SCIENCE

15 May 1964
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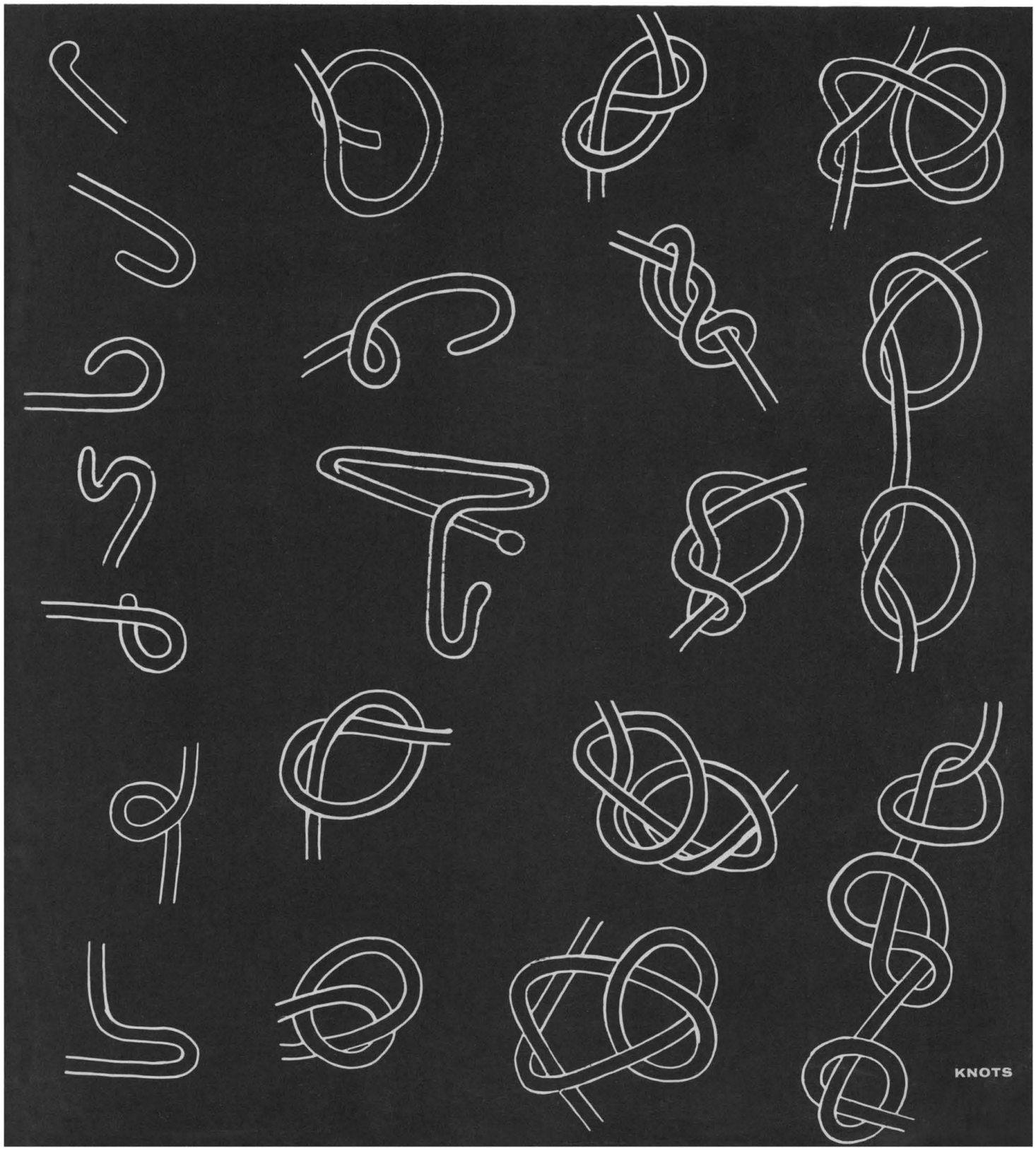
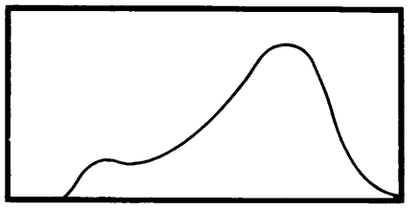
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



The Analytical Ultracentrifuge... *a review of some exciting new measurements*

The Analytical Ultracentrifuge has come a long way from its early days of simply photographing molecules as they sediment in high force fields. It now provides many of the highly sophisticated measurements needed in such rapidly advancing disciplines as biochemistry, biophysics, genetics and polymer chemistry. Three measurement areas are particularly active.

Interacting Systems The analysis of systems containing interacting components is the focus of considerable theoretical interest. An important contribution has been Gilbert's theory for reversibly interacting systems involving a single component. Systems of two components which react to form a complex also have been studied in detail. Bethune and

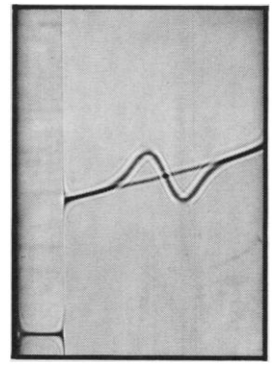


Monomer-Trimer Equilibrium Forms Two Boundaries

Kegeles have applied a computer to analyze these systems as well as systems involving polymerization. Townend, Timasheff and co-workers have studied molecules which associate in aggregates as large as pentamers, and dissociate into sub-units. Others have examined isomerizing systems in which molecular interactions occur at speeds comparable to the time of separation of the molecular species. Both sedimentation and electrophoresis have provided important measurements in these studies.

Density Gradients Now established as a powerful and sensitive method to study nucleic acids, equilibrium sedimentation in a density gradient is rapidly finding other uses. Ifft and Vinograd have

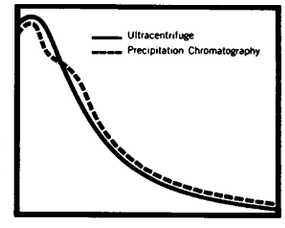
Schlieren Pattern of BMA at Sedimentation Equilibrium in a Density Gradient



used density gradients to calculate molecular weights for solvated macromolecules, and have studied in detail the behavior of a protein of known molecular weight in a density gradient. Hu, Bock and Halvorson through use of stable isotopes have distinguished between newly synthesized and pre-existing proteins in a cell-free system. Wales has used density gradients of organic solvents to study extremely small quantities of various synthetic polymers, and Hermans has used density gradients to analyze for molecular weight distribution and density distribution of polymers. Both the analytical ultracentrifuge with ultraviolet and schlieren optics, and the preparative unit with swinging bucket rotors are widely used in density gradient centrifugation.

Synthetic Polymers The two density gradient studies noted above are only part of the recent surge of research using the ultracentrifuge to study synthetic polymers in organic solvents. Important papers have been published by investigators at the National Bureau of Standards,

Comparison of Data for Molecular Weight Distribution of Polystyrene

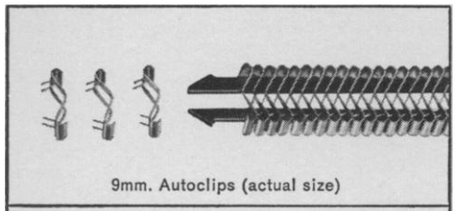


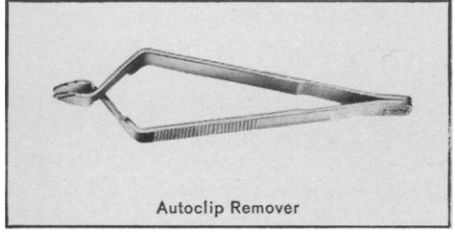
Esso, Shell Development, Dow, and Chemstrand. Their work covers linear polyethylene, polystyrene, Hevea rubber, and cis-1, 4-polyisoprene. A particularly significant example is the study by Wales and Rehfeld showing excellent results in measuring molecular weight distributions from sedimentation velocity data, and demonstrating clearly that their method did not require calibration with fractions of known molecular weight.

RAPID CLOSURES—WITH NO STRINGS ATTACHED

NOW—a modern method for closing surgical incisions—ideal for use on laboratory animals. The new Autoclip Applier makes other tedious, time-consuming techniques obsolete.

The precision-engineered, Autoclip Applier automatically spring feeds Autoclips for placement as fast as the skin edges can be approximated. The stainless steel Applier holds a rack of 20 Autoclips. Reloading is fast and easy. The Applier complete with Autoclips can be conveniently autoclaved.


9mm. Autoclips (actual size)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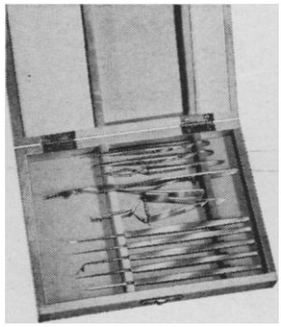

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SCIENCE

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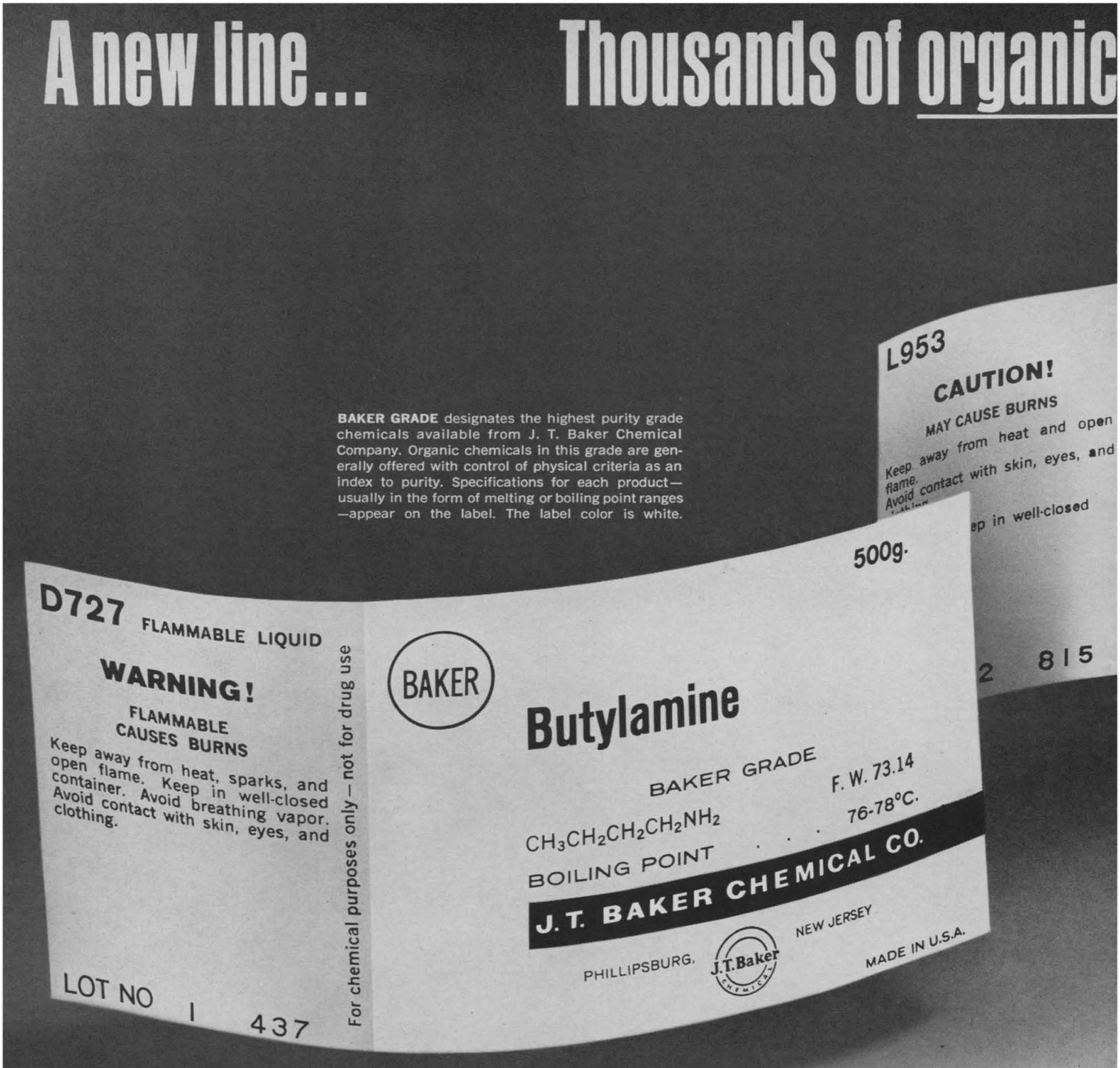
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Representative knots and possible stages in knot formation in *Leucothrix mucor*, a marine bacterium related to the blue-green algae. Drawings are idealized from three dimensions (see page 870).

A new line... Thousands of organic



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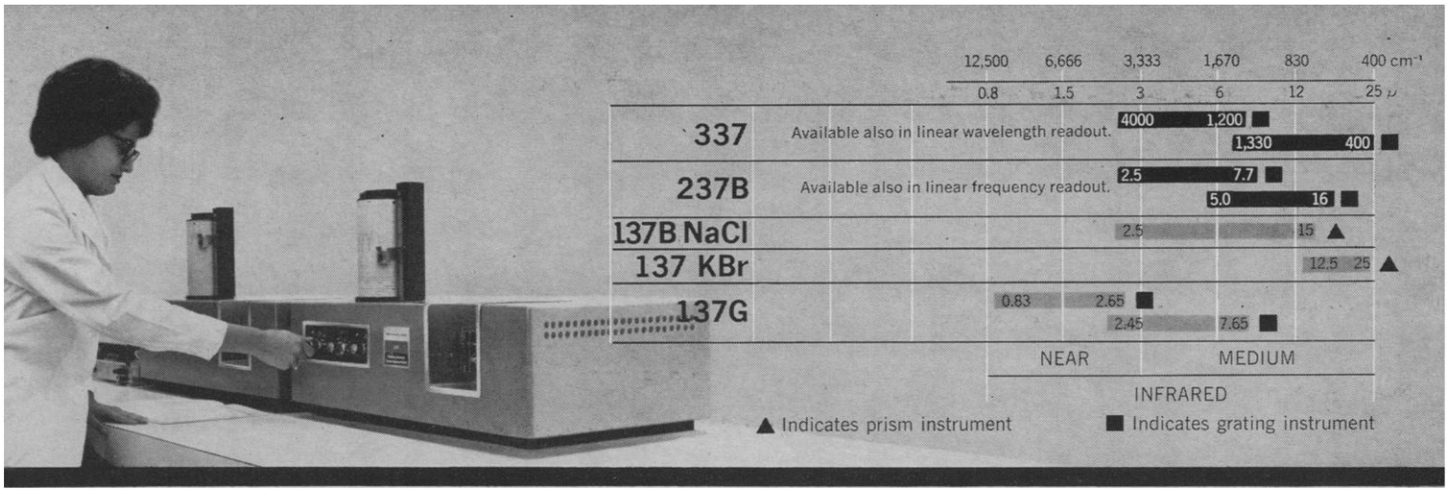


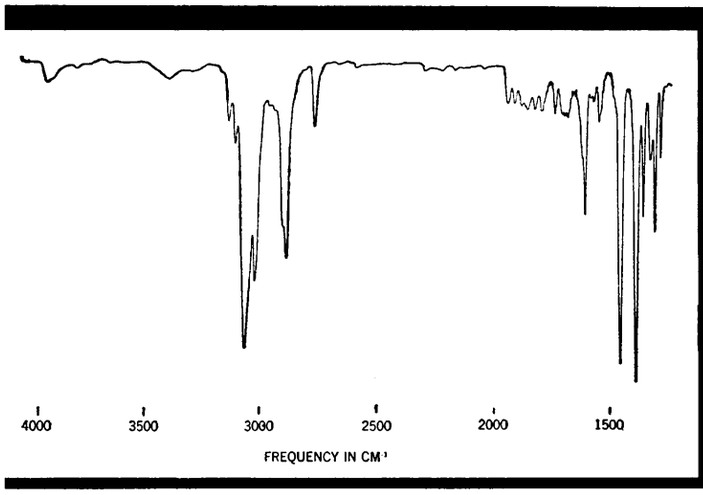
TWO NEW LOW-COST SPECTROPHOTOMETERS USE VARIABLE SLIT PROGRAMMING TO PROVIDE A WIDE RANGE OF RESOLUTION AND ENERGY SCHEDULES

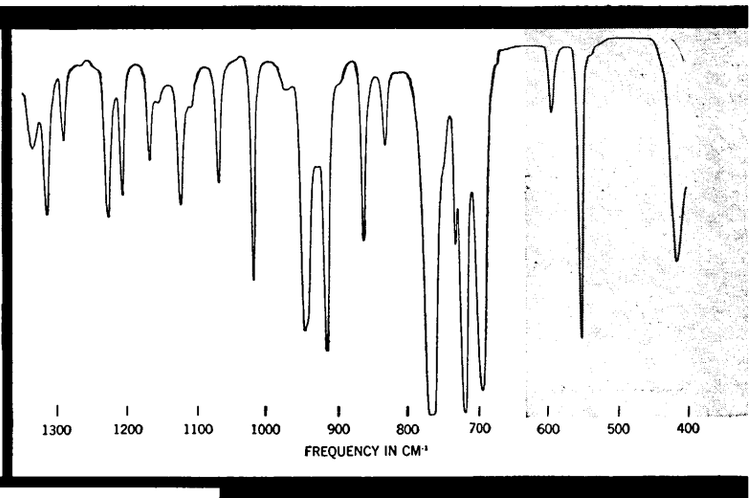
Perkin-Elmer's new low-cost infrared spectrophotometers, the Models 237B and 337, share outstanding new capabilities:

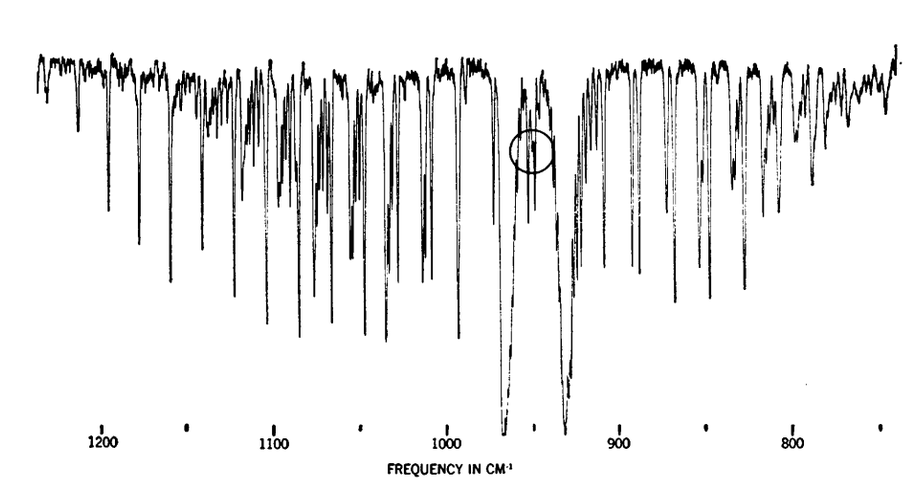
- three-minute scan option for reliable fast surveys;
- variable slit programming, to optimize spectral slit widths under varying requirements of sample, speed and resolution;
- external recorder attachment provisions, for abscissa expansion or compression, as required;
- dual-grating monochromator, for resolution better than that of many instruments costing twice as much.

The Model 237B covers the range from 4000 to 625 cm^{-1}, with a version available in linear wavelength. It is ideal if you normally operate in this fundamental region. The Model 337, also available in either linear frequency, or linear wavelength, scans from 4000 to 400 cm^{-1}. Both instruments cover their individual ranges in two serial scans, on convenient 8½" x 11" charts.

No matter what your choice, either the Model 237B or the Model 337 will provide all the performance you want at the lowest price available. For more information, write Instrument Marketing Division, Perkin-Elmer Corporation, 910 Main Avenue, Norwalk, Conn.







▲ Typical dual scan of indene, run in six minutes in the three-minute scan mode of the Model 337, demonstrates excellent definition possible even at this recording rate. Slit program was 6. Shaded area shows range added by the Model 337 to that of the Model 237B. In this region you gain access to carbon-bromine, carbon-iodine and carbon-chlorine vibrations, out-of-plane aromatic carbon-hydrogen bonds, and data on inorganic and metal-oxygen or metal-nitrogen bonds in complexes. Recent work also points to characteristic vibrations of ketones, aldehydes, acids and esters occurring in the 500 cm^{-1} region.

◀ Ammonia scan from 1200 to 800 cm^{-1} points out one wavenumber resolving power of Model 337, with abscissa expanded on auxiliary recorder.

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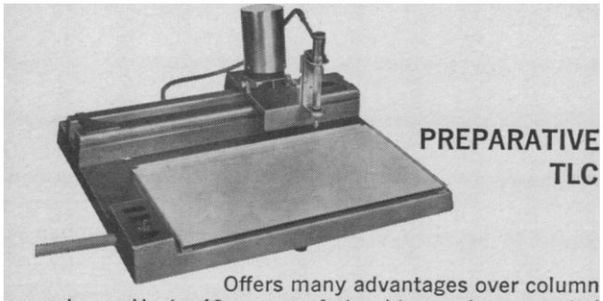
THIN LAYER CHROMATOGRAPHY

new Equipment . . . new Techniques . . . new Adsorbents

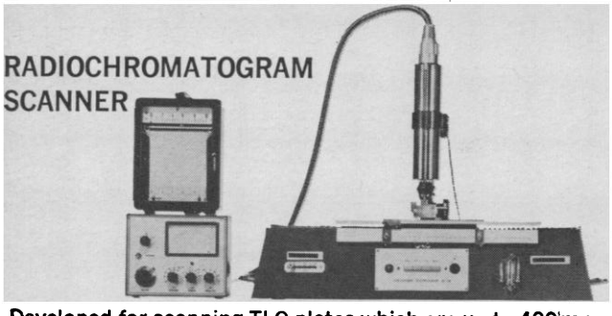


PREPARATIVE TLC

Offers many advantages over column procedures. Up to 40 grams of steroids can be separated on a single 400 x 200 mm plate. New developing tanks, drying racks, desiccators, recovery systems and an automatic sample-streaking instrument (illustrated) are now available for quantitative separations on layers up to 2 mm thick.

THIN LAYER ELECTROPHORESIS

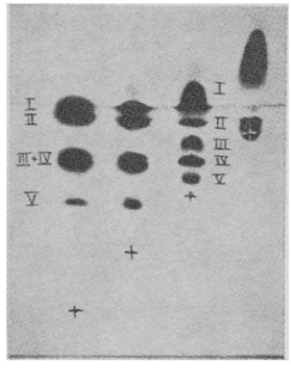
A new migration chamber developed specifically for TLE. Unique features for saturation (chamber height only 1 mm), temperature control, and buffer flow. The power supply can, of course, be used for paper chromatography also. Have you investigated the advantages of combining TLE with TLC?



RADIOCHROMATOGRAM SCANNER

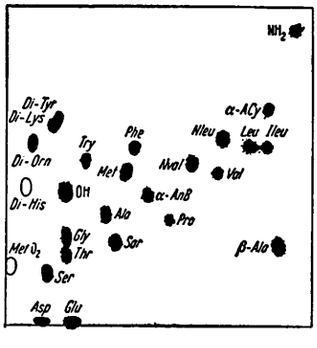
Developed for scanning TLC plates which are up to 400 mm long. The plate is automatically advanced on a motor-driven sled. Mechanical adjustments permit perfect alignment under detector head. Usable with ratemeters, scalers and recorder for paper or thin layer chromatography.

POLYZONAL TLC



Polyzonal TLC is a new technique which utilizes the solvent de-mixing phenomenon for a rapid determination of ideal developing conditions; a single solvent mixture provides varied results (on the same plate), which would otherwise require testing of numerous plates in different solvent systems. Illustrated are separations of the same compound (2, 4-Dinitrophenyl (I), DNP-Valine (II), DNP-Alanine (III), DNP-Glycine (IV), and DI-DNP Histidine (V).

CONTINUOUS SOLVENT FLOW TLC



Another technique which utilizes the B-N Chamber to obtain separations not possible with standard developing procedures. Illustrated is a chromatogram of the most important 2, 4 Dinitrophenyl amino acids. Continuous solvent flow has also been applied with great success for amino acids in urine and blood; for leucine and isoleucine; and for various sugars (saccharose, galactose, fructose, ribose, etc.).

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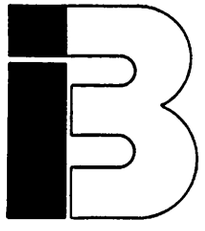

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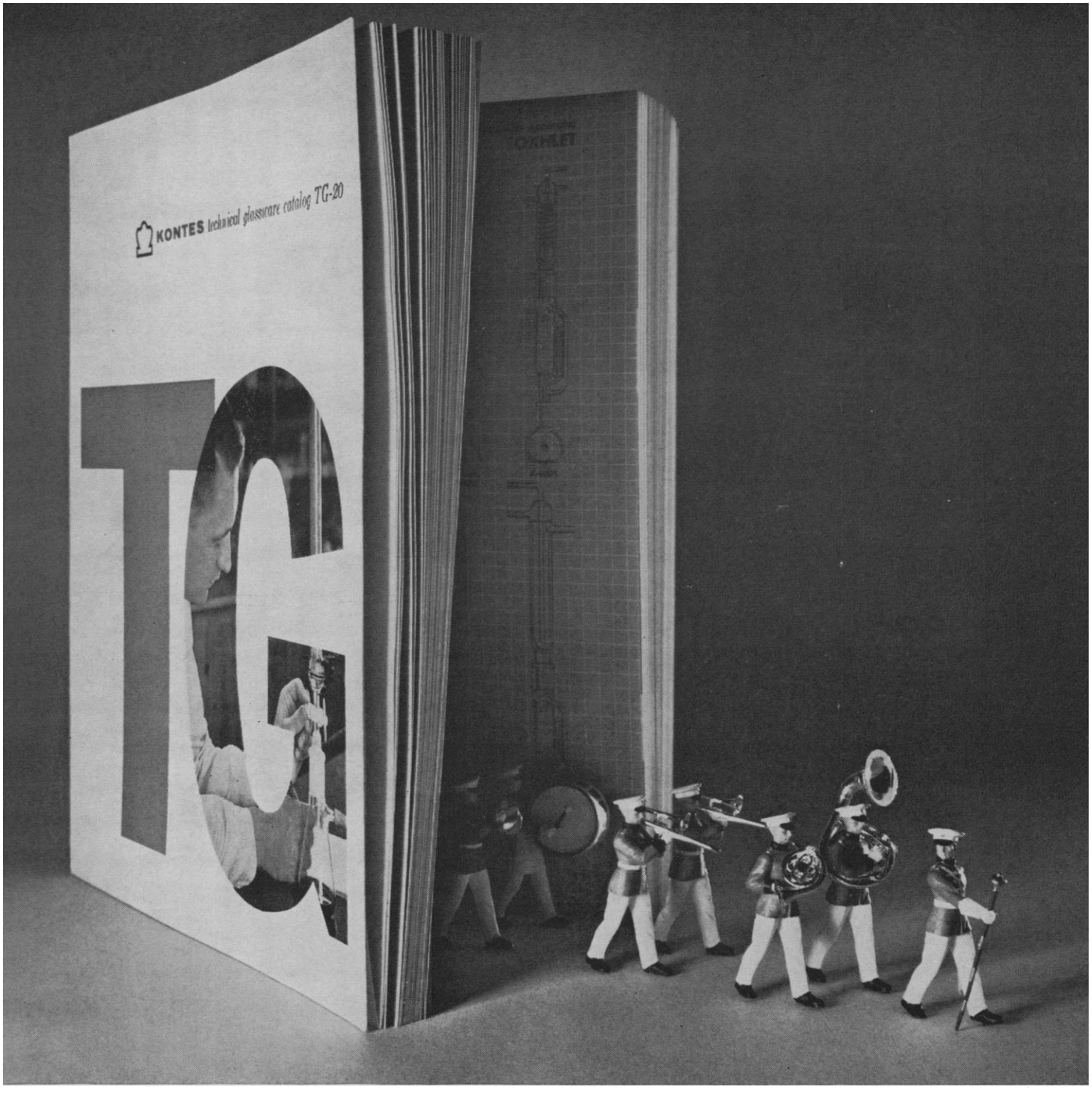

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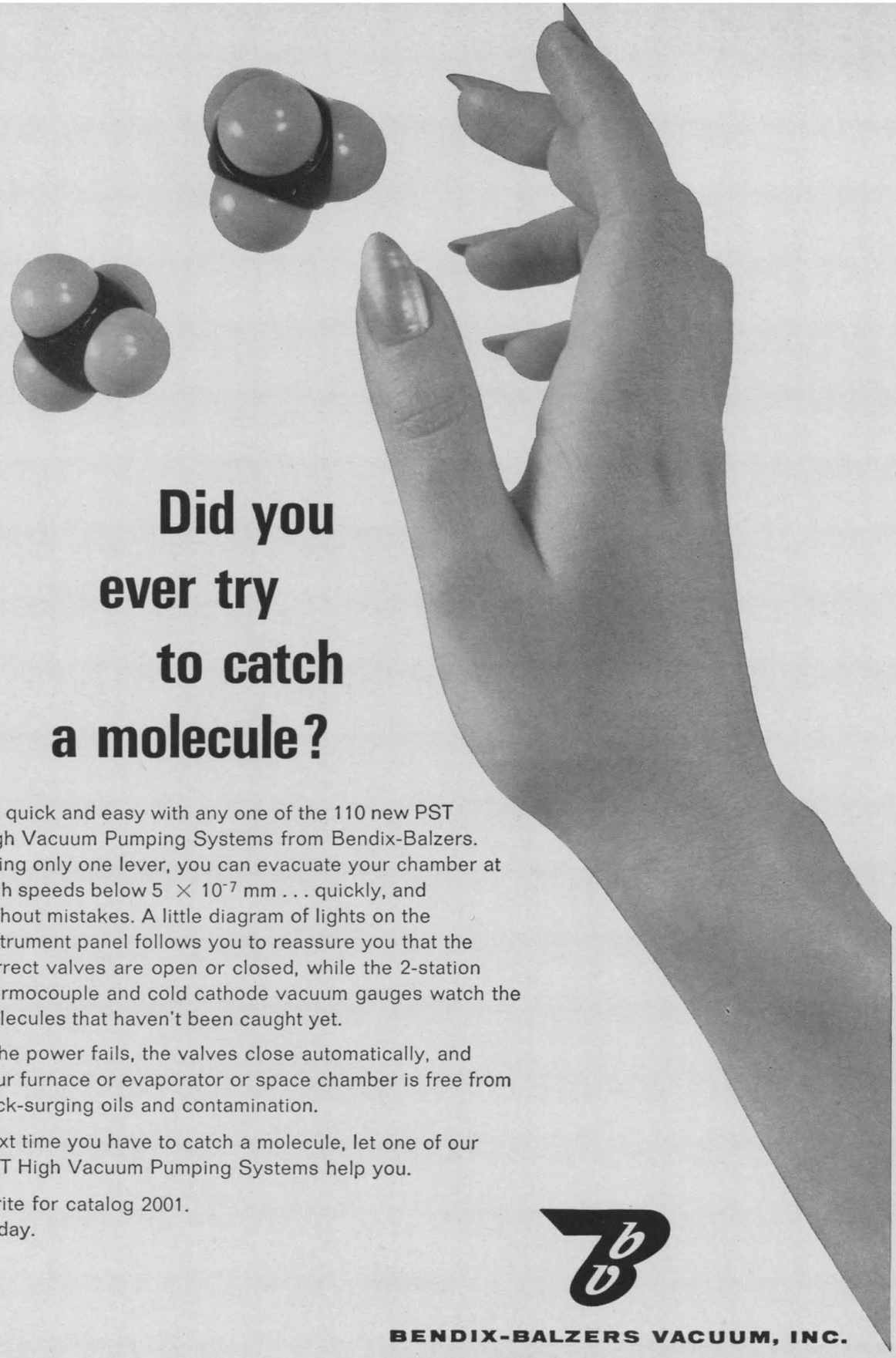

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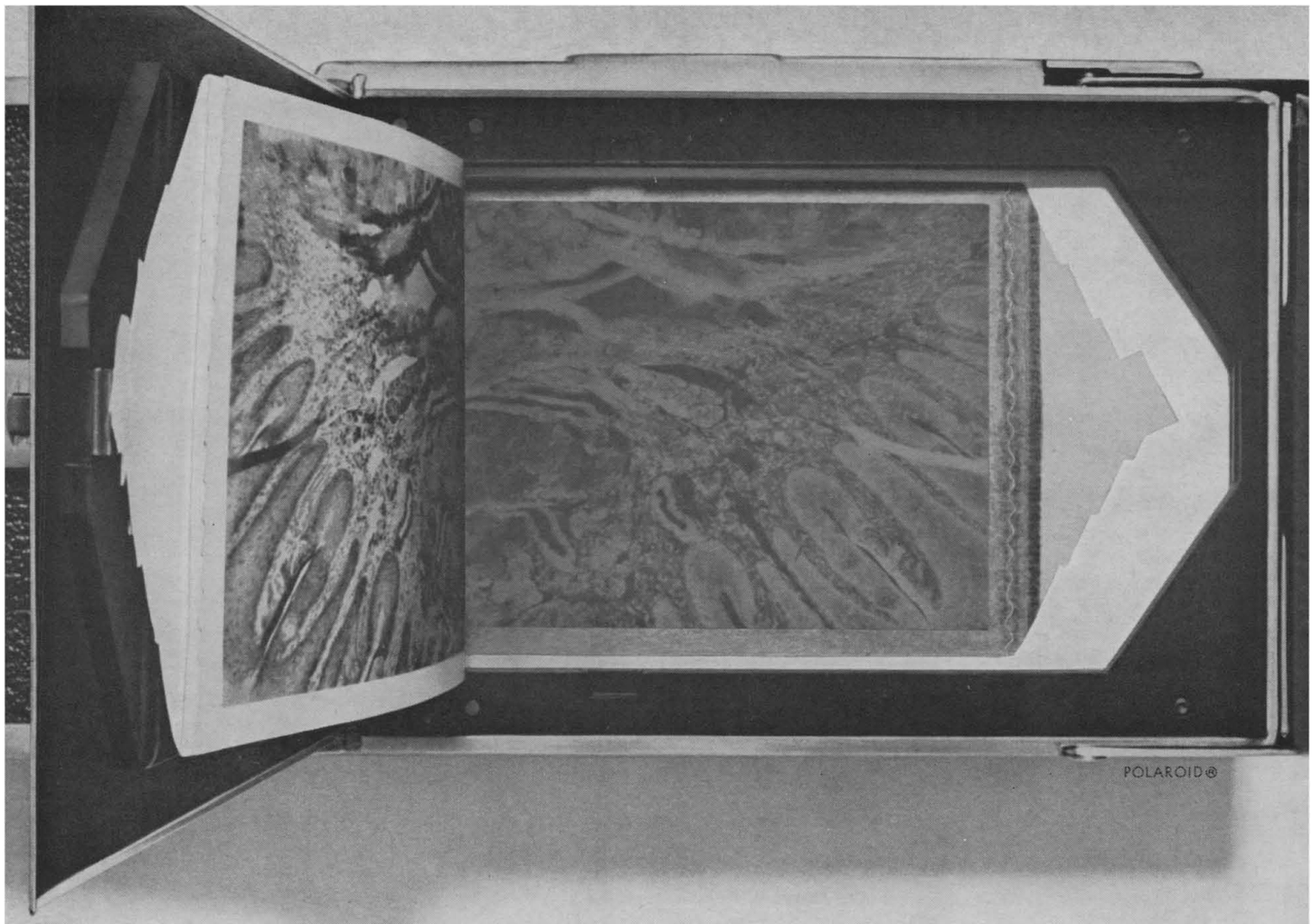

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The camera (that's it at the bottom) is vertically mounted on a rigid column. It glides right down so the lensless shutter and extension tube fit over your microscope objective. You work with eye-level ground glass viewing and focusing. Click the shutter, count, and open the door. There's your finished photomicrograph.

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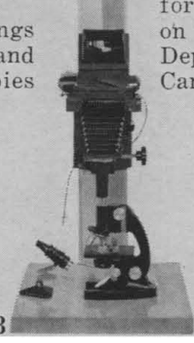
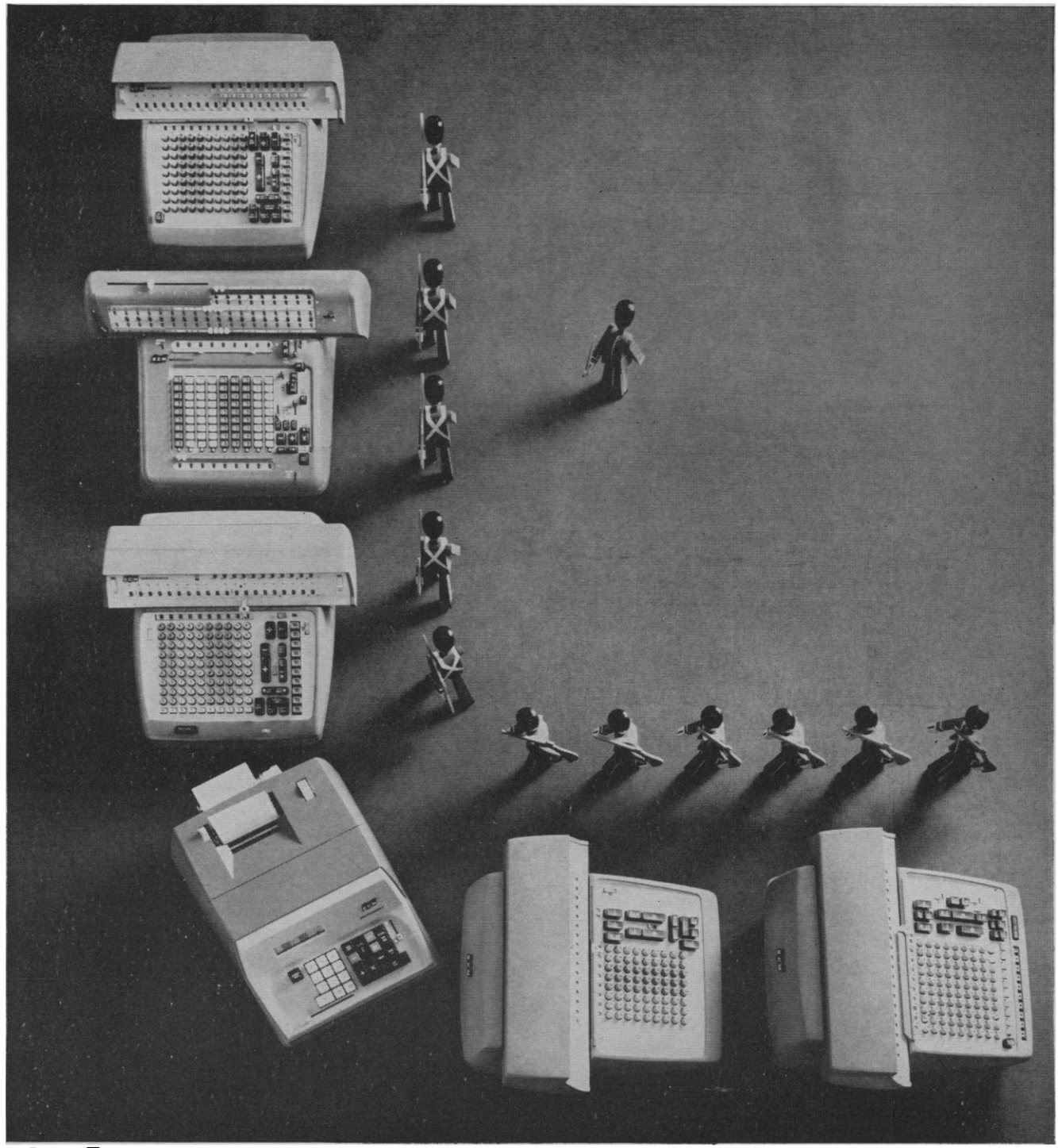


Polaroid MP-3 Industrial View Camera



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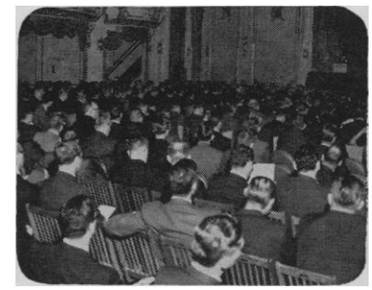
how HVEC contributes to research through the dissemination of technical information.

Third International Accelerator Conference

High Voltage Engineering sponsored its Third International Accelerator Conference last November in Boston. The three-day meeting was attended by 480 Scientists from 21 countries. Fifty-five papers were presented.

Objective of the Conference: to promote the exchange of information pertaining to accelerators, research program techniques, space physics, electron research, accelerator technology, and experimental techniques. Proceedings are presently being prepared and will be available on request.



Tandem Quarterly

In October 1963, HVEC published the first issue of The Tandem Quarterly — a technical report on tandem accelerator technology for research laboratories and personnel. Its one aim: to supply its recipients — mostly physicists and operating staffs of tandem laboratories — with information not usually covered in existing journals. For instance:

- Machine operating experience
- Particle beams obtained at each installation and their uses
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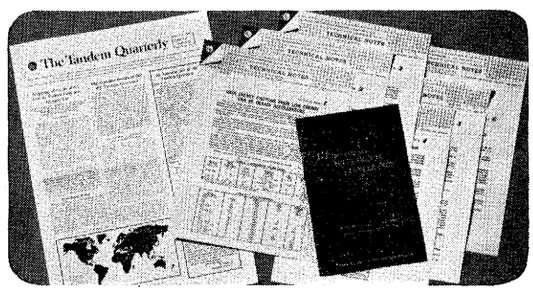
- Accelerator installation and shielding information

Service to Science



HVEC disseminates a variety of information on charged particle research, basic and applied, as well as technical developments at HVEC. Available information spans the spectrum of nuclear research and technology . . . physics, chemistry, and industrial and medical applications. As manufacturers of particle accelerators, we provide this service because it reinforces the scientific cause and acquaints a wide audience with the uses and benefits of particle accelerators.

Technical Notes

This series is another recent HVEC program to disseminate information on noteworthy developments in accelerator experimentation and techniques, particularly single-stage machines. Topics to date include:

- High Energy Protons from Low Energy Van de Graff Accelerators
- Heavy Ion Acceleration
- Carbon Determinations Via Charged Particle Activation
- Energy Spectra of Energetic Particles in Space
- Micrometeoroid Simulation
- High Energy Photons from Low Energy Van de Graff Accelerators
- Copies of these and future Technical Notes are available upon request

New Single Stage ICT Accelerators

HVEC recently introduced its ICT Accelerator systems. These high-current machines offer the same high-purity particle beam, low energy spread and polarity-conversion features which are characteristic of Van de Graaff accelerators. Several models are available:

- An 8-MeV Tandem Ion Accelerator convertible to electron operation.
- A 4-MeV Single Stage, Positive Ion Accelerator convertible to Electron or Tandem Operation.

All models incorporate an Insulating Core Transformer power source rated at 12 milliamperes. A 60 kilowatt 3 MeV electron machine is also available. Sufficient power is provided to capitalize on future developments in high-current particle source and target technologies.

For more detailed information, please write to Technical Sales, High Voltage Engineering Corporation, Burlington, Massachusetts.

HIGH VOLTAGE ENGINEERING

15 May 1964, Volume 144, Number 3620

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.

Interfaces between Science and Public Policy

With the second World War, and ever since, we have had an increasing concern for the power of science and technology in the national service. Yesterday we hardly thought of science in its relation to foreign policy; today it is all too easy to think of it only in that connection. And over the long future we may find that questions posed by the intricate relationship between matters of science and technology and our domestic public affairs and public policy may prove yet more urgent. Even today one can see the lengthening shadows of various problems that surely lie in wait for us if they are not already at our doorstep.

Who in the future will man the frontiers at the many interfaces between science and public policy? Where will these people come from? What should their training be? The scientific and technical skills and knowledge and judgment that are brought to the service of the nation at the governmental level are multiple in the points at which they enter and the avenues through which they serve. They are also multiple in kind. In the realm of policy one can distinguish at least four general kinds of function: the execution of policy involving matters of science and technology on the domestic front; the corresponding function in relation to foreign policy; the formulation of foreign and domestic scientific policy; and the integration of scientific policy with the wider formulation of a general foreign policy. There is also the fundamental task of scientific planning at the substantive level—the task, essentially, of scientific creativity. The several levels of scientific planning have their counterparts in the kinds of background and talents required of those who would discharge these functions.

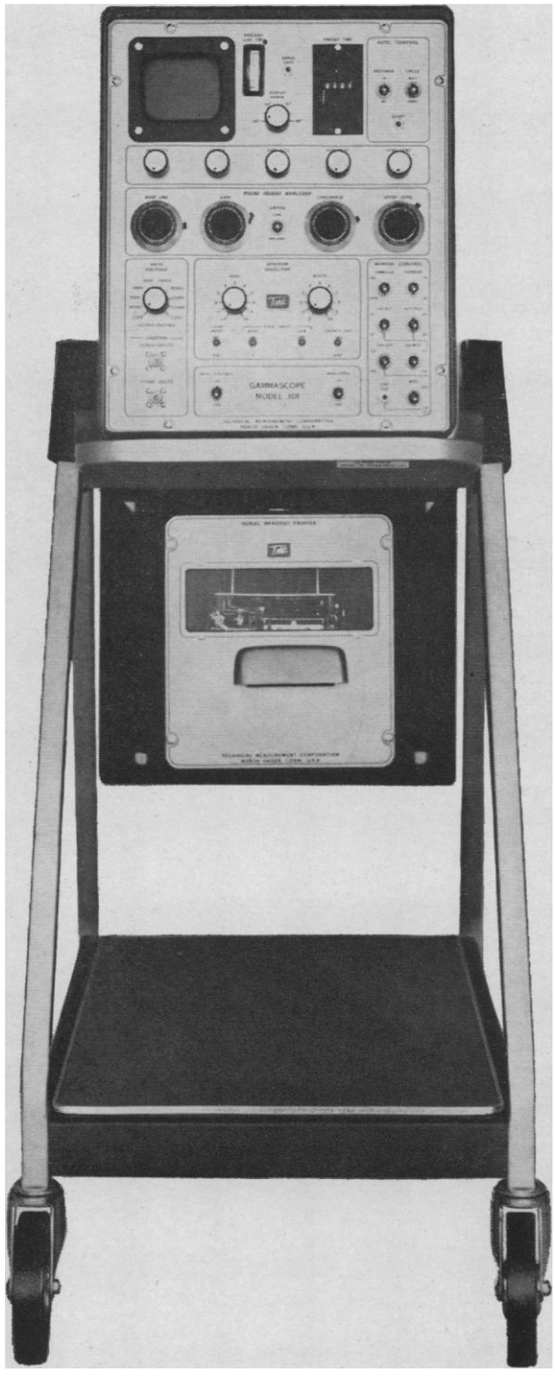
At the creative level, the function must depend on the intellect, vigorously disciplined and highly prepared. The level of general and administrative scientific policy requires extensive and intensive scientific training combined with administrative judgment and acumen in the most comprehensive connotations of these terms. Scientific originality in the narrower sense may be less essential. The formulation of "political scientific policy" will require men and women with the broadest kind of scientific competence. They should comprehend the substantive aspects of the questions with which they deal, and their personal scientific achievements should command the respect and the service of the men of science of high calibre who must be their advisers. They must also have a fundamental understanding of public policy and of the modes and patterns of public representation and negotiation. There are not many such men among us. How are we to increase their numbers to the maximum that our population and our resources will afford? H. M. Dowling, for many years headmaster of the Crewe County Grammar School in England, has observed that good minds introduced early enough to the sciences and humanities together, and introduced to them as coherent subjects rather than as collections of isolated and apparently unrelated facts and ideas, will retain a lifelong sympathy with, and a general understanding of, the objectives of both. Such men can truly evaluate the currents of their time.

Among all the demands of our day in the field of science in national policy, the challenge of finding men and women who are equipped to work in this most exacting field, and of properly preparing them to assume their burdens, stands preeminent. Upon how well that task can be accomplished in the years to come will depend to no inconsiderable degree the welfare of America.

—CARYL P. HASKINS, *Carnegie Institution of Washington*

(From the Walter E. Edge lectures, Princeton University, March 1964)

Five Radiation Lab Functions You Can Perform Best with a GAMMASCOPE®



1. Using mixed tracers in absorption studies

The 100-channel Gammascope will function as a dual-peak spectrometer, clearly displaying the energy peaks of both elements on the visual and printed spectrum. Both elements are counted automatically and simultaneously.

2. Working with short-lived isotopes

Half-lives of less than a day are problems for scanning devices, but the Gammascope, with fast automatic data accumulation, can complete a spectrum analysis in far less time than it takes to materially affect the isotope's activity.

3. Determining isotope purity

Monitoring samples to determine their purity or to check the specifications of matched samples are other laboratory processes that can be completed quickly and accurately with the greater resolution, counting speed and readout efficiency of the Gammascope.

4. Using several isotopes in succession

It is a simple matter to recalibrate the Gammascope for each new element used. Simply set the adjustable visual window to intensify the primary energy peak. The window adjusts to any width (number of channels) and any location on the energy spectrum.

5. Making diagnostic and experimental spectrum analyses

In whole body counts, uptake studies and other biophysical radiation applications, the Gammascope will complete a spectrum analysis in a fraction of the time a scanning spectrometer takes. All pulses are stored in the 100-channel magnetic core memory while the cathode-ray tube simultaneously displays the build-up of the spectrum. To make a complete analysis you calibrate in one step, start the analysis and the automatic accumulation takes over. The completed count — determined by the pre-set live timer — can be printed out on the digital printer.

The Gammascope pulse analysis system includes built-in linear amplifier, high voltage supply, visual display and external printer — $5990 (export slightly higher).

For complete data contact the nearest TMC office or Technical Measurement Corporation, 441 Washington Avenue, North Haven, Connecticut.

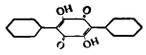
TMC

TECHNICAL MEASUREMENT CORPORATION

Kodak advertises:

cyclic anions . . . the processing of your 16mm film by us . . . orderly rummaging

Like the dew of morn

Polyporic acid is  . It has been found only in the mushroom *Polyporus rutilans*. When the two hydroxyls lose their protons, leaving the molecule a dianion, the strangest thing happens. The four oxygens become quite indistinguishable from each other. The π-electrons in the ion completely delocalize themselves, covering the whole structure like the dew of morn. Such an anion is known as an oxocarbon. It has been minutely palpated by that new chemical instrument, the high-speed digital computer. Oxocarbons constitute a new class of aromatic substances. Molecular orbital calculations, vibrational spectra, synthesis, and metal-complexing properties for such manifestations of oxocarbon symmetry as  ,  , and  are elaborated by Prof. Robert West, of Wisconsin and his team in a series of papers in *J.A.C.S.* for September 5, 1963.

West alleges* that we didn't even know we had been selling an oxocarbon for years. He happens to be right, but our feelings of inadequacy are softened by the fact that he has just coined the word "oxocarbon" to represent cyclic anions of the form $C_nO_n^{-m}$. He is talking about a moderately popular redox indicator, *Rhodizonic Acid Dipotassium Salt* (EASTMAN 2942). 

Dissolved in water it yields  . Bubble air through the solution and oxidative ring contraction results in CO_2 and the croconate ion,  . Metal derivatives of this ion have been known since 1841. A small usage that EASTMAN 2942 probably finds as an analytical reagent for Bi, Pb, Sr, and Sn may in reality depend on this ion. Reality grows ever realer, thanks to generalizers like West. Further oxidize  with nitric acid, he says, and you get  .

EASTMAN 2942 is not easy to make. We first tried in 1930 and flubbed. In 1936 we tried again, for a purpose arising from internal research on photographic developers. That time we flubbed not.

West applies the term "oxocarbon" also to triquinoyl octahydrate, which we will write merely as $C_6O_6 \cdot 8H_2O$ because its structure has been debated for 102 years. We tried selling it for 10 of them without much luck and gave up.

There are some 4400 EASTMAN *Organic Chemicals on which Distillation Products Industries, Rochester, N. Y. (Division of Eastman Kodak Company) has not given up, however, and which it offers in its "List No. 43."*

The blunt truth

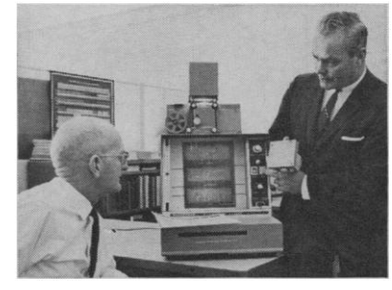
Genuine KODAK Processing Service for technical color motion-picture footage is available. We suspect you are a bit startled to see us so blunt about it, that you are well prepared to believe we can process our color film as it ought to be processed, and that by and large you are quite pleased to note we can solicit the business. We are glad you are pleased and trust you will find your confidence in our work to be well placed.

To get to the point, call 716-562-6000 and ask for Extension 3257 when you want the sharpest image edges and the sharpest color differentiation that you can possibly hope at present to record on 16mm film at index as high as 125. To save phone tolls, write Eastman Kodak Company, Photorecording Methods Division, Rochester, N. Y. 14650.

Thus you arrange for our special forced processing of KODAK EKTACHROME MS Film. But the word "forced" bothers us. It is handy for distinguishing from the regular processing for Exposure Index 64 and otherwise overemphatic. It implies that you give up some of the sharpness, color brilliance, color differentiation, and fineness of grain for which EKTACHROME MS Film is selected in the first place. You do, a trifle. The difference, however, is of a magnitude such that awareness of it entitles one to lavish compliments on the power of his eye.

Kodak Processing Laboratories are willing and ready to offer the choice between E.I. 64 and E.I. 125 processes.* They seriously restrict themselves to a processing tolerance of ±0.1 log E and are awfully stuffy about color uniformity. It is only our quaint way of signifying respect for the pains that have been invested in exposing the film.

I-r for i-r's sake



He is telling the man that a set of 11 microfilm magazines like the one in his hand and the one he has inserted in the top of the reader holds the 21,000 infrared absorption spectra that at least one publisher now sells in microfilm form. Other magazines (or rolls, aperture cards, film jackets, microfiches—all of which are compatible) will supplement this basic library with the man's own spectra. When matching "fingerprints" or when deducing the structure of a new compound by comparison with related ones, the larger the library the easier the task, provided the indexing system is good. When it yields a desired number, the man will insert the proper magazine and let the microfilm race until the code lines on the film, seen against the scale alongside the screen, find their mark. On the screen appears the desired spectrum. The piece of paper is a "hard" copy thereof, such as emerges from the slot in the base at a touch of that button he is pressing. Nobody gets a chance to ruin the integrity of the file.

Consider a man who holds down a job determining the identity of unknown substances. On his income tax return he has written "chemist." His family thinks of him holding a test tube up to the light and scowling at it. Actually, a far more typical working pose would show him rummaging through heaps of long strips of paper as he searches for an i-r absorption spectrum that some pinhead has misplaced. In moments of agonizing self-appraisal he knows that the way analytical chemistry is practiced today, a more orderly approach to information storage and retrieval may earn several times as many points as the ability to name from memory nine ways to test for urea.

Expertise on the i-r (information-retrieval, that is) problems of the modern analytical laboratory can hardly be expected to come from within. Recordak Corporation, 770 Broadway, New York City 10003, a subsidiary of Eastman Kodak Company, *can hardly wait* to send a representative who is well aware that every lab has to work differently, that some will have us do their microfilming for them, that some will want to lease the right kind of microfilmer and do it themselves, that some generate enough spectra to justify buying their own microfilmer, etc., etc.

* Private communication, in appreciation of which we are arranging to blow him *and* the team *and* their ladies to dinner at the No. 1 steak house in Madison, with plenty of *Agaricus bisporus* (Lange) Sing. on the steaks for those in the party who enjoy it but certainly no *P. rutilans*.

*But the E.I. 125 processing is priced somewhat higher, and orders for processing less than 1000 feet are billed as 1000 feet.

Forthcoming Events

May

21–22. American **Geological** Inst., Toronto, Ont., Canada. (D. M. Kinney, U.S. Geological Survey, Washington, D.C.)

21–22. Southern **Textile Research** Conf., Hilton Head Island, S.C. (American Assoc. of Textile Chemists and Colorists, P.O. Box 886, Durham, N.C.)

21–23. **Minerals**, 9th annual symp., Moab, Utah. (J. C. Fox, Soc. of Mining Engineers, 345 E. 47 St., New York, N.Y.)

21–23. California Soc. of **Professional Engineers**, annual, Palm Springs, Calif. (J. C. Huisking, 970 Hillcrest Dr., Pomona, Calif.)

23–24. **Radiosensitizers and Radioprotective Drugs**, 1st intern. symp., Milan, Italy. (R. Paoletti, Pharmacology Inst., Via A. del Sarto, 21, Milan)

24–28. Institute of **Food Technologists**, 24th annual, Washington, D.C. (A. Kramer, Dept. of Horticulture, Univ. of Maryland, College Park)

24–28. Near and Middle East **Medical** conf., Istanbul, Turkey. (P. Ponthus, Institut de Radiologie et de Lutte Contre le Cancer, Hotel-Dieu de France, Beirut, Lebanon)

24–29. International Federation for **Information Processing**, global conf., New York, N.Y. (A. P. Speiser, I.B.M. Research Laboratory, Zurichstr. 108, Adliswil-Zurich, Switzerland)

25. **Organic Solid State**, 2nd symp., Franklin Inst., Philadelphia, Pa. (M. M. Labes, Franklin Inst. Laboratories, 20th and The Parkway, Philadelphia 3)

25–27. American **Gynecological** Soc., Hot Springs, Va. (American Gynecological Soc., 3800 Reservoir Rd., Washington, D.C. 20007)

25–27. **Power Reactors and Radioisotopes**, Canadian Nuclear Assoc., Toronto, Ont. (CNA, 19 Richmond St. West, Toronto 1, Ont.)

25–29. Society of **Physical Chemistry**, 14th annual, Bordeaux, France. (G. Emschwiller, Soc. de Chimie physique, 10, rue Vauquelin, Paris 5°, France)

26–29. **Water Studies**, 17th intern. conf., Liége, Belgium. (Cebedeau—Journees 1964, 2, rue A. Stevart, Liége)

27–29. Canadian **High Polymer** Forum, 12th, Ste. Marguerite, Quebec. (H. Daoust, Dept. of Chemistry, University of Montreal, P.O. Box 6128, Montreal, P.Q.)

27–29. **Operations Research** Soc. of America, Montreal, P.Q., Canada. (G. D. Shellard, New York Life Insurance Co., 51 Madison Ave., New York, N.Y. 10010)

27–29. American **Ophthalmological** Soc., Hot Springs, Va. (AOS, 108 E. 68 St., New York, N.Y. 10021)

28–30. American Assoc. of **Museums**, St. Louis, Mo. (S. F. Borhegyi, Milwaukee Public Museum, Milwaukee 3, Wis.)

28–31. **Rockets and Space Flight**, 13th symp., Darmstadt, Germany. (A. F. Staats, Hermann-Oberth-Gesellschaft, Gesellschaft zur Förderung der Erforschung und Erschliessung des Weltraumes, Fritz-Beindorff-Allee 9, Hanover, Germany)

30–7. **Medical Surgical** meetings and film festival, 5th intern., Turin, Italy. (Minerva Medica, Corso Bramante n. 83–85, Turin, Italy)

June

1–3. Instrument Soc. of America, **Analysis Instrumentation** Div., symp., San Francisco, Calif. (Northern California Sec., ISA, 1341 Seventh St., Berkeley, Calif. 94710)

1–3. **Chemical Inst. of Canada**, 47th annual, Kingston, Ont. (D. G. Diaper, Royal Military College, Kingston)

1–3. **Subunit Structure of Proteins**, 17th biology symp., Brookhaven Natl. Laboratory, Upton, N.Y. (S. Lacks, Dept. of Biology, Brookhaven Natl. Laboratory, Upton 11973)

1–4. Basic Science and Clinical Aspects of **Muscle**, Edmonton, Alberta, Canada. (G. Monckton, Univ. of Alberta Hospital, Edmonton)

1–5. **Medical Library** Assoc., 63rd annual, San Francisco, Calif. (MLA, 919 N. Michigan Ave., Chicago 11, Ill.)

1–5. Society of the **Plastics Industry**, natl. conf., New York, N.Y. (W. C. Bird, 250 Park Ave., New York 10017)

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. 37831)

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, Mo.)

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)

15–17. **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, Czechoslovakia)

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 Ärztliche 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.)

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New Products

Automatic 100-channel **pulse height analyzer** provides spectrum analysis of gamma ray and beta particles as well as high-energy protons, charged particles, and fission products. Visual presentation of the energy spectrum simplifies calibration of the analyzer. A variable single-channel window control permits operation of the instrument as a single-channel system, as a multi-channel unit with any number of channels up to 99, or both. Readout is provided by a digital print-out unit. Channel number and counts are printed serially on paper tape. The instrument includes a built-in high-voltage supply, linear amplifier, preset timer, live time meter, add-subtract logic, output for totalizing counts, and static and dynamic display. —J.S. (Technical Measurement Corp., Dept. S202, 441 Washington Ave., North Haven, Conn.)

Precision recording absolute spectrofluorometer provides excitation spectra produced by constant energy that can be converted to highly accurate absorption spectra by division by wavelength for quantum correction and application of appropriate scale factor. In addition the fluorescence emission spectrum is recorded, corrected for system and photo sensor wavelength dependency. Absorption spectra can be obtained by this fluorometric means at concentration levels one or more orders of magnitude below that required for absorption spectrophotometry. Corrected fluorescence spectra will allow immediate assignment of the energy levels involved without the use of reference phosphors and correction calculations. The complete instrument utilizes the xenon arc in a highly efficient arrangement and the light that passes through the sample is monitored by a thermocouple bolometer that has a very flat energy versus wavelength response. The output of the bolometer controls a reference light level and fluorescence intensity is measured as a ratio of these values. The emission monochromator and the photo-tube responses are sufficiently stable to permit a correction cam to modify the reference level to correct the system without any reduction in sensitivity of the instrument with attenuators or slit adjustments that would influence the band-pass of the instrument. Second-order spectra are removed by filters that are automatically inserted as the monochromators scan. Spectrum scan time is optimized automatically to maintain resolution to selectable limits over sharp peaks and reduce time spent in flat regions. In addition to fluorometry the instrument operates as a double beam, double monochromator spectrophotometer.—R.L.B. (G. K. Turner Associates, Dept. S238, 2524 Pulgas Ave., Palo Alto, Calif.)

High-sensitivity recorder (model V.O.M-7) with a full-scale sensitivity of 0.5 mv is designed to measure the output of gas chromatography detectors, electrode potentials, and other low-level signals in biomedical research. Simply an improvement of the earlier V.O.M.-5, the new model directly measures and records d-c voltage, current, and resistance without need for external converters. It has a calibrated accuracy of ±0.5 percent full scale on the 0.5-, 1-, and 10-mv ranges, and ±2 percent on the 0.1-, 1-, and 10-volt ranges. Five current ranges are provided from 1 μa to 10 ma with ±2 percent accuracies on all ranges. The most sensitive resistance setting allows a full-scale deflection for 1 ohm. Like the V.O.M.-5, the new model weighs 20 lb (9 kg) and can be used flat, tilted 30°, or wall mounted.—D.J.P. (Bausch & Lomb, Dept. S251, Rochester, N.Y. 14602)

Ball rebound tester measures the energy absorbed when a small steel ball is dropped on a sample to evaluate the physical properties of plastic materials. The tester is said to measure the response of polymeric materials, plastics, elastomers, and films to fixed impact energy of constant frequency from −200° to +500°F in vacuum or in any desired atmosphere. The manufacturer states that the resulting information can be used to determine thermodynamic transitions, damping factor as a function of temperature, and other physical properties. The specimen disks, 1 inch (2.54 cm) in diameter, required for the test, may be cut from film, sheet, or extrusions. The tester is semiautomatic, motorized, and has a built-in temperature controller.—J.S. (Transistor Automation Corp., Dept. S203, 101 Erie St., Cambridge 39, Mass.)

Pneumatic air dryer provides dry air containing less than 4 parts per million H_2O at a rate of 2.5 ft^3/min for purging infrared spectrophotometer. High-resolution infrared spectrophotometry requires dry air in the sample chamber to eliminate absorption bands due to water vapor in the atmosphere. The Beckman Pneumatic Air Dryer requires a compressed air source capable of 5 ft^3/min at 100 lb/in^2. (gage), and an 115-volt a-c outlet. The compressed air enters through an inlet filter into two identical desiccating chambers. Highly absorbent packing material within each chamber removes both water vapor and oil from the air as it passes through. A timing motor actuates a value system which alternates the air flow through the two chambers in 30-sec cycles. First one chamber supplies dry air to the instrument, then the other. During the period a chamber is not supplying air, the flow of air through that chamber is reversed and the chamber itself is purged. The output of the chambers passes through another filter and pressure regulator. Once in operation, the time required to reach the spectrophotometer's optimum purge is generally between 8 and 12 hours. For this reason, when an instrument is in daily use, 24-hour-a-day operation of the dryer is recommended. This dryer, which may be used on any spectrophotometer designed for purging, may be wall mounted or placed on any flat surface convenient to the instrument.—D.J.P. (Beckman Instruments, Inc., Scientific and Process Instruments Div., Dept. S242, Fullerton, Calif.)

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

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The information reported here is obtained from manufacturers and from other sources considered to be reliable. Neither *Science* nor the writers assume responsibility for the accuracy of the information.

Address inquiries to the manufacturer, mentioning *Science* and the department number.

Forthcoming Events

(Continued from page 903)

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 Academy 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. Amreican **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. (Inst. of Physics and the Physical Soc., 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°)