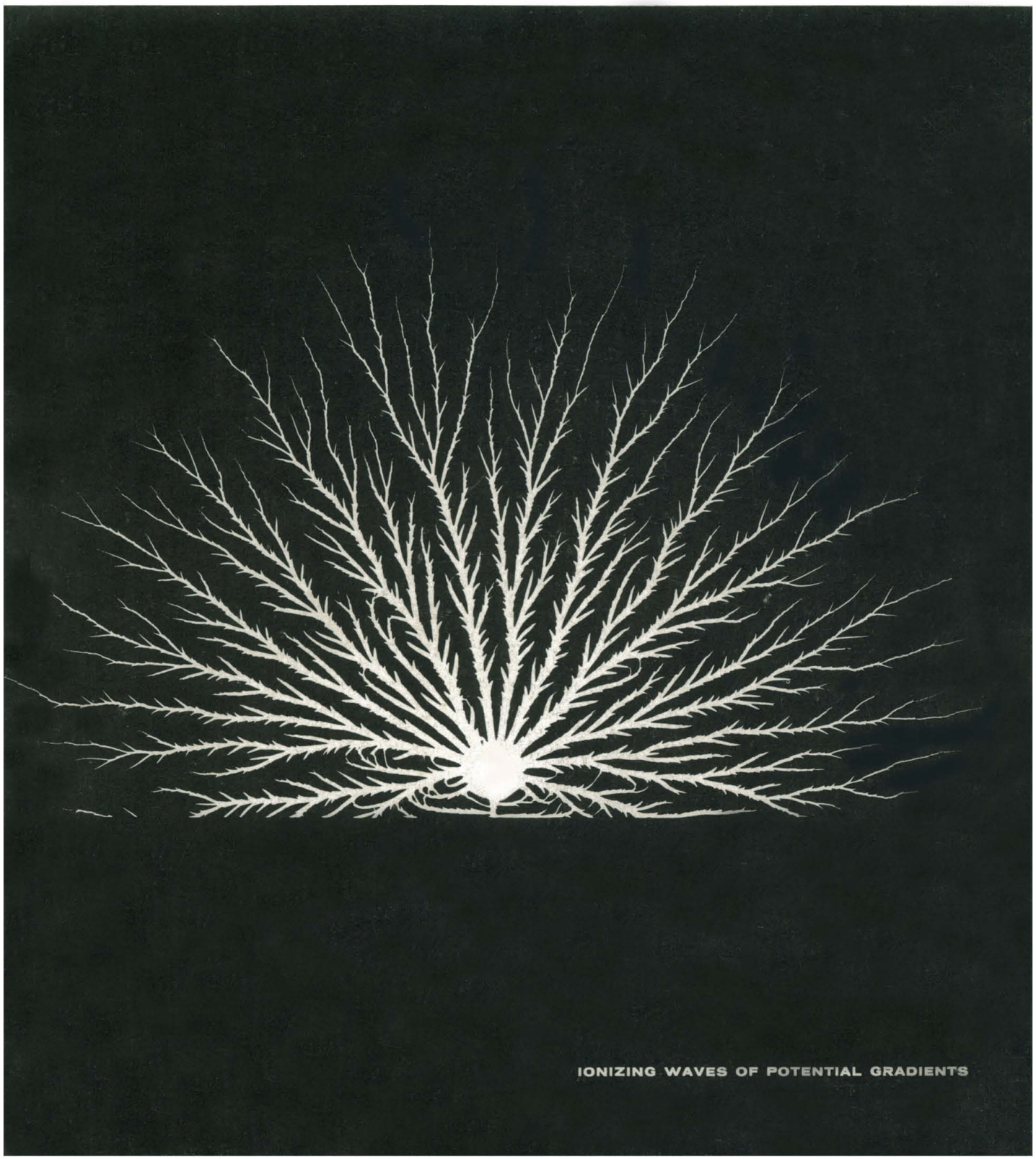
SCIENCE

11 June 1965
Vol. 148, No. 3676

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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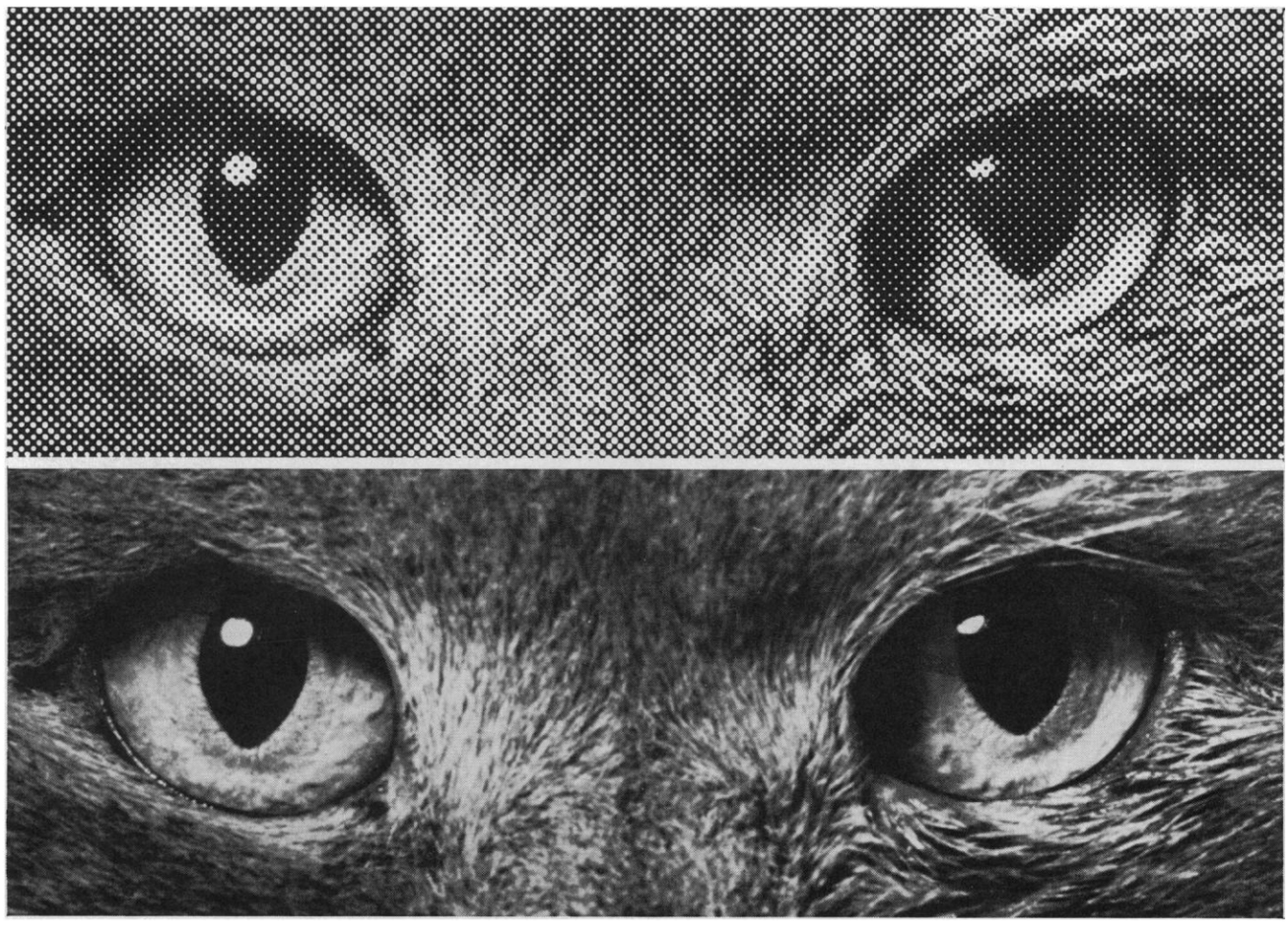

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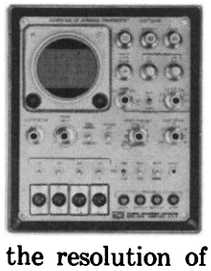

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COVER

Autograph of branched streamers from a positive point on the impulse potential, intercepted at progressively greater distances toward the negative plane by a transverse film. The tips of each of the branches represent an ionizing wave of positive potential gradient. The gradient propagates itself by photo-electric ionization of the air near the film. See page 1417. [E. Nasser]

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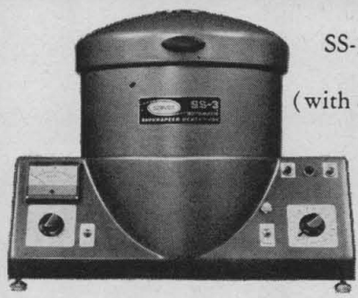

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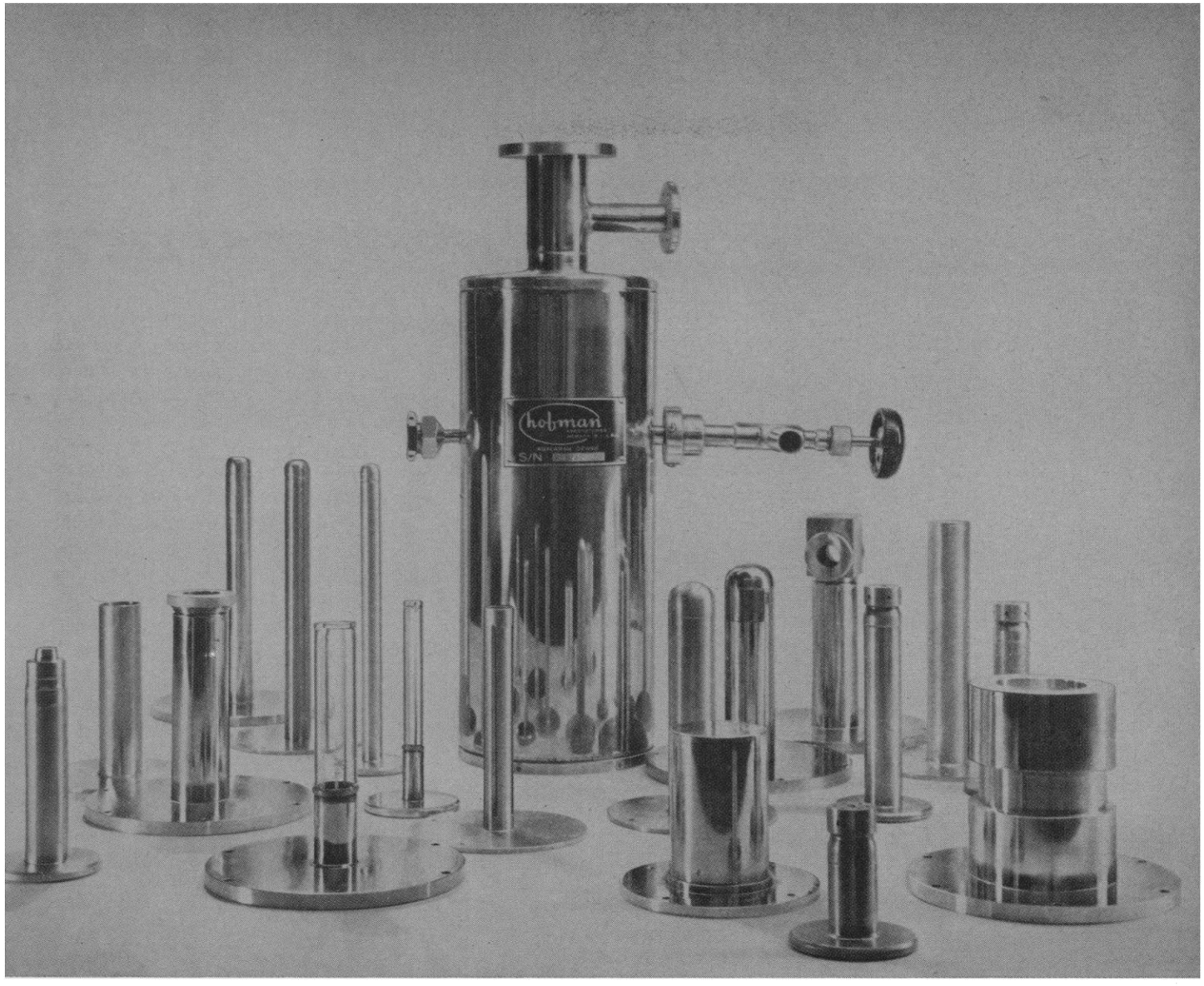

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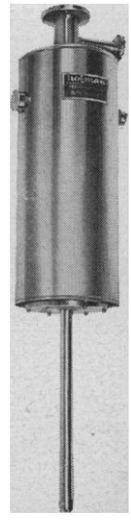

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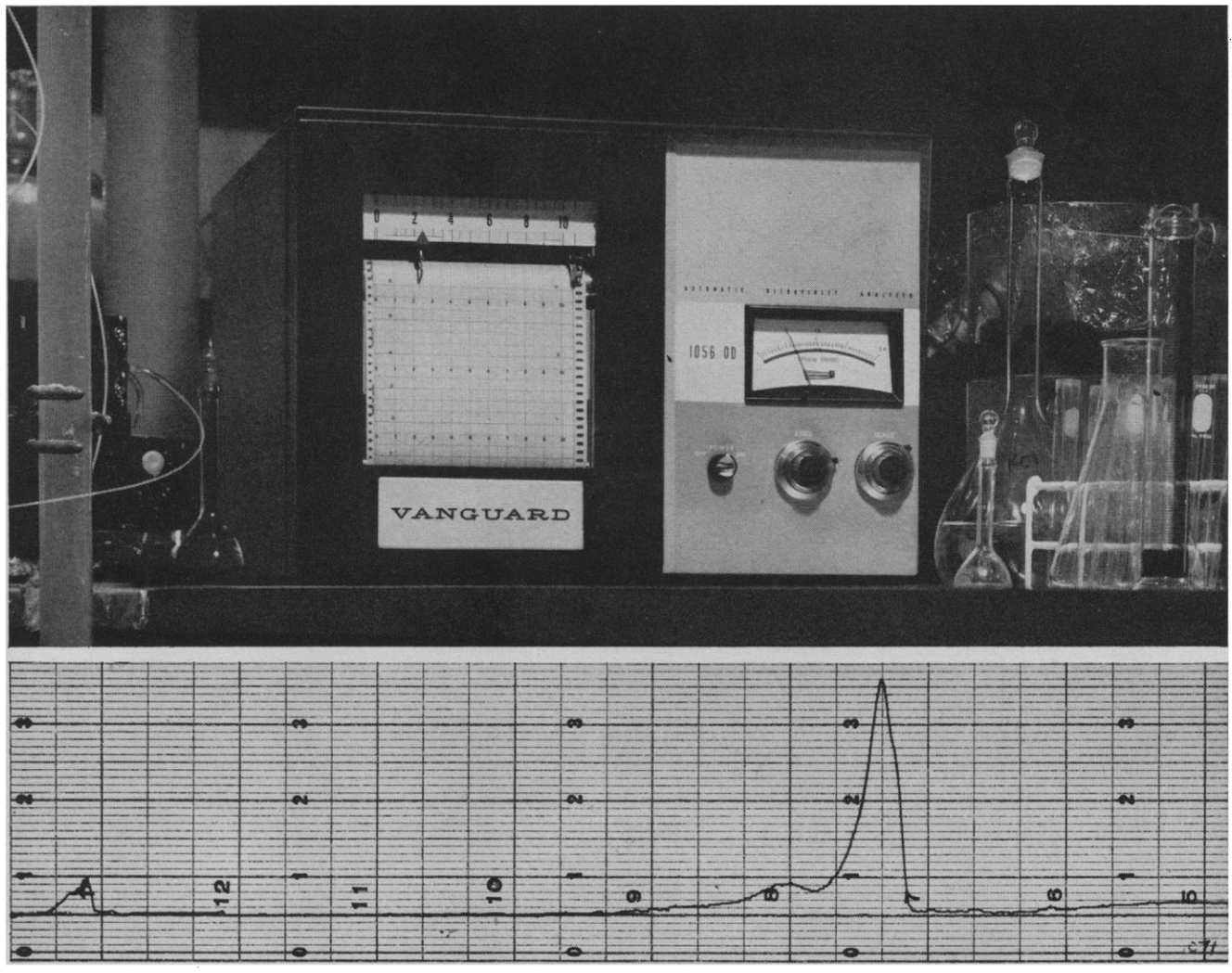

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Published jointly by Verlag Chemie and Academic Press

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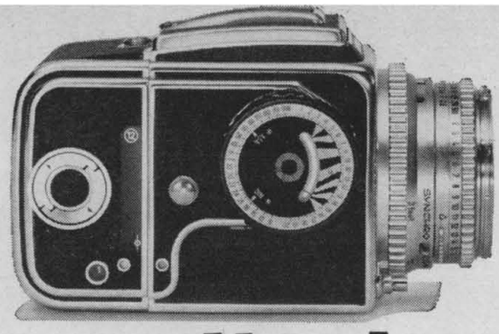
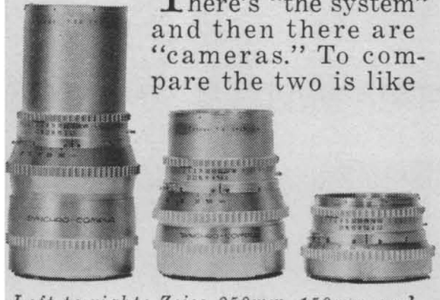
(V140) March 1965, 247 pp., $10.00



When you talk about "the system" there's no brand X to compare it with.



Left to right: Zeiss 250mm, 150mm, and 80mm lenses.

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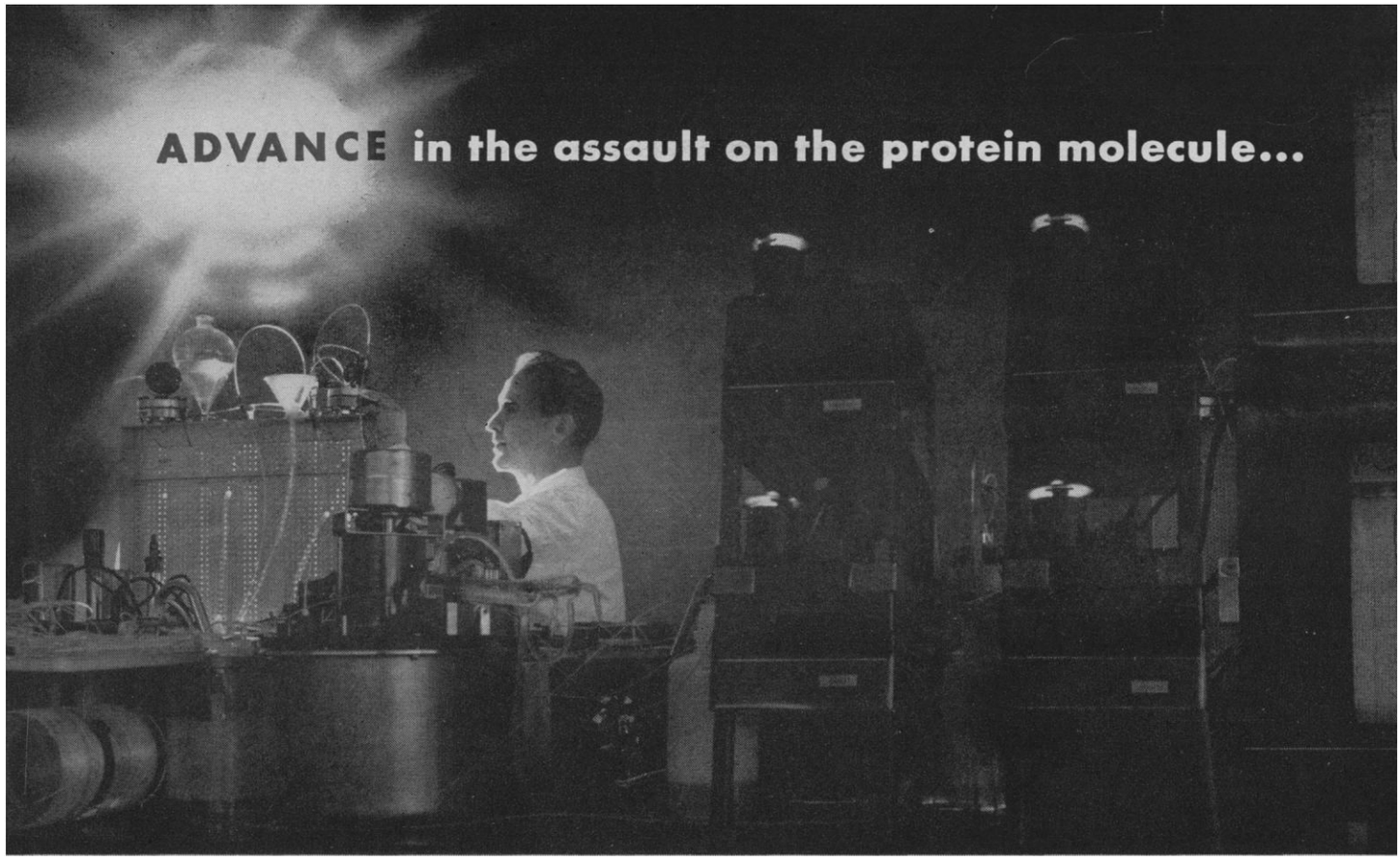

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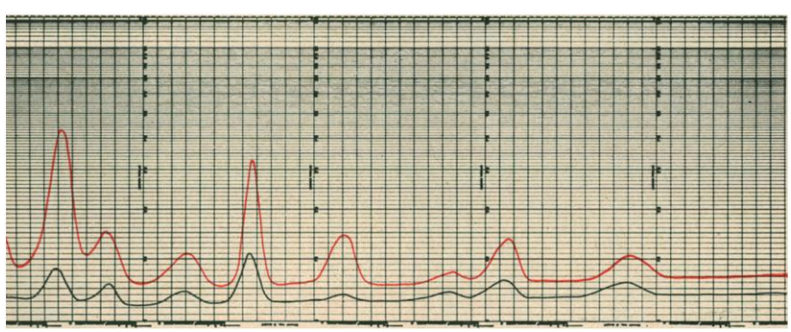

Section of a chromatogram showing tryptic hydrolyzate of performic acid oxidized bovine pancreatic Ribonuclease before and after alkaline hydrolysis.

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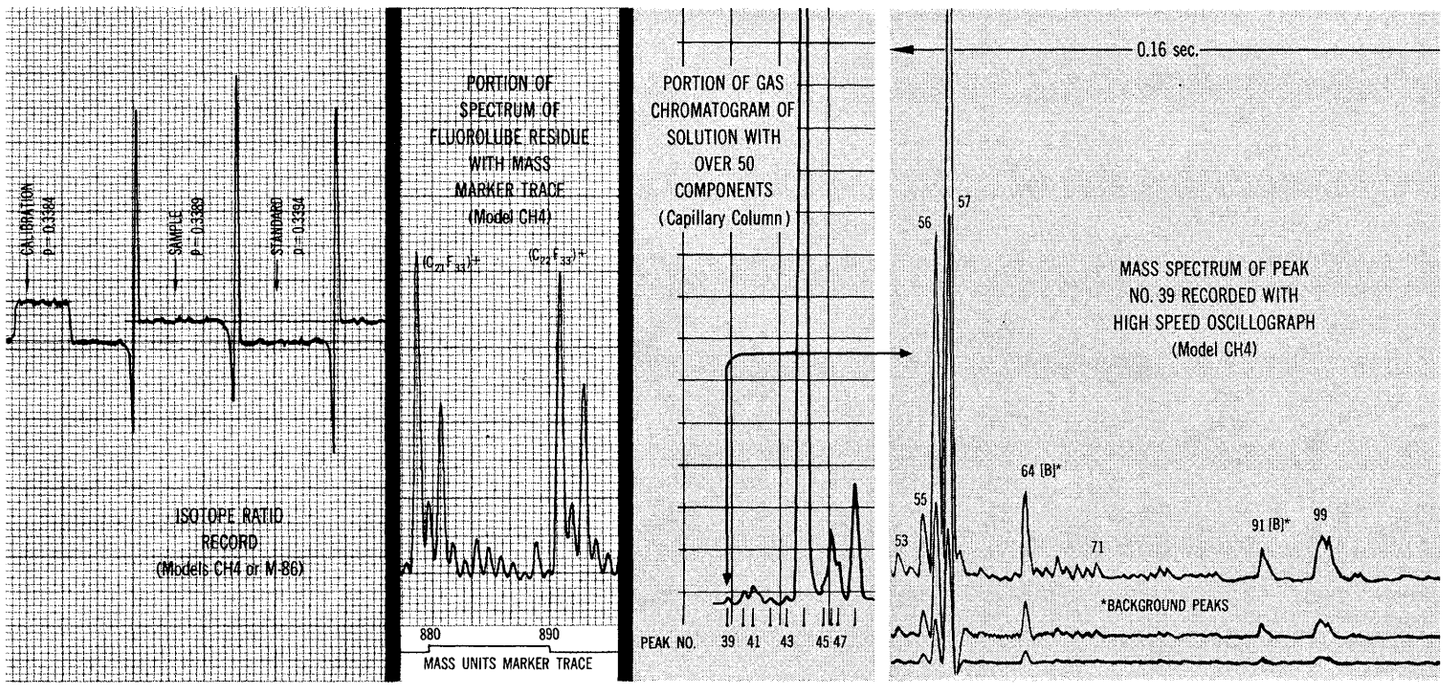

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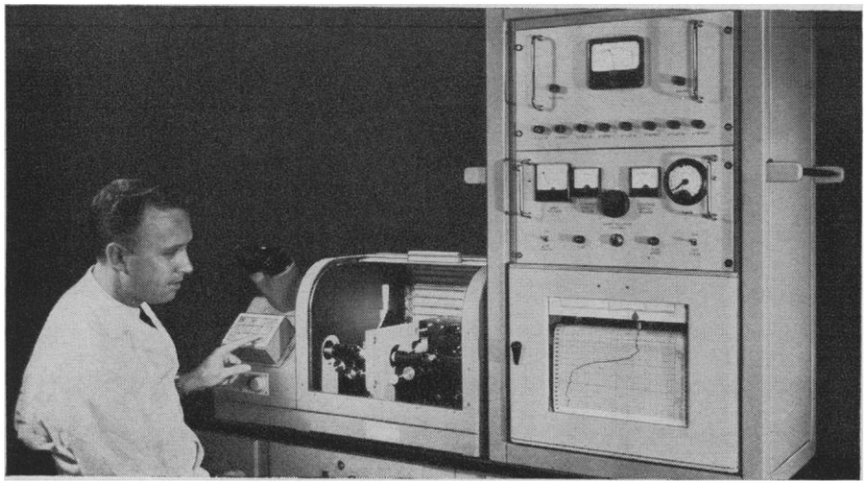

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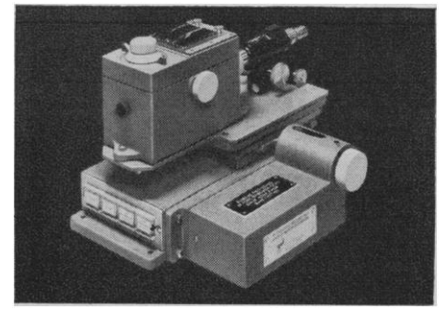
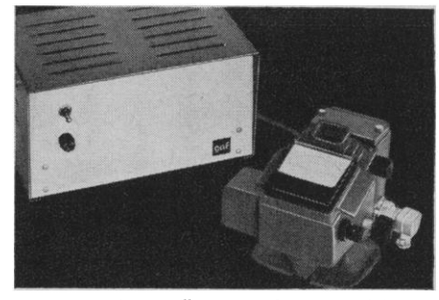
The Model 4 gives you unusual flexibility through a wide choice of magnifications, scanning speeds, aperture sizes and sample handling accessories.

Because of its uncommon precision and reliability, the Model 4 has become the most widely used laboratory instrument for photographic image evaluation. Its versatility has led to many other applications—**ballistics, micro-electronics, medicine, photo-interpretation, graphic arts, spectrography, nuclear physics, and criminal identification, for example.**



2. Scanning aerial images produced by optical systems? GAF's MICRO-IMAGE SCANNER is a specially designed automatic microscope system for evaluating aerial images; it provides a chart record of log relative intensity versus distance scanned.



3. Measuring reflection density of fine lines? GAF's MICROLINE® EVALUATOR is a high magnification instrument for measuring the reflection density of fine lines (as narrow as .005"), printed matter, and other fine-structured patterns. The effective size of the standard measuring slit is .03 x .0007 inches. The instrument has a compact measuring head with direct-reading meter. Density range is 0–1.7. A convenient viewing screen shows reading area at 11x magnification.

The GAF Microline Evaluator is excellent for many applications in research, quality control, and inspection.

For full information on these and other GAF instruments which can help solve your problem, write Photo & Repro Market Development.

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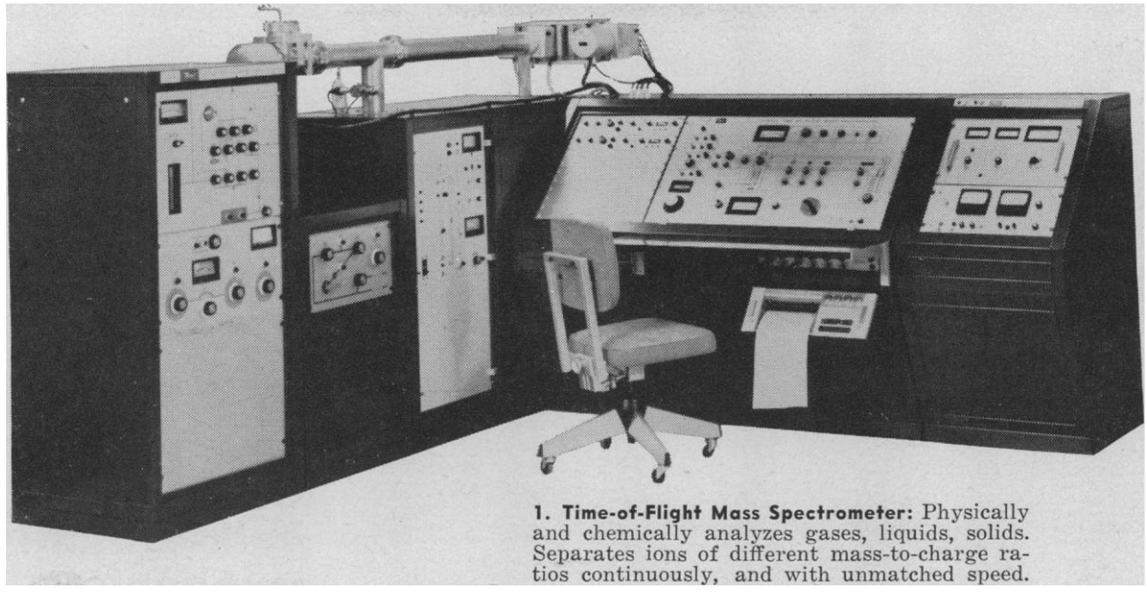
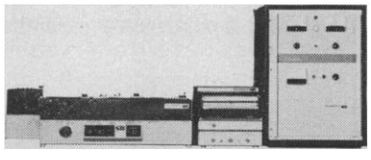
You can use Bendix TOF Mass Spectrometers in 25 different research and analysis areas.

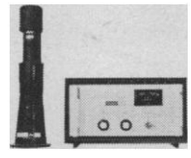


1. Time-of-Flight Mass Spectrometer: Physically and chemically analyzes gases, liquids, solids. Separates ions of different mass-to-charge ratios continuously, and with unmatched speed.

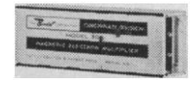
Imagine what you can do with all these.



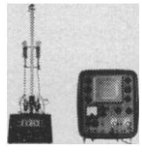
2. Polarmatic Spectropolarimeter: Plots optical rotation of solutions as a function of wavelength, simultaneously recording the optical transmission.



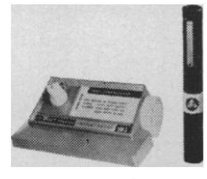
3. Automatic Polarimeter: Rapidly measures rotation of monochromatic plane-polarized light passing through a liquid, with angular sensitivity of 0.0002 degree of arc.



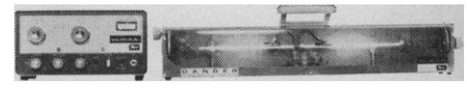
4. Magnetic Electron Multiplier: Basic component detects photons, other particles. Small, rugged, lightweight, undamaged by exposure to atmospheric pressure.



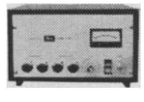
5. Polarotrace 1660A: Polarography system using drop-synchronized linear voltage sweep to detect and measure trace elements in solutions.



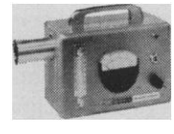
6. Dosimeters: Pen-sized meters for immediate and accurate measurement of personnel radiation exposure.



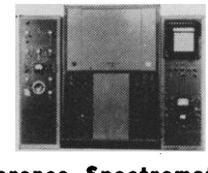
7. Helium-Neon Gas Laser: Inexpensive portable tool that demonstrates basic properties of lasers. Highly monochromatic light source.



8. Lab-Vis®: Uses unique ultrasonically vibrating blade to measure Newtonian and non-Newtonian liquid viscosities from 1 to 50,000 centipoises.



9. Electrostatic Air Sampler: Light, compact and portable kit for rapidly sampling large quantities of air.



10. Interference Spectrometer: Perot-Fabry unit ideally suited to studies of hyperfine structures, isotopic shift and the Zeeman effect.

11. Reactor Instrumentation: Measures core neutron flux, safeguards reaction operation. Solid-state modules can be assembled into any system.

12. Personnel Ratemeter: Small, lightweight instrument for measuring radiation rates from 0 to 500 rads per hr.

13. Radioassay Unit: Sensitive instrument for measuring small amounts of radioactivity.

For details on any of our 13 scientific instruments for research and analysis (or one designed and built to your specifications), write us at 3625 Hauck Rd., Cincinnati, Ohio 45241.

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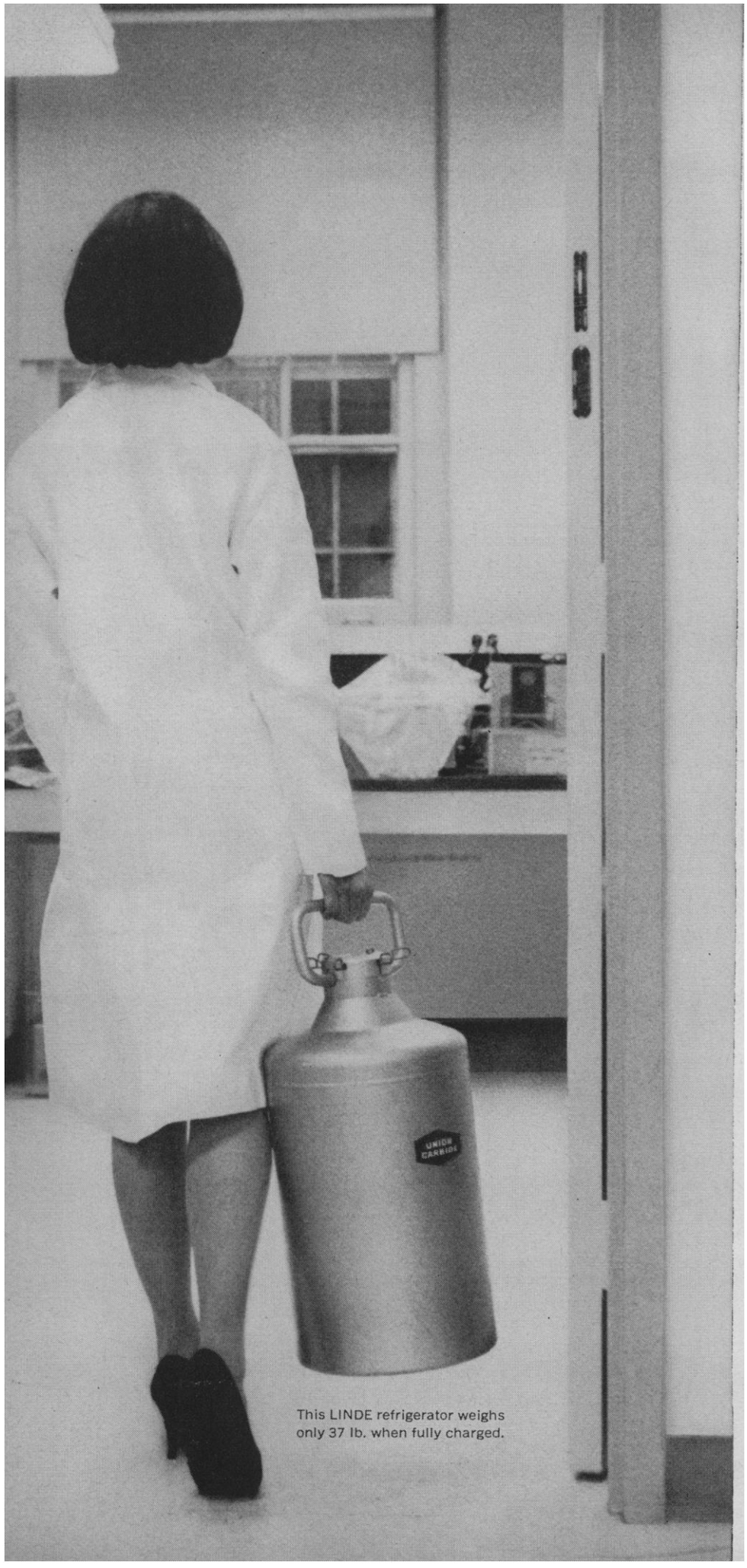

This LINDE refrigerator weighs only 37 lb. when fully charged.

Have you been looking for a walk-around cryogenic refrigerator?

Here it is. It's the new LINDE LR-10A-6 Liquid Nitrogen Refrigerator. It combines portability and long-term storage so effectively you'd almost think a researcher designed it for us.

Carry it anywhere—it weighs only 37 lb. fully charged/holds 6 canisters with a capacity of 115 cu. in./has a minimum holding time of 3 weeks at —196°C between refills of liquid nitrogen/is totally nonmechanical, and completely safe for storing biological materials.

This dual-purpose storage and shipping container is just one of many related products available from Union Carbide, the people who know most about cryogenics. Some others: liquid nitrogen refrigerators which store up to 42,900 1.2-ml. ampules on canes...controlled rate freezers...biological transports...liquefied gas containers.

Are you interested in storing biological specimens safely and economically? Choose from the big line of LINDE cryogenic equipment. For further information, mail the coupon.

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Union Carbide Corporation
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Please send me information on:

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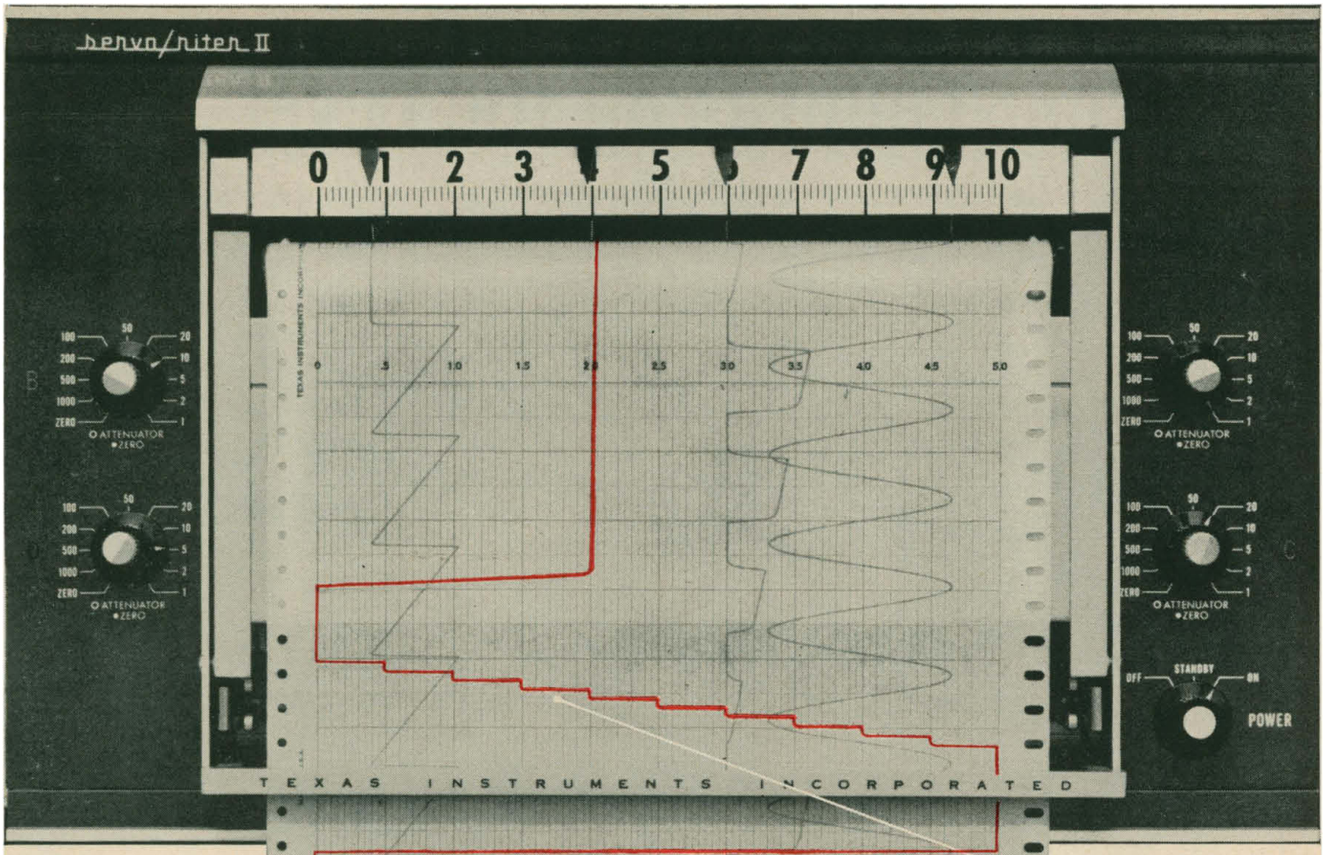

servo/riter® II recorders are available with 1 to 6 pens, in portable and flush-mounting models, with wide or narrow charts. Choice of inputs, ranges, chart speeds, accessories, almost any combination —you name it.

trace with 10% steps shows better than ¼% accuracy

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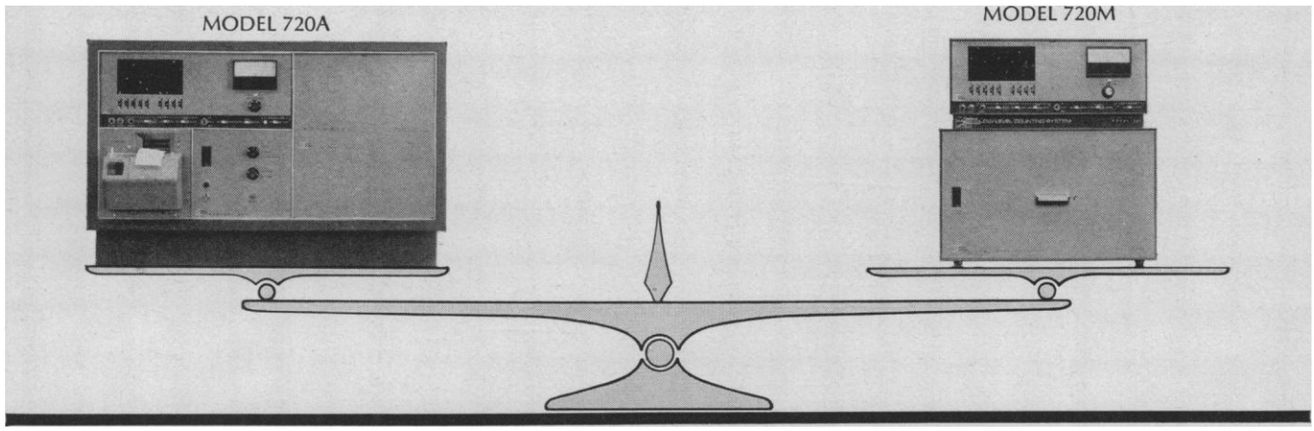

AUTOMATIC

The 720A Automatic Low Level Counting System has a capacity of 100 planchets up to 2" in diameter. The automatic changer can be programmed to count on a single sample or continuous-run basis.

MANUAL

The 720M Manual Low Level Counting System offers a simple, compact, and economic arrangement with the same sensitivity, shielding effectiveness, and electronic capability as the automatic system.

WHEN THE BACKGROUND RADIOACTIVITY IN THE ENVIRONMENT IS COMPARABLE TO THE LOW LEVEL RADIOACTIVITY OF YOUR EXPERIMENTAL SAMPLE, HOW DO YOU MEASURE YOUR SAMPLE?

You are engaged in radiometric studies of material with low levels of radioactivity — in health physics, in life sciences, in geochemistry, or in neutron activation analysis. The test samples generally contain smaller quantities of radioactive material than normally encountered in routine counting. Yet you must be certain that YOUR COUNT IS ON THE LEVEL!

With B/A Low Level Counting Systems, background radiation is reduced to as little as 0.5 cpm (30 counts per hour!) That outstanding performance stems from Baird-Atomic's traditional reliability, and from specific engineering features such as the use of a 4" virgin lead shield, with an inner shield of OHFC copper. The materials used in the detector and sample slide are also carefully selected to insure low natural radioactivity content.

The background is further reduced through the use of anticoincidence circuitry, guaranteeing greater sensitivity and more statistically reproducible results. Detectors of 1.25" or 2.25" diameter with windows of 800 μgms/cm^2 or 100 μgms/cm^2 are available.

Your own counting problems may be amenable to solution through low level techniques. If you are engaged in studies in any of the fields named above (age dating? fallout? trace quantities of radioactivity in samples of air, water, milk, metals, vegetable or animal tissue? others?) you can be certain, with a Baird-Atomic Low Level Counting System, that YOUR COUNT IS ON THE LEVEL.

Service is available through all Baird-Atomic sales offices, in the US and abroad. Write to the Atomic Instrument Division for our detailed data sheet 720A-720M. Scientists: Investigate challenging opportunities with Baird-Atomic. An Equal Opportunity Employer.

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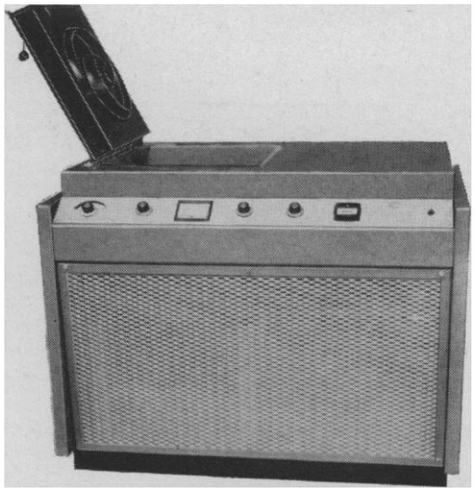
The New IEC B-20 High Speed Refrigerated Centrifuge costs $500 more.



It's a bargain.

We can tell you that IEC'S new B-20 high speed refrigerated centrifuge offers *more* than anything else on the market.

It does, and we will:

The B-20 offers 46,300 g; no comparable centrifuge does.

The B-20 offers closer temperature control and more head stability because of the new Turbo-Cover,* which directs a whirling vortex of air pressure to stabilize the new, belt driven, flexible shaft. No other centrifuge has it.

The B-20 offers programmed, one-knob *automation;* no comparable centrifuge does.

The B-20 offers 4 x 250 ml capacity in a swinging bucket head; no comparable centrifuge does.

Plus a smooth-walled stainless steel chamber, low-noise level, and virtually no maintenance.

The B-20, heir to advances made in IEC'S intensive ultra-centrifuge development program, and a culmination of the IEC Quality Assurance Program, offers all these advantages, and more.

Yes, the B-20 is a remarkable bargain.

Your work is handled better, day after day, week after week. Your staff performs more efficiently. Write — today — for complete data.

*Patent Pending.

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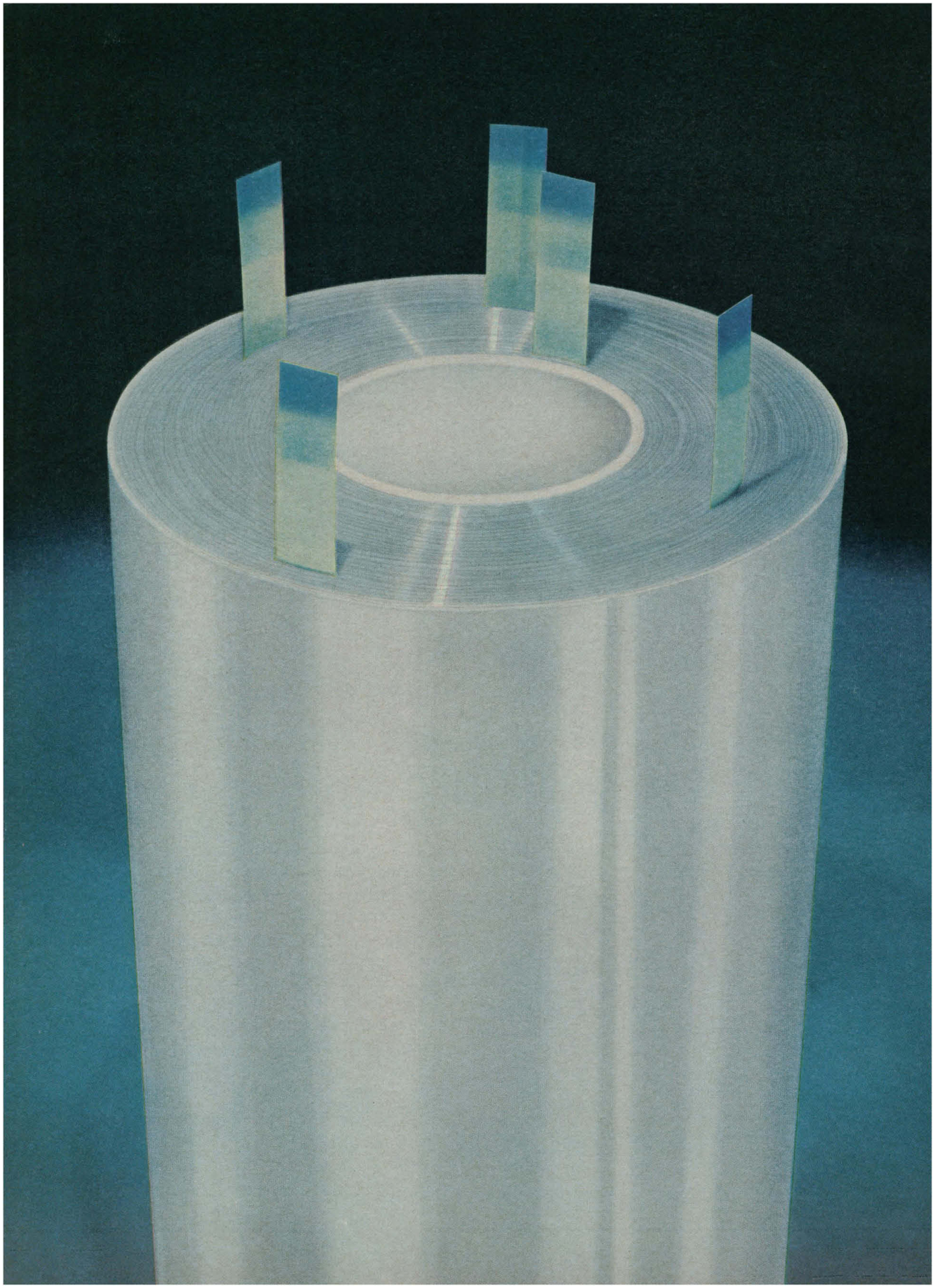
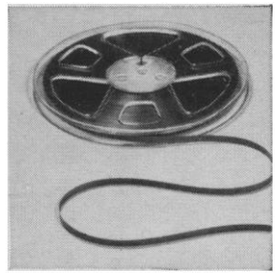
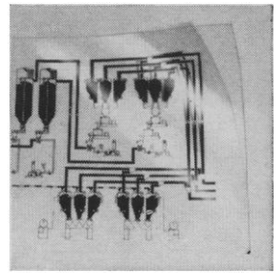


Temperature flags! Nothing is left to chance with new Celanar Polyester Film

There are no unwanted "surprises" with new Celanar polyester film by Celanese. Because we leave nothing to chance. Such as the possibility of undetected harmful environmental changes suffered in transit. Celanar film is shipped with *temperature recording flags* to alert you to possible damage before you put it on the processing line.

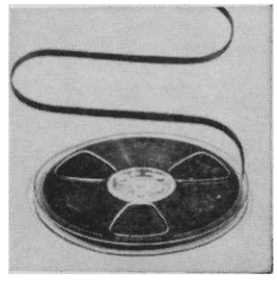


But that's just one of the meaningful service advantages that are causing so many manufacturers to switch to new Celanar film. For magnetic tape. Packaging. Engineering reproduction. Metalizing. Stationery and office supplies. And electrical applications.



The *basic* reason why Celanar film has no peer is, of course, *cleanliness*. New Celanar film is produced in a sealed-off "White Room" clean enough for surgery—the most modern in the industry. And the cleaner the polyester film, the better it processes.

It's nice, though, to have such other unique advantages accrue to you as *protection against dust contamination* by use of non-fibrous plastic cores. And that, for critical applications, Celanar film may be *shipped with Impact Recorders* to protect you against accepting film jolted and damaged during shipment. Or that its splice-free roll lengths are tailored to your specifications.



This is the kind of meaningful service you would expect from Celanese Plastics—whose operating philosophy is that the customer, not the supplier, is always right. Celanese Plastics Company, 744 Broad Street, Newark 2, N. J.

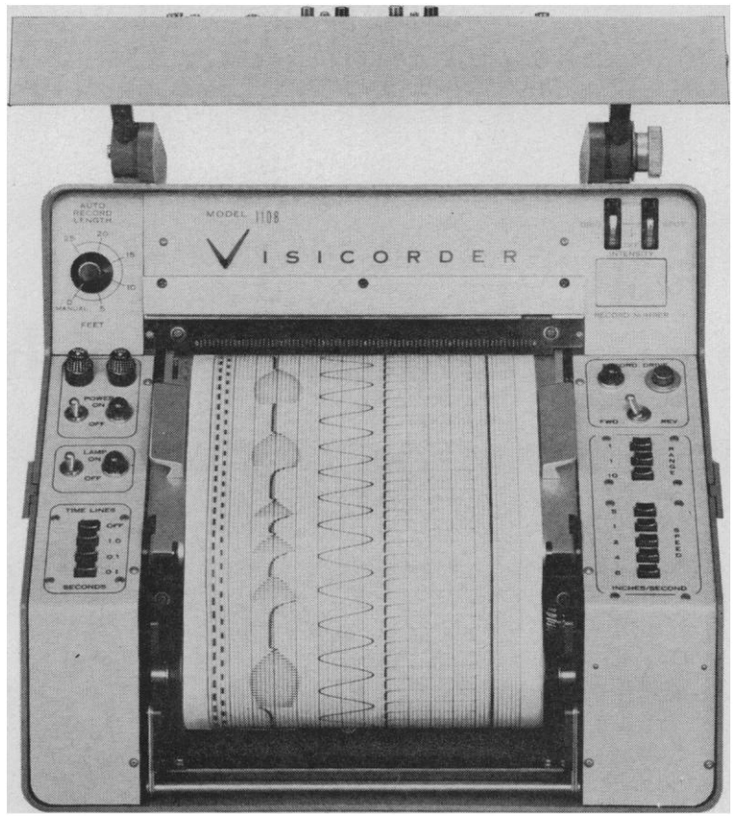
Celanese® Celanar®

Celanar® Polyester Film

Temperature recording flags, to warn you against possible damage in shipment, is just one of *six* meaningful service advantages you get when you switch to new Celanar polyester film.

Celanese

SPECIFYING A RECORDING OSCILLOGRAPH?



Only Honeywell gives you 12″ features at an 8″ price!!!!

Compare the Honeywell Model 1108 Visicorder Oscillograph with other intermediate-size recorders. You'll find that no other 8-inch instrument offers all these features for under $5000:

- Simultaneous recording of up to 24 channels of dynamic data from DC to 13,000 cps.
- Clear, immediately visible recordings on 8″ wide paper.
- Choice of 15 forward recording speeds from .05 to 80 inches/second.
- Built-in record takeup unit.
- Reverse record travel for easy review; also permits latensification of traces run at high paper speeds.
- Latensification while recording with an optional built-in latensifier lamp.
- Photographically printed time lines at any of three different intervals.
- Manual control of galvanometer trace and gridline intensity.
- Provision for use as a developing-out recorder by simply snapping an accessory filter in place.

Sound like a lot of oscillograph for under $5000? It is! For a demonstration of the Model 1108 Visicorder Oscillograph, call your nearest Honeywell office, or write: Honeywell, Denver Division, 4800 East Dry Creek Rd., Denver, Colo. 80217.

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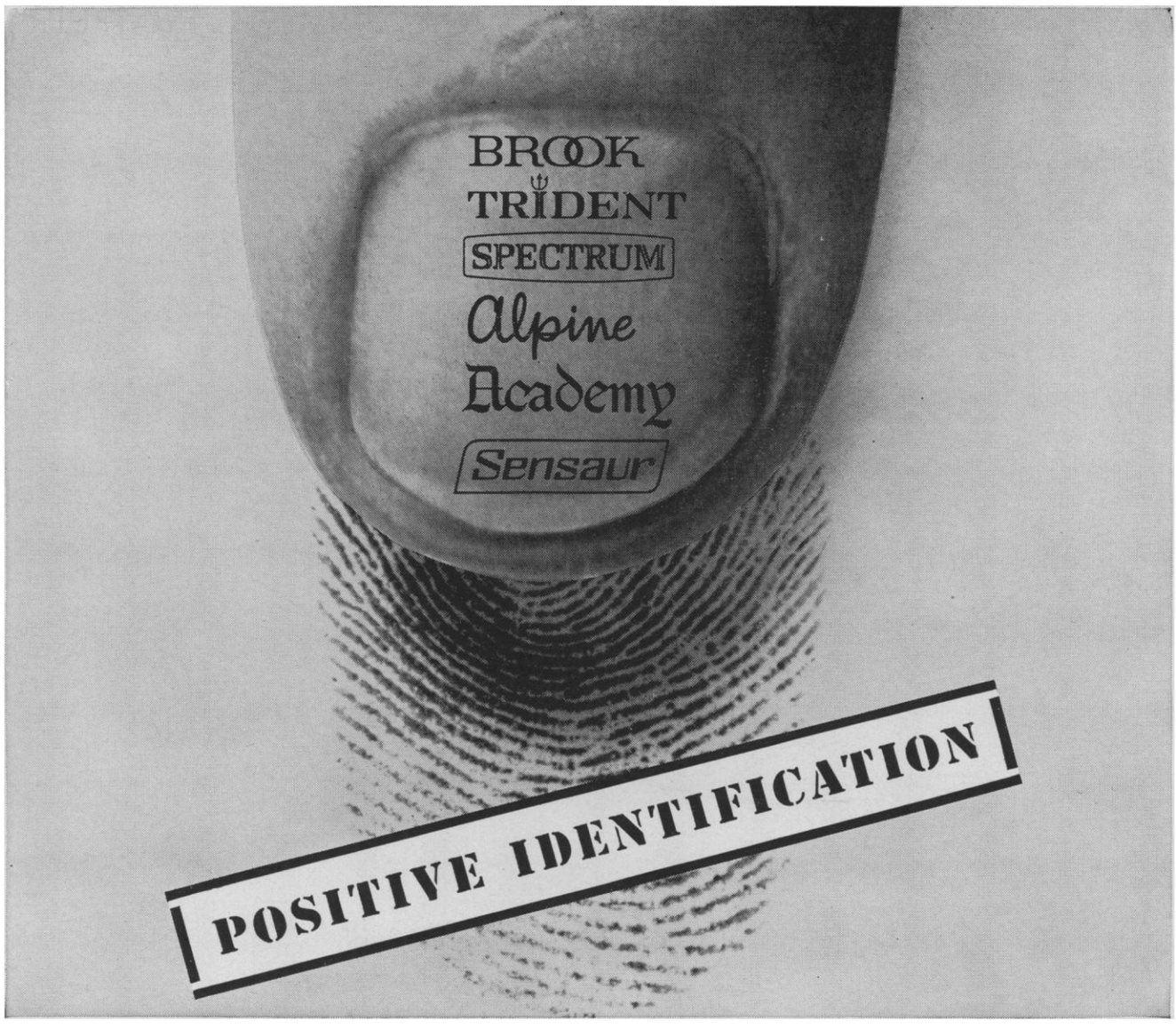

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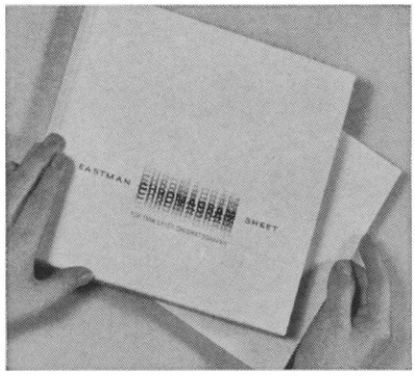
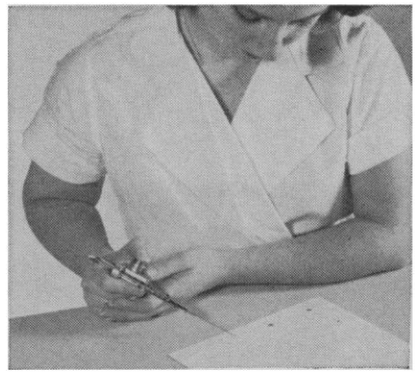
EASTMAN CHROMAGRAM Sheet is now available

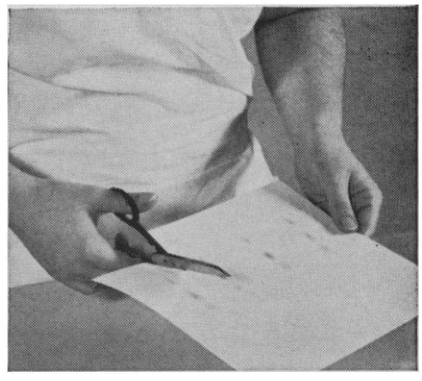
No longer need skilled people spend time at the messy work of coating glass plates.
The simplicity of paper chromatography is back with the speedy, detailed separations that turned you to TLC.



EASTMAN CHROMAGRAM Sheet comes ready to use. Simply take it out of the box.



Spot it and develop it. (Activation is often unnecessary.)



It produces results as good as—or better than —results obtainable with glass plates.

EASTMAN CHROMAGRAM Sheet eliminates the expense of bulky coating equipment. It takes little space in use or storage. It is unbreakable. There is no siliceous dust.

EASTMAN CHROMAGRAM Sheet, Type K301R, consists of inert poly(ethylene terephthalate) bearing silica gel which Kodak itself processes and controls. The coating is as uniform and isotropic as you would expect from Kodak and as you could scarcely hope to expect from manual application. The silica gel is bound with polyvinyl alcohol and contains a fluorescent indicator of lead-manganese-activated calcium silicate. Type K301R2 has no phosphor. The adsorbent is 100 microns thick; at 0.3mm over-all, the sheet is thick enough not to be limp, thin enough to make storage problems disappear. The 20 cm x 20 cm sheets come 20 to a box. You stock only one size, since the sheet may be readily cut into desired smaller sizes or shapes.

EASTMAN CHROMAGRAM Sheet works with all the solvents for silica-gel TLC. Development can be done in conventional TLC chambers. The chamber should be lined with filter paper to provide complete saturation with solvent vapor—a good precaution even for the old glass TLC plates.

Separations of substances not visible directly may be visualized under ultraviolet light (2450A) against the fluorescent background through their u-v absorption or their own fluorescence, by staining reactions with conventional spray reagents, by iodine vapor, or by scanning for a radioactive label.

A technical paper and samples of EASTMAN CHROMAGRAM Sheet are available from the dealers listed below or from *Distillation Products Industries*, Rochester, N. Y. 14603.

"CHROMAGRAM" IS A TRADEMARK OF EASTMAN KODAK COMPANY

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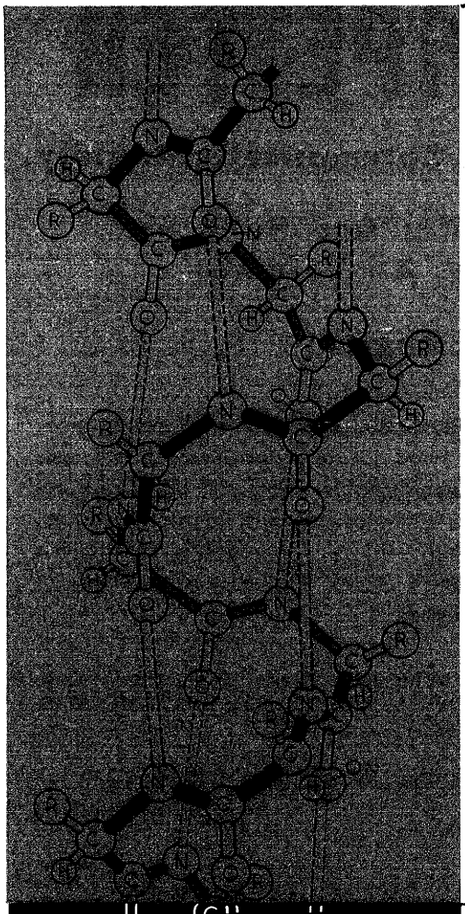

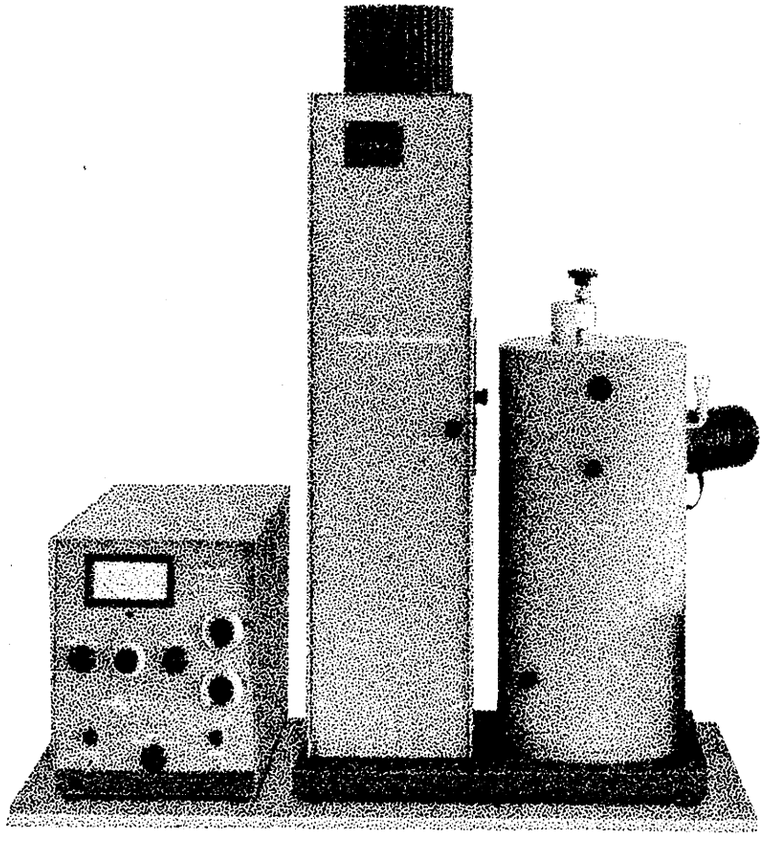

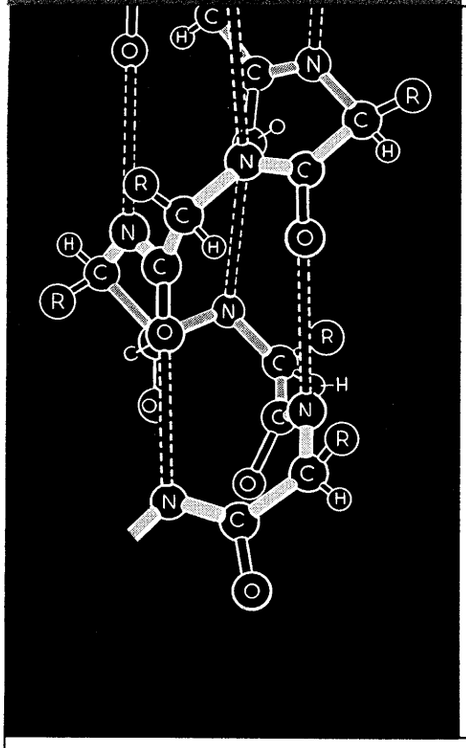

BY REQUEST: *A LOW-TEMPERATURE OSMOMETER FOR BIOCHEMISTS*

A number of researchers have asked for a low temperature version of the Mechrolab High Speed Membrane Osmometer. And here it is. Equipped with thermoelectric cooling, the Model 503 allows operation down to 5° C. Overall temperature range is 5° to 65° C, making it a very versatile instrument indeed.

Best news of all, aside from the fact that you're assured of the stability of your materials, is that the 503 requires *less than 1 ml.* of sample solution.

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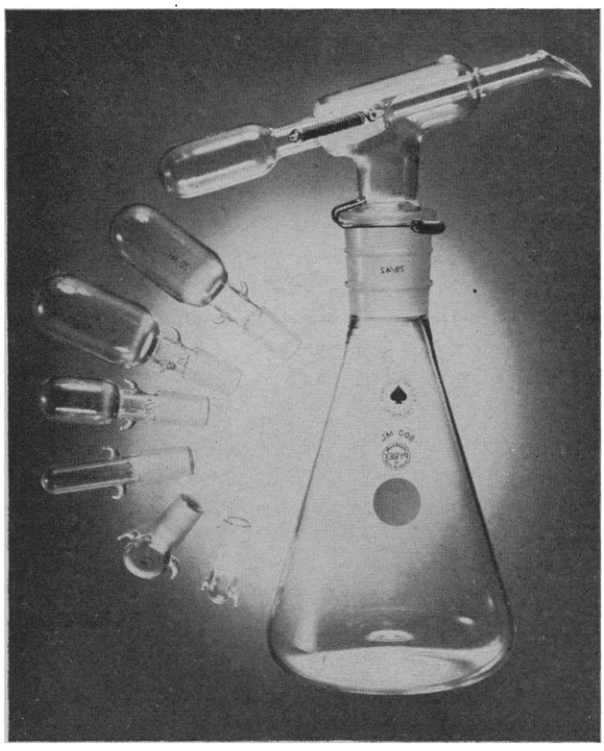

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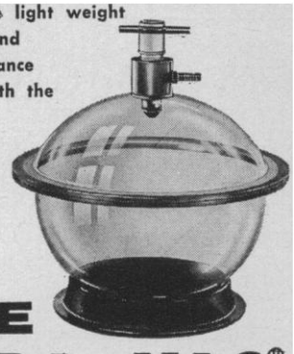

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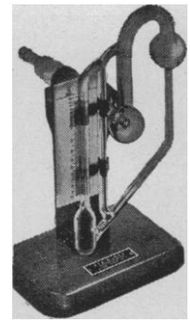

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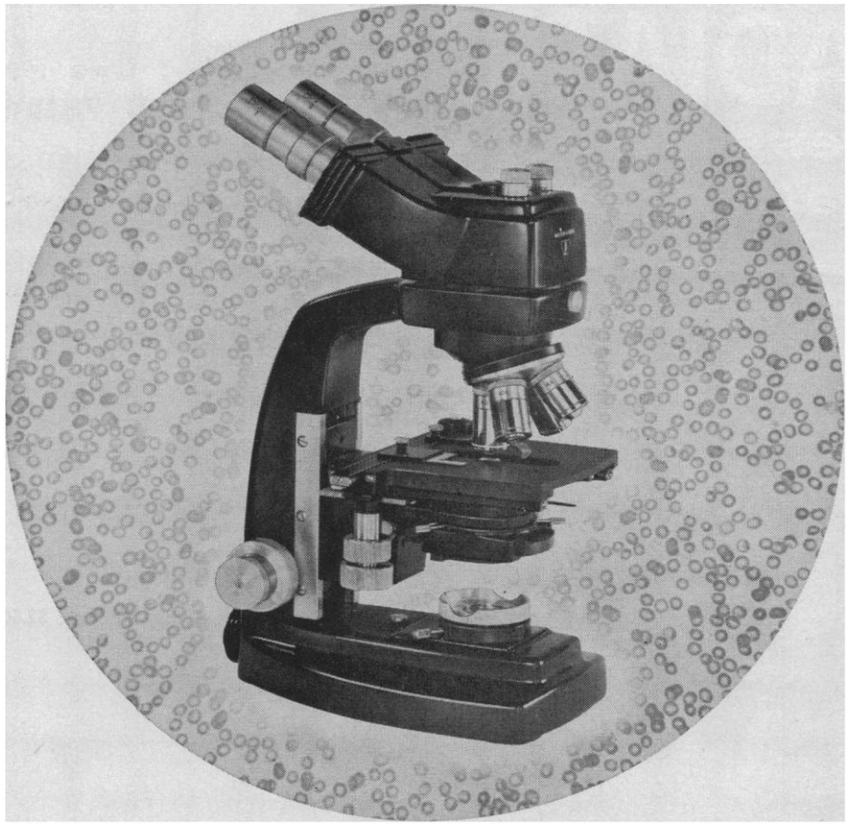

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CHARGED PARTICLES

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Results from Tandem Research Program

The Tandem Research Group has made notable progress in the past year. Significant experimental results from the program are:

1. 250 mA high-brightness positive ion beam from an expanded-plasma source operating at 38 kv.
2. 270 μA analyzed beam of H_1^+ ions out of the Research Tandem with 320 μA H^- injection and water-vapor stripping.
3. 2.0 μA analyzed dc beam of He^- ions. The previous maximum current routinely available has been 0.1 μA with the EN source.

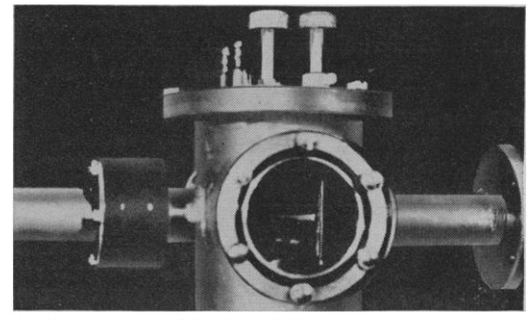
Doubly Charged Helium Ions

Components are now available for converting 3, 4 and 5 MeV machines to produce He^{++} ions at higher energies. Specifications: 30 μA at 5.0 MeV; 10 μA at 7.0 MeV; 5 μA at 10.3 MeV. More than double this current performance has been demonstrated but with some loss in stability and reliability. Multiple-charge states (2, 3 and 4) of neon, oxygen and nitrogen have also been produced with the new kit installed in a 3 MeV Van de Graaff. Beam energies from 5.04 MeV to 9.8 MeV and beam currents from 0.1 to 10 μA were observed. For details on the new HE^{++} kit and experimental results, write for Technical Note #13.

Optical Spectroscopy of Excited Atomic States

When an energetic beam of ions is passed through a thin foil, the charge state of the ion may change, either up or down. The emitted particles may be left in states of electronic excitation from which visible light is subsequently emitted during de-excitation. The emitted light spectrum is characteristic of the excited ion. When particle beams of approximately 0.4 μA or more are used, the light is sufficiently intense for spectroscopic analysis.

The refinement and application of this technique promises to be of major importance in the theory of atomic structure, in measuring hot plasma temperatures, and in acting for the means of energy loss in fast fission fragments in an absorber. Perhaps most importantly, it will help determine the relative abundance of the elements in the sun and other stars, which is the basis for theory of stellar evolution, the origin of the chemical elements, the age of astronomical objects and the nature of the stellar energy. For further details, ask for Technical Note #10.

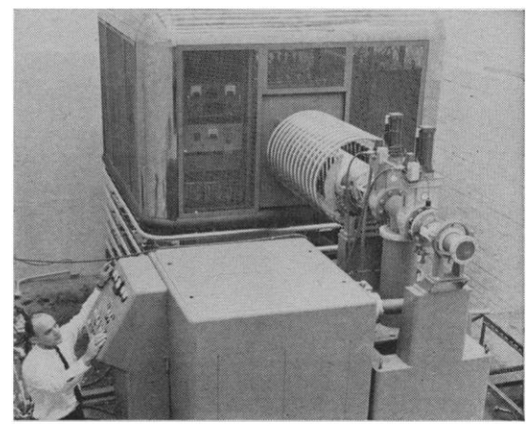


A nitrogen beam, 0.8 μA at 2 MeV, passes from right to left through a carbon foil approximately 9 $\mu g/cm^2$ thick.

Intense Ion Beams at 500 kv

The ICT-500 keV positive ion accelerator now being built by High Voltage Engineering operates at energies from 100 to 500 keV dc and pulsed. In performance tests, the machine has produced analyzed ion beam currents from 4 mA at 100 keV to 10 mA from 300 to 500 keV. 10 mA dc positive ion beam currents of H^1, H^2, and D^1 have been produced at a target located 6 feet from the end of the acceleration tube. Beam diameter is 15 millimeters maximum for all particles over the entire energy range. Previous experience with a similar machine of 300 keV maximum energy showed 15 mA of d_2^+ and a 3 centimeter beam diameter. The ICT-500 positive ion accelerator is designed for dc and pulsed operation in the nanosecond and microsecond range with a minimum pulse length of 2 nsec. at a repetition rate of 2.5 Mc/s. Pulse content is 1 mA protons and 0.7 mA deutrons.

The particle source utilized with the ICT-500 positive ion accelerator is an expanded plasma type which has produced 70 mA total beam at 500 kv.



The high-brightness, intense ion beam produced by the ICT-500 accelerator is eminently suited for laboratory production of 14 MeV neutrons for cross-section measurements, dosimetry studies, weapons-effect simulation and special low-density target experiments.

For detailed information, write to Technical Sales, High Voltage Engineering Corp., Burlington, Mass. or HVE (Europa) N. V. Amersfoort, The Netherlands. Subsidiaries: Electronized Chemicals Corporation, Ion Physics Corporation. ARCO Division, Walnut Creek, California.

HIGH VOLTAGE ENGINEERING

11 June 1965, Volume 148, Number 3676 **SCIENCE**

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phone: 202-387-7171. Cable: Advancesci, Washington. Copies of "Instructions for Contributors" can be obtained from the editorial office. ADVERTISING CORRESPONDENCE: Rm. 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE 6-1858.

Not by Truth Alone

As a humanist I lived in contented ignorance of mathematics until, a few years ago, I read a little book by Sir Charles P. Snow, entitled *The Two Cultures*. Sir Charles had become alarmed about the growing gulf between science and the humanities, resulting in the creation of two publics that could not speak each other's language. It struck me that he had raised an important issue, albeit in a rather strident tone.

A well-read friend of mine told me: "Oh, don't bother with Snow. Go back a few years and read what George Sarton said about this in his great Colver lectures of 1930." I obeyed, and was delighted with the amiable, smooth-flowing prose of that charming historian of science. Sarton was already proposing what he called "the New Humanism." "The New Humanism," he said, "will not exclude science; it will include it and . . . it will be built around it. Science is our mental armature; it is also the armature of our civilization. It is the source of our intellectual strength and health, but not the only source. However essential, it is utterly insufficient. *We cannot live on truth alone.*"

You can imagine how this relieved me. In gratitude to Sarton I felt that I should lend a hand at building this desirable bridge between the two cultures.

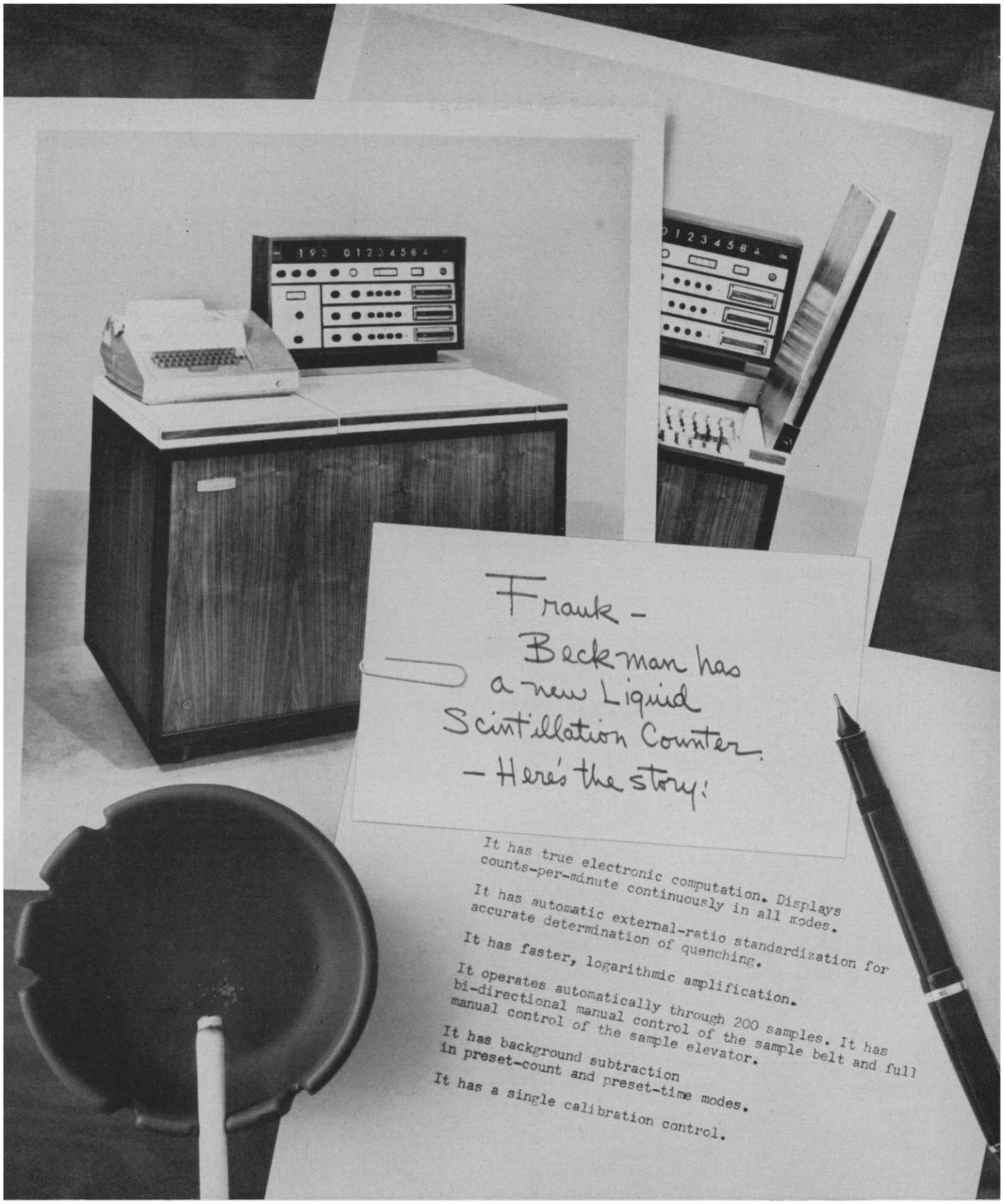
But when I looked at science I was immediately perplexed. There seemed to be not one science-culture but a host of highly specialized groups that were not speaking each others' languages. In a general way they could communicate, but specifically they had little time for, or interest in, each other. There is the man of pure science, and there are the many of the applied sciences. Maybe, before the great bridge is built, the scientists will have to construct some small ones in their own domain.

I now have the conviction that pure science is pure art. I find the appreciators of the great mathematicians and physicists using the same terminology that I employ when I express my feelings about the loveliness of Plato's *Crito*, or the supreme poetry of Shakespeare. Sarton spoke of the explanation by Eudoxos (of the motions of celestial bodies) as *elegant*. Selig Hecht, writing of Frederick Soddy's theory of the mixtures of isotopes in most natural elements, says that it was "sublime guesswork of the kind that *gives one's heart a lift*" (italics added). P. A. M. Dirac uses language like this: "Schrödinger got this equation by pure thought, looking for some *beautiful* generalization of De Broglie's ideas. . . ." It sounds like one artist paying his respects to the creative power of another.

"Not by truth alone," said Sarton, speaking, naturally, of scientific truths. No, truly we cannot so live. But what if, after all, truth and beauty are just two words describing (with those other abstractions, like love and justice) aspects of a sublime essence that was postulated twenty-five hundred years ago by Socrates?

If this (or "something like it," as Plato would have said) be true, then the gulf is not as deep as it might seem. We who are not equipped with the kind of mind required for the pursuit of science (the *exact* sciences, I mean) are still free to follow beauty where our nature seems to lead us while the scientists pursue beauty in their realm. We may not understand the details of each other's work but we are united in the creative spirit and we already have the rudiments of a common tongue for the creation of Sarton's new humanism.—FREEMAN TILDEN

[Condensed and adapted from a guest editorial in the April 1965 issue of *Trends in Parks & Recreation*. Mr. Tilden, a writer and lecturer on conservation and author of *The National Parks*, resides in Arlington, Virginia.]



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particular system. As an example, J. Hoffman (National Bureau of Standards) described the application of nucleation theory in polymer crystallization. This is a new field which has been developing rapidly in the past few years and has given rise to a much greater understanding of the relation between solid state structure of polymers and their mode of crystallization. Another area where theoretical and experimental developments have run parallel is that of heterogeneous vapor deposition, particularly the deposition of metal atoms. J. Hirth (Ohio State University) reviewed this area and felt that classical theory represented the situation fairly well. This view is in strong contradiction to some recent theories and some lively discussion ensued over the value of using contact angles as a suitable thermodynamic parameter. Although there was a sharp division of opinion on this point, Hirth adequately summarized the situation by saying that the contact angle could be considered as a rug under which many of the uncertainties could be conveniently swept.

In the second category, emphasis was on experimental data which could be related to essentially unmodified theory. S. Mossop (Commonwealth Scientific and Industrial Research Organisation, Australia) reviewed the current status of knowledge in cloud physics. He commented that only in recent years have fundamental studies enabled a quantitative approach to be formulated for cloud nucleation. This comment was amplified later in the proceedings when some recent experimental studies of water vapor condensation were outlined. A. Nielsen (University of Copenhagen) reported continued studies relating precipitation of sparingly soluble salts to the Volmer-Becker-Döring formulation; he mentioned recent successes in unraveling the role of homogeneous and heterogeneous nucleation in precipitation studies. Nielsen suggested that the relative solvation of ions affects the kinetics of nucleation; he illustrated this effect with recent results. The role of nucleation processes in ceramics and noncrystalline solids was considered by R. Maurer (Corning Glass Research Laboratories), and was extended by an interesting contribution from J. Hammel (Pittsburgh Plate Glass Company). The degrees of quenching possible in glass transitions enable quite extensive nucleation studies, both homogeneous and heterogeneous, to be carried out.

In diversifying the areas of interest

at this symposium, the organizers included physiological nucleation processes; bone mineralization and gall stone formation were considered. The former area was reviewed by M. Glimcher (Harvard University), and his discussion turned out to be one of the highlights of the symposium. A brisk discussion following this paper centered around the form of calcium phosphate which nucleates at serum *p*H. Some of the participants felt that octocalcium phosphate was a metastable precursor to bone mineral; Glimcher felt that hydroxyapatite nucleated directly. Both factions agreed, however, that in physiological processes the nature of the initiating nucleus was dependent upon the protein substrate.

From general comments and discussion following the papers it seems that at least one of the major symposium aims, that of improving communication between various areas of nucleation study, was attained. The symposium was sponsored jointly by the National Science Foundation and Case Institute of Technology. Abstracts of the proceedings may be obtained from the undersigned.

A. G. WALTON
Department of Chemistry,
Case Institute of Technology,
Cleveland, Ohio

Forthcoming Events

June

19. Academy of **Tuberculosis Physicians**, New York, N.Y. (G. P. Bailey, 1295 Clermont, Denver 20, Colo.)

20. Society of **Vascular Surgery**, annual, New York, N.Y. (W. S. Edwards, Dept. of Surgery, Medical College of Alabama, Birmingham)

20–22. Society for **Investigative Dermatology**, 26th annual, New York, N.Y. (H. Beerman, 255 S. 17 St., Philadelphia, Pa.)

20–23. American Soc. of **Agricultural Engineers**, 58th annual, Univ. of Georgia, Athens. (J. L. Butt, P.O. Box 229, St. Joseph, Mich.)

20–24. American Soc. of **Mammalogists**, Winnipeg, Manitoba, Canada. (B. P. Glass, Dept. of Zoology, Oklahoma State Univ., Stillwater 74075)

20–24. American Soc. of **Medical Technologists**, Cincinnati, Ohio. (R. Matthaei, Suite 25, Hermann Professional Bldg., Houston, Tex. 77025)

20–24. American **Nuclear** Soc., 11th natl., Gatlinburg, Tenn. (ANS, 244 East Ogden Ave., Hinsdale, Ill.)

20–24. **Air Pollution Control** Assoc., 58th annual, Toronto, Ont., Canada. (M. Katz, Dept. of Natl. Health and Welfare, 45 Spencer St., Ottawa, Ont.)

20–24. **Aerospace**, conf., Houston, Tex. (T. B. Owen, Douglas Aircraft Co., 300

Ocean Park Blvd., Dept. A2-260, Santa Monica, Calif.)

20–25. American **Physical Therapy** Assoc., Cleveland, Ohio. (L. Blair, 1790 Broadway, New York 10019)

20–25. **Weights and Measures**, natl. conf., Washington, D.C. (M. W. Jensen, Office of Weights and Measures, 203–213, Natl. Bureau of Standards, Washington, D.C. 20234)

21–22. **Genetic Selection and Infectious Diseases**, London, England. (Ciba Foundation, 41 Portland Pl., London, W.1)

21–22. **Vacuum Metallurgy** Div., American Vacuum Soc., 8th annual conf., New York, N.Y. (L. M. Bianchi, Refractomet Div., Universal-Cyclops Steel Corp., Bridgeville, Pa.)

21–23. Society for the Study of **Development and Growth**, annual, Carleton College, Northfield, Minn. (J. A. Schiff, Dept. of Biology, Brandeis Univ., Waltham, Mass.)

21–23. **Luminescence Dosimetry**, intern. conf., Stanford, Calif. (F. H. Attix, Code 7280, U.S. Naval Research Laboratory, Washington, D.C. 20390)

21–23. **Heat Tansfer and Fluid Mechanics**, inst., Univ. of California, Los Angeles. (A. F. Charwat, Dept. of Engineering, Univ. of California, Los Angeles 90024)

21–24. **Agricultural** Inst. of Canada, Vancouver, B.C. (AIC, Central Office, 176 Gloucester St., Ottawa 4, Ont.)

21–24. Canadian Soc. of **Animal Production**, annual, Vancouver, B.C. (J. A. Newman, CSAP, Experimental Farm, Lacombe, Alta.)

21–24. **Automatic Control in Peaceful Uses of Space**, intern. symp., Stavanger, Norway. (J. A. Aseltine, Aerospace Corp., P.O. Box 95085, Los Angeles, Calif.)

21–24. **Fuel Cells**, intern. symp., Brussels, Belgium. (Mr. Vanleugenhaghe, S.E.R.A.I., 1091, chaussee d'Alsemberg, Brussels 18)

21–25. Canadian **Anaesthetists'** Soc., annual, Charlottetown, Prince Edward Island. (S. M. Campbell, 178 St. George St., Toronto 5, Ont.)

21–25. **Carbon**, 7th biennial conf., Case Inst. of Technology, Cleveland, Ohio. (W. W. Lozier, Union Carbide Corp., Carbon Products Div., P.O. Box 6116, Cleveland, Ohio 44101)

21–25. **Engineering Education**, world congr., Chicago, Ill. (American Soc. for Engineering Education, Univ. of Illinois, Urbana)

21–26. **AAAS Pacific Div.**, Riverside, Calif. (R. C. Miller, California Acad. of Sciences, Golden Gate Park, San Francisco 18)

The following societies plan to meet in conjunction with the AAAS Pacific Div.:

American **Meteorological** Soc. (J. E. Miller, New York Univ., New York)

American **Nature Study** Soc. (B. O. Bergh, Univ. of California, Riverside)

American **Phytopathological** Soc., Pacific Div. (C. E. Horner, Oregon State Univ., Corvallis)

American Soc. for **Horticultural Science**, western regional (C. K. Labanauskas, Univ. of California, Riverside)

American Soc. of **Ichthyologists and Herpetologists**, western div. (R. Rosen-

blatt, Scripps Institution of Oceanography, La Jolla, Calif.)

American Soc. of **Limnology and Oceanography**, Pacific Div. (J. G. Pattullo, Oregon State Univ., Corvallis)

American Soc. of **Plant Physiologists**, western section (M. Mazelis, Univ. of California, Davis)

American **Statistical** Assoc. (E. King, Pacific Telephone Co., Los Angeles, Calif.)

Biometric Soc. western North America Div. (F. S. McFeely, Montana State College, Bozeman)

Botanical Soc. of America, Pacific section (J. R. Stein, Univ. of California, Berkeley)

Ecological Soc. of America, western section (H. G. Baker, Univ. of California, Berkeley)

Institute of **Food Technologists** (H. Lineweaver, Western Regional Research Laboratory, Albany, Calif.)

Western Soc. of **Soil Science** (R. Miller, Utah State Univ., Logan)

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22. National Assoc. of **Science Writers**, New York, N.Y. (H. Nelson, Los Angeles *Times*, Los Angeles, Calif.)

22–24. **Research Problems in the Physics of X-ray Spectra**, Ithaca, N.Y. (H. W. Schnopper, Dept. of Physics, Cornell Univ., Ithaca)

22–25. Joint **Automatic Control**, 6th conf., Rensselaer Polytechnic Inst., Troy, N.Y. (J. L. Shearer, Mechanical Engineering Dept., Pennsylvania State Univ., University Park)

22–25. American **Home Economics** Assoc., 56th annual, Atlantic City, N.J. (Mrs. J. Gaines, AHEA, 1600 20th St., NW, Washington, D.C. 20009)

23–25. Association of French Speaking **Dermatologists and Venereologists**, 12th congr., Paris, France. (G. Garnier, Assoc. des Dermatologistes et Syphiligraphes de Langue Française, 14, rue Cimarosa, Paris)

24–26. British Soc. of **Urological Surgeons**, London, England. (J. P. Mitchell, 21 St. John St., Manchester 3, England)

24–26. **Small-Angle X-Ray Scattering**, conf., Syracuse, N.Y. (H. Brumberger, Chemistry Dept., Syracuse Univ., Syracuse, N.Y. 13210)

24–27. **Biochemistry and Physiology of Alkaloids**, 3rd intern. symp., Halle/Saale, Germany. (Deutsche Akademie der Wissenschaften zu Berlin, Weinbergweg Hall an der Salle, East Germany)

25. American **Laryngological, Rhinological and Otological** Soc., New York, N.Y. (V. R. Alfarno, 917 20th St., NW, Washington, D.C.)

25–26. **Veterinary Education**, natl. symp., Univ. of Georgia, Athens. (J. T. Mercer, School of Veterinary Medicine, Univ. of Georgia, Athens)

25–10. Pan American Committee of **Geophysical Sciences**, 1st meeting, Guatemala City, Guatemala. (General Secretariat, Pan American Inst. of Geography and History, Ex-Arzobispado 29, Mexico, D.F.)

26–3. International **Dental** Federation, 53rd, Vienna, Austria. (G. H. Leatherman, 35 Devonshire Pl., London, W.1, England)

27–29. **Smoking and Health**, 1st intern. congr., New York, N.Y. (W. A. Scharffenberg, 6830 Laurel St., NW, Washington, D.C. 20012)

27–30. **Botanical** Soc. of America, Northeastern Section, summer field meeting, Univ. of Maine, Orono. (R. K. Zuck, Dept. of Botany, Drew Univ., Madison, N.J.)

27–30. Canadian **Pediatric** Soc., annual, Ottawa, Ont. (CPS, 14 Green Ave., St. Lambert, Quebec)

27–2. American **Crystallographic** Assoc., Gatlinburg, Tenn. (W. L. Kehl, Gulf Research and Development Co., P.O. Box 2038, Pittsburgh, Pa.)

27–2. **Mineralogical** Soc. of America, Gatlinburg, Tenn. (G. Switzer, U.S. Natl. Museum, Washington, D.C.)

27–2. **New Industrial Technologies**, engineering seminar, Pennsylvania State University, University Park. (Continuing Education Conference Center, Pennsylvania State Univ., University Park 16802)

28–29. **Hepatology**, 4th intern. symp., Chianciano Terme, Italy. (Secretariat, via Nicolò Porpora 9, Rome)

28–30. **Genetics of Congenital Norformations**, symp., Bratislava, Czechoslovakia. (F. Hrabal, Foreign Relations Dept., Czechoslovak Acad. of Sciences, Národní tr. 3, Prague 1)

28–30. **Electromagnetic Compatibility**, 7th annual symp., New York, N.Y. (Inst. of Electrical and Electronics Engineers, Electromagnetic Compatibility Group, Box A, Lenox Hill Station, New York 10021)

28–30. **Electromagnetic Scattering**, conf., Univ. of Massachusetts, Amherst. (R. S. Stein, Polymer Research Inst., Univ. of Massachusetts, Amherst)

28–30. **Relaxation Techniques in Chemical Kinetics**, symp., State Univ. of New York, Buffalo. (Mrs. E. E. Schmidt, 193 Hayes Hall, State Univ. of New York, Buffalo 14214)

28–30. Physics of **Quantum Electronics**, conf., San Juan, P.R. (P. L. Kelley, M.I.T. Lincoln Laboratory, Lexington, Mass. 02173)

28–1. **High Temperatures**, intern. symp., Paris, France. (Prof. Flahaut, Faculté de Pharmacie, 4, avenue de l'Observatoire, Paris 6e)

28–1. American **Orthopaedic** Assoc., Hot Springs, Va. (L. R. Straub, 535 E. 70 St., New York 10021)

28–2. **Vacuum**, 3rd intern. congr., Stuttgart, Germany. (H. Adam, 5 Köln-Bayental, Postfach 195, West Germany)

28–3. **Insect Biochemistry**, U.S.–Japan Cooperative Science Program seminar, Chiba, Japan (invitation only). (Office of Intern. Science Activities, Natl. Science Foundation, Washington, D.C.)

29. National Council of **Teachers of Mathematics**, New York, N.Y. (J. D. Gates, NCTM, 1201 16th St., NW, Washington, D.C. 20036)

29–1. **Mutant Mice with Neurological Diseases**, conf., Jackson Laboratory, Bar Harbor, Maine. (J. L. Fuller, Jackson Laboratory, Bar Harbor)

29–2. **Data Processing Management** Assoc., intern. conf., Philadelphia, Pa. (Conference Registrar, Data Processing Management Assoc., P. O. Box 1079, Philadelphia 19105)

30–2. **Microwave Applications of Semiconductors**, symp., University College, London, England. (Symposium Secretary, Inst. of Electronic and Radio Engineers, 8-9 Bedford Square, London, W.C.1)

30–3. National Soc. of **Professional Engineers,** annual, Albuquerque, N.M. (NSPE, 2029 K St., NW, Washington, D.C.)

July

1–4. **Astronomical** League, Miami, Fla. (A. P. Smith, Jr., 1601 S.W. 10th St., Miami)

1–10. General **Relativity and Gravitation,** intern. conf., London, England. (H. Bondi, Dept. of Mathematics, King's College, London, W.C.2)

1–1 August. **Theoretical Biology and Theoretical Biophysics,** Colorado State Univ. colloquium, Fort Collins. (H. J. Morowitz, Dept. of Molecular Biology and Biophysics, Box 2166, Yale Station, New Haven, Conn.)

2–3. British Soc. for **Immunology,** summer meeting, Glasgow, Scotland. (I. Roitt, Courtauld Inst., Middlesex Hospital, London W.1, England)

2–4. **Astronomical League,** Milwaukee, Wis. (W. M. DuVall, 518 Emmertsen Rd., Racine, Wis. 53406)

2–5. **Meteorological Data Processing,** Uccle and Brussels, Belgium. (World Meteorological Organization, 41, avenue Giuseppe Motta, Geneva, Switzerland)

2–9. International Union of **Pure and Applied Chemistry,** 23rd conf. Paris, France. (R. Morf, c/o F. Hoffman-La Roche, Ltd., Grenzacherstr. 124, Basel, Switzerland)

4–10. American **Library** Assoc., annual, Detroit, Mich. (D. H. Clift, American Library Assoc., 50 E. Huron St., Chicago, Ill.)

5–6. Low-Level **Radioactivity Measurements,** symp., London, England. (N. G. Trott, Physics Dept., Royal Marsden Hospital, Surrey Branch, Downs Rd., Sutton, Surrey, England)

5–7. **Astrophysical,** intern. symp., Liege, Belgium. (P. Swings, Inst. D'Astrophysique, Cointe-Sclessin, Belgium)

5–7. American Soc. of **Heating, Refrigerating, and Air-Conditioning Engineers,** Portland, Ore. (R. C. Cross, 345 E. 47 St., New York 10017)

5–10. French Soc. for the **Advancement of Science,** 84th annual congr., Tours. (The Association, 28 rue Serpente, Paris 6e, France)

5–6. Aug. American **Mathematical** Soc., summer inst. on algebraic groups and discontinuous subgroups, Boulder, Colo. (G. L. Walker, 190 Hope St., Providence, R.I. 02906)

6–8. **Water Resources Research,** western conf. Colorado State University, Fort Collins. Office of Conference Services, 204 Administration Bldg., Colorado State Univ., Fort Collins 80521)

6–9. American **Dental** Soc. of Europe, annual, Florence, Italy. (A. Sturridge, 35 Harley St., London W.1, England)

6–9. **Miscroscopy,** 12th intern. symp., Sheffield, England. (MICRO-65, McCrone Research Inst., 451 E. 31 St., Chicago, Ill. 60616)

6–10. **Plant Viruses,** 5th intern. conf., Wageningen, Netherlands. (State Agricultural Univ. of Wageningen, Laboratory of Virology, Salverdaplein 10, Wageningen)

7–9. **Molecular Relaxation Processes**, symp., Aberystwyth, Wales. (General Secretary, Chemical Soc., Burlington House, London W.1, England)

7–11. Society for the Study of **Fertility**, annual, Edinburgh, Scotland. (C. A. Simmons, 129 Harley St., London, W.1)

8–16. British **Medical** Assoc., annual, Swansea, England. (D. Gullick, BMA, Tavistock Sq., London, W.C.1)

9–11. **Heat Flow below 100°K**, and Its Technological Applications, Grenoble, France. (J. Wilks, Commission 1, Intern. Inst. of Refrigeration, c/o Clarendon Laboratory, Parks Rd., Oxford, England)

10–17. **Education and Health**, intern. conf., Madrid, Spain. (L. P. Aujoulat, 1 rue de Tilsit, Paris 8°)

11–15. **Psychoanalysis**, 2nd intern. forum, Zurich, Switzerland. (G. Chrzanowski, 4 E. 95 St., New York 10028)

11–15. American **Veterinary Medical** Assoc., annual, Portland, Ore. (AVMA, Dept. of Public Information, 600 S. Michigan Ave., Chicago 5, Ill.)

12–14. **Biological Sciences** symp., 16th annual, Univ. of Michigan, Ann Arbor. (L. B. Mellett, Dept. of Pharmacology, Univ. of Michigan Medical School, Ann Arbor)

12–14. Physiology and Biochemistry of **Muscle as a Food**, symp., University of Wisconsin, Madison. (E. J. Briskey, College of Agriculture, Univ. of Wisconsin, Madison 53706)

12–15. Japan Soc. of **Constitutional and Diathetic Medicine**, congr., Kyoto, Japan. (The Society, Dept. of Pathology, Kyoto Univ., Kyoto)

12–15. **Nuclear and Space Radiation Effects**, annual conf., Univ. of Michigan, Ann Abror. (S. C. Rogers, Radiation Effects Dept., 5312, Sandia Corp., Albuquerque, N.M.)

12–17. **Spectroscopy**, 12th intern. colloquium, University of Exeter, Exeter, England. (C. E. Arregger, 1 Lowther Gardens, Prince Consort Rd., London, S.W.7, England)

12–18. **Pure and Applied Chemistry**, 20th intern. congr., Moscow, U.S.S.R. (N. A. Kleimenov, Inst. of Chemical Physics, Acad. of Sciences, Vorobyevskoye chaussee 2-b, Moscow)

13–15. **Aerospace Vehicle Flight Control**, Soc. of Automotive Engineers/NASA conf., Los Angeles, Calif. (SAE, 485 Lexington Ave., New York 10017)

13–16. Royal **Medico-Psychological** Assoc., annual, Glasgow, Scotland. (RMPA, 11 Chandos St., London W.1, England)

14–15. **Reinforced Plastics**, regional conf., Soc. of Plastics Engineers, Seattle, Wash. (J. B. Meyer, RETEC Registration, c/o J. B. Meyer Co., P.O. Box 6664, Seattle)

15–16. **Water Quality Management** in River and Reservoir Systems, hydraulic engineering research aspects, seminar, Vanderbilt Univ., Nashville, Tenn. (W. H. Wisely, American Soc. of Civil Engineers, 345 East 47 St., New York 17)

15–18. Properties and Applications of **Low Temperature Plasma**, symp., Moscow, U.S.S.R. (E. S. Starkman, College of Engineering, Univ. of California, Berkeley)

15–21. **Education of Professional Physicists**, intern. conf., London, England.

(Miss P. N. Boston, Inst. of Physics and the Physical Soc., 47 Belgrave Sq., London, S.W.1)

18–24. **Dental,** 2nd intern. congr., Rio de Janeiro, Brazil. (P. F. Reis Filho, Associacao Brasileira de Odontologia, Rua da Baia 570, 5.º Andar, C. Postal 2357, Minas Gerais, Brazil)

18–24. International **Ophthalmic-Optical** Congr., Dublin, Ireland. [E. Pemberton, Assoc. of Ophthalmic Opticians (Ireland), 11 Harrington St., Dublin]

19–21. **Surgery of the Hand,** 1st intern. congr., Rio de Janeiro, Brazil. (Sociedade Brazileira de Mäo, Rio de Janeiro)

19–21. **Swine in Biomedical Research,** intern. symp., Richland, Wash. (L. K. Bustad, Biology Dept., Battelle-Northwest, P.O. Box 999, Richland 99352)

19–22. Association of **Food and Drug Officials** of the U.S., 69th annual, New York, N.Y. (The Association, P.O. Box 9095, Austin, Tex.)

19–22. **Space,** 5th European symp., Munich, Germany. (Executive Secretary, British Interplanetary Soc., 12, Bessborough Gardens, London, S.W.1, England)

19–23. Study of **Nuclear Structure** with Neutrons, intern. conf., Antwerp, Belgium. (M. Neve de Mevergnies, Neutron Physics Dept., CEN-CSK, Mol, Belgium)

19–23. Society for **Analytical Chemistry,** conf., Nottingham, England (C. A. Johnson, 14 Belgrade Sq., London, S.W., England)

20–23. American **Malacological** Union, Wagner College, New York, N.Y. (J. J. Parodiz, Carnegie Museum, Pittsburgh, Pa.)

21–31. **Mental Health,** 5th Caribbean conf., Fort-de-France, Martinique, French West Indies. (Caribbean Federation for Mental Health, Mme. Charles Saint-Cyr, Ravine Vilaine, Fort-de-France)

22–24. International Assoc. for **Dental Research,** 43rd general meeting, Toronto, Ont., Canada. (G. H. Rovelstad, U.S. Navy Dental School, Natl. Naval Medical Center, Bethesda, Md.)

22–26. **Rorschach and Projective Methods,** 6th intern. congr., Paris, France. (A. Morali-Daninos, 7 avenue Trudaine, Paris 9e)

22–27. Thermodynamics of **Nuclear Materials and Atomic Transport in Solids,** Vienna, Austria. (C. E. Holley, Jr., Div. of Research and Laboratories, Intern. Atomic Energy Agency, Kärntnerring 11, Vienna 1)

24–4. Sept. **Organism-Sediment Interrelationship,** NSF seminar, Bermuda Biological Station. (K. E. Chave, Marine Science Center, Lehigh Univ., Bethlehem, Pa. 18015)

25–28. American Assoc. of **Dental Schools,** Toronto, Canada. (C. V. Rault, Georgetown Univ., Washington, D.C.)

25–29. Pacific **Dermatologic** Assoc., Portland, Ore. (G. MacDonald, 4294 Orange St., Riverside, Calif.)

25–30. **Neurochemical,** intern. conf., Oxford, England. (J. N. Cummings, Dept. of Chemical Pathology, Natl. Hospital, Queen Sq., London, W.C.1, England)

25–30. International **Psycho-Analytical** Assoc., 24th congr., Amsterdam, Netherlands. (R. P. McKnight, Austin Riggs Center, Stockbridge, Mass.)

NEW BOOKS

(Continued from page 1457)

Correlation of Centrally Acting Drugs. E. Trabucchi, R. Paoletti, and N. Canal, Eds. Pergamon, London; Macmillan, New York, 1964. 296 pp. Illus. $13. Twenty-two papers presented at the Second International Pharmacological Meeting sponsored by the Section on Pharmacology of the International Union of Physiological Sciences (Prague).

Biology in the Laboratory. Addison E. Lee and Osmond P. Breland. Harper and Row, New York, 1965. 339 pp. Illus. Paper, $3.95.

The Biology of Hemichordata and Protochordata. E. J. W. Barrington. Freeman, San Francisco, Calif., 1965. 182 pp. Illus. Paper, $2.50. University Reviews in Biology Series, edited by J. E. Treherne.

The Brachiopod Superfamily Stenoscismatacea (*Smithson. misc. Collns.* **148**, No. 2). Richard E. Grant. Smithsonian Institution, Washington, D.C., 1965. 198 pp. Illus. Plates. Paper, $4.50.

Calcium et maladies métaboliques de l'os. vols. 1–3. vol. 1, *Os et métabolisme du calcium a l'état normal* (342 pp.); vol. 2, *Os et métabolisme du calcium á l'etai pathologique* (592 pp.); vol. 3, *Intestin, Rein et métabolisme du calcium* (455 pp.). A. Lichtwitz and R. Parlier, Eds. L'Expansion Scientifique Francaise, Paris, 1964. Illus. Paper.

Catalogue of the Type Specimens of Microlepidoptera in the British Museum (Natural History), Described by Edward Meyrick. vol. 5, Timyridae, Hyponomeutidae Ethmiidae, Metachondidae, Cosmopterigidae, Walshiidae, Blastodacnidae, Scythridae. J. F. Gates Clarke, British Museum (Natural History), London, 1965. 585 pp. Illus. £15.

The Chemistry of Plant Processes. C. P. Whittingham. Philosophical Library, New York, 1965. 209 pp. Illus. $7.50.

Clinical Endocrinology. For practitioners and students. Laurence Martin. Little, Brown, Boston, ed. 4, 1964. 314 pp. Illus. $12.50.

The Common Liver Fluke. *Fasciola hepatica L.* E. M. Pantelouris. Pergamon, London; Macmillan, New York, 1965. 267 pp. Illus. $12. International Series of Monographs on Pure and Applied Biology, Zoology Division, vol. 21.

Cybernetics and Biology. F. H. George. Freeman, San Francisco, Calif., 1965. 146 pp. Illus. Paper, $2.50. University Reviews in Biology Series, edited by J. E. Treherne.

Electrophysiology of the Heart. Proceedings of an international symposium (Milan, Italy), October 1963. B. Taccardi and G. Marchetti, Eds. Pergamon, London; Macmillan, New York, 1965. 354 pp. Illus. $15. Twenty-one papers presented at a symposium sponsored by the Istituto di Cardiologia Sperimentale dei Servizi Scientifici Simes.

Essentials of Histology. Gerrit Bevelander. Mosby, St. Louis, ed. 5, 1965. 329 pp. Illus. $6.50.

Fish as Food. vol. 3, pt. 1, *Processing*. Georg Borgstrom, Ed. Academic Press, New York, 1965. 503 pp. Illus. $17.50. Thirteen papers contributed by A. C.

Jason; C. L. Cutting; N. A. Voskresensky; F. W. van Klaveren and R. Legendre; Victor Meyer; Frithiof Alm; Henri Cheftel; A. G. van Veen; Tsutomu Maruyama; Keishi Amano; Sven Lassen; Georg Borgstrom and Clark D. Paris; and T. Sparre.

Function and Structure in Micro-Organisms. Fifteenth symposium, Society for General Microbiology (London), April 1965. M. R. Pollock and M. H. Richmond, Eds. Cambridge Univ. Press, New York, $13.50. Seventeen papers contributed by D. D. Woods; H. L. Kornberg; J. Lascelles; R. J. Britten; H. Holter; J. O. Lampen; K. McQuillen; K. A. Stacey; H. J. Rogers; B. A. Newton and D. Kerridge; R. E. Burge and M. E. J. Holwill; L. Wolpert; W. Hayes; Ruth Sager; H. O. Halvorson; P. C. Fitz-James; and D. Mazia.

General Zoology. Tracy I. Storer and Robert L. Usinger. McGraw-Hill, New York, ed. 4, 1965. 749 pp. Illus. $8.50.

Grundzüge der Biochemie der Pflanzen. Wacław Leonowitsch Kretowitsch. Fischer, Jena, East Germany, 1965. 485 pp. Illus. DM. 69.

Human Genetics and Its Foundations. Maurice Whittinghill. Reinhold, New York; Chapman and Hall, London, 1965. 447 pp. Illus. $8.95. Reinhold Books in the Biological Sciences Series.

Insecticides. A. J. Feuell. Cramer, Weinheim, Germany, 1965. 250 pp. Illus. Paper.

Introduction to Modern Biochemistry. P. Karlson. Translated from the German edition (Stuttgart, 1964) by Charles H. Doering. Academic Press, New York, ed. 2, 1965. 456 pp. Illus. $11.

Laboratory Manual for General Biology. Mary E. Hawthorne, Ernest H. Blaustein, and Robert F. Slechta. Brown, Dubuque, Iowa, 1965. 267 pp. Illus. Paper, $3.95.

Manual for Nutrition Surveys. Interdepartmental Committee on Nutrition for National Defense, National Institutes of Health, Washington, D.C., ed. 2, 1964 (order from Superintendent of Documents, Washington, D.C.). 343 pp. Illus. Plates. $2.50.

Mechanisms of Hormone Action. A NATO Advanced Study Institute (Meersburg, Germany), May 1964. P. Karlson, Ed. Thieme, Stuttgart, Germany; Academic Press, New York, 1965 (order from Intercontinental Medical Book Corp., New York). 287 pp. Illus. DM. 49.80. Twenty-two papers.

Medical Orthodoxy and the Future of Psychoanalysis. K. R. Eissler. International Universities Press, New York, 1965. 604 pp. $12.

Metabolism and Physiological Significance of Lipids. Proceedings, Advanced Study Course (Cambridge, Mass.), September 1963. R. M. C. Dawson and Douglas N. Rhodes, Eds. Wiley, New York, 1964. 667 pp. Illus. $21. Forty papers on the following topics: Metabolism (13 papers); Lipid Absorption (4 papers); Physiological Significance (15 papers); Lipids of the Nervous System (4 papers); Lipids and Proteins (2 papers); and symposia (2 papers).

The Metabolism of Insects. Darcy Gilmour. Freeman, San Francisco, Calif.,

1965. 207 pp. Illus. Paper, $2.50. University Reviews in Biology Series, edited by J. E. Treherne.

Microbial Inhibitors in Food. Fourth International Symposium (Goteborg, Sweden), June 1964. N. Molin and A. Erichsen, Eds. Almqvist and Wiksell, Stockholm, 1964. 408 pp. Illus. $9. Thirty-three papers listed under the following topics: Action of Microbial Inhibitors in Foods (11 papers); Use of Microbial Inhibitors in Foods (12 papers); Natural Occurrence of Microbial Inhibitors in Foods (4 papers); and General Papers (6 papers).

Pharmacology of Cholinergic and Adrenergic Transmission. Proceedings, Second International Pharmacological Meeting (Prague), August 1963. vol. 3. G. B. Koelle, W. W. Douglas, and A. Carlsson, Eds. Pergamon, London; Macmillan, New York, 1965. 358 pp. Illus. $15. Thirty papers.

The Physiology of Nematodes. D. L. Lee. Freeman, San Francisco, Calif., 1965. 164 pp. Illus. Paper, $2.50. University Reviews in Biology Series, edited by J. E. Treherne.

Plant Anatomy. Katherine Esau. Wiley, New York, ed. 2, 1965. 789 pp. Illus. $14.50.

Preparation and Bio-Medical Application of Labeled Molecules. Proceedings of a symposium (Venice), August 1964. J. Sirchis, Ed. European Atomic Energy Community, Brussels, Belgium, 1964. 520 pp. Illus. Forty-six papers presented at the symposium sponsored by the Radiation Chemistry and Radioelements Centers of the Universities of Bologna, Padua, and Rome, the Italian National Research Council (C.N.R.), and the European Atomic Energy Community (Euratom).

Principles of Animal Biology. Lawrence S. Dillon. Macmillan, New York, 1965. 573 pp. Illus. $7.95.

Radioactive Fallout, Soils, Plants, Foods, Man. Eric B. Fowler, Ed. Elsevier, New York, 1965. 325 pp. Illus. $14. Eleven papers.

Radiotracer Methodology in Biological Science. C. H. Wang and David L. Willis. Prentice-Hall, Englewood Cliffs, N.J., 1965. 400 pp. Illus. $16.

The Rational Use of Dyes in Biology: And General Staining Methods. Edward Gurr. Williams and Wilkins, Baltimore, 1965. 434 pp. Illus. $14.

Recent Advances in Biological Psychiatry. vol. 7. Proceedings of the 19th Annual Convention and Scientific Program of the Society of Biological Psychiatry (Los Angeles, Calif.), May 1964. Joseph Wortis, Ed. Plenum Press, New York, 1965. 312 pp. Illus. $13.50. Twenty-eight papers on the following topics: Symposium on Lysergic Acid Diethylamide (LSD) (4 papers); Clinical Studies (4 papers); Conditioning and Memory: Experimental Studies (3 papers); Clinical Studies of Memory and Allied Function (3 papers); Contemporary Views on the Biological Bases of Psychiatry (4 papers); Research in Genetic and Biochemical Determination (3 papers); and miscellaneous studies (7 papers).

Recent Research on Carnitine: Its Relation to Lipid Metabolism. Papers pre-

sented at a symposium (Cambridge, Mass.), July 1964. George Wolf, Ed. M.I.T. Press, Cambridge, Mass., 1965. 220 pp. Illus. $7.50. Twenty-five papers on the following topics: Synthesis, Analysis, Distribution, Biosynthesis, and Turnover of Carnitine (8 papers); Function of Carnitine in Fatty Acid Metabolism (7 papers); Metabolic Role of Carnitine and Lipid-Bound Carnitine (6 papers); and Physiological Effects of Carnitine (4 papers).

The Redox Potential of the Blood in vivo and in vitro: Its Measurement and Significance. Ernst Ziegler, with a chapter by J. Rehm. Translated by J. E. Smith. Thomas, Springfield, Ill., 1965. 206 pp. Illus. $8.50.

Reproduction in the Insects. K. G. Davey. Freeman, San Francisco, Calif., 1965. 106 pp. Illus. Paper, $2.50. University Reviews in Biology Series, edited by J. E. Treherne.

Respiratory Failure. (*Ann. N.Y. Acad. Sci.* **121**, art. 3). Harold E. Whipple, Ed. New York Acad. of Sciences, New York, 1965. 307 pp. Illus. Paper, $10. Twenty-nine papers presented at a conference held in February 1964. The topics considered were Pathophysiology of Respiratory Failure (6 papers); Methods of Therapy: Mechanical Ventilation (6 papers); Methods of Therapy: Oxygen Therapy and Associated Therapeutic Measures (9 papers); and Management of Respiratory Failure (8 papers).

Spores. vol. 3. Symposium (Allerton Park, Ill.), October 1964, held under the auspices of the University of Illinois and with the support of the Office of Naval Research. L. Leon Campbell and H. Orin Halvorson, Eds. American Soc. for Microbiology, Ann Arbor, Mich., 1965. 256 pp. Illus. $6. Twenty-one papers.

Strasburger's Textbook of Botany. Rewritten by Richard Harder, Walter Schumacher, Franz Firbas, and Dietrich von Denffer. Translated from the 28th German edition (Stuttgart, 1962) by Peter Bell and David Coombe. Longmans, Green, London, 1965. 864 pp. Illus. 84s.

Structure and Function in Biological Membranes. vol. 2. J. Lee Kavanau. Holden-Day, San Francisco, 1965. 448 pp. Illus. $14.75.

Structure and Function in the Nervous Systems of Invertebrates. vols. 1 and 2. Theodore Holmes Bullock and G. Adrian Horridge, with chapters by Howard A. Bern, Irvine R. Hagadorn, and J. E. Smith. Freeman, San Francisco, 1965. vol. 1, 818 pp.; vol. 2, 929 pp. Illus. $75 set.

Theory and Practice in Experimental Bacteriology. G. G. Meynell and Elinor Meynell. Cambridge Univ. Press, New York, 1965. 300 pp. Illus. $9.50.

Mathematics, Physical Sciences, and Engineering

Advances in Morphogenesis. vol. 4. M. Abercrombie and Jean Brachet, Eds. Academic Press, New York, 1964. 297 pp. Illus. $12. Six papers: "The transplantation of living cell nuclei" by J. B. Gurdon; "Morphogenesis in *Micrasterias*" by H. Waris and P. Kallio; "Problems in

corneal morphogenesis" by Alfred J. Coulombre; "Regeneration in lower plants" by Luise Strange; "Regeneration in annelids" by Henriette Herlant-Meewis; and "Biological aspects of the yolk of the hen's egg" by Ruth Bellairs.

The Barker Index of Crystals. A method for the identification of crystalline substances. vol. 3, pts. 1 and 2. vol. 3, *Crystals of the Anorthic System:* pt. 1 "Introduction and Tables"; pt. 2, "Crystal Descriptions, A.1 to A.831, Atlas of Configurations." M. W. Porter and L. W. Codd. Published for Barker Index Committee by Heffer, Cambridge, Eng. Unpaged. Illus. Tables £12 set.

Data for Plasmas in Local Thermodynamic Equilibrium. Hans-Werner Drawin and Paul Felenbok. Gauthier-Villars, Paris, 1965. 503 pp. F. 64.

Dynamic Circuit Theory. Hugo K. Messerle. Pergamon, London; Macmillan, New York, 1965. 679 pp. Illus. $15.

Electromagnetics in Space: Antenna Considerations as Related to Space Communications. Karl R. Spangenberg, Ed. McGraw-Hill, New York, 1965. 289 pp. Illus. $15. Chapters contributed by A. S. Dunbar, T. H. Lee, J. L. Bellamy, and E. A. Blasi.

Elementary Differential Equations and Boundary Value Problems. William E. Boyce and Richard C. DiPrima. Wiley, New York, 1965. 503 pp. Illus. $8.95.

Ergodic Theory in Statistical Mechanics. I. E. Farquhar. Interscience (Wiley), New York, 1965. 243 pp. Illus. $12. Vol. 7, Monographs in Statistical Physics and Thermodynamics, a series edited by I. Prigogine.

Hydraulic Control of Machine Tools. E. M. Khaimovich. Translated from the Russian edition by O. Tedder. K. Foster, Translation Ed. Pergamon, London; Macmillan, New York, 1965. 585 pp. Illus. $17.50.

Introduction to Mathematics with Applications. Herbert Barkan and Carl Konove. Van Nostrand, Princeton, N.J., 1965. 379 pp. Illus. $7.95.

Laboratory Manual for Introductory College Chemistry. Floyd J. Quick. Macmillan, New York, 1965. 272 pp. Illus. Paper, $3.95.

Nuclear Techniques in Analytical Chemistry. Alfred J. Moses. Pergamon, London; Macmillan, New York, 1965. 150 pp. Illus. $6.50. International Series of Monographs on Analytical Chemistry, vol. 20.

Number Theory. J. Hunter. Oliver and Boyd, Edinburgh; Interscience (Wiley), New York, 1964. 159 pp. Illus. $2.75. University Mathematical Texts Series.

Numerical Methods. vols. 1 and 2. vol. 1, *Iteration, Programming, and Algebraic Equations* (168 pp., $3); vol. 2, *Differences, Integration, and Differential Equations* (224 pp., $2.75). Ben Noble. Oliver and Boyd, London; Interscience (Wiley), New York, 1965. Illus.

Open Tubular Columns in Gas Chromatography. L. S. Ettre. Plenum Press, New York, 1965. 184 pp. Illus. $4.95.

Palynology in Oil Exploration. A symposium (San Francisco, Calif.), March 1962. Aureal T. Cross, Ed. Society of Economic Paleontologists and Mineralogists, Tulsa, Okla., 1964. 208 pp. Illus.

Paper, $8. Fifteen papers; the contributors include R. A. Couper, Aureal T. Cross, William R. Evitt, M. F. Glaessner, N. Goubin, B. de Jekhowsky, Robert M. Kosanke, Kenneth E. Lohman, Karl R. Newman, James M. Schopf, Bernard L. Schaffer, Lewis E. Stover, Robert H. Tschudy, Charles F. Upshaw, and John L. Wray.

Phase Transitions. Robert Brout. Benjamin, New York, 1965. 216 pp. Illus. $9. Frontiers in Physics Series, edited by David Pines.

Physics. K. R. Atkins. Wiley, New York, 1965. 764 pp. Illus. $9.50.

Physics. Wayne E. Hazen and Robert W. Pidd. Addison-Wesley, Reading, Mass., 1965. 640 pp. Illus. $11.75.

Physics and Chemistry of the Organic Solid State. vol. 2. David Fox, Mortimer W. Labes, and Arnold Weissberger, Eds. Interscience (Wiley), New York, 1965. 991 pp. Illus. $27.50. Nine papers: "Conductivity" by Jan Kommandeur; "Organic polymers that conduct electricity" by D. E. Weiss and B. A. Bolto; "Magnetic properties" by D. E. O'Reilly and J. H. Anderson; "Luminescence and energy transfer" by Maurice W. Windsor; "Scintillations in organic solids" by J. B. Birks; "Solubility and diffusivity" by C. E. Rogers; "Mechanical relaxation phenomena" by A. E. Woodward and J. A. Sauer; "Polymorphism" by Walter C. McCrone; and "Radiation effects in polymers" by Raymond S. Alger.

Physics of the Marine Atmosphere. H. U. Roll. Academic Press, New York, 1965. 434 pp. Illus. $15. International Geophysics Series, vol. 7, edited by J. Van Mieghem.

Plasma Diagnostics with Microwaves. M. A. Heald and C. B. Wharton. Wiley, New York, 1965. 470 pp. Illus. $13.50. Wiley Series in Plasma Physics.

Polymers: Structure and Bulk Properties. Patrick Meares. Van Nostrand, Princeton, N.J., 1965. 393 pp. Illus. $12.50.

Powder Metallurgy. S. A. Tsukerman. Translated from the Russian by Robert E. Hunt and H. S. H. Massey. A. R. Entwisle, Translation Ed. Pergamon, London; Macmillan, New York, 1965. 152 pp. Illus. $6.

Practical Aerodynamics. A. K. Martynov. Translated from the Russian edition by V. H. Brix. R. C. Pankhurst, Translation Ed. Pergamon, London; Macmillan, New York, 1965. 405 pp. Illus. $12.

Principles of Electron Tubes, Including Grid-Controlled Tubes, Microwave Tubes, and Gas Tubes. J. W. Gewartowski and H. A. Watson. Van Nostrand, Princeton, N.J., 1965. 671 pp. Illus. $18.50. Bell Telephone Laboratories Series.

The Principles of Power Generation. G. Ye. Kholodovskii. Translated from the Russian edition (Moscow, 1960) by V. H. Brix. Pergamon, London; Macmillan, New York, 1965. 110 pp. Illus. $4.50.

Principles of Surface Coating Technology. Dean H. Parker. Interscience (Wiley), New York, 1965. 835 pp. Illus. $27.50.

Principles of General Thermodynamics. George N. Hatsopoulos and Joseph H. Keenan. Wiley, New York, 1965. 830 pp. Illus. $15.

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