physiological Soc., Pharmacological Soc. of Canada, Canadian Assoc. of Anatomists, Canadian Biochemical Soc.), 3rd annual, Winnipeg, Manitoba. (E. H. Bensley, Montreal General Hospital, 1650 Cedar Ave., Montreal 25, P.Q.)

8-11. National Soc. of Professional Engineers, annual, Boston, Mass. (P. H. Robbins, NSPE, 2029 K St., NW, Washington 6)

8-12. American College of Chest Physicians, Miami Beach, Fla. (M. Kornfeld, 112 E. Chestnut St., Chicago 11, Ill.)

9-10. American Geriatrics Soc., Miami Beach, Fla. (R. J. Kraemer, 2907 Post Rd., Warwick, R.I.)

9-10. Canadian Inst. of Food Technology, 3rd annual conf., Winnipeg, Manitoba. (W. J. Eva, Box 846, Winnipeg, Manitoba)

9-11. Acoustical Soc. of America, Providence, R.I. (W. Waterfall, ASA, 335 E. 45 St., New York 17)

9-11. Endocrine Soc., Miami Beach, Fla. (H. H. Turner, 1200 N. Walker, Oklahoma City 3, Okla.)

9-11. National Speleological Soc., annual, Carlsbad, N.M. (G. W. Moore, U.S. Geological Survey, Menlo Park, Calif.)

9-12. American Medical Women's Assoc., Miami Beach, Fla. (Mrs. L. T. Majally, 1790 Broadway, New York 19)

9-12. American Rheumatism Assoc., annual, Hollywood-by-the-Sea, Fla. (F. E. Demartini, Presbyterian Hospital, 622 W. 168 St., New York 32)

9-12. American Therapeutic Soc., Miami Beach, Fla. (O. B. Hunter, Jr., 915 19 St., NW, Washington 6)

10-12. American College of Angiology, Miami Beach, Fla. (A. Halpern, 11 Hampton Court, Great Neck, N.Y.)

10-12. American Electroencephalographic Soc., Boston, Mass. (G. A. Ulett, 1420 Gratten St., St. Louis 4, Mo.)

10-12. Society for Biological Psychiatry, Miami Beach, Fla. (G. N. Thompson, 2010 Wilshire Blvd., Los Angeles 57, Calif.)

11. American Acad. of Tuberculosis Physicians, Miami Beach, Fla. (G. P. Bailey, P.O. Box 7011, Denver 6, Colo.)

11-12. American Diabetes Assoc., Miami Beach, Fla. (J. R. Connelly, 1 E. 45 St., New York 17)

(See issue of 22 April for comprehensive list)

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