

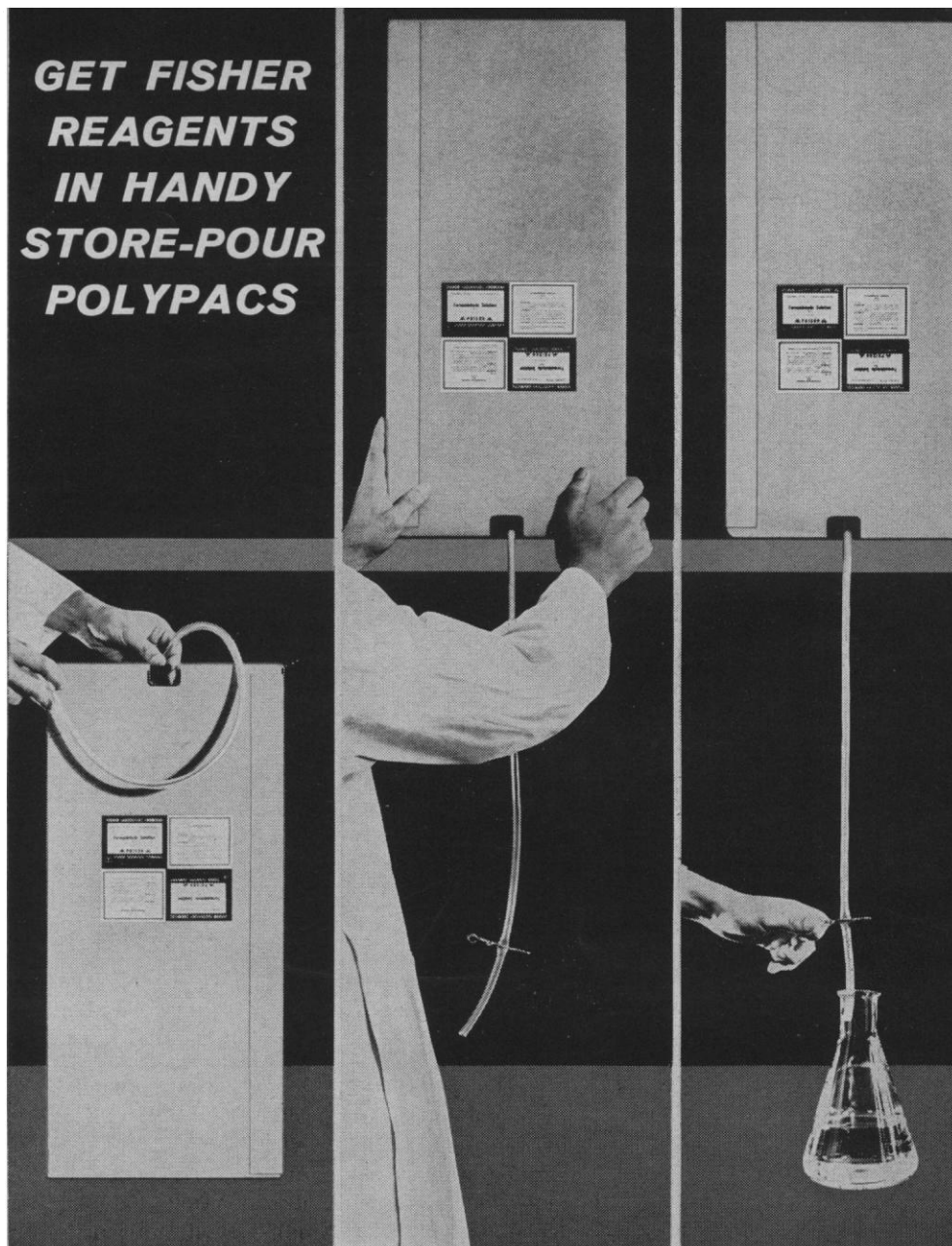
the temperature constancy of the core magnet. The latter has a temperature coefficient of 10^{-3} per degree Centigrade, so the temperature of the beam housing must be kept constant. Other temperature effects occur in both the standard and the vacuum models. The latter permits operation under vacuum or controlled atmospheric conditions. In this model, the entire mechanism is contained inside a glass body that will hold a vacuum of 10^{-5} to 10^{-6} mm-Hg. Eight ranges are provided from 0–100 μ g (smallest division 0.001 mg) to 0–20 mg (smallest division 0.2 mg). An individual balance covers seven of the eight ranges. Load capacity is 1 g. (Brinkman Instruments, Inc., Dept. Sci498, 115 Cutter Mill Rd., Great Neck, N.Y.)

Dielectric constant and dissipation factor of solids or liquids are measured by this instrument. A probe, essentially a guarded capacitor, forms one leg of a bridge; a variable capacitor forms the complementary leg. In operation, a dielectric material is placed in the field of the probe. If the bridge is not balanced, a signal appears at the input of the instrument's amplifier. The signal path is split in the amplifier so that two phase discriminators may be driven. A 90-deg lag is introduced into the dielectric-constant discriminator. By resolving the unbalance signal into two components, one in phase and one in quadrature with the reference signal, it is possible to indicate, on separate null meters, which control the operator must adjust to obtain bridge balance. The dielectric constant and dissipation factor are read directly from the controls.

A flat probe for solid samples and a corrosion-resistant probe for liquid samples are available. Dielectric-constant range is 1.0 to 12.0 with accuracy said to be ± 5 percent. Dissipation-factor range is 0 to 0.15 and accuracy $\pm(5 \text{ percent} + 0.001)$. (Delsen Corp., Dept. Sci500, 719 West Broadway, Glendale, Calif.)

Calorimeter controller is a thermistor-actuated system consisting of the necessary power supply, bridge circuit, amplifiers, relays, electric water heater, and valves for the automatic addition of hot and cold water to adjust and control calorimeter jacket temperatures. It can be used with old or new models of the manufacturer's adiabatic calorimeters if minor changes are made in the water connections. Temperature is said to be maintained to within $\pm 0.01^\circ\text{C}$ of the bucket temperature throughout the

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test period except for momentary variations of not more than 0.1°C during periods of rapid temperature rise. A stainless-steel thermistor probe in the calorimeter jacket and another in the bucket are held adjacent to the customary mercurial thermometer to sense temperature equality.

Temperature differences are utilized through a Wheatstone-bridge circuit and a photoelectric galvanometer to actuate solenoid valves that add hot and cold water in variable amounts. Hot and cold water are added alternately in small amounts when the galvanometer beam moves on and off the photo cell. When a rapid change in temperature occurs, as in a bomb calorimeter immediately after firing, the wide swing of the light beam strikes a second photocell and actuates full flow of hot water. The equipment permits manual control at any time. The hot water reservoir is made an integral part of the controller system, and flow lines are kept as short as possible to keep lags small. (Parr Instrument Co., Dept. Sci487, 211 53 St., Moline, Ill.)

Time-lapse cinemicrography apparatus is built into and on a steel desk. It includes the following major components: camera with drive, timing unit, and observation eyepiece; light source; antivibration mount. The 16-mm camera is equipped with a 400-ft magazine. The light source combines a tungsten-filament source for viewing with a variable-intensity xenon flash lamp for exposures of less than 10⁻⁴ sec. The camera is driven through a quick-change gear box that provides eight rates from 1/4 to 32 frames per minute. The intensity of the xenon flash can be varied over a range of about 600 without alteration of its color value. A large incubator enclosure provided with a thermostatically controlled heat source maintains materials under observation at constant temperatures from ambient to 40°C. (Sage Instruments, Inc., Dept. Sci488, 9 Bank St., White Plains, N.Y.)

Calibration-transfer standard is an ac-dc voltage and current measuring instrument containing a three-dial potentiometer, light beam galvanometer, volt box, hermetically sealed oil-filled shunt box, standard cell, ac-dc transfer element, and switching circuits. Direct-reading limit of error is said to be ± 0.06 percent for ac and ± 0.05 percent for dc. Application of correction factors permits increased accuracy.

Voltage range is up to 1500 v, current is 15 amp, and ac frequency is 20 cy to 50 kcy/sec. Adapters permit frequency range increase to 50 Mcy/sec. (Radio Frequency Laboratories, Inc., Dept. Sci480, Powerville Rd., Boonton, N.J.)

Instrument heating units are designed to maintain exact temperatures for various electronic control devices. Performance and control characteristics depend upon the desired operational functions. Controlled temperatures up to 500°F are available with power requirements ranging from 1/5 to 3 watt/in² of exposed oven surface. (Spec-Heating, Inc., Dept. Sci478, 13942 Saticoy St., Van Nuys, Calif.)

Signal-actuated voice recorder is designed to record a message and at the same time maintain an automatic log of the time and date that the message originated. The recording medium is 1/4-in. magnetic tape operating at a speed of 5/8 in./sec to provide continuous operation for 25 1/2 hours without changing reels. At this speed, response within 6 db is obtained over the frequency range 300 to 2600 cy/sec. Recording begins within 10 msec after a voice signal is detected. (Litton Industries, Dept. Sci438, 6601 Romaine St., Hollywood 38, Calif.)

Low-power microscope features zoom optics to provide continuous magnification from 10 to 30 \times . The instrument maintains constant focus throughout power change adjustments. Field of view is 0.420 in. at 10 \times and 0.240 in. at 30 \times . A cross-line reticle is supplied, and a choice of two measuring reticles is available. Direct readings are possible at all magnifications without need for interpolation. Folding tripod legs are provided for convenient transport and storage. (Bausch & Lomb, Inc., Dept. Sci447, Rochester 2, N.Y.)

Ruby rods for optional-maser applications are available in sizes that will yield cylinders 1/2 in. in diameter and 8 in. long, or 3/8 in. in diameter and 12-in long. The boules are 0.04-percent chrome doped and oriented with C-axis perpendicular to the cylinder axis. Growing cycle is 42 hr, and annealing cycle 120 hr. (Adolph Meller Co., Dept. Sci479, P.O. Box 6001, Providence, R.I.)

JOSHUA STERN
National Bureau of Standards,
Washington, D.C.

Calcification in Biological Systems

AAAS Symposium Volume No. 64

Edited by R. F. Sognnaes

July 1960

526 pp., 283 illus., \$9.75,
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This monograph deals comprehensively with the mechanism of mineral deposition throughout the animal kingdom. Current research approaches, findings and hypotheses are presented by investigators representing disciplines ranging from physical chemistry and histochemistry to electron microscopy and tissue culture. The central theme revolves about the question, "Why do certain normal and pathological tissues calcify?"

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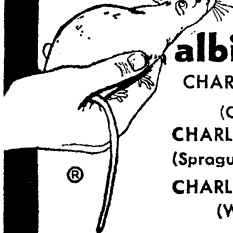
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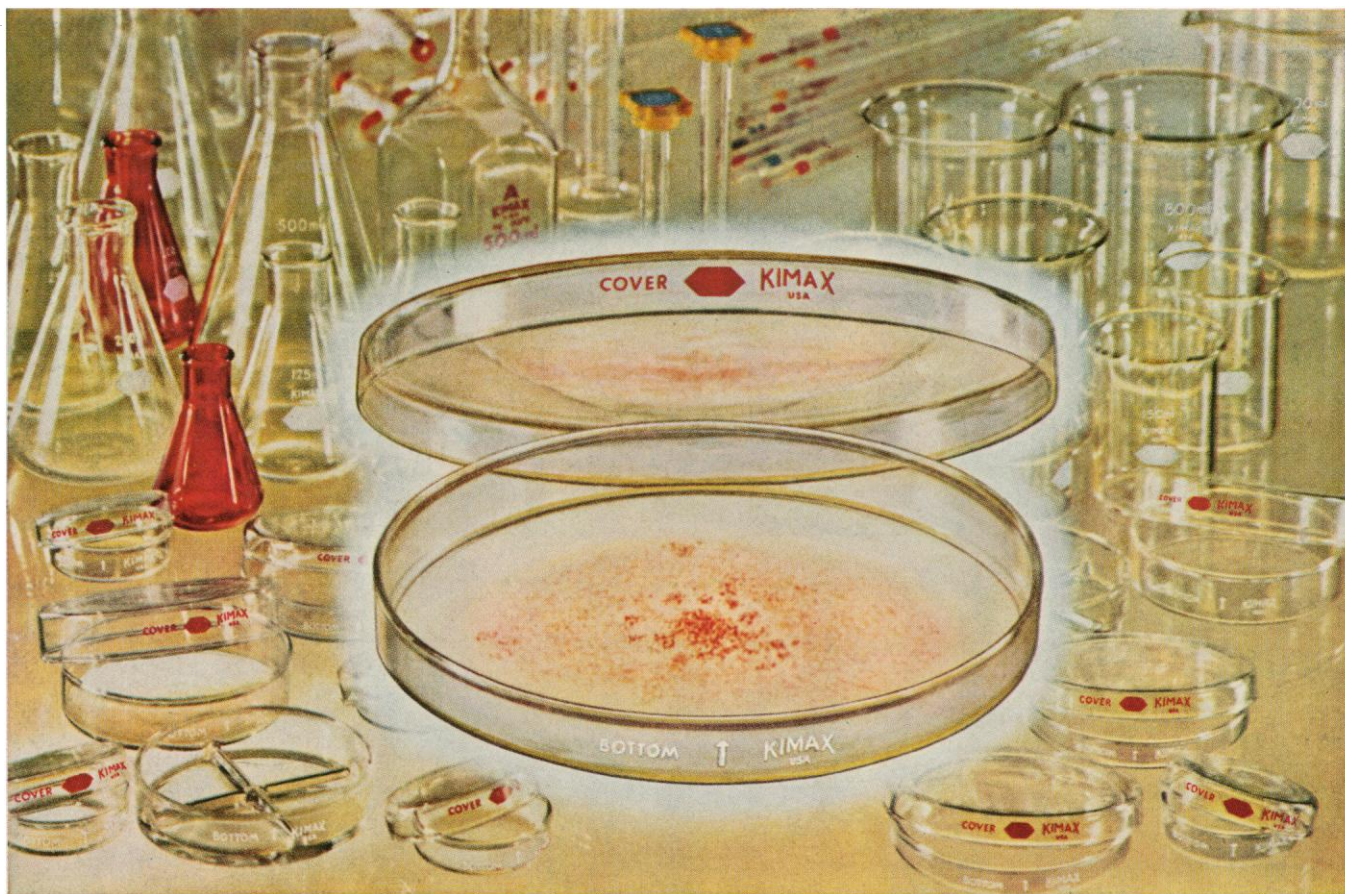
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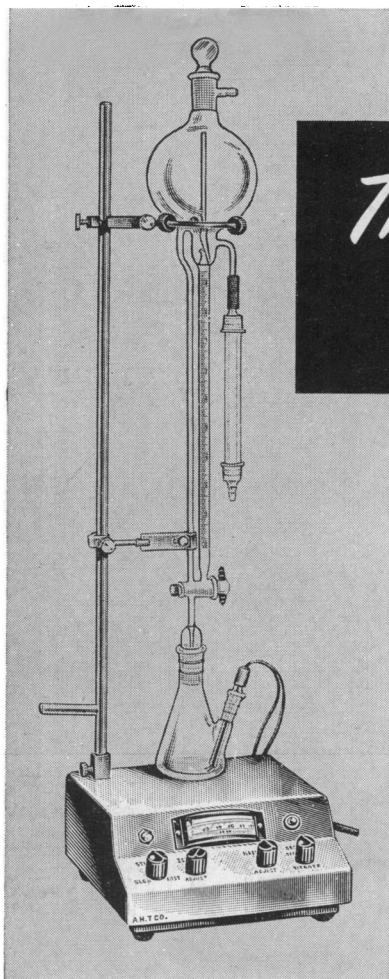
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