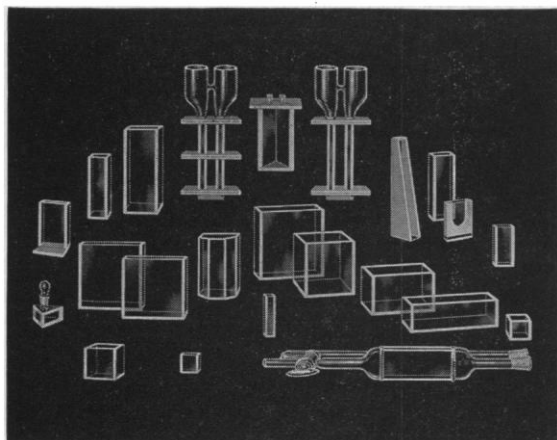


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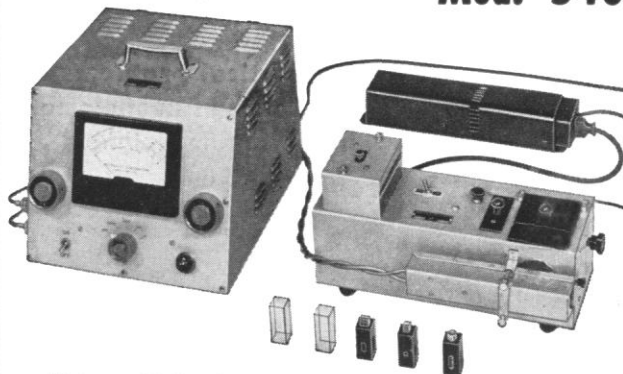
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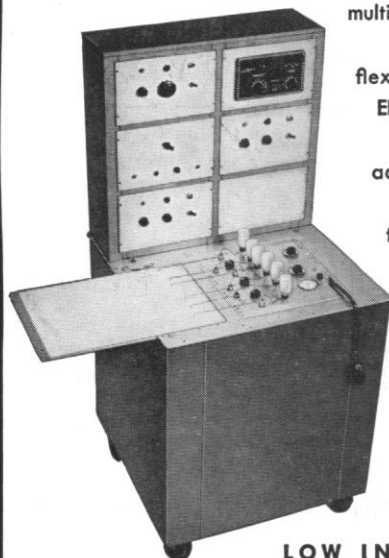
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EQUIPMENT NEWS

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).

■ **ALTITUDE TEST CHAMBER** includes three modes of application. A combination chamber simulates altitude to 200,000 ft with temperatures from -100° to $+400^{\circ}$ F. The altitude chamber may be lifted out and operated separately at ambient temperatures. The remaining apparatus operates independently to provide controlled-temperature environments. Sizes from 12 to 36 ft³ are available. (Mantec, Inc., Dept. S746)

■ **SINE-WAVE-TO-SQUARE-WAVE CONVERTER** utilizes the signal from the driving oscillator to provide operating power for its transistor squaring circuit. The unit is capable of 17 v peak-to-peak output from 5 to 100,000 cy/sec. Rise time is 0.5 percent of period. (Mandrel Industries Inc., Dept. S747)

■ **ANGULAR ACCELERATION GENERATOR** is a torsional pendulum instrument incorporating a 12-in. test-bed table which provides very low-decrement sinusoidal oscillations to a maximum amplitude of ± 180 deg. The period of oscillation is variable from 0.92 to 8 sec, and angular acceleration is variable between 0.48 and 146 rad/sec.² Test devices weighing up to 25 lb can be accommodated. Angular displacement may be derived from a micropotentiometer or synchro driven from the torsion shaft. (Statham Development Corp., Dept. S753)

■ **PHASE NULL METER**, small enough to be built into equipment, consists of a phase-sensitive vacuum-tube voltmeter and a calibrated phase shifter. Accuracy is ± 1 deg over the ranges ± 20 deg and 160 to 200 deg. A push-button polarity switch informs the operator whether the signal is closer to 0- or 180-deg phase relation to the reference. Frequency range is 380 to 420 cy/sec. Input signal range is 300 to 800 mv; reference voltages from 3.15 to 30 v, a-c, can be utilized. (Trio Laboratories, Inc., Dept. S756)

■ **OXYGENATOR** operates by exposing to an oxygen atmosphere a film of blood on a series of rotating disks of stainless steel mounted within a horizontal cylinder of Pyrex. No foaming or bubbling of the blood is said to occur. Oxygen-CO₂ mixtures are delivered the full length of the apparatus by a perforated stainless-steel

The Beginnings of Embryonic Development

AAAS Symposium Volume No. 48

Published July 1957

Edited by Albert Tyler, California Institute of Technology
R. C. von Borstel, Oak Ridge National Laboratory
Charles B. Metz, The Florida State University

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subject and author index, clothbound

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A symposium on "Formation and Early Development of the Embryo", held 27 December, 1955, at the Second Atlanta Meeting of the AAAS, served as the basis for this volume. Emphasis was placed on the problems of early development and of the initiation of development. The investigations presented in the various communications cover both descriptive and experimental work on the biological and chemical levels. Apart from their intrinsic interest and the measure of progress that they provide, the specific discoveries and analyses presented serve to exemplify various approaches toward the understanding of the manner in which sperm and egg contrive to produce a new individual.

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tube. Three lengths, 13, 17 and 21 in., with 60, 80 and 100 disks, respectively, are available. Corresponding priming volumes are 1400, 2000 and 2500 ml. (Pemco, Inc., Dept. S765)

■ **THICKNESS GAGE** uses radiation from a sealed, self-contained gamma-radiation source to measure thickness of continuous sheet materials. Transmitted radiation is sensed by a scintillation method. Response time is in the millisecond range. (Budd Co., Dept. S760)

■ **FREEZE DRYER** is mechanically refrigerated to temperatures as low as -60°C . The equipment, of mobile design, provides for bulk drying as well as manifold drying. Heat is furnished by quartz infrared tubes mounted inside the stainless-steel vacuum drum. The condenser has a capacity of 16 lit. A McLeod gage provides measurement of vacuum, and a thermistor indicates condenser temperature. (VirTis Company, Inc., Dept. S761)

■ **VIBRATION EXCITER** of electrodynamic design has a frequency range from 5 to 5000 cy/sec. Force levels of 1025 lb r.m.s. and 3150 lb peak are obtainable in noise testing with 15-to-2000-cy/sec bandwidth. The exciter will operate in altitude environments from 0 to 125,000 ft, in humidity from 0 to 95 percent, and in temperature from 0 to 200°F . Total displacement is 1 in. (MB Manufacturing Co., Dept. S763)

■ **OSCILLOSCOPE** has identical horizontal and vertical deflection characteristics for use as an x - y indicator. It may be converted into a general-purpose instrument by interchanging plugged-in components. Bandpass is from d-c to 10 Mcy/sec, rise time is 0.35 μsec , and deflection factors are selectable from 0.05 to 20 v per division. (Tektronix, Inc., Dept. S766)

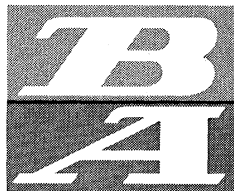
■ **FRACTIONATING COLUMN** of spinning-band design features 2 to 3 ml liquid holdup, approximately 0.1 mm-Hg pressure drop per plate, 30 theoretical plates at total reflux, and 60 percent efficiency at a liquid take-off rate of 43 ml/hr. (Stanford Glassblowing Laboratories, Dept. S767)

■ **PRESSURE CHAMBER**, $\frac{1}{2}$ in. in diameter by 10 in. high, provides pressures to 30,000 atm. The pressure chamber is inside a thick-walled tube which in turn is surrounded by a stack of restraining rings. A tapered fit between the tube and the rings permits application of squeeze to prevent radial expansion. Pumps are manually operated. Electrically insulated leads may be conducted into the chamber. (Nucor Research, Inc., Dept. S771)

JOSHUA STERN

National Bureau of Standards

29 NOVEMBER 1957



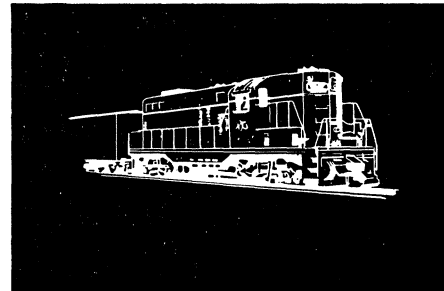
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ELECTRONIC RAILROADING

After many years of research and study, the railroad diesel locomotive is now under scientific surveillance. Preventive maintenance, which saves millions of dollars annually, is programmed and controlled not in the overhaul shop but in the laboratory before the breakdown or damage occurs.

The New York Central Railroad takes regular periodic samples of crankcase oil and then analyzes each sample for the presence of metallic particles. This analysis is accomplished with a Baird-Atomic Direct Reading Spectrometer. The Direct Reader provides spectrochemical analyses of inorganic materials in extremely short time with direct readout of percentage concentration of selected elements on special logarithmic scales.

Metallic particles suspended in the oil indicate engine-part wear and poten-



tial trouble spots. For example, high lead or copper content indicates excessive bearing wear while a trace of aluminum predicts trouble in the blower assembly. Detailed highly accurate internal diagnosis can be made of the massive diesel engines without removing the locomotive from service. Repairs and overhauls are scheduled in advance, before serious damage is done, and on-the-line engine failure is prevented.

DEKATRON* Counter Tubes

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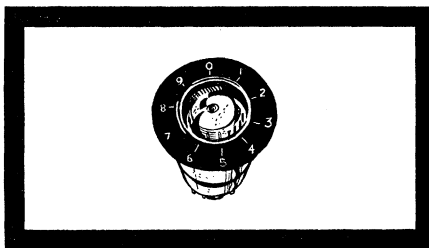
The development of modern scaling circuitry began with the early binary scalars which employed circuits based on bistable scales-of-two. These circuits and their successors, the feedback-binary decades, utilized hard-vacuum tubes and their reliability suffered from the inherent high power con-

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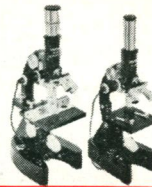
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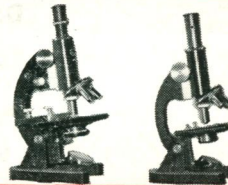
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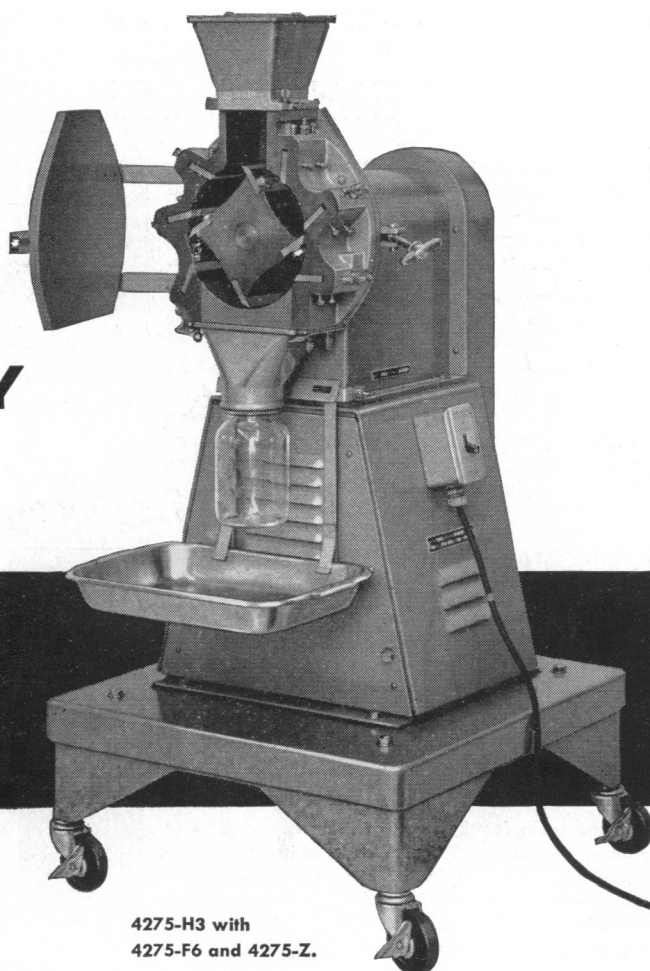
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