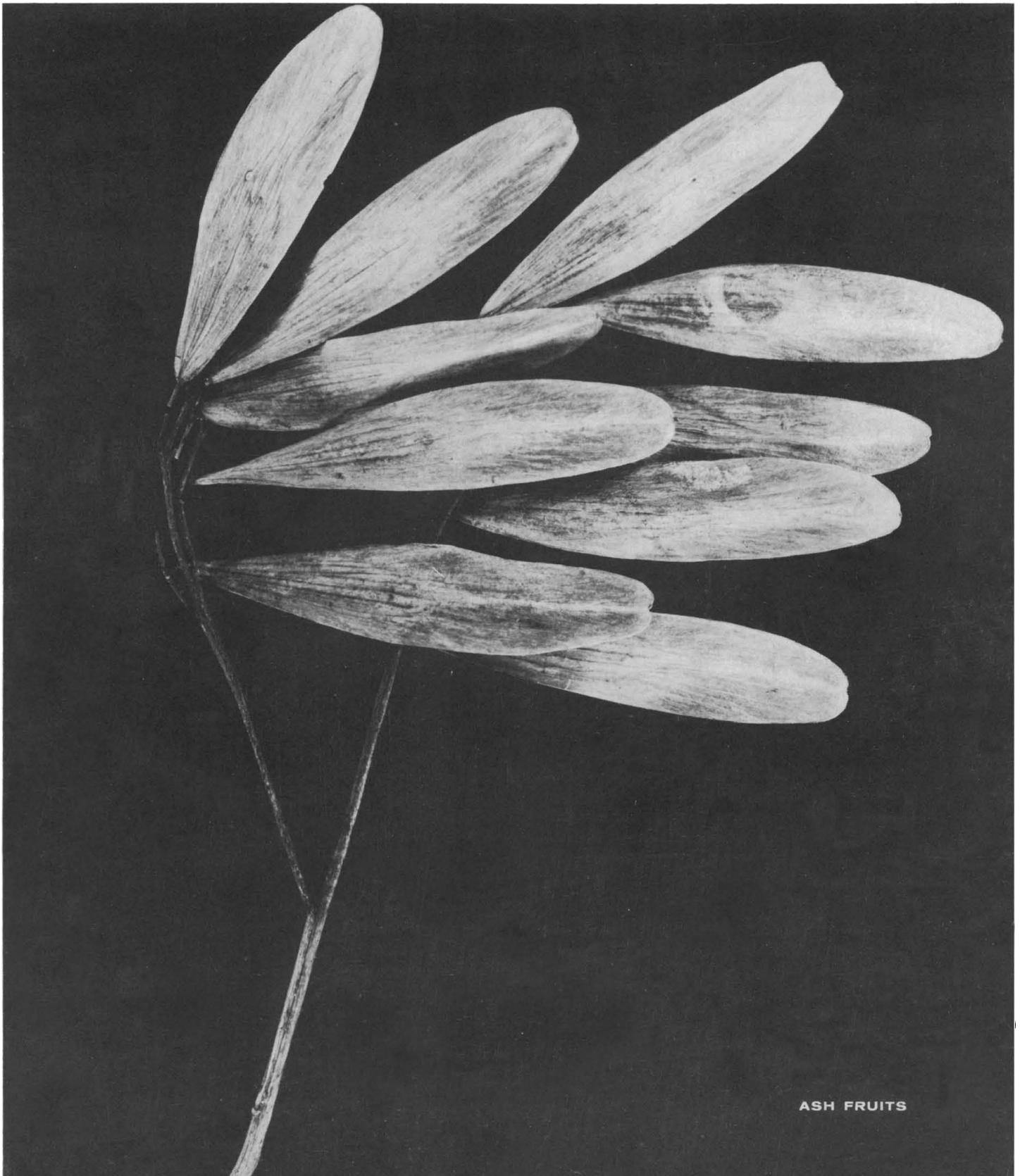


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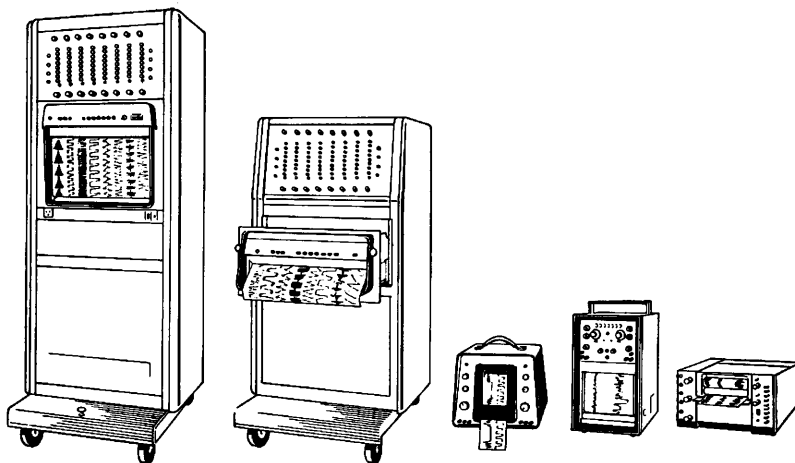
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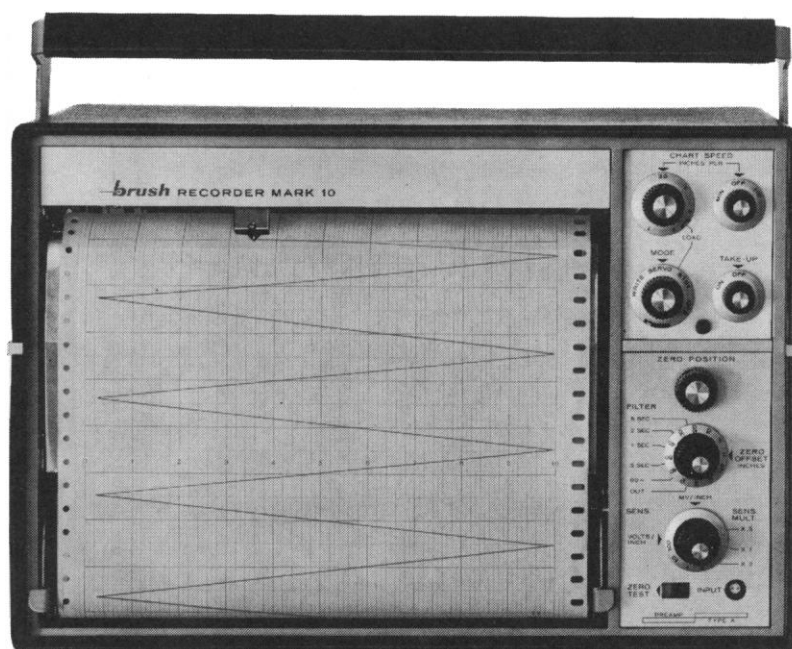
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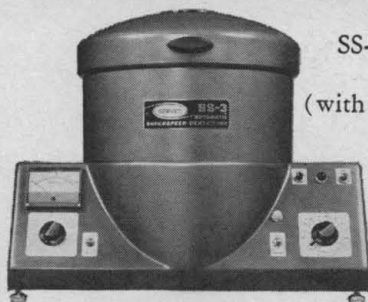
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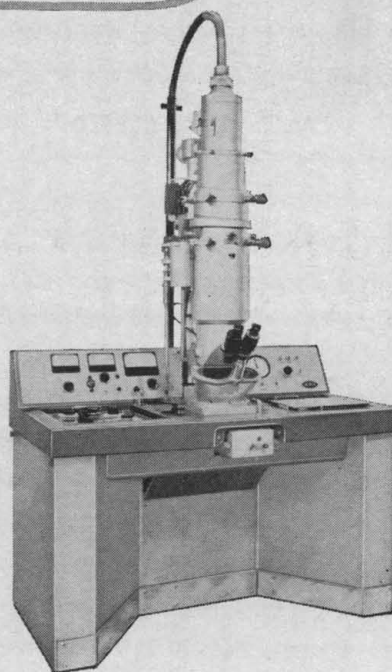
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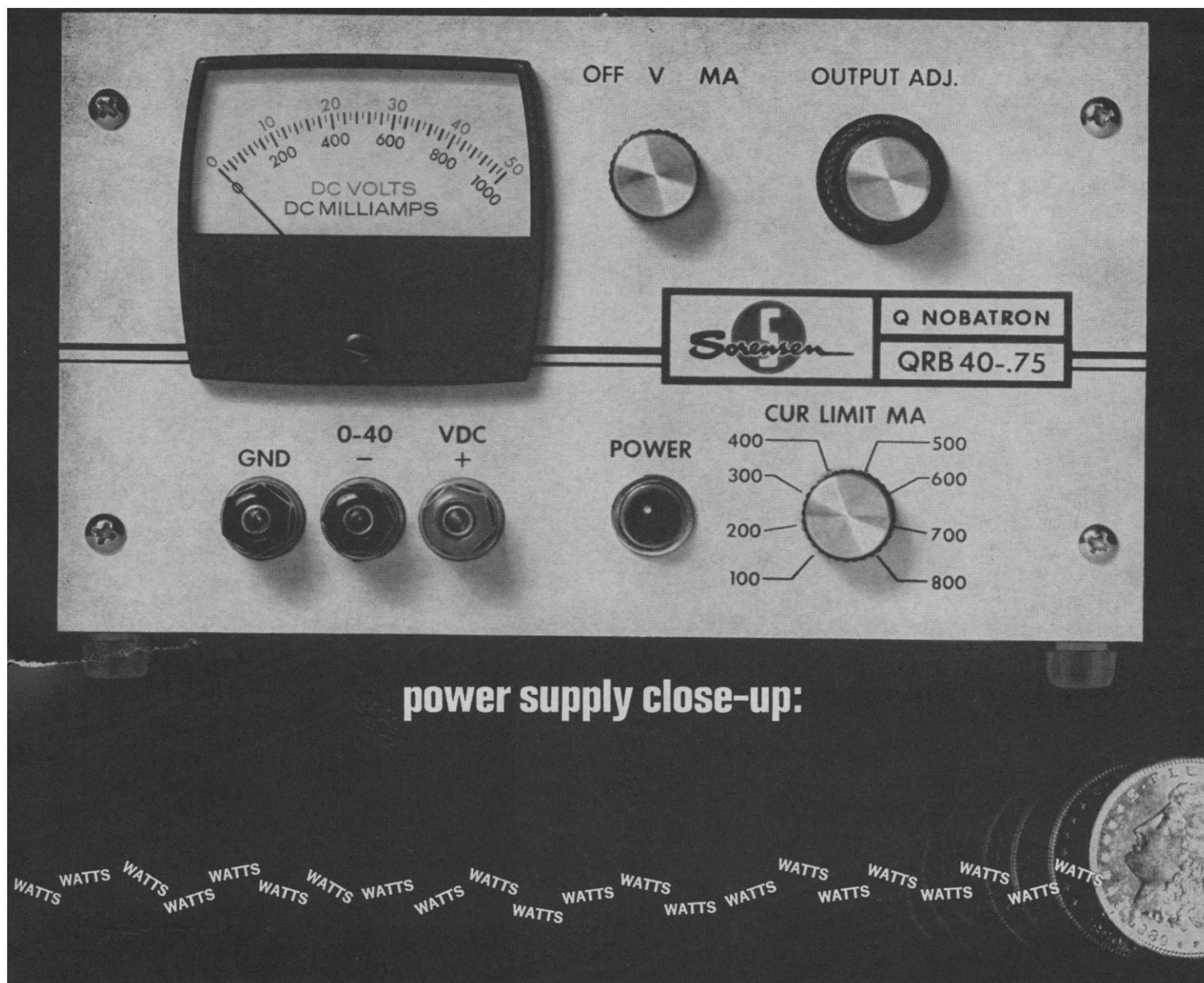
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QRB20-1.5	0-20	0-1.5	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅞	9	5¼		10.75
QRB30-1	0-30	0-1	±(0.01% + 1mv)	0.15mv	50	±0.015	8¼	5⅞	9	5¼		10.75
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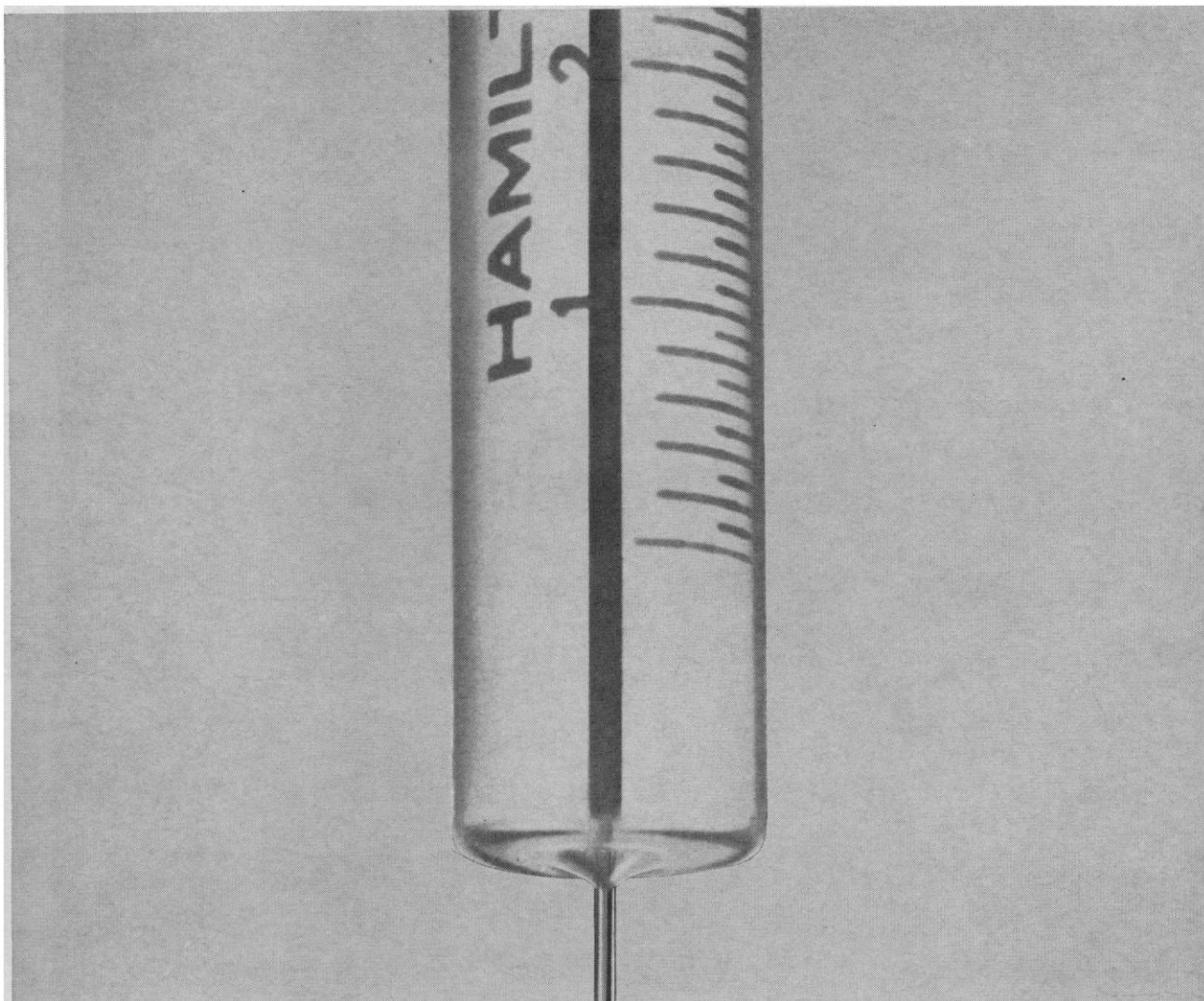
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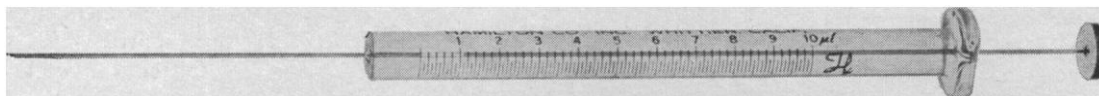


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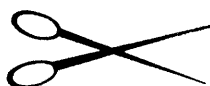


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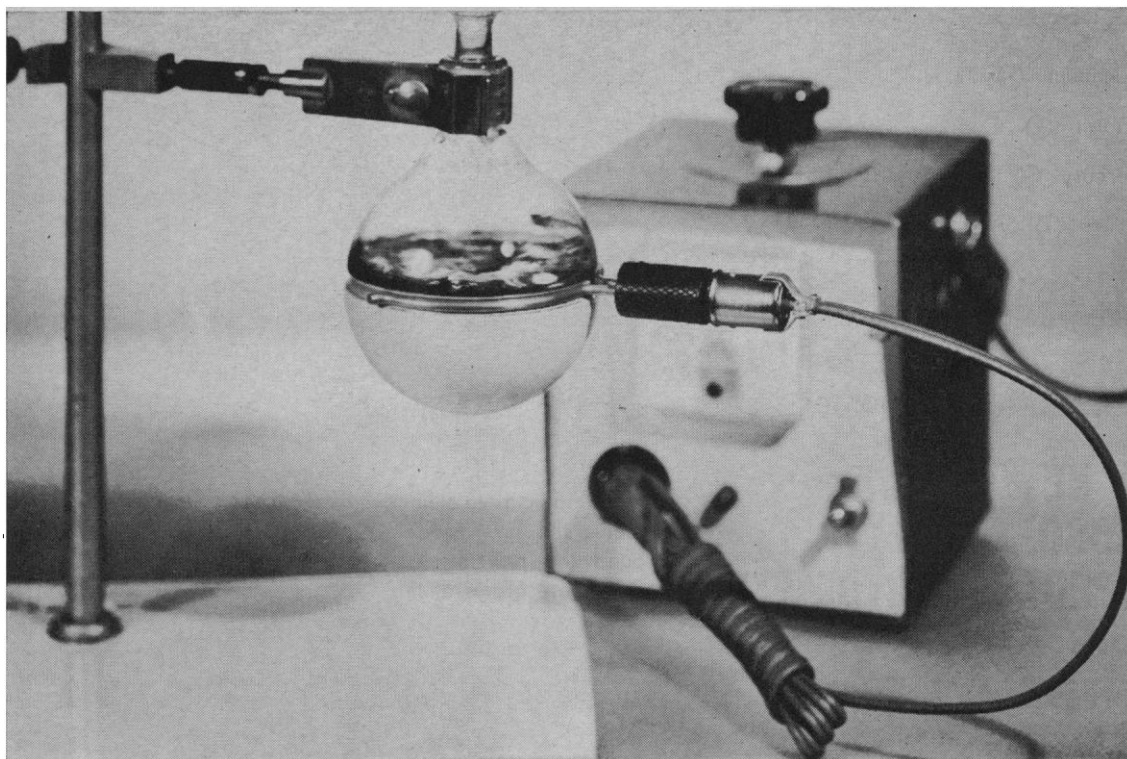
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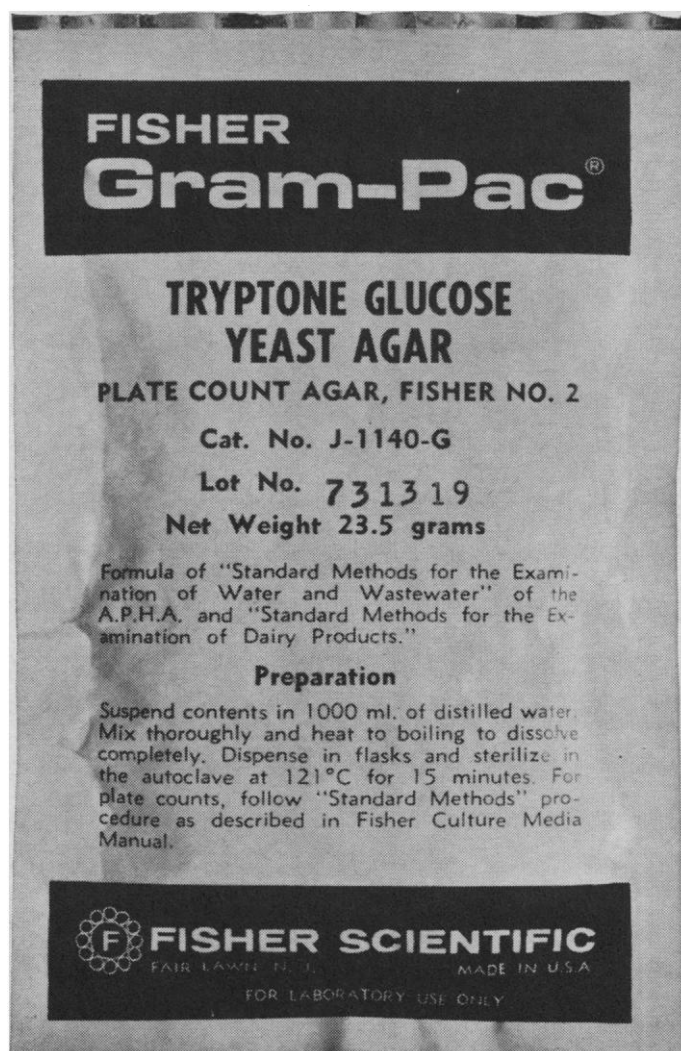
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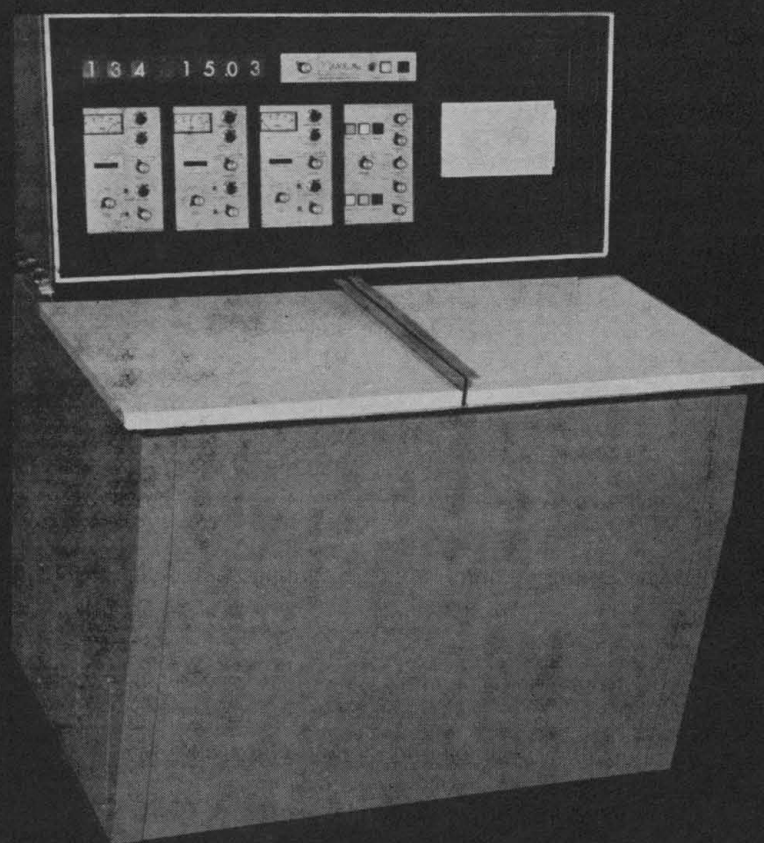
Its uniform heat minimizes chance of thermal strain to glass vessels. And it provides an effective shield in rare instances when vessels do collapse under high vacuum-high pressure conditions.

Glas-Col desiccator heating mantles have been used for years—safely, and with complete success.

CATALOG NUMBER	DESICCATOR FLANGE DIAMETER	WATTAGE	PRICE
M-200	160mm	330w-115v	\$45.00
M-202	200mm	380w-115v	57.00
M-204	250mm	380w-115v	57.00

GLAS-COL® HEATING MANTLES

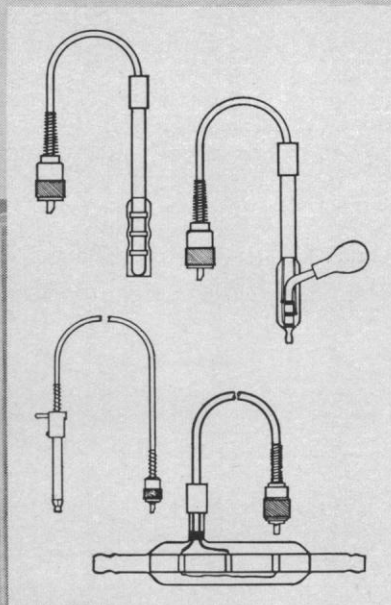
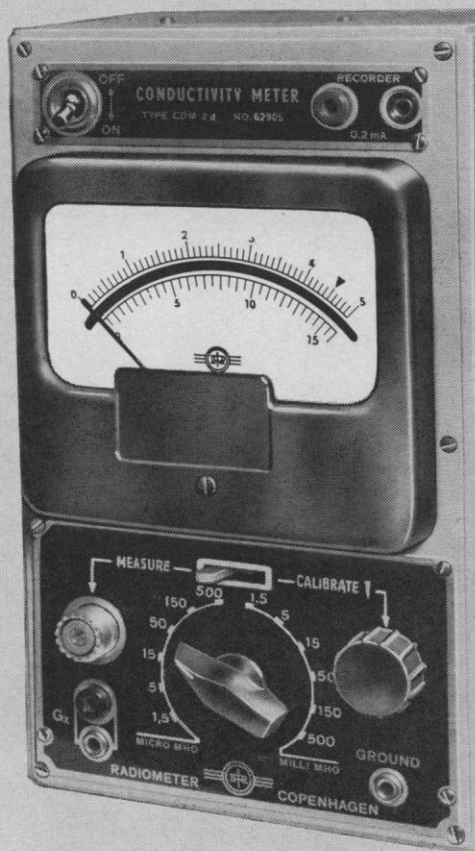
Glas-Col Apparatus Company
Dept. SC, 711 Hulman Street, Terre Haute, Indiana
U.S. Patents 2,231,506; 2,739,220; 2,739,221; 2,282,078.



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Model CDM-2

Direct reading CONDUCTIVITY METER *by RADIOMETER*

The Radiometer Model CDM-2 has been designed with laboratory requirements in mind. Without any sacrifice in accuracy it has been made more flexible and simpler to operate than the conventional conductivity bridge—and covers the *complete* range of conductivities.

Direct readings on 12 ranges are displayed instantly on a hand drawn illuminated mirror scale with an accuracy of better than $\pm 1\%$ on most ranges and $\pm 2\%$ at the extremes of conductivity.

A choice of conductivity cells makes CDM-2 ideal for all normal laboratory conductivity measurements as well as conductometric titrations. Available cells cover either immersion, flow, or pipette applications—all on grounded or ungrounded media.

Output terminals are provided for connection to

recorders for continuous measurement, or to automatic titrators for automatic conductometric titrations.

Write for complete descriptive literature and prices.

RANGES: (12 complete full scale ranges)

0 - 1.5 - 5 - 15 - 50 - 150 - 500 micromhos.

0 - 1.5 - 5 - 15 - 50 - 150 - 500 millimhos.

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RADIOMETER  **COPENHAGEN**

In Canada: Bach-Simpson Limited, Box 2484, London

COMPOUND	LOW SPECIFIC ACTIVITY		HIGH SPECIFIC ACTIVITY		PRICES Prepaid air shipment included			
	Order No.	Range mc/mM	Order No.	Range mc/mM	50 μ c	0.1 mc	0.5 mc	1.0 mc
L-Alanine-C ¹⁴ (U.L.)	CFB-7	5-10	CFB-62	75-110	\$38	\$ 70	\$350	\$680
L-Arginine-C ¹⁴ monohydrochloride (U.L.)	CFB-8	5-10	CFB-63	150-220	48	87	400	800
L-Aspartic-C ¹⁴ acid (U.L.)	CFB-9	5-10	CFB-64	100-150	38	68	340	670
L-Glutamic-C ¹⁴ acid (U.L.)	CFB-10	5-10	CFB-65	125-180	40	68	340	670
Glycine-C ¹⁴ (U.L.)	CFB-11	5-10	CFB-66	50-70	23	32	125	225
L-Leucine-C ¹⁴ (U.L.)	CFB-13	5-10	CFB-67	150-220	55	95	460	880
L-isoLeucine-C ¹⁴ (U.L.)	CFB-14	5-10	CFB-68	150-220	45	88	440	870
L-Lysine-C ¹⁴ monohydrochloride (U.L.)	CFB-15	5-10	CFB-69	150-220	55	90	450	870
L-Phenylalanine-C ¹⁴ (U.L.)	CFB-16	5-10	CFB-70	200-320	56	92	450	880
L-Proline-C ¹⁴ (U.L.)	CFB-17	5-10	CFB-71	125-180	55	105	525	990
L-Serine-C ¹⁴ (U.L.)	CFB-18	5-10	CFB-72	75-110	55	92	450	870
L-Threonine-C ¹⁴ (U.L.)	CFB-19	5-10	CFB-73	100-150	48	88	440	870
L-Tyrosine-C ¹⁴ hydrochloride (U.L.)	CFB-20	5-10	CFB-74	200-320	58	105	518	940
L-Valine-C ¹⁴ (U.L.)	CFB-21	5-10	CFB-75	125-180	48	88	440	880

HIGH PURITY AVAILABLE FROM STOCK: UNIFORMLY LABELLED CARBON-14 L-AMINO ACIDS

Immediate shipment of high specific activity—Advances in production techniques now permit immediate delivery from stock of uniformly labelled carbon-14 L-amino acids at high specific activities. The table above lists fourteen amino acids and provides separate order numbers for those having high and low specific activities.

Purity verified and documented—Each of the uniformly labelled carbon-14 amino acids listed is purified by paper and ion-exchange chromatography and finally by crystallization. Radiochemical purities are checked by dilution analysis, paper chromatography (usually in two solvent systems), and by paper electrophoresis at two different pH levels. A data sheet showing the results of these analyses and copies of actual scans are provided with each shipment.

Packaged for greatest radiation stability—Those amino acids having low specific activity are supplied as freeze-dried solids. Higher range materials have been distributed in 0.01N HCl, and this practice is being continued where we are satisfied that it gives a reasonable shelf-life for our customers—at least six months with not more than 2% decomposition. For some of these amino acids,

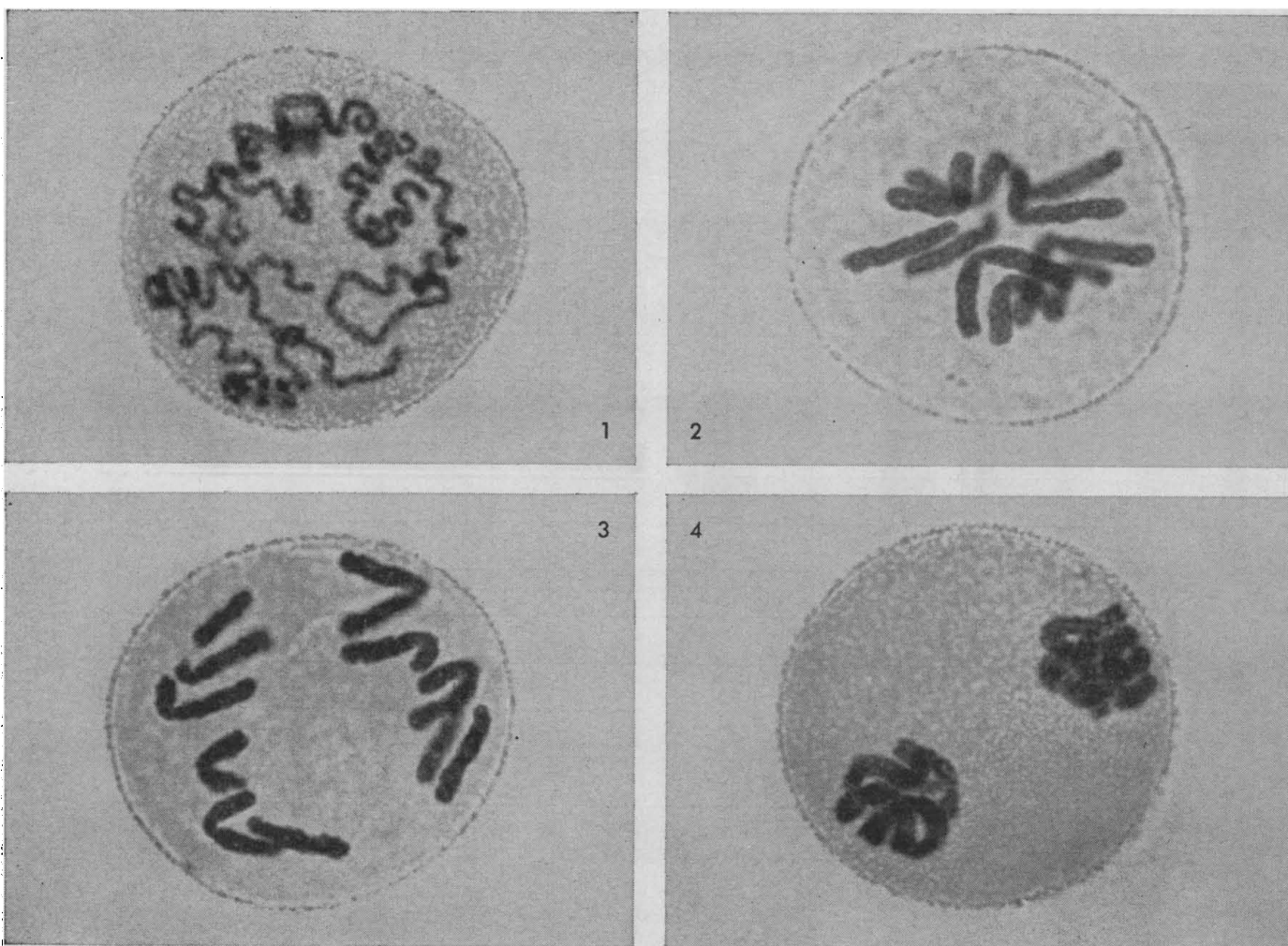
however, decomposition was found to be excessive. These are now being supplied on Whatman No. 3 paper in evacuated, sealed ampoules. The laboratory is always investigating methods for improving radiation stability and, therefore, the exact method used may change as further experience is gained.

Send for catalog—A complete catalog of nearly 400 carbon-14 labelled compounds is available on request. The Radiochemical Division of Nuclear-Chicago will also prepare carbon compounds on special order. For complete information, call us collect at 312 827-4456.

NUC-G-4-235



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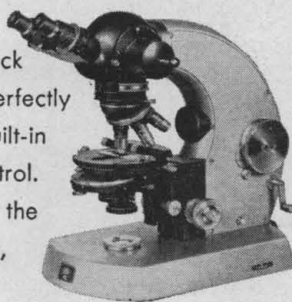


Photomicrographs of meiosis as follows: 1) Prophase, 2) Early Anaphase, 3) Anaphase, 4) Telophase . . . magnification—1600x. Taken by Robert F. Smith.

Make a sequence like this by touching a button

With the Carl Zeiss Photomicroscope you can click off a whole series of photomicrographs, each perfectly exposed and in focus. The microscope has a built-in automatic camera with photoelectric exposure control. The touch of a button opens the shutter, exposes the film the proper length of time, closes the shutter, transports the film one frame, actuates a film counter . . . ready for the next exposure. You can take an entire series of photomicrographs rapidly in color or black-and-white.

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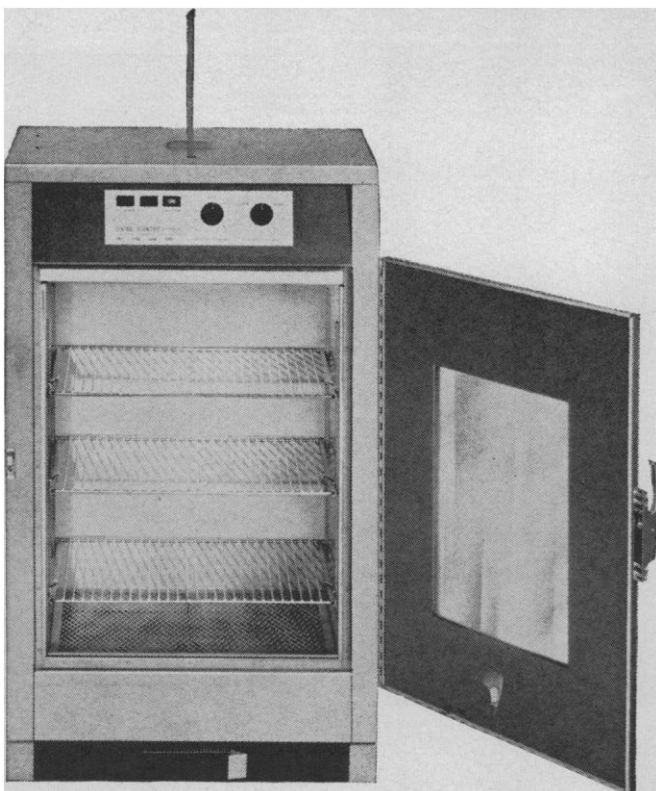
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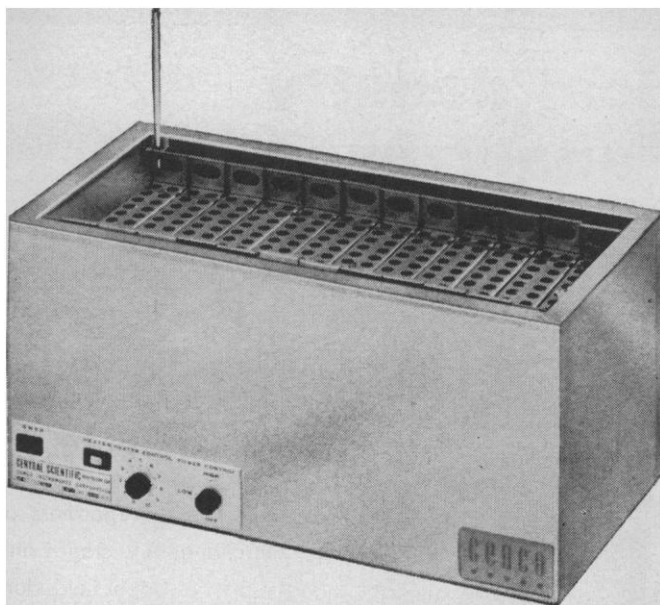
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High capacity . . . Forced draft circulation for uniform heat distribution no matter what the load . . . Unique control system—hydraulic thermostat and proportional power device ensure constant temperature and safety of sample contents . . . Sheathed Incoloy heaters—protected against spillage . . . Double-wall construction . . . Stainless steel interior . . . Adjustable shelves—48 positions on 1/2-in. centers.

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Cenco's expanded line of water baths includes a new series of three utility-medical baths capable of a wide variety of applications for medical and general testing, industrial quality control, and petroleum and chemical testing. Three sizes are offered, each with the following features:

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All sizes of these new utility-medical baths can be equipped with a wide range of accessories such as test tube racks, gable covers, concentric ring covers, and water level regulators.

Cenco also has many other special-purpose constant-temperature baths available for immediate delivery.

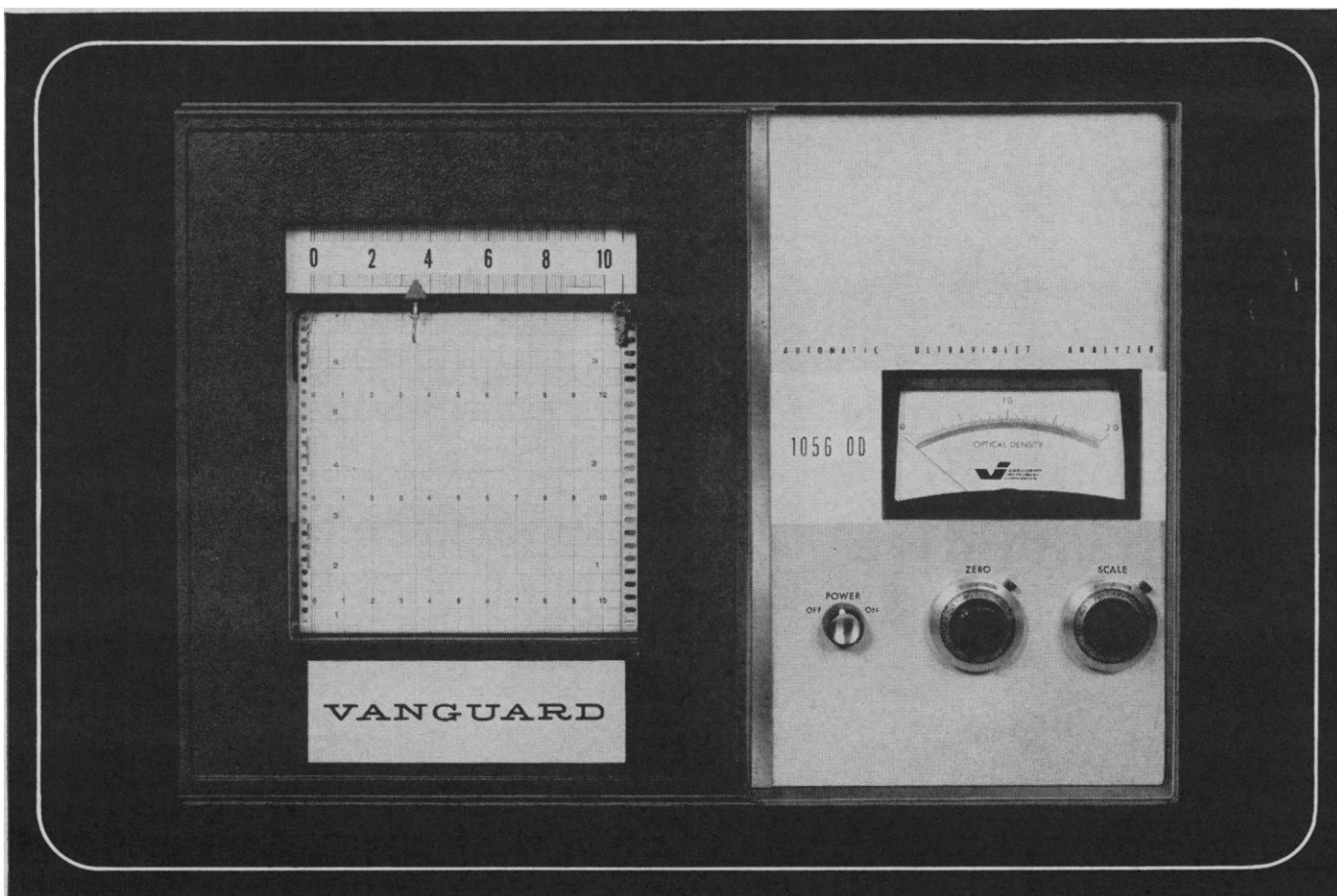
CEN-4-220

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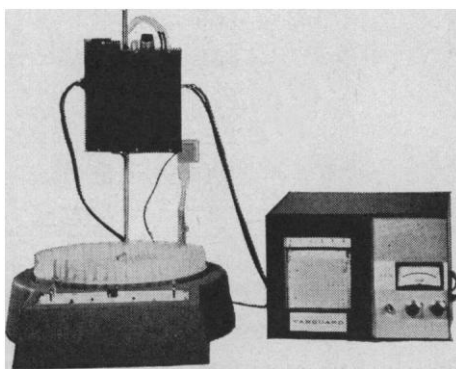
new automatic optical density ultra-violet analyzer

Vanguard Model 1056-OD Automatic Ultra-Violet Analyzer provides the investigator with unequalled reliability and versatility. Through the use of two independent logarithmic converters, this instrument provides a chart recording of the optical density of the effluent from a chromatographic column—the ordinate of which is linear with optical density. In addition, a plain diffraction grating monochromator enables the operator to select any wave length from 200 millimicrons into the visible spectrum.

■ Dual beam operation utilizing sample and reference cuvettes provides continuous base line

compensation for gradient elutions or other applications where the optical density of the eluent may change ■ Automatic chart recorder marking system speeds location and identification of test tubes containing ultra-violet absorbing fractions ■ Completely transistorized for dependable, maintenance-free operation ■ Detection system completely self-contained and light-shielded.

For complete specifications on the Model 1056-OD Automatic Ultra-Violet Analyzer, send for new informative literature. For immediate information and/or a quotation, call your nearest Vanguard office.



Model 1056-OD Automatic Ultra-Violet Analyzer shown with Model 1000 Fraction Collector. Model 1056-OD is compatible with all Fraction Collectors.



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Sephadex® Beads

EXTEND THE USEFULNESS OF GEL FILTRATION IN ANALYTICAL AND PREPARATIVE OPERATIONS

Effluent delivery rates increased full order of magnitude

Improvements in the production of SEPHADEX now permit this useful cross-linked dextran material to be supplied in the form of spherical beads. Substitution of the new beads for the irregularly shaped particles in which SEPHADEX was heretofore available (see Figure 1) results in far more uniform hydrodynamic conditions within SEPHADEX columns. Tangible results? *Flow rates are greatly improved with remaining good resolution.*

The introduction of the new beads greatly extends the possibilities to use SEPHADEX gel filtration in production-scale preparative operations. We strongly suggest that laboratory workers acquaint their colleagues in semiworks and production engineering with the new beads of SEPHADEX. The use of the spherical particles could open entirely new avenues in unit operations.

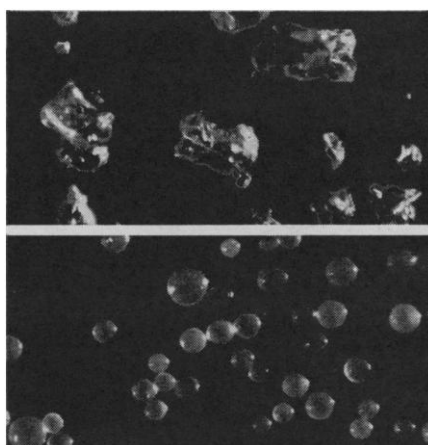


Figure 1. SEPHADEX was formerly supplied in the form of irregularly shaped particles as shown in top photograph. Now available in spherical beads as shown below, SEPHADEX facilitates packing of columns and greatly increases speed of operations.

SEPHADEX LABORATORY COLUMN

A chromatographic column, designed by Pharmacia, especially for gel filtration with SEPHADEX, is available and is described in a separate leaflet. Please ask for information.

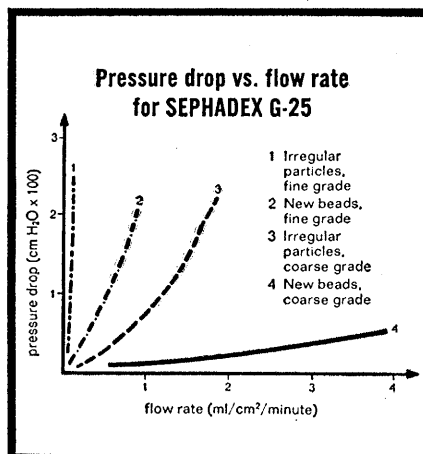


Figure 2. The curves above depict pressure-drop/flow-rate functions for columns using a 50 cm bed of SEPHADEX G-25. For given hydrostatic heads, note that the new spherical beads give up to tenfold greater effluent deliveries. Analytical procedures are hastened and preparative operations are put within economically practical engineering ranges.

Available forms of new SEPHADEX beads

SEPHADEX Type	Exclusion Limit (MW)	Grade	Size (microns)	Bed Volume ml/g
G-25	5,000	coarse fine	100-300 20-80	5
G-50	10,000	coarse fine	100-300 20-80	10
G-75	50,000	one grade	40-120	12-15
G-100	100,000	one grade	40-120	15-20
G-200	200,000	one grade	40-120	30-40

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For full information on the use of SEPHADEX in gel filtration, send the coupon with your letterhead.

(Inquiries outside North America should be directed to AB PHARMACIA, Uppsala, Sweden.)



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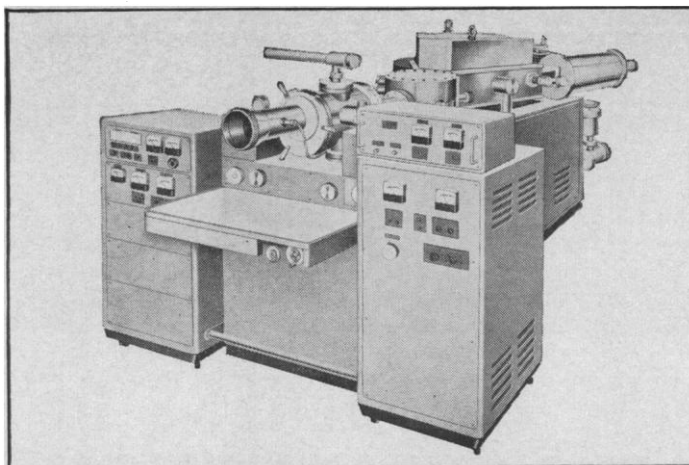
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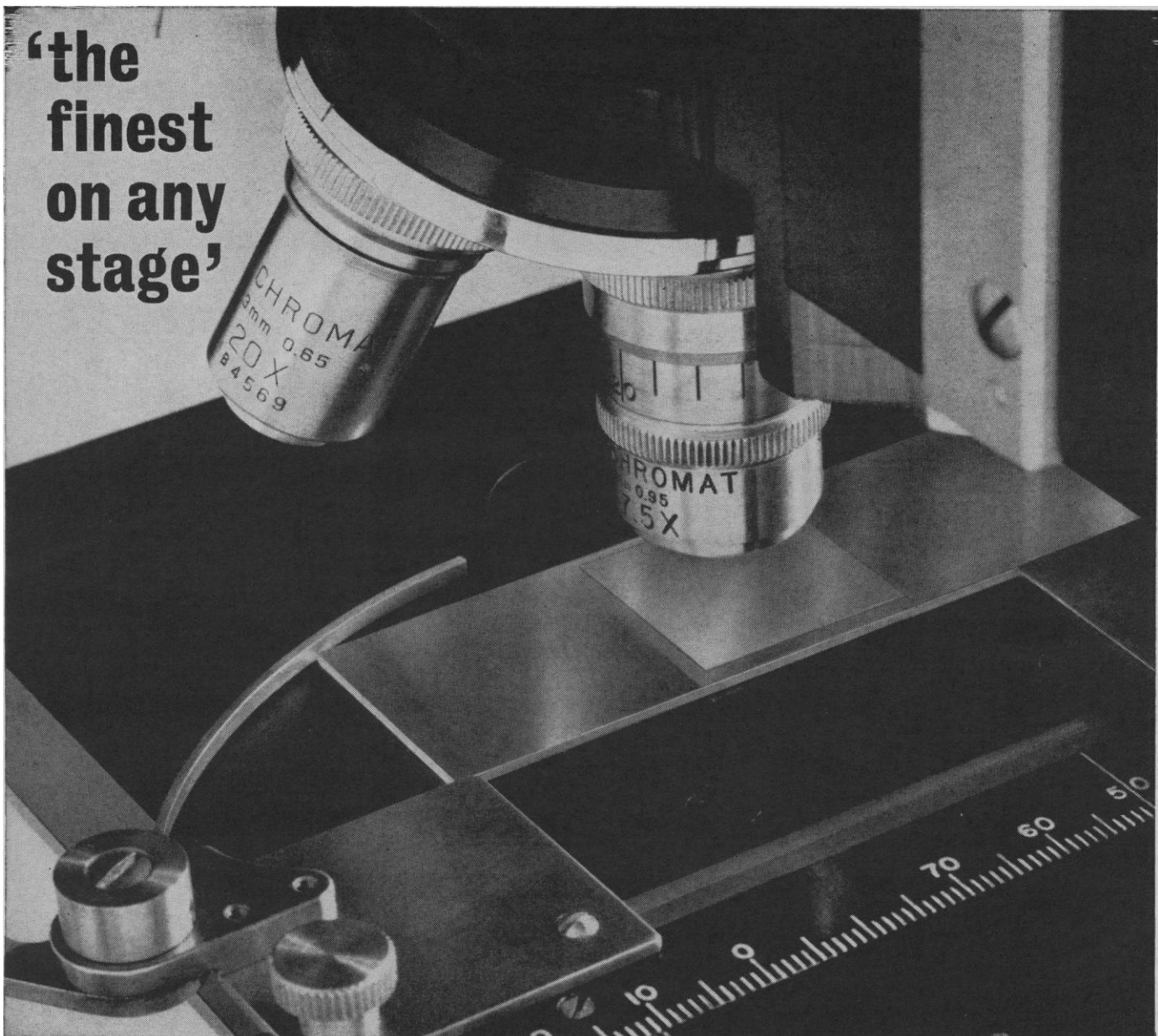
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The JEOL (Japan Electron Optics Laboratory Co.) Double Focusing Mass Spectrometer, JMS-01U is an unconventional Mattauch type instrument. It features, in one instrument, the use of either or both types of ion sources — spark and electron bombardment, and either or both detection methods — photographic and electrical. This flexibility allows high resolution analysis of metals and semiconductor impurities and high molecular weight organic structures. The basic analyzer tube is very easily adjustable through a unique mechanism for ion beam focusing and intensity control to attain exceptionally high resolution, sensitivity and reproducibility. Direct sample inlet and reservoir type heated inlet systems are optionally available as well as a peak matching device and emission outlet. Specially designed and convenient front panel controls assure simple operation. JEOLCO (U.S.A.), Inc. has established a fully staffed servicing network in the United States to provide technical assistance and assure continuous trouble-free service. For complete technical and sales information please call or write JEOLCO (U.S.A.), Inc., 461 Riverside Avenue, Medford, Massachusetts 02155, telephone 396-6241, area code 617.

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GOLD SEAL® SLIDES and COVER GLASSES

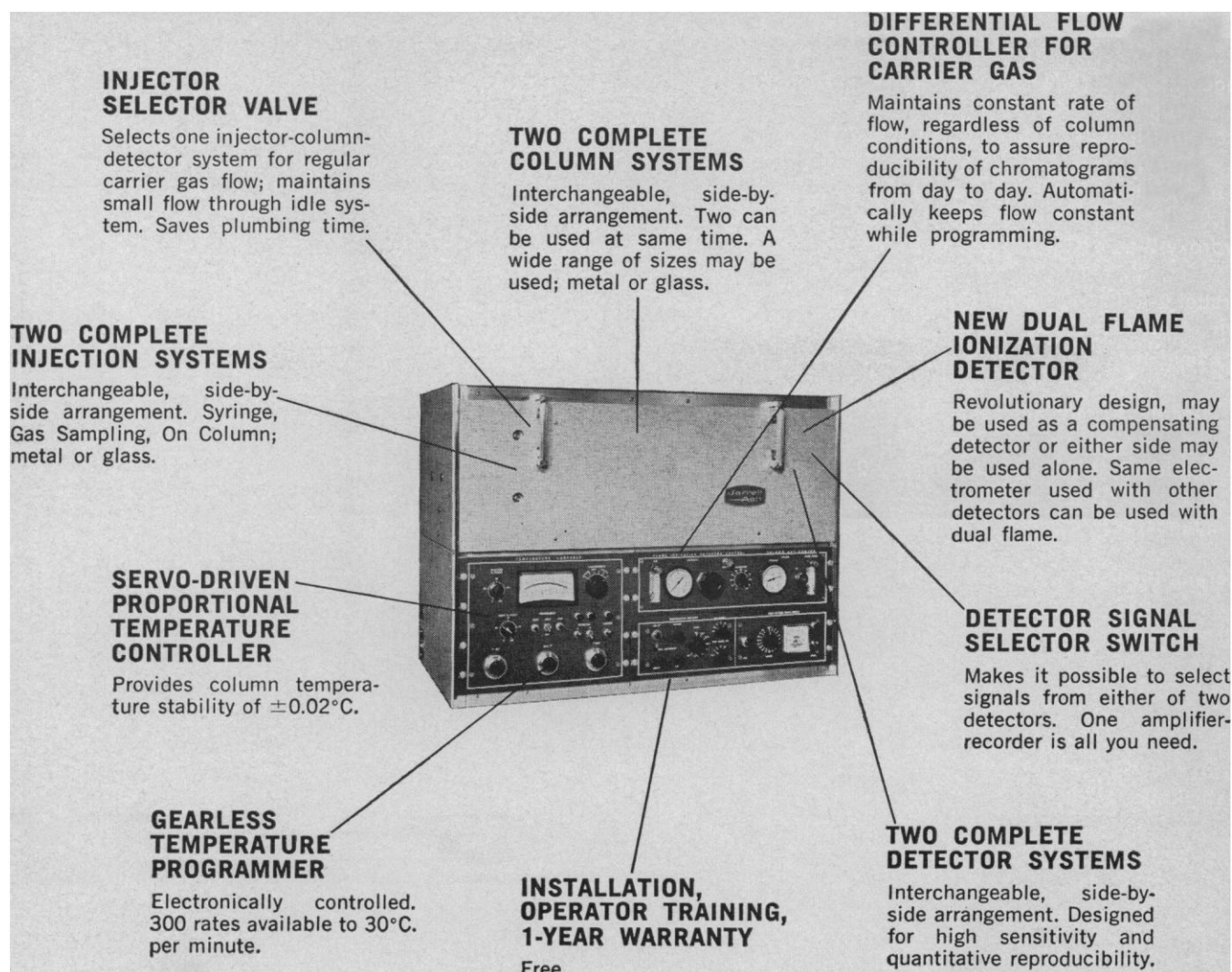
Microslides and cover glasses bearing the familiar "Gold Seal" label have set standards of quality for many years. They are as perfect as painstaking manufacturing processes can make them. And as a final safeguard, they are individually inspected before being packaged.

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Your dealer carries "Gold Seal" microslides and cover glasses and a large selection of microslide boxes, cabinets, and other accessories. Illustrations and full details of all items may be found in the Clay-Adams catalog No. 107. If you do not have a copy, write today on your institutional letterhead to:

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rogen mustard (ethylene-1, 2-C14) Triolein-carboxyl-C14 S-adenosyl-L-methionine-methyl-H3 DL-hydroxypro
 ntobarbital-2-C14 Nicotinic acid-7-C14 S-adenosyl-L-methionine-methyl-C14 N-hydroxy-2-acetylaminofluore
 L-methionine-methyl-H3 DL-norepinephrine-7-H3 hydrochloride Methyl oleate-1-C14 Vitamin A
 hydroxy-2-acetylaminofluorene-9-C14 Dopa-2, 3-H3 Pentobarbital-2-C14 Methyl stearate-1-C14 Oleic
 arbital-2-C14 Maleic hydrazide-2, 3-C14 Fluorene-9-C14 Dimethyl malonate-2-C14 Linoleic acid-1-C14
 cinnamic acid-2-C14 Iodoacetamide-1-C14 Nicotinamide-7-C14 Nitrogen mustard (ethylene-1, 2-C14)
 N-acetyl-1-C14-D-glucosamine DL-hydroxyproline-2-C14 Cinnamic acid-2-C14 S-adenosyl-L-methionine-methyl-H3
 hydrazide-2, 3-C14 N-hydroxy-2-acetylaminofluorene-9-C14 Iodoacetamide-1-C14 Triolein-carboxyl-C14
 S-adenosyl-L-methionine-methyl-C14 Vitamin A-2-C14 Oleic acid-1-C14 N-acetyl-1-C14-D-glucosamine
 uorene-9-C14 Barbitol-2-C14 Nitrogen mustard (ethylene-1, 2-C14)
 Nicotinic acid-7-C14 Methyl stearate-1-C14 Linoleic acid-1-C14
 Dopa-2, 3-H3 Methyl oleate-1-C14 Dimethyl malonate-2-C14
 Methyl oleate-1-C14 Nicotinamide-7-C14 Methyl oleate-1-C14
 nine-methyl-H3 Oleic acid-1-C14 Pentobarbital-2-C14 Barbitol-2-C14
 Methyl stearate-1-C14 N-acetyl-1-C14-D-glucosamine
 2, 3-H3 Vitamin A-2-C14 Iodoacetamide-1-C14 Fluorene-9-C14
 enosyl-L-methionine-methyl-H3 Maleic hydrazide-2, 3-C14 Iodoacetamide-1-C14
 Linoleic acid-1-C14 L-methionine-methyl-H3 Dimethyl malonate-2-C14
 DL-norepinephrine-7-H3 hydrochloride Nitrogen mustard (ethylene-1, 2-C14)
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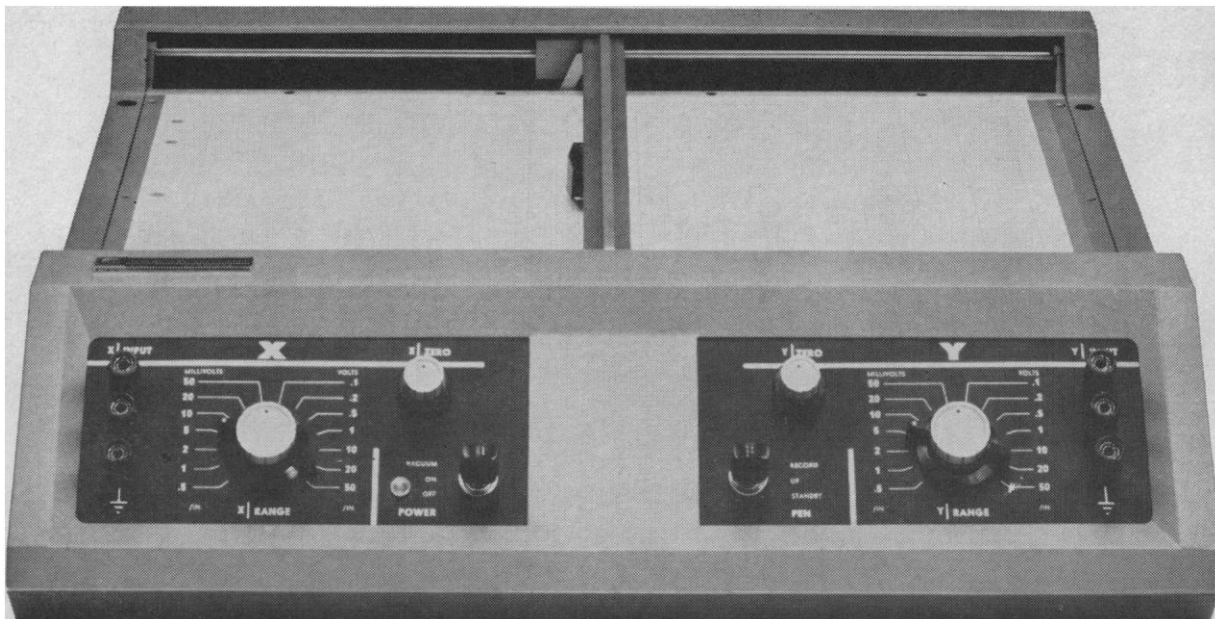
John Leach



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ANOTHER NEW X-Y RECORDER FROM VARIAN?

Yes and no. The new F-81 is the same high quality recorder as our recently introduced F-80. It is also the most accurate, fully-equipped X-Y you can buy for under \$1900. Here's a basic instrument that comes with all the features you need to do the job. It has a unique vacuum hold down for the chart, electric pen lift, and solid-state ruggedness throughout. You can use any size or shape of paper from 2" x 2" to 11" x 17", without masking. And you can position the chart with the vacuum on. □ Human engineering on the F-81 gives you new operating convenience. Simple control panel, easy-to-service magnetic pen holders and field-convertible bench top or rack mounting make it easy for you to build this X-Y recorder into test consoles, control panels, and analytical instruments.

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- F-81 price \$1875

What's the difference between the F-80 and the F-81? The F-80 has an automatic-cycling time base and sells for \$2025. □ For further information or a demonstration write Recorder Division. In Europe contact Varian A.G., Zug, Switzerland.

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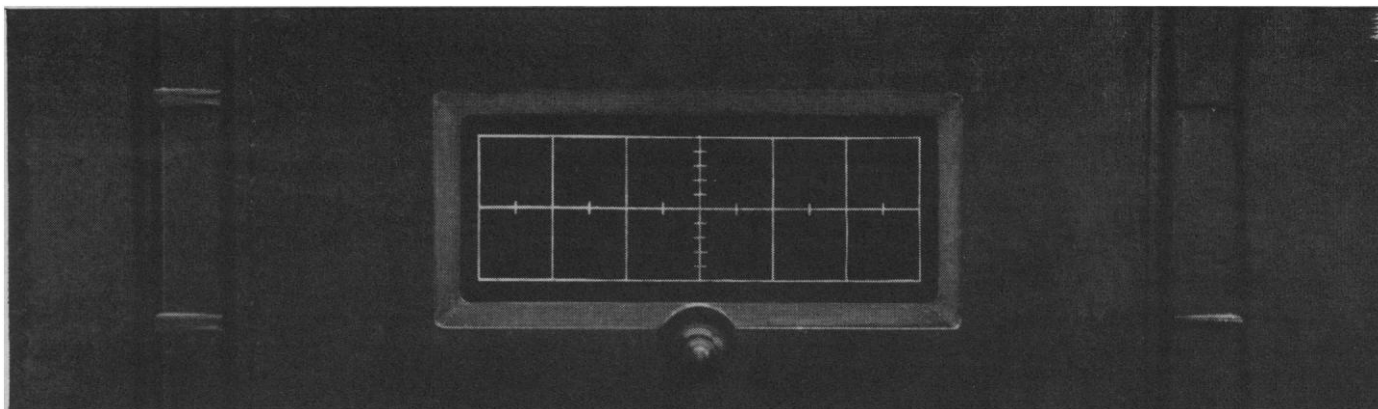
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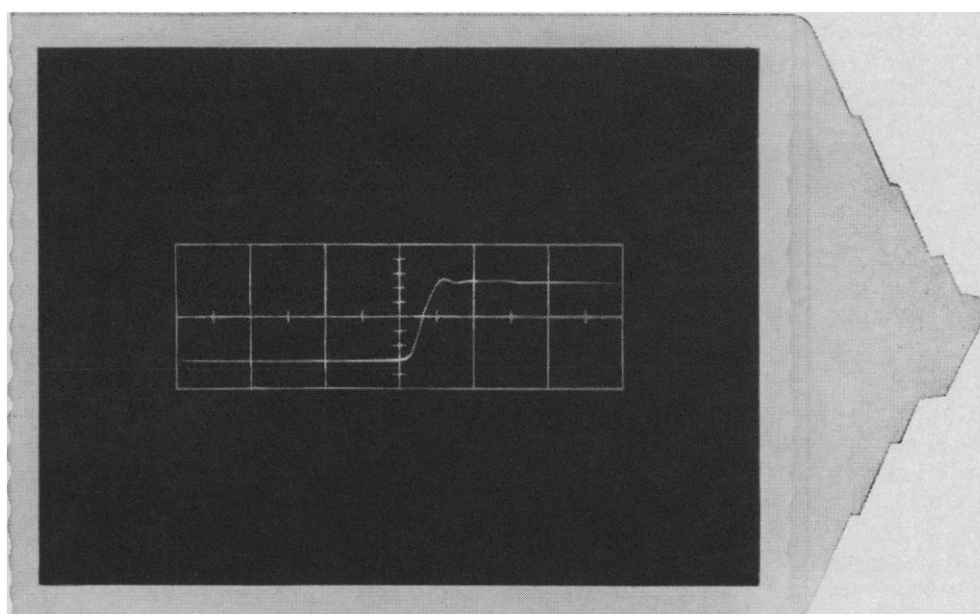
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See anything?



This new film did.

This new film saw something the eye couldn't: the rise time of a single pulse on a Tektronix 519 scope at a sweep rate of 2 nanoseconds/cm. The new film, Polaroid PolaScope Land Film, actually extends the usefulness of existing oscilloscopes by supplying "brightness" that the scope hasn't got!

The reason is that this PolaScope film has an ASA equivalent rating of 10,000, which means it can see things your eye cannot. It has about twice the writing rate of the Polaroid 3000-speed film, currently the standard for

high speed oscilloscope photography. (No other commercially available films come anywhere near the speed of PolaScope film.) And because it's made by Polaroid you get a finished usable print — see above — ten seconds after exposure.

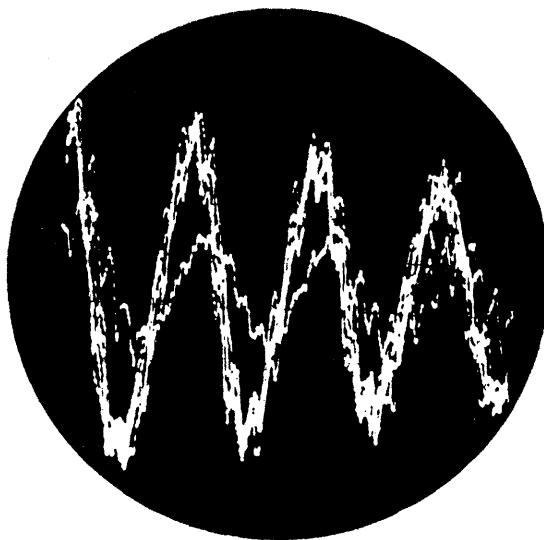
PolaScope film will also give you better shots of slower pulses and stationary waveforms. So little light is required, camera aperture and scope intensity can be reduced considerably, and that's how to get really sharp oscilloscope pictures.

And wherever else light is at a premium — such as photomicrography and Kerr Cell photography — PolaScope film will make new applications possible, old applications more useful.

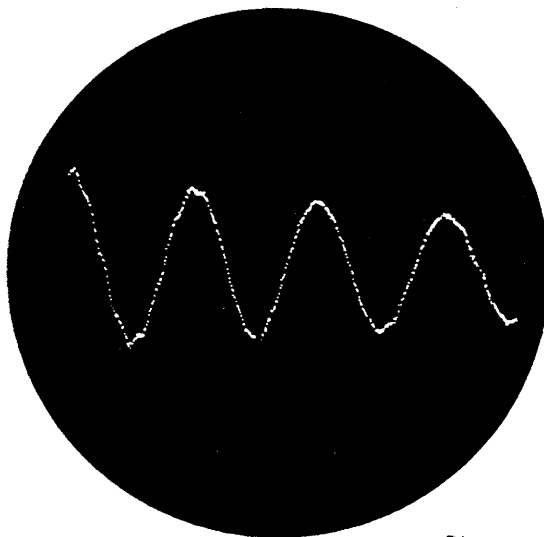
PolaScope Type 410 Film is packed 12 rolls to the carton. The price is actually lower than the Polaroid 3000-speed film. For the name of the industrial photographic dealer nearest you, write to Technical Sales Department, Polaroid Corporation, Cambridge 39, Massachusetts.

POLAROID®

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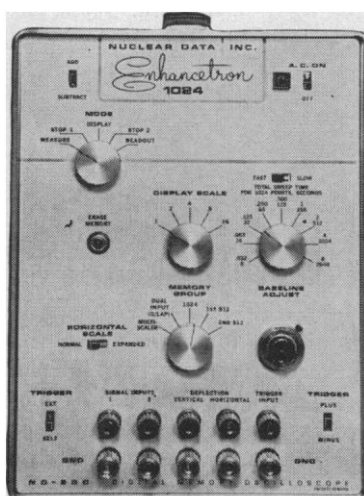


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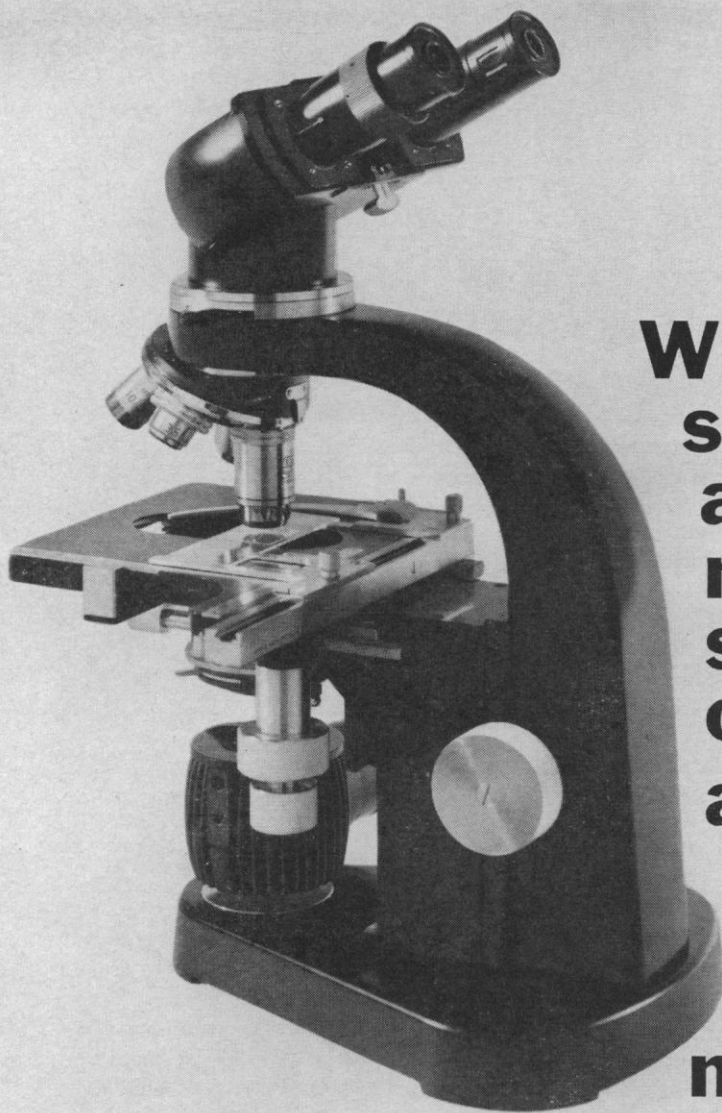
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The Social Sciences and Society

Hard-nosed social scientists strive to avoid problems of policy and to concentrate on process. When they deal with value preferences at all, it is to measure their incidence, distribution, and intensity in a given population. Matters of this kind can be treated objectively, quantitatively, and scientifically, and the social scientist thus can avoid the fact-value syndrome that plagues his more traditionally oriented colleagues.

Unfortunately this value-free posture tends to blind the so-called hard-nosed social scientist to the really great problems of man and society and often focuses his attention upon relatively unimportant issues. It helps to explain the monumental accumulation of trivia and the ponderous elaboration of platitudes that characterize so much contemporary social science. And it tends to make social science a more or less sophisticated servant of any power elite that may seek its services in the manipulation of human behavior, regardless of goal or purpose.

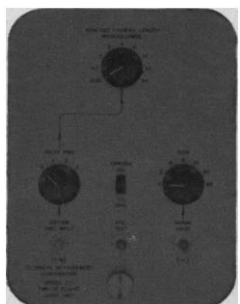
A value-free science is of course absurd in any strict sense since science has its own norms, standards, or values, by which its statements are tested and/or evaluated. Nor is it enough to say that scientific values are merely methodological or procedural, concerned with means and not ends, except only as they aid in the objective pursuit of truth. For truth wears many faces, and to discover what is true or false is not unrelated to the discovery of what is good or bad. A scientific concept can be true or false in the degree to which it corresponds to the norms or standards of science itself—i.e., to meter readings—and it may be good or bad in the degree that it contributes to, or corresponds with, the basic needs and goals of human life. Unless science is merely random behavior or idle curiosity without purpose, it has a responsibility to discover and to serve these basic needs and goals.

This lays a special obligation on the social sciences because they are by definition concerned with man and society. So-called behavioral science, whether hard-nosed or soft-nosed, assumes that human behavior is goal-directed, and that in striving for these goals, men choose among alternative modes of conduct. It assumes also that in choosing, they are conditioned not merely by the physical world and the pressures of appetite and instinct but by formal education in rational modes of thought and behavior. Rationally induced changes in human behavior thus become as reasonable—as scientific—as rationally induced changes in the physical environment. There is nothing unscientific in social scientists' seeking to change those conditions of character and environment that impair man's ability to make rational choices among alternative modes of behavior.

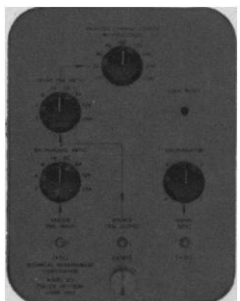
Not less important is the task of social scientists, by precept and example, to encourage in everyone they can reach a conscious and continuous reflection on the human condition and on alternative roads to the basic goals for which all men strive. Scientists are not immune from the responsibilities of other citizens. They need to be reminded that attitudes of Olympian indifference or cynicism toward moral and ethical problems in a society that has all but canonized the scientist can issue in apathy and cynicism among others, attitudes dangerous alike to science and a good society.—PETER H. ODEGARD [Excerpted from *The Educational Record* 45, 190 (1964)]



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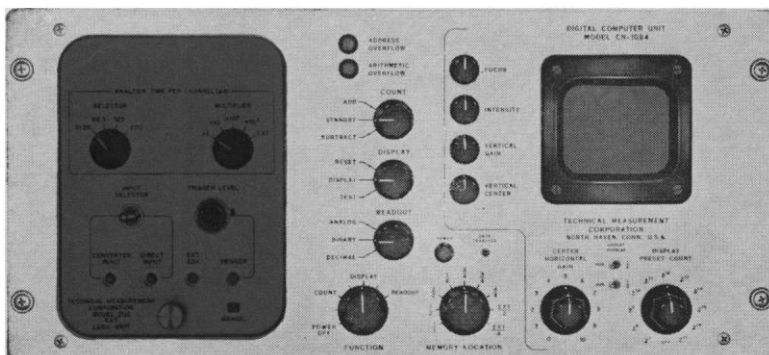
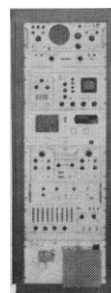
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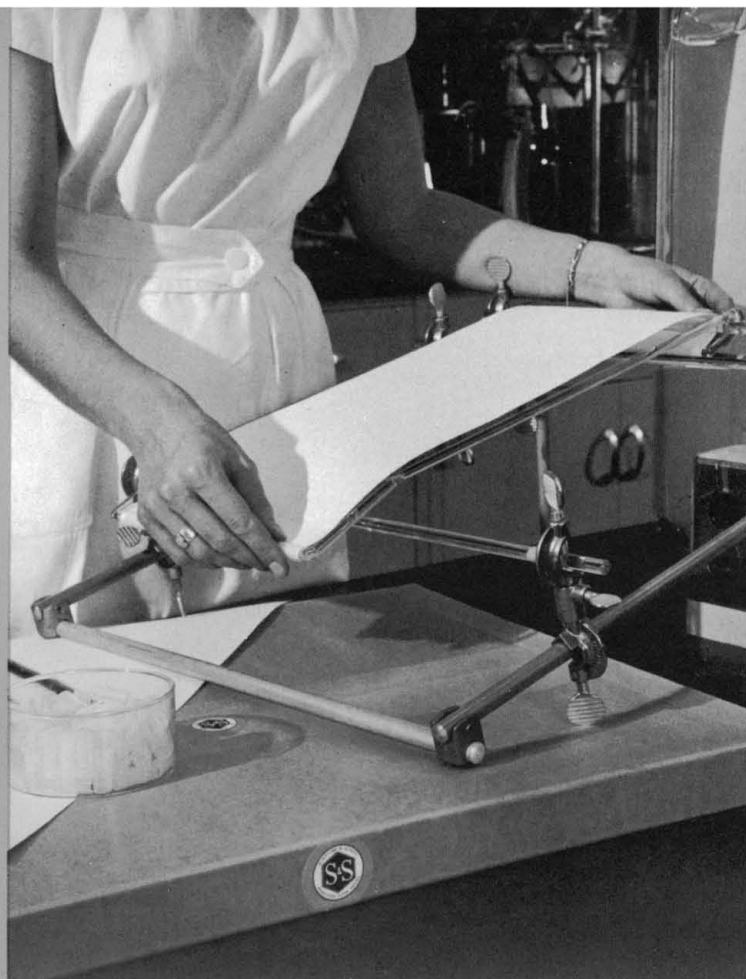
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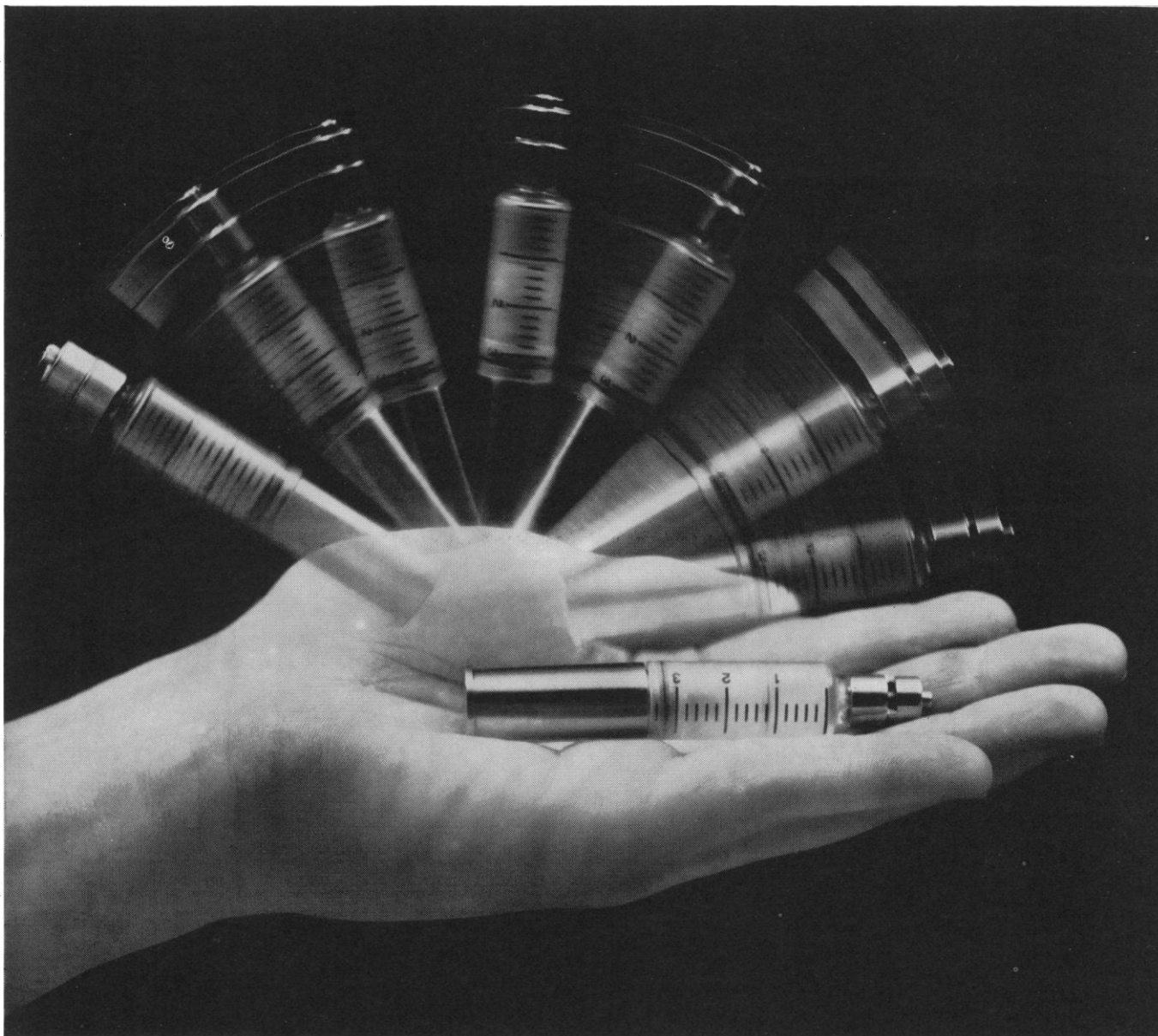
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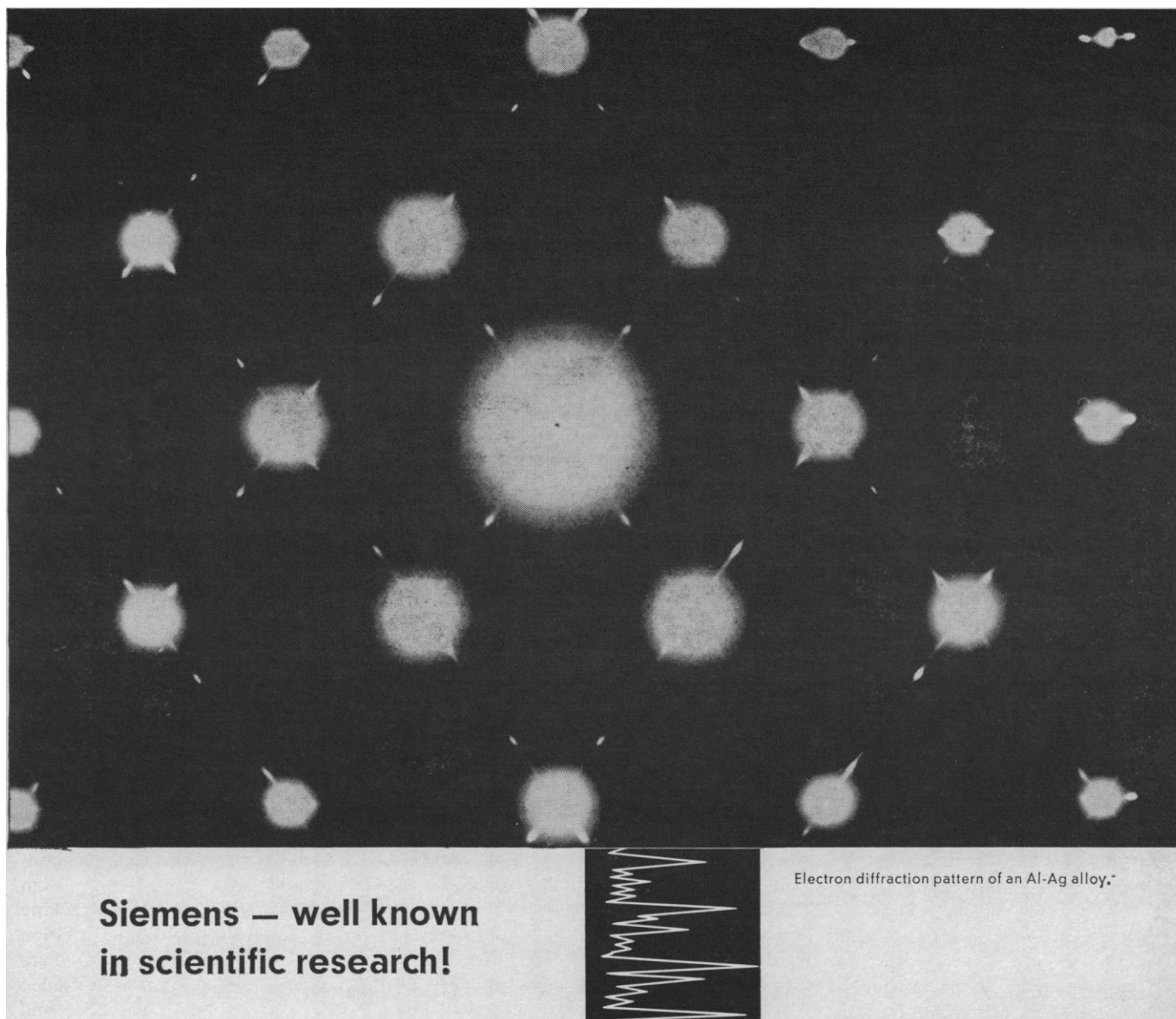
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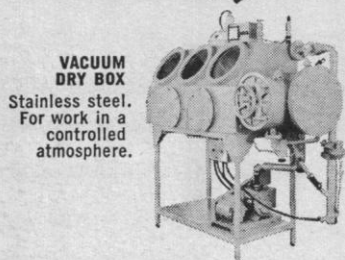
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towns have subsided, perhaps by a combination of effects of compaction and slumping.

Landslides were widespread, but the slides in Anchorage are best known. Slides there occurred along cliffs in outwash gravels overlying silt and sand. Several slides were more or less conventional rotational slides. The Turnagain Heights slide which was the largest is quite different; it consists of a series of slices that slid down and then away from the cliff, along what seems to be an almost horizontal surface. This sliding stopped when the earthquake stopped. Incipient cracks occur on the relatively undisturbed land surface behind the head of the slide.

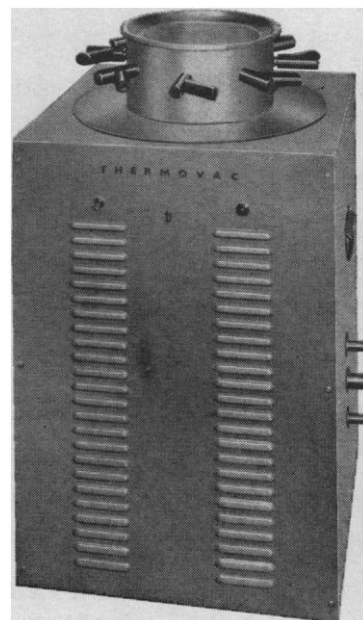
Structures built on bedrock were less severely damaged than structures built on unconsolidated sediments. For example, large buildings at Anchorage built on unconsolidated sediments were extensively damaged, whereas large buildings built on bedrock at Whittier, only half as far from the epicenter as Anchorage, suffered minor damage. It is hard to estimate intensity because so many factors affect the damage. Large structures of reinforced concrete were significantly damaged although adjacent small, woodframe structures were undamaged. The amount of damage is affected not only by epicentral distance but also by the kind of foundation material, bedrock or unconsolidated deposits, the type of construction, the height of the structure, and the duration of shaking.

Kachadoorian commented that during a comparable earthquake near the San Francisco Bay area he would expect compaction to occur in the marginal lands around the bay that are being developed with engineered fill over bay muds. He noted that much of the highway fill in Alaska could be called engineered fill, yet in most places in the meizoseismal region where the highways crossed unconsolidated sediments they were disturbed by the earthquake. He had no examples of the behavior of large buildings on engineered fill over loosely consolidated, water-saturated sediments. He thought that frozen ground had little influence on the damage because the frost zone was only a small fraction of the thickness of unconsolidated sediments. He noted that steel railroad bridges as far north as Hurricane had buckled in compression. Many highway bridges had pounded and damaged their terminal piers.

An account of the structural damage

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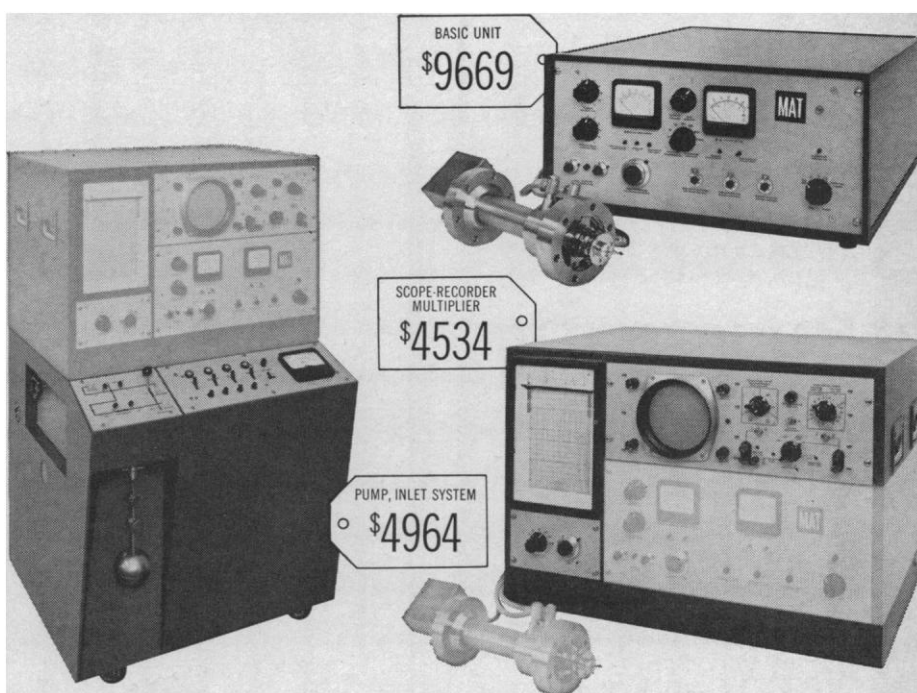
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*Pat. Pend.

in Anchorage was given by K. V. Steinbrugge (Pacific Fire Rating Bureau, San Francisco). As a possible cause of the compression in bridges mentioned by Kachadoorian, lurch-cracks parallel to many streams, which had been observed from a helicopter, might be considered. Steinbrugge stressed the close connection between the behavior of both the building and the ground. More attention must be given to the quantitative measurement of ground motion in an earthquake. The character of this motion is a function of distance. In the Good Friday earthquake, the changes in ground motion over the 120-km distance from the focus to Anchorage evidently were the reason for selective damage to tall structures in comparison with the usually undamaged, small rigid buildings. Similar selective damage occurred in Mexico City from the 28 July 1957 earthquake, located just off the Mexican coast. The three key factors of poor construction, poor foundation material, and long-period ground motion were also common to the two cases.

The different effects produced by long-period and short-period motion make intensity scales difficult to apply. An extreme example of intensity variation is the Turnagain area with both total destruction (intensity XII) and little or no damage to many houses on the bluff (intensity VII), including their unreinforced, concrete-block chimneys. The duration of the earthquake motion is an important datum; in one case a group of men left and reentered a building twice while shaking continued. In certain single-story shops in Anchorage moveable goods were undisturbed on shelves. This indicated a small proportion of short-period accelerations. The damage studied in detail was that due to vibration in structures whose substrata had not failed by compaction, lurching, or landsliding. Most of the vibration damage could be explained as failure to meet standards of construction or design of the quality accepted in the San Francisco Bay area. Some doubt must remain, however, on the adequacy of even this relative standard; Anchorage was about the same distance from the primary shock as Sacramento is from San Francisco. With many modern structures such as precast concrete, the interconnections between elements are critical. There were numerous examples of failure in joints and connections. Some failures within reinforced concrete columns were related

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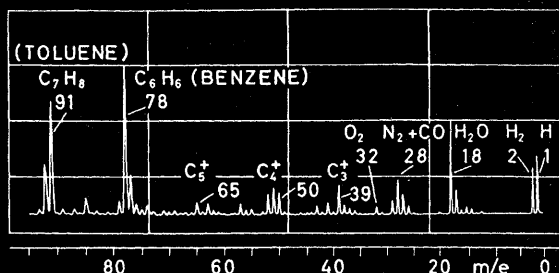


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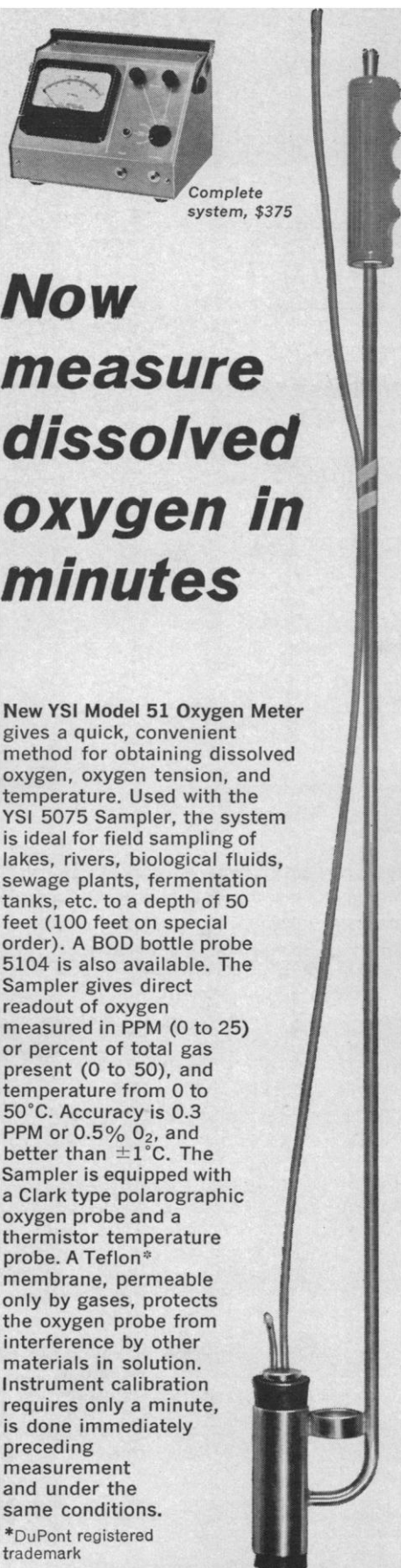


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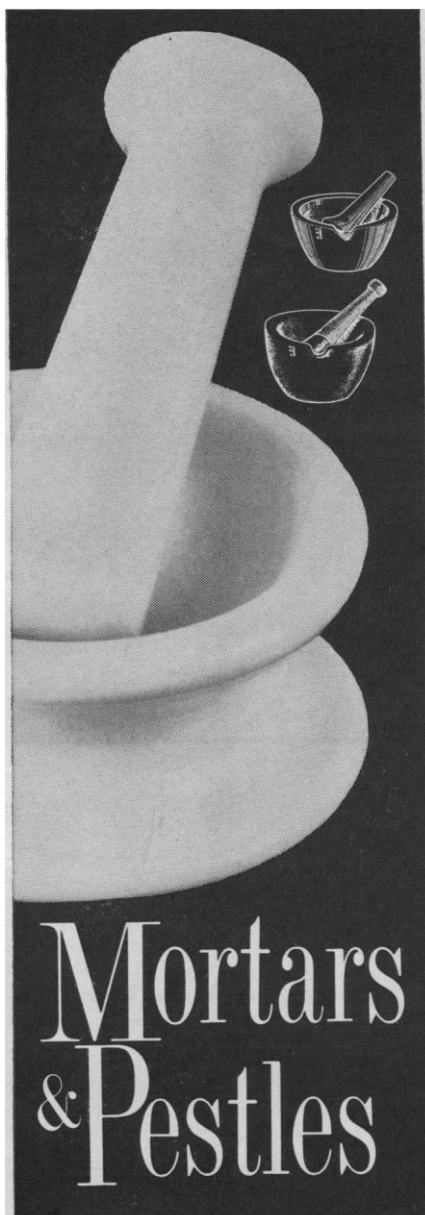


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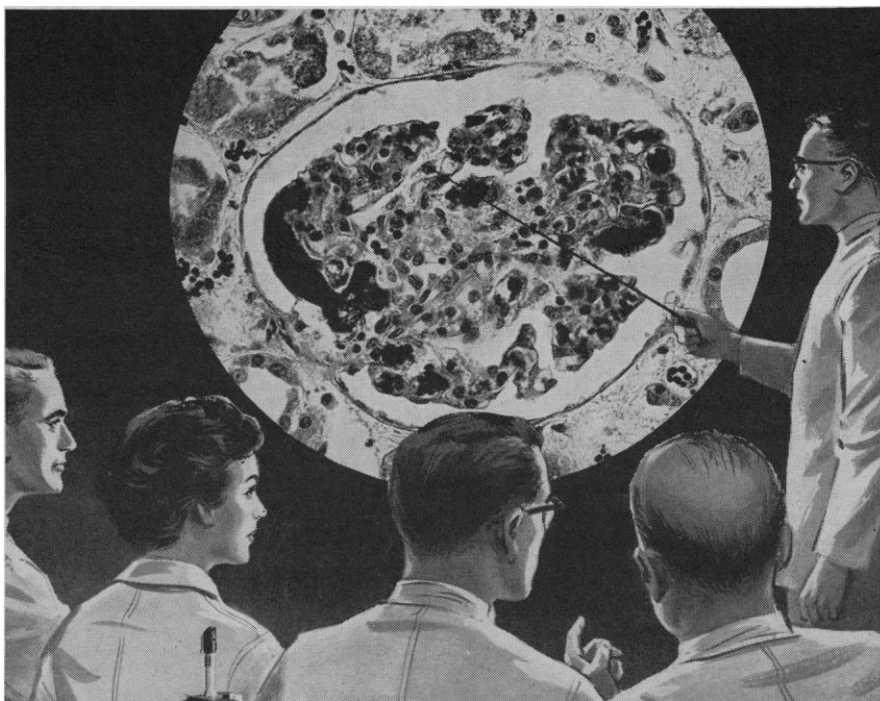
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to the irregular manner in which reinforcing steel was tied together before the concrete was poured.

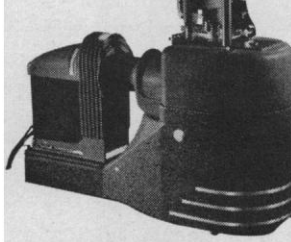
Only close examination of particular structural damage provided reasonable conclusions in many cases and these were instances of ineptly handled design or construction, or both. This raises the question of whether special knowledge of effects of earthquakes should not be taught more widely in schools of structural engineering. In the case of one multi-storied, damaged building, initial opinion blamed the foundation soils. Excavations now made show that the poor quality of the concrete foundations allowed them to fail in this building. The pattern of damage in Anchorage should not lull us into a sense of security; a strong earthquake nearer to Anchorage could give quite a different pattern.

During the questions, the chairman asked if there was an earthquake building code in Anchorage. Steinbrugge replied affirmatively and commented that interpretation and enforcement are important. In answer to a question of whether any concrete, multi-storied building was undamaged, he indicated that of the buildings over six stories personally inspected only the New Providence Hospital had little damage. Other questions raised concerned (i) the correspondence between the free periods of buildings and the predominant ground motion and (ii) the effect of the extreme seasons on the curing of concrete. The reply in the first case was that only the strong-motion record from the aftershock referred to by Cloud was available. A period of 6/10 second would probably affect more the taller buildings. In the second case, reasons other than frozen concrete could usually account for the damage. In response to a question concerning damage at Spenard High School, F. McClure (consulting structural engineer) replied that the key to failure in that case was in execution of the design rather than in the design itself.

Before turning to a general discussion, the chairman invited R. E. Goodman (Department of Mineral Technology, Berkeley) to report on his field observations in Alaska of the relation between soil mechanics and damage to structures. Goodman observed that we are ignorant about many factors that are fundamental to the safety of structures now being erected in the San Francisco Bay area. We do not fully understand the mechanics of soils under dynamic loads. We do not know



Kidney, 300X (Rochester General Hospital)



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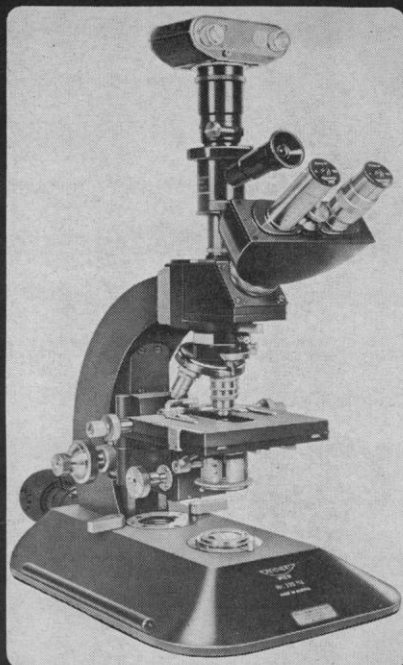
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how foundations interact with structure. Much current research on these problems is based on data from smaller earthquakes. Shaking table experiments with soils indicate that we cannot scale up effects of small earthquakes to anticipate effects of large earthquakes because there is a transition from elastic to inelastic behavior. The magnification factor of ground accelerations and displacements on soft grounds in laboratory models subjected to shaking is much higher in response to horizontal forcing motion than in response to vertical. Furthermore, it has been demonstrated that horizontal shaking has a much larger effect on slope stability than the vertical component of motion. Because there are no strong motion records in Anchorage of the Alaskan earthquake, there is little information that can be of use in soil mechanics about the design of foundations. We urgently need the installation of more strong-motion seismographs in seismic areas. We must evaluate all the exceptions to the generalizations on the relation of damage to substrata and all possible relevant variables, in order to acquire further understanding.

After Goodman's remarks, the chairman invited comments and a lively discussion took place. Kachadoorian commented that although there is much we need to know in order to develop criteria for design, the geologic observations very clearly point out the problems with which engineers must deal. He disputed the point that, because of the lack of strong motion records, little useful information has been acquired from the Alaska earthquake; strong motion records would certainly be valuable, but the available information on the ways that foundations and structures fail should be very useful. Steinbrugge noted that experience in how structures fail, even where we do not have all the data we wish, provides an empirical basis for future design. C. A. Wahrhaftig (Department of Geology and Geophysics, Berkeley) remarked that the report of the State Earthquake Investigation Commission on the 1906 earthquake in California showed a nearly perfect correlation between intensity of damage and nature of the substratum. Lines of equal damage are parallel to contacts of alluvium with bedrock and roughly follow the contours of depth of alluvium, not only within San Francisco, but also over the coast ranges and central valley. G. B. Oakeshott (California Division of Mines) reported a few of his ob-

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servations in Alaska. Cordova is about as far east of the epicenter of the earthquake as Anchorage is west. Cordova is built on bedrock and the town suffered no shaking damage. The highway to the Cordova airport crosses the delta of the Copper River on gravel fill over mud and muskeg for a distance of about 2 km. Over this interval there was almost total failure of the pavement; the part of the highway built on bedrock was not even cracked. The town of Girdwood is in the area of highest intensity of damage; railroad and highway beds on filled ground failed completely, but the windows were not broken in a schoolhouse built on bedrock even though it had a concrete block foundation.

The question was next raised as to whether the correlation between substrata and damage is as clear as previous speakers had implied; in the Arvin-Tehachapi earthquake of 1952 railroad tunnels in bedrock were severely damaged whereas dams and other structures on loose ground at comparable epicentral distances were not damaged. Oakeshott replied that the tunnels at Tehachapi are in deeply weathered, granitic rock; they were dug without the use of explosives. Wahrhaftig added that three of the four damaged tunnels were along the line of surface breakage on the fault.

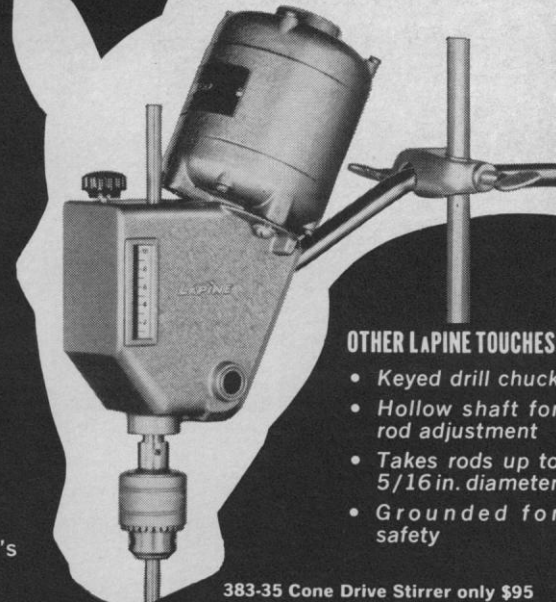
A number of salient scientific and practical points emerged as a result of this symposium. The earthquake has drawn attention to a region that is of exceptional geological and geophysical interest because of the intersection of island arc and continental structures, and has revealed an unexpected pattern of regional crustal movement. The continuing lack of records of ground vibration in epicentral areas was emphasized. Valuable information was obtained and questions were raised regarding problems of design and execution of buildings that must withstand shaking. The knowledge necessary for design of stable structures built on unconsolidated materials is apparently very incomplete; fills that were stable enough for operations under static conditions failed abruptly under seismic conditions. The problems for expanding metropolitan areas in seismic zones where marginal land is being developed are grave.

Details of much of the material presented by Grantz and Kachadoorian are available in the U.S. Geological Survey Circular 491. For additional material, Cloud referred to the U.S.

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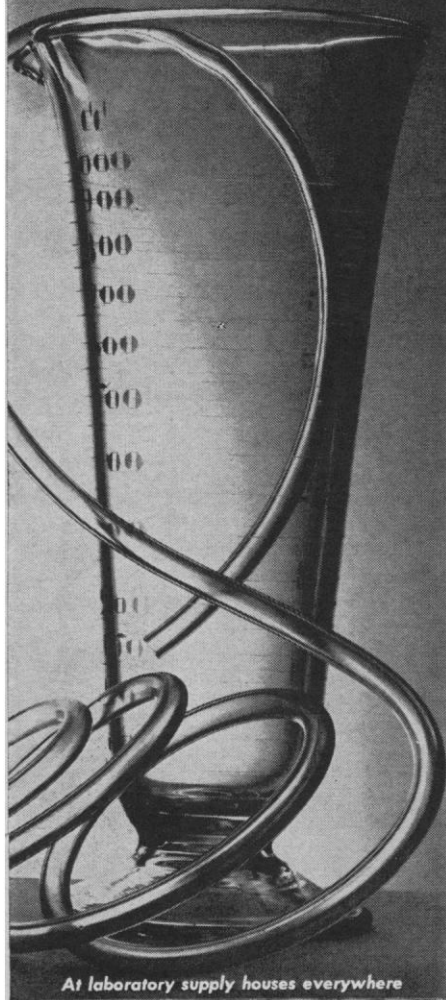
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Botanical Field Meeting

Each year, usually toward the latter part of June, the North East Section of the Botanical Society of America has a field meeting. The central theme is plants in their natural environment. This year Drew University at Madison, New Jersey, was host (14-17 June 1964).

Kemble Widmer (state geologist for New Jersey) spoke on the relationship between the extremely complex geology (formations from archaean to the last glaciation are represented) and the distribution of plants in the Garden State. An exhibit of herbarium specimens of the flora of the Great Swamp was arranged by Florence M. Zuck. Visits by the group were made to the Great Swamp (the newest National Wildlife Refuge, dedicated 29 May 1964) and the Cedar Bog at High Point. The rather rare submerged aquatic *Hottonia inflata*, first reported from the Great Swamp by R. K. Zuck, was, perhaps, the outstanding botanical feature. The bog at High Point is one of the rare sites where all plants expected in a particular environment are well represented and can easily be seen from an encircling road. The display of the swamp calla was spectacular.

Louis Hand and Dorothy Everett spoke on the plants of the Pine Barrens of New Jersey in preparation for a field trip to this area. Everett's slides, produced by her and her husband, were some of the most technically perfect ever done for the flora of this area. The Pine Barrens are among the richest areas in the temperate region for number and variety of species of plants. Two outstanding and rare plants, the curly grass fern, *Schizaea pusilla*, and a curious morning glory, *Breweria Pickeringii* var. *caesariensis*, the latter a true endemic, were seen in the field, as well as hosts of three species of sun dews (*Drosera rotundi-*

folia, *D. intermedia*, and *D. filiformis*) and two orchids (*Pogonia ophioglossoides* and *Calopogon pulchella*).

At Island Heights, New Jersey, John Small (Rutgers University) spoke on the general botanical aspects of New Jersey and about Island Beach State Park in particular. He discussed the relationship of wind and wave action to the formation of Island Beach and the stabilizing influence of plants on the sand dunes in the area. Plant life is delicately balanced, and man's inroads must be curtailed if the area is to be maintained in its present state. Here we saw sea rocket (*Cakile edentula*), beach plum (*Prunus maritima*), and Spanish Oak (*Quercus falcata*) as plants typical of the region.

The host institution for the 1965 summer field meeting will be the University of Maine.

ROBERT K. ZUCK
Drew University, Madison, New Jersey

Forthcoming Events

September

16-18. American Assoc. of Medical Clinics, annual, Bal Harbour, Fla. (The Association, Box 58, Charlottesville, Va.)

17-18. Computing, 7th annual Northwest conf., Seattle, Wash. (R. K. Smith, Northwest Computing Assoc., Box 836, Seahurst, Wash.)

17-18. Engineering Management, conf., Cleveland, Ohio. (Inst. of Electrical and Electronics Engineers, Box A, Lenox Hill Station, New York, N.Y. 10021)

17-18. Polypropylene Fibers, symp., Southern Research Inst., Birmingham, Ala. (W. C. Sheehan, SRI, 2000 Ninth Ave. S., Birmingham, Ala. 35205)

17-19. Cancer, 5th natl. conf., Philadelphia, Pa. (American Cancer Soc., 219 E. 42 St., New York, N.Y. 10017)

17-19. British Assoc. of Urological Surgeons, annual, Sheffield, England. (Joint Secretariat, 47 Lincoln's Inn Fields, London, W.C.2, England)

17-20. Science Education, intern. conf., Banff, Alberta, Canada. (S. Trieger, Faculty of Education, Univ. of Alberta, Edmonton, Canada)

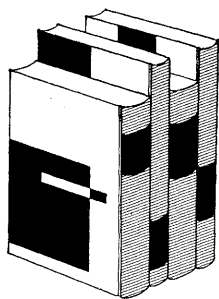
18. Hungarian Chemical Soc., Tihany. (M. T. Beck, Szabadsag ter 17, Budapest 5, Hungary)

19-26. Gynecology and Obstetrics, 4th world congr., Buenos Aires, Argentina. (R. Lede, Primera Catedra de Ginecología, Hospital de Clínicas, Córdoba 2149, Buenos Aires)

19-27. Scientific Films Assoc., 18th intern. congr., Athens, Greece. (SFA, 38, Avenue des Ternes, Paris 17^e, France)

20-23. Ceramic-Metal Systems, American Ceramic Soc., French Lick, Ind. (ACS, 4055 North High St., Columbus, Ohio)

20-23. American Inst. of Chemical Engineers, Las Vegas, Nev. (F. J. Van



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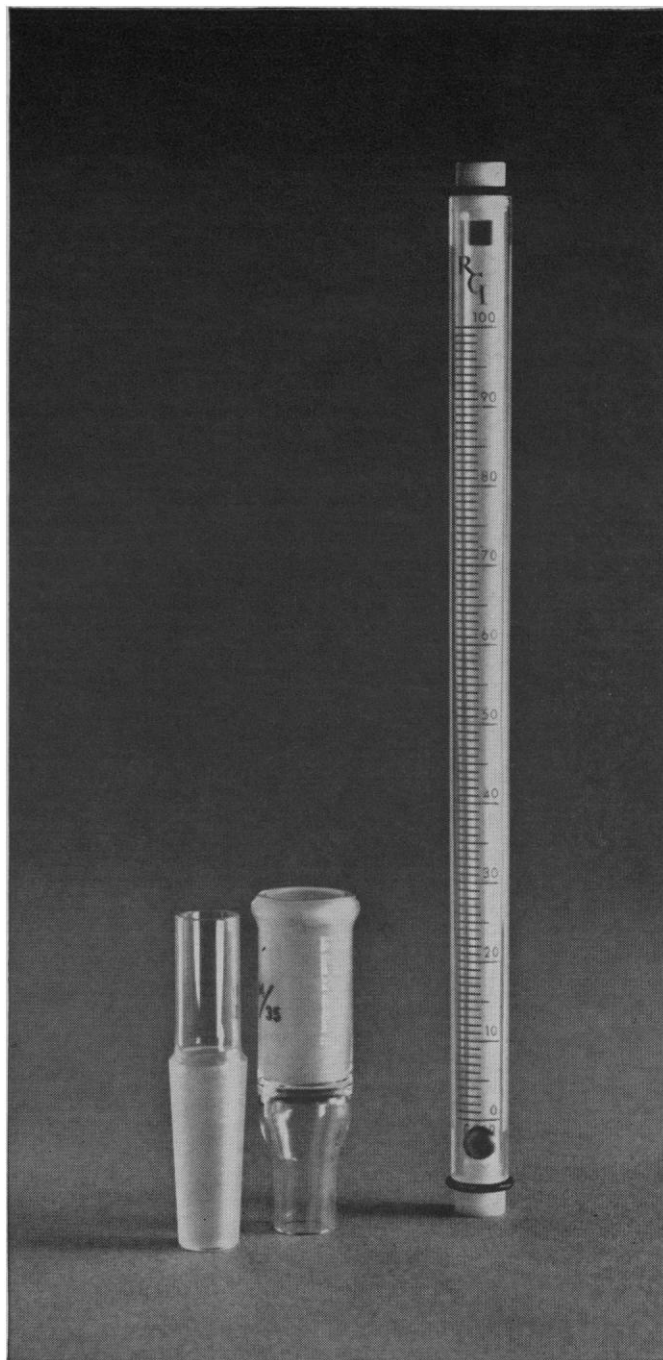
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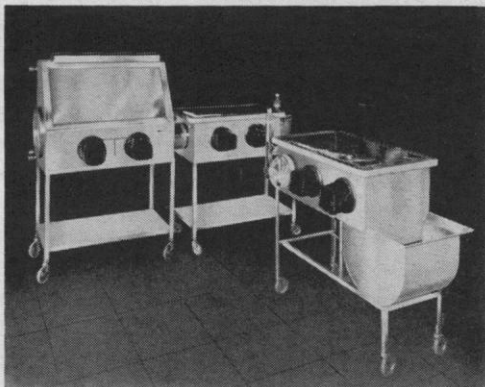
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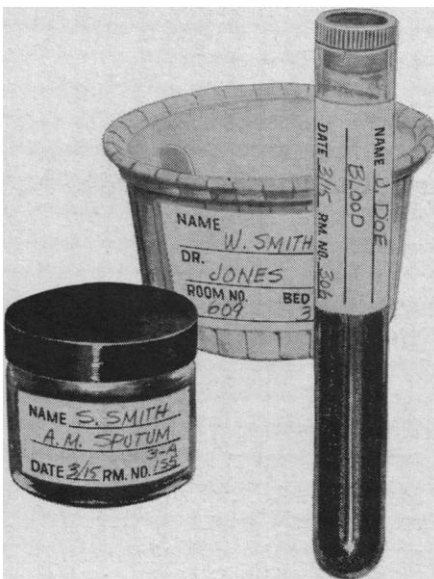
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20-25. Neuroradiology, 7th symp., New York, N.Y. (J. M. Taveras, Neurological Inst., Columbia-Presbyterian Medical Center, New York, N.Y. 10032)

20-26. Anaesthesiology, 3rd world congr., São Paulo, Brazil. (L. Rodrigues Alves, Caixa Postal 330, São Paulo)

21-24. Agricultural Engineering, intern. congr., Lausanne, Switzerland. (P. Regamey, Etat de Vaud, 14. Cité-Devant Lausanne)

21-24. German Soc. for Psychology, 24th congr., Vienna, Austria. (J. Rohrer, Deutsche Gesellschaft für Psychologie, Am Hof 1e, 5300 Bonn, Germany)

21-25. Animal Care Panel, 15th annual, New York, N.Y. (ACP, P.O. Box 1028, Joliet, Ill. 60434)

21-26. Documentation, 30th intern. conf., The Hague, Netherlands. (Intern. Federation for Documentation, 7 Hofweg, The Hague)

21-26. Electrochemical Thermodynamics and Kinetics, intern., London, England. (M. Fleischmann, Dept. of Physical Chemistry, Univ. of Newcastle upon Tyne, England)

21-26. Parasitology, 1st intern. congr., Rome, Italy. (A. Corradetti, Istituto di Parassitologia, Citta Universitaria, Rome)

22-24. Many-Body Problems in Physics and Chemistry, conf., Manchester, England. (Administration Assistant, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

22-25. Middle East Neurological Soc., Ankara, Turkey. (N. Avman, c/o Hacettepe Tip Fakültesi, Ankara)

22-25. Soil Micromorphology, 2nd intern., Arnhem, Netherlands. (A. Jongerius, Stichting voor Bodemartering, Postbus 10, Bennekom, Netherlands)

22-28. Radiology, 11th intern. congr., Rome, Italy. (L. Turano, Istituto de Radiologia, Univ. of Rome, Rome)

23-26. British Assoc. for Cancer Research, annual, Edinburgh, Scotland. (J. G. Bennette, Courtauld Inst., Middlesex Hospital, London, W.1, England)

23-26. Viral Diseases of Polkilothermic Vertebrates, New York, N.Y. (S. P. Snieszko, Eastern Fish Disease Laboratory, Leestown, P.O. Kearneyville, W.Va.)

24-27. American Medical Writers' Assoc., annual, Philadelphia, Pa. (American Medical Writers Assoc., 2000 P St., NW, Washington, D.C.)

25-26. Communications, 3rd Canadian symp., Montreal, Quebec. (F. G. R. Warren, P.O. Box 802, Station B, Montreal)

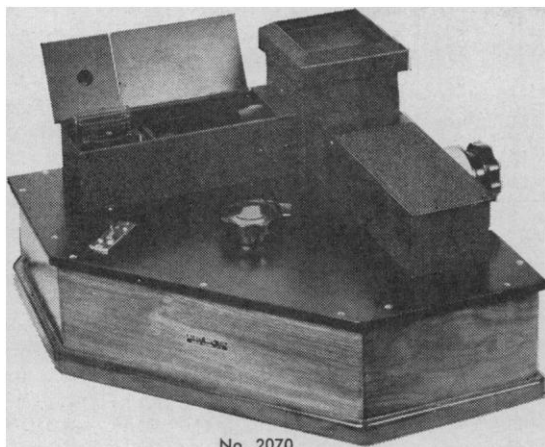
27-30. Society of American Foresters, 64th annual, Denver, Colo. (SAF, Mills Bldg., Washington, D.C. 20006)

27-1. Water Pollution Control Federation, 37th annual, Bal Harbour, Fla. (WPCF, 3900 Wisconsin Ave., Washington, D.C. 20016)

27-2. Society of Motion Picture and Television Engineers, 96th technical conf., New York, N.Y. (SMPTE, 619 W. 54 St., New York, N.Y. 10019)

28-30. Circuit and System Theory, conf., Monticello, Ill. (W. R. Perkins,

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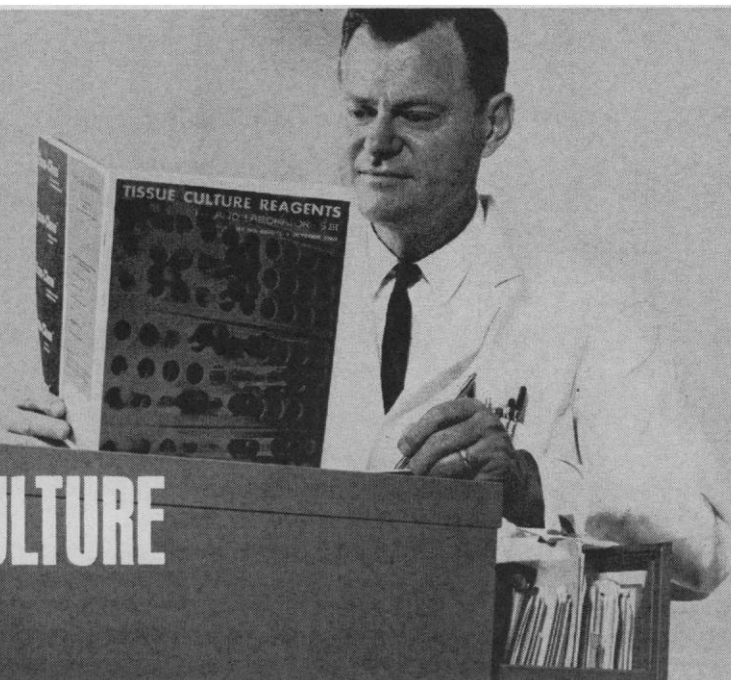
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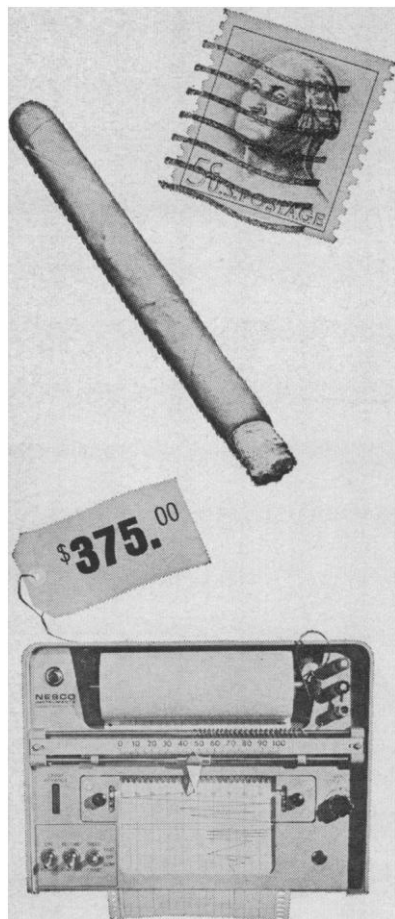
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Dept. of Electrical Engineering, Univ. of Illinois, Urbana)

28-2. Society for Applied Spectroscopy, 3rd natl. conf., Cleveland, Ohio. (E. Yeager, Dept. of Chemistry, Western Reserve Univ., Cleveland 44106)

29-1. Physics of Failure in Electronics, 3rd annual symp., Chicago, Ill. (M. Goldberg, IIT Research Inst., 10 W. 35 St., Chicago 60616)

29-1. Physics and Nondestructive Testing, symp., Dayton, Ohio. (W. J. McGonagle, Southwest Research Inst., P.O. Box, 2296, San Antonio, Tex. 78206)

29-1. American College of Preventive Medicine, New York, N.Y. (R. E. Coker, Jr., Box 1263, Chapel Hill, N.C.)

29-1. Technical Assoc. of the Pulp and Paper Industry, 1964 testing conf., Portsmouth, N.H. (TAPPI, 360 Lexington Ave., New York, N.Y. 10017)

29-2. American Roentgen Ray Soc., 65th annual, Minneapolis, Minn. (C. A. Good, Mayo Clinic, Rochester, Minn.)

30-2. American Council on Education, 47th annual, San Francisco, Calif. (L. Wilson, ACE, 1785 Massachusetts Ave., NW, Washington, D.C. 20006)

30-2. Earth Sciences, intern. conf., Cambridge, Mass. (H. G. Houghton, Dept. of Meteorology, Massachusetts Inst. of Technology, Cambridge)

30-2. Standards Engineers Soc., 13th annual, New York, N.Y. (SES, 170 Livingston Ave., New Providence, N.J.)

30-2. Vacuum, 11th natl. symp., Chicago, Ill. (G. H. Bancroft, Bendix-Balzers Vacuum, Inc., 1645 St. Paul St., Rochester, N.Y. 14621)

30-4. Spectroscopy, 11th intern. conf., Belgrad, Yugoslavia. (Sekretarijat, Prodrodno-matematicki fakultet, Fizickochemijski zavod Belgrad, Studeniski trg., 16, Bloc C, Yugoslavia)

October

1-2. Emission of Electrons from Solids, conf., Univ. of Keele, Keele, England. (Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1, England)

1-3. American Assoc. for Surgery of Trauma, Chicago, Ill. (S. R. Gaston, 18 Fort Washington Ave., New York 10022)

2-3. Council for International Organizations of Medical Societies, 6th general assembly, Brussels, Belgium. (P. A. Messerli, 6 rue Franklin, Paris 16^e, France)

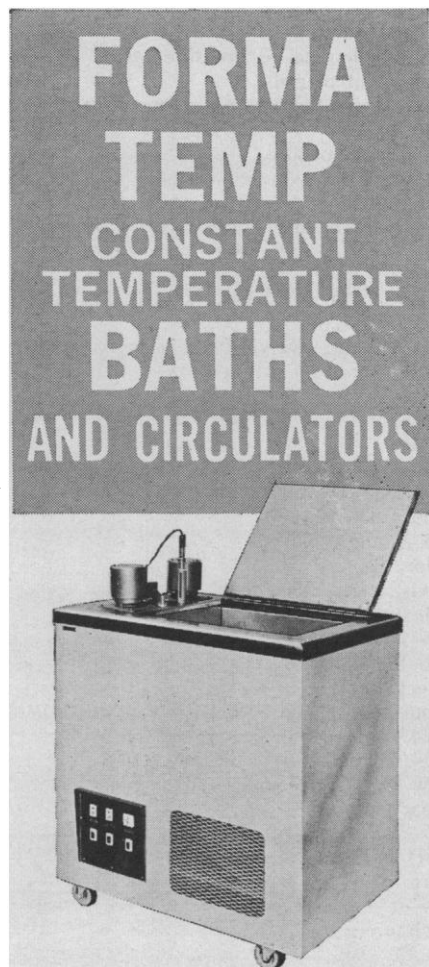
2-3. Psychotherapy of the Family, symp., Milwaukee, Wis. (B. C. Burris, Milwaukee Psychiatric Hospital, Milwaukee 53213)

2-9. Radiology, 8th inter-American congr., Caracas, Venezuela. (R. Merinfeld, Apartado Postal 9362 Candelaria, Caracas)

3-4. New England Intercollegiate Geological Conf., Yale Univ., New Haven, Conn. (J. Rodgers, Dept. of Geology, Yale Univ., New Haven 06520)

3-4. Medical Radiobiology, 7th natl. congr., Pisa, Italy. (Segreteria, Inst. di Radiologia dell'Università, Spedali Riuniti de "S. Chiara," Pisa)

3-13. Weights and Measures, 12th conf., Paris, France. (Intern. Bureau of Weights and Measures, Pavillon de Breteuil, Sèvres, Seine-et-Oise, France)



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4-9. American College of Surgeons, clinical congr., Chicago, Ill. (American College of Surgeons, 55 East Erie St., Chicago 60611)

5-6. Enzyme Regulation, 3rd intern. symp., Indianapolis, Ind. (G. Weber, Indiana Univ. School of Medicine, Indianapolis)

5-7. Association of Medical Illustrators, annual, Los Angeles, Calif. (C. Bridgman, Dept. of Anatomy, UCLA Center for Health Sciences, Los Angeles)

5-7. Radiation Effects on Electronics, natl. meeting, American Nuclear Soc., Syracuse, N.Y. (ANS, 244 East Ogden Ave., Hinsdale, Ill.)

5-8. Clay Mineral Soc., Univ. of Wisconsin, Madison. (M. L. Jackson, Univ. of Wisconsin College of Agriculture, Madison 6)

5-8. American Documentation Inst., annual, Philadelphia, Pa. (B. F. Cheydleur, Philco Corp., Willow Grove, Pa. 19090)

5-8. Research Methods and Instrumentation, 14th symp., Bethesda, Md. (J. B. Davis, Natl. Insts. of Health, Bethesda, Md. 20014)

5-9. Aeronautics and Space Engineering, Soc. of Automotive Engineers, Los Angeles, Calif. (E. V. Albert, 399 N. Sepulveda Blvd., El Segundo, Calif. 90245)

5-9. American Public Health Assoc., New York, N.Y. (B. F. Mattison, 1790 Broadway, New York, N.Y.)

5-10. German Physical Soc., Düsseldorf. (GPS, Gänsheidestr. 15a, Stuttgart, Germany)

6-8. Analytical Chemistry in Nuclear Technology, 8th conf., Gatlinburg, Tenn. (C. D. Susano, Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn.)

6-8. Cornea, world congr., Washington, D.C. (J. H. King, 1746 K St., NW, Washington, D.C.)

6-9. Optical Soc. of America, annual, New York, N.Y. (M. E. Waga, OSA, 1155 16th St., NW, Washington, D.C. 20006)

6-9. Space Electronics, symp., Las Vegas, Nev. (C. H. Doersam, Jr., Box 177, Port Washington, N.Y.)

6-10. Clinical and Experimental Hypnosis, 16th annual, Pittsburgh, Pa. (Soc. for Clinical and Experimental Hypnosis, 353 W. 57 St., New York, N.Y. 10019)

7. California Acad. of Sciences, San Francisco. (G. E. Lindsay, California Academy of Sciences, Golden Gate Park, San Francisco)

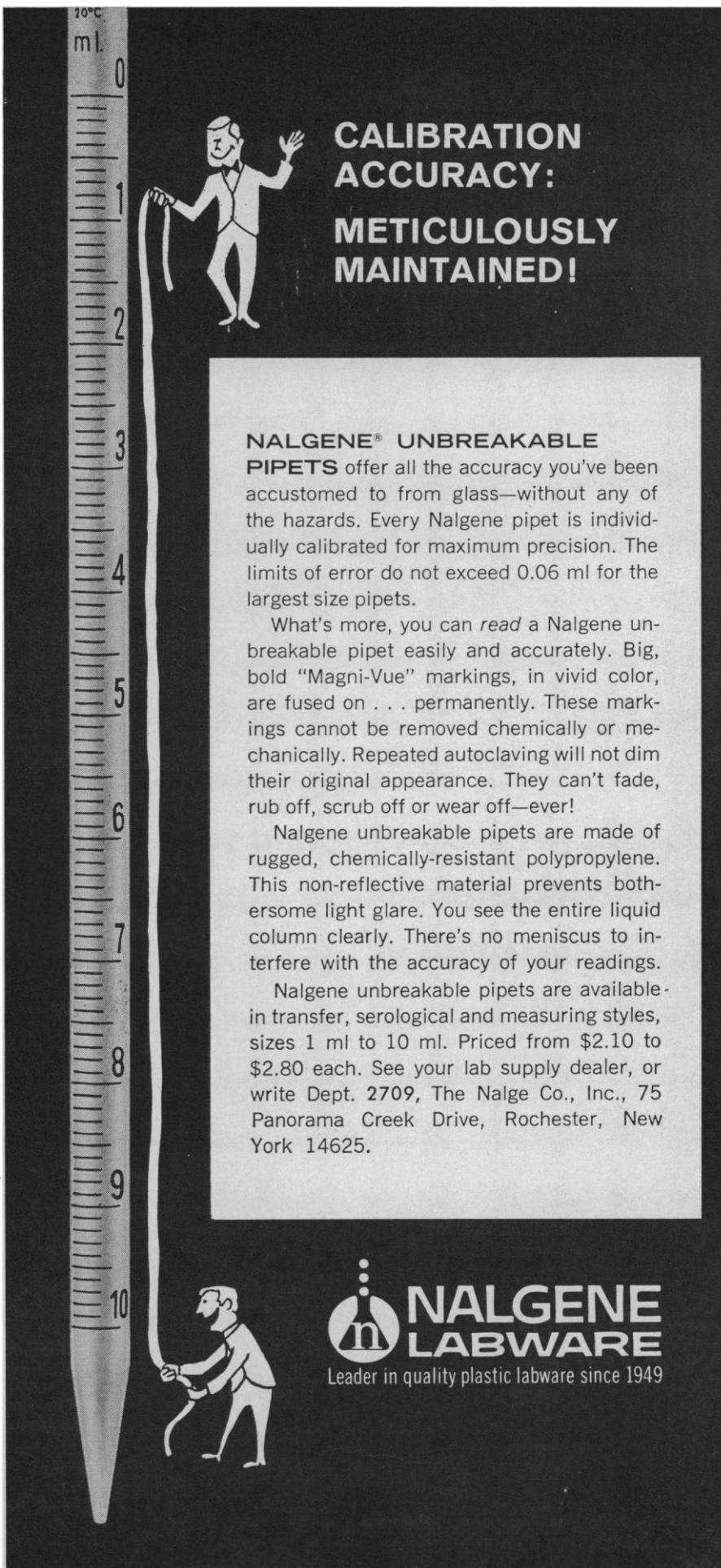
7-9. Structure and Functions of Epidermal Barriers, intern. symp., Brno, Czechoslovakia. (Zd. Vlašin, Dermatological Clinic, 53, Pekařská, Brno)

7-9. Electronic Information Handling, natl. conf., Pittsburgh, Pa. (A. Kent, Univ. of Pittsburgh, Pittsburgh)

7-9. Institute of Management Sciences (TIMS)/Operations Research Soc. of America (ORSA), joint natl. meeting, Minneapolis, Minn. (G. B. Davis, School of Business Administration, Univ. of Minnesota, Minneapolis)

8-10. Agricultural Meteorology, 6th conf., Lincoln, Nebr. (American Meteorological Soc., 45 Beacon St., Boston 8, Mass.)

9-10. Undergraduate Courses and Curricula, midwestern regional conf., Univ.




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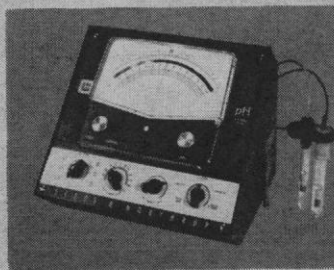
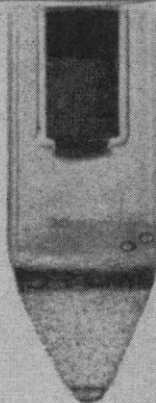
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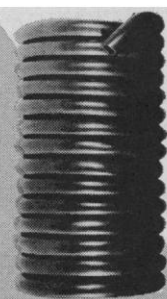
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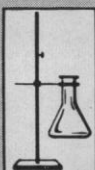
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of Kansas, Lawrence. (R. E. McNair, Assoc. of Midwest College Biology Teachers, Univ. of Kansas, Lawrence)

10. **Paleontological Research Inst.**, annual, Ithaca, N.Y. (R. S. Harris, 109 Dearborn Pl., Ithaca 14850)

11-14. **American Oil Chemists Soc.**, Chicago, Ill. (C. H. Hauber, AOCS, 35 E. Wacker Dr., Chicago 60601)

11-14. **International Scientific Radio Union/Inst. of Electrical and Electronics Engineers**, joint meeting, Univ. of Illinois, Urbana. (E. C. Jordan, Dept. of Electrical Engineering, Univ. of Illinois, Urbana)

11-15. **Diseases of the Chest**, 8th intern. congr., Mexico City, D.F. (M. Kornfeld, American College of Chest Physicians, 112 E. Chestnut St., Chicago 11, Ill.)

11-15. **Electrochemical Soc.**, Washington, D.C. (ES, 30 E. 42 St., New York, N.Y. 10017)

11-16. **Allergology**, 5th intern. congr., Madrid, Spain. (F. Lahoz, Clínica de la Concepción, Avda. Reyes Católicos 2, Madrid 3)

11-16. **American Assoc. of Medical Record Librarians**, annual, Miami Beach, Fla. (M. J. Waterstraat, RRL, 840 North Lake Shore Dr., Chicago, Ill. 60611)

11-16. **Pan American Assoc. of Ophthalmology**, 7th, Montreal, Canada. (J. W. McKinney, PAAO, 921 Exchange Bldg., Memphis, Tenn.)

11-16. **American Soc. of Plastic and Reconstructive Surgery**, annual, San Francisco, Calif. (P. P. Pickering, 2850 Sixth Ave., Suite B, San Diego, Calif.)

12-14. **Aviation Pathology**, 5th scientific session, Washington, D.C. (Secretary, Joint Committee on Aviation Pathology, Armed Forces Inst. of Pathology, Washington, D.C. 20305)

12-14. **Entry Technology**, American Inst. of Aeronautics and Astronautics conf., Williamsburg, and NASA-Langley Research Center, Va. (S. P. Johnston, AIAA, 1290 Sixth Ave., New York, N.Y.)

12-14. **Protection Against Radiations in Space**, 2nd symp., Gatlinburg, Tenn. (F. C. Maienschein, Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn.)

12-15. **Instrument Soc. of America**, 19th **Instrument-Automation** conf., New York, N.Y. (ISA, 530 William Penn Pl., Pittsburgh, Pa. 15219)

13-15. **Air Force Science and Engineering**, 11th symp., Brooks Air Force Base, Tex. (G. E. Schafer, Headquarters Aerospace Medical Div., Brooks AFB)

13-16. **Calorimetry**, 19th conf., Washington, D.C. (W. N. Hubbard, Argonne Natl. Laboratory, 9700 S. Cass Ave., Argonne, Ill.)

13-16. **Lubrication**, 1st intern. conf., American Soc. of Mechanical Engineers/American Soc. of Lubrication Engineers, Washington, D.C. (W. J. Anderson, MS 6-1, NASA-Lewis Research Center, 21000 Brookpark Rd., Cleveland, Ohio)

13-17. **Electron Microscopy Soc. of America**, 22nd annual, Detroit, Mich. (A. R. Taylor, Virus Div., Parke, Davis & Co., Detroit 32)

14-15. **American Soc. of Tool and Manufacturing Engineers**, Minneapolis, Minn. (R. E. Gariss, 6523 El Pulcro St., Long Beach, Calif.)



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14-16. **Gaseous Electronics**, 7th conf., Atlantic City, N.J. (S. Schneider, U.S. Army Electronics R&D Laboratories, Fort Monmouth, N.J. 07703)

14-16. **Parenteral Drug Assoc.**, annual conv., New York, N.Y. (PDA, Broad and Chestnut Sts., Philadelphia 7, Pa.)

14-16. **Remote Sensing of Environment**, 3rd symp., Ann Arbor, Mich. (D. C. Parker, Univ. of Michigan, Box 618, Ann Arbor 48107)

14-16. **Sonics and Ultrasonics**, symp., Santa Monica, Calif. (A. H. Meitzler, Bell Telephone Laboratories, Inc., Murray Hill, N.J.)

15-16. **Bioenergetics**, symp., Univ. of Western Ontario, London, Ontario, Canada. (K. P. Strickland, Dept. of Biochemistry, Faculty of Medicine, Univ. of Western Ontario, London)

15-16. **Systems Science**, first annual conf., Inst. of Electrical and Electronics Engineers, Univ. of Pennsylvania, Philadelphia. (H. G. Sparks, Moore School of Engineering, Univ. of Pennsylvania, Philadelphia)

15-17. **Correlation of Particles Emitted in Nuclear Reactions**, intern. conf., Gatlinburg, Tenn. (A. Zucker, Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn. 37830)

15-17. **Central Neuropsychiatric Assoc.**, Denver, Colo. (W. P. Shelton, 8215 Westchester Dr., Dallas 25, Tex.)

15-22. **Association of American Medical Colleges**, 75th annual, Denver, Colo. (P. J. Sanazaro, Div. of Education, Assoc. of American Medical Colleges, 2530 Ridge Ave., Evanston, Ill. 60201)

16-17. **Western Industrial Medical Assoc.**, Los Angeles, Calif. (C. Einert, 2151 Berkeley Way, Berkeley 4, Calif.)

16-17. **Systemics**, 11th annual symp., St. Louis, Mo. (H. C. Cutler, Missouri Botanical Garden, St. Louis)

16-20. **American Medical Women's Assoc.**, New York, N.Y. (M. A. Sears, Anderson Hospital, Houston 25, Tex.)

16-24. **American Soc. of Clinical Pathologists**, annual, Bal Harbor, Fla. (ASCP, 445 N. Lake Shore Dr., Chicago, Ill.)

17-18. **Society for Psychophysiological Research**, 4th annual, Washington, D.C. (L. A. Gustafson, SPR, 74 Fenwood Rd., Boston, Mass. 02115)

17-20. **College of American Pathologists**, Bal Harbor, Florida. (E. E. Simard, Box 136, Salinas, Calif.)

17-25. **International Aeronautic Federation**, general conf., Tel Aviv, Israel. (M. J. Randleman, Natl. Aeronautic Assoc., 1025 Connecticut Ave., NW, Washington, D.C. 20036)

18-21. **Association of Military Surgeons of the U.S.**, Washington, D.C. (Brig. Gen. F. E. Wilson, Suite 132, 1500 Massachusetts Ave., NW, Washington, D.C. 20005)

18-22. **Metallurgical Soc.**, fall meeting, Philadelphia, Pa. (D. A. Parks, Inst. of Metals Div., Metallurgical Soc. of AIME, 345 E. 47 St., New York, N.Y. 10017)

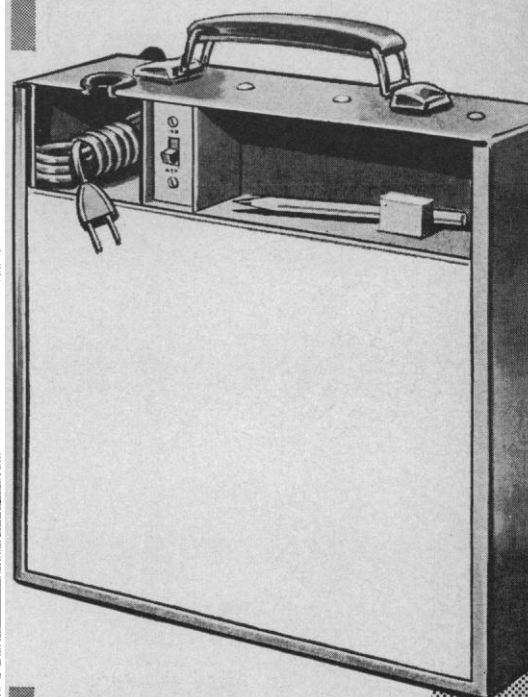
18-23. **American Acad. of Ophthalmology and Otolaryngology**, Chicago, Ill. (W. L. Benedict 15 Second St., SW, Rochester, Minn. 55901)

18-24. **Dental Education**, 2nd Latin American seminar, Mexico City. (D. Restrepo, Pan American Sanitary Bureau, 1501 New Hampshire Ave., NW, Washington, D.C. 20036)

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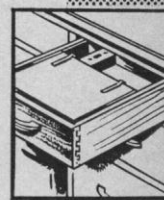
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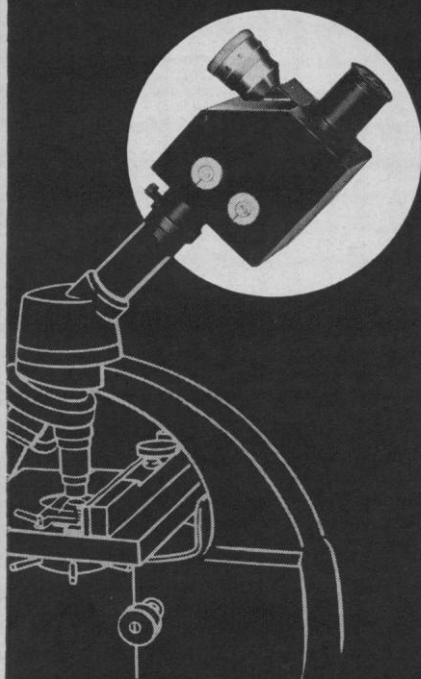


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19-20. **Unconventional Inertial Sensors**, symp. (secret), Farmingdale, N.Y. (R. E. McIntyre, RMG-8, Bureau of Naval Weapons, Washington 25, D.C.)

19-21. **Academy of Psychosomatic** Soc. of Mechanical Engineers, Lafayette, Ind. (T. P. Goodman, Technological Inst., Northwestern Univ., Evanston, Ill.)

19-21. **Academy of Psychosomatic Medicine**, New York, N.Y. (R. N. Rutherford, 200 Broadway, Seattle, Wash.)

19-21. **Technical Assoc. of the Pulp and Paper Industry**, plastics-paper conf., Washington, D.C. (TAPPI, 360 Lexington Ave., New York 10017)

19-22. **Association of Official Agricultural Chemists**, 78th annual, Washington, D.C. (L. G. Ensminger, AOAC, Box 540, Benjamin Franklin Station, Washington, D.C. 20044)

19-23. **American Soc. of Civil Engineers**, New York, N.Y. (W. H. Wisely, ASCE, 345 E. 47 St., New York, N.Y. 10017)

19-23. **American Soc. for Metals**, Philadelphia, Pa. (A. R. Putnam, ASM, Metals Park, Ohio)

19-23. **Radiochemical Methods of Analysis**, symp., Salzburg, Austria. (Intern. Atomic Energy Agency, 11 Karntnerring, Vienna 1, Austria)

20-30. **Nov. UNESCO**, 13th session, general conf., Paris, France. (UNESCO, Place de Fontenoy, Paris 7^e)

21-22. **American Heart Assoc.**, Council on Arteriosclerosis, annual, Atlantic City, N.J. (D. M. Smith, AHA, 44 E. 23 St., New York, N.Y. 10010)

21-22. **Industrial Hygiene Foundation**, annual, Pittsburgh, Pa. (R. T. P. deTreville, IHF, 4400 Fifth Ave., Pittsburgh 15213)

21-23. **Aerospace and Navigational Electronics**, 11th East Coast conf., Baltimore, Md. (M. Hastings, Mail No. 1281 A, Baltimore Space and Defense Center, Westinghouse Electric Corp., P.O. Box 1693, Baltimore 21203)

21-23. **Pain**, intern. symp., Detroit, Mich. (R. S. Knighton, 2799 W. Grand Blvd., Detroit)

21-23. **Spectroscopy, Instrumentation and Chemistry**, 3rd Pacific meeting, San Francisco, Calif. (J. G. Conway, Lawrence Radiation Laboratory, Univ. of California, Berkeley 4)

21-24. **Acoustical Soc. of America**, 68th, Austin, Tex. (W. Waterfall, ASA, 335 E. 45 St., New York, N.Y. 10017)

21-25. **Cybernetics**, 4th intern. congr., Namur, Belgium. (Intern. Assoc. for Cybernetics, 13 rue Basse-Marcelle, Namur)

22-23. **New Mexico Acad. of Science**, Albuquerque. (K. S. Bergstresser, 739 42 St., Los Alamos, N.M.)

23-24. **Kentucky Acad. of Science**, Morehead. (G. Levey, College Box 2325, Berea, Ky.)

23-24. **American Physical Soc.**, Chicago, Ill. (R. G. Sachs, Argonne National Laboratory, Argonne, Ill. 60440)

23-25. **Association of Clinical Scientists**, Washington, D.C. (R. P. MacFate, 300 N. State St., No. 5422, Chicago, Ill. 60610)

23-25. **Experimental Gerontology**, symp., Basel, Switzerland. (Prof. Verzar, Inst. de Gerontologie Experimentale, Nonnenweg 7, Basel, Switzerland)

24-29. **American Acad. of Pediatrics**,

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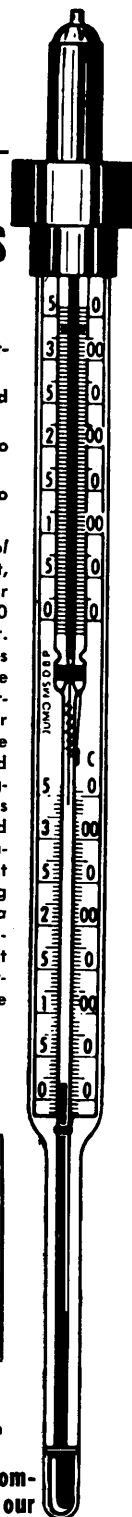
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annual, New York, N.Y. (AAP, 1801 Hinman Ave., Evanston, Ill.)

25-31. American Soc. for Horticultural Science, Caribbean Region, 12th annual, Maracay, Venezuela. (E. H. Casseres, Londres 40, México 6, D.F.)

26-27. American Inst. of Aeronautics and Astronautics/Canadian Aeronautics and Space Inst., joint meeting, Ottawa, Ont., Canada. (P. J. Burr, AIAA, 1290 Sixth Ave., New York, N.Y. 10019)

26-27. Combustion Inst., western states section, fall meeting, Univ. of Utah, Salt Lake City. (Secretary, CI, 16902 Bollinger Dr., Pacific Palisades, Calif. 90272)

26-28. Antimicrobial Agents and Chemotherapy, 4th conf., American Soc. for Microbiology, New York, N.Y. (ASM, 115 Huron View Blvd., Ann Arbor, Mich.)

26-28. Chemical Inst. of Canada, 14th Chemical Engineering meeting, Hamilton, Ont. (CIC, 48 Rideau St., Ottawa 2)

26-28. Society of Rheology, 35th annual, Pittsburgh, Pa. (H. Markovitz, Mellon Inst., 4400 Fifth Ave., Pittsburgh 13)

26-14. Pan American Standards Committee, textiles seminar, Lima, Peru. (American Standards Assoc., 810 18th St., NW, Washington, D.C.)

27. Oak Ridge Inst. of Nuclear Studies, Oak Ridge, Tenn. (W. G. Pollard, Box 117, Oak Ridge)

27-29. Joint Computer Conf., San Francisco, Calif. (R. I. Tanaka, c/o Lockheed Missiles and Space Co., 3251 Hanover St., Palo Alto, Calif.)

28-30. Society of Experimental Stress Analysis, annual, Cleveland, Ohio. (B. E. Rossi, 21 Bridge Square, Westport, Conn.)

28-30. Inertial Guidance Test, 2nd symp., Holloman Air Force Base, N.M. (F. P. Ray, Holloman AFB)

28-30. Nuclear Science, 11th symp., Philadelphia, Pa. (U.S. Office of Aerospace Research, 4th and Independence Ave., SW, Washington, D.C.)

28-30. Rock Mechanics, 6th symp., Rolla, Mo. (C. Christianson, Dept. of Mining Engineering, School of Mines and Metallurgy, Univ of Missouri, Rolla)

28-30. Southeastern Library Assoc., 21st biennial conf., Norfolk, Va. (E. F. Jesse, c/o Armed Forces Staff College Library, Norfolk)

29-31. American Soc. for Aesthetics, Chicago, Ill. (J. R. Johnson, Cleveland Museum of Art, Cleveland 6, Ohio)

29-31. Electron Devices, Inst. of Electrical and Electronics Engineers, Washington, D.C. (M. Mass, Hewlett-Packard Co., 1501 Page Mill Rd., Palo Alto, Calif.)

29-31. Gerontological Soc., 7th annual, Minneapolis, Minn. (GS, 660 South Euclid, St. Louis, Mo. 63110)

29-31. Indiana Acad. of Science, Indianapolis. (C. F. Dineen, Biology Dept., St. Mary's College, Notre Dame, Ind.)

29-31. Society of Photographic Scientists and Engineers, annual symp., Washington, D.C. (W. S. Dempsey, FMA, Inc., 4925 Fairmont Ave., Washington, D.C.)

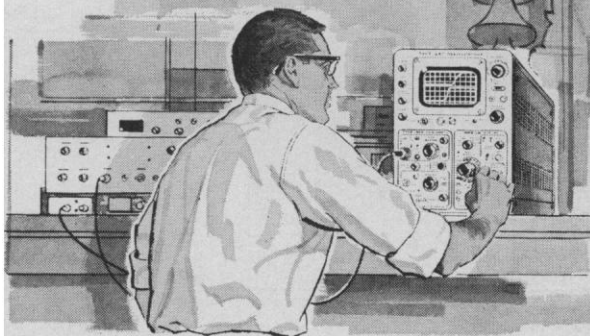
29-31. Society for the Scientific Study of Religion, Washington, D.C. (S. Z. Klausner, SSSR, 1424 16th St., NW, Washington, D.C.)

30-1. Meteoritical Soc., 27th meeting, Arizona State Univ., Tempe. (C. B. Moore, Dept. of Geochemistry, Arizona State Univ., Tempe)

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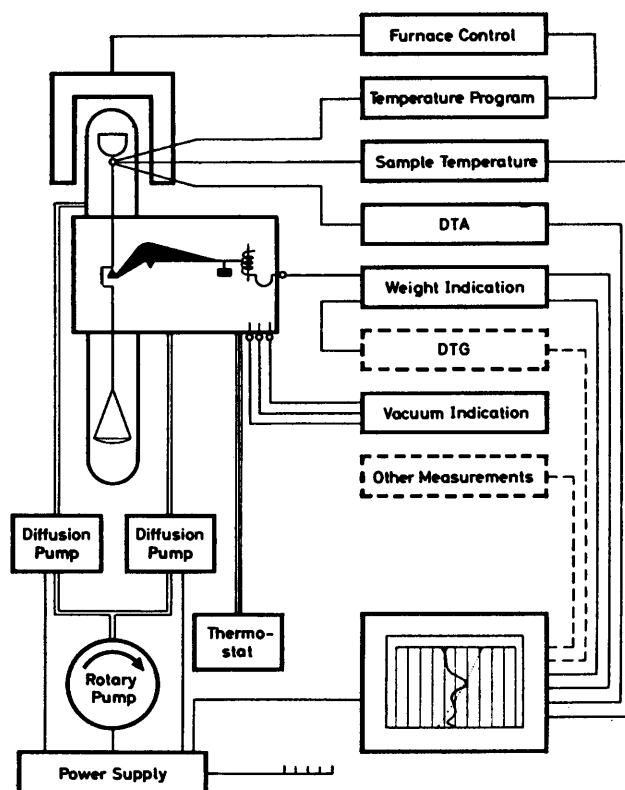
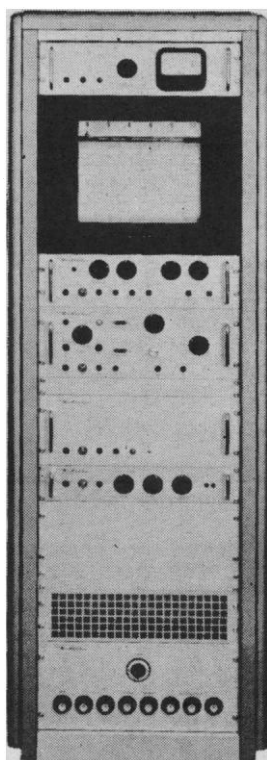
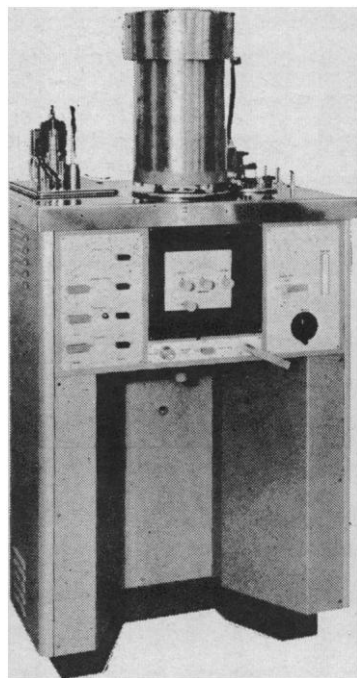
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gas cell has a path length of 9 cm and, with the two window covers in place, has an overall length of 10.8 cm. Standard windows supplied are NaCl or KBr, but other windows can be specially ordered. This cell can be used with all American and British spectrophotometers except the Unicam SP-100. A cell specifically designed for the Unicam instrument is the GH-7, which has a path length of 7 cm and an overall length of 8.8 cm. Its other design features duplicate those of the GH-5. Although designed specifically for the Unicam SP-100, the GH-7 also fits all other British and American spectrophotometers.—D.J.P. (Limit Research Corp. P. O. Box 852, Darien, Conn.)

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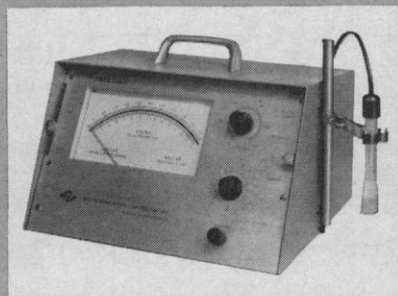
Robert L. Bowman (R.L.B.), with the assistance of Denis J. Prager (D.J.P.), Laboratory of Technical Development, National Heart Institute, Bethesda 14, Md. (medical electronics and biomedical laboratory equipment).

Joshua Stern (J.S.), Basic Instrumentation Section, National Bureau of Standards, Washington 25, D.C. (physics, computing, electronics, and nuclear equipment).

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long columns with their inherent disadvantages. Components which cannot be resolved either on simple chromatographic columns of moderate length or by other methods (for example, electrophoresis and ultracentrifugation) are often separated easily by this technique. Beyond the better resolution which can be attained, recycling chromatography has a number of other advantages over previous separation methods. The progress of separation can be observed after each cycle and the experiment stopped when the components of interest have attained their optimal separation. Completely separated components, and uninteresting or disturbing parts of the effluent, may be bled out of the system after any cycle, while the remaining components are allowed to continue separation. The causes of an asymmetrical peak can be revealed by studying its development from cycle to cycle. The system is composed of four interconnected main subunits which can be assembled on a special cart: a separation column, a selector valve, a peristaltic pump, and a flow analyzer. These units are separately available for incorporation into other instrument systems. The Plexigum columns, fitted with adjustable plungers at both ends, are specially constructed to permit flow in either direction and can be sealed completely to eliminate the water-head pressure. These features ensure that the flow rate, even through beds of materials with low mechanical strength (gels), does not fall off with use. Columns in two standard lengths, 60 and 100 cm, both with 32-mm bore, are available at present. The peristaltic pump has a pumping rate continuously variable from 0 to 390 ml/hr with a flow constancy of 0.5 percent over a period of several days. The selector valve is used to divert the stream from open to closed circuit. Open circuit is used when introducing the sample, bleeding out selected parts of the effluent, equilibrating the column with buffer, and running a single-cycle separation, as during a pilot separation. Closed circuit is used during recycling. The valve will operate under a pressure head of 18 kg/cm² and its holdup when in the recycling position is only 150 μ l. The plunger heads in the column, and the valve channels, are machined to keep turbulence in the stream to a minimum. LKB manufactures three instruments suitable as the flow analyzer, namely, the UVICORD UV absorptiometer, the Conductolyzer for continu-



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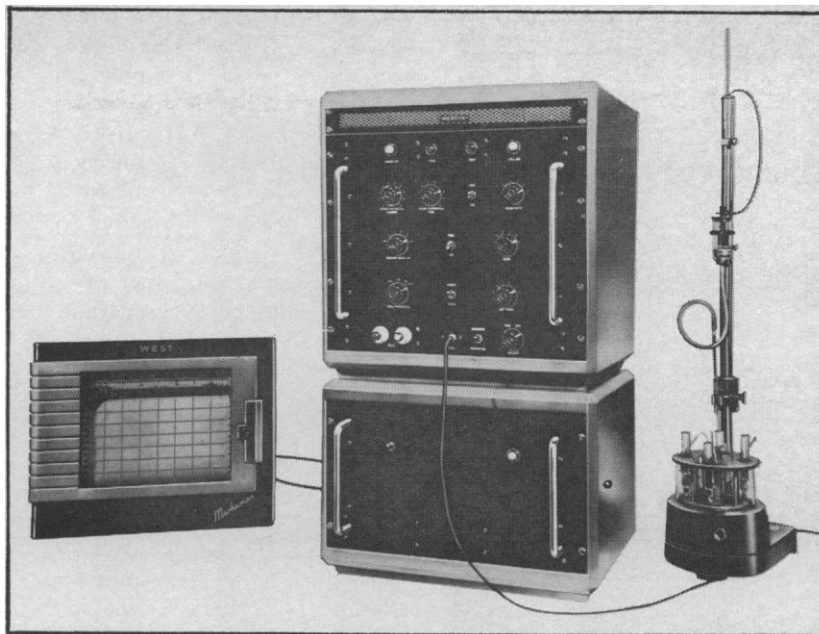
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Aphasia in Adults: Diagnosis, Prognosis, and Treatment. Hildred Schuell, James J. Jenkins, and Edward Jiménez-Pabón. Harper and Row, New York, 1964. 440 pp. Illus. \$12.

An Approach to Dental Prosthetics. D. C. Berry and J. K. Wilkie. Pergamon, London; Macmillan, New York, 1964. 127 pp. Illus. \$4.75.

The Bacteria. A treatise on structure and function. vol. 5, *Heredity*. I. C. Gunsalus and Roger Y. Stanier, Eds. Academic Press, New York, 1964. 533 pp. Illus. \$16.

Bacterial Endotoxins. Proceedings of a symposium (New Brunswick, N.J.), September 1963. Maurice Landy and Werner Braun, Eds. Rutgers Univ. Press, New Brunswick, N.J., 1964. 707 pp. Illus. \$12.

Bacteriología y Virología Médicas. Estuquio Roch. Editorial Porrua, Mexico City, 1964. 645 pp. Illus.

The Basis of Human Evolution. Bertram S. Kraus. Harper and Row, New York, 1964. 396 pp. Illus. Paper, \$4.75; cloth, \$6.50.

The Biochemical Aspects of Hormone Action. A symposium (St. Louis, Mo.). 1962. Albert B. Eisenstein, Ed. Little, Brown, Boston, 1964. 256 pp. Illus. \$8.50.

Biochemistry and Behavior. Samuel Eiduson, Edward Geller, Arthur Yuwiler, and Bernice T. Eiduson. Van Nostrand, Princeton, N.J., 1964. 566 pp. Illus. \$15.

Biochemistry of Phenolic Compounds. J. B. Harborne, Ed. Academic Press, New York, 1964. 628 pp. Illus.

The Biochemistry of Semen and of the Male Reproductive Tract. Thaddeus Mann. Methuen, London; Wiley, New York, 1964. 517 pp. Illus. \$16.50.

Biologie de l'Amérique Australe. vols. 1 and 2, *Études sur la Faune du Sol*. Delamare Deboutteville and Eduardo Rapoport, Eds. Éditions du Centre National de la Recherche Scientifique, Paris. vol. 1, 657 pp., Illus., 1962; vol. 2, 399 pp., Illus. \$16.60.

Biology of the Antarctic Seas. vol. 1. Milton O. Lee, Ed. American Geophysical Union, Washington, D.C., 1964. 88 pp. Illus. \$10.

The Biology of the Trace Elements. Their role in nutrition. Karl H. Schütte. Lippincott, Philadelphia, 1964. 248 pp. Illus. \$8.

Bleeding in the Surgical Patient (*Ann. N.Y. Acad. Sciences*, 115, art. 1). Harold E. Whipple, Ed. New York Acad. of Sciences, New York, 1964. 546 pp. Illus. Paper, \$7.

Bone and Tooth. Proceedings of a conference (Oxford, England) April 1963. H. J. J. Blackwood, Ed. Pergamon, London; Macmillan, New York, 1964. 443 pp. Illus. \$15.

Cellular Fine Structure. An introductory student text and atlas. James A. Freeman and Jack C. Geer. McGraw-Hill, New York, 1964. 208 pp. Illus. \$9.50.

The Chemical Origin of Life. Alexander

I. Oparin. Translated from the Russian by Ann Synge. Thomas, Springfield, Ill., 1964. 152 pp. Illus. \$6.75.

The Chemistry of Some Life Processes. Vernon H. Cheldelin and R. W. Newburgh. Reinhold, New York; Chapman and Hall, London, 1964. 128 pp. Illus. Paper, \$1.95.

Chemotherapie maligner Tumoren. Dosierungsprobleme—Untersuchungen zum Wirkmechanismus von Cyclophosphamid. Bielefelder Symposium, November 1962. Hilmar Wilmanns, Ed. Schattauer, Stuttgart, Germany, 1964. 228 pp. Illus. DM. 32.

The Conduction of the Nervous Impulse. A. L. Hodgkin. Thomas, Springfield, Ill., 1964. 108 pp. Illus. \$5.50

Congenital Malformations. Second International Conference (New York), July 1963. Compiled and edited by the International Medical Congress. The Congress, New York, 1964. 456 pp. Illus.

Cunningham's Textbook of Anatomy. G. J. Romanes, Ed. Oxford Univ. Press, New York, ed. 10, 1964. 1028 pp. Illus. \$22.50.

Dynamic Pathology. Structural and functional mechanisms of disease. Maurice M. Black and Bernard M. Wagner. Mosby, St. Louis, Mo., 1964. 296 pp. Illus. \$8.

The Ecology of Rocky Shores. J. R. Lewis. English Universities Press, London, 1964. 335 pp. Illus. 42s.

Electron Microscopic Anatomy. Stanley M. Kurtz, Ed. Academic Press, New York, 1964. 437 pp. Illus. \$14.

Electronic Aspects of Biochemistry. Proceedings of a symposium (Ravello, Italy), September 1963. Bernard Pullman, Ed. Academic Press, New York, 1964. 598 pp. Illus. \$20.

Environmental Biology. vol. 1. R. F. Morgan. Pergamon, London; Macmillan, New York, 1963. 254 pp. Illus. Paper, \$2.95.

Environmental Measurement and Interpretation. Robert B. Platt and John F. Griffiths. Reinhold, New York; Chapman and Hall, London, 1964. 249 pp. Illus. \$8.75.

Enzymes. Malcolm Dixon and Edwin C. Webb. Academic Press, New York, ed. 2, 1964. 970 pp. Illus. \$16.

Essentials of Practical Microtechnique. Albert E. Galigher and Eugene N. Kozloff. Lea and Febiger, Philadelphia, 1964. 484 pp. Illus. \$10.

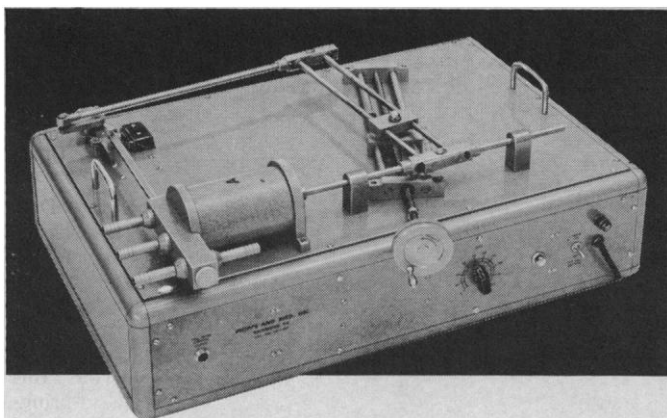
Evolution of Psychosomatic Concepts. Anorexia nervosa: a paradigm. M. Ralph Kaufman and Marcel Heiman, Eds. International Universities Press, New York, 1964. 409 pp. \$10.

Experimental Chemotherapy. vol. 3, pt. 2, *Chemotherapy of Bacterial Infections.* Chemotherapy of fungal infections. Chemotherapy of rickettsial and viral infections. R. J. Schnitzer and Frank Hawking, Eds. Academic Press, New York, 1964. 667 pp. Illus. \$22 until 31 Dec.; \$25.

Fatty Acids: Their Chemistry, Properties, Production, and Uses. pt. 3. Klare S. Markley, Ed. Interscience (Wiley), New York, ed. 2, 1964. 1004 pp. Illus. \$35.

The Fossil Evidence for Human Evolution. An introduction to the study of paleoanthropology. W. E. LeGros Clark. Univ. of Chicago Press, Chicago, ed. 2, 1964. 213 pp. Illus. \$6.

General Science: Biology. F. E. Clegg.



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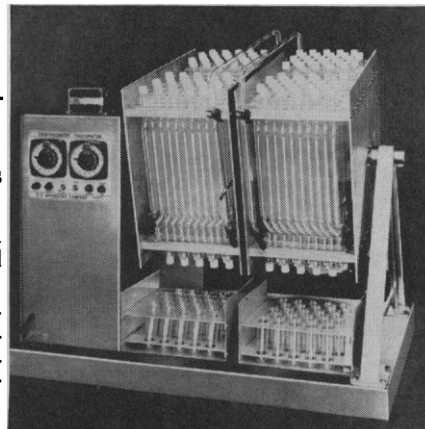
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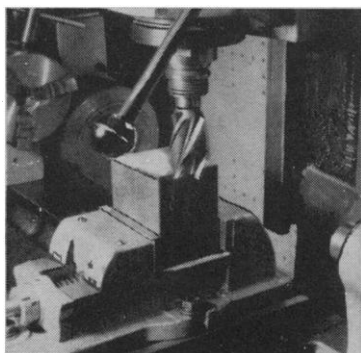


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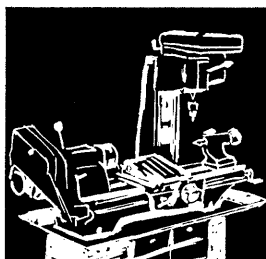
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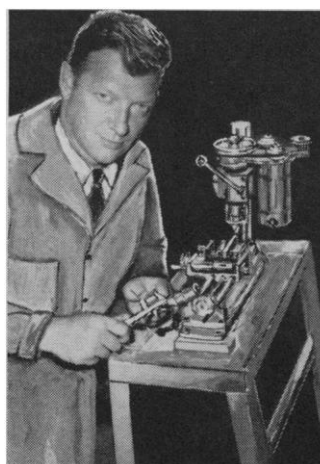
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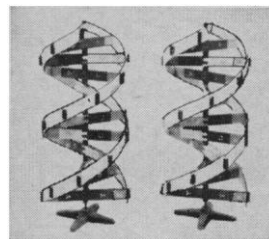
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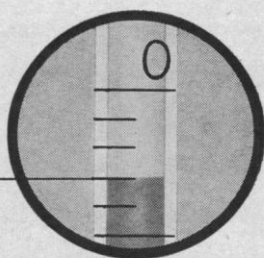
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Industry and Tropical Health, V. Proceedings of a conference (Boston), October 1963. Published for the Industrial Council for Tropical Health by the Harvard School of Public Health, Boston, 1964. 243 pp. Illus. \$10.

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Introduction to Cell Differentiation. Nelson T. Spratt, Jr. Reinhold, New York; Chapman and Hall, London, 1964. 127 pp. Illus. Paper, \$1.95.

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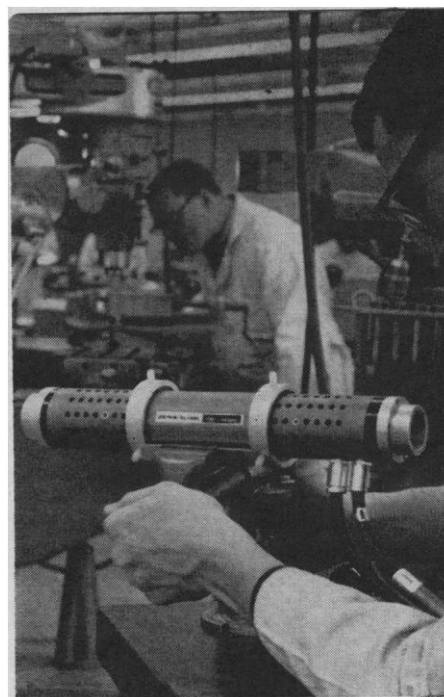
Lipid Transport. Proceedings of a symposium (Nashville, Tenn.), October 1963. H. C. Meng, Ed. Thomas, Springfield, Ill., 1964. 280 pp. Illus. \$10.50.

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Microbiology and Pathology. Alice Lorraine Smith. Mosby, St. Louis, Mo., ed. 8, 1964. 699 pp. Illus. \$8.50.

The Modes and Morals of Psychotherapy. Perry, London; Holt, Rinehart, and Winston, New York, 1964. 288 pp. \$5.50.

Nutrition: A Comprehensive Treatise. vol. 1, *Macronutrients and Nutrient Elements*. George H. Beaton and Earle Willard McHenry, Eds. Academic Press, New York, 1964. 565 pp. Illus. \$18.50.

Physical Techniques in Biological Research. vol. 5, pt. A, *Electrophysiological Methods*. Academic Press, New York, 1964. 478 pp. Illus. \$16.

The Physiological Effects of High Altitude. Proceedings of a symposium (Interlaken, Switzerland), September 1962. W. H. Weihe, Ed. Pergamon, London; Macmillan, New York, 1964. 375 pp. Illus. \$12.

The Physiology of Diurnal Rhythms. Janet E. Harker. Cambridge Univ. Press, New York, 1964. 122 pp. Illus. \$3.95.

The Physiology of Human Pregnancy. Frank E. Hytten and Isabella Leitch. Davis, Philadelphia, 1964. 475 pp. Illus. \$11.

The Physiology of Insecta. vol. 1. Morris Rockstein, Ed. Academic Press, New York, 1964. 654 pp. Illus. \$22.

Physiology of the Amphibia. John A. Moore, Ed. Academic Press, New York, 1964. 666 pp. Illus. \$18.

Plant Biochemistry. D. D. Davies, J. Giovanelli, and Tom ap Rees. Davis, Philadelphia, 1964. 466 pp. Illus. \$10.50.

Plants at Work. A summary of plant physiology. F. C. Steward. Addison-Wesley, Reading, Mass., 1964. 192 pp. Illus. \$2.95.

Principles of Preventive Dentistry. D. H. Goose and R. L. Hartles. Pergamon, London; Macmillan, New York, 1964. 141 pp. Illus. \$4.50.

Progress in Protozoology. Proceedings of the First International Congress (Prague), August 1961. J. Ludvík, J. Lom, and J. Vávra, Eds. Czechoslovak Acad. of Sciences, Prague; Academic Press, New York, 1963. 730 pp. Illus. Plates. \$24.

Protein Metabolism in the Plant. Albert Charles Chibnall. Yale Univ. Press, New Haven, Conn., 1964 (reprint of 1939 edition). 322 pp. Illus. Paper, \$1.95; cloth, \$6.50.

The Proteins: Composition, Structure, and Function. vol. 2. Hans Neurath, Ed. Academic Press, New York, ed. 2, 1964. 854 pp. Illus. \$26.

Radiation Protection. ICRP Publ. No. 4. Report of Committee 4 (1953-1959) on Protection Against Electromagnetic Radiation Above 3 Mev and Electrons, Neutrons, and Protons. Published for the International Commission on Radiological Protection by Pergamon, London; Macmillan, New York, 1964. 50 pp. Illus. Paper, \$3.25.

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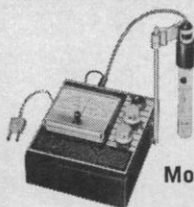
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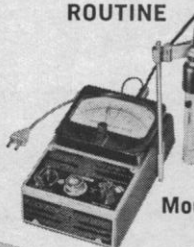
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vol. 20. Proceedings of the Laurentian Hormone Conference (Mont Tremblant Lodge, Canada), September 1963. Gregory Pincus, Ed. Academic Press, New York, 1964. 614 pp. Illus. \$21. Fourteen papers: "Some studies with antisera to growth hormones, ACTH, and TSH" by E. E. McGarry, J. C. Beck, L. Ambe, and R. Nayak; "Calciphylaxis and the parathyroid glands" by Hans Selye, Giulio Gabiani, and Beatriz Tuchweber; "Parathyroids, calcitonin, and control of plasma calcium" by D. Harold Copp; "Hypothalamic factors releasing pituitary hormones" by Roger Guillemin; "The neuroendocrine regulation of hypophyseal luteinizing hormone secretion" by S. M. McCann and V. D. Ramirez; "Some effects of hormones on the metabolism of adipose tissue" by Eric G. Ball and Robert L. Jungas; "The effects of corticosteroids upon connective tissue and lysosomes" by Gerald Weissmann and Lewis Thomas; "Testicular hormones and the synthesis of ribonucleic acids and proteins in the prostate gland" by H. G. Williams-Ashman, Shutsung Liao, R. L. Hancock, L. Jurkowitz, and D. A. Silverman; "Ovarian steroid synthesis and secretion *in vivo*" by R. V. Short; "Steroid secretions of the normal and polycystic ovary" by Virendra B. Mahesh and Robert B. Greenblatt; "Effects of steroids on pituitary gonadotropin and fertility" by Francis J. Saunders; "Hormone antagonists: inhibitors of specific activities of estrogen and androgen" by Leonard J. Lerner; "A quantitative study of inhibition and recovery of spermatogenesis" by D. J. Patanelli and Warren O. Nelson; and "Kinetics of the germinal epithelium in man" by Carl G. Heller and Yves Clermont.

Residue Reviews. Residues of pesticides and other foreign chemicals in foods and feeds. vol. 6. Francis A. Gunther, Ed. Academic Press, New York; Springer, Berlin, 1964. 169 pp. Illus. \$6.

Salivary Glands and Their Secretions. Proceedings of a conference (Seattle, Wash.), August 1962. Leo M. Sreebny and Julia Meyer, Eds. Pergamon, London; Macmillan, New York, 1964. 396 pp. Illus. \$20.

Sensory Evoked Responses in Man (*Ann. N.Y. Acad. Sci.* 112, art. 1). Harold E. Whipple, Ed. New York Acad. of Sciences, New York, 1964. 546 pp. Illus. Paper, \$7. 27 papers presented at a conference held in February 1963.

Small Animal Anaesthesia. Proceedings of a symposium (London), July 1963. Oliver Graham-Jones, Ed. Pergamon, London; Macmillan, New York, 1964. 276 pp. Illus. \$12.

Le Sodium et la Vie. Alain Reinberg. Presses Universitaires de France, Paris, 1964. 128 pp. Illus. Paper.

Structure and Metabolism of Corticosteroids. Proceedings of a symposium (Paris), July 1963. Jorge R. Pasqualini and Max F. Jayle, Eds. Academic Press, New York, 1964. 178 pp. Illus. \$6.

Symptomatology and Therapy of Toxicological Emergencies. William B. Deichmann and Horace W. Gerarde. Academic Press, New York, 1964. 621 pp. Illus. \$18. Third edition of *Signs, Symptoms, and Treatment of Certain Acute Intoxications.*

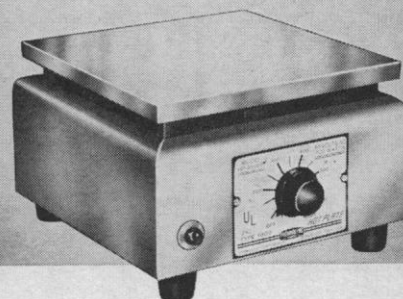
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Les Triterpénoides en Physiologie Végétale et Animale. P. Boiteau, B. Pasich, and A. Rakoto Ratsimamanga. Gauthier-Villars, Paris, 1964. 1318 pp. Illus. F. 310.

Water and Solute-Water Interactions. J. Lee Kavanau. Holden-Day, San Francisco, Calif., 1964. 109 pp. Illus. \$5.50.

The Zymogram in Clinical Medicine. S. H. Lawrence. Thomas, Springfield, Ill., 1964. 118 pp. Illus. \$5.75.

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Advances in Petroleum Chemistry and Refining. vol. 8. John J. McKetta, Jr., Ed. Interscience (Wiley), New York, 1964. 540 pp. Illus. \$22.50. Seven papers: "Radiation effects on lubricants," by J. G. Carroll and R. O. Bolt; "Theoretical aspects and practical implications of static electricity in the petroleum industry," by A. Klinkenberg; "Advances in hydrocracking," by A. Voorhies, Jr., and W. M. Smith; "Dewaxing with urea," by A. Hoppe; "High-temperature technology," by E. B. Gutoff; "The polymethylbenzenes," by H. E. Cier and H. W. Earhart; and "Engine evaluation of fuels and lubricants," by F. T. Finnigan and P. E. Pfeifer.

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Analytical and Canonical Formalism in Physics. André Mercier. Dover, New York, 1963. 230 pp. Illus. Paper, \$1.75. A reprint of the volume published by North-Holland, 1959.

Applied Superconductivity. Vernon L. Newhouse. Wiley, New York, 1964. 297 pp. Illus. \$8.50.

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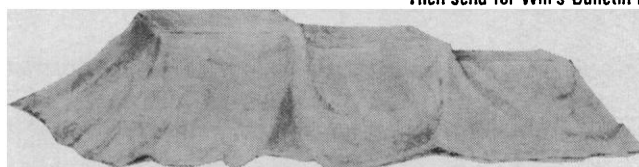
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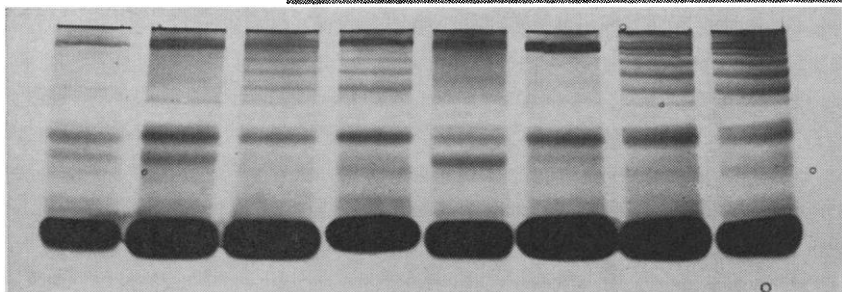
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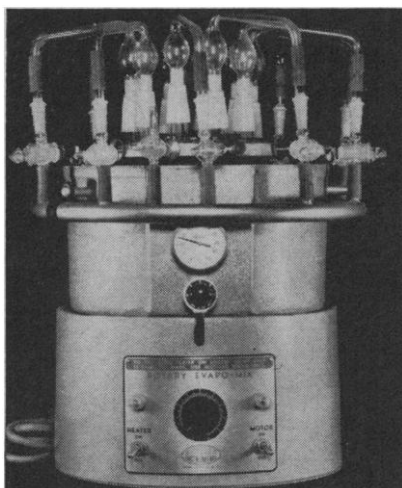
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Challenging Mathematical Problems with Elementary Solutions. vol. 1, *Combinatorial Analysis and Probability Theory*. A. M. Yaglom and I. M. Yaglom. Translated from the Russian edition (Moscow, 1954) by James McCawley, Jr. Revised and edited by Basil Gordon. Holden-Day, San Francisco, Calif., 1964. 239 pp. Illus. \$5.95.

The Chemical Elements in Nature. F. H. Day. Reinhold, New York, 1964. 372 pp. Illus. \$9.50.

Chemical Principles. P. W. Selwood. Holt, Rinehart, and Winston, New York, 1964. 592 pp. Illus. \$8.50.

Computer Programming Systems. F. Peter Fisher and George F. Swindle. Holt, Rinehart, and Winston, New York, 1964. 655 pp. Illus. \$11.50.

Copolymerization. George E. Ham, Ed. Interscience (Wiley), New York, 1964. 955 pp. Illus. \$27.50.

A Course of Mathematics for Engineers and Scientists. vol. 4. Brian H. Chirgwin and Charles Plumpton. Pergamon, London; Macmillan, New York, 1964. 361 pp. Illus. \$5.

Electron Density Distribution in Ionosphere and Exosphere. Proceedings of the NATO Advanced Study Institute (Skeikampen, Norway), April 1963. E. Thrane, Ed. North-Holland, Amsterdam; Interscience (Wiley), New York, 1964. 403 pp. Illus. \$13.50.

Electron Paramagnetic Resonance. S. A. A'ltshuler and B. M. Kozyrev. Translated from the Russian edition (Moscow, 1961) by Scripta Technica. Charles P. Poole, Jr., Ed. Academic Press, New York, 1964. 382 pp. Illus. \$13.50.

Elementary Analysis. Richard F. McCoart, Malcolm W. Oliphant, and Anne E. Scheerer. Holden-Day, San Francisco, Calif., 1964. 267 pp. Illus. \$7.95.

Elements of General Topology. Sze-Tsen Hu. Holden-Day, San Francisco, Calif., 1964. 224 pp. Illus. \$8.75.

Elements of Mathematical Logic. P. S. Novikov. Translated from the Russian edition (Moscow, 1959) by Leo F. Boron. Oliver and Boyd, Edinburgh; Addison-Wesley, Reading, Mass., 1964. 308 pp. Illus. \$7.95.

Elements of Plasma Physics. Solomon Gartenhaus. Holt, Rinehart, and Winston, New York, 1964. 208 pp. Illus. \$9.50.

Energy Transfer in Gases. Institute of Chemistry (Brussels University), November 1962. Interscience, New York; Stoops, Brussels, 1964. 554 pp. Illus. \$15. Twelve papers presented at the Solvay Institute's 12th chemistry conference.

Fast Reactions in Solution. E. F. Caldin. Wiley, New York, 1964. 328 pp. Illus. \$7.50.

From Vital Force to Structural Formulas. O. Theodor Benfey. Houghton Mifflin, Boston, 1964. 127 pp. Illus. Paper, \$1.95.

Functions of a Complex Variable. And some of their applications. vol. 1. B. A. Fuchs and B. V. Shabat. Translated from the second Russian edition (Moscow, 1959) by J. Berry. J. W. Reed, Ed. Pergamon, London; Addison-Wesley, Reading, Mass., 1964. 447 pp. Illus. \$10.

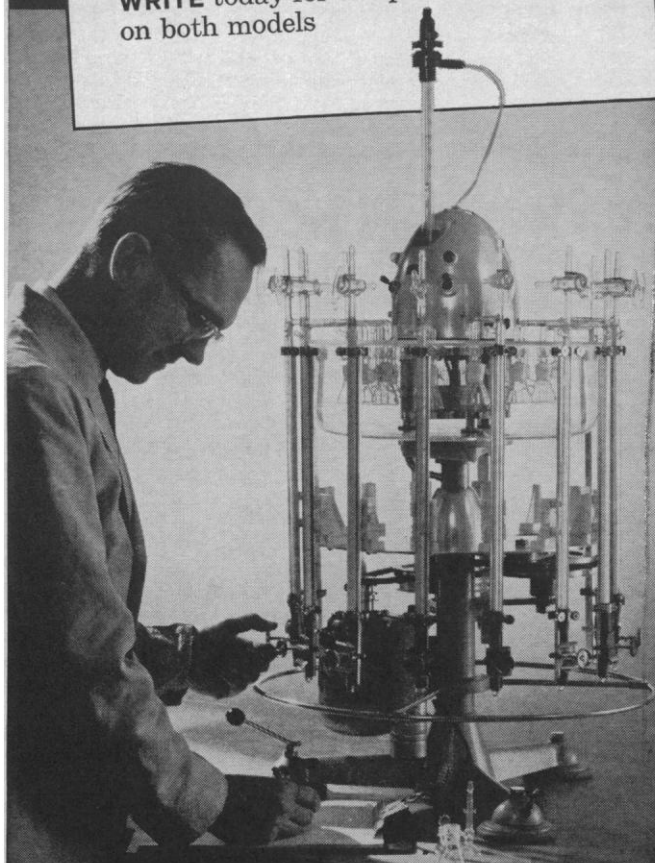
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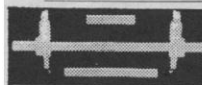
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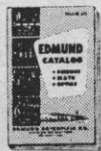
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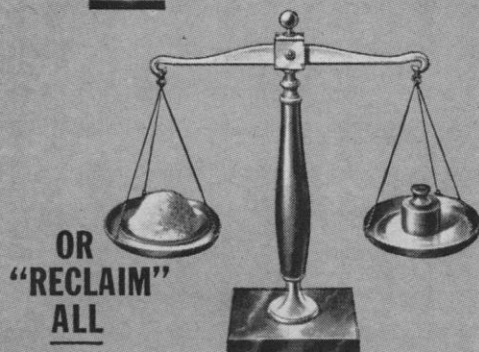
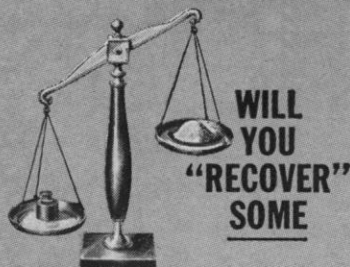
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Fundamentals of Heat Transfer. Samson Semenovitch Kutateladze. Translated from the second Russian edition (Moscow, 1962) by Scripta Technica. Robert D. Cess, Ed. Academic Press, New York. 1964. 501 pp. Illus. \$14.50.

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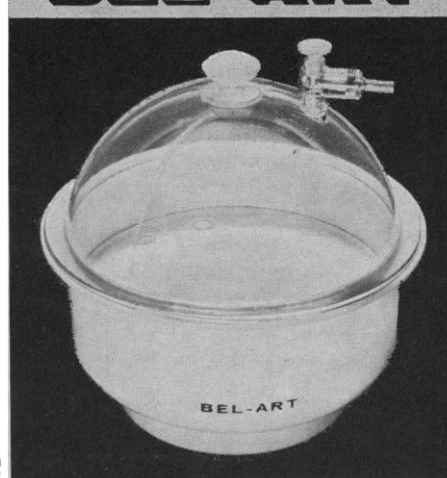
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Methods of Experimental Physics. vol. 2, *Electronic Methods*. E. Bleuler and R. O. Haxby, Eds. Academic Press, New York, 1964. 853 pp. Illus. \$24. Twelve sections: Evaluation of Measurement, Sidney Reed; Passive Circuit Elements and Networks, R. M. Scarlett; Vacuum Tubes, Edward J. Craig; Gas Tubes, W. J. Kearns and R. P. Welinger; Semiconductor Circuit Elements, I. A. Lesk; Rectifiers, Amplifiers, and Oscillators, R. P. Featherstone; W. J. Kearns and

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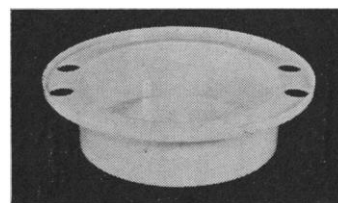


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