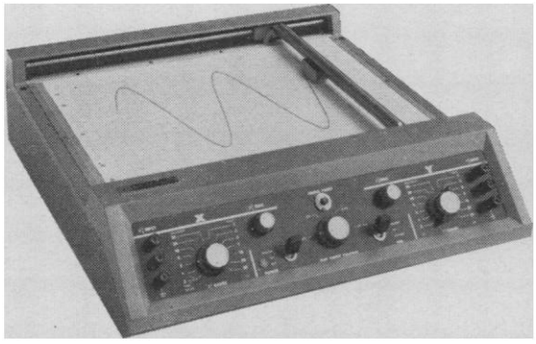

## HERE'S VARIAN'S NEW X-Y RECORDER

Recorders should be rugged and reliable. That's why Varian's solid-state X-Y recorders have all moving parts mounted on one sturdy casting. ■ And Varian's X-Y recorders are designed for convenience, too. Unique vacuum hold-down is maintenance-free and holds any size or shape of paper from 2″ x 2″ to 11″ x 17″, without masking. The control panel is arranged to avoid confusion. Pen is held magnetically for easy servicing. Charts can be precisely positioned with vacuum on.

**THE VARIAN X-Y RECORDER FEATURES:**

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- vernier adjustment between ranges
- full scale zero plus 100% suppression
- zener diode reference
- independent servo-operated axes
- bench-top or rack mounting

Varian makes two models of this superior X-Y recorder: The F-80 (shown above), with automatic-cycling time base — $2025; the F-81, without time base — $1875. ■ For further information or a demonstration, write RECORDER DIVISION.

**VARIAN ASSOCIATES**
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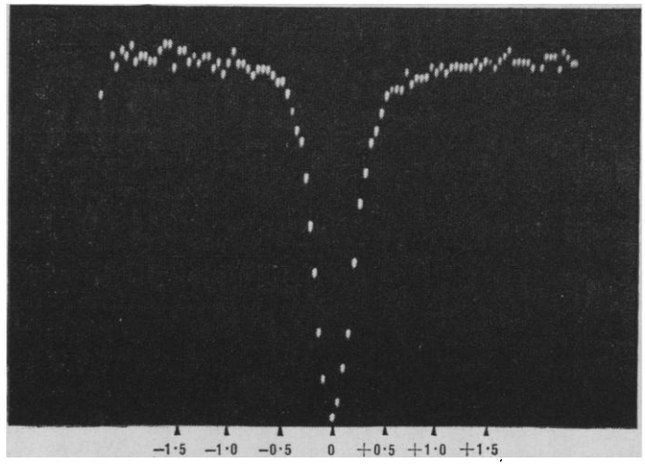
*In Europe contact Varian A. G., Zug, Switzerland*

# tested mössbauer sources

The Radiochemical Centre is now able to supply a range of reasonably priced **INDIVIDUALLY TESTED** cobalt-57 sources for Mössbauer studies.

Sources are electroplated and annealed, employing stainless steel backing foils for single line sources and natural iron backing foils for hyperfine magnetic splitting.

Write for our Technical Bulletin which describes the range of Mössbauer sources now available.




DOPPLER VELOCITY (mm. sec$^{-1}$)
Resonance absorption spectrum of cobalt-57 single line Mössbauer source.

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# New Products

**Laser power meter** (model 401), designed specifically for measurement of power of continuous-wave gas lasers, measures directly radiation of 6328-Å wavelength. Measurements can be performed at any other wavelength between 4000 and 12,000 Å by use of a spectral-response calibration curve with which the instrument is supplied. Amplitude modulation of the laser beam at frequencies between 10 and 50 kcy/sec can also be monitored. Calibration accuracy of the meter is said to be ± 2.5 percent of full-scale range at 6328 Å. Full-scale ranges are 1, 3, 10, 30, and 100 mw and are selected by a front-panel switch. Output is provided for a 100 mv potentiometer recorder with frequency flat to 20 kcy/sec at the recorder output. Lens aperture of the sensing cell is 25 mm in diameter and acceptance angle is ± 10 deg. The cell may be used in a mounting stand or mounted directly to the beam output aperture of the laser—J.S. (Spectra-Physics, 1255 Terra Bella Ave., Mountain View, Calif.)

**Circle 1 on Readers' Service card**

**Streak camera** (model SP-1), manufactured by Hitachi Ltd., Tokyo, is designed for recording the emission spectra of laser materials. Writing time of the camera is 165 $\mu$sec at a writing rate of 4 mm/$\mu$sec. Film loading may be performed in daylight with attached lightproof 100-ft 35-mm magazines with built-in cutoff. Synchronization of events is accomplished by using an output pulse from the rotating mirror and the high-speed rotating capping shutter. Both pulses are displayed on an electronic counter. The system is said to have been designed so that it can be operated by research technicians without photographic training. To prepare for an observation, the object is positioned in line with the optical system. Provision is made for alignment up to 350 deg off axis by turning the mirror pickup assembly. Alignment focusing is accomplished with a reflex viewer through the prime lens, and focusing for slit alignment is straight through the optical system at the film plane. The mirror drive is electrical, requiring 20 amp at 220 volts for the maximum writing speed.—J.S. (Ehrenreich Photo-Optical Industries of California, 701 Welch Rd., Palo Alto, Calif.)

**Circle 2 on Readers' Service card**

**High-vacuum baffles** designed specifically for use with liquid nitrogen as a refrigerant are available in 4-inch and 6-inch nominal sizes. The baffles consist of a flanged housing containing a chevron element and reservoir assembly that can be removed for cleaning without breaking vacuum line flange connections. The reservoir holds enough liquid nitrogen for an operating period of 11 hours. A vacuum jacket surrounds the reservoir to reduce refrigerant losses to a minimum. Flanges of the aluminum casing have standard 150-lb (68-kg) ASA series drillings. The flanges have raised gasket seating surface designed for use with O-rings in aluminum ring retainers. Automatic liquid nitrogen level sensors and fillers are available as accessories.—J.S. (Consolidated Vacuum Corp., 1775 Mt. Read Blvd., Rochester 3, N.Y.)

**Circle 3 on Readers' Service card**

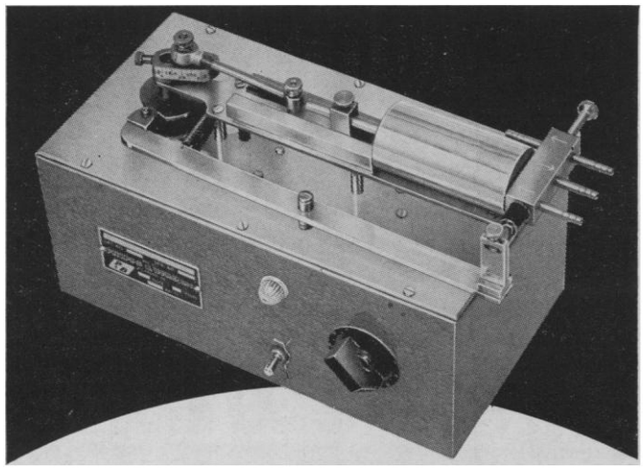
**Viscometer bath** (model TV-40) manufactured by P. M. Tamson, Netherlands, provides a working temperature range of 0 to 230°C. Temperature control precision is said to be ±0.005°C when water is used as the bath medium. With oils or silicone fluids as the medium, maximum variation is given as ±0.01°C. The control heater of quartz is cycled by the thermoregulator to maintain temperature control. The bulb of the contact thermometer in the thermoregulator is close to the heater so that it is rapidly heated by the hot coil. As a result, the control heater is on only 4 seconds each cycle. A stainless-steel jacketed booster heater permits the bath to be brought up to working temperature at the rate of 1°C/min with water and 2°C/min with oil. Power consumption with the booster heater is 2920 watts. A cooling coil with inlet and outlet connections to a refrigerant circulat-

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

Robert L. Bowman (R.L.B.), with the assistance of Denis J. Prager (D.J.P.), 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).

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Neither *Science* nor the writers assume responsibility for the accuracy of the information. A Readers' Service card for use in mailing inquiries concerning the items listed is included on pages 87 and 161. Circle the department number of the items in which you are interested on this card.



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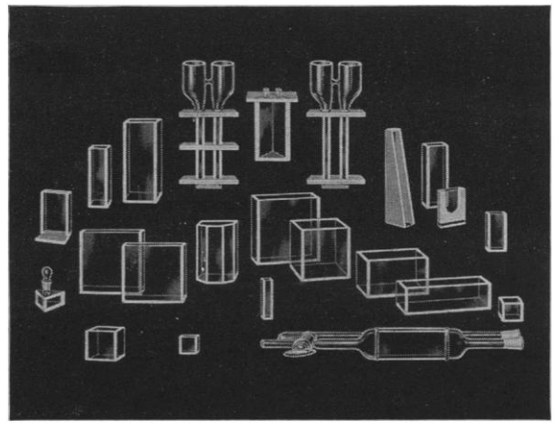

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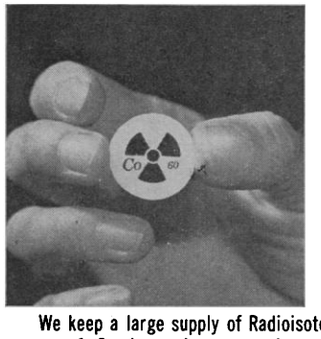


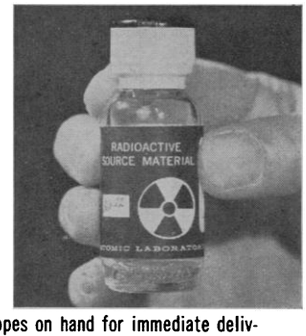


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ing system is also provided. All parts in contact with the bath liquid are made of stainless steel. The bath chamber has a stainless-steel cover with four covered openings, 2 inches (5 cm) in diameter, for suspending viscometer tubes.—J.S. (Fisher Scientific Co., Fisher Building, Pittsburgh 19, Pa.)

**Circle 4 on Readers' Service card**

**Thickness gage** is designed specifically for measuring the thickness of silicon and germanium slices and wafers. It allows measurement of thickness without actual contact with the brittle semiconductor slice, thus avoiding mechanical damage. The instrument operates on the air-flow principle. Linear displacement is converted into an amplified air-flow change which is read on a specially adapted flowmeter. During measurement, the semiconductor slice is suspended between two air jets. The air flow has the additional advantage of cleaning away grit or particles that might affect readings made in other ways. Accuracy of ±0.000025 inch is said to be easily achieved. Four models provide amplifications ranging from 100 to 1 through 10,000 to 1.—J.S. (Futurecraft Corp., 1705 N. Chico Ave., South El Monte, Calif.)

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**High-speed infrared detector system** (model IRD-4) is designed for plasma diagnostics, millimeter and submillimeter wavelength studies, and time-resolved infrared spectroscopy. The detector operates in the wavelength region from 100 $\mu$ to a few millimeters. The system consists of a high-sensitivity photodetector with a wave guide, a super-conductive magnet, and a helium cryostat in which the detector is immersed. This unit is contained within the stainless-steel cryostat, which is 36 inches (91 cm) high. Signals with risetimes of less than 1 $\mu$sec are said to be detectable. The output is available from a low-capacitance transmission line for connection to appropriate circuitry. With amplifiers of low input noise resistance, minimum detectable energy is said to be $10^{-21}$ watt-sec or better with 1 cy/sec bandwidth. A special constant-current power supply is available to charge the superconducting magnet and a helium liquid level detector is available for monitoring the operation of the system.—J.S. (Advanced Kinetics, Inc., 1231 Victoria St., Costa Mesa, Calif.)

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**Rotating drum camera** provides time-resolved photographic data of hypervelocity phenomena at writing speeds up to 0.19 mm/$\mu$sec. The record is made on a 3- by 12.4-inch fast-emulsion film strip fixed to the inner periphery of a rotating drum. The drum rotates at 600 rev/sec to provide the writing speed quoted for a total writing time of 1667 $\mu$sec. The camera requires adjustment only of focus and aperture ($f$/2.5 to $f$/16) for operation. Focus range is 14 inches to infinity. The instrument is air driven and requires 0.3 lb/sec of air at 70 lb/in.$^2$ pressure. The instrument measures 15 by 8 by 8 inches and weighs 25 lb.—J.S. (Avco Corp., 2 Industrial Ave., Lowell, Mass.)

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**Neutron-gamma shielding materials** utilize base materials of high hydrogen content, such as polyethylene, paraffin, hard rubber, or epoxy. Various additives such as lead, boron, cadmium, and tungsten may be added in appreciable quantities. Base materials and additives are of high purity to minimize activation of the shielding materials. The additives are uniformly distributed throughout the base material. A variety of formulations and shapes can be tailored to meet specific shielding requirements. Typical formulations are: polyethylene—3-percent boron; rubber—50-percent lead—1-percent boron; and paraffin—25-percent lead.—J.S. (Reactor Experiments Inc., 140 Harbor Blvd., Belmont, Calif.)

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**Photoelectric autocollimator** is designed for the monitoring and control of angular position with accuracy said to be better than 1 sec. In operation, the autocollimator sends out a highly collimated beam of light directed against a porro prism or a flat mirror mounted on the object to be monitored. If the object is perfectly aligned, the reflected beam is exactly parallel to the incident beam and no error is indicated. If the object is rotated, however, the returning image moves through twice the angle of deviation and the instrument generates a corresponding error signal. The instrument uses a single light source and a single detector. It can be furnished to monitor rotation about either the vertical or the horizontal axis or to monitor both axes simultaneously. Simultaneous visual autocollimation is provided on a diverted line of sight and sufficient

focusing adjustment is provided to enable an observer to view positions and orientation of the monitored object. A calibrated optical micrometer drum permits initial alignment and also functions as an alternative null-measuring device.—J.S. (Barnes Engineering Co. Commerce Rd., Stamford, Conn.)

**Circle 9 on Readers' Service card**

**Image converter camera** (model ID) is a diagnostic instrument for the study of high-speed luminous events. The instrument provides both streaking and framing operation through the use of interchangeable plug-in units. Three frames per event are obtained at exposure times adjustable from 5 to 200 nsec, with independently adjustable framing intervals at rates from 5,000 to 20 million exposures per second. Streak writing rates range from 1000 to 0.25 mm/$\mu$-sec. Framing and streak operation can be alternated through the same optical setup. Light gain of 50 makes possible the study of low-intensity events at exposure times in the nanosecond range. The camera can be triggered either optically or electrically from the experiment. A fiber optic probe from the trigger delay generator can pick up luminosity from the event and trigger the instrument at a preselected energy level. In the converter, light is converted into an electron image. The image converter tube is turned on for the selected interval by a rectangular pulse to the gating grid. The framing exposure time is determined by the duration of this shutter pulse. The electron image is focused and then deflected into three positions for framing operation. For streak operation, ramp pulses applied to deflection electrodes sweep the image across the photoanode.—J.S. (Space Technology Laboratories, Inc., 139 Illinois St., El Segundo, Calif.)

**Circle 10 on Readers' Service card**

**Ultraviolet intensity meter** is designed for monitoring the exposure of phoresists. The meter can be used to maintain control of ultraviolet source intensity, focus, and alignment. The spectral range of the meter is 250 to 500 m$\mu$ with peak at 400 m$\mu$. Sensitivity is 200 $\mu$a/100 ft-ca. Diameter of the sensitive area can be adjusted between 1 and 0.2 inch. Other spectral ranges can be supplied.—J.S. (Gilway Co., Byfield, Mass.)

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# INDEX TO ADVERTISERS, 10 January 1964

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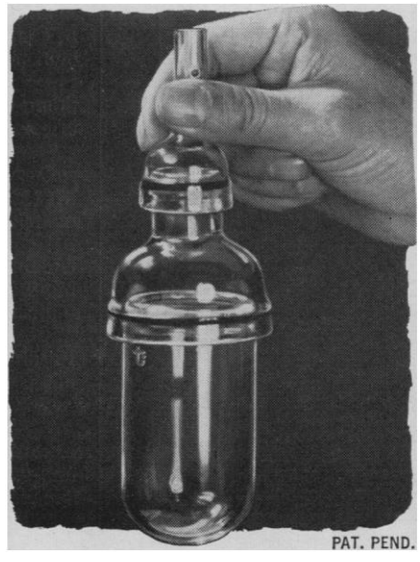

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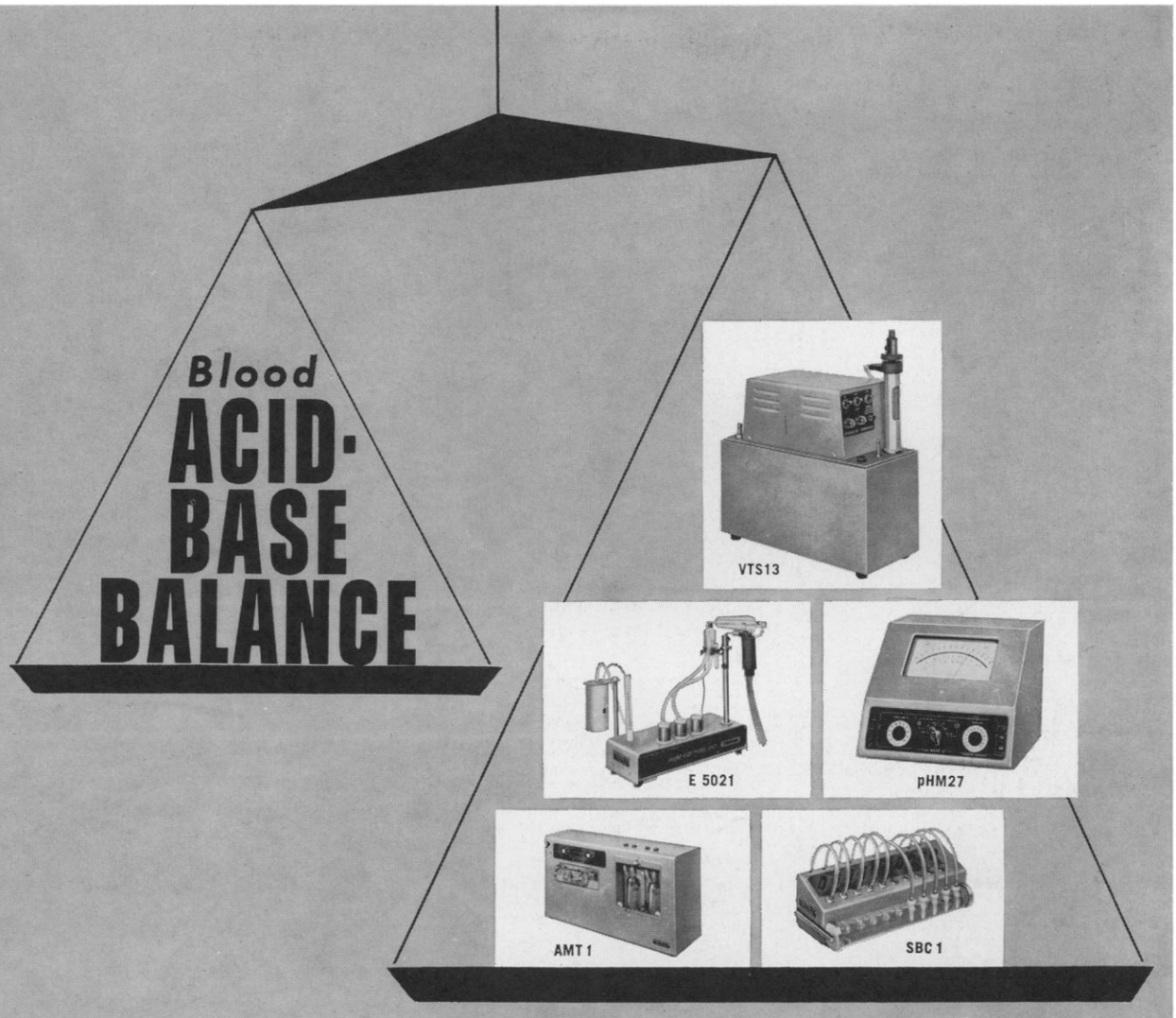


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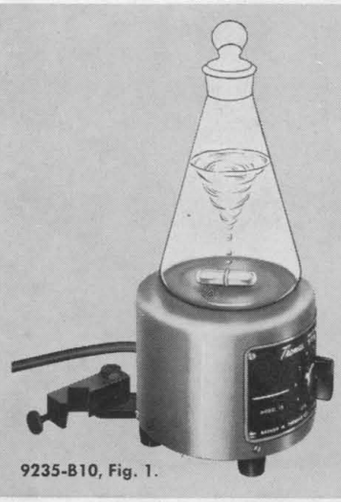
- ***More powerful stirring action***
- ***Wider diameter top plate—5 inches***



9235-B10, Fig. 1.

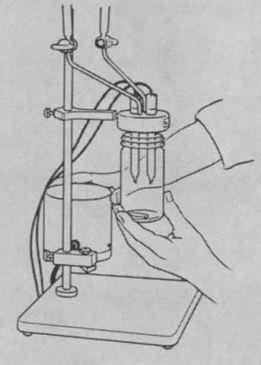


Fig. 2.
Stirrer swings aside to permit convenient removal of vessel containing sample.


Fig. 3.
Showing vigorous agitation of 4 liters of 50% Glycerol Sol.

A new stainless steel and more powerful, extremely efficient model of the Magnetic Stirrer introduced by us in 1944. Drive unit totally enclosed in compact housing of corrosion-resistant stainless steel, stronger than aluminum. Rotating magnetic field spins a magnetized stirring bar, encapsulated in inert plastic, to stir liquids in open or closed vessels. Speed is rheostat-controlled; operation is quiet and vibration-free.

**Wide Power Range.** These new model stirrers produce *vigorous agitation of 4 liters of 50% glycerol solution* (see fig. 3). Positive control of stirring rate, from full speed down to a few revolutions per second, allows use also for very small volumes or for gentle mixing. Magnetic coupling flux is adequate to stir effectively even in vessels elevated 1 inch above drive unit.

**Drive Unit.** Continuous duty motor and driving magnet are encased in housing of heavy gauge stainless steel, 5 inches diameter × 3½ inches high, with no seams above base. The larger motor of these improved stirrers is of the shaded pole type. Bearings are lubricated for long service life. Alnico V driving magnet, ¾-inch square × 2 inches long, is dynamically balanced on motor shaft. Rubber feet permit use on bench. Free-standing height is 4 inches.

**Swing Arm Support.** Exclusive feature of Thomas Magne-Matic® Stirrers is the attached swivel clamp. When mounted on support, stirrer can be raised or lowered on the rod, or swung aside for easy removal of vessels from assemblies (see fig. 2). Clamp also permits adjustment of stirrer center in a horizontal plane from 3 to 4½ inches from rod. Particularly convenient in both the mounting and use of the closed system assemblies.

**Stirring Bars.** Stirrers supplied are Alnico V magnets encapsulated in Teflon, with central pivot ridge to minimize friction.

**9235-B10. Magnetic Stirrer, Thomas Enclosed Rheostat Model,** as above described; with rheostat in drive unit and speed control knob on front of housing. With two 7/16-inch diameter Teflon-coated stirring bars, one 1-inch, the other 1 9/16 inches long. With 3-wire cord, 3-prong plug with adapter, for 115 volts, 60 cycles, a.c.; 10 watts . . . . . **40.40**

**9235-B20. Ditto,** but without stirring bars . . . **36.00**

**9235-B40. Magnetic Stirrer, Thomas Remote Control Model,** with separate rheostat attached to control unit by 30-inch connecting cord. With stirring bars as listed above. For 115 volts, 60 cycles, a.c.; 10 watts. . . . . **44.40**

**9235-B50. Ditto,** but without stirring bars . . . . **40.00**

10% discount in lots of 12 or more.

***Bulletin 144, giving detailed information, sent upon request***

**ARTHUR H. THOMAS COMPANY**

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