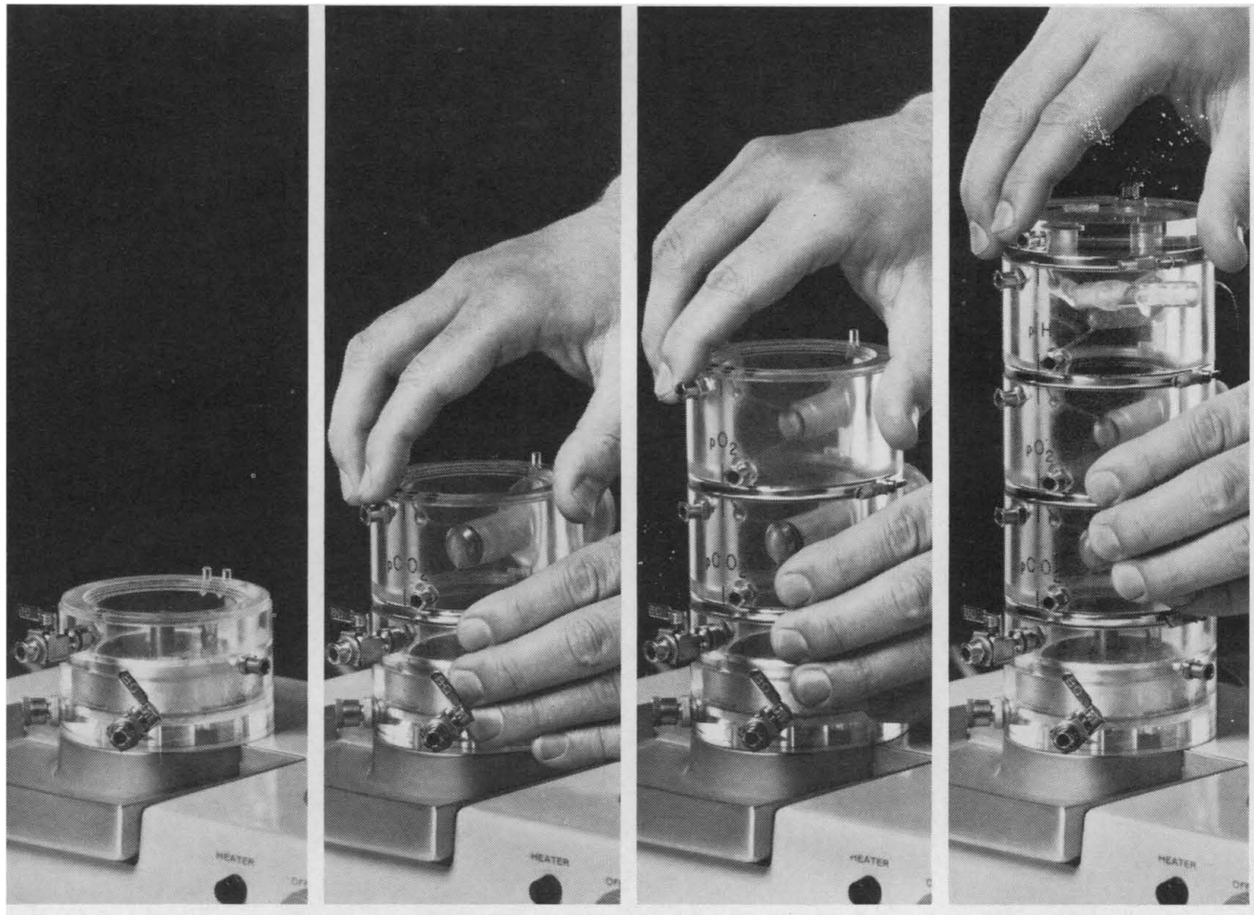
SCIENCE

22 May 1964
Vol. 144, No. 3621

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



To a constant temperature water bath | *. . . add a pCO_2 module* | *. . . a pO_2 module* | *. . . then a pH module*

HOW'S THAT FOR VERSATILITY IN A BLOOD GAS CUVETTE!

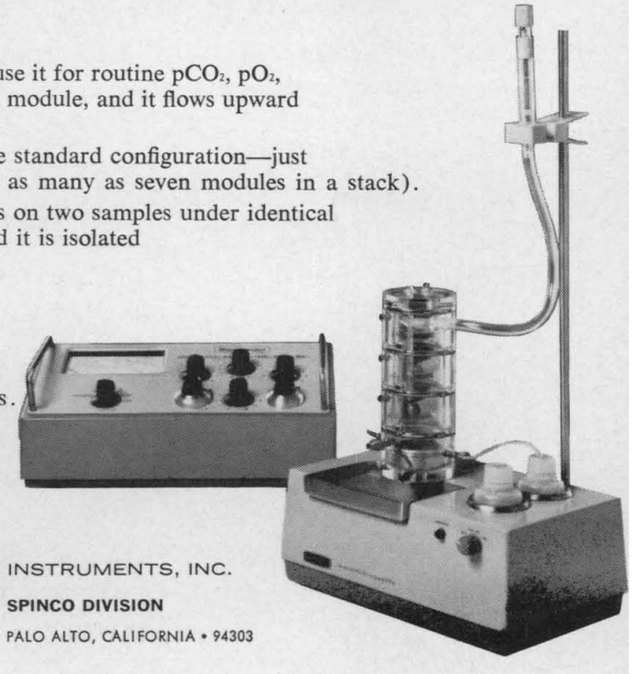
Above you see our new Modular Cuvette just as you would use it for routine pCO_2, pO_2, and pH measurements. Now inject a sample into the bottom module, and it flows upward to be measured simultaneously in all three modules.

But research needs vary, and there's no need to stay with the standard configuration—just rearrange modules, or add as many as you wish (we've had as many as seven modules in a stack).

Perhaps for a particular study you want to compare readings on two samples under identical conditions. Simple again—give any module a slight turn and it is isolated from the others for individual sampling.

Happily, the performance of our Modular Cuvette is as impressive as its versatility. Precise temperature control to ±0.1°C is maintained by constant temperature water circulating through the centers of all modules. Sample size is small—less than a third of a cc fills all three standard modules.

The remarkable Modular Cuvette and its companion 160 Physiological Gas Analyzer are described in our new brochure on blood gas analysis; ask for Data File MC-5.



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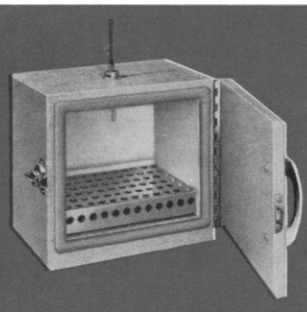
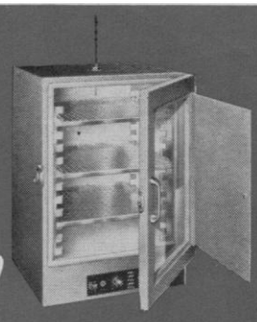


Cat. No. 100 INCUBATOR. Range to 40°C. Interior 10" W x 8" H x 7" D, hot wall heat.....$85.00

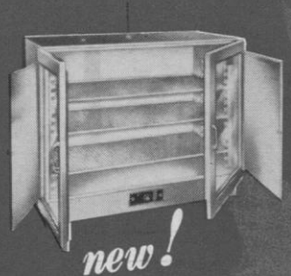
Cat. No. 110 INCUBATOR. Same as above, with Lucite door, stainless steel exterior.....$105.00



new!

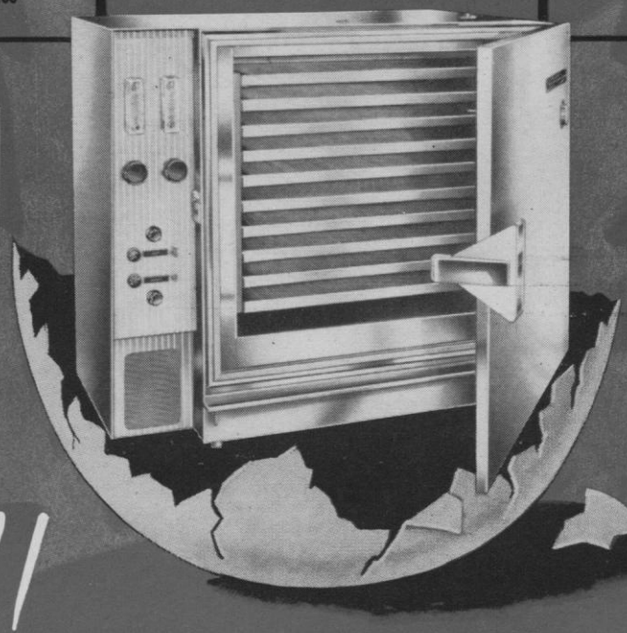
Cat. No. 300 INCUBATOR. Range to 65°C. Interior 15" W x 20" H x 15" D. 3 shelves, hot wall heat.....$210.00

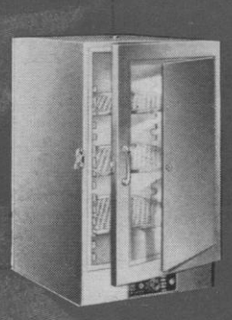
Cat. No. 200 INCUBATOR. Range to 65°C. Interior 13" W x 13" H x 13" D. 2 shelves, hot wall heat.....$185.00



new!

Cat. No. 600 INCUBATOR. Range to 65°C. Interior 38" W x 27" H x 18" D. No center post, hot wall heat.....$450.00





Cat. No. 400 INCUBATOR. Range to 65°C. Interior 18" W x 27" H x 18" D. 3 shelves, hot wall heat.....$265.00

look!

...culture testing made easier with this new addition to the Lab-Line family

Cat. No. 405 CO_2 INCUBATOR

We meditated and we cogitated . . . until we finally incubated this handsome addition . . . the **new No. 405 Carbon Dioxide Incubator.** Individual **Solid State Controllers** regulate the exact temperature and air flow. Larger capacity Monel chamber, stainless steel exterior, built-in regulator valves, flow meters, economical price. Compare these features . . . You just can't go wrong!

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- **Built-in humidity control**
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- **Ten Monel pull-out shelves hold up to 2100 Petri dishes (60 x 15 mm.)**
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22 May 1964
Vol. 144, No. 3621

SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Membranes, containing chlorophyll, taken from a spinach chloroplast. This chromium-shadowed preparation shows that the membrane is composed of a highly ordered array of units called quantasomes. A quantasome has the characteristics required for the energy conversion site in photosynthesis (× 187,000). See page 1009.

Meet a $41,000 multiparameter analyzer... and general purpose computer By combining the PDP-5 computer and a dual channel analog-to-digital converter, Digital has developed a dual-purpose machine that's priced lower than many special-purpose analyzers—and less capable computers. Unique among analyzers, its parameters are programmed in rather than built in. This way, parameters may be easily altered. There is an ample core memory for a 56 by 64 matrix. And although each channel has a capacity of 4096 counts, channels may be made double length through programming to achieve a count capacity in excess of 16 million. A built-in data channel permits a 12-bit event to be entered in six microseconds. ▪ As a computer, the PDP-5 can be used for such functions as peak area integration, spectrum stripping, curve fitting, and a wide variety of other mathematical analyses. The machine has a 55,555 additions-per-second computation rate, a 1024- or 4096-word random access magnetic core memory, 12-bit word length, 24-bit arithmetic, two-megacycle bit input via built-in data channel, external device program interrupt, input-output buss for direct connection of as many as 64 external devices, and a complete software package—including programs to perform standard one- and two-parameter data taking and data display functions. The $41,000 price tag includes the PDP-5, CRT display, analog-to-digital converter, keyboard printer, paper tape reader, and punch. ▪ If these facts have whetted your appetite for more detailed information, we'd be happy to talk to you about the PDP-5 at your convenience.

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- *Oil dampened to speed weighings*

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To give you more convenient, accurate readings, Torsion has designed the PL-1 with a fine-reading vernier to 1/10 gram and a capacity of 1 kilogram. The balance has an optical range of −10 grams to +110 grams.

The heart of the mechanism in the new PL-1 is the Torsion no-knife edge construction. This eliminates friction and wear, insures lifetime accuracy and speeds weighing. The balance will operate accurately even in severely corrosive or dust-laden atmospheres.

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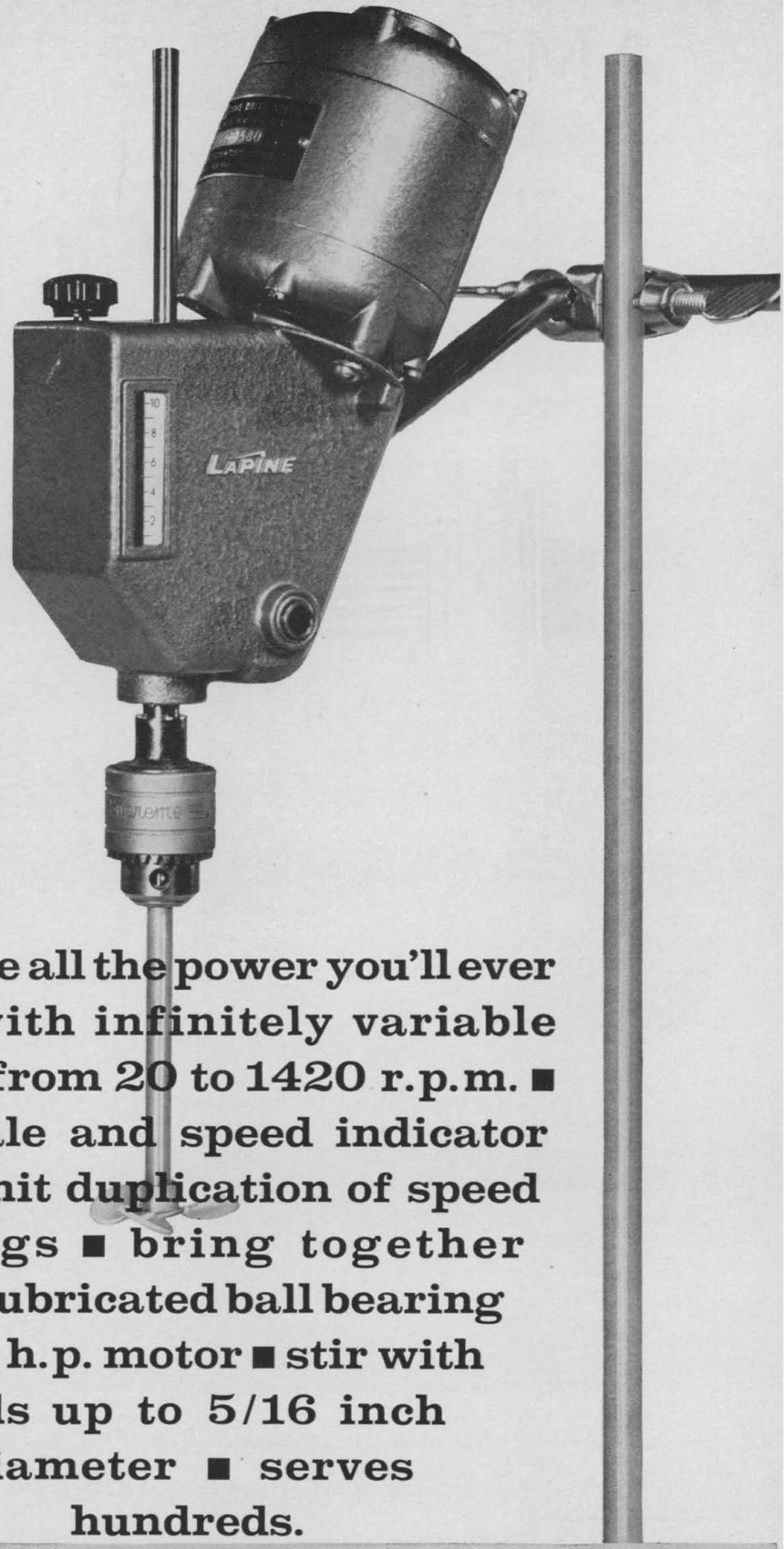

Combine all the power you'll ever need, with infinitely variable speeds from 20 to 1420 r.p.m. ■ add scale and speed indicator to permit duplication of speed settings ■ bring together with lubricated ball bearing 1/70 h.p. motor ■ stir with rods up to 5/16 inch diameter ■ serves hundreds.

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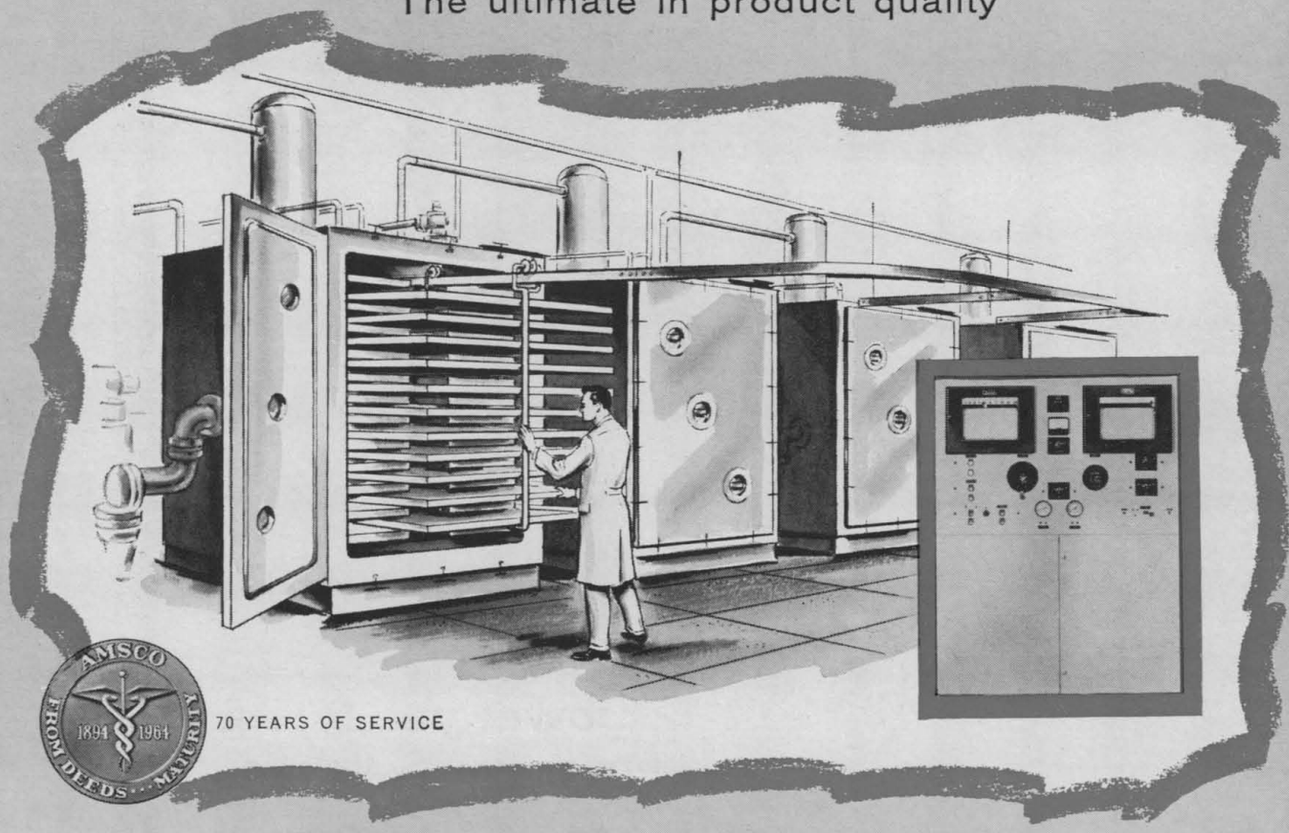
The ultimate in product quality



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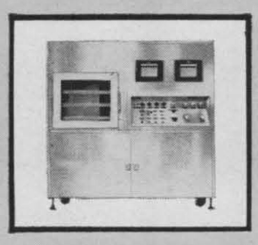
• *For complete details request Technical Brochure IC-612.*



Amsco also offers both laboratory and pilot plant scale equipment.

As required by the application especially engineered features coupled with a full range of available instrumentation results in the proper system for the use intended.

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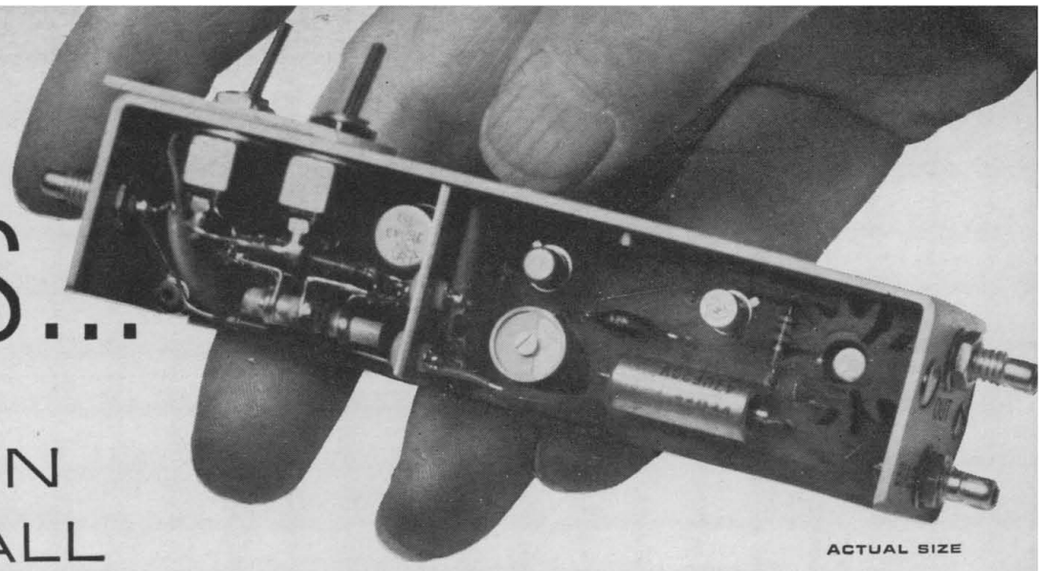
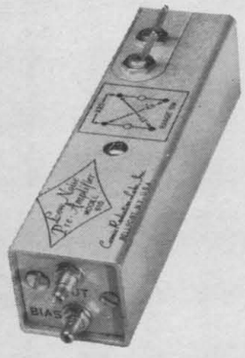
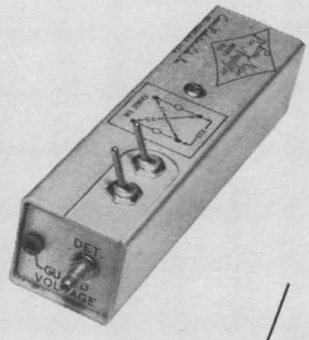
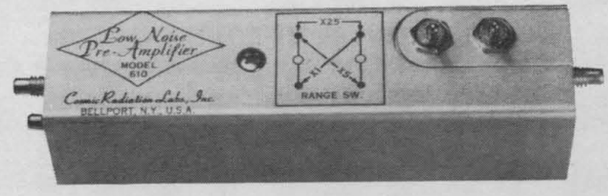


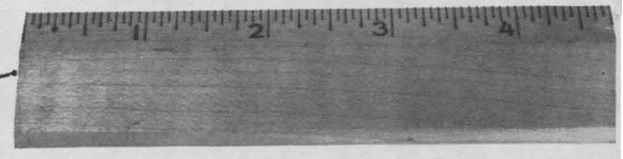
ACTUAL SIZE

...COME IN SMALL PACKAGES...









...FROM Cosmic !

LOW-NOISE PRE-AMPLIFIER MODEL PA-610
(Fully transistorized with FET)

Designed primarily for use with low-noise high resolution solid state detectors and engineered for use in vacuum systems, this compact unit can be operated within a vacuum chamber without exceeding its components thermal rating. Specifications of model PA 610 Low Noise Preamplifier are detailed in the table below. It is completely compatible with Cosmic's Model 901 Linear Amplifier and is connected to the —32 v. supply. Charge gain of the Preamp is adjusted with the use of 2 miniature toggle switches for .9, 4.6 and 23 mv/Mev of energy loss in silicon.

Noise level (Kev, fwhm)			Charge Sensitivity (mv/Mev)			Pulse-shape dimensions out				Saturation characteristics		Permissible counting rate (10-Mev particle)	Power requirements	Price
0 pf	10 pf	100 pf	X1	X5	X25	Rise Time (nanosec)			Fall Time	Neg. Output	Pos. Output			
6-12	8-14	25-35	0.9	4.6	23	X25	X5	X1	100	1 volt	3-5 volts	10^5 cps	32 volts at 12 ma	$450
						250	50	10-20	μsec time constant		(depends on load)			

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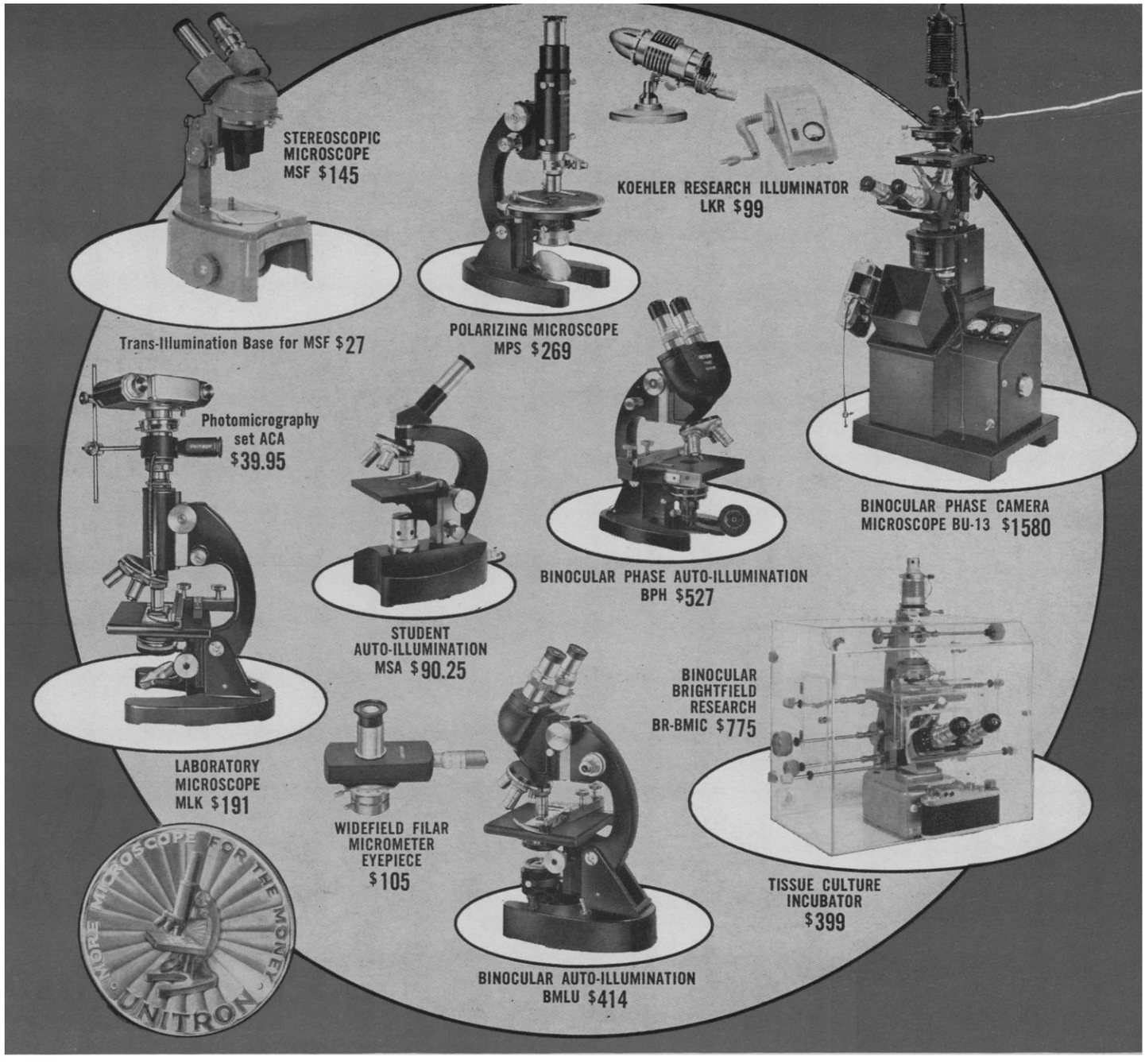

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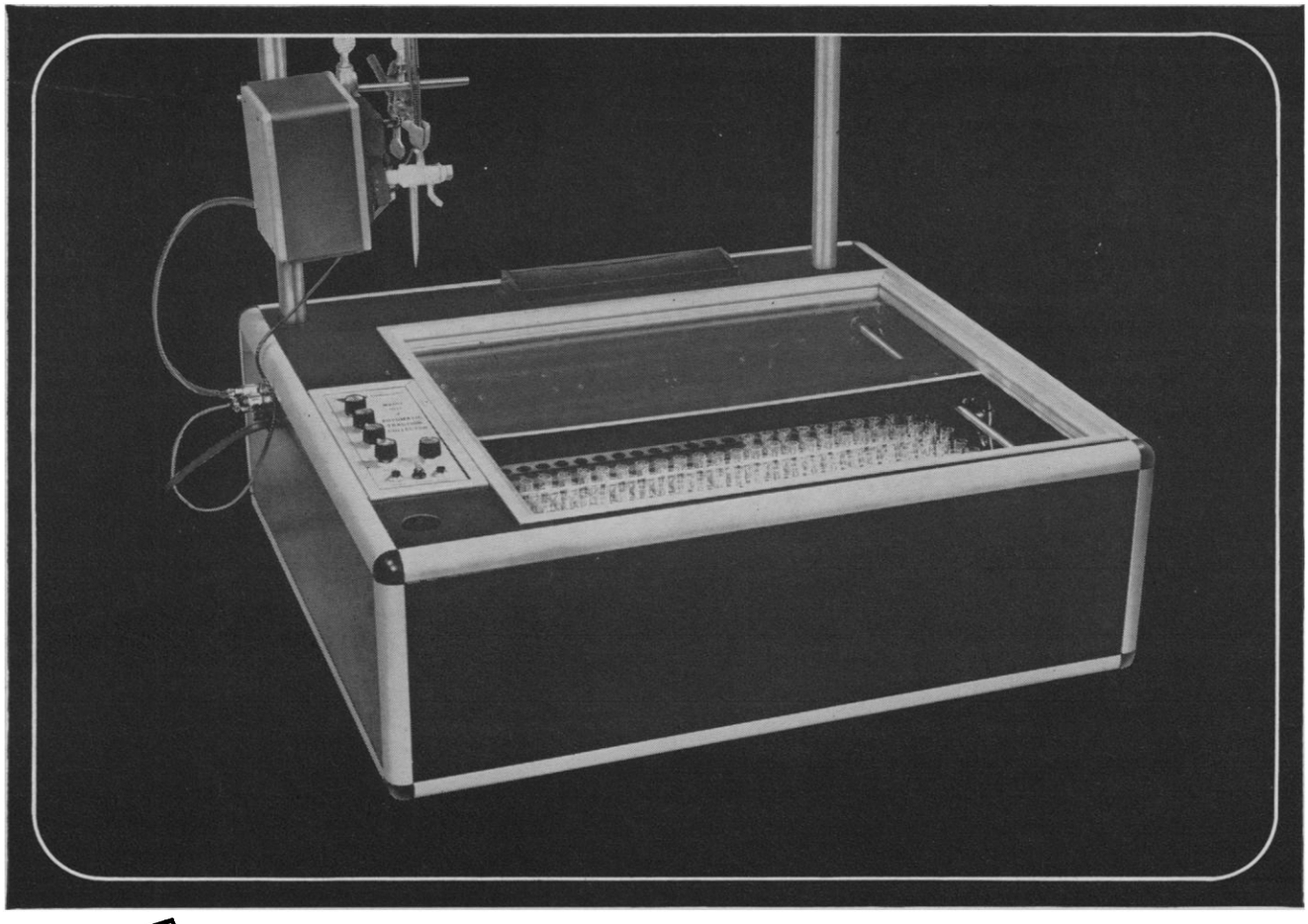
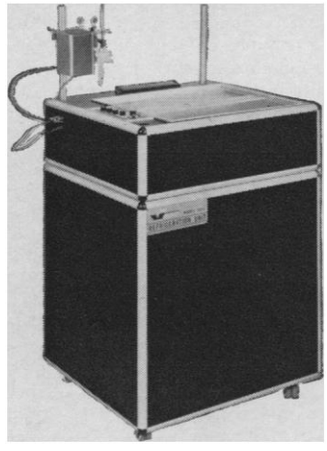


new automatic fraction collector

Vanguard's Model 1011 Automatic Fraction Collector provides the investigator with far greater reliability plus ease of operation plus extremely large test tube capacity—and at a price that makes this instrument available to every laboratory. Here are a few of the features that make Model 1011 Automatic Fraction Collector a remarkable instrument: ■ Space-saving design—Model 1011 measures only 29″ wide, 8″ high, and 26″ deep ■ 400 test tube capacity—tubes contained in eight independently removable stainless steel trays (each tray holds 50 standard size test tubes of 13mm., 15mm., 16mm., or 18mm.) ■ Three sturdy 4-foot stainless steel support tubes in triangular configuration for rigidity ■ Time, Drop and Volumetric capability are all standard at no extra cost ■ Solid state electronics ■ Sliding, clear glass Dust Cover protects test tubes from external contamination ■ No siphons needed with unit.



Model 1011 Fraction Collector may be used with the new Model 1012 Refrigeration Unit. This accessory transforms Model 1011 into a DRY Refrigerated Fraction Collector. Model 1012 measures only 29″ wide, 29″ high, 26″ deep, and is thermostatically controlled.

For complete specifications on the Model 1011 Automatic Fraction Collector and the Model 1012 Refrigeration Unit (shown at left), send for new informative brochure. For immediate information and/or a quotation, call your nearest Vanguard office.

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The Problems of
Precise Measurements of
Signal Waveforms in Noise

NONE OF THE "SIGNAL AVERAGING" DEVICES NOW AVAILABLE *REALLY* AVERAGE SIGNALS

EXCEPT NORTHERN SCIENTIFIC'S NS-513 DIGITAL MEMORY OSCILLOSCOPE

What these non-averaging "signal averagers" really do is add the recurrent waveforms. It is up to the customer to do the last tedious step, determine the number of signals that were totalled, and divide data points of interest by that number, if he wants absolute rather than relative values.

So urgent is the need to measure recurrent signals obscured by noise, nobody has complained very much.

But in Northern Scientific's Model NS-513 Digital Memory Oscilloscope, the recorded and displayed data have the dimension volts, not volt-seconds. A reading of 892 means 892 millivolts, and doesn't keep increasing in magnitude as more signals occur.

In this instrument each of the 512 data points approaches its final value in almost exactly the way a heavily damped galvanometer approaches its final value, in the case of measuring a d. c. voltage. As in the case of the damped galvanometer, voltage excursions due to noise have only the slightest effect on the position of the galvanometer, even if the noise spikes have much greater amplitude than the signal. By very close analogy, the recorded data points in the Northern Scientific instrument approach final values at rates determined by the operator-selected time constant, which can be as short as two seconds or as long as several hours.

The entire waveform, as recorded, is heavily damped and after reaching its near-final value, is almost unaffected by even a large number of persistently incorrect input signals. The operator may, of course, use a short time constant initially to obtain a quick approximation.

A few outstanding features of the NS-513 follows: Delivers direct voltage readings, not readings which depend upon sweep speeds and the number of signals averaged. No more growing, moving displayed waveforms, no more ambiguities ...Provides 0.1% accuracy...Uses all silicon semiconductors...Has built-in typewriter controls...Provides point by point, or subtotal, digital readout for easy integration...Has reversible sweep...Has trigger circuits that respond to external trigger pulses or prominent signal features.

For further information, write for our new brochure, price and delivery information, or phone (608/238-4741).

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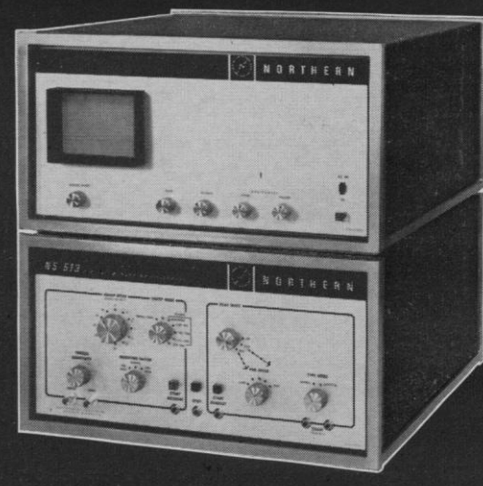
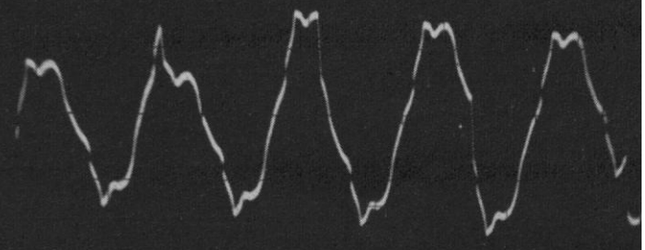
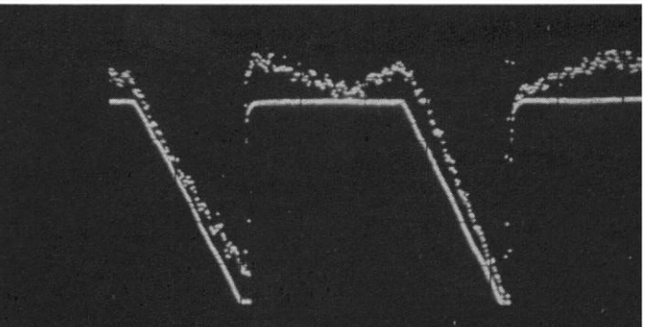


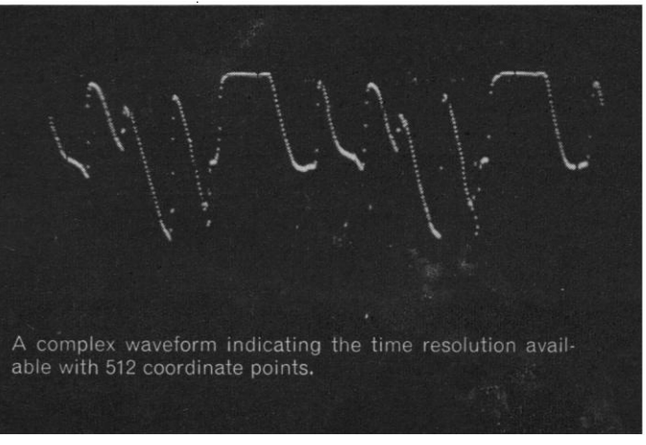
NOISY SIGNALS now clearly seen in a *truly easy* and *excitingly new way*...with the NS-513 Digital Memory Oscilloscope (above).



Noise and signal, as seen by standard oscilloscope at input to Model NS-513 Digital Memory Oscilloscope.



A quick measurement with a short time constant produces a reasonable first approximation, as shown by the jagged line of this multiple exposure photograph. Switching to a more appropriate time constant and measuring for several minutes produced the more accurate final waveform shown superimposed.



A complex waveform indicating the time resolution available with 512 coordinate points.

COLEMAN

AUTOMATED NITROGEN ANALYZERS for micro samples; for larger samples

For Micro Samples

Now in use in hundreds of laboratories, the automated Coleman Model 29 Nitrogen Analyzer is providing rapid, exact results for an almost unlimited range of materials.

From foods to fertilizers, from plastics to petroleum derivatives, from biological materials to organic intermediates, the instrument is supplementing or replacing both the manual Dumas and the Kjeldahl methods.

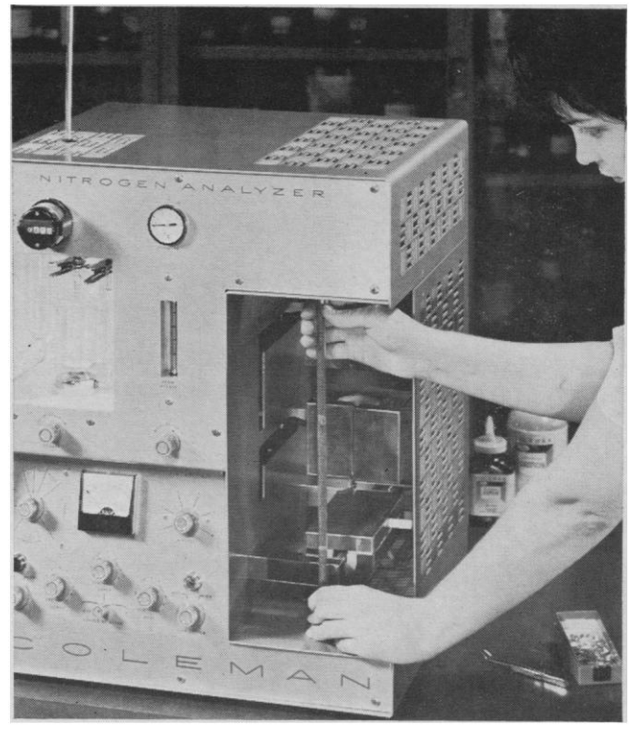
A special extraction technique, announced in a recent issue of ANALYTICAL CHEMISTRY, permits the instrument to be used for trace analysis with materials containing as little as 20 ppm nitrogen.

Operation of the instrument is simple. The operator is required merely to weigh and install the sample, to actuate the instrument, and 8 minutes later, to read and record nitrogen volume from a digital counter.

Thus, an analyst without extensive training in microchemistry can produce excellent results in both routine investigations and in research.

Condensed Specifications:
Sample . . . any material that pyrolyzes at temperatures up to 1000° C.
Sample size . . . from 5 to 50 milligrams, generally.
Operating cycle . . . 8 minutes.
Accuracy . . . results correspond to theory ±0.2% nitrogen.
Readout . . . digital counter in microliters.

Ask for Bulletin SB-291



For Larger Samples

Specially designed to meet requirements of materials that require extensive sample preparation before a representative sample can be obtained, the Coleman Model 29A accepts samples up to 50 milligrams. Even larger samples of inorganic materials are analyzed without difficulty.

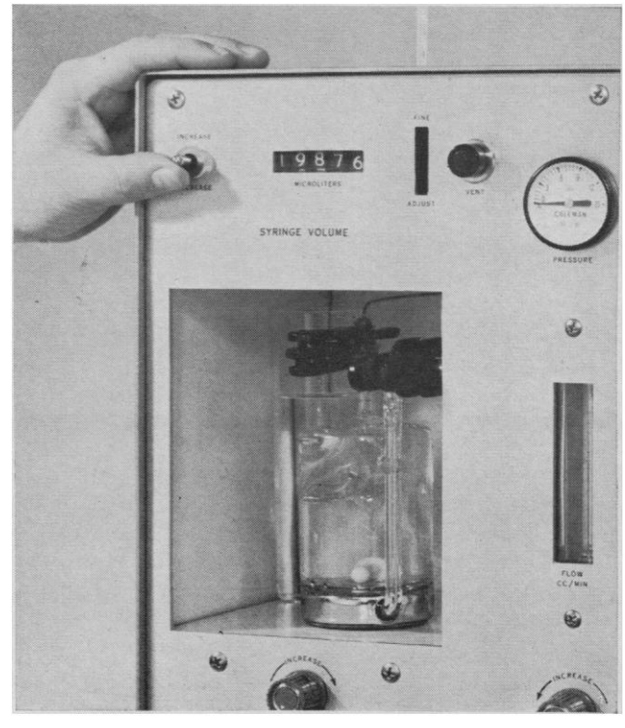
The instrument is finding wide application in laboratories working with such diverse materials as foods, feeds, grains, soils, fertilizers, milk products, and biological materials.

To accept the larger samples, the instrument incorporates an expanded combustion system, extended combustion cycle, and a larger, modified nitrometer for measurement of the greater volumes of nitrogen. The measurement operation is speeded by a reversible electric motor in the precision syringe-and-micrometer screw adjustment.

The Model 29A minimizes the work formerly required in preparing samples of non-homogeneous materials for microanalysis.

Condensed Specifications:
Sample . . . any material that pyrolyzes at temperatures up to 1000° C.
Sample size . . . 50 up to 500 milligrams; up to one gram or more for inorganic materials.
Operating cycle . . . 12 minutes.
Accuracy . . . results correspond to theory ±0.2% nitrogen.
Readout . . . motor-driven digital counter.

Ask for Bulletin SB-291



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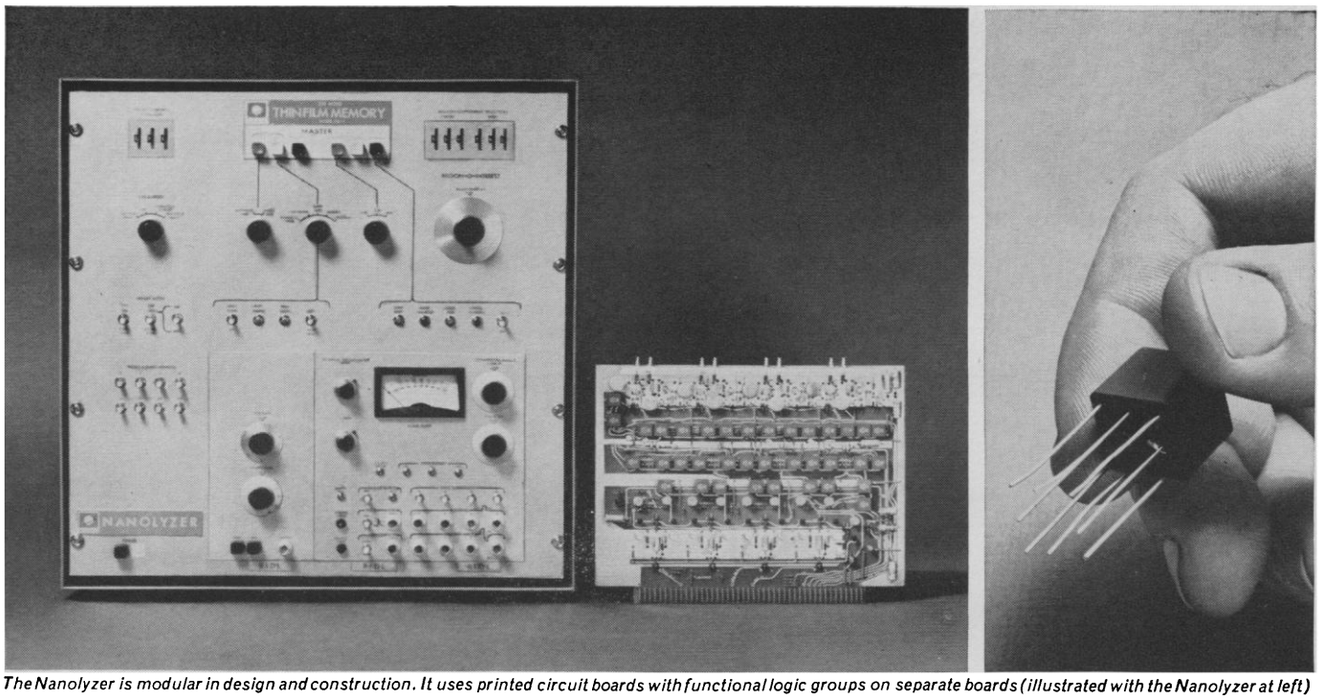

The Nanolyzer is modular in design and construction. It uses printed circuit boards with functional logic groups on separate boards (illustrated with the Nanolyzer at left) The computer circuits use all-silicon transistor Snap-Logic elements (illustrated at right) to assure matched circuit components during servicing and replacement.

THE NEW RIDL NANOLYZER* OPENS TOTALLY NEW AREAS OF INVESTIGATION

The new RIDL Nanolyzer* is an important advance in multi-channel pulse height analyzer design. It has removed the instrumentation limits, imposed by presently available analyzers, on new areas of investigation in high energy physics, fast radio-chemistry and like applications.

The principal advantage of the Nanolyzer is its ability to collect and handle more data per unit time with an unprecedented degree of accuracy. It accepts, analyzes, stores and displays data seven to fifty times faster than conventional analyzers. Central to this ability is the utilization of a 100 megacycle ADC providing a 10 nanosecond/channel address rate, Snap-Logic silicon elements and a thin-film memory plane.

In addition to the obvious advantage of high speed data acquisition for applications where high counting rates or very short counting times are encountered, the Nanolyzer effects important economies of time and cost in less demanding uses. Its data handling speed permits more efficient use of accelerator facilities, and results in more accurate data.

Important and unique features of the Nanolyzer follow:

THIN-FILM MEMORY: Memory cycle time of 0.6 μ sec. does not contribute to system dead time because of parallel data transfer from ADC. Capacity 10^5 or 10^6 counts for each of the 256 channels.

ANALOG TO DIGITAL CONVERTER: 100 megacycle crystal controlled, synchronized ramp start/stop, zero crossover timed amplitude analysis, differential linearity of 2%, dynamic range 376 channels with digitally selected zero suppression of up to 120 channels without pulse distortion.

INPUT CIRCUITS: Double delay-line shaped pulses for rapid system recovery. Selective analysis only of pulses satisfying following criteria: delayed coincidence/anti-coincidence gate timed thru internal ANTI-WALK® Discriminator, unique pile-up rejection circuit, and upper/lower discriminators. Built-in four-channel mixer for one, two or four data inputs into one, two or four sub-groups without external logic.

OPERATING MODES: Six electronically interlocked push switches control all input/output functions. Add or subtract from PHA storage. Remote operating capability. Automatic preset live-time or clock-time, or preset count operation in any selected channel. Entire memory or any selected part useable during data storage or display. Region-O-Interest* control for selective readout of entire memory, halves, quadrants or between digitally selected upper and lower channel limits. Readouts through magnetic tape, parallel printers, punch tape, IBM typewriter and live external display.

CONSTRUCTION: Modular construction, plug-in printed circuit boards, all-silicon transistor Snap-Logic* elements. Solid state throughout, functional and simple to use controls.

Would you like to know more about this remarkable Nanolyzer? We will be happy to send you more information and complete specifications. After critical evaluation, we believe that you will agree that the development of the Nanolyzer is one of the most significant advancements in multi-channel analyzer technology in recent years. Please write for literature. NUC:R-4-229

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RIDL

A DIVISION OF NUCLEAR-CHICAGO CORPORATION
4501 West North Ave., Melrose Park, Illinois 60160

new PICKER 2 in 1

SPECTRO/DIFFRACTOMETER

x-ray emission / x-ray diffraction

always ready for either technique

two permanently mounted x-ray tubes preclude changeover downtime

use this tube for fluorescence analysis

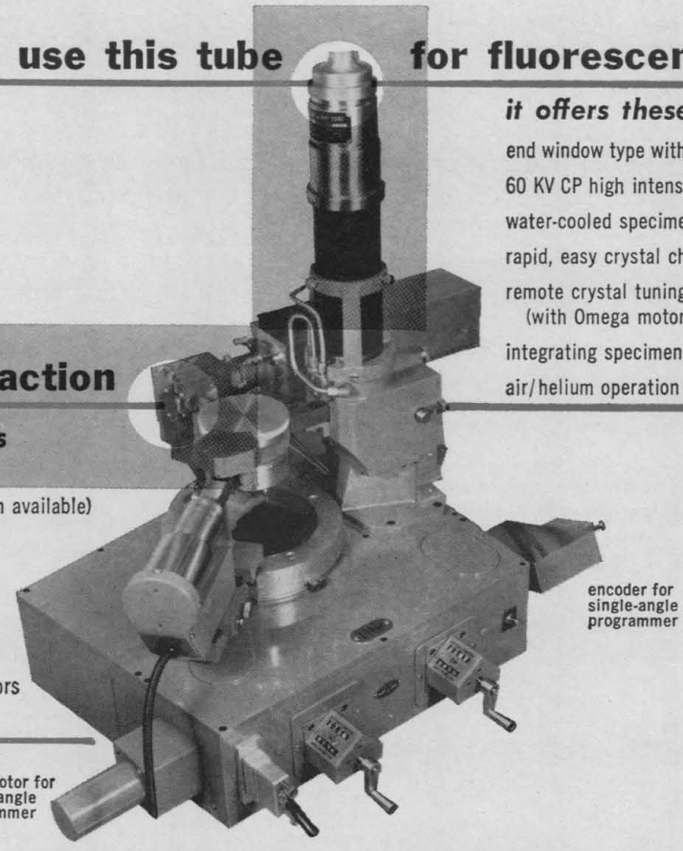
it offers these advantages

- end window type with W, Mo, Cr, or Pt target
- 60 KV CP high intensity radiation
- water-cooled specimen chamber
- rapid, easy crystal changing
- remote crystal tuning (with Omega motor)
- integrating specimen spinner
- air/helium operation (10 second flush)

this for x-ray diffraction

it offers these advantages

- constant potential operation
- variety of focal spots (.4, .75 and 1.5 mm available)
- both Omega and 2-Theta scanning
- electrically operated shutters
- take-off angle easily adjustable (without disturbing beam alignment)
- track-mounted specimen and detector supports
- complete set of slits or pinhole collimators



The Picker Two-in-One SPECTRODIFFRACTOMETER provides uniquely versatile technical resources for a minimal outlay. It will find particular welcome in the laboratory where both diffraction and emission analyses may be required on the same specimen: one can follow the other by simple switchover (no need to interchange and/or align components). The instrument's instant readiness to tackle either job commends it to the small laboratory where scant space or stringent budget permits investment in only one goniometer.

To get the detailed story of these remarkable instrumental advances, call any local Picker representative or write PICKER X-RAY CORPORATION, WHITE PLAINS, N.Y.

another advance...

automatic single-angle programming

The attachments seen jutting from the diffractometer base in the picture above are the slew motor and encoder for the Picker Single-Angle Programmer.

The programmer will automatically analyze

up to 10 elements by x-ray emission techniques

or up to 5 pairs of Bragg angles by diffraction

Operating unattended, it can save countless manhours in situations where much sequential work is to be done.

look to **PICKER** *for* **NEW** *THINKING*

in x-ray instrumentation

COAT BY PAULINE TRIGERE. HAT BY ADOLFO. CALCULATOR BY MONROE. PHOTOGRAPHED AT THE GUGGENHEIM MUSEUM BY HIRO.

Breathtaking! Beautiful though it is, there's far more than meets the eye to this new Monro-Matic® calculator. For underneath its strikingly contemporary facade are the workings of the fastest, simplest, most automatic standard calculator ever devised. Yet it's priced comparably to those far less accomplished machines it has outmoded. As your local Monroe representative will be pleased to demonstrate. Call him. Or write us. Monroe Calculating Machine Company, Inc., Orange, New Jersey.

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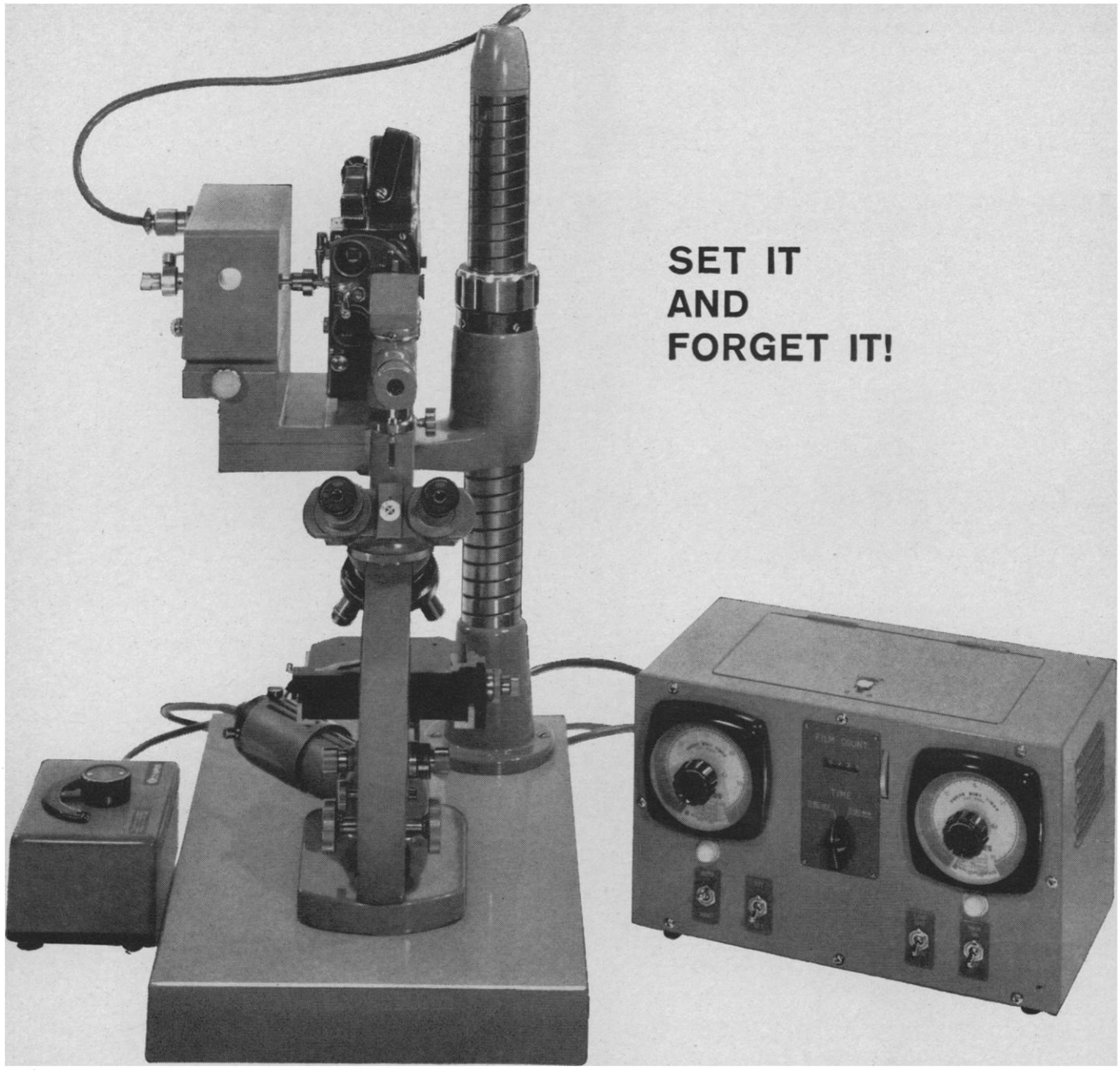


New, Elgeet-Olympus high-precision Micro-Cinematographic Apparatus for time-lapse photography

Take clear, brilliant 8mm or 16mm movies through a standard microscope. Primarily designed for microscopes having a vertical tube.

The viewer of Model 2600 permits observing the image while shooting the picture, and its auto-timer makes possible slow-speed picture taking. The use of an Elgeet-Olympus Exposure Meter Model EMM-IV is recommended for obtaining the most favorable exposure.

PHOTOGRAPHIC MAGNIFICATION—Any good 16mm or 8mm can be used.

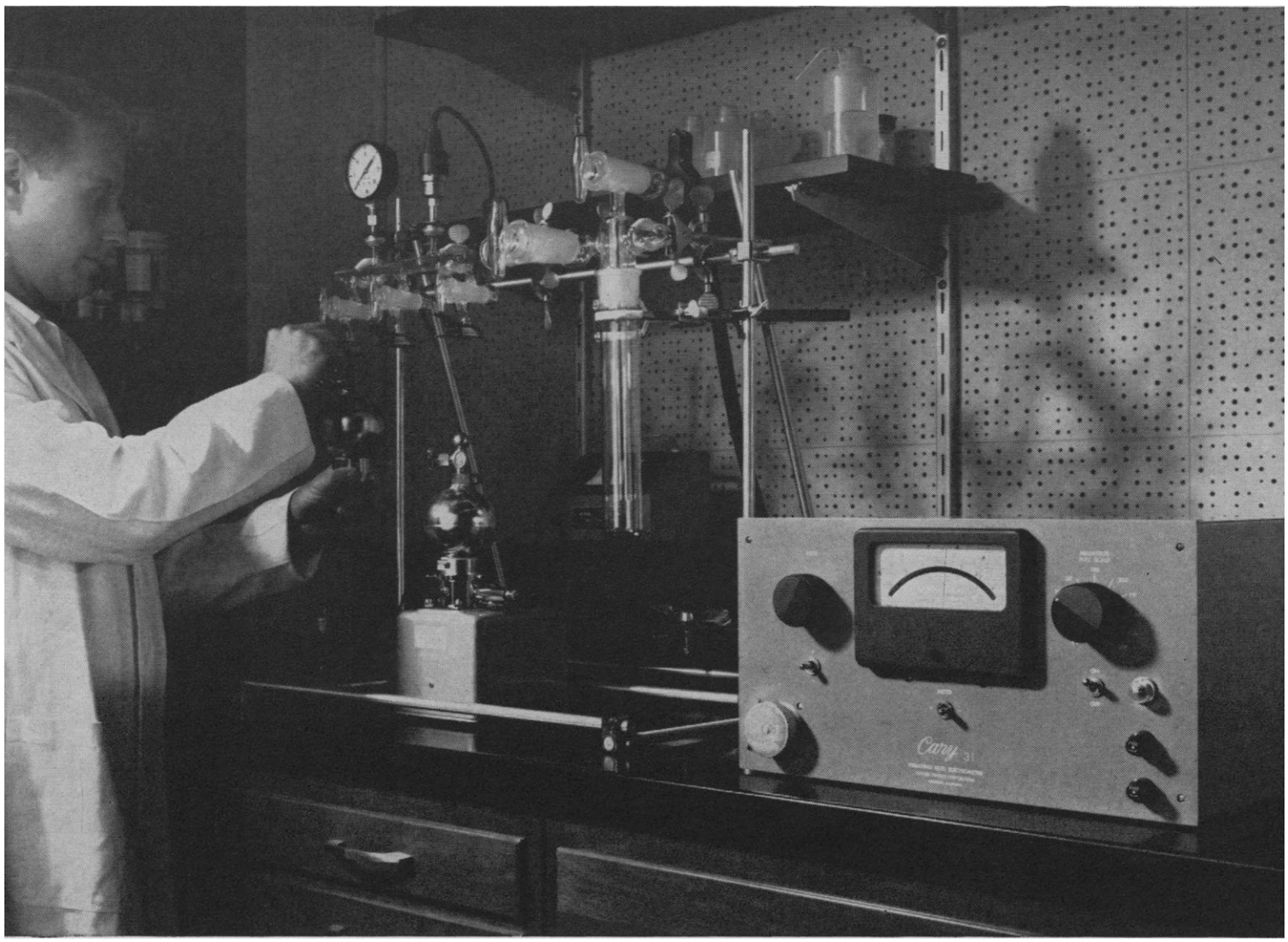
16mm . . . . . 0.28 times total magnification of microscope.
8mm . . . . . 0.4 times total magnification of microscope.

A selection of models is available for various cameras and purposes. Components, such as Power Pack, Drive Mechanism and Stand, may also be purchased separately. For full information, write Elgeet Optical Co., Inc., 303 Child Street, Rochester, New York 14611.

Elgeet

CARY MODEL 31 VIBRATING REED ELECTROMETER

with ion chamber...for precise direct measurement of C^{14} or H^3 in gases



For details on Cary Model 31 and Ion Chambers send for Data File E-303-54

Model 31 detects less than 3 dpm C^{14}/cc air with Cary 250-cc ion chamber, provides measurements reproducible to better than 1%, and operates for months with a single calibration. It is ideal for simplifying measurement of either gaseous or combustible non-gaseous radioactive samples. Gaseous samples to 250°C are collected in or passed through the ion chamber for static or continuous flow measurements. Far more precise and sensitive than liquid trapping equipment, a Model 31 with ion chamber costs less than $2,000.

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Cary
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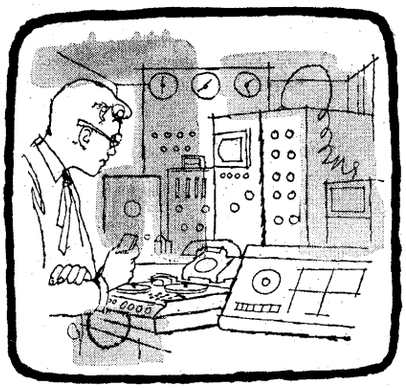
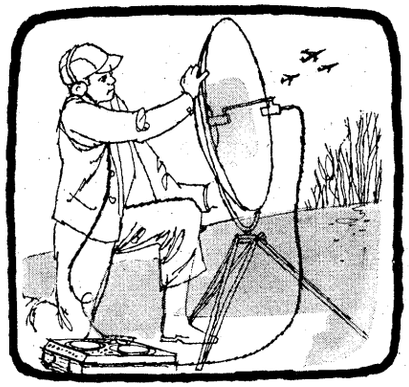
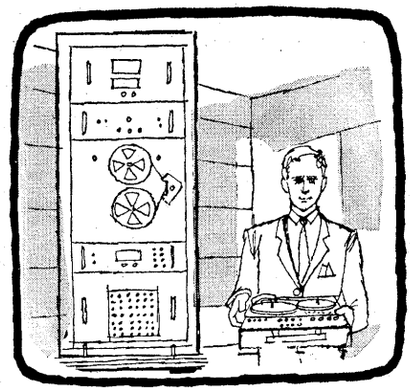
Vibrating Reed Electrometers & Amplifiers • Raman/UV/IR Recording Spectrophotometers • Spectropolarimeters



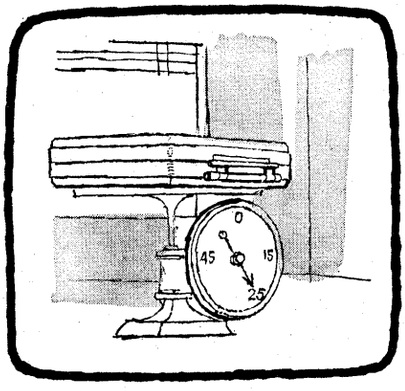
IF YOU ARE RECORDING IN THE LAB...



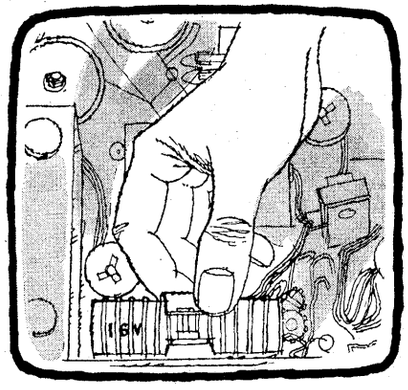
OR IN THE FIELD, YOU CAN NOW...



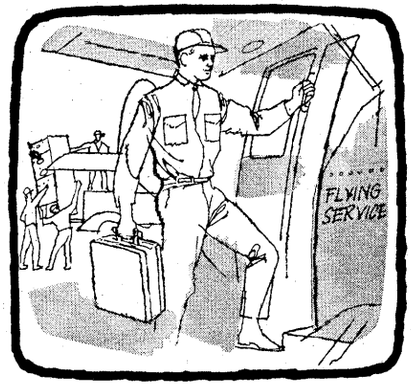
GET PRECISION PERFORMANCE...



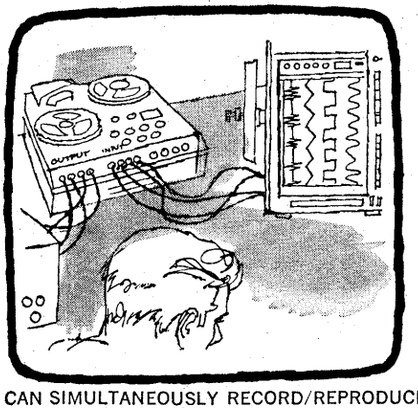
IN A 25-POUND RECORDER/REPRODUCER



THAT IS COMPLETELY SELF-POWERED,



CAN BE HAND-CARRIED ANYWHERE.



CAN SIMULTANEOUSLY RECORD/REPRODUCE 4 TRACKS,

DIRECT SYSTEM

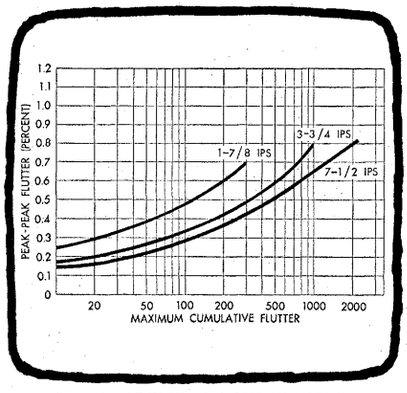
*Tape Speed	Frequency Response ±3db
1⅞	100—5,000
3¾	100—10,000
7½	100—20,000

FM SYSTEM

Tape Speed	Frequency Response ±½ db
3¾	0—1,000
7½	0—2,000

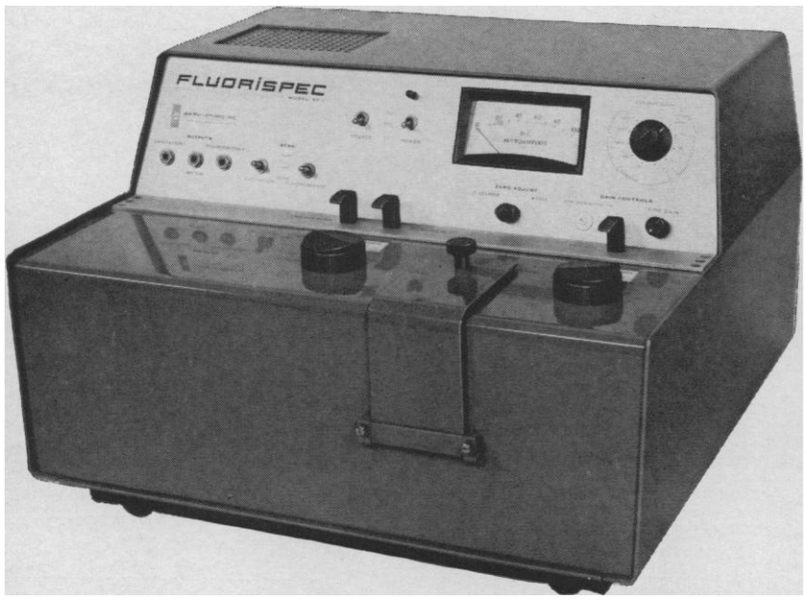
optional speeds available

FM OR DIRECT.



WITH EXTREMELY LOW FLUTTER

MODEL SF/1
FLUORISPEC
FLUORESCENCE SPECTROPHOTOMETER

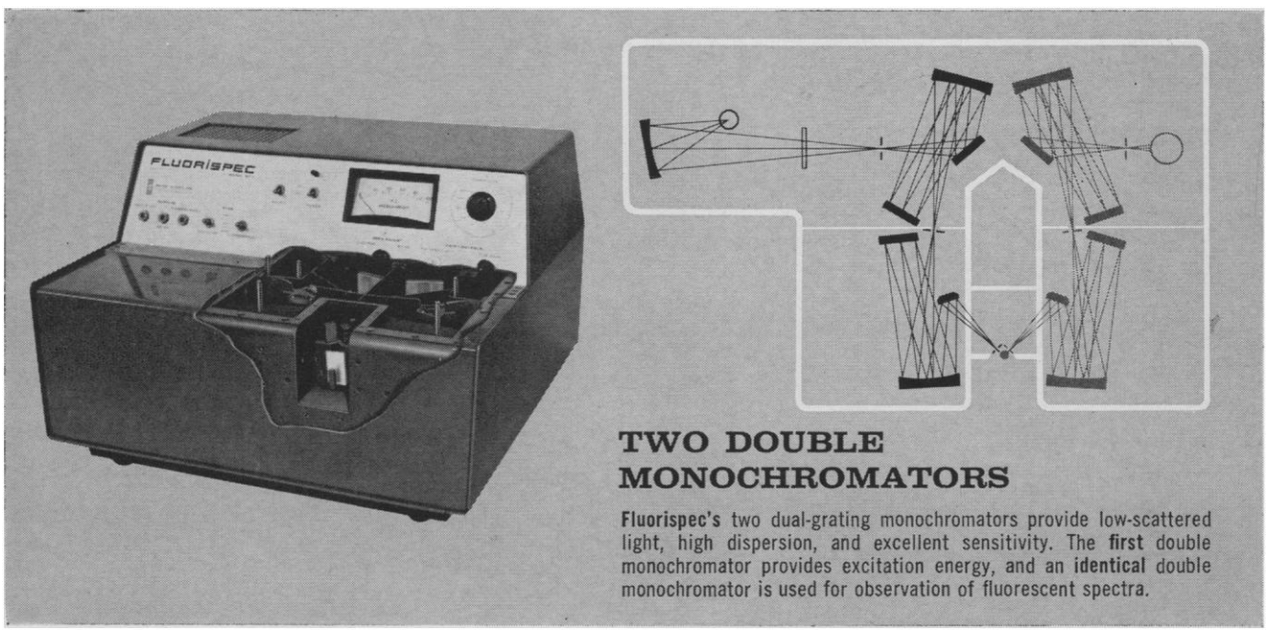


NEW
Fluorispec, Baird-Atomic's Model SF-1 **Fluorescence Spectrophotometer** is a completely **new**, compact instrument which successfully combines the advantages of spectrophotometry with the inherent sensitivity of fluorescence measurement!

HIGH RESOLUTION
Fluorispec's high resolution and the low-scattered light of its **two** dual-grating monochromators augments the high specificity of fluorescence assay in identifying unknown compounds!

WELL-DESIGNED OPTICS
Fluorispec's highest quality optics give reliable, reproducible results. Also featured are automatic/manual scanning and a choice of slit widths!

ULTRA-HIGH SENSITIVITY
Fluorispec's ultra-high sensitivity permits assay of fluorescent compounds in the parts-per-billion range!



TWO DOUBLE MONOCHROMATORS

Fluorispec's two dual-grating monochromators provide low-scattered light, high dispersion, and excellent sensitivity. The **first** double monochromator provides excitation energy, and an **identical** double monochromator is used for observation of fluorescent spectra.

For comprehensive descriptive literature, price, delivery and other information, please contact:

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BAIRD-ATOMIC, INC.
33 University Road / Cambridge, Mass. 02138
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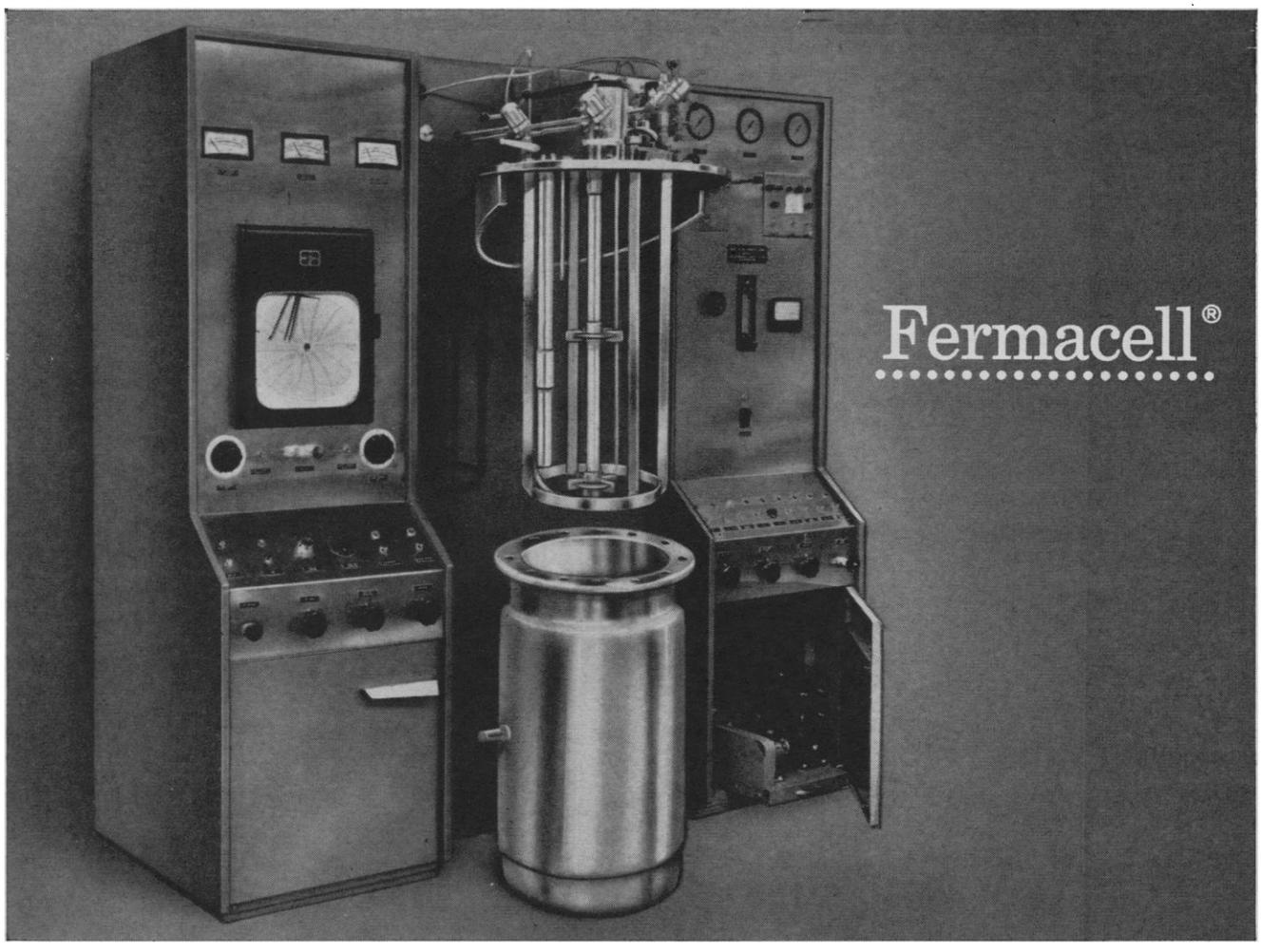


The Fermentor with the Removable Vessel

For laboratory, pilot-plant and small-scale production of microbial cells

The Fermacell is a general purpose fermentor used for basic laboratory research as well as pilot-plant and small-scale production of microbial cells. It is available in two sizes for working volumes up to 40 or 100 liters and is designed for batch production and continuous culture.

Rigid Control. This culturing apparatus is a completely steam-sterilizable system, fully integrated for rigid control of agitation, aeration, temperature, pressure, foam and pH. It is used for growing aerobic and anaerobic bacteria, streptomycetes, molds and yeasts, as well as mammalian and plant tissue cultures.

Easy to Handle and Easy to Use. The Fermacell's fermentor vessel can be removed quickly by one person in less than three minutes for cleaning as well as emptying and refilling. This design permits complete access to process lines, ports, and electrodes mounted in the stationary fermentor head plate.

FERMACELL FEATURES

Removable Fermentor Vessel is easy to handle, easy to clean; provides complete access to the fermentor interior.

Replaceable Shaft Seal Assembly is designed for repeated steam sterilization and a long life of positive sealing without danger of contamination. Seals are contained in a removable cartridge to facilitate inspection and replacement.

Rigid Temperature Control is maintained within ±0.5°C from 5°C above water supply temperature to 60°C.

Integral Recirculating Water Conditioning System circulates cold or heated water to fermentor jacket on control demand.

Extremely Versatile for a wide range of microbial studies. Components are designed for simple removal and cleaning as well as flexibility of operation. Choice of interchangeable spargers and impellers in four different models.

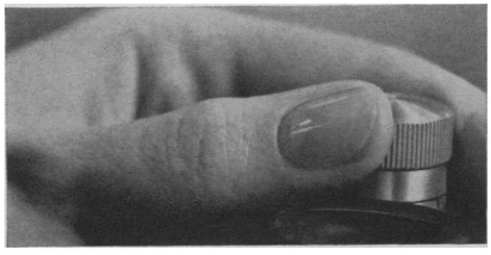
Broad Range of Accessories include Automatic pH Control, Photosynthetic and Ultraviolet Illuminators, Air Incineration System, Air Humidifier, Air Compressor and other equipment.

Easy to Operate—all controls are conveniently mounted on the front of the apparatus.

Send for 12-page Illustrated Catalog No. FMS/5224

NBS New Brunswick Scientific Co., Inc.
1130 Somerset Street, New Brunswick, N. J.

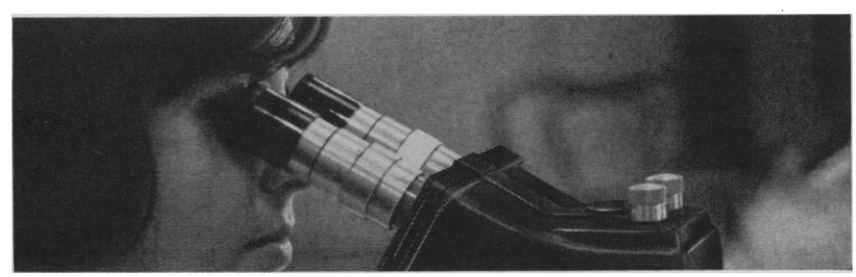
A simple way to answer this question would be to say "ask the man who owns one." Because thousands of users have found out "why" for themselves. But, let's start off by asking you some questions: Have you ever needed more working distance? . . . an increased real field-of-view? . . . or increased depth-of-focus? Have you ever wanted a flatter field? . . . or more image brightness? If you answer "yes" to just one of these, Advanced DynaZoom® is for you! ■ For instance, by



WHY ZOOM?

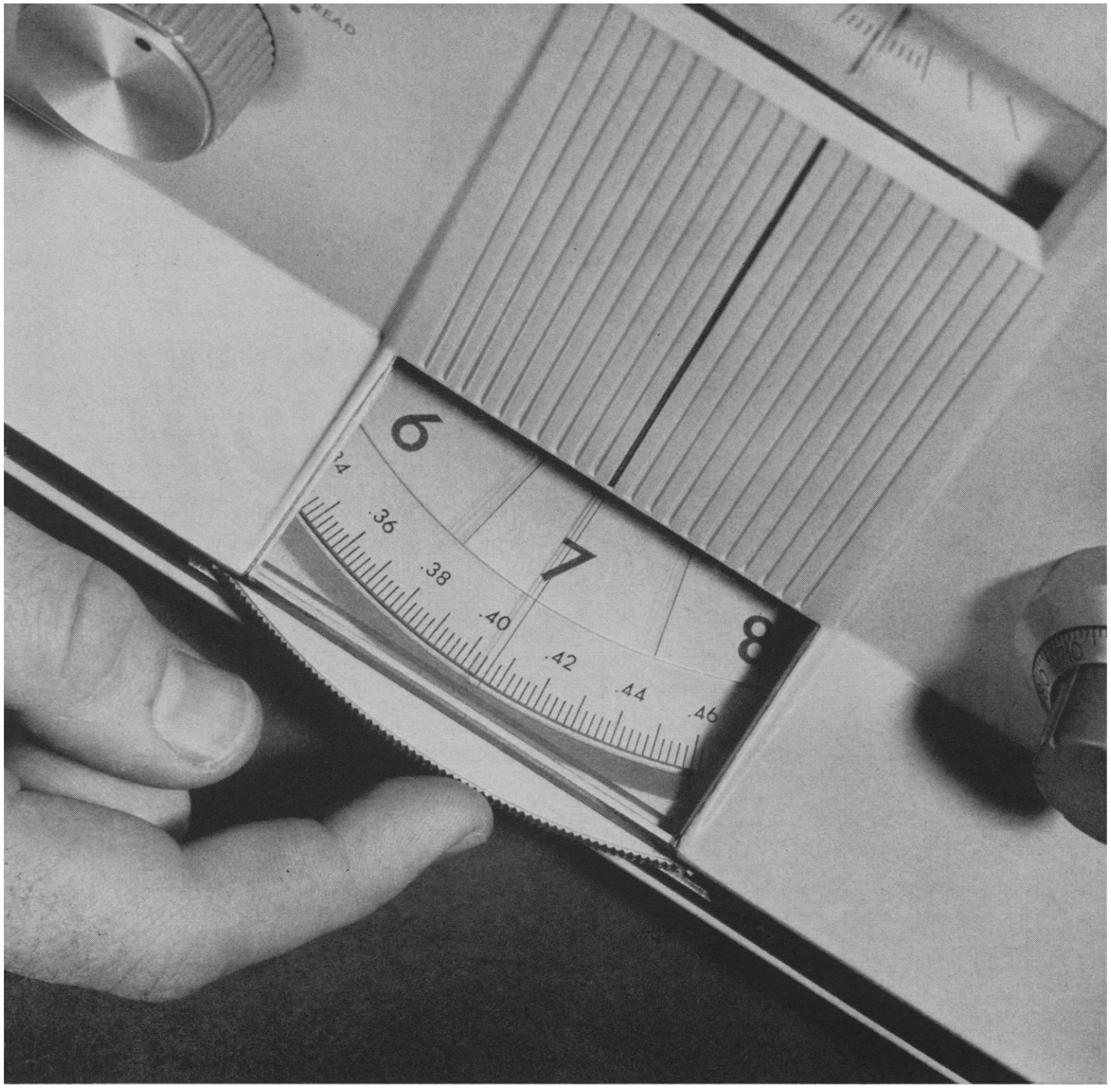
achieving a desired magnification using a lower power objective and the plus magnification of the DynaZoom system—you increase the working distance—the real field-of-view is increased—the depth-of-focus is increased and you have a much flatter field of view. ■ Or, in dark field and fluorescence microscopy—by using a lower power eyepiece in combination with the DynaZoom system and a higher power, higher N.A. objective, you get greatly increased image brightness—brightness that is an absolute necessity in these methods. ■ Obtaining high magnification through the use of the DynaZoom system, rather than using the highest power eyepiece—adds no field curvature and there is no change in eye relief. ■ DynaZoom provides the only means of getting "in-between" magnifications, exactly . . . through a continuously variable range. ■ And more . . . many more capabilities are yours . . . that only the DynaZoom system can offer. And best of all . . . IT'S FREE . . . because it's standard on Advanced DynaZoom microscopes at no extra cost. ■ Ask for a demonstration and see for yourself. Write Bausch & Lomb Incorporated, 75905 Bausch Street, Rochester, New York 14602.

In Canada, write Bausch & Lomb Optical Co., Ltd., Dept. 759, Scientific Instrument Division, 16 Grosvenor St., Toronto 5, Ont.



BAUSCH & LOMB

FOR THE INQUIRING MIND SEARCHING FOR BETTER MICROVISION... *Advanced Dyna Zoom*



If it says 7.406 pH it means it!

Not 7.408...not 7.404 pH!

That's relative accuracy better than ±0.001 pH. You get it with the Beckman Research pH Meter. And it's repeatable to better than ±0.0005 pH. No wonder this instrument is the new standard of the world for pH measurement.

It has an effective scale length of 30 feet to assure maximum readability. You get fingertip adjustment over the entire −0.5 to +14.5 pH range with no switching. You have direct reading, null balance readout coupled with recorder output. Continuously variable sensitivity control gives you convenient operation on routine or high precision measurements. Your local Beckman Sales Engineer is eager to give you a personal demonstration of this, the most advanced pH meter anywhere. Contact him or write us direct for Data File LpH-38-264.

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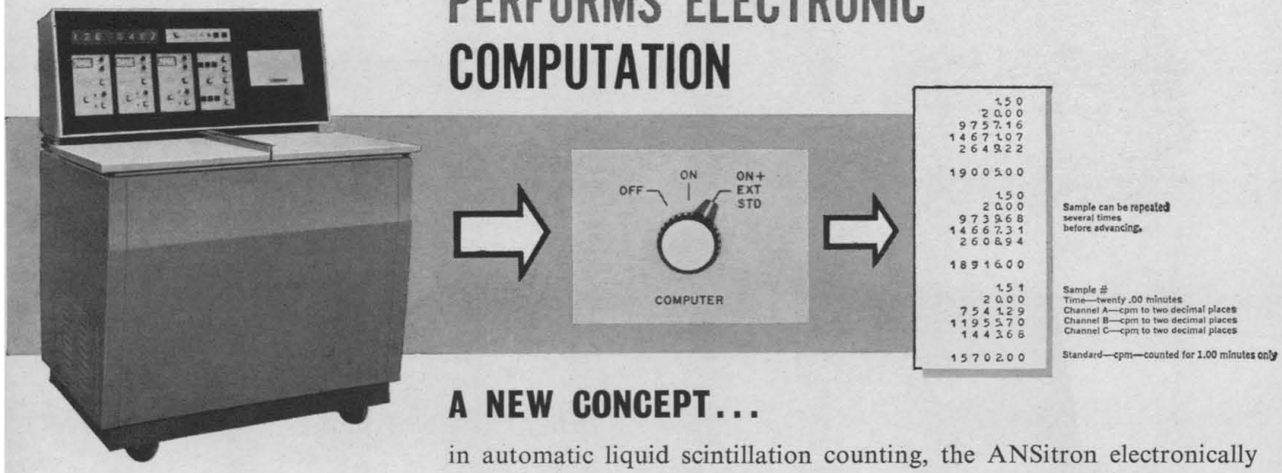
In LIQUID SCINTILLATION Spectrometers...

Only the ANSitron...

PERFORMS ELECTRONIC COMPUTATION



A NEW CONCEPT...

in automatic liquid scintillation counting, the ANSitron electronically processes accumulated data in as many as 200 samples. At the conclusion of each determination the ANSitron's computer section requires only microseconds to calculate sample count-rate. Count-rate for each channel computed to two decimal places, with background contribution eliminated, is printed out together with sample number and counting time. For all measurements decimal points are properly positioned. Electronic computation reduces total data processing time, including print out, to less than three seconds per sample for a three channel instrument. Sample information is presented in a concise format, ideal for a permanent record or for error-free transcription. Reliability of the ANSitron's electronic computational circuitry is many times greater than that of mechanical calculators.

Error Free >

And the ANSitron is capable of even more. Quenching in single or dual label samples is determined by means of a unique external standardization technique which gives computed data, independent of sample counting statistics. A novel low count rejection system, based on statistical principles, enables automatic rejection of low activity samples in seconds. Quartz-crystal controlled "live timing" provides automatic compensation of counting time for instrumental process time. Logarithmic spectrum conversion results in the widest possible dynamic range; H^3 and P^{32} can be measured in the same sample without the need for attenuators.

Quench Computation >

The ANSitron, the only liquid scintillation spectrometer utilizing all silicon transistors and diodes and with neither conventional relays nor stepping switches has been designed with especial emphasis on reliability. For an informative brochure describing these and the several other new features of the ANSitron write or phone:

All Silicon Reliability >

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The IEC HR-1... Highest Speeds Highest G's and now CONTINUOUS FLOW!

If you demand extraordinary performance and versatility plus continuous flow capabilities in a high speed centrifuge, you can significantly increase your lab's output and capacity by adding an IEC HR-1.

With the exclusive new **Helixtractor** continuous flow unit, the HR-1 separates micro-deposits from large volumes with efficiency gains up to 300/400%. Further, the Helixtractor is completely aerosol free; can be removed and autoclaved as a unit, so it is ideal for centrifuging infectious materials.

HR-1 delivers 18,500 rpm. Forces to 41,320 x G. Holds any temperature between −20°C to +10°C within 1°C. It offers 5 high-G angle heads and 70 accessories including a Maxiforce Ring that permits spinning 250 ml plastic bottles to 26,300 x G.

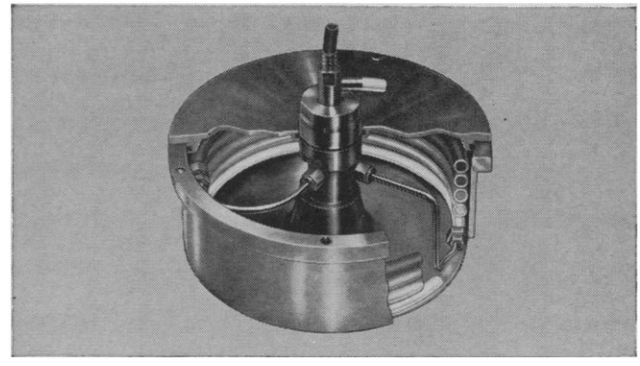
If you presently own an HR-1, the Helixtractor is available to you right now. Demand a demonstration.

If you are considering a high speed centrifuge the HR-1 is easily the most reliable, versatile, high performance instrument in the standard price range.

WRITE FOR BULLETIN 0.

Helical separation takes place in a transparent plastic coil. Material is introduced into the spinning helix through a central stationary hub. Solids collect along the tubing wall as a paste. Different phases are easily identified and isolated simply by cutting the tubing.

Material passing through the tubing is subjected to the same G force for the same time. The liquid film is only a fraction of an inch thick so solids separate three to four times faster than conventional centrifugation because they travel a shorter distance to the tube wall.



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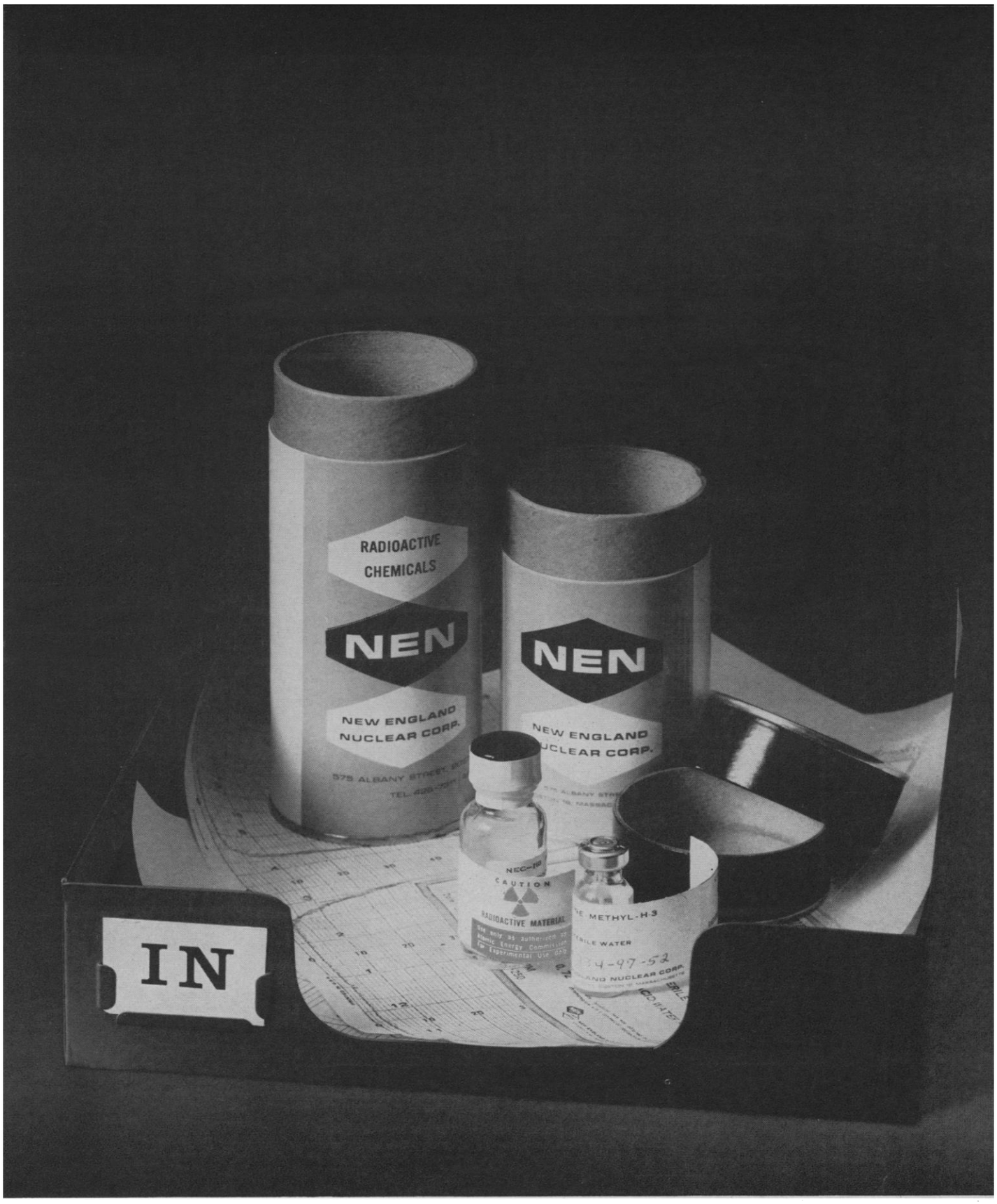

Yesterday, these radioactive chemicals were in our stock. Today, they are in your lab. You expect to get fast service from New England Nuclear Corp.

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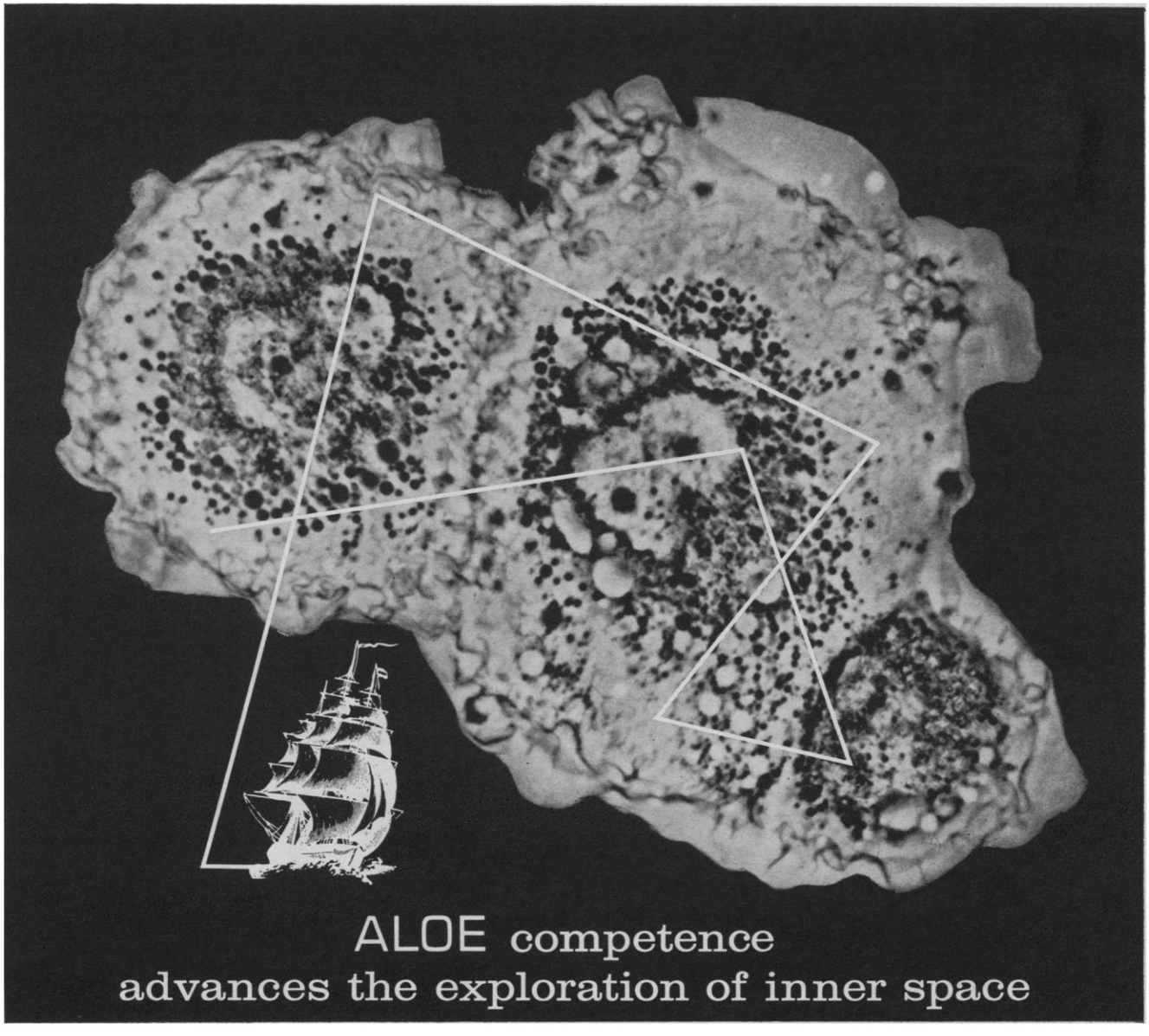

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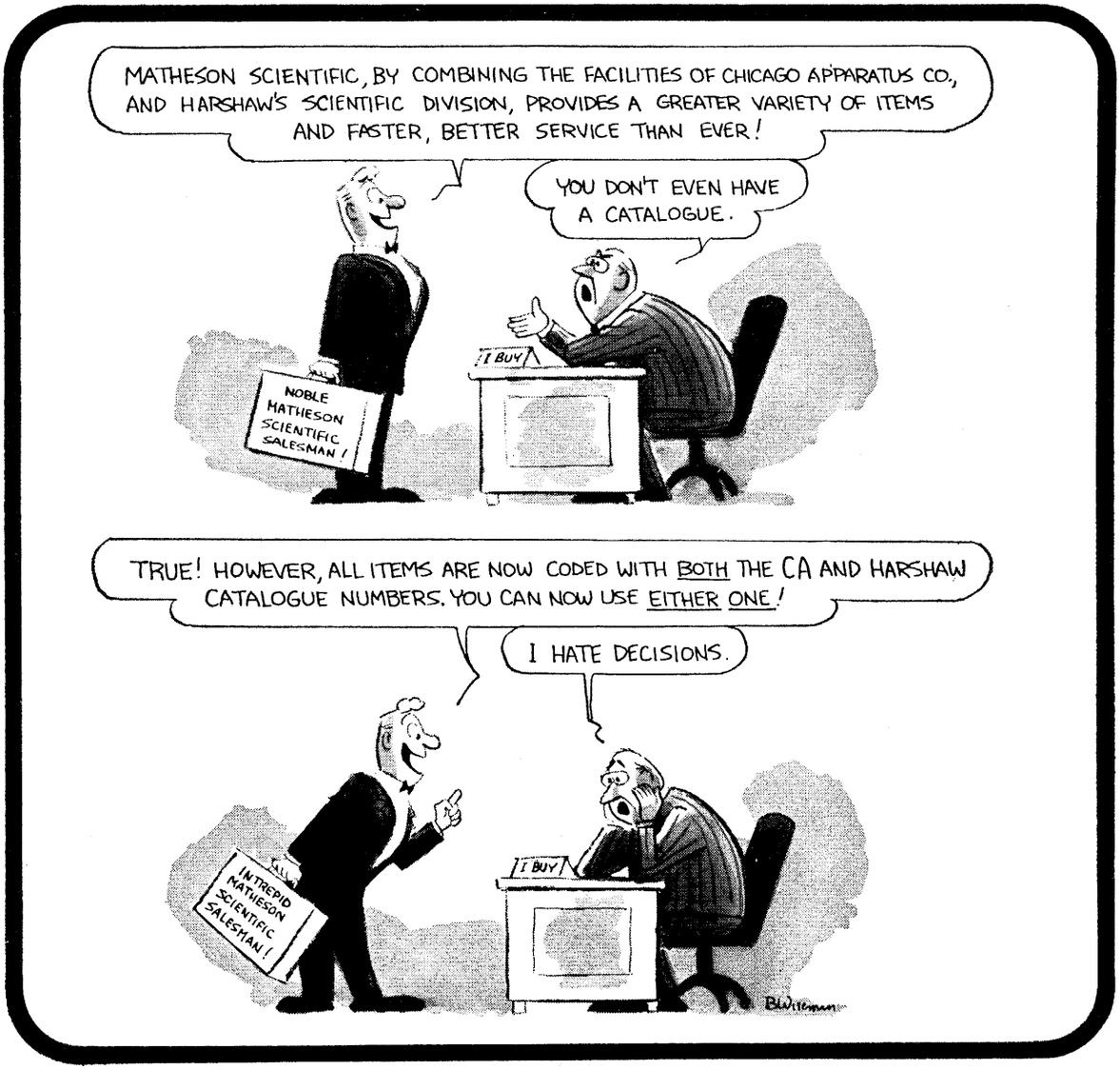

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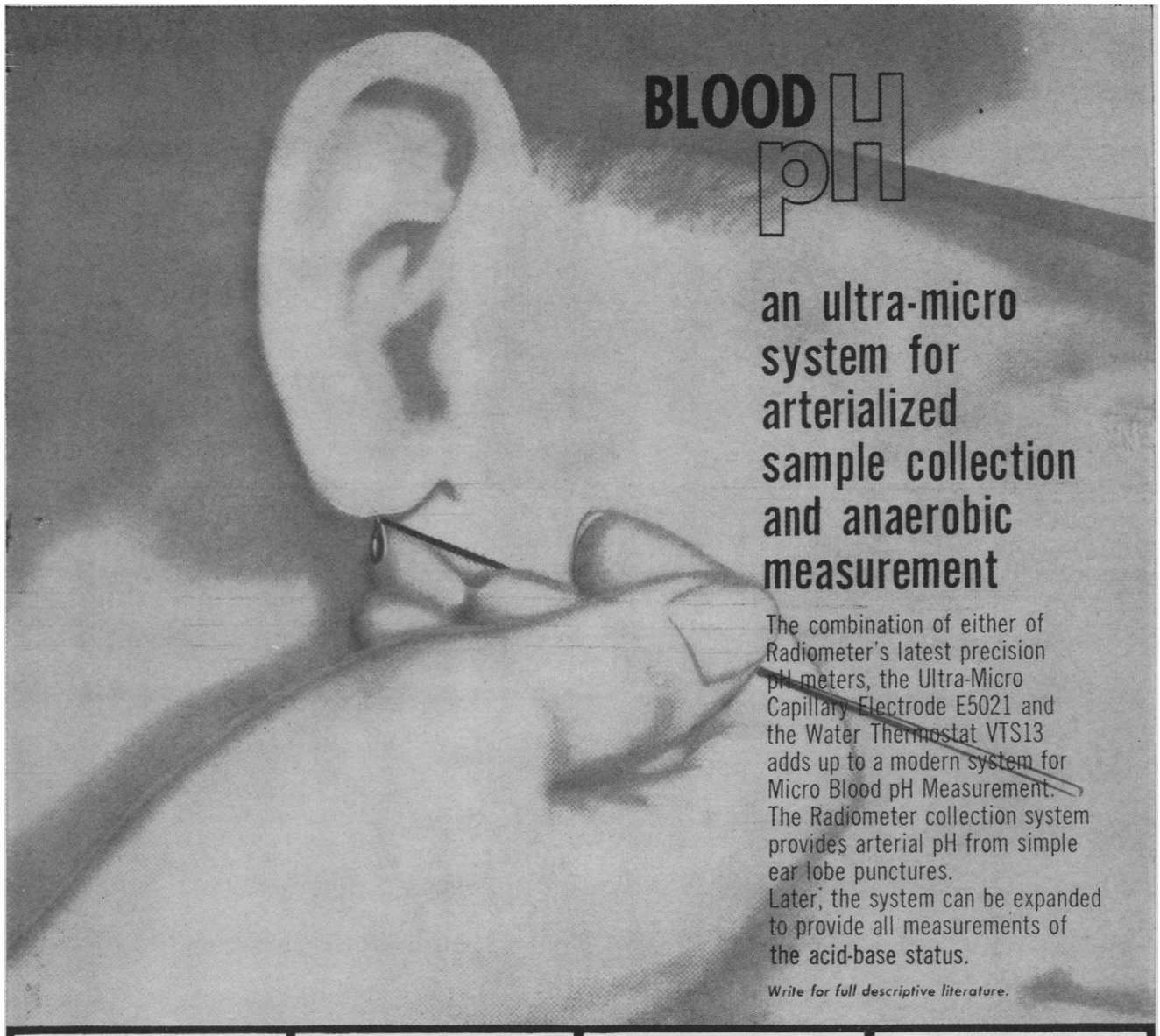

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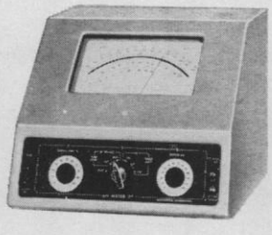

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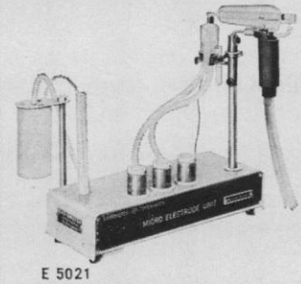

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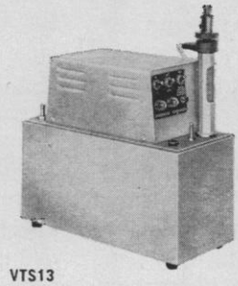

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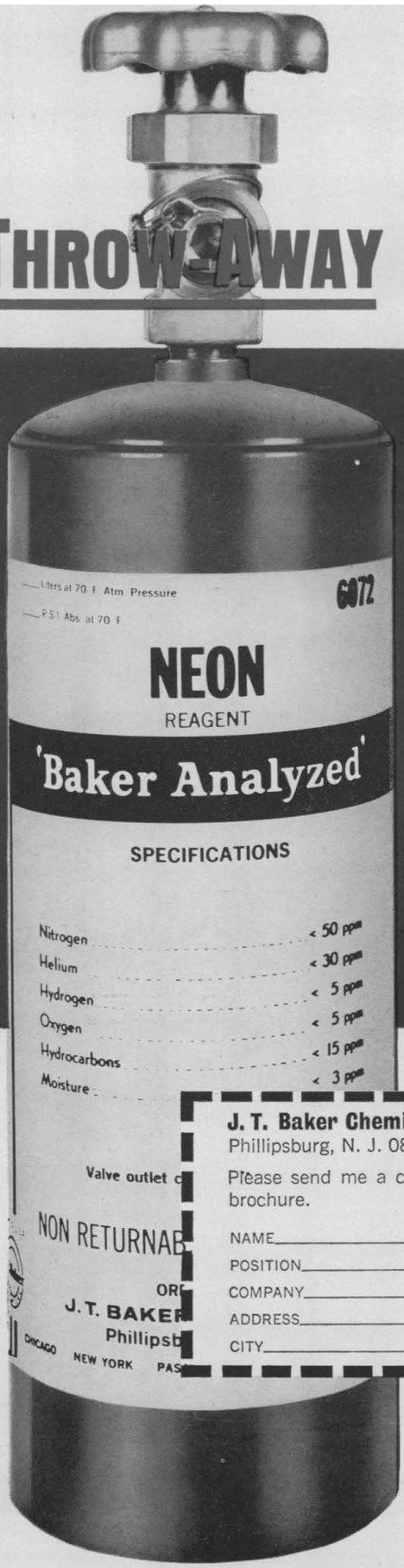

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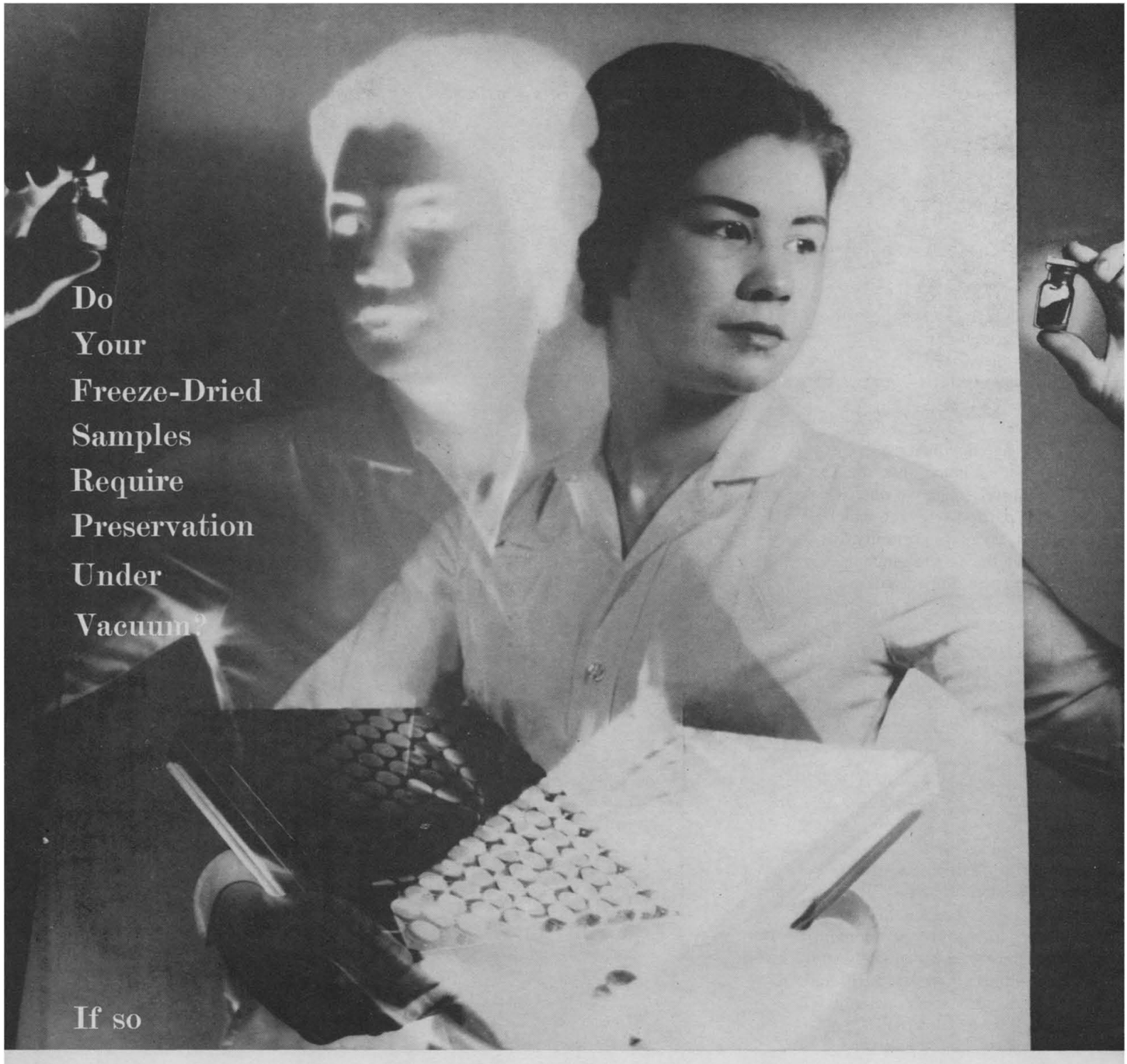

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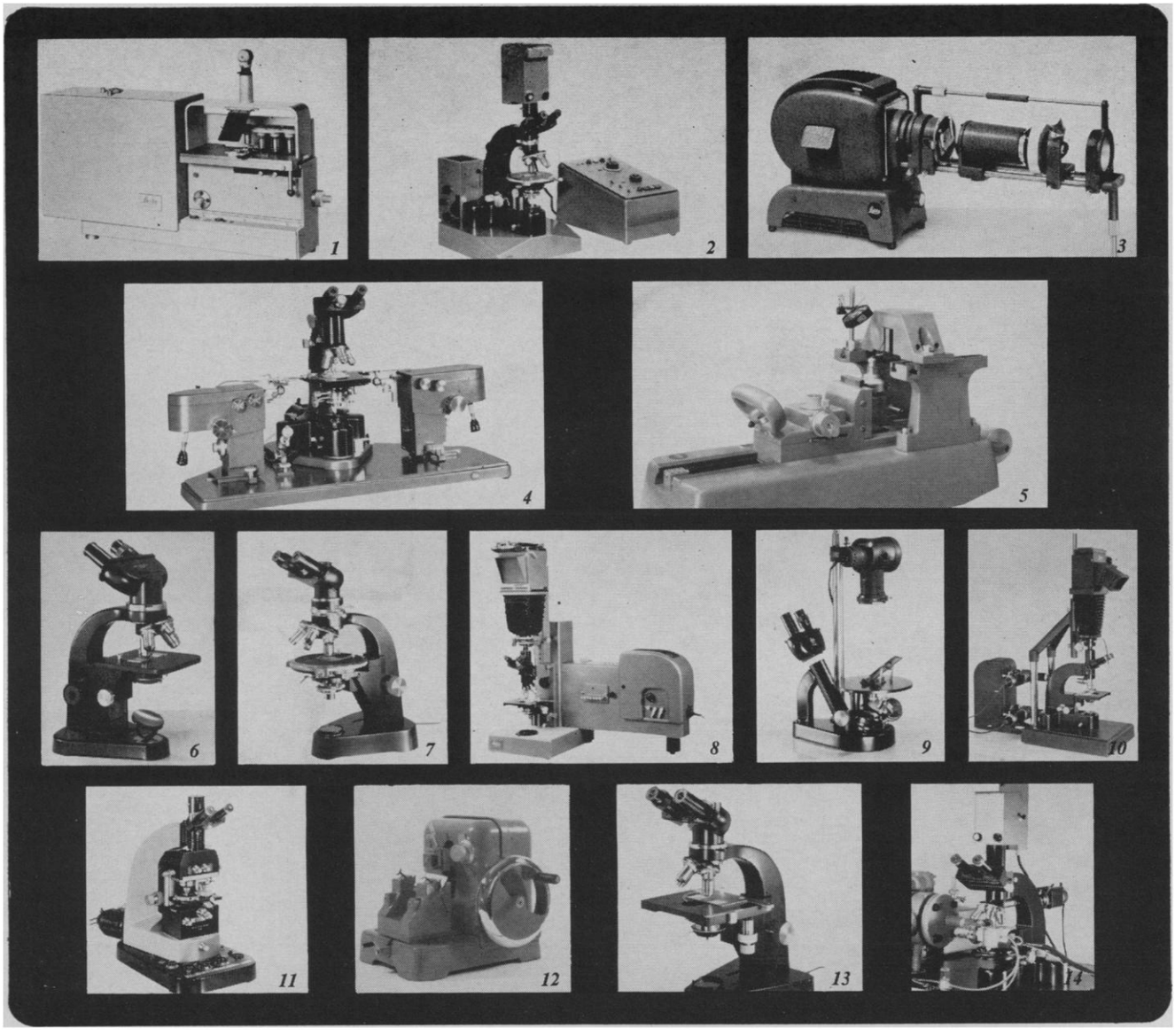

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SCIENCE

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Science and the General Welfare in a Democracy

Most speeches by government scientists have the stimulating effect of a stiff dose of tranquilizer. The recent Harrelson lecture by Glenn T. Seaborg departs from this custom. He outlines some of the tremendous questions which face civilization in matters where science and technology affect the general welfare and indicates that our scientific leadership faces thorny problems in dealing with the support of science.

Seaborg selects for special discussion three major recent developments, each of which alone has changed or will change civilization irreversibly. Naturally he first examines the destructive and constructive effects of atomic energy. Computers and automation are the second development, one whose eventual impact is not yet fully perceived. Seaborg feels that "the potential effects of this technology are of such significance that we must restudy, and perhaps may have to reshape, what we had thought were unchanging economic concepts and principles." Pointing to a third development which may change man's destiny, he comments on potential discoveries in molecular biology:

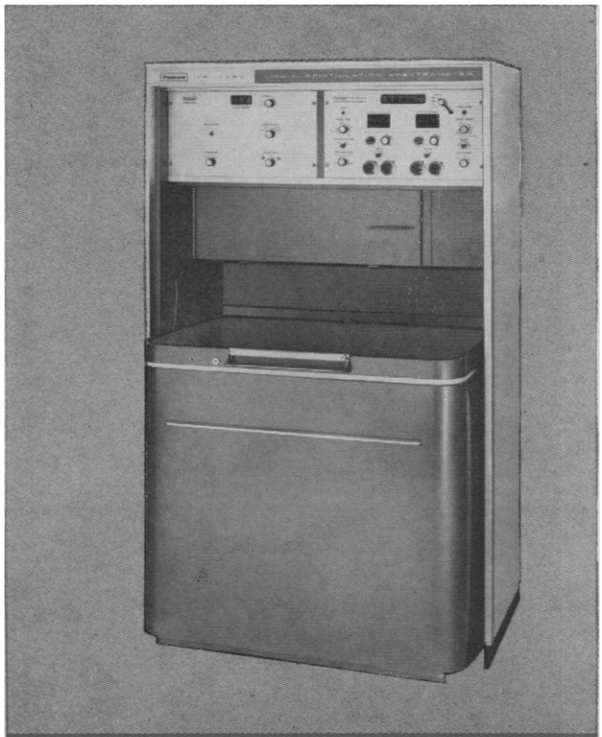
"We may expect that inevitably our recently acquired knowledge of the genetic code will be applied also to the improvement of the human species. . . . But once we have the ability to determine the genetic characteristics of a human infant, who will step forward with sufficient wisdom to choose those traits most beneficial to the man of the future?"

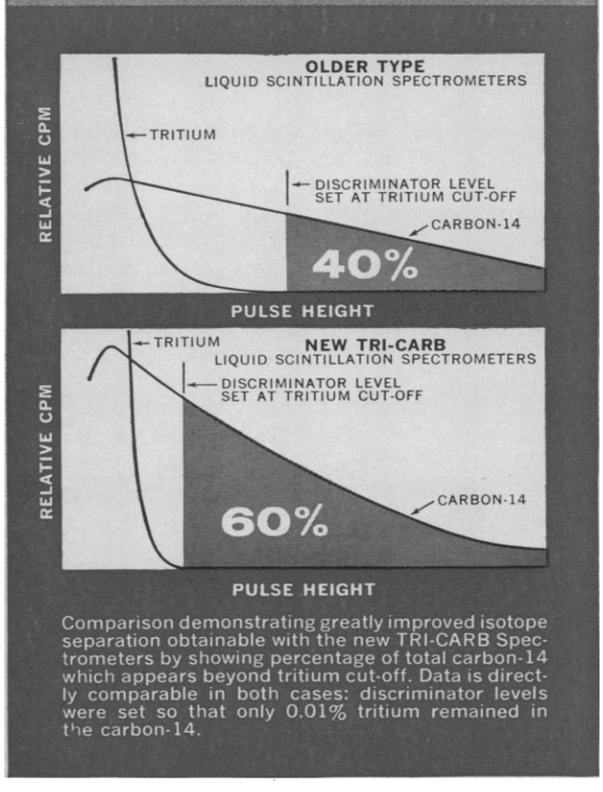
Against this background of the role of science and technology in shaping civilization, Seaborg examines how well we are equipped as a nation to cope with problems in which the health of science is at stake. At this point in his speech he seems to remember that as chairman of the Atomic Energy Commission he must avoid criticism of other bureaucrats. Accordingly, for a few moments his remarks lose their sharpness. However, he ends this section with the observation that "we continue as a nation to be plagued by a persistent myopia as to our long-term national goals in science." He points out that "we will need to apportion funds among the different fields; weigh the relative merits of spending for research, for facilities, and for the improvement of teaching; and decide how much is justified for high-energy physics . . . and for other areas of work in which the costs for basic facilities are high." He asks, "How can we prevent a Science pork barrel?" And he cautions, "We must not let our national support of science and technology degenerate to the point where no state—no Congressional district—is complete without a Post Office, a reclamation project and a new science laboratory. . . . We must manage somehow to provide for the support of new centers . . . in such a way that we do not turn our best scientists into migratory workers . . . gravitating from one scientific mecca to another, dependent upon the fluctuating whims of Federal support."

Seaborg does not provide solutions, but in posing the questions forthrightly he has set a high standard for others. Public discussion of these issues will surely lead to more informed thinking and ultimately to wiser action.—PHILIP H. ABELSON

(Dr. Seaborg gave the Harrelson lecture at North Carolina State University, Raleigh, on 11 March 1964. Reprints can be obtained from the Division of Public Information, U.S. Atomic Energy Commission, Washington 25, D.C.)

Better Isotope Separation IN NEW TRI-CARB® SPECTROMETERS





Comparison demonstrating greatly improved isotope separation obtainable with the new TRI-CARB Spectrometers by showing percentage of total carbon-14 which appears beyond tritium cut-off. Data is directly comparable in both cases: discriminator levels were set so that only 0.01% tritium remained in the carbon-14.

The capability of a liquid scintillation spectrometer to separate isotopes in a double-labeled sample can be measured by its ability to screen the weaker isotope out of the spectrum of the more energetic one while maintaining optimum counting efficiency for each. At the same time, the instrument must be capable of accepting and amplifying linearly pulses of different magnitudes to permit simultaneous counting of isotopes with widely varying energies. New Tri-Carb Liquid Scintillation Spectrometers provide unequalled isotope separation in a broad range of counting situations because they incorporate:

(a) *Pulse Summation—which provides a more precise reproduction of the spectral shapes of low energy isotopes.*

(b) *Precisely adjustable channels of pulse-height analysis with separate, non-overloading amplifiers for each channel.*

PULSE SUMMATION

Pulse Summation is an exclusive Packard development for utilizing essentially all of the light energy produced in liquid scintillation solutions, instead of only half of the light as in older coincidence-type liquid scintillation spectrometers. In the liquid scintillation process, the total number of photons emitted for each low energy beta particle is very small. Even with the best light collection and photocathode conversion efficiencies, only one or two photoelectrons are produced in each photomultiplier tube from an average 6 kev tritium particle. By doubling the number of photoelectrons analyzed through the full use of *both* photomultiplier tubes for pulse summation and subsequent pulse-height analysis, a substantial advantage can be achieved in the statistics of photon collection and photoelectron utilization. **The more precise spectral curves achieved in new Tri-Carb Spectrometers as a result of better statistics, provide unequalled separation of low energy isotopes such as tritium and carbon-14.**

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1–6. **Gastroenterology**, 7th intern. congr., Brussels, Belgium. (Assoc. of Natl. European and Mediterranean Socs. of Gastroenterology, 43, rue des Champs-Elysées, Brussels 5)

2–3. **Photovoltaic Specialists**, 4th annual conf., Cleveland, Ohio. (P. Rappaport, RCA Laboratories, Princeton, N.J.)

2–4. **Global Communications**, intern. symp. (Globcom VI), Philadelphia, Pa. (R. Guenther, RCA Communications Systems Div., Bldg. 1-3-1, Camden, N.J.)

2–4. **Telemetering**, natl. conf., Los Angeles, Calif. (W. S. Pope, 8420 Quinn St., Downey, Calif.)

2–5. **Food Microbiology**, 4th intern. symp., Göteborg, Sweden. (N. Molin, Swedish Inst. for Food Preservation Research, Göteborg 16)

2–6. **Acoustical** Conf., 3rd., Budapest, Hungary. (Acoustics Div., Hungarian Soc. of Optics, Acoustics, and Film Techniques, Szabadság tér 17, Budapest 5)

2–6. **Opthalmic-Optics**, intern. congr., Copenhagen, Denmark. (Danmark Special Optiker-Forening, Vesterbrogade 41B, Copenhagen 5)

3–5. Collaborative **Pesticides** Analytical Committee, 8th, Wageningen, Netherlands. (R. de B. Ashworth, c/o Plant Pathology Laboratory, Hatching Green, Harpenden, Hertfordshire, England)

3–10. American **Metalworking Technology** for the European Community (AMTEC), Brussels, Belgium. (E. L. Koester, ASTM, 10700 Puritan Ave., Detroit, Mich.)

7–9. National Public Relations Council of **Health and Welfare Services**, New York, N.Y. (The Council, 257 Park Ave. S., New York 10010)

7–9. **Isotopically Labeled Drugs** in Experimental Pharmacology, conf., Chicago, Ill. (L. J. Roth, Dept. of Pharmacology, Univ. of Chicago, Chicago 60637)

7–11. **Special Libraries** Assoc., St. Louis, Mo. (Mrs. J. North, Missile and Space Div., Lockheed Aircraft Corp., Palo Alto, Calif.)

7–12. **Mass Spectrometry** and Allied Topics, 12th annual conf., Montreal, Quebec, Canada. (N. D. Coggeshall, Gulf Research and Development Co., P.O. Drawer 2038, Pittsburgh, Pa. 15230)

7–13. European **Ophthalmological** Soc., 2nd congr., Vienna, Austria. (J. François, 15, Place de Smet de Naeyer, Ghent, Belgium)

8–9. Basic **Cancer Research**, 2nd Scandinavian symp., Stockholm, Sweden. (K. E. Hellström, c/o Riksföreningen mot Cancer, Postgiro 90 19 51, Stockholm)

8–10. **Quasi-Optics**, symp., Polytechnic Inst. of Brooklyn, 14th, New York, N.Y. (Polytechnic Inst. of Brooklyn, 55 Johnson St., Brooklyn 1)

8–11. **Cardiovascular** Conf., 2nd intern., St. Adele, Quebec, Canada. (D. F. M. Bunce, Dept. of Physiology, College of Osteopathic Medicine and Surgery, Des Moines, Iowa)

8–11. International **Planned Parenthood Federation**, conf. of region for Europe, Near East, and Africa, London, England. (J. Bettie, 6 Pembroke Rd., London, W.1)

8–12. **Surface Contamination**, intern. symp., Gatlinburg, Tenn. (B. R. Fish, Health Physics Div., Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn.)

9. International Assoc. for the **Prevention of Blindness**, Vienna, Austria. (J. P. Baillart, 47, rue de Bellechasse, Paris 7°, France)

9–11. **Cobalt Applications**, intern. meeting, Brussels, Belgium. (Cobalt Information Center, Battelle Memorial Inst., 505 King Ave., Columbus 1, Ohio)

9–11. **Electromagnetic Compatibility**, 6th natl. symp., Los Angeles, Calif. (J. A. Eckert, Dept. 3441/32, Northrop Norair, 3901 West Broadway, Hawthorne, Calif.)

9–12. Canadian Federation of **Biological Societies**, Halifax, N.S. (A. H. Neufeld, The Federation, Univ. of Western Ontario, London, Ont., Canada)

9–12. **Max Planck Soc. for the Furtherance of Science**, general meeting, Hamburg, Germany. (Max-Planck Gesellschaft zur Förderung des Wissenschaften e.V., Düsseldorf, Germany)

10–12. **Heat Transfer and Fluid Mechanics**, Berkeley, Calif., (S. Levy, General Electric Co., 150 Curtner Ave., San Jose, Calif.)

10–19. **Intergovernmental Oceanographic Commission**, 3rd session, Paris, France. (W. S. Wooster, Office of Oceanography, UNESCO, Place de Fontenoy, Paris 7°)

11–13. **Manufacturing Chemists'** Assoc., 92nd annual, White Sulphur Springs, W. Va. (MCA, 1825 Connecticut Ave., NW, Washington, D.C.)

11–13. **Population** Assoc. of America, San Francisco, Calif. (P. C. Glick, Bureau of Census, Washington, D.C. 20233)

13–19. **Medical Film Festival**, Helsinki, Finland. (W. M. A.-Film Finmedicas, Ullanlinnankatu 1, Helsinki)

13–19. **World Medical Assoc.**, 18th general assembly, Helsinki, Finland. (H. S. Gear, 10 Columbus Circle, New York, N.Y. 10019)

14–17. American Assoc. of **Feed Microscopists**, 12th annual, Hot Springs, Ark. (G. M. Barnhart, Missouri Dept. of Agriculture, State Office Bldg., Jefferson City)

14–17. American **Nuclear** Soc., 10th annual, Philadelphia, Pa. (O. J. DuTemple, 244 E. Ogden Ave., Hinsdale, Ill. 60502)

14–18. **Industrial Pharmaceutical Research**, 6th natl. conf., Land O'Lakes, Wis. (L. W. Busse, 190 Pharmacy Bldg., Univ. of Wisconsin, Madison 6)

14–18. **Health Physics** Soc., 9th annual, Cincinnati, Ohio. (H. F. Kolde, Taft Sanitary Engineering Center, Cincinnati)

14–19. **Alpha Chi Sigma** Fraternity, Greenvale, L.I., N.Y. (M. L. Griffin, 5503 E. Washington St., Indianapolis, Ind.)

14–19. **Cardiology**, 7th inter-American congr., Montreal, P.Q., Canada. (The Congress, 2052 St. Catherine St., W., Montreal 25)

14–20. National **Speleological** Soc., annual conv., New Braunfels, Tex. (J. H. Estes, 2818 S. 39 St., Abilene, Tex. 79605)

15–16. Association for **Applied Gnotobiotics**, 4th symp., East Lansing, Mich. (C. K Whitehair, Dept. of Pathology, Michigan State Univ., East Lansing)

15–17. **Lattice Defects in Quenched Metals**, intern. conf., Argonne, Ill. (The Conference, Bldg. 212, Argonne Natl. Laboratory, Argonne)

15–17. Institute of **Navigation**, 20th annual, New York, N.Y. (P. Rosenberg, 330 Fifth Ave., Pelham, N.Y. 10803)

15–17. American **Neurological** Assoc., 89th annual, Atlantic City, N.J. (M. D. Yahr, 710 West 168 St., New York, N.Y.)

15–18. American Soc. of **Limnology and Oceanography**, 27th annual, Miami Beach, Fla. (G. H. Lauff, ASLO, Sapelo Island Research Foundation, Sapelo Island, Ga.)

15–18. **Materials**, 2nd intern. symp., Berkeley, Calif. (T. H. Chenoweth, 276 Hearst Mining Bldg., Univ. of California, Berkeley 94720)

15–19. **Antibiotics**, intern. congr., Prague, Czechoslovakia. (V. Vlôek, Antibiotics Research Inst., Roztoky near Prague)

15–19. **Molecular Spectroscopy**, symp., Columbus, Ohio. (H. H. Nielsen, Dept. of Physics, Ohio State Univ., 174 W. 18 Ave., Columbus 43210)

15–19. **Technical Writers**, 12th annual inst., Troy, N.Y. (J. R. Gould, Rensselaer Polytechnic Inst., Troy)

15–21. **Women Engineers and Scientists**, 1st intern. conf., New York, N.Y. (E. Eaves, 18 Third Ave., Port Washington, N.Y. 11050)

15–3. **Relativity**, teaching at undergraduate level, Arlington, Tex. (J. Ellis, Dept. of Physics, Arlington State College, Arlington)

15–4 Sept. **Gordon Research Conf.**, New Hampshire. (W. G. Parks, Dept. of Chemistry, Univ. of Rhode Island, Kingston)

16–17. **Computer Augmentation of Human Reasoning**, symp., Washington, D.C. (W. D. Orr, TRW Computer Div., 8433 Fallbrook Ave., Canoga Park, Calif.)

16–18. **Entomological** Soc. of America, Pacific Branch, annual, Long Beach, Calif. (W. W. Allen, 112 Agric. Hall, Dept. of Entomology, Univ. of California, Berkeley)

17–19. **Microscopy**, 11th intern. symp., Chicago, Ill. (MICRO-64, McCrone Research Inst., 451 E. 31 St., Chicago 60616)

17–20. American College of **Angiology**, Las Vegas, Nev. (A. Halpern, 11 Hampton Court, Great Neck, N.Y.)

17–20. International Assoc. for the Study of the **Bronchi**, 14th congr., Vienna, Austria. (Secretariat, The Congress, c/o Wiener Medizinische Akademie für Arztliche Fortbildung, Aslerstr. 4, Vienna 9)

18–19. **Patent, Trademark, and Copyright Research** Inst., 8th annual conf., George Washington Univ., Washington, D.C. (PTCR Inst., George Washington Univ., Washington, D.C. 20006)

18–19. American **Rheumatism** Assoc., San Francisco, Calif. (J. A. Coss, Jr., 20 E. 76 St., New York, N.Y. 10021)

18–20. **Community Psychiatry**, conf., Univ. of Wisconsin, Madison. (L. M. Roberts, 1300 University Ave., Madison)

18–20. **Endocrine** Soc., San Francisco, Calif. (H. H. Turner, 200 N. Walker, Oklahoma City, Okla.)

18–20. American Assoc. of **Physics Teachers**, summer meeting, Madison, Wis. (H. R. Crane, Dept. of Physics, Univ. of Michigan, Ann Arbor)

18–20. **Space Technology**, 4th European symp., Rome, Italy. (A. Eula, Associazzione Italiana Razzi, Piazzo Santo Bernardo 101, Rome)

18–20. **Sulfite Pulping**, conf., Chicago, Ill. (Technical Assoc. of the Pulp and

Paper Industry, 360 Lexington Ave., New York, N.Y. 10017)

18–22. American College of **Chest Physicians**, San Francisco, Calif. (M. Kornfeld, 112 E. Chestnut, Chicago, Ill.)

19. **Parenteral Drug** Assoc., Philadelphia, Pa. (The Association, Broad and Chestnut Sts., Philadelphia 7)

19–20. American **Geriatrics** Soc., 21st annual, San Francisco, Calif. (AGS, 10 Columbus Circle, New York, N.Y. 10019)

19–27. **Chemical Engineering**, European conv., Frankfurt am Main, Germany (Chicago Section, American Chemical Soc., 86 E. Randolph St., Chicago 1, Ill.)

21. **Surface Physics**, Providence, R.I. (W. H. Brattain, Bell Telephone Laboratories, Murray Hill, N.J. 17971)

21–23. Society for **Investigative Dermatology**, 25th annual, San Francisco, Calif. (H. Beerman, SID, 255 S. 17 St., Philadelphia, Pa. 19103)

21–24. American Soc. of **Agricultural Engineers**, Fort Collins, Colo. (J. L. Butt, ASAE, 420 Main St., St. Joseph, Mich.)

21–25. **Air Pollution Control** Assoc., 57th annual, Houston, Tex. (The Association, 4400 Fifth Ave., Pittsburgh, Pa.)

21–25. **American Medical Assoc.**, San Francisco, Calif. (F. J. L. Blasingame, N. Dearborn, Chicago, Ill. 60610)

21–26. American Soc. for **Testing and Materials**, 67th annual, Chicago, Ill. (ASTM, 1916 Race St., Philadelphia 3, Pa.)

22–24. American **Dairy Science** Assoc., Tucson, Ariz. (H. F. Judkins, 32 Ridgeway Circle, White Plains, N.Y.)

22–24. **Medicinal Chemistry**, 9th natl. symp., Minneapolis, Minn. (A. T. Winstead, American Chemical Soc., 1155 16th St., NW, Washington, D.C. 20006)

22–24. Association for Research in **Ophthalmology**, San Francisco, Calif. (H. Kaufman, c/o Hillis Miller Health Center, Gainesville, Fla.)

22–24. **Photosensitization in Solids**, intern. conf., Chicago, Ill. (L. Grossweiner, Dept. of Physics, Illinois Inst. of Technology, Chicago)

22–24. American Assoc. of **Physical Anthropologists**, 33rd annual, Mexico City, Mexico. (T. D. Stewart, The Association, U.S. Natl. Museum, Washington, D.C.)

22–24. **Polymers**, 2nd biennial symp., American Chemical Soc., Durham, N.C. (H. N. Friedlander, Chemstrand Research Center, Inc., Box 731, Durham)

22–25. **Agricultural Pesticides** Technical Soc., Fredericton, N.B., Canada. (W. H. Minshall, University Substation P.O., London, Ont., Canada)

22–25. American Soc. of **Pharmacognosy**, annual, Pittsburgh, Pa. (R. Blomster, Univ. of Pittsburgh School of Pharmacy, Pittsburgh 15213)

22–26. American Soc. for **Engineering Education**, Orono, Maine. (W. L. Collins, Univ. of Illinois, Urbana)

22–26. **Nobel Prize Winners**, 14th meeting, Lindau im Bodensee, Germany. (H. F. Kinderlen, Standing Working Committee for the Nobel Prize Winners, Postfach 11, 899 Lindau im Bodensee)

22–26. Association of Official **Seed Analysts**, Rochester, N.Y. (E. W. Sundermeyer, 329 U.S. Court House, Kansas City 6, Mo.)

22–27. **AAAS Pacific Division**, 45th meeting, Vancouver, B.C., Canada. (R. C. Miller, California Acad. of Sciences, San Francisco)

22–27. International Organization for **Pure and Applied Physics**, 2nd general assembly, Paris, France. (J. Tonnelot, Laboratoire de Biologie Physico-Chimique, Orsay, Seine-et-Oise, France)

23. National Assoc. of **Science Writers**, San Francisco, Calif. (M. D. Spencer, Buffalo *Evening News*, Buffalo, N.Y.)

23–25. Precision **Electromagnetic Measurements**, conf., Boulder, Colo. (National Bureau of Standards, Boulder Labs., Boulder)

23–26. American **Home Economics** Assoc., 55th annual, Detroit, Mich. (AHEA, 1600 20th St. NW, Washington, D.C.)

24–25. **Computers and Data Processing**, 11th annual, symp., Estes Park, Colo. (W. H. Eichelberger, Denver Research Inst., Univ. of Denver, Denver, Colo. 80210)

24–26. Joint **Automatic Control** Conf., Stanford, Calif. (L. Zadeh, Univ. of California, Berkeley)

24–28. American Assoc. of **Bioanalysts**, annual, Las Vegas, Nev. (W. N. Reich, AAB, P.O. Box 607, Walnut Creek, Calif.)

24–1. **Air Pollution**, European conf., Strasbourg, Austria. (A. Stern, Div. of Air Pollution, U.S. Public Health Service, Washington, D.C. 20201)

25–26. Fundamental Phenomena in **Hypersonic Flow**, intern. symp., Buffalo, N.Y. (H. S. Tolley, Cornell Aeronautical Laboratory, P.O. Box 235, Buffalo 14221)

25–27. **American Physical Soc.**, Denver, Colo. (R. G. Sachs, Sterling Hall, Univ. of Wisconsin, Madison 53706)

25–28. **Rockets and Space Flight**, 13th symp., Darmstadt, Germany. (A. F. Staats, Hermann-Oberth-Gesellschaft, Fritz-Beindorff-Allee 9, Hanover Germany)

28–4. American **Library** Assoc. St. Louis, Mo. (D. H. Clift, 50. E. Huron St., Chicago, Ill.)

29–30. **Vacuum Metallurgy**, conf., New York, N.Y. (M. A. Cocca, G.E. Laboratory, P.O. Box 088, Schenectady, N.Y.)

29–1. American Soc. of **Heating, Refrigerating, and Air-Conditioning Engineers**, 71st annual, Cleveland, Ohio. (ASHRAE, 345 E. 47 St., New York, N.Y.)

29–1. Effects of **Radiation on the Hereditary Fitness** of Mammalian Populations, symp., Bar Harbor, Maine. (T. H. Roderick, Jackson Laboratory, Bar Harbor)

29–2. American Inst. of **Aeronautics and Astronautics**, 1st annual, Washington, D.C. (AIAA, 500 Fifth Ave., New York, N.Y. 10036)

29–2. American **Dermatological** Assoc., Honolulu, Hawaii. (W. M. Sams, 303 Ingrham Bldg., Miami 32, Fla.)

30–5. Society for **Social Responsibility in Science**, Fellowship Farm, Pa. (W. C. Davidson, Dept. of Physics, Haverford College, Haverford, Pa.)

July

1–4. National Soc. of Professional **Engineers**, annual, Asheville, N.C. (K. E. Trombley, NSPE, 2029 K St., NW, Washington, D.C.)

1–4. British **Tuberculosis** Assoc., St. Andrews, Scotland. (BTA, 59 Portland Place, London, W.1, England)

2–3. **Spectrochemical Analysis**, limits of detection, conf., Exeter, England, Institute of Physics and the Physical Society, 47 Belgrave Sq., London, S.W.1, England)

2–4. Scandinavian, **Dental** Congr., Helsinki, Finland. (N. Anderson, Bergmansg. 11 D, Helsinki)

2–5. Northwest **Proctologic** Soc., Banff, Canada. (F. C. Swartzlander, Greyhound Bldg., Calgary, Canada)

2–8. **Nuclear Physics**, intern. congr., Paris, France. (The Congress, B.P. No. 14, Orsay, Seine-et-Oise, France)

5–10. American **Physical Therapy** Assoc., annual conf., Denver, Colo. (H. J. Hislop, 1790 Broadway, New York, N.Y. 10019)

6–8. **Electron-Beam Processes** for Microelectronics, symp., Malvern, Worcester, England. (Information Officer, Royal Radar Establishment, St. Andrews Rd., Malvern)

6–9. **Learning and Associated Phenomena in Invertebrates**, Cambridge, England. (D. Davenport, Dept. of Biological Sciences, Univ. of California, Santa Barbara)

6–9. **Signal Processing** in Radar and Sonar Directional Systems, Birmingham, England. (British Institution of Radio Engineers, 9 Bedford Sq., London, W.C.1)

6–10. **Magnetic Recording**, intern conf., London, England. (Secretariat, the Conference, c/o Inst. of Electrical Engineers, Savoy Pl., London, W.C.2)

6–10. Theoretical and Applied **Mathematical Programming**, intern. symp., London, England. (M. Kinnaird, Operational Research Soc., 64 Cannon St., London, E.C.4)

6–10. Physics of **Non-crystalline Solids**, intern congr. Delft, Netherlands, (J. A. Prins, Lab. Technische Natuurkunde T.H. Delft)

6–11. **Magnetohydrodynamic Electrical Power** Production, Paris France. (European Nuclear Energy Agency, 38 Blvd. Suchet, Paris 16°)

6–12. **Sanitary Engineering**, 9th inter-American congr., Bogotá, Colombia. (J. A. Jove, Inter-American Assoc. of Sanitary Engineering, Centro Simón Bolívar, Edificio Sur, 6° piso, Caracas, Venezuela)

7–10. **American Dental Soc. of Europe**, annual, Brighton, England. (A. E. F. Sturridge, 35 Harley St., London, W.1)

7–11. European **Orthodontic** Soc., 40th congr., Athens, Greece. (H. N. Haralabakis, Akadimias St. 31, Athens 135)

8–11. International Soc. of **Gastroenterology**, 6th intern. congr., Medellin, Colombia. (J. L. A. Roth, 419 S. 19 St., Philadelphia, Pa.)

8–16. **Entomology**, 12th intern. congr., London, England. (P. Freeman, British Museum of Natural History, Cromwell Rd., London, S.W.7)

10–11. Rocky Mountain **Cancer** Conf., Denver, Colo. (N. P. Isbell, 1809 E. 18 Ave., Denver 80218)

10–15. **Pleistocene Geomorphology**, symp., Exeter, England. (T. H. Elkins, Royal Geographical Soc., Kensington Gore, London, S.W.7)

12–15. **Solid Propulsion**, NASA meeting, Philadelphia, Pa. (W. H. Hunter, Office of Program Development, Washington, D.C. 10025)

12–16. **Gastroenterology**, 9th Pan American congr., Bogotá, Colombia. (C. A. Estape, Soriano 877, Montevideo, Uruguay)

13–15. Problems of **Capillary Permeability** in Health and Disease, Univ. of Michigan 1964 summer symp., Ann Arbor, Mich. (M. M. Dewey, Dept. of Anatomy, Univ. of Michigan, Ann Arbor)

13–15. **Data Processing and Acquisition in Biology and Medicine**, conf., Rochester, N.Y. (K. Enslein, 42 East Ave., Rochester 14604)

13–17. **Canadian Teachers'** Federation, Lac Beauport, P.Q., Canada. (G. Nason, 444 MacLaren St., Ottawa, Ont., Canada)

13–17. Chemistry of **Carbohydrates**, intern. symp., Münster, Germany. (F. Micheel, Organisch-Chemisches Institut, Universität, Hindengurgplatz 55, Münster)

13–17. International Assoc. for **Child Psychiatry** and Allied Professions, London, England. (F. H. Stone, Royal Hospital for Sick Children, 70 University Ave., Glasgow, W.2 Scotland)

13–18. **Instrumental Analytical Chemistry**, 3rd annual symp., Bethlehem, Pa. (A. J. Diefenderfer, Dept. of Chemistry, Lehigh Univ., Bethlehem)

13–18. Latin Federation of **Medical Electro-Radiological Socs.**, 6th congr., Brussels, Belgium. (Secretariat, 256 Chaussee de Wavre, Heverle-Louvain, Belgium)

14–17. **Rarefied Gas Dynamics**, 4th intern. symp., Toronto, Ont., Canada. (G. N. Patterson, Inst. of Aerophysics, Univ. of Toronto, Toronto 5)

14–17. **Regional Science** Assoc., 4th congr., Ghent, Belgium. (W. Isard, Univ. of Pennsylvania, Philadelphia 19104)

14–17. **Western Resources** Conf., Boulder, Colo. (Bureau of Continuation Education, 352 Chemistry Bldg., Univ. of Colorado, Boulder)

14–19. **Sociology**, 7th Latin American congr., Bogotá, Colombia. (C. E. Angulo, Facultad de Sociologia, Universidad Nacional de Colombia, Bogotá)

15–19. **Pleistocene Geomorphology**, symp., Cambridge, England. (T. H. Elkins, Royal Geographical Soc., Kensington Gore, London, S.W.7, England)

16–24. **British Medical Assoc.**, annual Manchester, England. (D. Gullick, BMA, Tavistock Sq., London, W.C.1, England)

16–24. **Organic Photochemistry**, intern. symp., Strasbourg, France. (G. S. Hammond, Gates and Crellin Laboratories of Chemistry, California Inst. of Technology, Pasadena)

18–22. International Union of **Biological Sciences**, 15th general, Prague, Czechoslovakia. (G. L. Stebbins, Dept. of Genetics, Univ. of California, Davis)

19–24. American **Veterinary Medical Assoc.**, 101st annual, Chicago, Ill. (AVMA, 600 South Michigan Ave., Chicago 5)

19–25. **Polarography**, 3rd intern. congr., Southampton, England. (D. A. Pantony, Dept. of Metallurgy, Royal School of Mines, Prince Consort Rd., London, S.W.1, England)

19–26. Comparative **Endocrinology**, 4th intern. symp., Paris, France. (L. Gallien, Laboratoire d'Embryologie, Faculte des

Sciences de Paris, 9 quai St.-Bernard, Paris 5e)

20–22. **Magnetic Resonance** in Biological Systems. Boston, Mass. (R. G. Shulman, Bell Telephone Laboratories, Murray Hill, N.J.)

20–23. New Mexico Acad. of **General Practice**, Ruidoso. (H. L. Douglas, Box 767, Tatum, N.M.)

20–24. International **Diabetes** Federation, 5th congr., Toronto, Ont., Canada. (H. Best, Organizing Council, 477 Mt. Pleasant Rd., Toronto 7)

20–24. **Nuclear Radiation** Effects, technical conf., Seattle, Wash. (Inst. of Electrical and Electronics Engineers, Box A, Lenox Hill Station, New York, N.Y. 10021)

20–24. **Organic Reaction Mechanism**, intern. symp. Cork, Ireland. (General Secretary, Chemical Soc., Burlington House, London, W.1, England)

20–24. **Semiconductor Physics**, intern. conf., Paris, France. (M. Balkanski, Laboratoire de Physique, Ecole Normale Supérieure, 24, rue Lhomond, Paris 5e)

20–25. **Catalysis**, 3rd intern. conf., Amsterdam, Netherlands. (D. M. Brouwer, c/o Badhuisweg 3, P.O. Box 3003, Amsterdam-N, Netherlands)

21–23. Physiology and Experimental Psychology of **Color Vision**, Ciba Foundation symp., London, England. (Ciba Foundation, 41 Portland Pl., London, W.1)

21–24. American **Malacological** Union, New Orleans, La. (M. C. Teskey, Rt. 2, Box 318, Marinette, Wis.)

21–28. International **Geographical** Union, 20th intern. congr., London, England. (T. H. Elkins, Royal Geographical Soc., Kensington Gore, London, S.W.7)

25–1. **Religion and Science**, 11th conf., Star Island. Portsmouth, N.H. (Religion and Science, 280 Newton St., Brookline, Mass. 02146)

26–29. **Photobiology**, 4th intern. congr., Oxford, England. (Blandford Site, Whiteknights Park, Reading, England)

26–31. American **Crystallographic** Assoc., Bozeman, Mont. (B. Post, Brooklyn Polytechnic Inst., 333 Jay St., Brooklyn, N.Y.)

26–31. **Mineralogical** Soc. of America, Bozeman, Mont. (G. Switzer, MSA, U.S. Natl. Museum, Washington, D.C. 20560)

26–1. **Biochemistry**, 6th intern. congr., New York, N.Y. (R. A. Harte, 6th Intern. Biochemistry Congr., 9650 Wisconsin Ave., NW, Washington, D.C. 20014)

27–21. **Engineering Foundation** Research Confs., Andover, N.H. (United Engineering Center, 345 E. 47 St., New York 17)

27–28. International **Cartographic** Assoc., 2nd general assembly, London, England. (D. E. Imhof, Kartographisches Institut, Eidgenössische Technische Hochschule, Zurich, Switzerland)

27–30. Technical Assoc. of the **Pulp and Paper Industry**, engineering conf., Seattle, Wash. (TAPPI, 360 Lexington Ave., New York, N.Y. 10017)

27–31. American **Dietetic** Assoc., 47th annual, Portland, Ore. (ADA, 620 N. Michigan Ave., Chicago, Ill. 60611)

30–1. International Soc. for **Human and Animal Mycology**, 3rd, Edinburgh, Scotland. (R. Vanbreuseghem, Inst. of Tropical Medicine, 155 rue National, Antwerp, Belgium)

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August

2–4. American Assoc. of **Colleges of Pharmacy**, New York, N.Y. (C. W. Bliven, 1507 M St., NW, Washington, D.C. 20005)

2–7. American **Pharmaceutical** Assoc., 111th annual, New York, N.Y. (G. B. Griffenhagen, Div. of Communications, 2215 Constitution Ave., NW, Washington D.C.)

2–8. **Applied Psychology**, 15th intern. conf., Ljubljana, Yugoslavia. (B. Petz, Inst. of Psychology of Zagreb, Djure Salaja b.b., Zagreb, Yugoslavia)

2–8. **Reactivity of Solids**, 5th intern. symp., Munich, Germany. (B. Stuke, Physikalische-Chemisches Institut, Sophienstr. 11, Munich)

3–5. Compounds of Interest in **Nuclear Reactor Technology,** intern. symp., Boulder, Colo. (J. T. Waber, Los Alamos Scientific Laboratories, P.O. Box 1663, Los Alamos, N.M. 87544)

3–7. Instrument Soc. of America, **instrumentation** conf., Geneva, N.Y. (H. S. Kindler, 530 William Penn Place, Pittsburgh, Pa.)

3–7. World Federation for **Mental Health,** 17th annual, Bern, Switzerland. (F. Cloutier, 1, rue Gevray, Geneva, Switzerland)

3–8. International **Years of the Quiet Sun**, regional symp., Buenos Aires, Argentina. (J. G. Roederer, Facultad de Ciencias, Perú 272, Buenos Aires)

3–10. **Anthropologists and Ethnologist**, 7th world conf., Moscow, U.S.S.R. (American Anthropological Assoc., 1530 P St., NW, Washington, D.C. 20005)

3–12. **Botanical** Congr., 10th intern., Edinburgh, Scotland. (Miss S. C. Penny, 5 Hope Park Sq., Edinburgh 8)

4–7. **Poultry Science** Assoc., annual, Minneapolis, Minn. (E. L. Johnson, Dept. of Poultry Science, Univ. of Minnesota, St. Paul 55101)

4–17. Methods of **Hydrological Forecasting,** 3rd inter-regional seminar, World Meteorological Organization/UN Economic Commission for Asia and the Far East, Bangkok, Thailand. (WMO, Secretariat, Geneva, Switzerland)

5–7. Sonic Investigations on **Internal Damping in Solids**, symp., London, England (Administration Assistant, Institute of Physics and the Physical Society, 47 Belgrave Square, London, S.W.1)

5–12. **Atmospheric Radiation**, symp., World Meteorological Organization/ Intern. Union of Geodesy and Geophysics, Leningrad, U.S.S.R. (Secretariat, WMO, Geneva, Switzerland)

5–15. **High Energy Physics**, 12th intern. conf., Dubna, U.S.S.R. (M. L. Goldberger, Commission on High Energy Nuclear Physics, IUPAC, Princeton Univ, Princeton, N.J. 08540)

6–11. American **Podiatry** Assoc., New York, N.Y. (F. A. Kalbacher, American Podiatry Assoc., 3301 16th St., NW, Washington, D.C. 20010)

7–14. Scientific Study on **Mental Retardation**, intern. congr., Copenhagen, Denmark. (A. Dupont, Statens Andssvageforsorg, Nyropsgade 28.2, Copenhagen 5)

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- JARS, URINOMETER ☐
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- SLIDES, MICROSCOPE ☐
- THERMOMETERS ☐
- TUBES, TEST ☐
- TUBES, CULTURE ☐
- URINALS ☐
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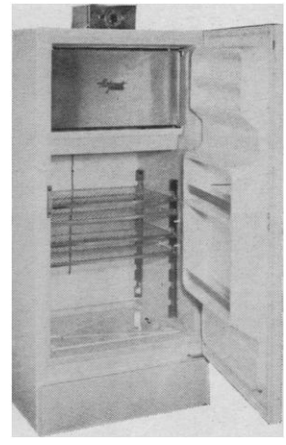
3 NEW REFRIGERATED INCUBATORS BY Hotpack



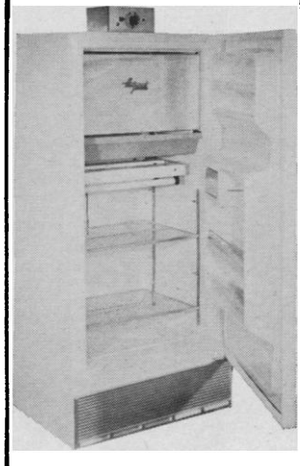
1 CONTROLLED TEMPERATURE 5° to 50°C

This new refrigerated incubator by Hotpack offers needed versatility in biological, chemical and pharmaceutical labs with precise temperature control **above and below ambient!**

- Accurate thermostatic temperature control
- Specially designed heating plenum
- Motor driven blower assures uniform air circulation
- Refrigeration by sealed, pre-lubricated compressor

Model 525 10 cu. ft. capacity

- **Immediate Delivery from Stock**

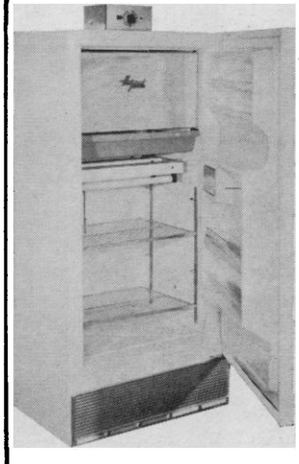


2 BUILT-IN GROWTH LIGHTING AND 5° to 50°C

Where special lighting is essential for controlled growth, this new model is equipped with fluorescent lamps giving proper light intensity. Temperatures are controlled precisely **above and below ambient!**

- Accurate thermostatic temperature control
- Specially designed heating plenum
- Motor driven blower assures uniform air circulation
- Refrigeration by sealed, pre-lubricated compressor

Model 525-1 10 cu. ft capacity



3 BUILT-IN GROWTH LIGHTING, CONTROLLED DAY/NIGHT CYCLES AND 5° to 50°C

This is a refrigerated incubator with lighting and a preset, 24-hour timer for automatic lamp cycling (photoperiodism). Dual thermostats are synchronized to lamp cycles for controlled day/night temperature.

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Instrumentation tape recorder is an all transistorized, four-channel recorder suitable for recording EKG, EEG, EMG and other physiological data. Compact in size and weighing 65 lb (29 kg), this portable recorder will operate on 105 to 230 volts a-c, 50 to 400 cycles, or two 12-volt batteries. The device has servo-controlled tape drive and maintains tape speed within 0.5 percent. With both direct and FM electronics for all four channels, the recorder has a frequency response of 50 cy/sec to 100 kcy, direct, and d-c to 10 kcy, FM. Band-width may be selected for optimum signal-to-noise ratio. Tape speeds of 37.5, 3.75, and 0.375 inches (95, 9.5, and 0.95 cm) per second give the user the ability to compress or expand time by a 100 :10 : 1 ratio. This allows the recordings of hours of physiological data to be played back in minutes or the recordings of seconds to be stretched out for minutes to facilitate careful examination. The recorder utilizes economical ¼-inch (0.6-cm) tape on standard 7-inch (18-cm) reels. Other features include record, playback and erase in both directions, simplified control panel with a minimum of controls, and easy calibration of data channels with a built-in meter.—D.J.P. (Precision Instrument Co., 3170 Porter Drive, Palo Alto, Calif.)

Circle 2 on Readers' Service card

Mass spectrometer system is a versatile instrument available with single or double focusing and a wide range of accessories which can make it suitable for either qualitative analysis of organic compounds, high-resolution mass defect work, or high-sensitivity trace analysis. It can also be made to function as a quick-scanning, wide-range gas chromatography detector or an isotope ratio measuring instrument. It has a mass range which is variable in four steps: M/e 1-300, 2-600, 4-1200, and 6-1800. It provides single focusing resolution of M/ΔM 2000; M/ΔM 200-2000 variable and double focusing resolution of greater than M/ΔM 10,000. Detectability is 1 part per thousand million with multiplier and less than 10 parts per million with Faraday cup detector. The instrument has an analysis sensitivity of 500,000 divisions per micron of mercury with multiplier and 500 divisions with Faraday cup. It operates with a precision of better than 0.5 percent. Each instrument is equipped with an all-glass heated inlet system which prevents sample decomposition while allowing analysis of gases, liquids, and solids. Rapid scanning (M/e 12-500 in 3 sec) allows continuous gas chromatography component analysis, pulse analysis of trace samples, and kinetic studies. The high-resolution, double-focusing attachment allows mass defect studies with resolution of better than 1 in 10,000. The attachment may be purchased with the basic instrument or field installed later.—D.J.P. (Perkin-Elmer Corp., Main Ave., Norwalk, Conn.)

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DNA molecular model for teaching and research helps one visualize the three-dimensional and dynamic aspects of this complex molecule. The model consists of 32 deoxyribose groups, 32 phosphate groups, 16 purines, 16 pyrimidines, and 40 hydrogen bonds, enough for 1½ turns of the helix. The complete skeletal structure of each group is represented; only hydrogen and the nonbonding sugar hydroxyl group are omitted for simplicity. Each group is molded from polyurethane to a scale of 1.25 Å/cm, within 5 percent. The assembled model is approximately 20 cm in diameter and is supported on a ¼ inch (0.6 cm) steel rod and wooden tripod. The base pairs are rigidly fastened together through the hydrogen bonds to form the adenine-thymine and guanine-cytosine structures. The phosphates and deoxyribose groups, however, have demountable bonding surfaces formed from VelCro fastener material. There are 192 bonding surfaces in the model and the whole structure can be built up, coded,

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The material in this section is prepared by the following contributing writers:

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).

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or taken down in a few minutes. The assembled model is strong enough to be removed from the supporting steel axis and stretched or flexed by hand. Each group is color coded for easy recognition. The model comes equipped with a clear plastic dust cover.—D.J.P. (Nova Research, 5174 Lakeland Court, Columbus 24, Ohio)

Circle 4 on Readers' Service card

Pipetting aids, an automatic dispensing pipettor and a safety pipet filler are designed to facilitate the measuring and dispensing of liquids in routine laboratory procedures. The automatic dispensing pipettor is a constant-volume pipettor for the repeated dispensing of fixed quantities of liquids. The unit consists of a rigid polypropylene measuring chamber which fits inside a polyethylene reservoir bottle. Measuring chambers are available in 1-, 2-, 3-, and 5-ml sizes and provide accuracy to within ±0.025 ml. The standard reservoir bottle holds 45 to 225 dispensings, depending upon the measuring chamber size. Easily operated by one hand, the measuring chamber is filled by squeezing the reservoir bottle and the liquid is dispensed by squeezing again. The second aid, a safety pipet filler, eliminates the need for mouth pipetting, so that hazardous liquids may be handled. The unit, which fits snugly over the top of pipets up to 20 ml, has a linear polyethylene body, a rubber bulb, and a polyolefin ball-check value. A hand loop provides a firm grip and allows one-handed operation—D.J.P. (Nalge Co, Inc., 75 Panorama Creek Drive, Rochester, N.Y.)

Circle 5 on Readers' Service card

Temperature-humidity chambers provide automatic dry bulb temperature control from ambient to +93°C and automatic humidity control from 20 to 98 percent. Completely separate saturable reactor proportional control systems maintain temperature to ±0.5°C and humidity to ±1 percent. Temperature is controlled by electrical heating and tap-water cooling. Percent relative humidity is regulated by a vapor pressure system which eliminates the wet bulb wick and is monitored by a wet and dry bulb hygrometer. Changing of chamber air is adjustable from 0 to 30 times a minute. Separate identical controls on the front panel are provided. Features include stainless steel double wall constructed with 3 inches (7.6 cm) of insulation, a double wall

insulated outer door and an inner glass observation door with stainless frame and silicone tube seal. Designed for component testing to military specifications, these units are suitable for determining the effects of humidity and temperature on biological systems and organisms as well as for controlled environment incubation.—D.J.P. (Blue M Electric Co., 138th and Chatham St., Blue Island, Ill.)

Circle 6 on Readers' Service card

One-kilogram balance has a capacity of 1000 g and a direct reading sensitivity of 0.001 g. Weights from 1 to 999 g are dial operated from the front of the instrument. Weights below 1 g are read on a projected scale and an auto-indicating vernier screen permitting an estimated sensitivity of 0.5 mg. An all-metal case has been designed with a low center of gravity to reduce the sensitivity to vibration normally encountered in laboratory sites. The aluminum cabinet features two counterbalanced sliding doors for easy sample insertion, a pan 5⅜ inches (13.7 cm) in diameter, and 9 inches (22.9 cm) free height inside the hanger to accommodate standard volumetric glassware. Access to any part of the balance, from the pan to all working mechanisms, is accomplished without the use of tools, by removing the top and three side panels.—D.J.P. (Voland Corp., 27 Centre Ave., New Rochelle, N.Y.)

Circle 7 on Readers' Service card

Oscillating shaker with adjustable platform and oscillation angles, is designed for tissue culture studies, protein determinations, washing precipitates, or for general shaking and mixing of solutions in the laboratory. The apparatus provides an oscillating, 11-inch (28-cm) by 5½-inch stainless steel platform, capable of holding either one Kolmer rack, two Army-type racks, or one Wasserman rack. The angle of the platform is adjustable up to 90° and the amount of oscillation is adjustable to furnish mild to violent shaking action. In this way the unit can be adjusted to suit various shaking requirements and unstoppered test tubes can be shaken without spilling. The platform can also accommodate a Lab-Line Temp-Blok Module Heater, permitting solutions in test tubes to be heated while being shaken.—D.J.P. (Lab-Line Instruments, Inc., Lab-Line Plaza, Melrose Park, Ill.)

Circle 8 on Readers' Service card

NEW BOOKS

(*Continued from page 990*)

A Correlation Study of Methods of Matrix Structural Analysis. Richard H. Gallagher, Ivan Rattinger, and John S. Archer. Pergamon, London; Macmillan, New York, 1964. 125 pp. Illus. $10. A report of the 14th meeting (Paris, July 1962), Structures and Materials Panel, Advisory Group for Aeronautical Research and Development, NATO.

Cosmic Dust. A. Dauvillier. Translated from the French edition (Paris, 1961) by Alan Crozy. Philosophical Library, New York, 1964. 175 pp. Illus. $15. The French edition, *La Poussiere Cosmique*, was reviewed in *Science* [**135**, 720 (1962)] by G. de Vaucouleurs.

Crystalline Olefin Polymers. pt. 2. R. A. V. Raff and K. W. Doak, Eds. Interscience (Wiley), New York, 1964. 689 pp. Illus. $22.50.

Discrete and Continuous Boundary Problems. F. V. Atkinson. Academic Press, New York, 1964. 584 pp. Illus. $16.50.

Discretus Calculus. A variable-metric approach to physical theory. Herbert S. Ingham. Philosophical Library, New York, 1964. 217 pp. Illus. $6.

The Dynamic Method in Oceanography. L. M. Fomin. Translated from the Russian by Scripta Technica. Elsevier, New York, 1964. 224 pp. Illus. $12.

The Elastic Constants of Crystals. H. B. Huntington. Academic Press, New York, 1964. 141 pp. Illus. $3.95. Reprinted from *Solid State Physics*, vol. 7, 1958.

Electromagnetic Theory for Engineering Applications. W. L. Weeks. Wiley, New York, 1964. 764 pp. Illus. $18.

Electron Energy Bands in Solids. Joseph Callaway. Academic Press, New York, 1964. 118 pp. Illus. $3.95. Reprinted from *Solid State Physics*, vol. 7, 1958.

Electronic Charges of Bonds in Organic Compounds. G. V. Bykov. Translated from the Russian edition (Moscow, 1960) by J. T. Greaves. Pergamon, London; Macmillan, New York, 1964. 199 pp. Illus. $9.

Electronic Fundamentals and Applications. John D. Ryder. Prentice-Hall, Englewood Cliffs, N.J., ed. 3, 1964. 711 pp. Illus. $17.

Electronic Spectra of Molecules and Ions in Crystals. pt. 1, *Molecular Crystals*; pt. 2, *Spectra of Ions in Crystals*. Donald S. McClure. Academic Press, New York, 1964. 179 pp. Illus. $3.95. Two papers, reprinted from *Solid State Physics*, vols. 8 and 9, 1959.

The Elements and Structure of the Physical Sciences. J. A. Ripley, Jr. Wiley, New York, 1964. 604 pp. Illus. $8.95.

The Elements of Stochastic Processes. With applications to the natural sciences. Norman T. J. Bailey. Wiley, New York, 1964. 261 pp. Illus. $7.95.

Ferroelectrics and Antiferroelectrics. Werner Känzig. Academic Press, New York, 1964. 201 pp. Illus. $4.95. Reprinted from *Solid State Physics*, vol. 4, 1957.

Filament Winding: Its Development, Manufacture, Applications, and Design.

D. V. Rosato and C. S. Grove, Jr. Interscience (Wiley), New York, 1964. 372 pp. Illus. $15.

The High Temperature Aspects of Hypersonic Flow. Proceedings of the AGARD-NATO meeting (Rhode-Saint-Genèse, Belgium), April 1962. Wilbur C. Nelson, Ed. Pergamon, London; Macmillan, New York, 1964. 800 pp. Illus. $42.

Ion Propulsion for Space Flight. Ernst Stuhlinger. McGraw-Hill, New York, 1964. 391 pp. Illus. $17.50.

Inorganic Reaction Mechanisms. An introduction. John O. Edwards. Benjamin, New York, 1964. 204 pp. Illus. $7.

Introduction to Atomic and Nuclear Physics. D. E. Caro, J. A. McDonell, and B. M. Spicer. Aldine, Chicago, 1964. 238 pp. Illus. $6.

Introduction to Chemical Thermodynamics. Irving M. Klotz. Benjamin, New York, 1964. 262 pp. Illus. Paper, $3.95.

IR: Theory and Practice of Infrared Spectroscopy. Herman A. Szymanski. Plenum Press, New York, 1964. 389 pp. Illus. $15.

Japanese Miniature Electronic Components and Assemblies Data Annual, 1964–65. G. W. A. Dummer and J. Mackenzie Robertson, Eds. Pergamon, London; Macmillan, New York, 1964. 507 pp. Illus. $21.

Kirk-Othmer Encyclopedia of Chemical Technology. vol. 3, *B to Calcium*. Herman F. Mark, John J. McKetta, Jr., and Donald F. Othmer, Eds. Interscience (Wiley), New York, ed. 2, 1964. 943 pp. Illus. $45.

Lectures in Abstract Algebra. vol. 3, *Theory of Fields and Galois Theory*. Nathan Jacobson. Van Nostrand, Princeton, N.J., 1964. 335 pp. Illus. $9.75.

Les Liquides Simples. M. Arnold Münster. Gauthier-Villars, Paris, 1964. 77 pp. Illus. Paper, F. 14.

Mathematical Induction. Bevan K. Youse. Prentice-Hall, Englewood Cliffs, N.J., 1964. 63 pp. Illus. $2.95.

Matrices: Their Meaning and Manipulation. W. G. Bickley and R. S. H. G. Thompson. Van Nostrand, Princeton, N.J., 1964. 182 pp. Illus. $4.25.

Matrix Methods of Structural Analysis. B. Fraeijs de Veubeke, Ed. Pergamon, London; Macmillan, New York, 1964. 349 pp. Illus. $15. Five papers presented to the Structures and Materials Panel of the Advisory Group for Aeronautical Research and Development, NATO. "Matrix methods of structural analysis—a precis of recent developments," J. H. Argyris, S. Kelsey, and H. Kamel; "Upper and lower bounds in matrix structural analysis," B. M. Fraeijs de Veubeke; "Further development and applications of the stiffness method," M. J. Turner, H. C. Martin, and R. C. Weikel; "Some problems in the discrete element representation of aircraft structures," I. C. Taig and R. I. Kerr; and "Digital analysis of nonlinear structures by the force method," P. H. Denke.

Mechanical Details for Product Design. Douglas C. Greenwood, Ed. McGraw-Hill, New York, 1964. 351 pp. Illus. $9.50.

The Mechanical Properties of Matter. A. H. Cottrell. Wiley, New York, 1964. 440 pp. Illus. $10.

Mechanisms of Oxidation of Organic Compounds. W. A. Waters. Methuen, London; Wiley, New York, 1964. 160 pp. Illus. $5.

Mécanique Physiqué. Jean Mercier. Presses Universitaires de France, Paris, 1963. 669 pp. Illus.

Meromorphic Functions. W. K. Hayman. Oxford Univ. Press, New York, 1964. 205 pp. Illus. Paper, $10.10.

Methods of Quantitative Inorganic Analysis. An encyclopedia of gravimetric, titrimetric, and colorimetric methods. Kazunobu Kodama. Interscience (Wiley), New York, 1963. 521 pp. Illus. $22.

Nuclear Engineering Fundamentals. Roy Weinstein, Alvin Boltax, and Giovanni Lanza. McGraw-Hill, New York, 1964. 1064 pp. Illus. $20.

Optical Masers. O. S. Heavens. Methuen, London; Wiley, New York, 1964. 111 pp. Illus. $3.25.

Organic Polarographic Analysis. Petr Zuman. Pergamon, London; Macmillan, New York, 1964. 323 pp. Illus. $6.50.

Organoboron Chemistry. vol. 1, *Boron-Oxygen and Boron-Sulfur Compounds*. Howard Steinberg. Interscience (Wiley), New York, 1964. 982 pp. Illus. $33.

Physical Chemistry. Gilbert W. Castellan. Addison-Wesley, Reading, Mass., 1964. 733 pp. Illus. $12.50.

Physics and Chemistry of the Earth. vol. 5. L. H. Ahrens, Frank Press, S. K. Runcorn, Eds. Pergamon, London; Macmillan, New York, 1964. 402 pp. Illus. $15. Contents: "The significance of the chemical bond for controlling the geochemical distribution of the elements" (pt. 1), L. H. Ahrens; "Recent information of the earth's interior from studies of mantle waves and eigenvibrations," Bruce A. Bolt; "Geophysical studies of rift valleys," R. W. Girdler; "Geomagnetic micropulsations," J. A. Jacobs and K. O. Westphal; "Chemical thermodynamics in mineral studies," Hans Ramberg; and "The geochemistry of the alkali metals," Knut S. Heier and John A. S. Adams.

Point Defects in Metals. A. C. Damask and G. J. Dienes. Gordon and Breach, New York, 1964. 328 pp. Illus. $19.50.

The Precambrian. vol. 1. Kalervo Rankama, Ed. Interscience (Wiley), New York, 1963. 303 pp. Illus. $8.95.

Principles of Astronomy. Stanley P. Wyatt. Allyn and Bacon, Boston, 1964. 573 pp. Illus. $8.95.

Problems of the Design and Accuracy of Complex Continuous-Action Devices and Computer Mechanisms. N. G. Bruyevich, Ed. Translated from the Russian edition (Moscow, 1958) by Gerald Segal. Pergamon, London; Macmillan, New York, 1964. 276 pp. Illus. $10.

Progress in Isotope Geology. Kalervo Rankama. Interscience (Wiley), New York, 1963. 723 pp. $20.

Progress in the Science and Technology of the Rare Earths. vol. 1. LeRoy Eyring, Ed. Pergamon, London; Macmillan, New York, 1964. 538 pp. $17.50.

The Propagation of Electromagnetic Waves in Multiconductor Transmission Lines. P. I. Kuznetsov and R. L. Stratonovich. Translated from the Russian edition (Moscow, 1958) by R. F. Kelleher. Pergamon, London; Macmillan, New York, 1964. 206 pp. Illus. $10.

The Properties of Glass Surfaces. L. Holland. Wiley, New York, 1964. 562 pp. Illus. $15.

Pulse Circuits: Switching and Shaping. Daniel S. Babb. Prentice-Hall, Englewood Cliffs, N.J., 1964. 399 pp. Illus. $15.35.

Quantum Electronics. vols. 1 and 2. Proceedings of the Third International Congress (Paris), February 1963. P. Grivet and N. Bloembergen, Eds. Dunod, Paris; Columbia Univ. Press, New York, 1964. vol. 1, 996 pp.; vol. 2, 957 pp. Illus. 2 vols., $35.

Quantum Field Theory and the Many-Body Problem. T. D. Schultz. Gordon and Breach, New York, 1964. 158 pp. Illus. Paper, $3.95; cloth, $5.95.

Radar System Engineering. Louis N. Ridenour, Ed. Boston Technical Publishers, Lexington, Mass., 1963. 776 pp. Illus. $5.50. A reprint of vol. 1 of the M.I.T. Radiation Laboratory Series.

Recent Advances in Matrix Methods of Structural Analysis. J. H. Argyris. Pergamon, London; Macmillan, New York, 1964. 211 pp. Illus. $10. Contents: "Force method"; "Displacement method"; "Matrix force method in non-linear problems"; "Matrix displacement method in non-linear problems." A survey of "some of the progress over the period 1956–62 in extending the matrix theory of structures presented by the author in 1955."

Relativité Généralisée Gravitation. Henri Arzelies. vol. 2. J. Moulis. Gauthier-Villars, Paris, 1963. 318 pp. Illus. Paper, $16.

Rounding Errors in Algebraic Processes. J. H. Wilkinson. Prentice-Hall, Englewood Cliffs, N.J., 1964. 167 pp. Illus. $6.

Schrödinger - Planck - Einstein - Lorentz: Briefe zur Wellenmechanik. K. Przibram. Springer, Vienna, Austria, 1963. 74 pp. Illus. $2.50.

Space Groups and Their Representations. G. F. Koster. Academic Press, New York, 1964. 88 pp. Illus. $3.95. Reprinted from *Solid State Physics*. vol. 5, 1957.

Space Physics. Donald P. LeGalley and Alan Rosen, Eds. Wiley, New York, 1964. 772 pp. Illus. $25.

Special Ceramics, 1962. Proceedings of a symposium (Stoke-on-Trent, England), July 1962. P. Popper, Ed. Published for the British Ceramic Research Assoc. by Academic Press, New York, 1963. 496 pp. Illus. $16.

The Stabilization of Polyvinyl Chloride. Fernand Chevassus and Roger de Broutelles. Translated from the second French edition (1963) by C. John R. Eichhorn and Esteban E. Sarmiento. St. Martin's Press, New York, 1964. 397 pp. Illus. $16.

Synthetic Fibers in Papermaking. O. A. Battista, Ed. Interscience (Wiley), New York, 1964. 352 pp. Illus. $14.

Telemetry. R. E. Young. Gordon and Breach, New York, 1963. 86 pp. Illus. $3.95.

Tensor Analysis. Theory and applications to geometry and mechanics of continua. I. S. Sokolnikoff. Wiley, New York, ed. 2, 1964. 383 pp. Illus. $9.75.

The Theory of Electromagnetism. D. S. Jones. Pergamon, London; Macmillan, New York, 1964. 823 pp. Illus. $15.

The Theory of Order-Disorder Transitions in Alloys, Toshinosuke Muto and Yutaka Takagi; **Order-Disorder Phenomena in Metals**, Lester Guttman. Academic Press, New York, 1964. 173 pp. Illus. $3.95. Two papers, reprinted from *Solid State Physics*. vol. 1, 1955, and vol. 3, 1956.

The Theory of Space, Time, and Gravitation. V. Fock. Translated from the revised Russian version (Moscow, 1961) by N. Kemmer. Pergamon, London; Macmillan, New York, 1964. 460 pp. Illus. $15.

University Physics. Francis Weston Sears and Mark W. Zemansky. Addison-Wesley, Reading, Mass., ed. 3, 1964. 1044 pp. Illus. $11.50.

X-Ray Optics and X-Ray Microanalysis. H. H. Pattee, V. E. Cosslett, and Arne Engström, Eds. Academic Press, New York, 1963. 640 pp. Illus. $22.

Biological and Medical Sciences

Advances in Biological and Medical Physics. vol. 9. John H. Lawrence, John W. Gofman, and Thomas L. Hayes, Eds. Academic Press, New York, 1963. 506 pp. Illus. $16. Seven papers: "Some recent advances in studies of the transcription of the genetic message," Thomas H. Jukes; "Human chromosomal aberration," H. N. Robson; "Tissue transplantation," E. J. Eichwald; "The microbeam as a tool in

radiobiology," Howard J. Curtis; "Electron paramagnetic resonance studies of biological interest," Bernard Smaller; "Polarimetric analysis of protein structure," Don Ridgeway; and "The analysis of biological similarity," Walter R. Stahl.

Advances in Lipid Research. vol. 1. Rodolfo Paoletti and David Kritchvesky, Eds. Academic Press, New York, 1963. 432 pp. Illus. $14. Ten papers: "The structural investigation of natural fats," M. H. Coleman; "Physical structure and behavior of lipids and lipid enzymes," A. D. Bangham; "Recent developments in the mechanism of fat absorption," John M. Johnston; "The clearing factor lipase and its action in the transport of fatty acids between the blood and the tissues," D. S. Robinson; "Vitamin E and lipid metabolism," Roslyn B. Alfin-Slater and Rosemary S. Morris; "Atherosclerosis—spontaneous and induced," Thomas B. Clarkson; "Chromatographic investigations in fatty acid biosynthesis," M. Pascaud; "Carnitine and its role in fatty acid metabolism," Irving B. Fritz; "Present status of research on catabolism and excretion of cholesterol," Henry Danielsson; and "The plant sulfolipid," A. A. Benson.

Advances in Metabolic Disorders. vol. 1. Rachmiel Levine and Rolf Luft, Eds. Academic Press, New York, 1964. 380 pp. Illus. $12. Eight papers: "Glycogen storage disease," H. G. Hers; "The parathyroids," G. D. Aurbach and John T. Potts, Jr.; "Mitochondrial respiratory control: biochemical, physiological, and pathological aspects," Lars Ernster and Rolf Luft; "Osteoporosis," B. E. C. Nordin; "Basal metabolic rate and thyroid hormones," J. R. Tata; "Insulin antagonists and inhibitors," J. Vallance-Owen; "Aldosterone: its biochemistry and physiology," John H. Laragh and William G. Kelly; "Folic acid deficiency in man and its interrelationship with vitamin B_{12} metabolism," A. Leonard Lubby and Jack M. Cooperman.

Advances in Protein Chemistry. vol. 18. C. B. Anfinsen, Jr., M. L. Anson, and John T. Edsall, Eds. Academic Press, New York, 1963. 345 pp. Illus. $14. Four papers: "Recent studies on the structure of tobacco mosaic virus," F. Alfred Anderer: "Assembly and stability of the tobacco mosaic virus particle," D. L. D. Caspar; "The dissociation and association of protein structures," F. J. Reithel; and "The amino acid composition of some purified proteins," G. R. Tristram and R. H. Smith.

Amino Acids and Serum Proteins. Based on the Richard J. Block Memorial Symposium, sponsored by the Division of Biological Chemistry (Atlantic City, N.J.). September 1962. Jacob A. Stekol, Ed. American Chemical Soc., Washington, D.C., 1964. 178 pp. Illus. $5.50.

Anatomy and the Problem of Behaviour. G. E. Coghill. Hafner, New York (reprint of 1929 edition), 1964. 125 pp. Illus. $4.75.

Animal Biology. Michael F. Guyer and Charles E. Lane. Harper and Row, New York, ed. 5, 1964. 807 pp. Illus. $8.95.

Animal Body Fluids and Their Regulation. A. P. M. Lockwood. Harvard Univ. Press, Cambridge, Mass., 1964. 185 pp. Illus. $2.75.

Animal Diversity. Earl D. Hanson. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1964. 128 pp. Illus. Paper, $1.75; cloth, $3.95.

Animal Genetics. Frederick B. Hutt. Ronald, New York, 1964. 560 pp. Illus. $12.

Annelids. R. Phillips Dales. Hillary House, New York, 1963. 200 pp. Illus. $3.

Annual Review of Entomology. vol. 9. Ray F. Smith and Thomas E. Mittler, Eds. Annual Reviews, Palo Alto, Calif., 1964. 400 pp. Illus. $8.50. Sixteen papers, of which nine are contributed by workers outside the United States: L. B. Barton-Browne (Australia) on water regulation in insects; D. Schneider (Germany) on insect antennae; G. P. Holland (Canada) on evolution, classification, and host relationships of Siphonapters; H. Klomp (Netherlands) on intraspecific competition and the regulation of insect numbers; E. Rivnay (Israel) on the influence of man on insect ecology in arid zones; F. Wilson (Australia) on the biological control of weeds; W. Fyg (Switzerland) on anomalies and diseases of the queen honey bee; J. F. B. Edeson and T. Wilson (England) on the epidemiology of filariasis due to *Wuchereria bancrofti* and *Brugia malayi*; and G. M. Saccà (Italy) on camparative bionomics in the genus *Musca*.

Bibliographie der Pflanzenschutz-Literatur. vol. 2, 1958. J. Bärner. Parey, Berlin, 1963. 329 pp. Paper, DM. 68.

Bioastronautics. Karl Schaefer, Ed. Macmillan, New York, 1964. 416 pp. Illus. $16.

The Biochemistry of Clinical Medicine. William S. Hoffman. Yearbook Medical Publishers, Chicago, ed. 3, 1964. 824 pp. Illus. $12.50.

The Biology of Plant Parasitic Nematodes. H. R. Wallace. St. Martin's Press, New York, 1964. 288 pp. Illus. $9.50.

Brain Mechanisms and Intelligence. A quantitative study of injuries to the brain. K. S. Lashley. Hafner, New York (reprint of 1929 edition), 1964. 200 pp. Illus. Plates. $5.50.

Brains of Rats and Men. A survey of the origin and biological significance of the cerebral cortex. C. Judson Herrick. Hafner, New York (reprint of 1926 edition), 1963. 401 pp. Illus. $6.

Cell Physiology and Biochemistry. William D. McElroy. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1964. 128 pp. Illus. Paper, $1.75; cloth, $3.95.

Cellular Membranes in Development. A symposium (Storrs, Conn.), June 1963. Michael Locke, Ed. Academic Press, New York, 1964. 398 pp. Illus. $12.

Cerebral Function in Infancy and Childhood. Albrecht Peiper. Translated from the third revised German edition (Leipzig, 1961) by Benedict Nagler and Hilde Nagler. Consultants Bureau, New York, 1963. 695 pp. Illus. $25.

Chelation Therapy. Alfred Soffer, Maynard Chenoweth, Gunther L. Eichhorn, Betty Rosoff, Martin Rubin, and Herta Spencer. Thomas, Springfield, Ill., 1964. 173 pp. Illus. $8.

Chemical and Biological Aspects of Pyridoxal Catalysis. Proceedings of symposium of the International Union of Biochemistry (Rome), October 1962. E. E. Snell, P. M. Fasella, A. Braunstein, and A. Rossi Fanelli, Eds. Pergamon, London;

Macmillan, New York, 1963. 616 pp. Illus. $20.

A Chemical Background to Nursing and Other Paramedical Programs. Gerald F. Grillot. Harper and Row, New York, 1964. 412 pp. Illus. $5.75.

Chemical Protection of the Body Against Ionizing Radiation. V. S. Balabukha, Ed. Translated from the Russian edition (Moscow, 1960) by J. T. Greaves. J. H. Barnes, Ed. Pergamon, London; Macmillan, New York, 1963. 180 pp. Illus. $8.50.

Cold Spring Harbor Symposia on Quantitative Biology. vol. 28, *Synthesis and Structure of Macromolecules*. Biological Laboratory, Long Island Biological Assoc., Cold Spring Harbor, N.Y., 1963. 630 pp. Illus. $15.

Comparative Anatomy and Embryology. William W. Ballard. Ronald, New York, 1964. 626 pp. Illus. $10.

Comparative Neurochemistry. Proceedings, Fifth International Neurochemical Symposium (St. Wolfgang, Austria), 1962. Derek Richter, Ed. Pergamon, London; Macmillan, New York, 1964. 503 pp. Illus. $14.

Cosmetics and the Skin. F. V. Wells and Irwin I. Lubowe. Reinhold, New York; Chapman and Hall, London, 1964. 698 pp. $22.

Craigie's Neuroanatomy of the Rat. Revised and expanded by Wolfgang Zeman and James Robert Maitland Innes. Academic Press, New York, 1963. 240 pp. Illus. $8.50.

The Cytology and Genetics of Barley 1951–1962. Robert A. Nilan. Washington State Univ. Press, Pullman, 1964. 288 pp. Illus. Paper, $4. This compendium presents information gathered from more than 1200 articles published between 1951 and 1962.

Data Acquisition and Processing in Biology and Medicine. vol. 2. Proceedings of the 1962 Rochester conference. Kurt Enslein, Ed. Pergamon, London; Macmillan, New York, 1964. 377 pp. Illus. $11.50.

Electronic and Computer-Assisted Studies of Biomedical Problems. Otto H. Schmitt and Cesar A. Caceres, Eds. Thomas, Springfield, Ill., 1964. 344 pp. $12.50.

The Enzymes of Lipid Metabolism. Proceedings of the Sixth International Conference on the Biochemistry of Lipids (Marseilles), 1960. P. Desnuelle, Ed. Pergamon. London, 1961; Macmillan, New York, 1964. 324 pp. Illus. $10.

Evolution of the Atherosclerotic Plaque. Richard J. Jones, Ed. Univ. of Chicago Press, Chicago, 1964. 374 pp. Illus. $6.75. A collection of papers given at an international symposium held at Chicago, Ill., in March 1963, under the joint sponsorship of the Chicago Heart Association and the Council on Arteriosclerosis of the American Heart Association.

Evolutionary and Genetic Biology of Primates. vol. 2. John Buettner-Janusch, Ed. Academic Press, New York, 1964. 342 pp. Illus. $12.50.

Experimental Surgery. Including surgical physiology. J. Markowitz, J. Archibald, and H. G. Downie. Williams and Wilkins, Baltimore, Md., ed. 5, 1964. 671 pp. Illus. $13.

The Formation of Wood in Forest

Trees. A symposium (Harvard Forest, Petersham, Mass.), April 1963. Martin H. Zimmerman, Ed. Academic Press, New York, 1964. 578 pp. Illus. $16.

Fortschritte der Zoologie. Max Hartmann, Ed. vol. 16, pt. 2. Hansjochem Autrum and Friedrich Seidel. Fischer, Stuttgart, Germany, 1963. 146 pp. Illus. Paper, DM. 34. Two papers: "Physiologie des Stoffwechsels" by Klaus Urich and "Vergleichende Physiologie der mechanischen Sinne" by Christian Hoffmann.

Function of the Human Body. Arthur C. Guyton. Saunders, Philadelphia, ed. 2, 1964. 441 pp. Illus. $7.75.

The Genetics of Bacteria and Their Viruses. Studies in basic genetics and molecular biology. William Hayes. Wiley, New York, 1964. 752 pp. Illus. $13.75.

Growth and Maturation of the Brain. A series of lectures delivered during a workshop (Amsterdam, Netherlands), September 1962. Dominick P. Purpura and J. P. Schadé, Eds. Elsevier, New York, 1964. 299 pp. Illus. $14.50.

Handbook of Physiology. Section 4, *Adaption to the Environment*. D. B. Dill, E. F. Adolph, and C. G. Wilber, Eds. Published for American Physiological Soc., Washington, D.C., by Williams and Wilkins, Baltimore, 1964. 1066 pp. Illus. $32.

Heat and Life. The development of the theory of animal heat. Everett Mendelsohn. Harvard Univ. Press, Cambridge, Mass., 1964. 222 pp. $4.50.

The Hormones. Physiology, chemistry, and applications. vol. 4. Gregory Pincus, Kenneth V. Thimann, and E. B. Astwood, Eds. Academic Press, New York, 1964. 702 pp. Illus. $22.

International Review of Experimental Pathology, 1963. vol. 2. G. W. Richter and M. A. Epstein, Eds. Academic Press, New York, 1963. 460 pp. Illus. $16. Eight papers: "Cellular recognition of foreign matter," Stephen Boyden; "The nucleic acids of viruses as revealed by their reactions with fluorochrome acridien orange," Heather D. Mayor; "Cytochemical aspects of experimental leukemia," Bo Thorell; "The use of statistics in the etiologic study of malignant neoplasms," Johannes Clemmesen; "A lymphoma syndrome in Tropical Africa," Denis Burkitt; "Microscopic morphology of injured living tissue," Ian K. Buckley; "Melanin granules," P. Drochmans; and "Biological effects of ionizing radiations," Arthur C. Upton.

International Review of Neurobiology. vol. 6. Carl C. Pfeiffer and John R. Smythies, Eds. Academic Press, New York, 1964. 488 pp. Illus. $15. Seven papers: "Protein metabolism of the nervous system," Abel Lajtha; "Patterns of muscular innervation in the lower chordates," Quentin Bone; "The neural organization of the visual pathways in the cat," Thomas H. Meikle, Jr., and James M. Sprague; "Properties of afferent synapses and sensory neurons in the lateral geniculate nucleus," P. O. Bishop; "Regeneration in the vertebrate central nervous system," Carmine D. Clemente; "Neurobiology of phencyclidine (sernyl), a drug with an unusual spectrum of pharmacological activity," Edward F. Domino, and "Free behavior and brain stimulation," José M. R. Delgado.

(*Continued from page 982*)

may be gained by engineering and science faculty through industrial and government consulting, nor the opportunities for summer employment on research projects.

Faculty in the nonscientific disciplines on calendar-year contracts in general had much lower salaries than engineers, scientists, and mathematicians on the same sort of contracts, and this difference, as much as any thing, seems to reflect the real advantage of the latter group in the academic market place.—J.W.

Announcements

Science & Public Policy, a new AAAS magazine, will begin publication on an experimental basis on 1 June.

The magazine, which is now scheduled for publication every other month, will contain public affairs articles that have previously appeared in *Science,* as well as other material. It is being distributed without charge to government officials, research administrators, and others interested in public policy matters involving science and technology. Complimentary copies are available to *Science* subscribers upon request. (*Science & Public Policy,* 1515 Massachusetts Avenue, NW, Washington, D.C. 20005)

A conference on **viral diseases of poikilothermic vertebrates** is scheduled 23–26 September in New York. Approximately 45 papers will be presented, dealing with histopathology, immunity, etiology, cytology, electron microscopy, and tissue culture of fishes and amphibians. (S. F. Snieszko, Eastern Fish Disease Laboratory, Leetown, P.O. Kearneysville, W. Va. 25430)

The establishment of a $15 million fund at Massachusetts Institute of Technology, earmarked for basic research in the **physical sciences,** was announced Monday. It includes a $5 million personal gift from Alfred P. Sloan, Jr., the remainder being from the Alfred P. Sloan Foundation. The money, according to Sloan, is to be used to help correct the imbalance he feels exists between basic and applied research. The fund will be managed by three administrators appointed by the M.I.T. Corporation's executive committee. Although primarily for research in physical sciences, it may also be used in areas where development in physical sciences impinges on other disciplines. Money from the fund may also be allocated for use in institutions other than M.I.T.

Grants, Fellowships, and Awards

A graduate fellowship in **electrochemistry** has been established at Columbia University, in honor of Samuel Ruben, inventor of the mercury dry cell and of the dry electrolytic capacitor. The $1000 fellowship is presented by the P. R. Mallory Foundation. Applications should be sent to H. B. Linford, Department of Chemical Engineering, Columbia University, New York.

Courses

An advanced seminar in **theoretical metallurgy** is scheduled 15 June to 7 August at the University of Denver's Denver Research Institute. It will consist of five lectures on "energetics in metallurgical phenomena," each to be delivered daily for 1 to 2 weeks, and supplemented by regularly scheduled informal discussion sessions. Attendance is open and there are no fees. Postdoctoral participants are eligible for stipends of $100 per week plus travel and dependency allowances; predoctoral stipends of $50 a week, plus travel allowances, are available. (M. D. Robbins, Denver Research Institute, University of Denver, Denver, Colo. 80210)

Scientists in the News

Columbia University's C. F. Chandler medal for achievement in pure or applied chemistry has been presented to **Henry Taube,** professor of chemistry at Stanford University. He was cited for pioneering work in the mechanisms of inorganic reactions.

Victor T. Tomberg, formerly with Kollsman Instrument Corp., New York, has been appointed senior research associate in the research department of neurosurgery, at the medical school of New York University.

Earl R. Parker, professor of metallurgy and director of the Institute of Engineering Research at the University

of California, Berkeley, has been named to receive the 1964 Albert Sauveur achievement award from the American Society of Materials. The prize, in recognition of "pioneering metallurgical achievements which have stimulated organized work" that has furthered knowledge in basic metallurgy, will be presented during the society's meeting in October.

Alexander Spoehr, former chancellor of the East-West Center and professor of anthropology at the University of Hawaii, has been appointed professor of anthropology at the University of Pittsburgh. He is scheduled to begin in the winter trimester, after an extended tour of anthropological research and educational facilities in the Pacific islands.

Paul R. Peabody, formerly supervisor of applied mathematics at the Jet Propulsion Laboratory, has been appointed manager of the new department of mathematical analysis at Computer Sciences Corporation, a data processing service organization in Los Angeles, Calif.

Hasmukh J. Mehta, assistant professor of anatomy at Western Reserve University, has been appointed professor and chairman of the department of anatomy in the recently organized St. John's Medical College, Bangalore, India, which is scheduled to open in July. He has been in charge of gross anatomy studies in the W.R.U. dentistry school for the past year.

Recent Deaths

Igor I. Bondarenko, 37; Soviet nuclear physicist, deputy director of the Physical Energy Institute, Obninsk, Russia; 7 April.

Burt G. Chollett, 88; orthopedic surgeon and a founder of the National Society for Crippled Children; 4 May.

Marin S. Dunn, 65; director of the biology department, Philadelphia College of Pharmacy and Science; 14 April.

R. Carl Millican, 46; of the Laboratory of Biochemical Pharmacology, National Institute of Arthritis and Metabolic Diseases; 7 March.

Howard Zahniser, 58; conservation leader, former chairman of the National Resources Council of America and a member of the Secretary of the Interior's advisory committee on conservation; 5 May.