sion of chemistry (that of the American Institute of Chemists) reference can be made to *The Chemist* [**35**, No. 4, 125 (April 1958)].

And last, a professional person will have pride in his profession and its accomplishments and live by the code of ethics of his profession. A true professional would never attempt to step into such fields as Webb suggests for the chemist or biologist in his letter, certification or no. But if the professional has the ability to teach, he will and can do a better job teaching his field than can a person with one or (in some cases) no course in that subject. A prime requisite for teaching is a great deal more knowledge of the subject matter than will ever be needed for the class. The teaching profession needs more instruction in the subjects to be taught rather than in how to teach. Certification does not make one a professional; one's viewpoint and training do.

W. W. Benton

2069 Watson Avenue,
St. Paul, Minnesota

Shutoff Pulse Illusion

The "shutoff pulse illusion" described by R. L. Ives in the 30 January issue of *Science* [**129**, 272 (1959)] is clearly the temporal analog of the well-known Mach spatial gradient ("Mach ring") effect [E. Mach, *Sitzber. Akad. Wiss. Wien, Math. Naturw. Kl. Abt. IIa* **52**, 303 (1865)]. Ives has drawn two-dimensional spatial patterns to illustrate diagrammatically the time-intensity course of the pulsed signals he used.

The direct comparability of Ives' temporal gradients with Mach's spatial gradients is borne out by the fact that if one actually stimulates the eye with two-dimensional spatial patterns of precisely the forms diagrammed by Ives, one perceives spatial brightness variations of the same kind as the perceived temporal variations described by Ives as the "shutoff pulse illusion." Similar stimulus patterns of many degrees of complexity were, as a matter of fact, designed and used by Mach to establish the empirical relations between perceived brightness and the derivative functions of the spatial distributions of light intensity. The spatial distributions used by Mach in his experiments are illustrated in his article and are reproduced in some of his other papers [*Sitzber. Akad. Wiss. Wien, Math. Naturw. Kl. Abt. IIa* **54**, 131 (1866); *Vierteljahr. Psych.* **2**, 38 (1868)]. In the same connection, it is also of interest to note that Ives' diagrammatic representation of his time stimuli and their associated perceptual effects are remarkably similar to Vivian O'Brien's analogous representations of spatial patterns that give rise to Mach rings. See Fig. 9 of O'Brien's paper on contour perception [*J. Opt. Soc. Am.* **48**, 112 (1958)].

Mach's analysis of perceptual effects of this type led to his brilliant deduction that the phenomena could be explained only by assuming mutual interactions among adjacent retinal positions —a concept which has in recent years received direct confirmation from electrophysiological studies of neural activity. See, for example, papers by Hartline [*Harvey Lectures* **37**, 39 (1941–42)] and Hartline, Wagner and Ratliff [*J. Gen. Physiol.* **39**, 651 (1956)]. These interaction effects actually serve to enhance brightness and color differences between adjacent stimuli, whether the proximity is spatial or temporal (as in Ives' example). Because of this differential enhancement these effects are basic to the fineness of visual discriminations, and hence, as Hering emphasized, are basic to veridical visual perception of both contours and temporal sequences in the everyday discriminations of boundary changes in the visual field.

Dorothea Jameson
Leo M. Hurvich

Department of Psychology,
New York University, New York

New Products

The information reported here is obtained from manufacturers and from other sources considered to be reliable, and it reflects the claims of the manufacturer or other source. Neither Science *nor the writer assumes responsibility for the accuracy of the information. A coupon for use in making inquiries concerning the items listed appears on page 1694.*

■ PULSE-HEIGHT ANALYZER accepts pulses of either sign up to a maximum rate of 1600 per second. The system's memory can be divided into either 100 or 150 channels; the energy scale may be either linear or exponential. The Hutchinson-Scarcott principle is used; information is stored in two torsional acoustic delay lines. The analyzer can subtract counts from a spectrum already in the memory. In conjunction with a live-time integrator, background count can be automatically subtracted from a spectrum. Readout facilities include an analog output for pen recorder and automatic printing in decimal form on adding-machine tape. (Marshall, Dept. 856)

■ TRANSISTOR TESTER permits measurement of the transistor beta parameter while the transistor remains in the circuit. The tester will also measure beta and collector leakage current parameters with the transistor removed from the circuit. The unit operates either from self-contained batteries or from line power. (Sierra Electronic Corporation, Dept. 871)

■ MAGNETIC TAPE RECORDER features seven channels of information with 1-Mcy/sec bandwidth. Tape width is ½ in. Tape speed is 120 in./sec, which allows 12 min of running time with standard 1-mil tape. Timing is reproducible to ± 0.005 percent. Peak flutter and wow are ± 0.1 percent or less. Starting time from rest to full speed is 4 sec. Input impedance is 93 ohm, and input voltage of 0.1 v peak-to-peak is required. Output signal level is 2 v at 93 ohm. (Minnesota Mining and Manufacturing Co., Dept. 872)

■ PARAMETRIC PREAMPLIFIER for the 350- to 500-Mcy/sec range, when coupled to a conventional ultrahigh frequency receiver, achieves over-all receiver noise figures below 1.0 db with bandwidths of approximately 1 percent. The varactor which is used as the working element of the parametric amplifier is said to be relatively insensitive to radio-frequency burnout and cross-modulation effects. (Microwave Associates, Inc., Dept. 874)

■ PRESSURE-SWITCH TRANSDUCER is capable of sensing pressure levels of from 0.5 to 4000 lb/in.² by interchange of internal modular components. Eight switches will cover the entire range. Calibration is accomplished by rotation of an external pressure-setting adjust-

ment. All moving parts are sealed by O-rings in an aluminum housing. Weight is 6 oz. A mounting bracket for vibration isolation to 2000 cy/sec and 50 *g* is available. (Hayden Switch, Inc., Dept. 875)

■ DUAL-CHANNEL AMPLIFIER for voltage and current is designed for use with the manufacturer's oscilloscope. The instrument provides simultaneous measurement and observation of both a-c voltage and current waveforms. Electronic switching between channels, either by alternate sweeps or by 100-kcy/sec chopping, allows a direct comparison of voltage and current relationships within a circuit. The current channel is equipped with a current-sensing probe that is clamped around a wire. (Hewlett-Packard Company, Dept. 879)

■ PULSED OSCILLATOR provides pulse lengths continuously variable from 1.5 to 15 μsec. Durations of 30 μsec are obtainable with less than 5-percent drop. Rise and fall time are less than 0.3 μsec above 20 Mcy/sec and within 3 cy/sec at lower frequencies. Delay is provided in three overlapping ranges to 200, 1100, and 11,000 μsec. A separate delayed trigger output is provided for oscilloscope synchronization, and a gating pulse coincident with the radio-frequency output is available for blanking or intensifying. Power level is such that transmission at 1 Mcy/sec through 6 in. of air is possible with barium titanate transducers. (Arenberg Ultrasonic Laboratory, Inc., Dept. 882)

■ VIBRATION PICKUP is an eddy-current-damped unit with response constant within ± 5 percent between 40 and 2000 cy/sec and within ± 10 percent between 30 and 2000 cy/sec. Sensitivity is 96.3 mv/in. sec. The pickup will function continuously at temperatures between −85° and 500°F and will withstand continuous acceleration up to 50 *g* and intermittent acceleration up to 100 *g*. Size is 1.42 in. square by 1 in. high. (M. B. Manufacturing Co., Dept. 884)

■ DATA CAMERA records both picture and data on one film strip. Recording of the auxiliary data is accomplished through the use of split optics. The optical path for imaging the data panel containing indicating instruments passes behind the shutter so that data-recording exposure is independent of target exposure. The auxiliary data area is 3/16-in. wide and extends the height of the frame. The area for the picture is 13/16 by ¾ in. The camera generates timing pulses to actuate illumination of the data panel. (Flight Research Inc., Dept. 888)

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National Bureau of Standards
Washington, D.C.

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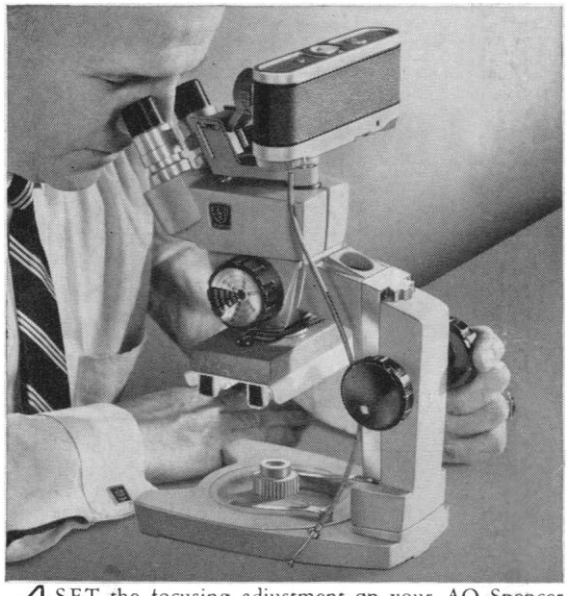

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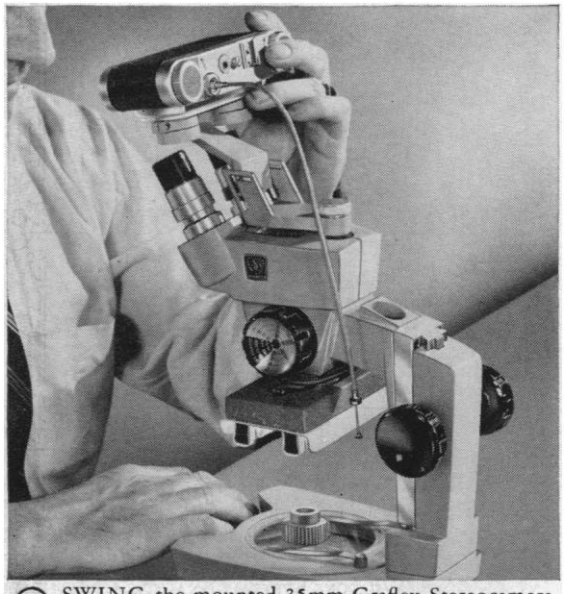

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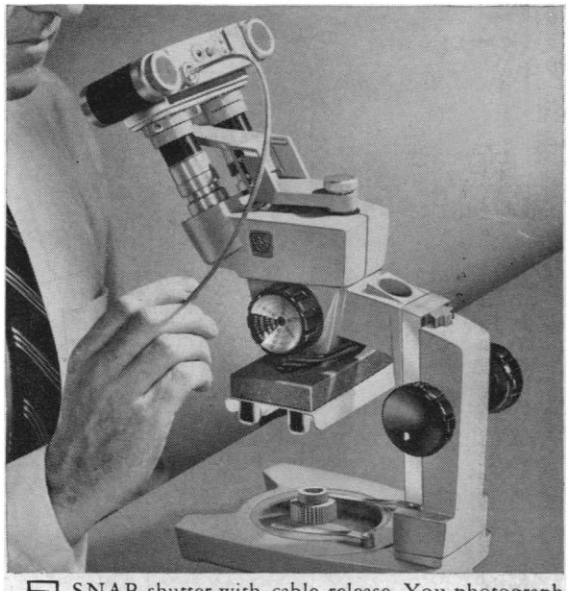

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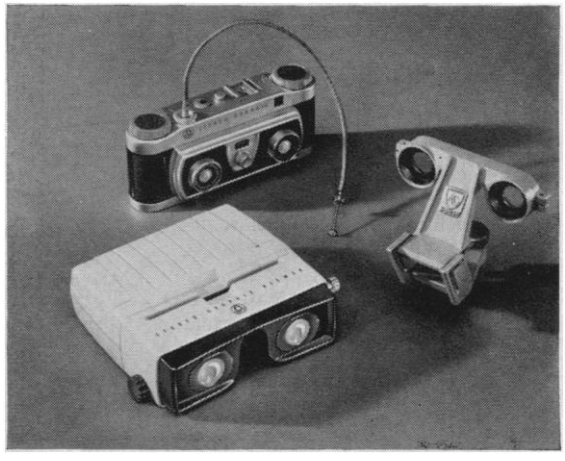

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