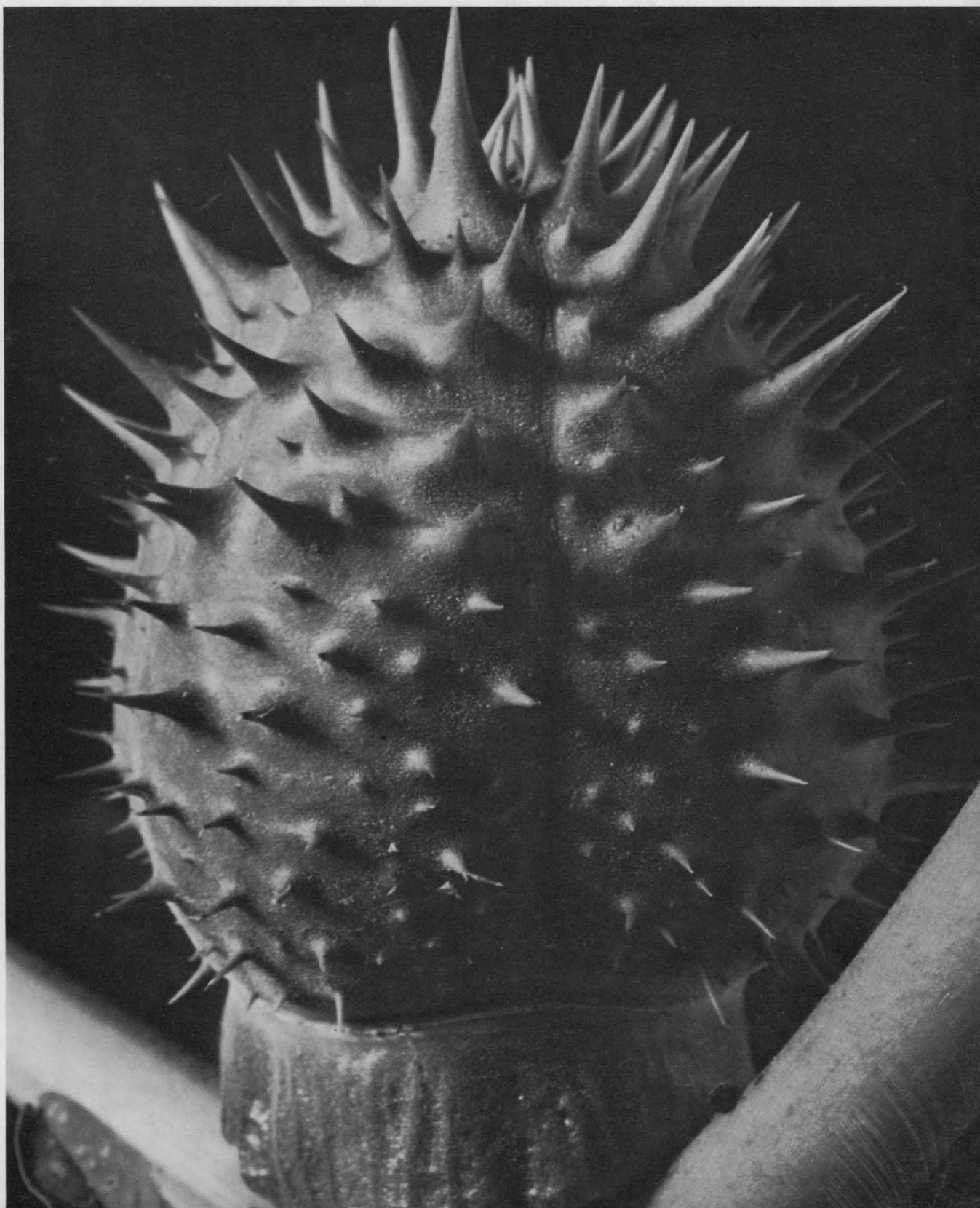


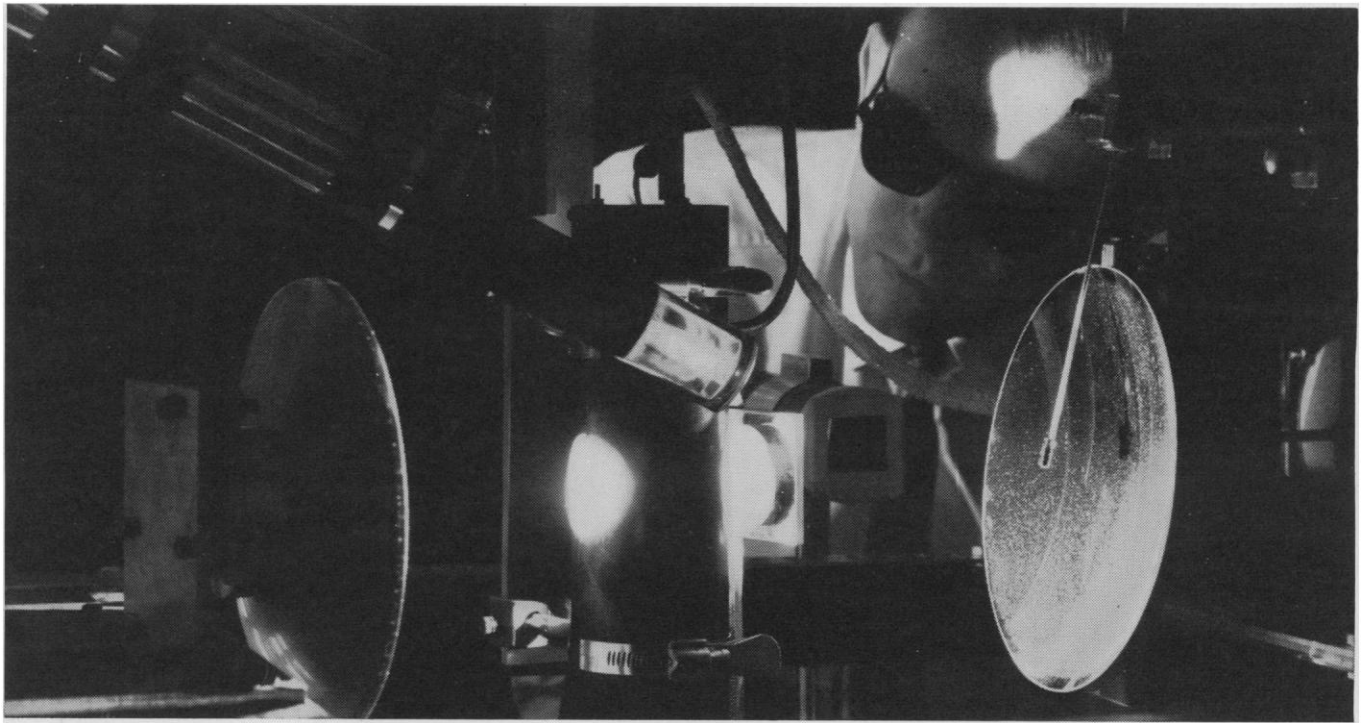
SCIENCE

25 May 1962

Vol. 136, No. 3517

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE





Exploring the possibilities in Coherent Light

At Bell Laboratories, Donald F. Nelson studies a beam of coherent red light produced by a continuously operating ruby optical maser. The heart of the device is a uniquely shaped ruby crystal immersed in liquid nitrogen in the tubular glass dewar extending from upper left to center. Light from the mercury arc lamp (lower center) is reflected by round mirror at left to mirror at right and then is focused on the ruby crystal to produce maser action. Coherent light emerging from end of dewar is picked up by a detector.

Is it feasible to take advantage of the enormous bandwidth available at optical frequencies? Could coherent light, for example, be sent through protecting pipes to provide high-capacity communication channels between cities?

To study such possibilities it is, first of all, necessary to have a source of continuous coherent radiation at optical frequencies. Such a source was first produced when Bell Laboratories scientists developed the gaseous optical maser.

Recently, our scientists demonstrated the generation of continuous coherent light by solid materials. Using a crystal of neodymium-doped

calcium tungstate, a material developed at Bell Laboratories, continuous optical maser action was obtained in the near infrared. It has also been attained with visible light, using a new optical "pumping" arrangement to excite a ruby crystal. (See illustration above.)

Multichannel light highways for communications are still far from realization. But with continuous sources of coherent light available, it becomes possible to explore the problems of modulating, transmitting, detecting, amplifying and, in general, controlling light for possible communications applications.



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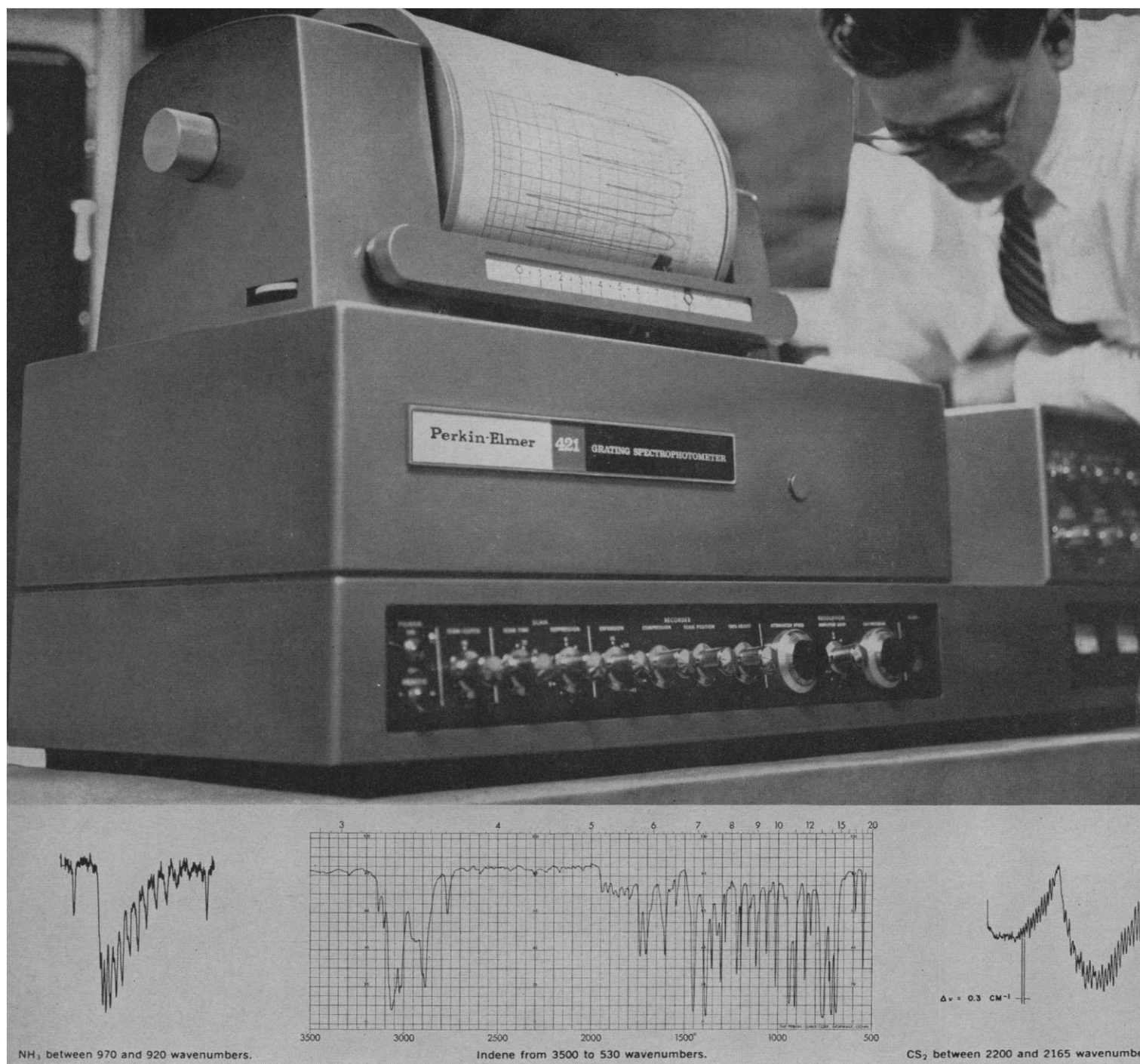
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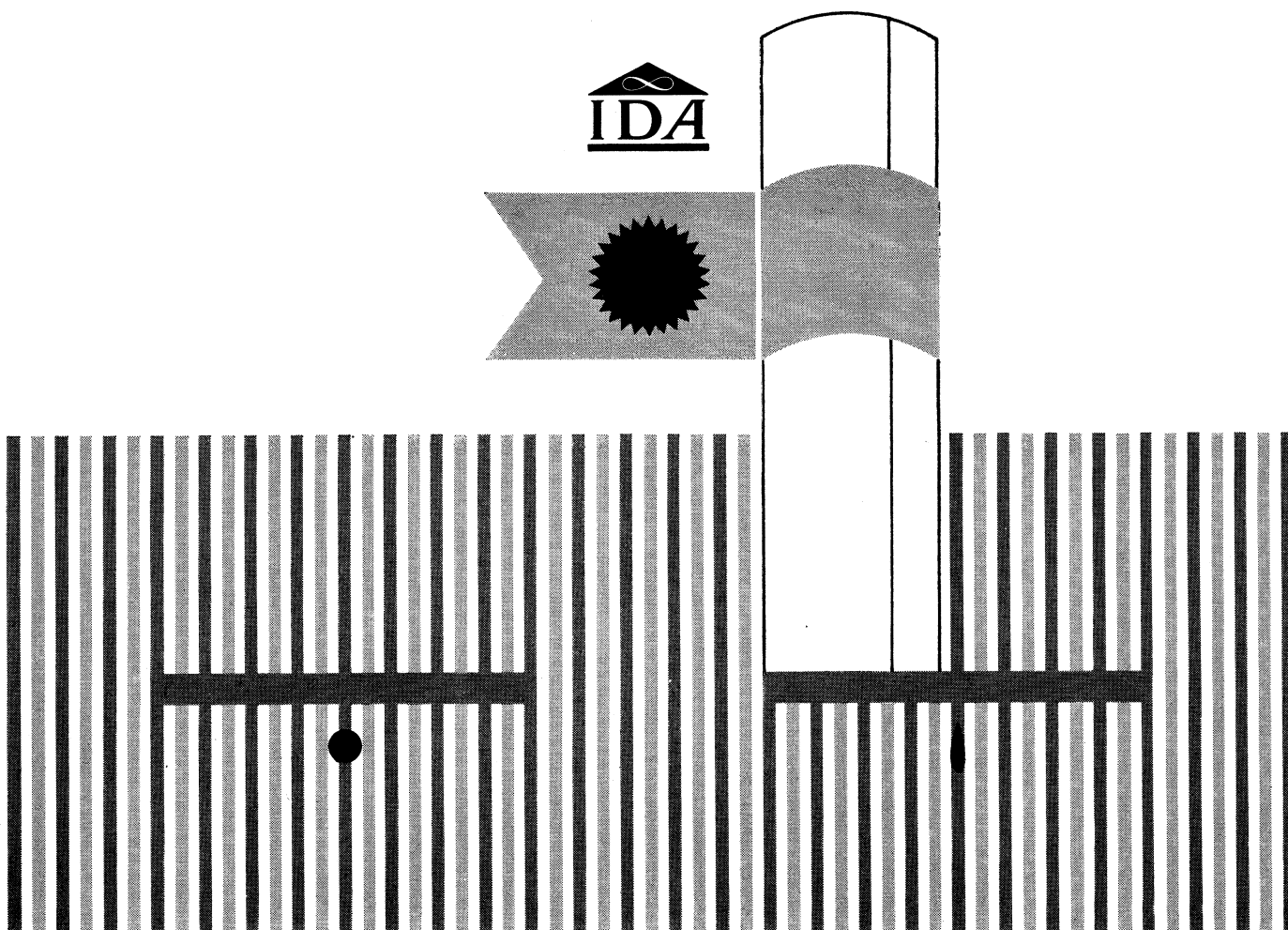
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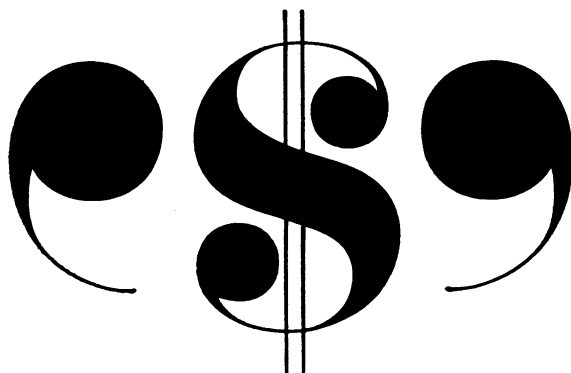
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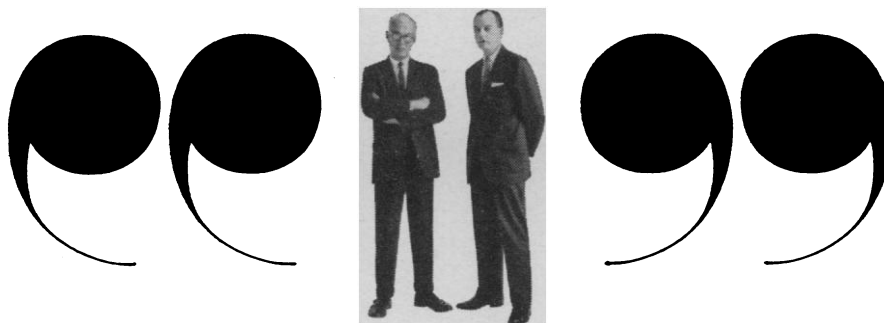
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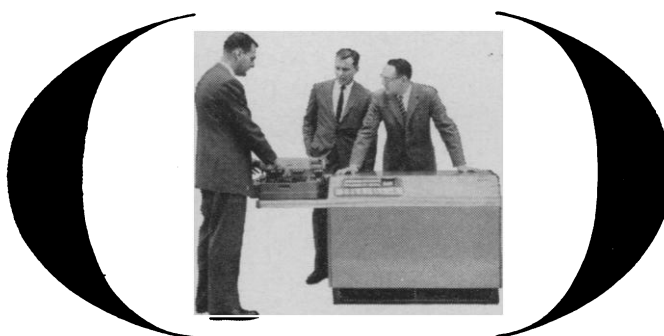


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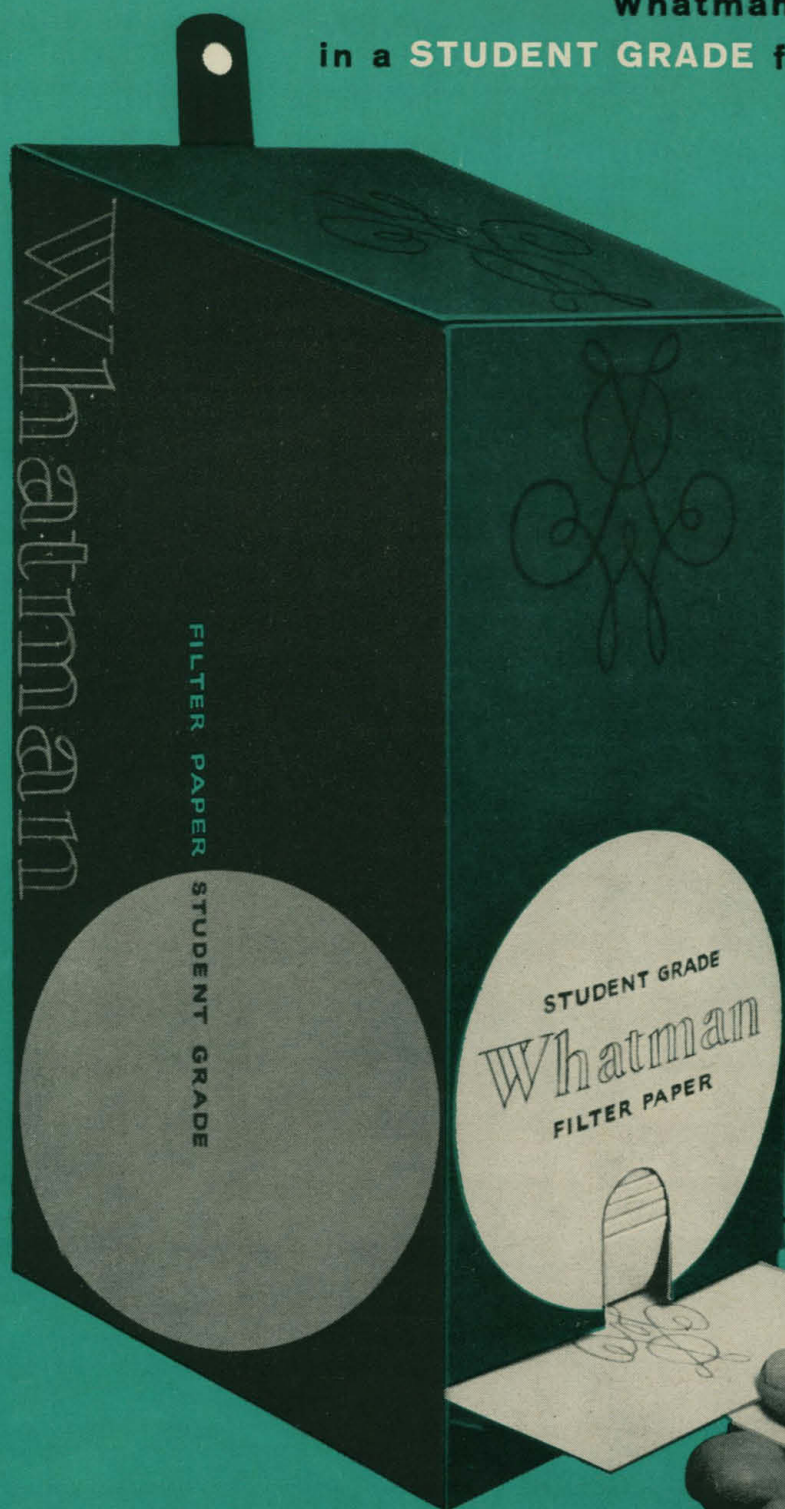
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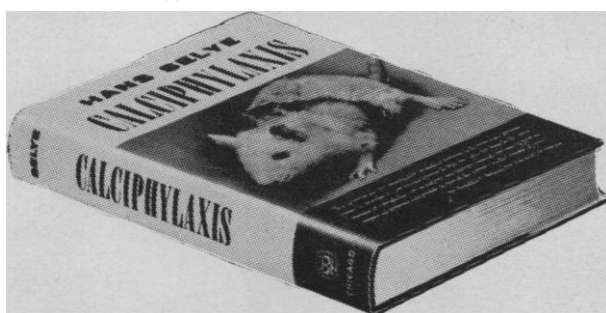
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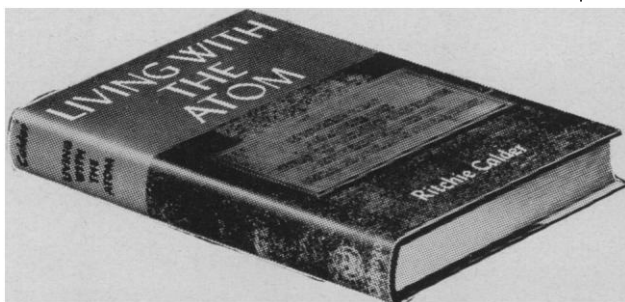
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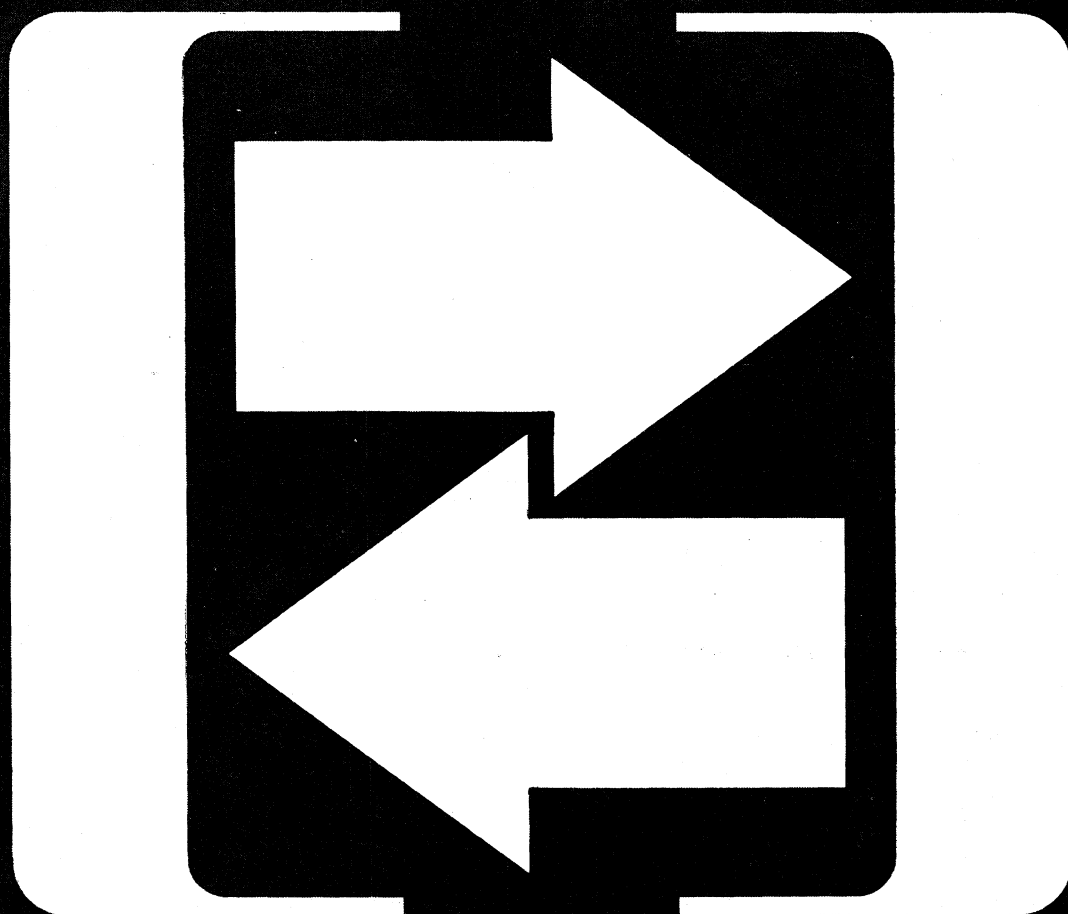
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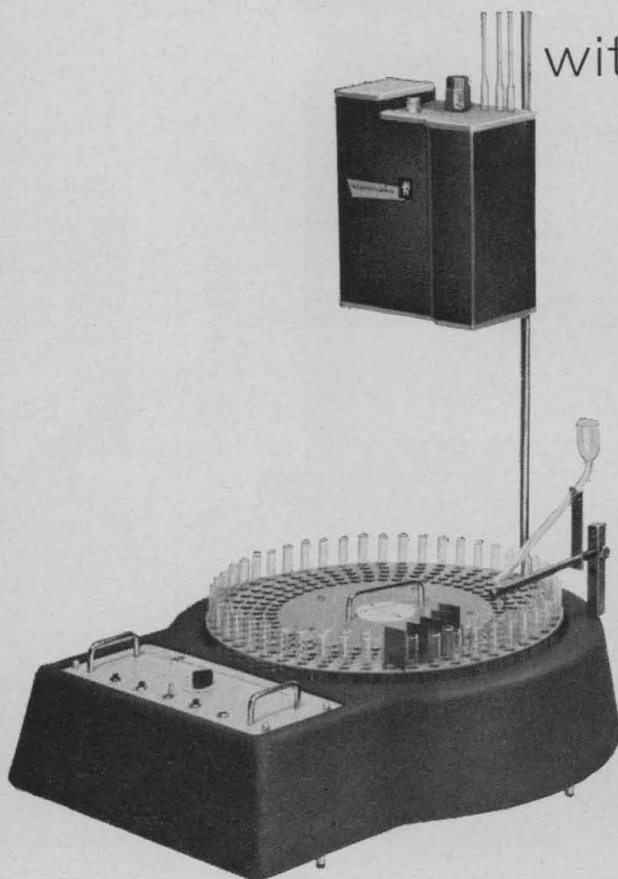
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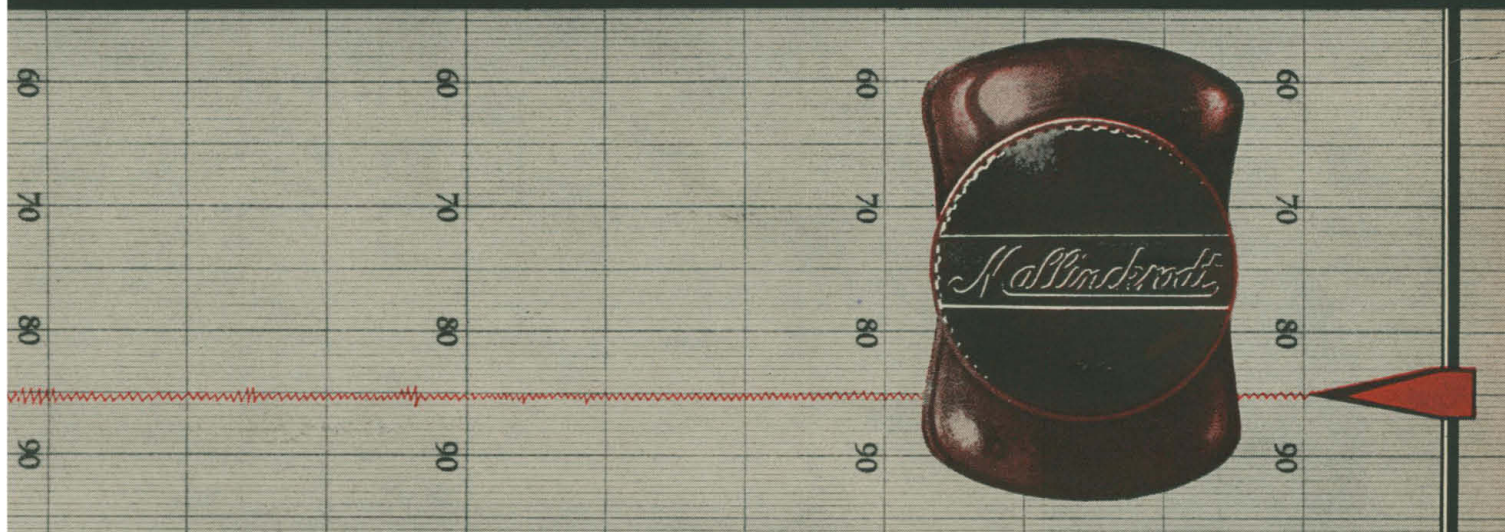
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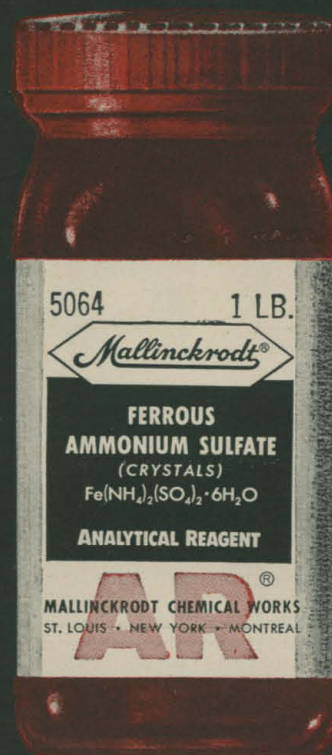
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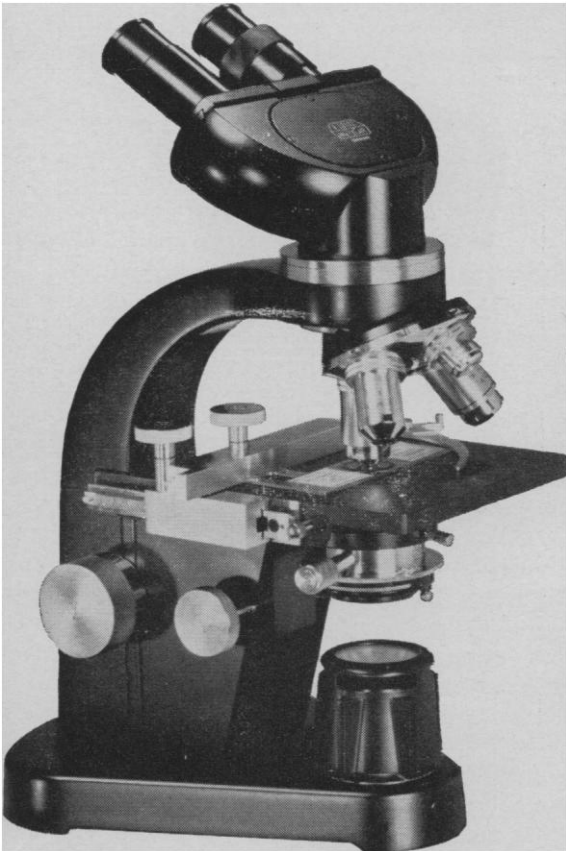
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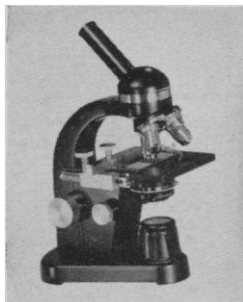
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Dangerous Tranquility

In late January 1962 my attention was attracted to an outbreak of congenital malformations in children in Germany and its possible relation to a specific drug. Because of my interest in congenital malformations of the heart I decided to examine the situation myself.

The malformation was phocomelia, which is characterized by reduction in the length of the long bones of the arms or legs, or both. In extreme cases the appendages are reduced to completely functionless nubbins. Occasionally the external ear is absent, and in the most severe cases the visceral organs are badly malformed.

Phocomelia has long been known as a rare malformation. In Germany, a few cases were seen in 1959, more were seen in 1960, and cases in "epidemic" numbers were seen in 1961. By November 1961, W. Lenz of Hamburg and W. G. McBride in Australia suggested that the outbreak was connected with the use of a new sleeping pill and tranquilizer containing thalidomide [α -(N-phthalimido)glutarimide]. A. Spiers in Scotland confirmed the relation by showing that the mothers of at least eight out of ten of the affected babies had taken the drug. Thalidomide was on trial in the United States, but fortunately it had not been approved for use by the Food and Drug Administration, owing to the fact that polyneuritis developed in some users and owing also to Dr. Frances O. Kelsey's doubt about the safety of its use in pregnancy.

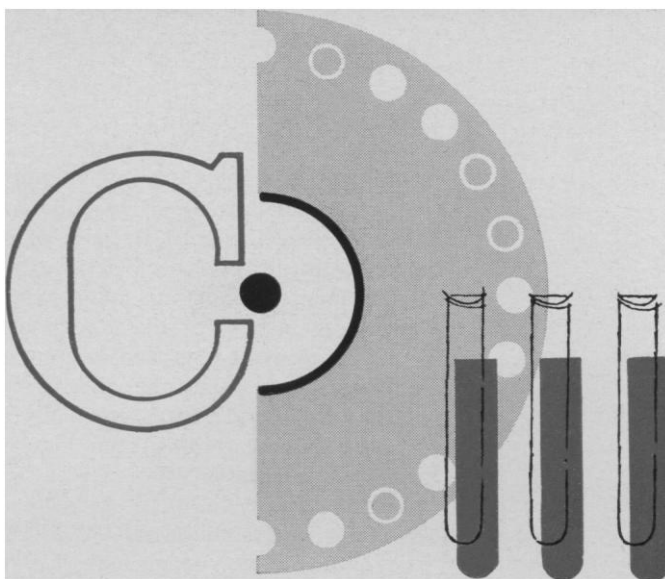
The drug was first marketed in Germany in 1958, and by 1960 it had become Germany's most popular sleeping tablet and tranquilizer. It was sold without prescription until the polyneuritis showed up; thereafter it was sold freely on prescription.

Thalidomide was withdrawn from the market in Germany by November 1961 and slightly later in England, Australia, and Canada. Much additional circumstantial evidence of the relation between thalidomide and phocomelia has now been collected. Lentz (personal communication) has studied 50 cases of women whose offspring have phocomelia and who had also taken the drug during pregnancy. He finds that the period of sensitivity is between days 30 and 60 after the last menstrual period, and that in most cases the drug had been taken between days 30 and 50. In those cases in which the date of conception was known, the period of sensitivity was from the 28th to the 42nd day.

The most conservative estimate is that by August 1962 some 3500 babies with phocomelia will have been born in Germany and several hundred will have been born in England and elsewhere.

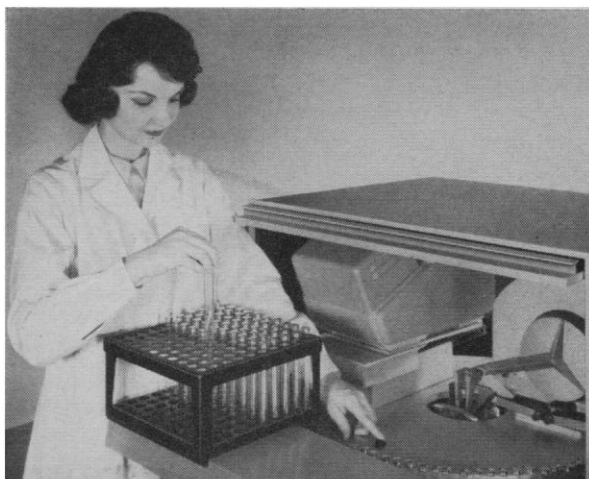
Definite proof that thalidomide does cause phocomelia must await further confirmatory animal experimentation or cessation of the outbreak in August 1962, 8 months after withdrawal of the drug. Nevertheless, the circumstantial evidence that this drug does cause congenital malformations is so strong, and the effects on the children are so terrible, that I feel the situation should be brought to the immediate attention of the public in this country. It is also important to remember that in many instances the damage is done before the mother knows she is pregnant. Therefore, young women must learn to be cautious about new drugs. Until new laws have become effective, and indeed until research for the proper tests on pregnant animals has been completed, physicians must bear in mind that sleeping tablets, tranquilizers, and other apparently innocent drugs may do terrible harm to the rapidly growing embryo and the unborn child.—HELEN B. TAUSSIG, M.D., *Johns Hopkins Hospital, Baltimore, Md.*

(This editorial is based on a longer editorial to be published soon in the *New England Medical Journal*.)



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For manual operation choose the Model 410A Auto-Gamma Spectrometer and a well-type scintillation detector. By adding a sample changer, automatic control unit and a digital printer, automatic operation will free your personnel of routine sample handling and data recording chores.

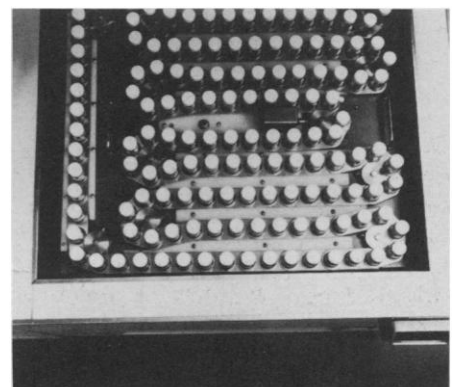
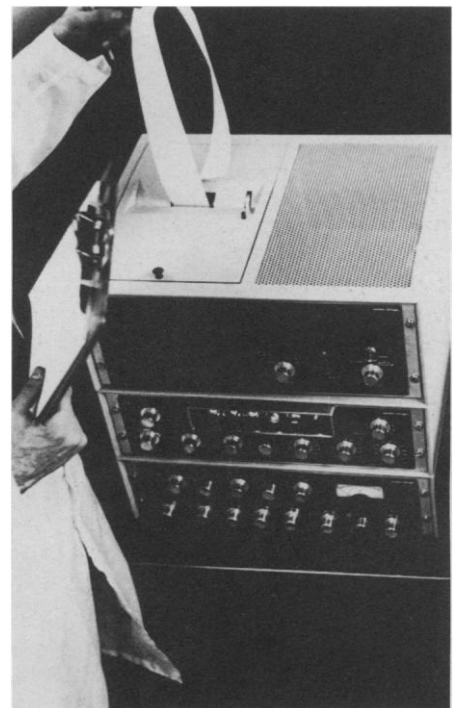
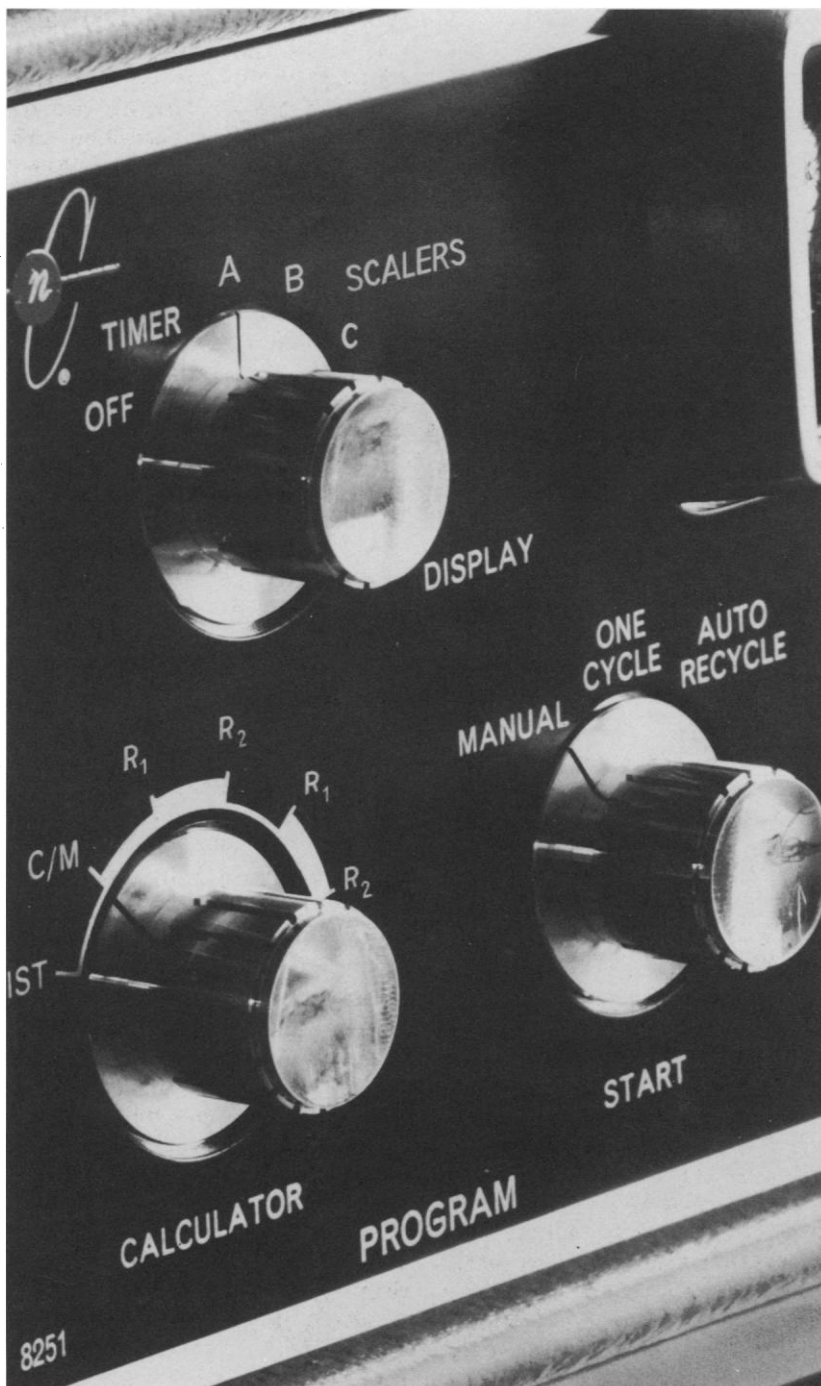
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NEW 3-CHANNEL LIQUID SCINTILLATION SPECTROMETERS provide important performance features: **RELIABILITY** All-transistorized circuitry and high-gain, low-noise photomultiplier tubes assure stability and reproducibility. **SIMPLICITY OF OPERATION** Single-labelled, intermixed, and double-labelled samples can be measured with a single setting of high-voltage controls. **ECONOMY OF SPACE AND COST** An exclusive design combines three scalers and a timer in a single compact chassis. **CONVENIENCE** Versatile readout options, 150 sample capacity, and sample programming deliver data with minimum time and effort.



USERS OF LIQUID SCINTILLATION SPECTROMETRY can now enjoy increased freedom from routine laboratory procedure and burdensome computations. Nuclear-Chicago's new systems combine programmed 3-channel operation with automatic calculation capability.

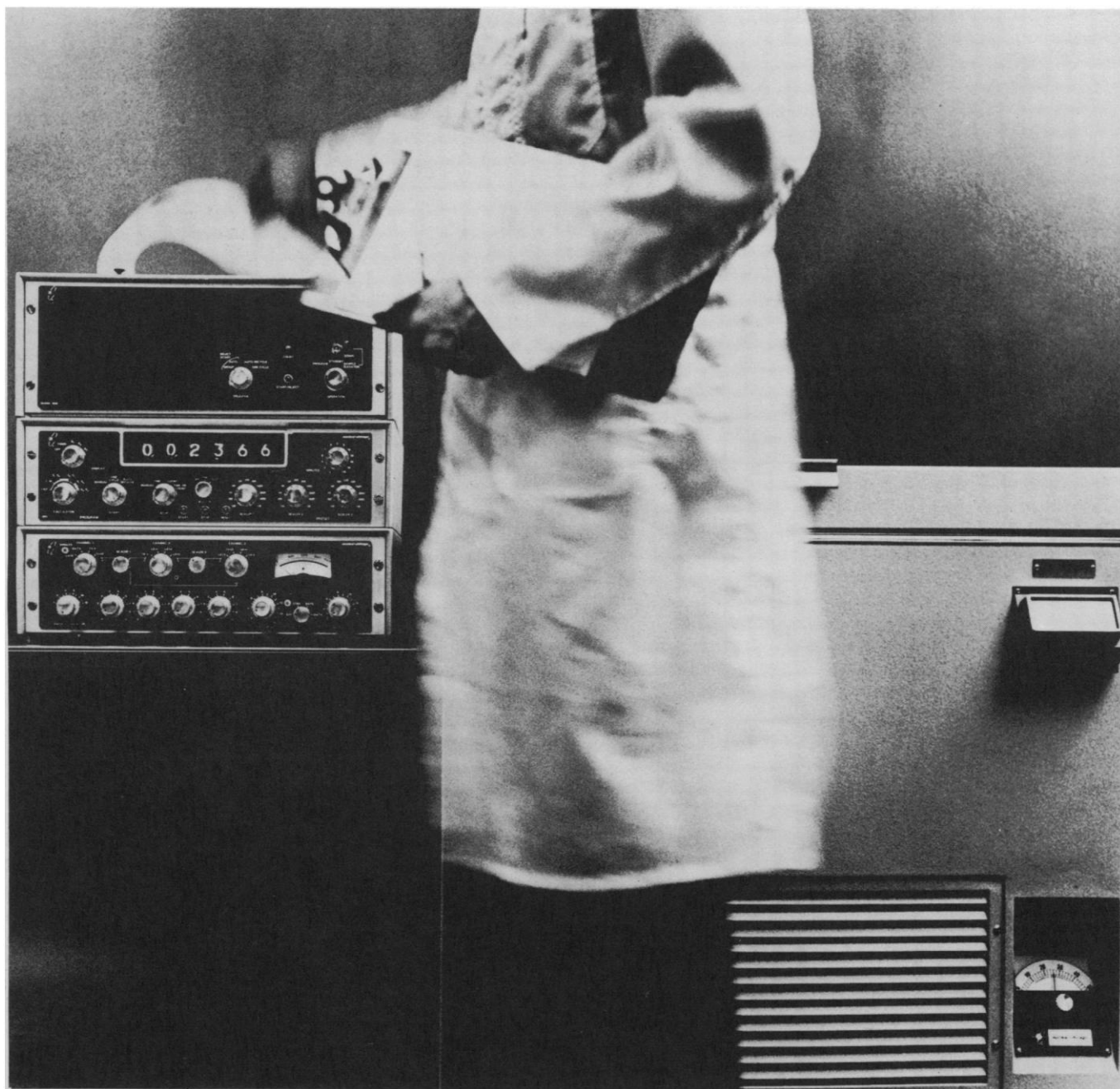


Figure 1—Nuclear-Chicago's 3-channel liquid scintillation spectrometer automatically programs 150 samples in a temperature-controlled chamber. Model 724 is equipped with a digital printer and Model 725 with an automatic printing calculator. These new systems offer unparalleled control, speed, and flexibility of operation. Once you have established

the counting program for all or any portion of the 150 samples, the instrument automatically counts and records activity in three separate channels for any two beta-emitting isotopes. With Model 725, counts per minute and channels ratio data for quench correction are printed for each sample permitting conversion to absolute counting efficiency.

CHANNELS RATIO CALCULATED AUTOMATICALLY TO SOLVE PROBLEMS OF QUENCH CORRECTION

Nuclear-Chicago's new 3-channel systems permit the automatic application of the channels ratio method to the problem of quench correction.

Quenching causes a shift of the spectrum toward lower energies resulting in a variable loss of counting efficiency. The causes of quenching are: (1) a colored sample may absorb some light photons before they leave the bottle, (2) the sample solute may interfere with the scintillation process (chemical quenching), and (3) dilution of a scintillator can lead to effects similar to chemical quenching where the energy transfer process may be inhibited.

The amount of quenching occurring in any carbon, tritium, or other beta-emitting sample is given by the channels ratio. This is automatically calculated by the 725 system enabling the investigator to obtain absolute counting effi-

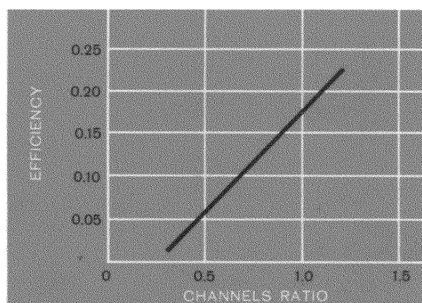


Figure 2—Correction curve for tritium showing absolute counting efficiency plotted against channels ratio.

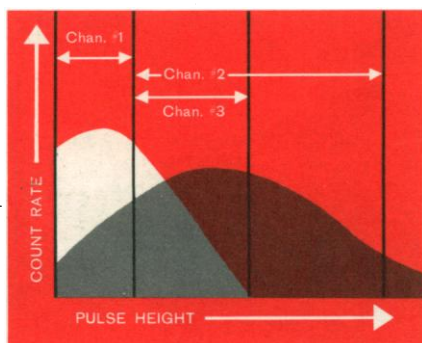


Figure 3—Typical channel settings on Nuclear-Chicago's automatic system for high-efficiency counting of two isotopes, intermixed, with simultaneous quench correction. Once established for the isotopes being measured, these channel settings are valid for all subsequent counting runs.

ciency for each sample regardless of the amount or type of quenching. A single setting of the system and a single counting run accomplish automatic counting of any sequence of tritium and carbon samples with simultaneous calculation of channels ratio for quench correction. Further, the instrument calculates quench correction data for the higher energy isotope in double-labelled samples.

Only one measurement of each sample is required. Pipetting errors associated with the internal standardization method of quench correction are eliminated.

The number of counts occurring in any one channel and the channels ratio will change if quenching is taking place. A standard correction curve of channels ratio vs. efficiency (figure 2) is prepared for each isotope. Absolute efficiency for each isotope can be read directly from the curve.

The 3-channel system can then be set as illustrated in figure 3. Channels #1 and #2 divide the tritium spectrum. At the same time Channel #2 covers most of the carbon spectrum and together with Channel #3 provides a measure of carbon quenching.

ELEGANT, COMPACT MECHANICAL AND ELECTRONIC DESIGN CONSERVES LABORATORY SPACE

All control and readout functions of Nuclear-Chicago's liquid scintillation spectrometers are housed in a single, compact desk-top data and control console (figure 4) that can be operated at any distance up to ten feet from the sample changer. This exclusive design permits the investigator to place the console at his desk or other convenient locations.

Three chassis comprise the control and data console: a digital printer or printing calculator, a transistorized 3-scaler and timer chassis, and a transistorized 3-channel spectrometer. The 3-chassis console measures only 16" by 19" by 20".

The scaler-timer chassis contains three fully transistorized scalers and a transistorized timer. This instrument provides readout in electronic, numerical display of time (figure 5A) or count (figure 5B) from any of the three scalers. Readout mode is selected by a front panel switch.



Figure 4—Desk-top control and data console.



Figure 5A—A turn of a switch shows "live" time in minutes and hundredths.



Figure 5B—A further turn of the switch shows counts accumulating in scaler A, B, or C.

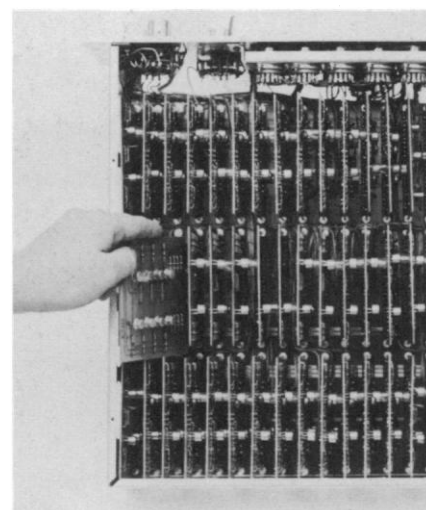


Figure 6—View inside scaler-timer chassis. Refined printed circuit techniques provide assured reliability. The circuit boards are labelled with their individual functions and arranged in a modular construction that minimizes maintenance problems.

NUCLEAR-CHICAGO'S LIQUID SCINTILLATION SPECTROMETERS MULTIPLY EFFICIENT USE OF LABORATORY RESOURCES

CHOOSE READOUT OPTIONS TO SUIT YOUR COUNTING REQUIREMENTS AND BUDGET

Sample number and time or counts are displayed by in-line numerical readout. Model 724 prints sample number, time,

and each scaler's accumulated counts. Model 725 offers the further capability of automatic calculation of counts per minute for each channel and calculation of proper channels ratio for quench correction. Both models offer additional outputs for other computing or data handling equipment if desired.

150 SAMPLE CAPACITY AND PROGRAMMED SAMPLE SELECTION CONTRIBUTE EXCLUSIVE OPERATING ADVANTAGES

The mechanical heart of Models 724 and 725 is the automatic sample changer in its custom-built controlled-temperature chamber. The changer offers a capacity of 150 samples. The counting sequence of individual samples or groups of samples can be programmed to the work load of your own laboratory.

Many research groups require a means of counting selected sample series ahead of those that may already have been placed in the sample changer. This is especially true when the changer is frequently loaded to capacity. Nuclear-Chicago's automatic programming now fills this requirement.

Automatic programming permits preferential counting of important samples while samples from other projects remain undisturbed in the changer.

CUSTOM-ENGINEERED CHAMBER GIVES YOU FULL CONTROL OF OPERATING TEMPERATURE

The instrument's precisely adjustable controlled temperature chamber allows you to choose the optimum temperature for best results. The unique design of the photomultiplier tubes and amplifier circuits used in Nuclear-Chicago instruments allows you to operate efficiently within a range of -10°C to room temperature. Operation at $+5^{\circ}\text{C}$ is particularly important in avoiding error due to freezing of samples in aqueous solution.

FURTHER TECHNICAL DATA AVAILABLE

Comprehensive specifications on Models 724 and 725 are available from your Nuclear-Chicago sales engineer or our home office.

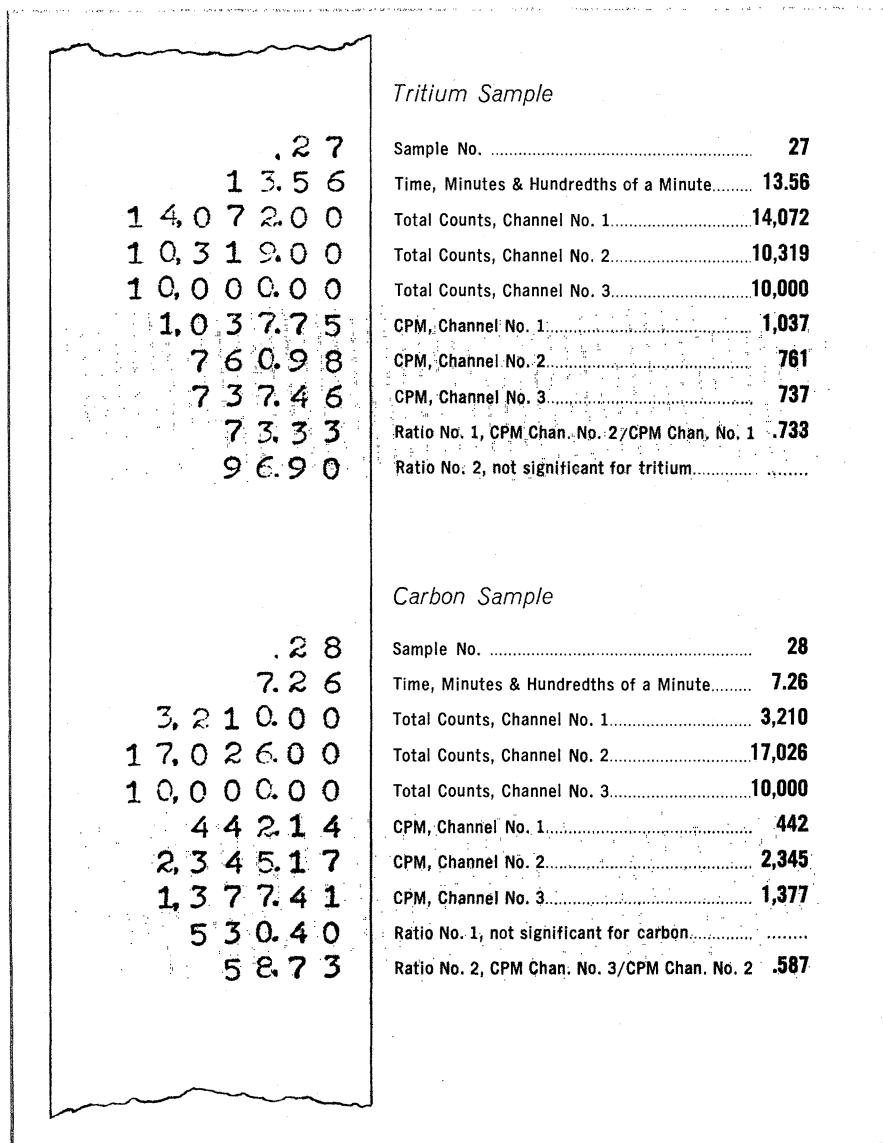


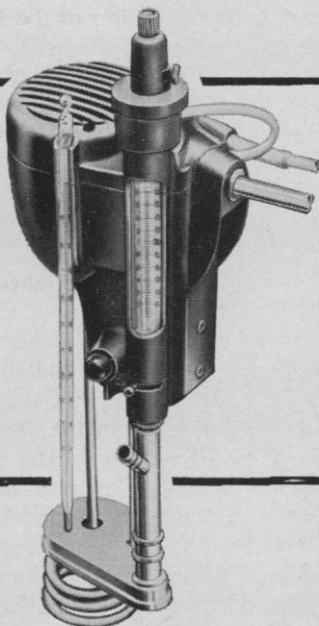
Figure 7—Representation of data printout in typical case of intermixed carbon and tritium samples. Unshaded area of tape

depicts data listing functions of Model 724. The shaded area illustrates the additional calculation capability of Model 725.



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Engineering (M)

The program of Section M (L. K. Wheelock, Engineers Joint Council) will include one or more sessions on technical information flow and on sciences in engineering education. Section M will cosponsor the program of the Conference on Scientific Manpower.

The *Tau Beta Pi Association* (Robert H. Nagel, University of Tennessee) will sponsor an address of general interest by a prominent engineer or scientist (29 Dec.).

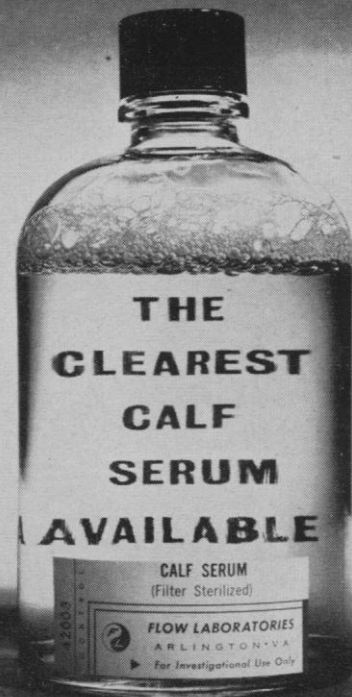
Medical Sciences (N)

As in previous years, Section N will have a four-session symposium (27 and 29 Dec.), with participants coming from all parts of the country. The general subject is new concepts regarding biological control mechanisms. The sessions and their chairmen are "Repression mechanisms" (Boris Magansanik, M.I.T.); "Feedback mechanisms" (H. Edwin Umbarger (Cold Spring Harbor); "Hormonal phenomena" (Earl W. Sutherland, Western Reserve); and "Permeability phenomena" (Charles R. Park, Vanderbilt). The vice-presidential address will be given by DeWitt Stettin, Jr. (National Institute of Arthritis and Metabolic Diseases).

A new affiliate of the AAAS, the *Academy of Psychoanalysis* (Sandor Rado, 235 E. 73rd St., New York) will meet from 28 to 30 December, with one or more business meetings and four scientific sessions. The general title of the meeting will be "Violence," and the sessions will be on neurophysiology and ethology, anthropology and sociology, psychoanalysis, and large-group relationships.

The *American Physiological Society* and the Bioscience Programs of the Office of Space Sciences of the National Aeronautics and Space Administration will jointly sponsor a symposium on "Life Support in Space: Basic Physiology and Systems Design." Coordinators are Robert E. Smith (Department of Physiology, UCLA Medical Center), and Orr E. Reynolds (director of Bioscience Programs, NASA).

The *American Psychiatric Association, Committee on Research* (Milton Greenblatt, George H. Grosser, and Henry Wechsler, all of Massachusetts Mental Health Center and Harvard Medical School) will sponsor a five-session program on "Human Reactions to Unknown or Impending Disaster."



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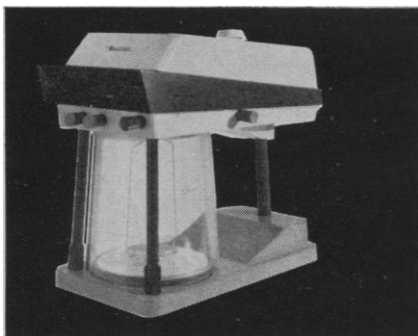
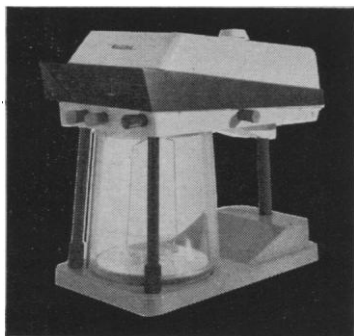
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Dentistry (Nd)

Section Nd (Ned B. Williams, University of Pennsylvania School of Dentistry) will have a two-session symposium on hard-tissue destruction (29 Dec.). The program will be cosponsored by the *American College of Dentists*, the *American Dental Association*, and the *International Association for Dental Research, North American Division*.

Pharmacy (Np)

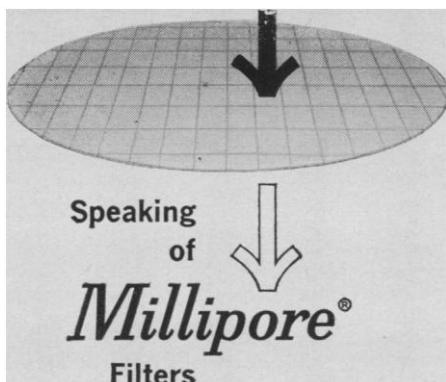
The 3-day program of Section Np (John E. Christian, Purdue) will include sessions for contributed papers in hospital pharmacy, other sessions for contributed papers, and a symposium "Uses of Computers in Research and Practice," 29 Dec. The section luncheon, with the vice-presidential address by John Autian (University of Texas), and a dinner will be held 27 Dec.

Section Np's entire program will be cosponsored by the *American Association of Colleges of Pharmacy*, the *American College of Apothecaries*, the *American Society of Hospital Pharmacists*, the *American Pharmaceutical Association, Scientific Section*, and the *National Association of Boards of Pharmacy*.

Agriculture (O)

Section O (George W. Irving, U.S. Agricultural Research Service) will have a four-session symposium on food quality "Production Practices and Processing." The individual sessions will be on genetic and environmental factors, protection of food crops against insects and diseases, processing factors, and quality evaluation and measurement. Considered in each session will be cereals, fruits, vegetables, meats, dairy products, poultry, and eggs.

At luncheon meetings invited papers will be presented on such overall aspects of the symposium subject as pharmacological factors in food quality and nutritional aspects of processed food.



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Lindeken, C. L., 1961
American Industrial Hygiene Assoc. Journal
22:232-237, August

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Industrial Science (P)

Section P (Allen T. Bonnell, Drexel Institute) is considering presentation of a symposium on communication in its broader aspects. It will also cosponsor the symposium on management science of the Institute of Management Sciences. Past vice-president S. O. Morgan (Bell Telephone Laboratories) will give the vice-presidential address at the annual luncheon. The Section will also give the 7th Industrial Citation Dinner.

The *Institute of Management Sciences* (Burton V. Dean, Case Institute of Technology) will have four sessions, as follows: "The Use of Judgments in Models of Decision Making" (26 Dec.); "Research and Development Management" (26 Dec.); "Experimental Design in Simulation" (27 Dec.); and "History of the Theory of Decision Making" (27 Dec.). These sessions probably will be cosponsored, respectively, by sections K-Social and Economic Sciences, P-Industrial Science, U-Statistics, and L-History and Philosophy of Science.

Education (Q)

The program of Section Q (Herbert A. Smith, University of Kansas) includes two or three joint sessions with the *Council for Exceptional Children* (26-27 Dec.); two joint sessions with the *American Educational Research Association* (30 Dec.); four or more sessions for contributed papers and possibly a symposium on the training of elementary school teachers for science (29-30 Dec.); a business meeting (29 Dec.); and the vice-presidential address of Kenneth E. Anderson (University of Kansas) (29 Dec.).

The four science teaching societies (ANSS, NABT, NARST, and NSTA), meeting with the AAAS (coordinator, William Gregory, Philadelphia Board of Education), will have a joint session (27 Dec.) and a series of concurrent sessions similar to the coordinated programs of recent years. A joint coffee hour and mixer will be held 27 Dec.

The national annual meeting of the *American Nature Study Society* (John A. Gustafson, RD 1, Homer, N.Y.) will begin with a board meeting (26 Dec.). After the joint session of all science teaching societies (27 Dec.) there will be a session on the nature study movement and one on early naturalists. On 28 December there will be museum tours, a session on nature photography, and presentation of a



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group of papers on the natural history of the Philadelphia area. On 29 December papers on nature instruction, and acquisition of areas for nature study will be presented, and in the evening the annual banquet will be held, at the Academy of Natural Sciences. The field trip with the National Association of Biology Teachers will probably be to Brigantine National Wildlife Refuge, New Jersey (30 Dec.).

For details of the annual national meeting of the *National Association of Biology Teachers*, see the summary given under "Biological Sciences (FG)."

The *National Association for Research in Science Teaching* (George G. Mallinson, Western Michigan University) will schedule its usual research symposium.

After the joint meeting of the science teaching societies, there will be a meeting of the *National Science Teachers Association* (Majorie Gardner, NSTA, Washington, D.C.). This will consist of two sessions—one afternoon session (27 Dec.) and one morning session (28 Dec.).

Science Service (Leslie V. Watkins, Science Service) will sponsor a session on a science youth program (29 Dec.).

Information and Communication (T)

The Association's 19th section, the new Section T—Information and Communication (Phyllis V. Parkins, *Biological Abstracts*) will hold its first regular meeting on 29 December, under the auspices of the Section Committee. As stated when the Section was organized, its primary aim is to bring information-communication experts and practising scientists together, for their mutual benefit. The morning will be reserved for invited speakers on information systems in use abroad. After a "Dutch treat" luncheon, with a well-known speaker who will deal with some of the larger aspects of scientific information and communication, the afternoon will be devoted to the vice-presidential address of George Seielstad and invited papers on topics still to be decided.

Statistics (U)

Organization of the Association's 20th section, Section U—Statistics, was authorized at the 1961 Council Meeting. The new section is planning a session on decision theory, to be held

jointly with Section A; one on astronomy, to be held jointly with Section D; one on *Tribolium* experiments, to be held jointly with Section F; and one on genetics, to be held jointly with the Biometric Society, ENAR, and the Society for the Study of Evolution. Sessions on developments in mathematical psychology, on the evaluation of statistics on ethnic origin, and on economic statistics are tentatively being planned.

Sessions on the teaching of statistics are also planned, with a view to helping individuals who are called upon to teach statistics even though their primary interests are in other areas. There will also be contributed papers.

Jerzy Neyman (University of California, Berkeley) will give a vice-presidential address, on "Statistics as a servant of all the sciences and as an independent discipline." A general discussion of the purposes of Section U and of its future program will be developed around this address.

A social event—either a smoker or a dinner—for persons interested in statistics, and their guests, is tentatively planned.

Cooperating with Section U in the arrangements is a committee of the Philadelphia Chapter of the American Statistical Association (John de Cani, University of Pennsylvania, chairman).

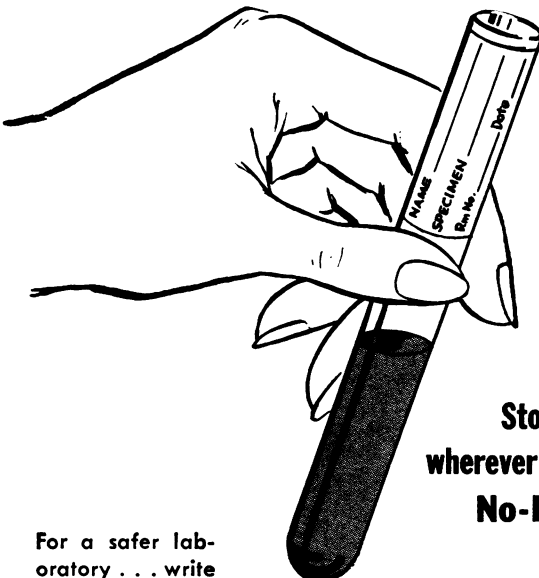
Science in General (X)

A number of organizations, too general in their interests to be placed in any sectional series or under any specific discipline, will constitute the "X series" in the printed *General Program*. In this preliminary synopsis, the programs of two of these—the Academy Conference and the Conference on Scientific Manpower—have already been mentioned, under "Other General Events."

The *American Geophysical Union* (Waldo Smith, AGU, Washington, D.C.) will cosponsor appropriate sessions.

The regular annual meeting of the *National Association of Science Writers* (Nate Haseltine, *Washington Post*) with the AAAS will include a business session and a dinner. A feature of the latter will be the fourth presentation of the new series of the AAAS-George Westinghouse Science Writing Awards for excellence in science writing in newspapers and magazines (27 Dec.).

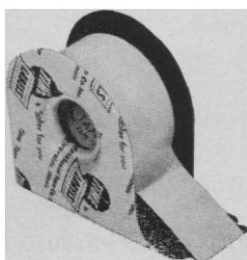
The national convention of the *Scientific Research Society of America* (Donald B. Prentice, Yale) is scheduled



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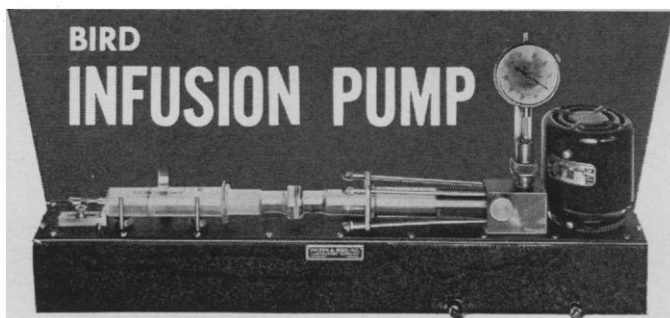
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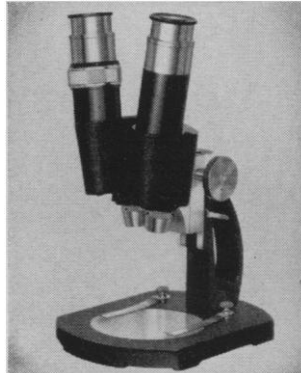
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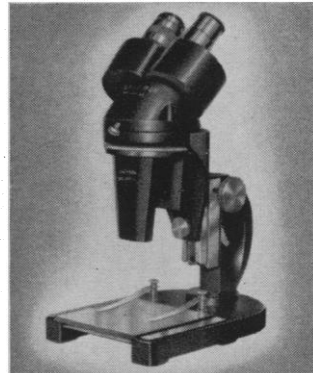
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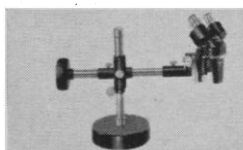
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for 29 December. The award of the William Procter prize and the annual RESA address will follow the luncheon, to be held jointly with the Society of the Sigma Xi.

The annual meeting of *Sigma Delta Epsilon*, graduate women's scientific fraternity (Dorothy Quiggle, Pennsylvania State University) will include a luncheon (27 Dec.), for all women in science and the grand chapter dinner and meeting (28 Dec.). A headquarters room will be maintained throughout the meeting period (26–29 Dec.).

The 63rd annual convention of the *Society of the Sigma Xi* (Thomas T. Holme, Society of the Sigma Xi, New Haven) will be held on 29 December, after the joint luncheon with RESA. In the evening the Society will join with the *United Chapters of Phi Beta Kappa* (Carl Billman, Phi Beta Kappa, Washington, D.C.) in sponsoring an address by a prominent scientist. Since the inauguration of the series in 1922, these distinguished lectures, of interest to all participants, have been a special feature of the Association meeting.

Call for Papers by Sections

Nine sections of the Association will arrange sessions for contributed papers at the Philadelphia meeting. The secretaries or program chairmen to whom titles and abstracts should be sent, *not later than 30 September*, are as follows:

C—CHEMISTRY. James R. White, Socony Mobil Oil Company, Box 1025, Princeton, N.J.

D—ASTRONOMY. Frank Bradshaw Wood, Flower and Cook Observatory, University of Pennsylvania, Philadelphia 4.

E—GEOLOGY AND GEOGRAPHY. Richard H. Mahard, Department of Geology and Geography, Denison University, Granville, Ohio.

G—BOTANICAL SCIENCES. Harriet B. Creighton, Department of Botany and Bacteriology, Wellesley College, Wellesley 81, Mass.

H—ANTHROPOLOGY. Eleanor Leacock, Bank Street College of Education, 69 Bank Street, New York 14, N.Y.

K—SOCIAL AND ECONOMIC SCIENCES. Donald P. Ray, National Institute of Social and Behavioral Science, 863 Benjamin Franklin Station, Washington 4, D.C.

NP—PHARMACY. John E. Christian, School of Pharmacy, Purdue University, Lafayette, Ind.

Q—EDUCATION. Herbert A. Smith, Bailey

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Although the general deadline is 30 September, most sections, and subsequently the AAAS office, would be happy to receive titles in advance of that date.

Meetings

Forthcoming Events

June

25-27. American Soc. of Heating, Refrigerating and Air-Conditioning Engineers, Inc., annual, Miami Beach, Fla. (ASHRAE, United Engineering Center, 345 E. 47 St., New York 17)

25-27. National Convention on Military Electronics, annual, Washington, D.C. (J. J. Slattery, Electronics Div., Martin Co., Baltimore, Md.)

25-28. Society for Investigative Dermatology, Chicago, Ill. (H. Beerman, SID, 255 S. 17 St., Philadelphia 3, Pa.)

25-29. Coordination Chemistry, intern. conf., Stockholm, Sweden. (L. G. Sillen, Dept. of Inorganic Chemistry, Royal Inst. of Technology, Stockholm 70)

25-29. Gordon Research Conf. on Nuclear Chemistry, New London, N.H. (W. G. Parks, Univ. of Rhode Island, Kingston)

25-29. Nobel Physicists, Lindau im Bodensee, Germany. (Ständiger Arbeitsausschuss für die Tagungen der Nobelpreisträger in Lindau, Postfach 11, Lindau im Bodensee)

25-29. Theoretical Interpretation of Upper Atmosphere Emissions, intern. symp., Paris, France. (J. W. Chamberlain, Yerkes Observatory, Williams Bay, Wis.)

25-30. Alpine Tundra Ecology, seminar, Estes Park, Colo. (M. Potts, Rocky Mountain Natl. Park, P.O. Box 1080, Estes Park)

25-30. Electromagnetic Theory and Antennas, symp., Copenhagen, Denmark. (Symp. Secretary, Øster Voldgade 10G, Copenhagen K.)

25-20 July. National Science Foundation, Summer Conf. for College Teachers of the History of Mathematics, Ann Arbor, Mich. (P. S. Jones, Dept. of Mathematics, Univ. of Michigan, Ann Arbor)

26-28. American Assoc. of Physics Teachers, Northfield, Minn. (R. P. Winch, Williams College, Williamstown, Mass.)

26-28. American Meteorological Soc., general meeting, Fairbanks, Alaska. (J. E. Miller, Dept. of Meteorology and Oceanography, New York Univ., University Heights, New York 53)

26-29. American Home Economics Assoc., Miami Beach, Fla. (D. S. Miller, 3705 Van Buren Ave., Corvallis, Ore.)

26-29. Poultry Science Assoc., Urbana, Ill. (C. B. Ryan, Texas A & M College, College Station)

(See 18 May issue for comprehensive list)

25 MAY 1962

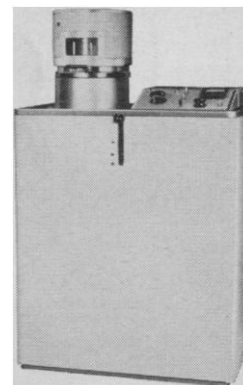
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