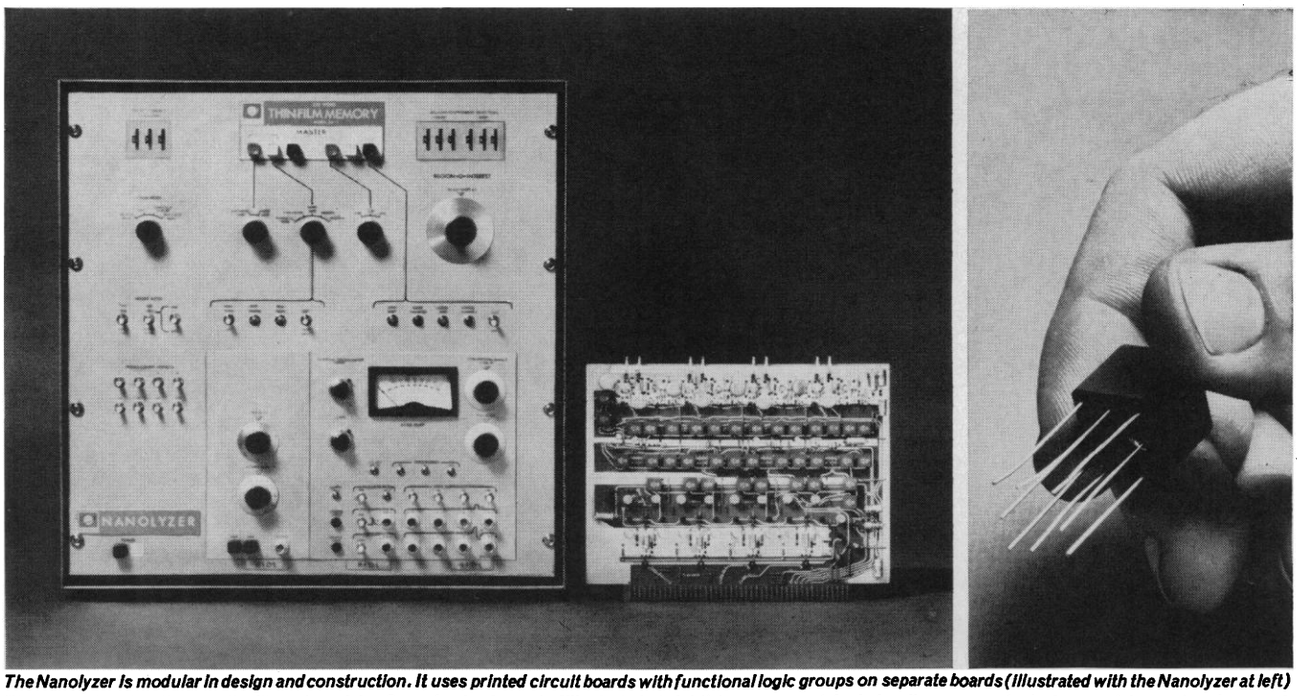
SCIENCE

17 July 1964

Vol. 145, No. 3629

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

ICEBERG CANYON



The Nanolyzer is modular in design and construction. It uses printed circuit boards with functional logic groups on separate boards (illustrated with the Nanolyzer at left) The computer circuits use all-silicon transistor Snap-Logic elements (illustrated at right) to assure matched circuit components during servicing and replacement.

THE NEW RIDL NANOLYZER* OPENS TOTALLY NEW AREAS OF INVESTIGATION

The new RIDL Nanolyzer* is an important advance in multi-channel pulse height analyzer design. It has removed the instrumentation limits, imposed by presently available analyzers, on new areas of investigation in high energy physics, fast radio-chemistry and like applications.

The principal advantage of the Nanolyzer is its ability to collect and handle more data per unit time with an unprecedented degree of accuracy. It accepts, analyzes, stores and displays data seven to fifty times faster than conventional analyzers. Central to this ability is the utilization of a 100 megacycle ADC providing a 10 nanosecond / channel address rate, Snap-Logic silicon elements and a thin-film memory plane.

In addition to the obvious advantage of high speed data acquisition for applications where high counting rates or very short counting times are encountered, the Nanolyzer effects important economies of time and cost in less demanding uses. Its data handling speed permits more efficient use of accelerator facilities, and results in more accurate data.

Important and unique features of the Nanolyzer follow:

THIN-FILM MEMORY: Memory cycle time of 0.6 μsec. does not contribute to system dead time because of parallel data transfer from ADC. Capacity 10^6 counts for each of the 256 channels.

ANALOG TO DIGITAL CONVERTER: 100 megacycle crystal controlled, synchronized ramp start/stop, zero crossover timed amplitude analysis, differential linearity of 2%, dynamic range 376 channels with digitally selected zero suppression of up to 120 channels without pulse distortion.

INPUT CIRCUITS: Double delay-line shaped pulses for rapid system recovery. Selective analysis only of pulses satisfying following criteria: delayed coincidence/anti-coincidence gate timed thru internal ANTI-WALK® Discriminator, unique pile-up rejection circuit, and upper/lower discriminators. Built-in four-channel mixer for one, two or four data inputs into one, two or four sub-groups without external logic.

OPERATING MODES: Six electronically interlocked push switches control all input/output functions. Add or subtract from PHA storage. Remote operating capability. Automatic preset live-time or clock-time, or preset count operation in any selected channel. Entire memory or any selected part useable during data storage or display. Region-O-Interest* control for selective readout of entire memory, halves, quadrants or between digitally selected upper and lower channel limits. Readouts through magnetic tape, parallel printers, punch tape, IBM typewriter and live external display.

CONSTRUCTION: Modular construction, plug-in printed circuit boards, all-silicon transistor Snap-Logic* elements. Solid state throughout, functional and simple to use controls.

Would you like to know more about this remarkable Nanolyzer? We will be happy to send you more information and complete specifications. After critical evaluation, we believe that you will agree that the development of the Nanolyzer is one of the most significant advancements in multi-channel analyzer technology in recent years. Please write for literature. NUC:R-4-229

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RIDL

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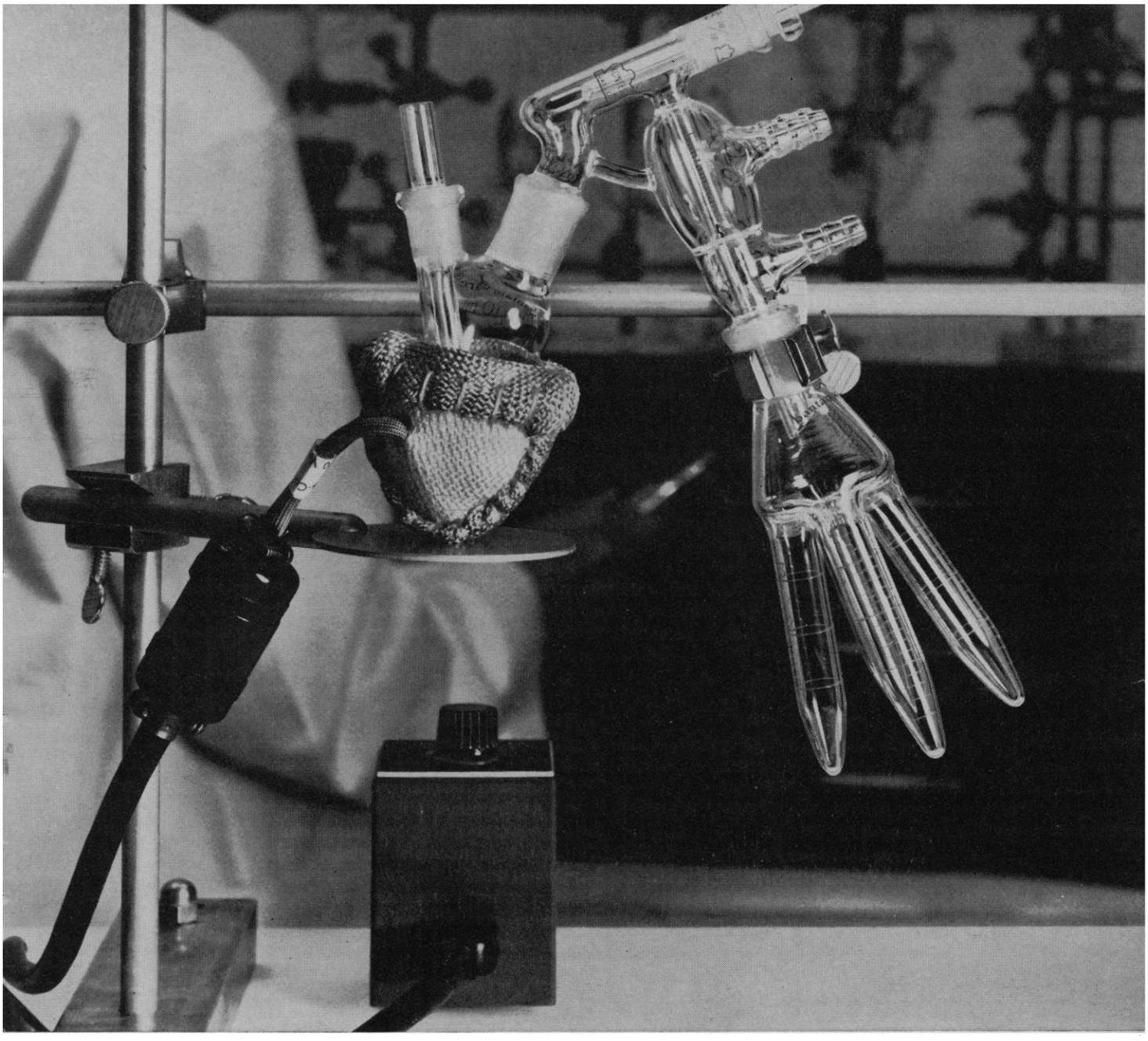

The Case of the Meandering ML's

In the vicinity of many research laboratories, small organic solutions are being mysteriously lost, daily. They are placed in small flasks, heated, and then . . . they vanish. Chemists patiently wait for their meandering ml's to show up. Sometimes a few straggle into fraction cutters, but most of them escape. The M.O. is always the same. Our job . . . find them.

Acting on a tip from Dr. Raymond Firestone at Merck & Co., Rahway, we went to work on our new K-28480 Bantam-ware Short Path Fractionator. Make the column about an inch long and let the thermometer bulb and stem serve as a packing, he said. Construct the condenser and vacuum connection in two inches, total length. Use only one joint on the fraction cutter but design it so that pipettes can be inserted to the bottom of any of the four receivers. Then, tilt the whole assembly so that drops fall from the drip tip ₹ 14/20 joint into one of the four receivers without unnecessary wetting. But nothing is vertically aligned, we pleaded. I know, he said. In desperation, we tried it.

We're happy to report that most of the meandering ml's now show up as product. The case is closed. Sequel: K-28480 has been added to the line because it fits in with the whole Bantam-ware concept. Very compact, low hold-up . . . functional.

Incidentally, that little rectangular box in the photo is our new Un-A-Watt voltage controller. It occupies 1/15th the space and weighs only 1/10th as much as a conventional coil transformer. It is custom made for Bantam-ware heating mantles with 0-60 Volt range, sparkless operation, removable support rod and high sensitivity. It fits in with the Bantam-ware concept also.

Bantam-ware Kits and hundreds of individual pieces are described in Catalog BW-2. Write for it today.

KONTES
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Vineland, New Jersey

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17 July 1964
Vol. 145, No. 3629

SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

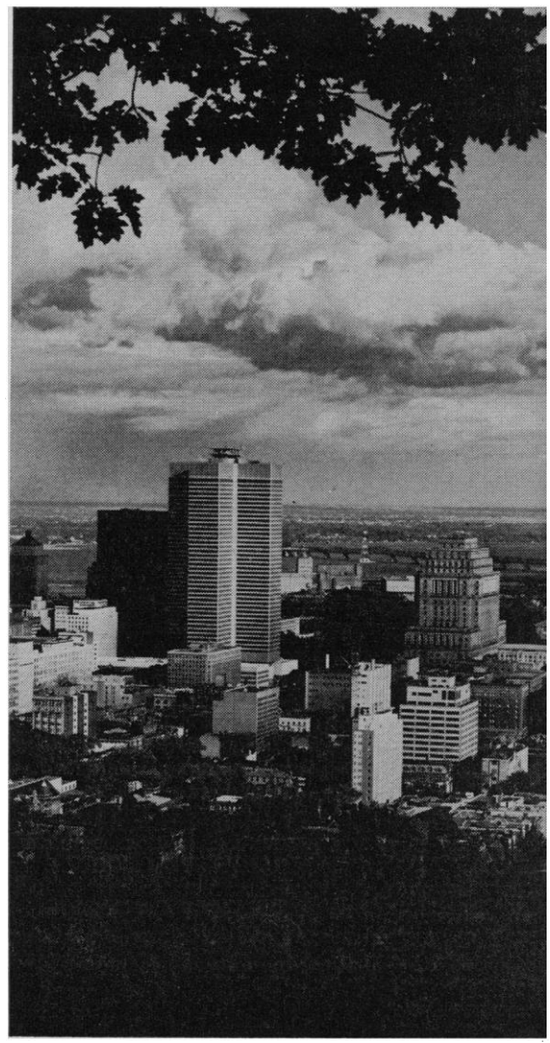
COVER

Aerial view of Iceberg Canyon, at eastern end of Lake Mead on the Arizona-Nevada state line. This aquatic expanse among the nearly barren, volcanic hills of this section of the Mohave Desert typifies the diversity of habitats available to the vertebrates of Arizona (see review of *The Vertebrates of Arizona*, page 258). [E. Tad Nichols]

MONTREAL • 131st AAAS

Order Your General Program

It provides complete, detailed information about all the sessions and symposia scheduled, the Annual Exposition of Science and Industry, and the Science Theatre.



Program Highlights

Moving Frontiers of Science V. C. Wynne Edwards on self-regulating systems in animal populations; J. M. Harrison on nonrenewable world resources; Philip Morrison on a topic on the border between nuclear physics and astronomy; and Clement L. Markert on role of genes in embryonic development.

Interdisciplinary Symposia Possible meteoric or lunar influences on meteorological phenomena; basic concepts of biochemical differentiation; medical geology and geography; history of the popularization of science.

Special Sessions AAAS Presidential Address by Alan T. Waterman; the AAAS Distinguished Lecture by Richard H. S. Crossman; the Joint Address of Sigma Xi and Phi Beta Kappa by René Dubos; the George Sarton Memorial Address by Lloyd G. Stevenson; and the National Geographic Society Illustrated Lecture.

International Conference on Primate Behavior Three AAAS sections and the combined ESA and ASZ Section on Animal Behavior and Sociobiology are sponsors. Five sessions, open to the public, will include 37 speakers from four continents.

AAAS Committees Sessions of the AAAS Committee on Meetings, including two sessions on the sociology of science arranged and chaired by Robert K. Merton; the Committee on Science in the Promotion of Human Welfare; the Commission on Science Education.

Sections and Societies The 20 AAAS Sections and some 70 participating societies are scheduling specialized symposia, and some have sessions for contributed papers.

AAAS Science Theatre The latest foreign and domestic films.

Exposition The Annual Exposition of Science and Industry is adjacent to all session rooms on the convention floor of the Queen Elizabeth Hotel.

Advance Registration By registering in advance, you avoid delay at the Registration Center on arrival, you receive the *General Program* in time to plan your days at the meeting, and your name is posted in the Visible Directory of Registrants when the meeting opens.

Use the coupon below for advance registration or to order your advance copy of the *General Program.*

AAAS
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1a ☐ Enclosed is $5.00 Advance Registration Fee. This brings me the **General Program** and a **Convention Badge.**

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2. FULL NAME (Dr., Miss, etc.) .....
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3. OFFICE ☐ OR HOME ☐ ADDRESS .....
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CITY ..... STATE/PROVINCE ..... ZIP CODE/ZONE .....

4. ACADEMIC, PROFESSIONAL, OR BUSINESS CONNECTION .....

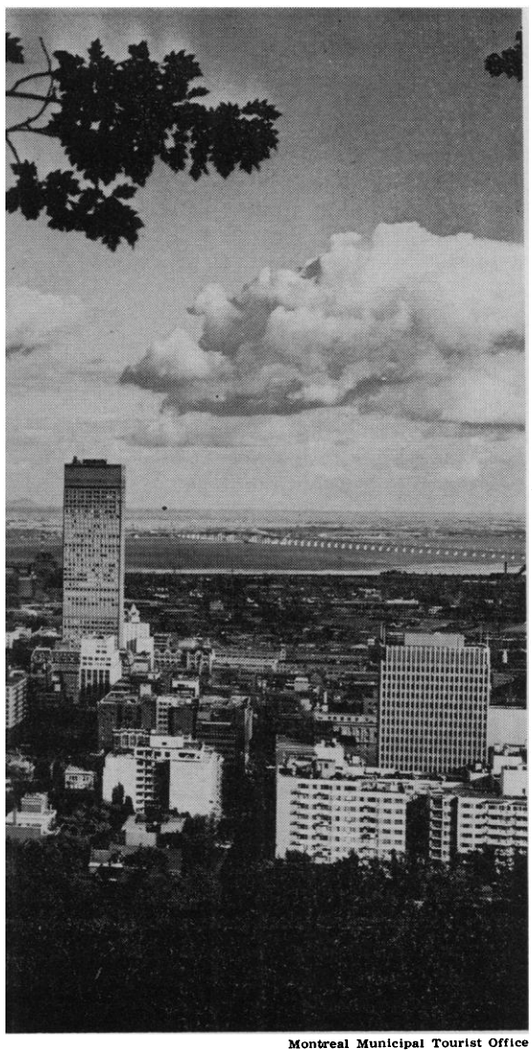
5. FIELD OF INTEREST .....

6. CONVENTION ADDRESS .....
(May be added later, after arrival)

Please mail this coupon and your check or money order for the total amount to the AAAS in Washington, D.C. (address as shown)

MEETING • 26-31 DECEMBER

Reserve Your Hotel Room



Montreal Municipal Tourist Office

Make sure you have the accommodations you prefer. A list of headquarters hotels of participating societies appears on page 299. The AAAS headquarters is the Queen Elizabeth.

The hotels for the AAAS Montreal meeting have established special, low rates and have reserved large blocks of rooms for the meeting.

Use the coupon below to make your hotel reservation in Montreal. **Send your application to the AAAS Housing Bureau in Montreal, not to any hotel.** Give a definite date and estimated hour of arrival, and also probable date of departure. The Housing Bureau will make the assignment and send you a confirmation promptly.

A rollaway bed can be added to any room at $3.00 per night. Mail your application now to secure your first choice of accommodations.

HOTEL RATES
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FOR THE ADVANCEMENT OF SCIENCE

For a list of the headquarters of each participating society and section, see page 299.

Hotel	Single	Double	Twin	Suite
Queen Elizabeth	$ 8.50, 10.00	$15.00	$15.00	$30.00–$50.00
Sheraton-Mt. Royal	8.50, 10.00	15.00	15.00	25.00– 45.00
Windsor	8.50	15.00	15.00	25.00– 45.00
Laurentien (Sheraton)	7.50	12.00	12.00	21.00– 30.00
Ritz Carlton	10.00	15.00	15.00	35.00
Berkeley	7.00	10.00	10.00	17.50
Queen's	6.50	10.00		17.00

AAAS Housing Bureau
2055 Peel St., Suite 525
Montreal 2, Que., Canada

Date of Application .....

Please reserve the following accommodations for the 130th Meeting of the AAAS in Montreal, 26-31 December 1964

First Choice Hotel ..... Second Choice Hotel ..... Third Choice Hotel .....

Type of room: Single ☐ Double ☐ Double, twin beds ☐ Suite ☐ Rates: Desired ..... Maximum .....

Number in party .....Sharing this room will be: .....

(List name and address of each person, including yourself. Attach list if space is insufficient.)

.....

.....

DATES: ARRIVAL ..... A.M. .....P.M..... DEPARTURE .....
(These must be indicated—add approximate hour, A.M. or P.M.)

NAME .....
(Individual requesting reservation) (Please print or type)

ADDRESS .....
(Street) (City) (State/Province) (ZIP Code)

Mail this coupon now to the Housing Bureau. Rooms will be assigned and confirmed in order of receipt of reservation.

A **Kodak** advertisement which recognizes that all are laymen, except in some small respect or other

Why no infrared opticist who is in touch with the situation asks "What?" any more but "Which?" when someone says, "IRTRAN"
In recent months it has become apparent that the five types of KODAK IRTRAN hot-pressed polycrystalline optical materials lead the field. This is perhaps attributable largely to the success of our program to eliminate absorption bands from the IR ranges which each is intended to transmit. At .080″ thickness, for instance, all we still have to cope with are the H_2O band at 2.7μ and one other at 5μ, both in IRTRAN 1 Material. Get the latest data from Eastman Kodak Company, Apparatus and Optical Division, Rochester, N. Y. 14650.

Why even those who think they understand the situation in the infrared beyond photography may not

Most IRTRAN material and most work of infrared opticists wind up in military hands. The security curtain is rather opaque. We are free to issue data within the U.S.A. on the physical nature of the materials. Beyond that we play dumb. Apart from IR technology for the analytical lab and chemical process control (where all is well), we do not envy those who must decide what may safely be disclosed.

Military considerations ultimately and inevitably have emotional content. Emotion suffuses the idea that someone who means you harm has technical devices for extending the senses that he and you both received at birth. You hope you know more about these means than he does and more about what to look for with these means. To feel this way goes along with the human condition. It sets one limit on the decisions of the declassifying boards.

The opposite limit is set by another realization which the members of these boards share with you. They too know that secrets stale quickly and that scientists in a position to freshen them up were born with a "need to know" but can produce no documents to prove it and often don't even want to. Intelligent military seek an optimum between these limits.

Two unclassified symposia on "Remote Sensing of Environment" and one classified one at the Institute of Science and Technology of the University of Michigan have given the military the thoughts of such diverse types as geologists, botanists, astronomers, conservationists, meteorologists, oceanographers, foresters, archaeologists, and half a dozen species of engineers. Everybody present knew that the already known applications will take care of themselves but wondered about the unknown ones that are in danger of dying unborn for want of cross-fertilization.

The final report of the symposia, identified as Document 4864-6-F, carries the following statement: "Qualified requesters may obtain copies of this document from: Defense Documentation Center, Cameron Station, Alexandria, Virginia." We have inquired how one qualifies as a requester and have been informed by the Defense Documentation Center that all reports it releases must be for use on a current Department of Defense contract or project.

For determination of cyanide, cyanate, and/or ammonia at high dilution
Reagents *3-Methyl-1-phenyl-2-pyrazolin-5-one* (EASTMAN 1397) and *3,3'-Dimethyl-1,1'-diphenyl-(4,4'-bi-2-pyrazoline)-5,5'-dione* (EASTMAN 6969) and an abstract of the procedures are obtainable from Distillation Products Industries, Rochester, N. Y. 14603. A catalog can also be supplied.

For those whose test tubes shake in other causes

Sales of these two are doing well. Their principal use is in a fine cause. Until 1951, when *Sewage and Ind. Wastes 23*, 1402 told how they can be deployed to detect as little as 0.1 p.p.m. of cyanide in industrial effluvia, counting dead fish had been more sensitive a method for CN^- than the available chemical tests. (An only slightly less sensitive test than fish-killing had been the killing of bacteria we depend on to decompose sewage.) In *Anal. Chem. 25*, 1188 the same authors also detailed the use of these reagents in ammonia determination.

Now (in *Anal. Chem. 36*, 865) along comes a lady in Prague who thoroughly scrutinizes what is going on in this ammonia determination. While we don't vote the same ticket she votes, and while she omits serving the reader by identifying "pyrazolone" as EASTMAN 1397 and "bispyrazolone" as EASTMAN 6969, and while her contribution to the ammonia-measuring technique seems limited to suggestions for diminishing interference by CN^-, CNS^-, Fe^{++}, Zn^{++}, Cu^{++}, and Ag^+, her paper reads like a model of how an analytical chemist should think. She demonstrates, incidentally, that contrary to the original hypothesis, pyrazolone is not the major actor in the procedure and that the test depends on formation of rubazoic acid. Now *that* is a biochemically interesting compound to track down on the back shelves of the library.

For less than $10*

With this outfit, which even includes our basic $1 treatise "Kodak Photosensitive Resists for Industry," one starts losing bystander status in the photographic fabrication techniques for useful artifacts, electronic or otherwise, of a linear scale ranging down to the microscopic. Light sensitivity is high enough for exposure by reflector floodlamps instead of arcs. We also pack in the pressure for spraying, the spray head, the developer, the thinner. The customer has to provide the etchant, the substrate, the pattern on plate or film, and the motivation.

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THE WORLD'S MOST VERSATILE & EASIEST-TO-USE AUTOMATIC MICRO-CAMERA...WORKS HAND-IN-GLOVE WITH THE MOST ADVANCED UNIVERSAL RESEARCH MICROSCOPE...

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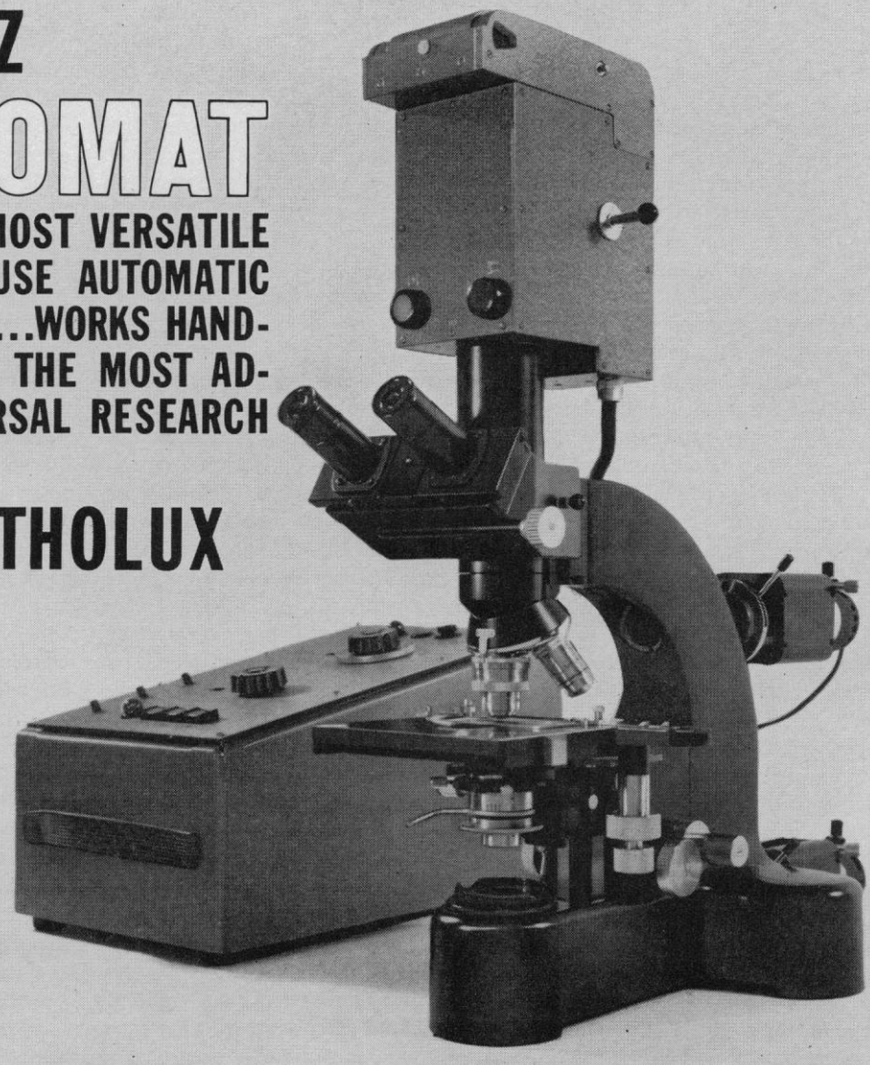

■ Touch a single button: computer-controlled, electromagnetic shutter sets itself automatically for exposures varying between 1/100 second and ½ hour or more.

■ Choice of two types of automatic light measurement and exposure: integrating or detail. You can set the ORTHOMAT to determine the correct exposure for the entire field or for any detail of the microscopic image (dark field, phase or fluorescence). Light measurement and exposure occur automatically.

■ Beam-splitter permits continuous viewing without interruption as you trigger automatic photomicrographs.

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New Leitz ORTHOMAT puts the most advanced photomicrographic techniques at your disposal with push-button simplicity. Its exclusive features are years ahead of any other micro-camera—even other "Automatics." And . . . ORTHOMAT works hand-in-glove with the incomparable Leitz ORTHOLUX Universal Research Microscope. Result: ORTHOMAT becomes an automatic camera microscope capable of solving the most difficult photomicrographic tasks at the touch of a button. The famous inter-designed ORTHOLUX systems of optics, illumination and mechanics include separate and combined incident and transmitted illumination, bright field, dark field, phase contrast, polarized light and fluorescence.

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SCIENCE

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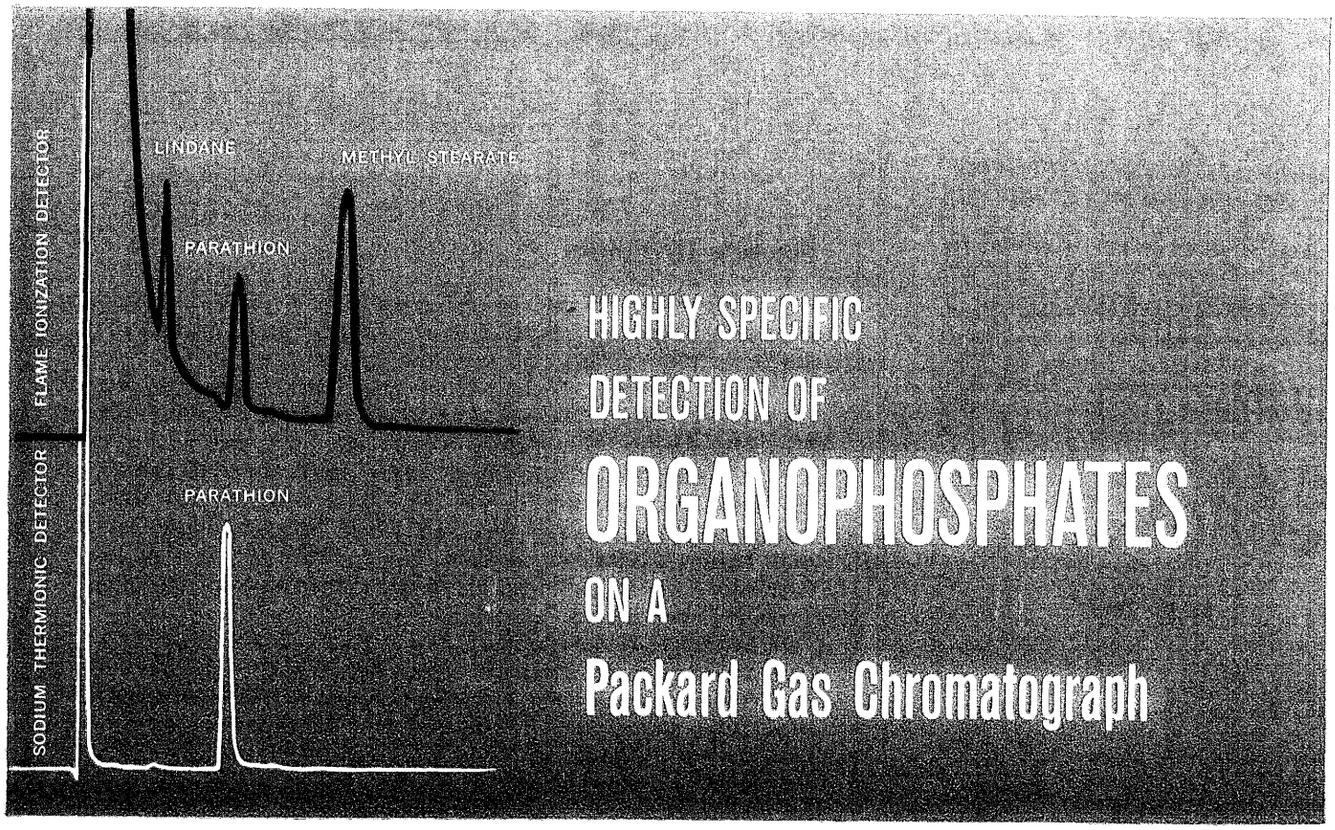
Foreign Programs for Universities

Political realities argue that we must plan to furnish technical assistance to other countries for some years into the future. If this be so, we will need a continuing supply of well-qualified people for a variety of overseas assignments. If people of high quality are to be available, a basic requirement is that foreign duty constitute a meaningful part of a professional career. This is a major point of *A.I.D. and the Universities*, John Gardner's recent report to the Administrator of the Agency for International Development.

Much of Gardner's advice is directed toward A.I.D., for there are many respects in which this government agency and its relations with universities could be improved. But much of the advice, and the part emphasized here, is aimed at universities, for it does not take a very long chain of reasoning to conclude that universities must have a key role in improving our technical assistance program.

In order for Professor X to be of maximum value to his host country, he must not only have technical proficiency and a reasonable knowledge of the country, he must stay long enough to become a living part of the situation he is attempting to help. Usually this is long enough to mean considerable loss of contact with graduate students and colleagues at home; too often it has meant being passed over in favor of someone on the campus when promotions and other favorable actions were under consideration. In short, going overseas on a technical assistance mission has often posed a choice between a trip of such short duration as to be of questionable value to the host country and one long enough to impose real personal penalties. The way to avoid this difficulty, Gardner says, is to root out "the attitude that overseas activities are something quite separate from the mainstream of the university's life and being. . . . If the university treasures its integrity then it has two choices: Get out of overseas activities entirely or recognize such activity as *an integral part of university life and work.*"

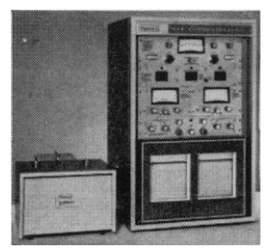
A university that takes the second alternative must concentrate, perhaps on one region or on one kind of technical assistance, and will develop special competence (faculty, library, research) in its area of concentration. It will arrange for a faculty member to take graduate students on overseas assignments, both because the foreign experience is a constructive part of their training and because in their later careers they too are likely to spend some time abroad. And it will make sure that foreign duty is as well recognized through honors and advancement as is duty on the home campus. All of this requires self-discipline and agreement, from the departments to the president's office, that selected, but only selected, kinds of foreign assistance constitute an integral part of that university's area of special competence. A university that adopts this position has a strong basis for insisting to A.I.D. that it is a university, not simply a convenient contracting and recruiting agency for short-term use, and that it must therefore have those contractual arrangements that will help it to contribute most effectively over the long run to achieving the objectives of the nation's foreign assistance program.—DAEL WOLFLE



HIGHLY SPECIFIC DETECTION OF ORGANOPHOSPHATES ON A Packard Gas Chromatograph

Phosphorous-containing compounds are one of the most recent groups to yield to a Packard Gas Chromatograph. The chromatogram which is shown above was made on a Packard Model 7611 dual system (dual column oven, dual detectors, dual electronics and dual recorders) and represents an important achievement in simultaneous determination of compounds of widely separated concentration.

A modified flame ionization detector with a sodium emission grid and termed a SODIUM THERMIONIC DETECTOR (STD) has been found to be nearly 1000 times more sensitive to phosphorous-containing pesticides than the standard flame ionization detector (FID). The sample was separated on a single column and passed through a 1:1 ratio stream splitter before simultaneous detection in the normally sensitive FID and the highly sensitive STD. In this manner, all the organic materials were detected in the FID (upper curve) while the trace amount of phosphorous compounds was readily detected in the STD unit (lower curve).



Packard Gas Chromatographs offer many significant advantages to research workers in the biochemical and biomedical disciplines. Fast, stable, highly sensitive determination, versatility and convenience of operation are some of the reasons why you should know more about these superb instruments. Your Packard Sales Engineer can provide complete details and performance criteria. Write for Bulletins and Specifications.

EXPERIMENTAL CONDITIONS*

1 μg lindane
1 μg parathion.
2 μg methyl stearate

COLUMN: 5 ft. x 4 mm all glass

LIQUID PHASE: 10% Dow Corning Silicone Fluid (DC200)

SUBSTRATE: 80-90 mesh Anacrom ABS (acid and base washed, and silanized)

CARRIER GAS FLOW RATES:
Nitrogen 60 cc/min
Hydrogen FID 40 cc/min; STD 60 cc/min
Air 300 cc/min

TEMPERATURES:
Inlet Heater 225°C
Column 205°C
Detectors 200°C
Outlet 200°C

DETECTORS: Standard Packard Hydrogen Flame Ionization (FID); Modified Packard Ionization Detector with sodium emission grid (STD).

ELECTROMETER RANGES:
FID 1 x 10^{-9} amperes full scale
STD 3 x 10^{-7} amperes full scale

DETECTOR VOLTAGE: 300 volts

NOISE LEVEL: 1 x 10^{-11} amperes full scale

CHART SPEED: 30 inches/hour

*L. Guiffrida, *J.A.O.A.C.*, **47**, No. 2, 293 (1964)

Packard

PACKARD INSTRUMENT COMPANY, INC.

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Cleveland, Ohio. (W. Chenoweth, American Inst. of Chemical Engineers, 345 E. 47 St., New York 17)

9–13. American Soc. of **Animal Science**, Knoxville, Tenn. (J. E. Oldfield, Dept. of Animal Science, Oregon State Univ., Corvallis)

9–14. South American Union of **Engineers'** Federations, 10th conv., Rio de Janeiro, Brazil. (Federacão Brasileira de Associacões de Engenheiros, Caixa Postal 1229, Rio de Janeiro)

10–14. **Structural Developments in Inorganic Chemistry**, New Hampton, N.H. (W. G. Parks, Dept. of Chemistry, Univ. of Rhode Island, Kingston)

10–15. Pan American Federation of **Engineering** Socs., 8th biennial conv., Caracas, Venezuela. (L. K. Wheelock, Engineers Joint Council, 345 E. 47 St., New York 10017)

11–14. American Soc. for **Pharmacology and Experimental Therapeutics**, San Francisco, Calif. (H. G. Mandel, George Washington Univ. Medical School, Washington, D.C. 20005)

12–14. **Ballistic Missile and Space Technology**, 9th symp., U.S. Naval Training Center, San Diego, Calif. (C. Morrow, Aerospace Corp., P.O. Box 95085, Los Angeles, Calif. 90045)

12–14. **Galaxies**, preliminary conf., Uppsala, Sweden. (T. Page, Van Vleck Observatory, Wesleyan Univ., Middletown, Conn. 06457)

12–14. **X-Ray Analysis** Applications, 13th annual conf., Denver, Colo. (W. G. Mueller, Metallurgy Div., Denver Research Inst., Denver 80210)

13–15. International Soc. for **Horticultural Science**, Edinburgh, Scotland. (G. de Bakker, Le v.d. Boschstraat 4, The Hague, Netherlands)

16–21. **Histochemistry and Cytochemistry**, intern. congr., Frankfurt am Main, Germany. (T. H. Schiebler, Anatomisches Institut der Universität, Koellikerstr. 6, 87 Würzburg, Germany)

16–23. Latin American **Schools of Medicine**, 4th conf., Pocos de Caldas, Brazil. (O. Versiani Caldeira, Univ. of Minas Gerais Medical School, Belo Horizonte, Minas Gerais, Brazil)

16–24. **Human Economy**, conf., Inst. of Paper Chemistry, Appleton, Wis. (A. N. McLeod, IPC, Appleton)

17–20. American Assoc. of **Clinical Chemists**, 16th natl., Boston, Mass. (F. F. Ronan, AACC, 19 Bay State Rd., Boston 15)

17–20. **Natural Ultra Low Frequency Electromagnetic Fields**, symp., Boulder, Colo. (W. H. Campbell, National Bureau of Standards, Boulder)

17–21. **Combustion**, 10th intern. symp., Cambridge, England. (Combustion Inst., 986 Union Trust Bldg., Pittsburgh 19, Pa.)

17–21. **Cryogenic Engineering**, conf., Philadelphia, Pa. (K. D. Timmerhaus, Engineering Research Center, Ketchum 129, Univ. of Colorado, Boulder)

17–21. **Simulation in Space Technology**, Blacksburg, Va. (F. J. Maher, Virginia Polytechnic Inst., Blacksburg)

17–22. International **Astronomical** Union, symp., Thessaloniki, Greece. (Maj. B. R. Agins, Air Force Office of Scientific Research, SRMA, Washington, D.C.)