EQUIPMENT NEWS

The information reported here is obtained from manufacturers and from other sources considered to be reliable. Science *does not assume responsibility for the accuracy of the information. All inquiries concerning items listed should be addressed to* Science, *Room 740, 11 W. 42 St., New York 36, N.Y. Include the name(s) of the manufacturer(s) and the department number(s).*

■ ELECTROCARDIOGRAPH is light and compact. A three-stage vacuum-tube input amplifier drives a three-stage transistor amplifier which in turn drives the galvanometer recorder. The galvanometer is very much smaller than those previously used. Total weight is 18 lb. (Sanborn Co., Dept. S605)

■ OPTICS DEMONSTRATOR consists of a single 3¼- by 4-in. glass-bound film containing more than 20 gratings of various numbers and dimensions and with spacings down to 800 per inch. A variety of interference and diffraction phenomena can be observed with the device, which was developed at the Cornell Aeronautical Laboratory. The device and its use are described in detail in *Am. J. Phys.* [**25**, 135 (1957)]. (National Press, Dept. S606)

■ ULTRAVIOLET MICROSCOPE uses television techniques to translate three selected ultraviolet wavelengths into three primary colors. Magnifications from specimen to screen of 4000 to 25,000 are possible. Resolution is of the order of 0.2 μ. A microspectrophotometer attachment displays the absorption of any selected ultraviolet wavelength along any of the horizontal scan lines. Absorption curves are displayed on a 5-in. screen. A quick-processing camera is provided for recording the curves. (Neutronics Research Co., Dept. S608)

■ SHELTER for use with tracking instruments consists of a steel cylinder 10 ft in diameter and 4 ft high topped by a hemispherical dome of reinforced plastic. The observation slot is 5 in. wide and extends 5 deg past the zenith. Rotation, unrestricted in either direction, is accomplished by an electrohydraulic drive unit with sprocket and chain. Maximum rotational velocity is 40 deg/sec. Maximum error between tracking-instrument position and dome position is 7 deg. (Coleman Engineering Co., Inc., Dept. S609)

■ INFRARED SAMPLE CELL of variable thickness permits cancellation of background solvent absorption in infrared spectroscopy. Cell thickness may be varied over a range of 0.015 to 6 mm. Sample volume varies 2 to 10 cm^3 over this thickness range. Reproducibility of

setting is better than ± 2 μ. Linearity is ± 2 percent or better for cell settings of 50 μ or greater. (Perkin-Elmer Corporation, Dept. S610)

■ PRESSURE TRANSDUCER measures gas pressure from 10^{-6} to 15 lb/in². Up to 35 v output is provided for telemetering. Acceleration sensitivity is less than 0.015 percent of the operating interval per grav. Pressure is sensed by a capacitive bridge which senses the displacement of a stretched diaphragm. Accuracy is ± 2 percent of the reading. Natural frequency is 3000 cy/sec. (Trans-Sonics Inc., Dept. S620)

■ CENTRIFUGE furnishes centrifugal field of 51,000 *g*. Twenty accurately regulated speeds from 2500 to 25,000 rev/min are selected by interchanging pulleys. Heat caused by windage friction is minimized by a combination of rotor insulation and ventilation. Convective stirring is said to be virtually eliminated. (Spinco Division, Beckman Instruments, Inc., Dept. S611)

■ MICROSCOPE COLD STAGE is designed for micro fusion studies over the range from − 100° to + 70°C. A stream of inert gas, precooled to a temperature below the expected melting point, is passed over the sample and escapes from the stage through a small annular space around the objective. Moisture is removed from the gas by an accessory cooling device. (Arthur H. Thomas Co., Dept. S613)

■ RUBBER STOPPER, designed to fit as many as 17 different openings from 22 to 100 mm in diameter, is essentially a size 15 stopper sliced into 17 concentric tapered rings. All rings are said to nest with a vacuum-tight fit. (Bethlehem Apparatus Co., Dept. S616)

■ THERMOCOUPLE REFERENCE JUNCTION provides a controlled temperature reference for up to 48 channels. Long-term temperature stability within 0.2°F is achieved with a resistance-bridge temperature-sensing system and a heater controlled by a magnetic amplifier. Reference temperature may be set from 25° above ambient to 250°F. (Pace Engineering Co., Dept. S617)

■ DENSITOMETER AND LIGHT METER is a selfcontained unit consisting of a light-sensitive crystal and a meter. Sensitive area is ⅛ by ¼ in. Controls are an off-on switch and a sensitivity switch. (Fotomatic Corporation, Dept. S621)

■ PRESSURE PICKUP is miniature model weighing 7 g. Output varies from 25 to 100 mv, full scale, depending on the pressure range. Sensing element is a strain gage with four active arms. Accuracy is ± 5 percent, and hysteresis is 0.25 percent. Excitation is 6 v alternating or direct current. Drift due to temperature is ± 0.01 percent/F°. Units are available in pressure ranges from 0 to 3 to 0 to 200 lb/in.² and in gage, differential, or absolute models. (Dynamic Instrument Co., Dept. S634)

■ MOTION-PICTURE CAMERA adjusts its lens opening automatically to accommodate to changing illumination. An iris diaphragm, operated by electric current generated in a photocell, operates the lens through its full range from *f*/1.9 to *f*/16 in less than 1 sec. Inadequate illumination, beyond the lens accommodation, is indicated by extinction of an amber light. Compensation for temperature changes, over the range tolerated by the film itself, is provided. (Bell and Howell, Dept. S635)

■ SYNTHETIC HEAT-TRANSFER FLUID, for electronic equipment, functions as a liquid at temperatures ranging from − 65° to + 400°F. The fluid, a silicate ester based compound, is electrically insulating and is compatible with practically all materials encountered in aircraft construction. (Monsanto Chemical Co., Dept. S637)

JOSHUA STERN
National Bureau of Standards

A MAJOR CLUE TO BIOCHEMICAL REACTIONS

which E-P-R Spectroscopy furnishes the biologist

E-P-R AT WORK

(Electron Paramagnetic Resonance)

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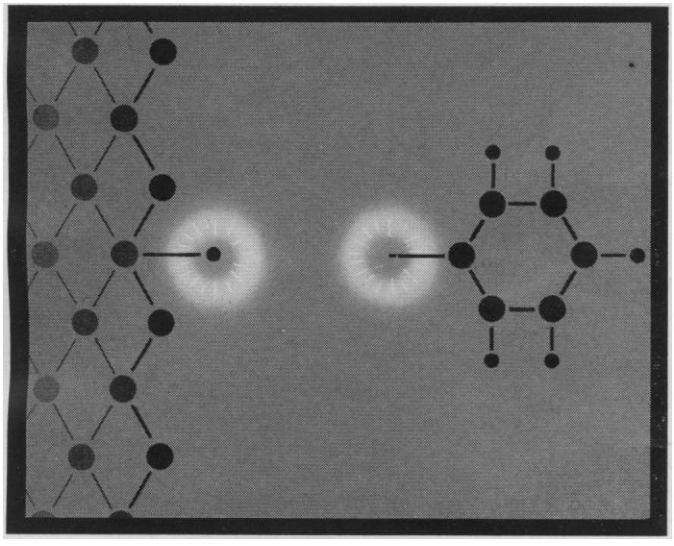


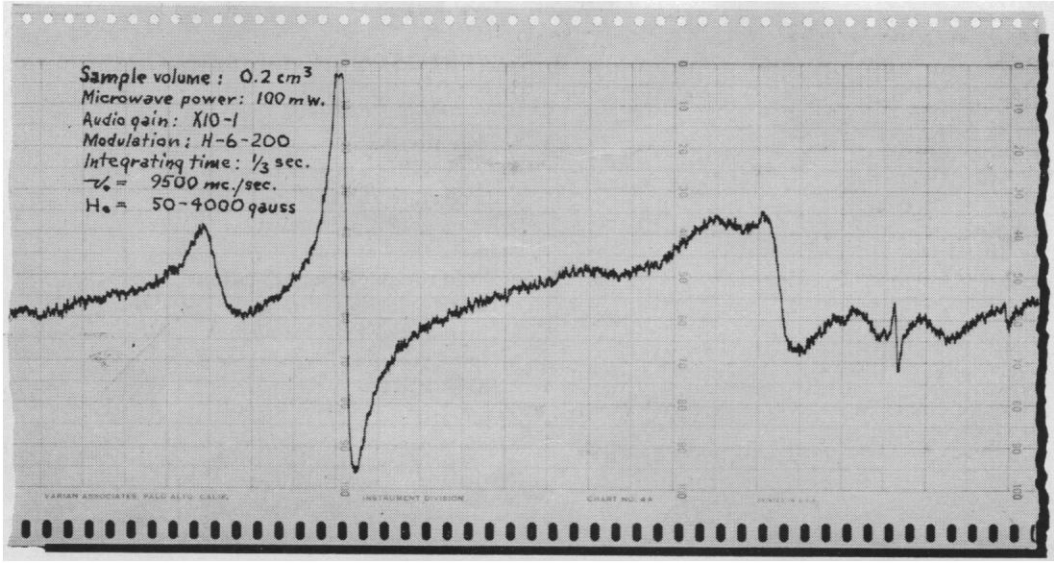
Is the odd molecule (or free radical) a necessary participant in most bio-chemical reactions? E-P-R's unique ability to determine its presence, identity, quantity and frequency of reaction can help unravel the vast complexities of life's chemistry. E-P-R spectroscopy is based on gyromagnetic properties of electrons and is particularly applicable to photosynthesis, enzyme substrate reactions, polymerization and radiation damage.

No other technique makes the same positive identifications. E-P-R Spectroscopy is singularly exclusive, "seeing" principally odd molecules and transition-element ions. It reveals quantity and identity, by measuring interaction of the odd electron with its surrounding nuclei. From E-P-R signals under varying temperature and chemical environments, the scientist can determine reaction kinetics.

E-P-R spectroscopy is non-destructive to life or chemical processes. Typical sample is 0.15 cc in a quartz tube. Concentration of the odd molecule can be as low as 10^{-8} molar if adequately separated from signal-masking impurities. Example below is one of a continuing series.

Number 8 of a series **DAMAGE FROM FREEZE DRYING IN WHOLE BLOOD**

INTERPRETATION: Some attempts have been made to correlate EPR signals in lyophilized materials with metabolic activities. An interesting sideline of this research has been the observaton of free radicals arising from broken bonds due to the freeze drying. The spectrum shown below is that recorded from lyophilized whole human blood. It reveals damage in two ways: first one observes the trivalent and divalent iron absorptions, indicating not only the conversion of hemoglobin to methemoglobin, but also damage to both of the molecules; second one sees the small sharp line to the right which is associated with a free valence. Preliminary experiments indicate that this free valence is produced by the breaking of the porphyrin ring structure.



For full technical details on E-P-R and N-M-R Spectroscopy and Spectrometers, write to the Varian Associates Instrument Division

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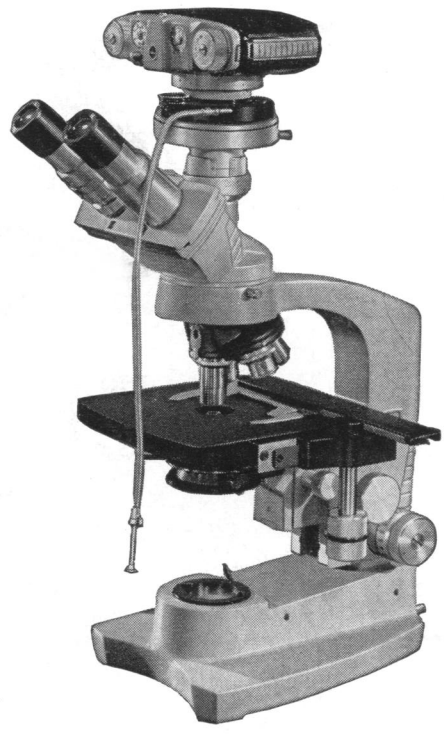
2

COMPLETELY **NEW** LINES

BY AMERICAN OPTICAL COMPANY

MICROSTAR

LABORATORY MICROSCOPES



Outstanding Features:

- Advanced styling and design
- Interchangeable and reversible bodies
- Rigid, well balanced arm
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- Wide selection of mechanical stages
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- Zone of convenience
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CYCLOPTIC

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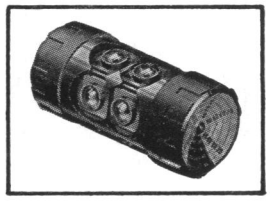
Revolutionary MAGNI-CHANGER . . . desired magnifications simply "dialed in"!



American Optical Company

INSTRUMENT DIVISION, BUFFALO 15, NEW YORK

Dept. U-4

Gentlemen:

- ☐ Please rush new CYCLOPTIC brochure SB 56
- ☐ Please rush new MICROSTAR brochure SB 124

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