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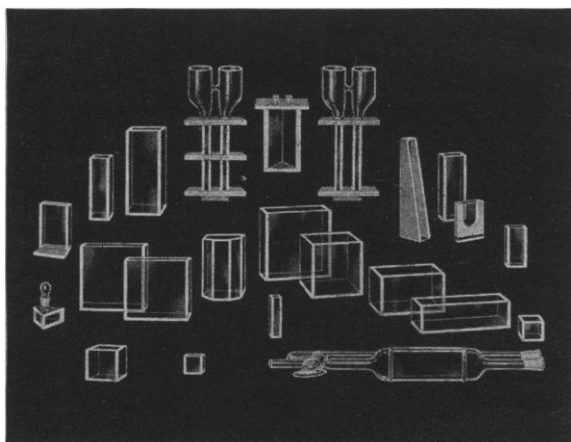
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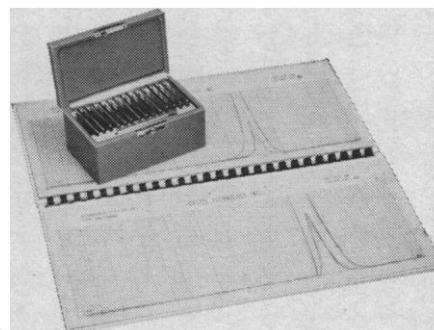
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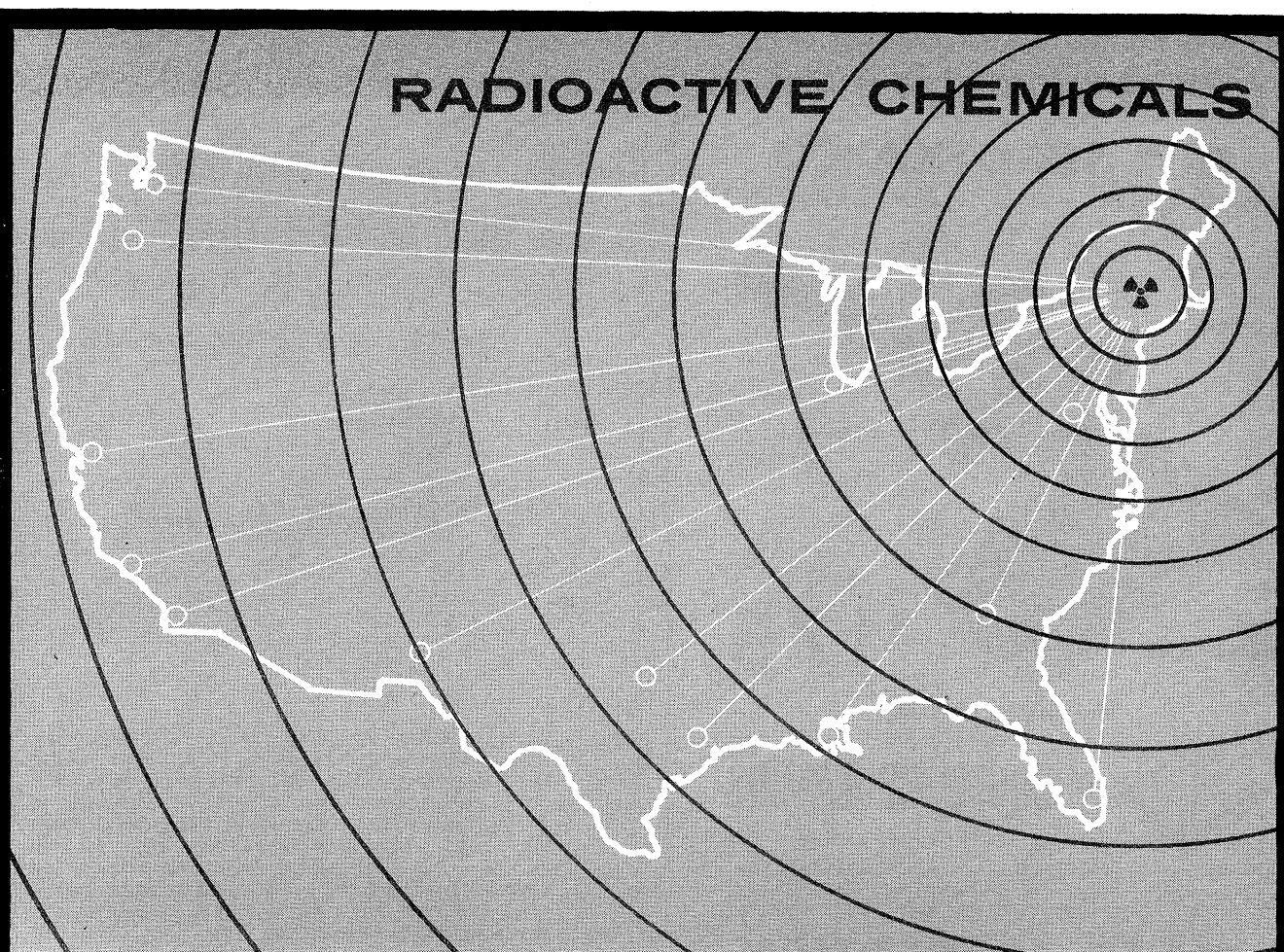
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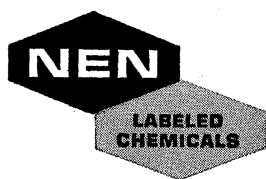
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Variable-speed optical chopper (model VSC) features wide speed range and excellent long-term frequency stability. This chopper is furnished in two packages. The control unit, in a one-piece aluminum cabinet with a recessed front panel, houses the power supply, the transistorized amplifier, and the frequency control. The second package is the chopper unit, containing the servo-motor, tachometer, and reference synchronous-rectifier output circuit. This unit can be mounted on a standard optical bench. It is designed so that the Telewave Infra-red Source, model IRS, with its heat sink may be mounted directly on the chopper unit. In operation, the chopping frequency is controlled by a velocity servo driving a multi-sector chopping disc. The servo loop has a two-phase servo-motor, a bridge-type error detector, a tachometer for the feedback signal, a potentiometer for setting the reference voltage, and a high-gain, transistorized amplifier. Besides interrupting the target radiation, the chopper blade passes between a light source and detector to produce a reference signal. This reference signal is synchronized with the target signal and is provided with a mechanical adjustment for varying its phase. The chopper frequency ranges from 1 cy to 5 kcy/sec, and higher frequencies can be obtained for special applications. The rotational speed of the servo-controlled chopper ranges from 1 to 40 rev/sec, with a maximum response time of 30 sec. The synchronous rectifier provides an output at all frequencies. The light

modulation is such that a nominally square wave is produced. The required power input is 115 volts, 60 cy, and 75 watts. Beam size depends upon the frequency range. For instance, a 0.1-inch beam is produced between 1 cy and 2.5 kcy. Larger beams are produced at lower chopping frequencies. Higher frequencies are available with smaller aperture sizes.—R.L.B. (Telewave Laboratories, Inc., Dept. S635, 43-20 34th St., Long Island City 1, N.Y.)

Fixed frequency synthesizer (model 301) accepts a standard frequency input and provides any specified frequency from 1 to 32 Mcy/sec in increments as small as 100 cy/sec. The frequency range can be extended to 480 Mcy/sec with accessory multipliers. Long-term stability and accuracy are said to be those of the reference standard. Harmonic content is 40 db below the fundamental and spurious content 70 to 90 db below the desired frequency. Standard input is 100 kcy/sec, 250 mv, into 50 ohms. Input frequency of 1 Mcy/sec can also be provided.—J.S. (Montronics, Inc., Dept. S625, P.O. Box 135, Bozeman, Mont.)

Data logger (model PDR) is a self-balancing potentiometer incorporating a pointer and a circular scale for analog data representation, or a three- or four-digit counter for digital display, and a tape printer for data logging. The logger will perform as a single-channel instrument, or, by coupling with an accessory automatic switching unit, it can be used as a low- to medium-speed scanner-logger. Each of up to 100 channels is sequentially switched into the measuring circuit and its value and channel number is printed. The scanning cycle is normally 5 sec per point. The indicated data is printed on 3-inch-wide paper tape, 250 ft long. Full-scale ranges as low as 1 mv can be provided.—J.S. (Westronics, Inc., Dept. S615, Post Office Box 11250, Fort Worth 10, Tex.)

Serum protein meter eliminates the need for sample holders, as the samples are placed directly on the prism. This instrument, a new model of an existing Bausch and Lomb instrument, determines serum protein by finding the index of refraction of the serum as compared to distilled water. Distilled water is placed on the prism and the instrument is zeroed. Then, after the prism is cleaned and dried, the 0.2-ml sample is placed on the prism and the protein analysis is read directly in protein grams per 100 mm. The instrument has a focusable eyepiece for reading the scale, built-in light source, and a lamp and prism assembly which are easily replaceable in the laboratory.—R.L.B. (Bausch and Lomb, Inc., Dept. S642, Rochester 2, N.Y.)

Current pulse generator (model 1400) produces 1-amp, 50-volt pulses in an eight-step pulse pattern program. Continuous, step-repeat, and step-pair-repeat modes of operation are provided. In the continuous mode, the program advances at a periodic rate. For step-repeat operation, eight switches select one or more steps to be repeated for periods from 2 μ sec to 2 msec. In the step-pair-repeat mode, the program output alternates between selected odd-even pairs. Program stepping frequency is adjustable between 1 kcy and 1 Mcy/sec, and the maximum number of repeated pulses is 2000. Output pulses can be adjusted in both width and delay from 10 nsec to 1 μ sec. Current amplitude can be adjusted from 50 ma to 1 amp with independently controlled rise and fall from 40 nsec to 3 μ sec. Voltage amplitude is 50 volts maximum and voltage stability is said to be ± 1 percent over an 8-hour period. Overall dimensions of the instrument are 24 by 24 by 71 inches.—J.S. (Computer Instrumentation Corp., Dept. S617, Route 38 and Longwood Ave., Cherry Hill, N.J.)

Electron microscope (model EM-75-C) features variable electron acceleration up to 75 kv and independent lens control that permits electron diffraction studies and electron imaging below 20 kv. Magnification is continuously adjustable and can be varied between 1200 and 12,000 diameters on the viewing screen. Resolving power is said to be better than 30 Å. The screen image measures 90 by 90 mm at all magnifications. The film cassette accommodates up to 36 indexed exposures on 35-mm film without changing camera,

The material in this section is prepared by the following contributing writers:

Robert L. Bowman (R.L.B.), Laboratory of Technical Development, National Heart Institute, Bethesda 14, Md. (medical electronics and biomedical laboratory equipment).

Joshua Stern (J.S.), Basic Instrumentation Section, National Bureau of Standards, Washington 25, D.C. (physics, computing, electronics, and nuclear equipment).

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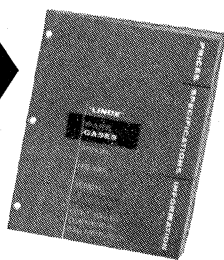
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or eight plates with metal viewing chamber and camera. The vacuum pump is air cooled. Pump-down time from cold start is 15 to 20 min; after changing filament or camera, 10 to 15 min; after changing specimen, 20 to 30 sec. The high-voltage generator is oil immersed. Condenser, objective, and projector lenses are electromagnetic. Variable magnification without image rotation is obtained by varying the pole-piece gap of the projector lens by means of an external control ring. A low-frequency beam wobbler assists in rapid determination of focus adjustment.—J.S. (Philips Electronic Instruments, Dept. S629, 750 S. Fulton Ave., Mount Vernon, N.Y.)

Differential temperature transducer (model 75) senses the temperature difference between two flowing liquids to 0.07°F. Output may be indicated directly on direct-reading galvanometer oscillographs, high-impedance amplifier-type recorders, millivolt potentiometers, or on direct-reading panel meters to be offered as optional equipment. Temperature difference is sensed by a 20-junction thermopile hermetically sealed, electrically isolated, and shielded against electromagnetic fields. Sensitivity of the device is 0.223 mv per degree Fahrenheit and time response for a step change in temperature is less than 0.5 sec. Though it is designed for high (up to 500°F) temperature, high (1500 lb/in.²) pressures, and very high (100 g's) accelerations, the device should find use in the biological field where low-sensitivity differential temperature measurement and control are necessary.—R.L.B. (Delta-T Co., Dept. S636, P.O. Box 473, Santa Clara, Calif.)

Infrared radiation pyrometer (model PY15) is a portable self-powered instrument designed to be hand-held by means of a pistol grip for measurement of temperature without physical contact. The operator sights through the optical system to scan a hot target, focusing by revolving a lens barrel. Incoming radiation passes through a beam splitter that directs the visible part to the operator and the rest to an infrared detector. The instrument is said to resolve a spot size of 0.30 inch per foot of viewing distance. Optics to resolve smaller spot sizes are available. Depression of a switch actuates meter indication of the temperature. Movement of the switch to a second position locks the reading so that the operator can remove the instrument from his eye to

note or record the reading. The switch automatically returns to the off position. The instrument is available in several models covering temperature ranges from 1250 to 7500°F. Focusing range is 18 inches to infinity. Accuracy for black-body radiation is said to be ± 2 percent of temperature and repeatability $\pm \frac{1}{2}$ percent of full scale. Response time is 2.0 sec.—J.S. (Pyrotel Corp., Dept. S622, 225 Valley Pl., Mamaroneck, N.Y.)

Thermistor temperature probe (model 32A135) is designed for the sensitive measurement and control of temperature in the vicinity of 0°C. The probe is 0.06 inch in maximum diameter and $\frac{1}{2}$ inch long and is provided with 0.008-inch dumet leads measuring 6 inches long. Resistance is 2000 ohms at 25°C and 5700 ohms (± 5 percent) at 0°C. Temperature coefficient at 25°C is -3.9 percent per degree centigrade. Dissipation constant at 25°C in still air is 0.6 mw per degree centigrade and the time constant is 6 sec.—J.S. (Victory Engineering Corp., Dept. S630, 130-39 Springfield Ave., Springfield, N.J.)

Instrumentation for pneumatic-elements research includes a hot-wire anemometer and a water table. The anemometer, of the constant-current type, covers the velocity range 1 to 500 ft/sec. The standard probe supplied is designed to fit tubing of $\frac{1}{4}$ inch outside diameter. Frequency response is down 3 db at 185 cy/sec at 10 ft/sec velocity and at 300 cy/sec and 160 ft/sec velocity, falling off approximately 20 db per decade above 300 cy/sec. Operating temperature range is 20° to 25°C. Non-standard probes can be supplied.

Use of the water table for studying flow phenomena in pneumatic systems is based on the analogy between a two-dimensional compressible gas flow and an open-channel potential liquid flow. The test section of the table is 17 ft. long and 5 ft wide. Water depth is controlled up to 5 inches by a weir calibrated in 0.001-inch increments. The test section has a smooth glass surface, flat within 0.003 inch, between smooth parallel walls. It is illuminated from beneath. Vibration isolators are used to damp out vibrations of 12 cy/sec or higher frequency. Pump capacity is 40 gal/min. The filters are stainless steel with an average pore size of 25 μ .—J.S. (Bowles Engineering Corporation, Dept. S626, 9347 Fraser St., Silver Spring, Md.)

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(a) **Ph.D. Medical Bacteriology** (virology, physiology, biochemistry); June graduate, strong laboratory experience; teaching, research, industrial interests. (b) **Ph.D. Zoology** (botany); physiology, protozoology, radiophysiology interests; prefers research, some teaching. (c) **Ph.D. Genetics** (zoology); developmental, biochemical, quantitative genetics; vertebrate morphology interests; prefers research, teaching. (Please write for information regarding these and other scientists, senior and junior, in all fields.) Science Division, The Medical Bureau, Inc., Burnside Larson, Chairman, 900 North Michigan Avenue, Chicago 11, Illinois.. X

Ph.D. Zoologist, research experience in animal behavior, bioacoustics, and taxonomy. Teaching experience: ecology, comparative anatomy, general zoology. Seeks research position with teaching. Box 66, **SCIENCE**. X

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Applications should be forwarded to Dr. A. C. Cuthbertson, Department of Chemistry, Box 133, Sackville, New Brunswick, Canada. 3/1, 8, 15

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An equal opportunity employer



Tecam® FLUIDIZED SAND BATH

for temperatures to 300°C

- Bath media is nonflammable and nonfuming
- Ideal for multiple neck flasks or those of irregular geometry

A multipurpose heater designed to replace oil baths and heating mantles in the temperature range to 300°C. Employs low pressure, low velocity compressed air to convert sand or similar refractory materials to a fluidized solid. The aerated sand assumes the properties of a nonvolatile, nonflammable, nonwetting insulated liquid permitting easy immersion and withdrawal of flasks and other vessels. Temperature regulation can be achieved by means of an autotransformer or simple proportional control of input to the heater coil. Built-in cut-off switch turns off heater when air pressure to bath is interrupted.

Advantages:

- Rapid heating and cooling
- Bath media do not splash
- Vessels are not wetted or coated by bath
- Bath media remain clean and do not decompose

Principle—Air diffused through the porous bottom of the bath produces a flotation effect upon the sand particles, reducing the relative density. The expanded bed behaves as a fluid; surface bubbles give the appearance of a boiling liquid. Heat is distributed through the bath by air passage and the displacement of sand particles. The fluidized bed exerts a buoyant effect upon immersed objects.

Size—Inside dimensions 7¼ inches diameter × 5¾ inches deep to heater coil. Depth is sufficient to immerse 1000 ml round bottom flasks to the neck, or 2000 ml flasks to over half flask diameter. Overall dimensions, approximately 11 inches high × 9½ inches diameter, exclusive of air valve and safety switch, which extend near base approximately 4 inches to the right and rear respectively.

Air Supply—Requires a filtered air input, free of oil and dust, of approximately 3 p.s.i. pressure, at a flow rate of 4 cu. ft. per minute. Compressor or impeller type sources are required. Diaphragm pumps do not ordinarily provide the required free air capacity.

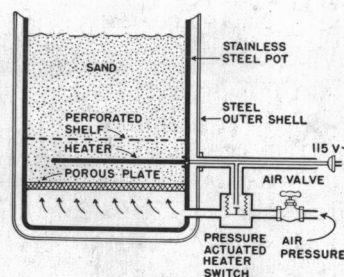
Bath Media—Clean, dry, free-flowing sand or material of similar density, screened to approximately 80 mesh, is required. Fines must be avoided. Approximately 10 lbs. required.

Wattage—Heater is rated at 750 watts at 115 volts, a.c.

Construction—Interior is stainless steel, with full diameter ceramic porous plate at bottom. Tubular immersion heater is steel jacketed. Outer shell is enameled steel.

Temperature Control—For controlling the temperature when operating the bath from 115-volt lines free of severe voltage fluctuation, an adjustable voltage transformer such as our 9708-G Type 116, 7.5-amp. Powerstat is suitable. A proportional wattage input controller can also be used; for optimum control, thermocouple-pyrometer controller is recommended.

8868. Sand Bath, Fluidized, Tecam®, as above described. With built-in heater, air pressure cut-off switch, air control valve, 10 lbs. of sand, but without air pump or temperature control device; 115 volts, a.c.; 750 watts.... **160.00**



Schematic cross-section of
Fluidized Sand Bath



ARTHUR H. THOMAS COMPANY

Scientific Apparatus and Reagents

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