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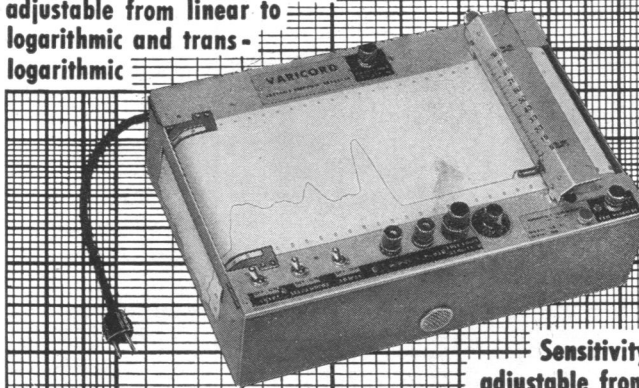
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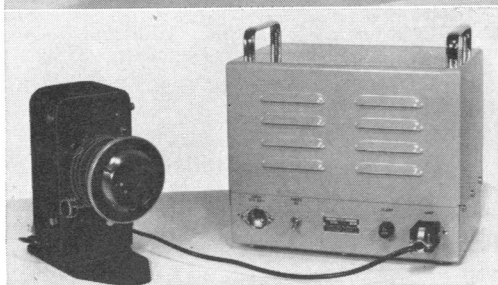
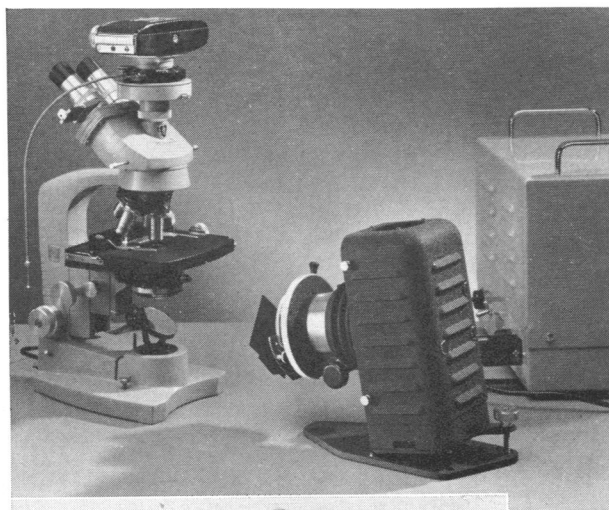
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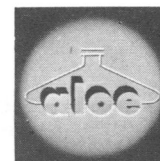
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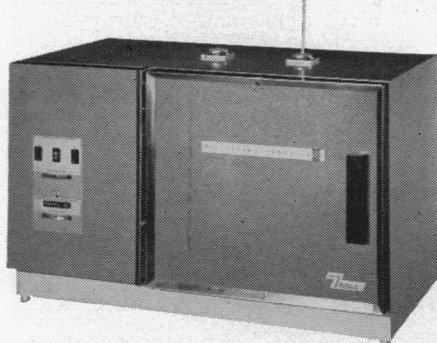


OUR 100TH YEAR

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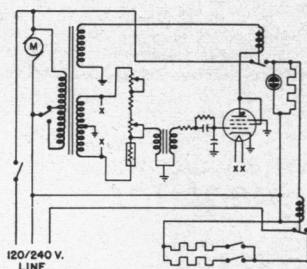
Total Re-Design for Freas Laboratory Ovens

Freas laboratory ovens have recently undergone a complete design change and now offer such innovations as an electronic control system, higher operating temperatures and advanced styling features which combine to provide greater operating dependability and convenience.



New Control Dependability

The most interesting feature of the new oven line is the electronic control system which utilizes a resistance thermostat acting through an electronic tube and sealed mercury relays. Moving parts—usually the cause of oven control failures in hydraulic thermostat systems—are completely eliminated. The simple circuitry of the new system is shown below.



Higher Operating Temperatures

Increased insulation, internal reinforcing and generally improved construction coupled with the electronic control now allow operating temperatures up to 325°C setting a new high in the laboratory oven field.

New Operating Convenience

The functionally grouped controls offer new ease of operation. The control dial is calibrated for direct temperature selection. The modern exteriors are easy to clean and maintain. Work load capacity and temperature uniformity in gravity convection models has been greatly increased by a unique airflow system. Whether your needs are for standard ovens, vacuum, incubators, sterilizers, low temperatures, high temperatures (1000°F.) or special purpose models, you will find them all fully described in Bulletin #302—contact your Distributor or PRECISION.

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New Products

The information reported here is obtained from manufacturers and from other sources considered to be reliable, and it reflects the claims of the manufacturer or other source. Neither Science nor the writer assumes responsibility for the accuracy of the information. A coupon for use in making inquiries concerning the items listed is included in the postcard insert.

■ **MICROTITRATOR** permits titration of quantities as small as a single drop; endpoint is detected electrometrically. The apparatus is equipped with microelectrodes for oxidation-reduction and for acidimetry-alkalimetry titrations. The apparatus requires a high-impedance, stable-zero pH meter. (Manostat Corp., Dept. 793)

■ **OHMMETER** measures resistance to 5000 megohms. The portable instrument has its own transistorized power supply for test potentials to 1000 v d-c. Mercury cells provide voltage stability. Accuracy of ± 3.0 percent is claimed for the upper half of the scale. The instrument cannot be damaged by short circuits. (Mideastern Electronics, Inc., Dept. 799)

■ **VACUUM GAGE** combines an ionization gage tube of the cold-cathode type, a magnet, and a power supply. Ion current is amplified and indicated on a panel meter. Full-scale pressure ranges are 10^{-3} to 10^{-7} mm-Hg. Calibration is linear from 10^{-4} to 10^{-8} mm-Hg. (Miller Laboratories, Dept. 807)

■ **LIQUID-LEVEL GAGE** employs a capacitive detector to measure continuously the level of liquids or granular solids. Height of the material produces a capacitance change that is measured by a self-balancing bridge with read-out in dial, counter, or other form. Accuracy of ± 0.1 in. over a 10-ft range is claimed. (Magnetic Instruments Co., Dept. 809)

■ **SHUTTER CALIBRATOR** is designed to check shutter operation of radar recording cameras. The period during which the shutter is open or closed can be read within ± 0.001 sec directly from film exposure. The calibrator provides a light spot rotating 5 times per second behind a transparent scale. Shutter open time is read from the scale readings at the ends of the trace made by the rotating spot. (Mast Development Co., Dept. 811)

■ **MICROSCOPE ACCESSORIES** include a trinocular block, a chronophotometer, and a microscope illuminator. The trinocular block, for attachment to standard research-type microscopes, makes possible simultaneous photomicrography, visual observation, and projection. The block contains either monocular or binocular eyepieces; plate or film cameras can be mounted on it. The projection lens can be used to carry the image to an acces-

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6" x 9", 175 pp., bibliographies, index, cloth, 1956. Price \$3.50.
AAAS Members' cash order price \$3.00.

Alcoholism—

Basic Aspects and Treatment

6" x 9", 220 pp., 33 illus., references, index, cloth, 1957.
Price \$5.75. AAAS Members' cash order price \$5.00.

AAAS Publications

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sory chronophotometer, sensitive to 10^{-6} lu, that provides push-button control of exposure from 0.7 to 60 sec. The illuminator is a xenon-atmosphere, tungsten-filament unit with either a two-lens aplanatic condenser or a five-lens achromatic condenser. (Canal Industrial Corp., Dept. 802)

■ **SIGNAL GENERATOR** produces long, calibrated pulses as well as sine, triangular, and square waves. Frequency range is 0.01 to 2000 cy/sec. Pulse lengths are 100 μ sec to 10 sec with accuracy ± 3 percent. Maximum pulse amplitude is 50 v at 40 ma. Frequency stability is ± 1 percent, amplitude stability ± 2 percent. (Kennedy Company, Dept. 812)

■ **DUAL-TRACE OSCILLOSCOPE** has twin vertical amplifiers that may be operated independently, differentially, or alternately on successive sweeps, or may be chopped at a 40-kcy/sec rate. Maximum sensitivity is 10 mv/cm. Fifteen calibrated sweeps range from 5 μ sec to 200 msec/cm. Frequency range is to 200 kcy/sec. (Hewlett-Packard Co., Dept. 813)

■ **ANALYTICAL BALANCE** features 1-sec measurement time in five automatic ranges from 30 to 3000 mg full scale. Weight of samples placed on the balance is given directly with no mechanical manipulation. Conventional difference methods may be used to extend the range to 200 g. An electrical mass offset allows the operator to zero the meter with a container on the balance, thus permitting weight of contents to be read directly. Accuracy of ± 0.2 percent is claimed. (E-H Research Laboratories, Dept. 814)

■ **OCTAVE BAND FILTER SET**, when attached to the manufacturer's sound-level meter, permits measurements to be made in eight octave bands ranging from 20 to 10,000 cy/sec. Noise in octave bands may be measured at levels more than 36 db below the over-all noise level. Weight of the combination filter and meter is approximately 19 lb. (Allison Laboratories, Dept. 815)

■ **TRANSIENT PROTECTOR** reduces high-voltage transients appearing at a nominal 28-v power line. Load currents up to 30 amp may be passed with a voltage drop of 1. The clipping level of the input spike voltage, which may be a maximum of 80 v, is 35 v. (Alto Scientific Co., Dept. 816)

■ **THERMAL SWITCH** is a miniature, non-repeating device which operates to close a circuit when specific temperature is reached. The device operates by fusion of a thin layer of material of high electrical resistance. Liquifaction of the insulating barrier permits a spring to close a pair of contacts. Latching action main-

RADIOACTIVITY AT WORK...#2

Our business is radioactivity—applying it, measuring it, protecting against it

This is the second in a series of reports devoted to NSEC's work with the exciting new tool, radioactivity. Its uses appear endless, not only in the nuclear industry, but also in the fields of chemicals, petroleum, pharmaceuticals, medicine, steel and coal. Applied radioactivity helps us examine product and process improvements, indicates ways to reduce costs, and probes for answers to complex research problems. With radioisotopes and radioactivity, we seek solutions by methods never before practical or economically feasible.

One of our project descriptions may apply directly to a problem you are facing, or point up a general application in your field. Take advantage of NSEC's specialized skills and equipment. See how safely and profitably the phenomena of radioactivity can be put to work for you.

ACTIVATION ANALYSIS

Where a high degree of quality control is desired, activation analysis offers a sensitivity far exceeding conventional quantitative analysis. Elements in quantities as minute as one part per billion can be identified and measured. Activation analysis is important in manufacturing, and in research projects requiring rigid standards of purity. It is especially useful in the processing of rare or expensive materials since, in most cases, only a fraction of a gram of material is required.

In activation analysis, exposure of the test sample to a stream of neutrons creates radioisotopes with distinct radiation characteristics. Even minute quantities of trace elements are made sufficiently radioactive that sensitive counting equipment can measure them. Activation analysis may be performed for as many trace elements as desired in a single small sample.

NSEC offers activation analysis as a commercial service. We can handle complete testing and analysis or can assist in establishing a standardized procedure for production line use. Ask Dr. Paul Kruger, Manager of our Chemistry Department, about this service.

RADIOTRACERS IN BIOMEDICAL RESEARCH

Radiotracing is proving extremely valuable in medical and pharmacological research. Radioactive tracers in infinitesimal amounts are used to follow the course of a substance through a living organism. With tracers, research scientists discover where the substance goes, how long it takes to get there, and what happens when it arrives.

Recently, NSEC completed a study determining the behavior of a radioactive enzyme for a drug manufacturer. Information was needed regarding the speed with which the product was absorbed and how it was distributed in the body. The experiments provided valuable data for the manufacturer. Extended animal tracer experiments are now

in progress and human studies are about to be undertaken.

Information about the method and radioisotope selected will soon appear in a scientific journal. For additional information on this and similar tracer studies, just write us. Our report on services for study of the reticulo-endothelial system is also available.

PROJECT SUNSHINE

When an atomic bomb test is made anywhere on earth, radioactivity is scattered into the air and carried about by wind currents. These "hot" atoms fall with precipitation and settle on animals, vegetation, soil, and water. This fallout contains the dangerous radioactive nuclide, strontium-90, and it is desirable to maintain constant knowledge of the amount.

To monitor this fission fallout, the Atomic Energy Commission set up "Project Sunshine." NSEC has been active in the program since 1955, analyzing samples received from all over the world. NSEC recently has been awarded two additional major contracts to measure fallout in Pittsburgh rainfall and in particulate material in the air.

Close to half the fallout measurements, and most of the particulate material analyses in this country are being conducted by NSEC.

NSEC is one of very few private firms with the necessary low-level counting equipment to perform such vital work. This, and similar apparatus designed and built by our staff, is used to conduct research that leads to a better life for us all. Would you like to discuss the ways it might assist you?

FISSION PRODUCT BEHAVIOR IN A REACTOR SLURRY

In a proposed nuclear power reactor, the fuel used is a slurry of uranium oxide and thorium oxide particles. NSEC made a preliminary study of the probable distribution of fission products within the reactor, to aid in the design of the fuel-decontamination processes. High pressure, high temperature studies were made in an autoclave using reactor-irradiated slurries, as well as synthetic mixtures of fission products.

NSEC has conducted hundreds of radiochemical analyses of experimental nuclear fuel elements, reactor coolant water and other reactor components. NSEC also assists in determining fuel burn-up efficiency, and the rate of gain for breeder reactors. We are taking part in the development of nuclear power plants for aircraft, and are advising many firms which are fabricating fuel elements for various reactors.

If your work involves nuclear reactors or components, call us at HOMESTEAD 2-4000 in Pittsburgh. We'll work with you from the preliminary environmental radioactivity survey through the disposal or use of the radioactive waste.

For more detailed information on our studies and services, just call or write. Proposals and quotations on your specific needs will be made without cost or obligation. And if you would like to keep informed of the latest developments in this constantly changing field, just write on your letterhead and ask us to put you on the mailing list for our monthly publication, "Radioactivity at Work."

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Nuclear Science and Engineering Corporation

DEPT. S-6, P. O. BOX 10901, PITTSBURGH 36, PENNSYLVANIA

tains a closed circuit regardless of subsequent temperature changes. Accuracy is ± 2 percent. Switching temperatures from 150° to 500°F are available. Resistance immediately below switching temperature is 100,000 ohm. Current capacity is more than 5 amp at 220 v. (Minitec, Dept. 804)

■ **POWER SUPPLY** furnishes 10 amp at 24 to 32 v. Regulation is ± 0.1 percent for line changes and ± 0.4 v for load changes. Output impedance is 0.05 ohm; ripple is 2 mv r.m.s. (Perkin Engineering Corp., Dept. 819)

■ **COUNTER-SCANNER** records information from one to six electronic counters on a single digital recorder. The scanner operates from staircase voltages produced by the counters. Readings from the scanned counters are recorded sequentially on adding-machine tape, with an identifying digit for each data source. Preset decimal information manually selected by six decimal dials on the scanner may also be automatically recorded. The instrument synchronizes the count and display functions of the counters and the printing function of the recorder. (Dymec Inc., Dept. 833)

■ **CONTOUR PHOTOCELLS** are selenium photovoltaic cells that can be produced in curved, cylindrical, or other configuration, or in three-dimensional shapes with radius of curvature as little as 1 in. Cell sizes range from $\frac{1}{4}$ by $\frac{1}{4}$ to 10 by 10 in. (International Rectifier Corp., Dept. 820)

■ **DIAMOND KNIFE AND HOLDER ASSEMBLY** for ultra microtomy permits sectioning of hard material. The knife may be moved laterally, and the knife and holder may be removed and replaced in the microtome without reorientation, thus permitting a dulled portion to be replaced with a sharp portion without resharpener. (Ivan Sorvall, Inc., Dept. 829)

■ **MICROWAVE EQUIPMENT** available for frequencies up to 140 kMc/sec includes crystal multipliers, crystal mounts, E-H tuners, cavity wavemeters, standing-wave detectors, phase shifters, attenuators, elbows, twists, terminations, standard-gain horns, movable shorts, and magic T's. (De Mornay-Bonardi, Dept. 817)

■ **LINEAR ACCELERATOR** generates 6 Mv for medical therapy and research applications. Electron beams up to 500 w at energies from 2 to 7.5 Mev are produced. X-ray output is 200 r/min at 100 cm. Electron-beam diameter is less than 5 mm at the x-ray target. (High Voltage Engineering Corp., Dept. 818)

■ **SHAFT-ANGLE ENCODER** provides up to 1024 code positions per rotation. The device is a sealed unit designed to operate at temperatures from -65° to $+162^{\circ}\text{F}$ and at vibrations to 1 kcy/sec. Precious-metal-alloy brushes are used. (Datex Corporation, Dept. 822)

■ **ULTRAVIOLET MICROSCOPE** uses an ultraviolet image-converter tube, called the Ultrascopes, to permit visual focusing. The image converter unit, combining the Ultrascopes tube and a 35-mm camera, is available separately for use on existing monocular microscopes. A grating monochromator to serve as an ultraviolet source is offered as an accessory. (Bausch & Lomb Optical Co., Dept. 823)

■ **WATER MONITOR** for fission products provides warning of fuel-element leakage or rupture. The instrument uses ion-exchange resin columns to separate iodine fission products from the main coolant stream. Each iodine isotope is discriminated individually so that only those related to fuel-element leakage are detected. The instrument is available for pressures exceeding 2500 lb/in². Sensitivity is 11,000 count/min μC of I^{135} with a background of 125 count/min. (Tracerlab-Keleket, Dept. 831)

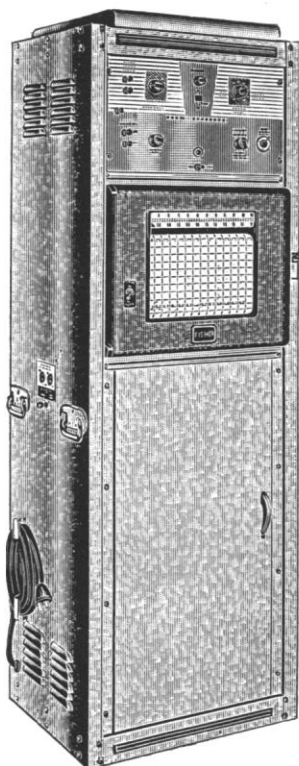
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■ **VIBRATING CONDENSER ELECTROMETER** detects currents as small as 10^{-15} amp and measures resistances to 10^{15} ohm. Input ranges are 10, 30, 100, 300 and 1000 mv. Accuracy varying from ± 0.3 percent on the 1000-mv range to ± 2 percent on the 10-mv range is claimed. Full-scale output is 1 ma d-c on all ranges. Zero is stable within ± 100 μ v over a 12-hr period. Input resistance is 10^{14} or 10^{16} ohm. (Herman H. Sticht Co., Dept. 824)

■ **ELECTROCARDIOGRAPH SYSTEM** is a three-channel instrument designed for experiments at high acceleration. The system is contained in two sections. The first is designed for stresses up to 200 g and consists of three single-channel pre-amplifiers. The second section, including amplifiers, power supply, and input chassis, is designed for standard rack-panel installation. (Epsco Corp., Dept. 826)

■ **DATA-PROCESSING DEVICE** combines a tape punch with a full-keyboard adding machine. The punch operates at 20 digits per second. Keyboard input may be electric or manual. The punch will produce 5-, 6-, 7- or 8-channel punched tape. (Victor Adding Machine Co., Dept. 832)

■ **RECORDING POLAROGRAPH** is said to be designed for maximum simplicity of operation in routine analysis. Facilities are included for application to every phase of conventional polarography. The recording potentiometer of 2.5-mv range may be applied to other uses. (E. H. Sargent and Co., Dept. 825)

■ **STOPCOCK** with Teflon plug and borosilicate-glass barrel is said to require no lubrication because it has a permanently fused inner-surface treatment of the barrel. Large taper angle prevents binding and freezing, and the plug tension is adjustable. (Scientific Glass Apparatus Co., Dept. 827)

■ **DIGITAL RECORDING DEVICE** for 35-mm motion picture cameras provides a 96-bit matrix image on each frame of film for correlating coded data with pictorial records in real time. The recorder, developed by Magnavox Research Laboratories, uses two 48-lamp assemblies to form a 96-lamp array. A prism arrangement projects the matrix image onto the film. Each lamp image measures 10 mils on a side and is separated by 10-mil spacing from adjacent lamp images. Lamps operate on 1 v. Cameras can be operated at speeds up to 80 frames per second; at this rate 7680 bits of coded information are recorded each second. (Traid Corporation, Dept. 834)

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National Bureau of Standards,
Washington, D.C.

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Advertising Manager, 13 years' experience scientific and optical instruments (work has won awards), desires post with growing company or technical group with publication. Résumé available. Box 109, SCIENCE. 5/29

Biologist, Ph.D., wants position in junior college, teachers' college, or liberal arts college. Box 110, SCIENCE. X

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A leading pharmaceutical firm requires an administrative man for research division. Job includes line and staff functions. Experience in research, industrial relations, budget, supplies, and services helpful. Job reports to manager of research administration. Must have at least a B.S. degree in physical or biological sciences. Send complete résumé, including salary requirements to

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Vacancy on the island of Hawaii with the plague research program of Hawaii Department of Health. Requires 7 years of professional research experience in zoology, mammalogy, animal ecology, or entomology of which 2 years shall have involved planning and conducting research projects, and graduation from a college or university of recognized standing with a master's degree in zoology, mammalogy, entomology, or a related biological science; or any equivalent combination of experience and training. Salary, \$666 per month. Continuous recruitment until need is met. Write to Mrs. Loretta Fukuda, Recruiting and Examining Supervisor, Department of Civil Service, Territory of Hawaii, 825 Mililani Street, Honolulu 13, Hawaii, for additional information and application. X

Endocrine Technician, B.S. in chemistry. Experience in endocrine assays preferred. NIH grant. Apply Personnel Director, Albert Einstein Medical Center, York and Tabor Roads, Philadelphia 41, Pa. 5/15

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Send resume to:

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Biochemist, Ph.D. or M.D., for chief of the biochemistry division of the department of pathology at a large midwestern university and teaching hospital. Excellent opportunity for independent research. Salary over \$10,000 depending upon qualifications. Position available September-October, 1959. Curriculum vitae requested. Interview arranged. Box 97, SCIENCE. 5/15, 22

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Ph.D., minimum 2 years' experience in industrial fermentation research. Well-trained and versatile senior scientist. Position involves the culture of microorganisms, shaker-flask and stirred fermentor studies, isolation of biosynthetic products. Industrial pharmaceutical laboratory, New York State. Box 111, SCIENCE. X

(a) **Parasitologist**; research department, group of well-qualified internists; should be qualified to handle tests for both clinical research purposes; vicinity Chicago. (b) **Young Ph.D.** in one of biological sciences interested in research in pharmacology; excellent opportunity for one who prefers small research organization; typical fields in which individual might be asked to work are pharmacology of new anticholinesterases, immunological problems connected with treatment of allergies and action of certain drugs on the skin; East. (c) **Clinical Chemist**, Ph.D.; preferably with minimum 5 years' recent experience as chemistry supervisor in hospital; 12-man group expanding facilities; Pacific Coast. (d) **Director of Research and Development** qualified to assume responsibility of research program so that present projects may be completed most efficiently and the best choice be made on development of new products; large city, Midwest. S5-3 Medical Bureau, Burneice Larson, Director, 900 North Michigan Avenue, Chicago. X

PHARMACOLOGIST

Position now available in our laboratories for Ph.D.-level scientist with 3 to 5 years' recent experience in cardiovascular research. In confidence kindly send curriculum vitae to Personnel Director

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Research Associate or Graduate Student to assist university Russian language biomedical literature study, New York area. Part- or full-time. Box 90, SCIENCE. 4/24; 5/1, 8

Teaching Opportunities at the College of Agriculture, University of Baghdad, in animal husbandry, irrigation and drainage, forestry, soils, agricultural extension, entomology, field crops, physics, horticulture, food technology, agricultural machinery, and dairy.

Those who are interested and have high qualifications in the subjects listed may apply to Dr. A. K. Khudairi, Dean, College of Agriculture, University of Baghdad, Abu Ghraib, Republic of Iraq. 5/15

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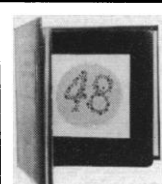
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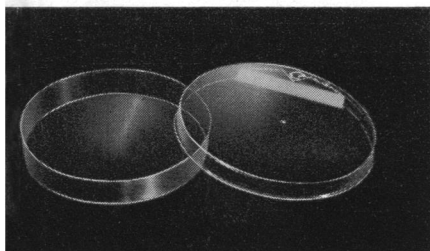
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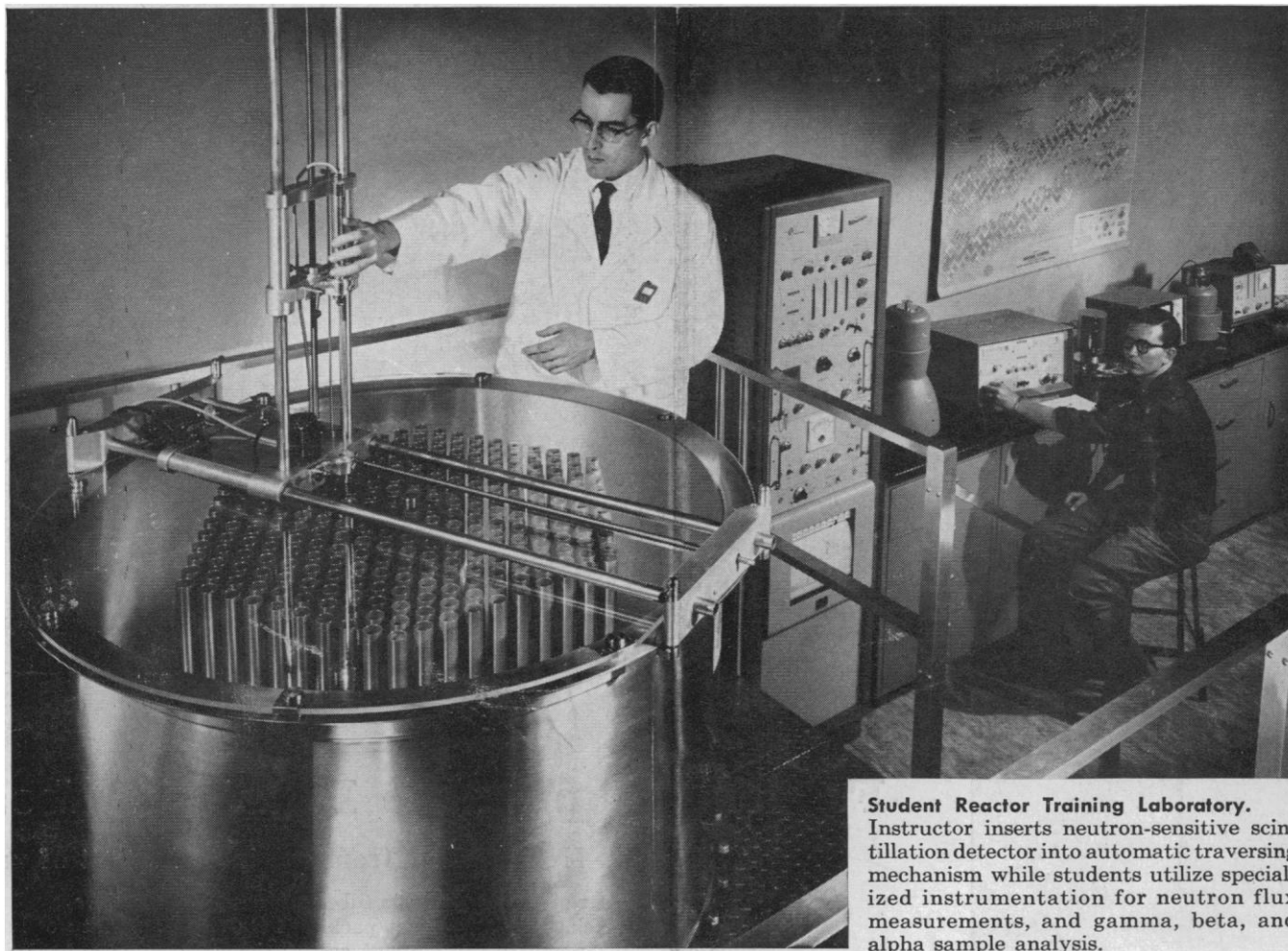
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