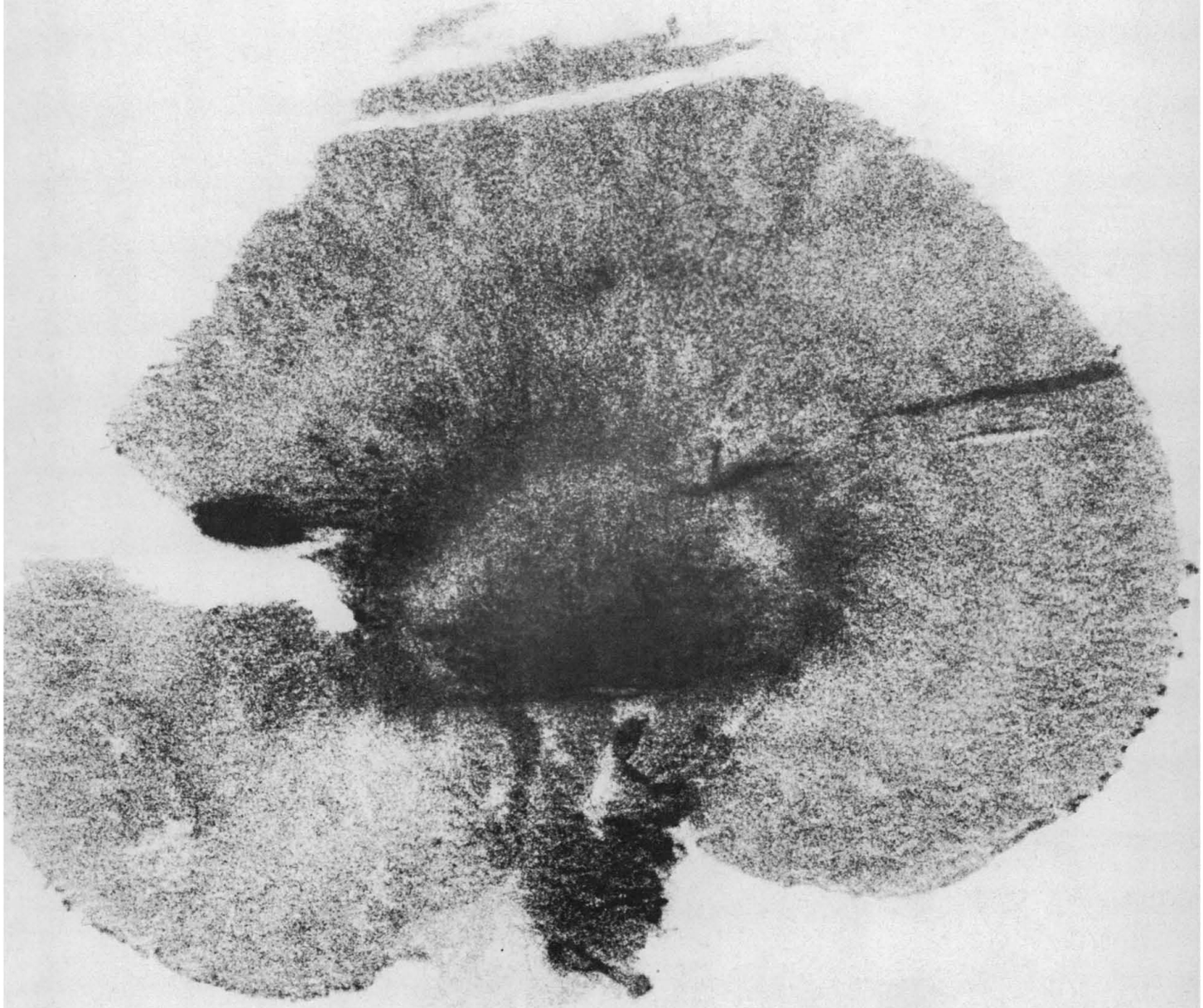
SCIENCE

14 February 1964

Vol. 143, No. 3607

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



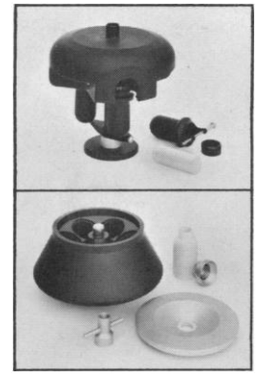
KIDNEY AUTORADIOGRAPHY

New
from Beckman...

Model L-2
Preparative Ultracentrifuge

Here is an advanced instrument for preparative centrifugation. More sophisticated than our Model L, the new L-2 has a substantially larger rotor chamber which holds not only every Model L rotor, but bigger swinging-bucket and fixed-angle rotors with far larger sample volumes. It has a convenient system to control rotor temperature, and it has a stabilizer to prevent rotor wobble during deceleration, helping to keep fractions from remixing.

If your research calls for an advanced preparative instrument, we'd like to send you more information on our new Model L-2. Ask for Data File L2-5.



The new Type SW 25.2 Rotor

Holds nearly twice as much sample (180 ml) as the next biggest swinging-bucket rotor, yet generates even more force (106,900 g)!

The new Type 19 Rotor

Spins 1.5 liters at 53,700 g! Caps for the six 250 ml bottles screw on and off easily by hand.

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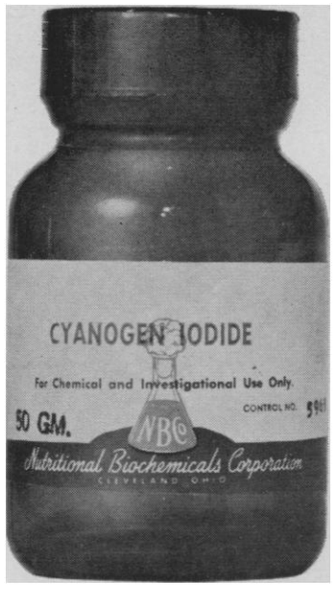
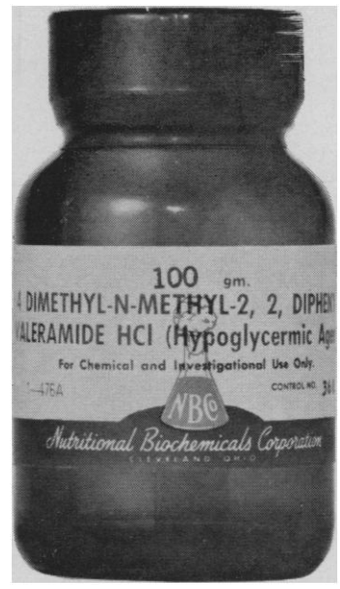


Two from N·B·C !



ICN MIMICS EFFECTS OF THYROXINE ON ISOLATED LIVER MITOCHONDRIA

Cyanogen Iodide (ICN) has been found to mimic in most respects Thyroxine's effects on isolated liver mitochondria (1). It is stable in water and serves as a donor of I+.

ICN behaves like Thyroxine in these respects:

1. A quantity as small as 10^{-6}M produces substantial water uptake and swelling in rat liver mitochondria. As with Thyroxine, ICN-produced swelling is inhibited by serum albumin and strong sucrose (0.75M).

2. Antimycin A, Amytal and Cyanide also inhibit ICN-produced swelling. Thyroxine has been reported to display similar properties. (2,3).

3. EDTA is effective against ICN-produced swelling. It is also effective against thyroxine (4).

4. ATP causes rapid shrinking of ICN-swollen mitochondria. It behaves exactly the same with Thyroxine-caused swelling. (5).

25-gram bottle, $1.50 gm. 5-gram bottle, $1.90 gm.
1-gram bottle, $2.25 gm.

(1) J. E. Rall, J. Roche, R. Michel, O. Michel, S. Varonne, Biochem. Biophys. Acta. 62, 622, (1962). (2) A. L. Lehninger, B. L. Ray, M. Schneider, J. Biophys. Biochem. Cytol. 5, 97, (1959). (3) A. L. Lehninger, B. L. Ray, Biochem. Biophys. Acta. 26, 643, (1957). (4) D. F. Tapley, J. Biol. Chem. 222, 325, (1956). (5) A. L. Lehninger, Ibid. 234, 2187, (1959).

UNIQUE HYPOGLYCEMIC AGENT FOUND FOUR TIMES AS POTENT AS TOLBUTAMIDE

4 Dimethyl Amino-N-Methyl 2, 2 Diphenyl Valeramide HCl was recently reported to be four times as potent as tolbutamide in lowering blood sugars.

It appears to act through a different mechanism than hypoglycemic agents which increase the oxidation of glucose.

Dulin, et. al. conclude that 4 D.M.D.V. appears to act by inhibiting liver glucose output—not by glucose oxidation or inhibition of metabolic effect of adrenal hormones. (1)

10-gram bottle, $4.50 gm. 5-gram bottle, $4.90 gm.
1-gram bottle, $5.50 gm.

(1) W. E. Dulin, F. L. Schmidt, M. C. Blanks, G. H. Luna, Proc. Soc. Exptl. Biol. Med. 109, 729, (1962).

All chemicals described are for chemical and investigational use only. They are not offered for clinical or drug use. The literature reference should not be interpreted as either an endorsement or disapproval of the biochemical by the cited investigator.

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SC-

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SCIENCE

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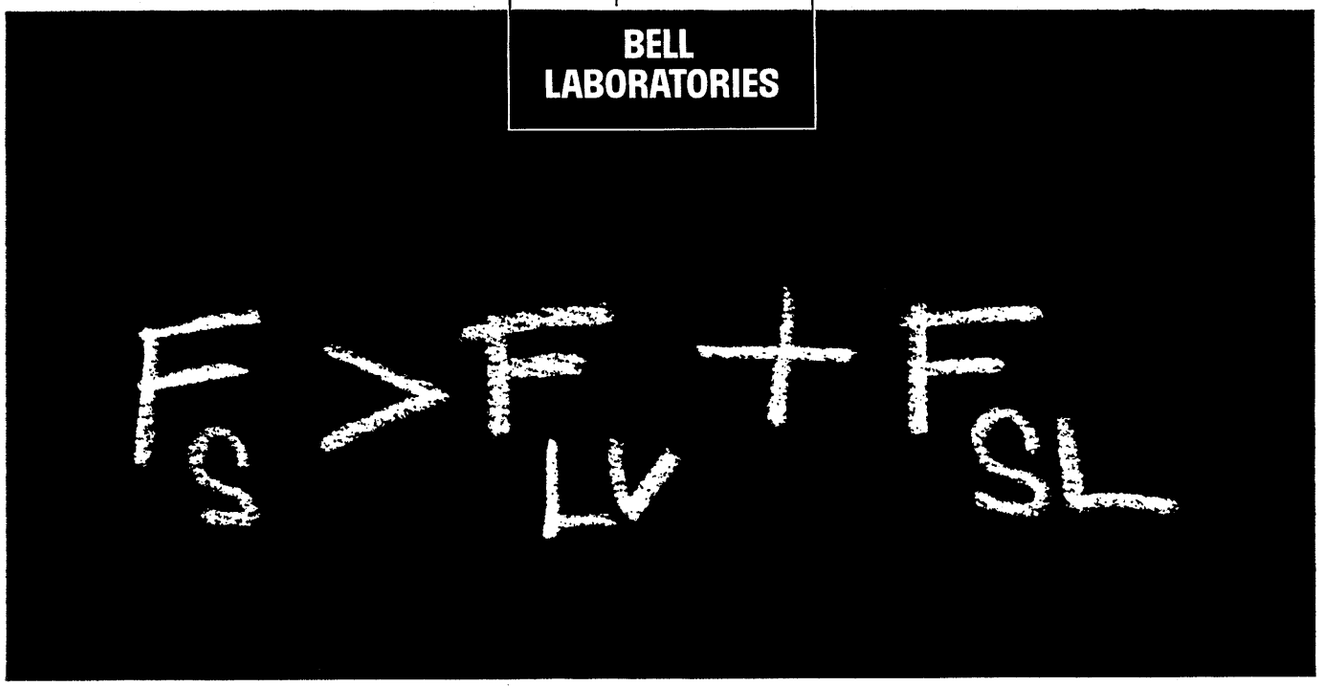
COVER

Reverse autoradiograph showing distribution of radiosodium in rat kidney; the light areas correspond to radioactive deposition. Two regions of sodium concentration can be distinguished; one is near the junction between the inner and outer medulla and the other is deeper within the medulla. The specimen was prepared from a frozen kidney section 10 microns thick. The picture was made with nonscreen x-ray film which had been exposed at −20°C. See page 695.

Report from

BELL LABORATORIES



Spontaneous spreading of a liquid on a solid occurs when surface tension of the solid (F_S) is greater than the sum of the surface tension of the liquid in contact with its vapor (F_{LV}) and the interfacial tension between the solid and liquid (F_{SL}).

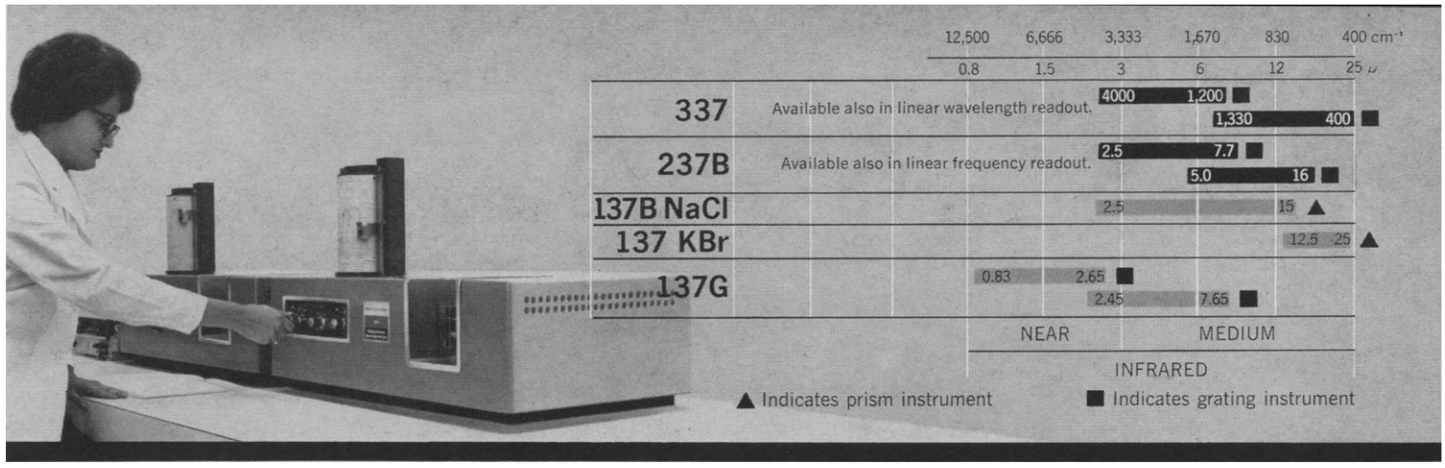
A NEW WAY OF LOOKING AT ADHESION

It is well known that any two clean solids will form a strong joint if their contacting surfaces are ideally flat and smooth. But real surfaces are rough and do not provide the proper interfacial contact necessary for forming a strong joint.

If, however, one of the materials is a liquid that *spreads* spontaneously over the second material, interfacial contact occurs extensively and rapidly. Thus the key to making strong joints is to have one material in the form of a liquid which "wets" the second material.

By the proper application of this simple theory of adhesion, research chemists at Bell Laboratories have made strong adhesive joints between what had previously seemed to be "unbondable" materials—for example, epoxy and solid untreated polyethylene. The procedure is first to cure the epoxy to its solid form, and then to bring it into contact with molten polyethylene. The molten polyethylene spreads on the epoxy and when solidified forms a strong joint.

While a complete understanding of the bonding process must await further research, detailed consideration of the spreadability concept seems to be invaluable in dictating which one of a pair of materials must be put into the liquid state to form the joint. BELL TELEPHONE LABORATORIES, World Center of Communications Research and Development.



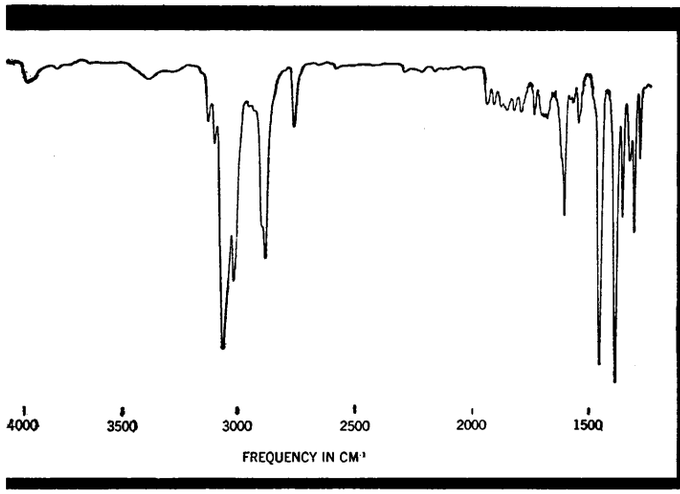
TWO NEW LOW-COST SPECTROPHOTOMETERS USE VARIABLE SLIT PROGRAMMING TO PROVIDE A WIDE RANGE OF RESOLUTION AND ENERGY SCHEDULES

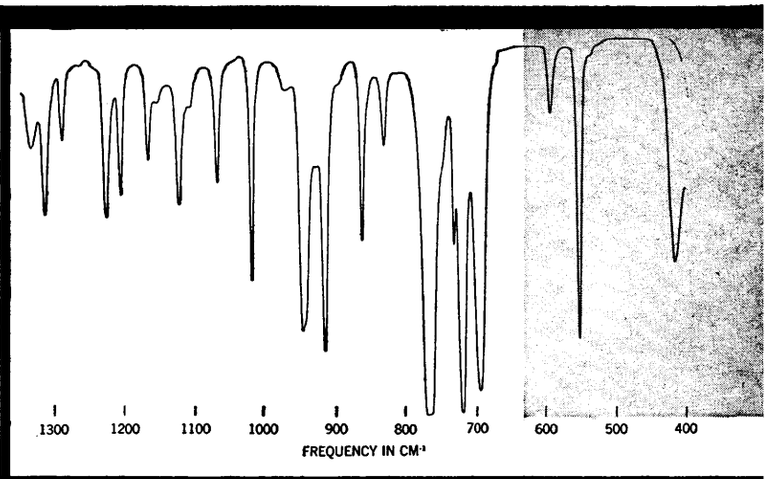
Perkin-Elmer's new low-cost infrared spectrophotometers, the Models 237B and 337, share outstanding new capabilities:

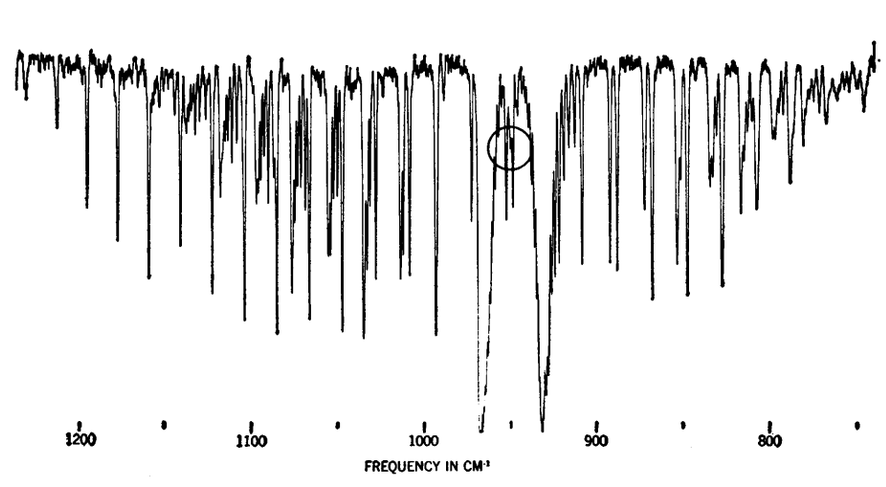
- three-minute scan option for reliable fast surveys;
- variable slit programming, to optimize spectral slit widths under varying requirements of sample, speed and resolution;
- external recorder attachment provisions, for abscissa expansion or compression, as required;
- dual-grating monochromator,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

PERKIN ELMER

this magnetic stirrer goes on field trips

New Porta-Stir™ from LaPine! Here's the first truly portable magnetic stirrer. New Porta-Stir stirs whatever liquid you want, wherever you want—and you can forget about outlets and extra wires! Easy to carry, Porta-Stir measures 5½″ square, 3½″ high. Weighs only 2¼ lbs. Neat and compact, the batteries, recharger and rheostat all are inside its white linear polyethylene case. Like the convenience? You'll appreciate the performance too.

In the field Porta-Stir can stir a liquid of water viscosity up to 1750 rpm for as long as 11 hours! And stirring speed remains constant. Because its three 1¼ volt batteries are the nickel-cadmium type, voltage drop is negligible. And batteries recharge to full strength overnight. Last for years. Porta-Stir may be operated on 115 volts AC as well as from batteries. The built-in transformer-rectifier trickle charger will keep batteries at peak power over extended periods. Speed regulation of the DC motor is excellent, and heat dissipation is not a problem.

The one-piece plastic case is impact- and chemical-resistant, and white for ease in titrating. A circular depression on the top centers beakers or flasks and the square case makes it easy to bank several stirrers.

Porta-Stir comes complete with three 1¼ volt nickel-cadmium batteries, built-in charger, removable line cord and 1½ inch long LaPine LOZENGE® Teflon*-covered magnetic stirring bar. The price, $45.00. About $10 more than ordinary magnetic stirrers. Well worth it, isn't it?

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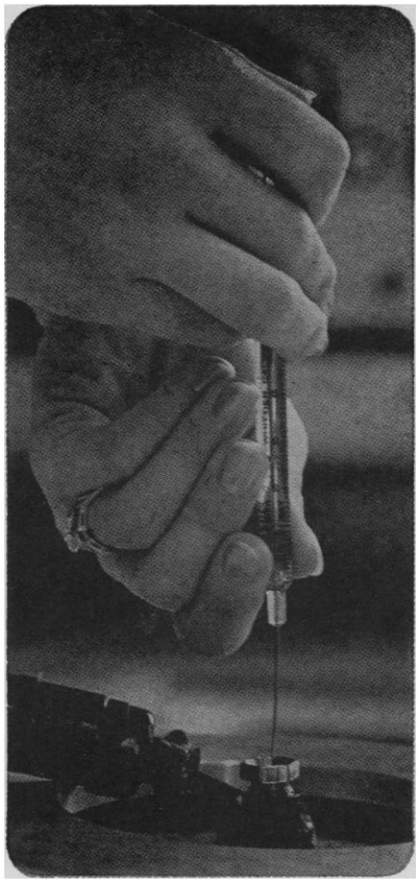
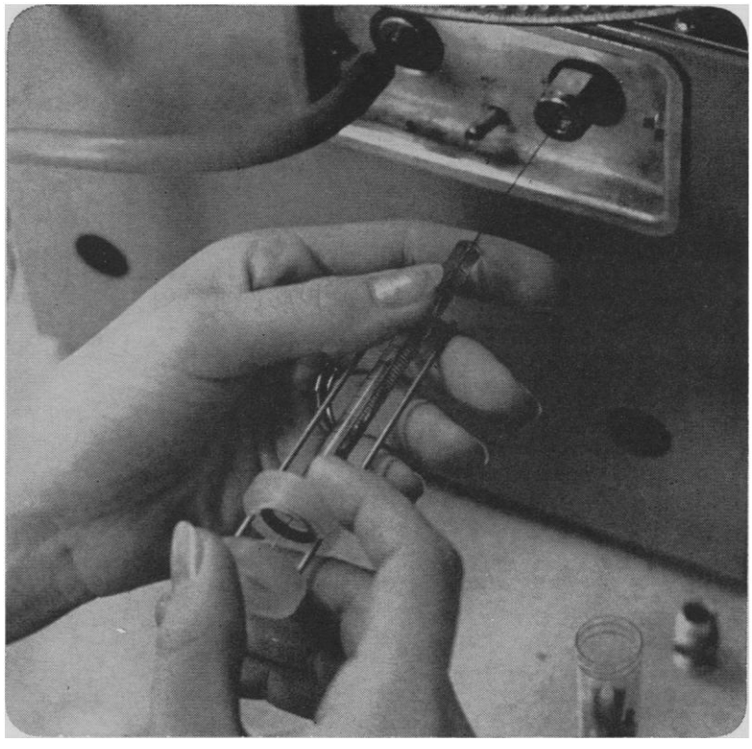
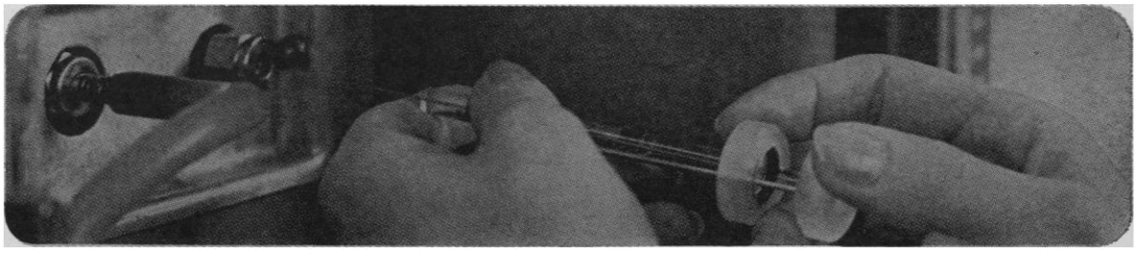
■ CASE HISTORY #38







QUALITY CONTROLLED ON CHLORINATED SOLVENTS

The chlorinated solvents manufactured by **Pittsburgh Plate Glass Company** at their Barberton, Ohio, Chemical Division, are continually analyzed before leaving the plant to make certain they meet the Company's high quality specifications. A high purity trichloroethylene produced at Barberton is used for flushing missile fuel systems and has an impurity specification of 200 p.p.m. To perform this analysis a 10μl sample is injected into a gas chromatograph and run with the detector filament current at its maximum level for greatest sensitivity. The impurity components are determined with an accuracy of 5-10 p.p.m. "The accuracy and ruggedness of the Hamliton 701NW/G simplify the handling of our samples," states **Fred P. Ewald, Jr., Barberton Senior Research Chemist. Hamilton manufactures a complete line of precision syringes from a capacity of 0.5μl to 500μl and other related chromatograph equipment.**

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14 February 1964, Volume 143, Number 3607 **SCIENCE**

Self-Development

When we have learned to achieve . . . self-renewal . . . we shall have discovered one of the most important secrets a society can learn, a secret that will unlock new resources of vitality throughout the society. And we shall have done something to avert the hardening of the arteries that attacks so many societies. Men who have lost their adaptiveness naturally resist change. The most stubborn protector of his own vested interest is the man who has lost the capacity for self-renewal.

No one knows why some individuals seem capable of self-renewal while others do not. But we have some important clues to what the self-renewing man is like, and what we might do to foster renewal.

For the self-renewing man the development of his own potentialities and the process of self-discovery never end. It is a sad but unarguable fact that most human beings go through their lives only partially aware of the full range of their abilities. As a boy in California I spent a good deal of time in the Mother Lode country, and like every boy of my age I listened raptly to the tales told by the old-time prospectors in that area, some of them veterans of the Klondike gold rush. Every one of them had at least one good campfire story of a lost gold mine. The details varied: the original discoverer had died in the mine, or had gone crazy, or had been killed in a shooting scrape, or had just walked off thinking the mine worthless. But the central theme was constant: riches left untapped. I have come to believe that those tales offer a paradigm of education as most of us experience it. The mine is worked for a little while and then abandoned.

The development of abilities is at least in part a dialogue between the individual and his environment. If he has it to give and the environment demands it, the ability will develop. Any small boy with real ability to wield his fists is likely to discover that ability fairly early. The little girl with the gift for charming grown-ups will have no trouble discovering that talent. But most abilities are not so readily evoked by the common circumstances of life. The "mute, inglorious Miltons" are more numerous than one might suppose, particularly in an age in which even an articulate Milton might go unnoticed, certainly unrewarded. Most of us have potentialities that have never been developed simply because the circumstances of our lives never called them forth.

Exploration of the full range of his own potentialities is not something that the self-renewing man leaves to the chances of life. It is something he pursues systematically, or at least avidly, to the end of his days. He looks forward to an endless and unpredictable dialogue between his potentialities and the claims of life—not only the claims he encounters but the claims he invents. And by potentialities I mean not just skills, but the full range of his capacities for sensing, wondering, learning, understanding, loving and aspiring.

The ultimate goal of the educational system is to shift to the individual the burden of pursuing his own education. This will not be a widely shared pursuit until we get over our odd conviction that education is what goes on in school buildings and nowhere else. Not only does education continue when schooling ends, but it is not confined to what may be studied in adult education courses. The world is an incomparable classroom, and life is a memorable teacher for those who aren't afraid of her.

—JOHN W. GARDNER, *Carnegie Foundation, New York*

[From *Self-Renewal: The Individual and the Innovative Society*, published by Harper & Row, New York, 1964; reprinted with permission of the publishers.]

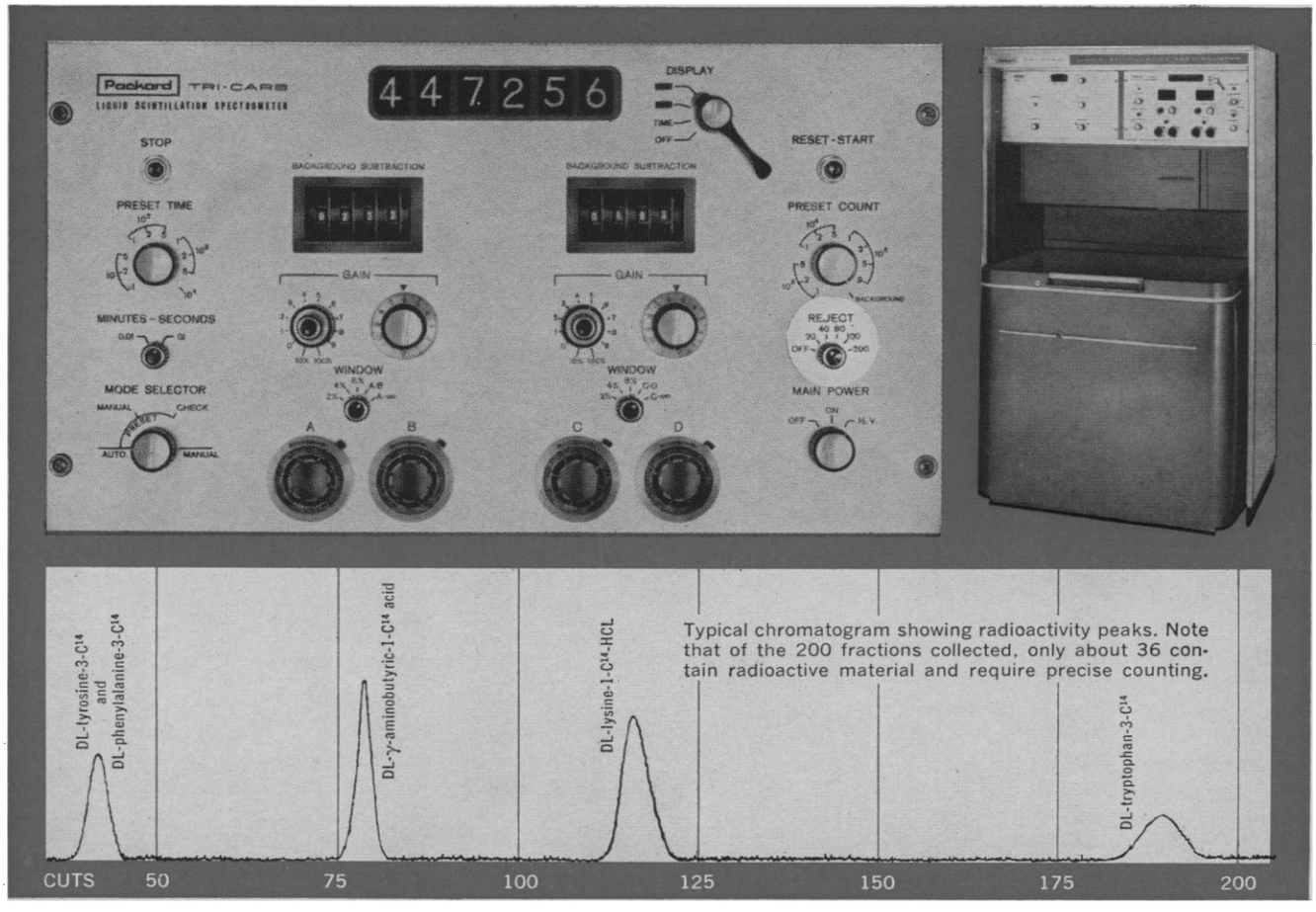
Low-Activity Sample Reject IN NEW TRI-CARB® SPECTROMETERS

The ability of new Tri-Carb Spectrometers to automatically bypass samples with little or no radioactivity can save hours of valuable counting time. This ability finds application in two commonly-encountered counting situations:

(1) *Identifying and counting only those chromatographic samples which contain material of interest while bypassing those which have little or no activity.* Since a typical chromatographic analysis (see curve below) may be represented by several hundred cuts, of which only a few will contain radioactivity, savings in counting time are substantial.

(2) *Separating samples of low activity from those containing higher levels to ensure allocation of optimum counting time for each.* For example: most of the samples from an experiment may require a 10 minute count to achieve the desired statistical accuracy, but a few low-activity samples need a 100 minute count to achieve the same statistics. These low-activity samples can be screened out (and identified) during the short counts on the majority, and then grouped together for automatic counting to the desired statistical accuracy. Again, important savings in counting time are achieved.

Low-activity Sample Reject increases the utility of new Tri-Carb Spectrometers because it places more instrument counting hours at the disposal of the researcher. It is just one of the many significant new features now available in 3000 and 4000 Series Tri-Carb Spectrometers. Ask your Packard Sales Engineer for complete details, or write for Bulletin 1030.



Typical chromatogram showing radioactivity peaks. Note that of the 200 fractions collected, only about 36 contain radioactive material and require precise counting.

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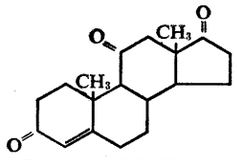
Kodak reports on:

2 mr per month above natural background... film for processing at 130°F... slight variations in configuration



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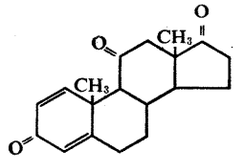

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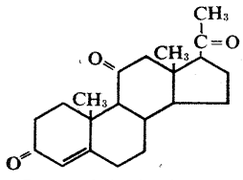
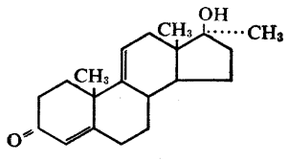


EASTMAN 9122, $3.00 for 1 g.



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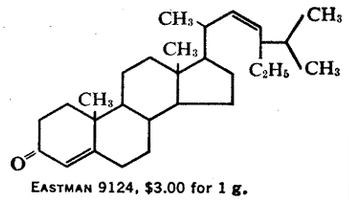
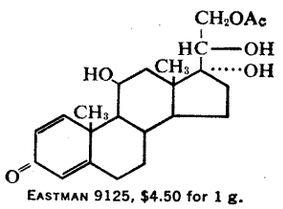


EASTMAN 9124, $3.00 for 1 g.



EASTMAN 9125, $4.50 for 1 g.

The film that spoils fastest

In November, the International Conference on the Radioactive Pollution of Gaseous Media met at the Centre d'Energie Nucleaire at Saclay, outside of Paris. One gaseous medium that interests everybody is the one we all like to breathe and take walks in. Nobody is in favor of polluting it.

At Saclay an American, a friend of ours, spoke of the need for a simple way to monitor radioactive noble gases from reactors. (Particulate, chemically reactive, condensable, and scrubbable radioactive effluvia being easier to remove, the noble gases may become the limiting factor in the economics of nuclear sanitation.) He offered a suggestion for monitoring the environment around the stacks: film badges loaded with KODAK Personal Monitoring Film, Type 3, such as are worn on the person.

He spelled out the reasoning that leads to 10 milliroentgens as the required sensitivity and said that dessication of this film confers the required sensitivity on the method. Dessication helps by reducing the effect of temperature on response, latent image stability, and chemical fog. After studies involving a deep salt mine where the dose runs 0.2 mr per month, our friend and his collaborators believe that in a month dessicated KODAK Personal Monitoring Film, Type 3, can reliably record 10 mr, *including* the normal natural background of about 8 mr per month.

Though obviously the film itself starts out with low background, the story about it winds up with some background which our friend, who is not a Kodak salesman but a professor at a school of public health, quite properly ignored. He did say that the smallest dose that personal badges usually measure reliably was about 30 mr but did not give the reason why it is no better than that: word has not gotten around as much as it should have that personal badges ought always to be loaded with KODAK Personal Monitoring Film, Type 3, simply because there isn't any other monitoring film that sensitive to ionizing radiation.

For the details on dessication, or the names of outfits that can do it for you, ask Eastman Kodak Company, Special Sensitized Products Division, Rochester, N. Y. 14650.

Man is a symbol-using animal

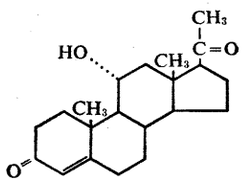
As far as we are concerned, the eyes have it. The eye is the gateway to the soul. When a blind man says "I see," he means "I understand." Literal seeing is preferred by billions to figurative seeing. Therefore where understanding is required, as in science and engineering, means are ever sought to use photography to best advantage.

Of course, photography covers more than the photographing of objects. Often it is very desirable to photograph symbols such, for example, as are drawn in some fashion or other by electronic pencil. To do such photography on more than a manual, casual basis we furnish a 16mm and 35mm film long known to those skilled in the art as KODAK LINAGRAPH Pan Film. Time has caught up with it, though, as we are pleased to tell you instead of having you tell us.

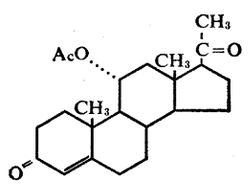
The old LINAGRAPH Pan emulsion couldn't stand more than 90°F processing temperature. To be in the swim today, one processes film almost as hot as one launders shirts. Minutes shrink to seconds (but the shirts hardly shrink at all any more). Now KODAK LINAGRAPH Pan Film carries the legend "Improved for High-Speed Processing." It can stand 130°F.

We don't merely guarantee that the emulsion will not turn to beef bouillon at 130°F. We tell you the photographic quality will be as good and better than when you carefully maintained 68°F, as you were taught in youth, when there was plenty of time.

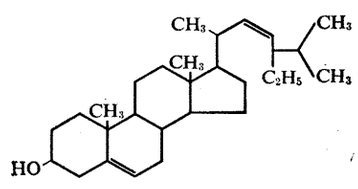
Arrangements to shoot the new KODAK LINAGRAPH *Pan Film to you are made through Photorecording Methods Division, Eastman Kodak Company, Rochester, N. Y. For 16mm, we can also furnish a processing machine that delivers in 2 minutes, dry to dry. For 35mm, there is still a little challenge left in designing 130°F processing gear instead of the easy way, where you simply make out a $12,500 equipment-purchase requisition.*



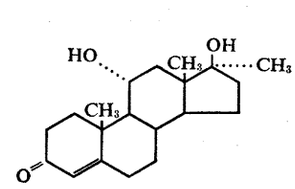
EASTMAN 9126, $3.00 for 1 g.



EASTMAN 9127, $3.00 for 1 g.



EASTMAN 9128, $3.00 for 1 g.



EASTMAN 9130, $4.50 for 1 g.

These are steroids but believed physiologically inert and thus different from very similar configurations of C, H, and O atoms in which very slight variations distinguish male from female and health from disease. To a small subset of the scientific community, these diagrams tell all, without need for stuttering non-words never intended to be framed by human lips. To that subset and that alone is newly offered any of these compounds under the indicated EASTMAN Organic Chemical number at the indicated price from Distillation Products Industries, Rochester, N. Y. 14603 (Division of Eastman Kodak Company). *Other stuff in this advertisement may bore that subset stiff. There are other subsets, however.* *Prices subject to change without notice.*

high lead content of rocks and soils and the incidence of multiple sclerosis in 24 areas of England.

W. H. Allaway (U.S. Department of Agriculture) reported on a recent discovery that a deficiency of selenium (less than 0.1 part per million in the dry weight of forage) causes white muscle disease in lambs and calves. Areas of selenium deficiency and toxicity are being mapped by animal nutritionists. A possible connection with the incidence of muscular dystrophy in humans is being investigated by at least one government agency.

The deficiency problems in Florida that are related to the availability of iron, copper, molybdenum, and cobalt to plants and the effect of these elements on nitrate and potassium contents were described by H. C. Harris (agronomist, University of Florida). Such areas in Florida have been related to salt sickness in cattle and to anemia and bone deformation in children. This situation is being alleviated by adding minor elements to the soil.

Trace-element studies in New Zealand in areas of marked difference in the incidence of dental caries were described by F. L. Losee (U.S. Navy). Areas with soils that have a high *p*H and $CaCO_3$ content produce vegetables with more molybdenum and less manganese, and there is a lower incidence of dental caries. This work was corroborated by W. B. Healey (New Zealand) who described recent experiments in feeding molybdenum and manganese to twin lambs.

Hans T. Shacklette (U.S. Geological Survey) showed that the difference in iodine content in plants is an inherent characteristic of the taxonomic group. A given species thus has a characteristic range within which a secondary relation with the environment can occur. The iodine content ranged from 2.7 parts per million dry weight in deciduous trees to 1435 parts per million in brown algae. The iodine content of Spanish moss, an air plant (described by Shacklette), and the differences in humans (described by R. L. Voight, U.S. Public Health Service) indicate that both animals and plants absorb considerable amounts of iodine from the atmosphere.

Maps of the United States that showed areas of trace-element deficiency and excess and also of disease incidence pointed up the geographic, geologic, and soil relationships and suggested the need for compiling maps that would indicate the distribution of trace elements in ground water, geologic strata, soils, and plants.

J. E. Banta (U.S. Public Health Service) discussed the problems of an epidemiologist in correlating trace-element differences with evolutionary chronic diseases, in defining the population at risk, and in defining the particular geochemical unit related to the disease pattern. Me made a strong plea for cooperation between the geochemist, geologist, and epidemiologist.

Several participants proposed the establishment of a trace-element institute or repository for trace-element information accumulated by workers in many fields. This proposal was considered premature at this time. A tentative decision was made to continue the group under the auspices of the Geochemical Society and the Geological Society of America, but to meet with other health groups and scientific societies in alternate years. Those who are interested in receiving notices of publication of the papers or in participating in further group activity are invited to contact any member of the committee. Members of the committee include Helen L. Cannon, U.S. Geological Survey, Denver, Colorado; Homer K. Hall, U.S. Public Health Service, Columbia, Missouri; Harry V. Warren, University of British Columbia, Vancouver; Michael Fleischer, U.S. Geological Survey, Washington, D.C.; and John Fortescue, Canadian Geological Survey, Ottawa, Ontario.

HELEN L. CANNON
U.S. Geological Survey,
Denver, Colorado

Forthcoming Events

February

19–21. American **Educational Research** Assoc., Chicago, Ill. (J. R. Gerberich, 1201 16th St., NW, Washington, D.C.)

19–5. Pan American **Medical** Assoc., 39th congr., the Americas, during a cruise aboard the S.S. *Independence.* (J. J. Eller, 745 Fifth Ave., New York, N.Y.)

23–27. Technical Assoc. of the **Pulp and Paper** Industry, 49th annual, New York, N.Y. (TAPPI, 360 Lexington Ave., New York, N.Y. 10017)

23–28. **Otorhinolaryngology and Bronchoesophagology,** 9th Pan American congr., Bogota, Colombia. (C. M. Norris, 3401 N. Broad St., Philadelphia, Pa.)

24–25. Atmospheric Movements of **Radioactive Materials,** Geneva, Switzerland. (World Meteorological Organization, Geneva)

24–25. **Writing-Improvement** Programs for Engineers, seminar, New York, N.Y. (C. A. Meyer, RCA Commercial Engineering, Harrison, N.J.)

24–28. Institution of **Electrical Engineers**, intern. conf. on transmission aspects of communications networks, London, England. (IEE, Savoy Pl., London, W.C.2)

25–26. **Dairy Engineering**, natl. conf., East Lansing, Mich. (C. W. Hall, College of Agriculture, Michigan State Univ., East Lansing)

26–28. **Biophysical** Soc., Chicago, Ill. (W. Sleator, Jr., Washington Univ. Medical School, 660 Kingshighway, St. Louis 10, Mo.)

26–28. **Scintillation and Semiconductor** symp., Washington, D.C. (G. A. Morton, RCA Laboratories, Princeton, N.J.)

27–28. Cellular Basis for the Action of **Cardiac Drugs**, Philadelphia, Pa. (Heart Assoc. of Southeastern Pa., 318 S. 19 St., Philadelphia 3)

27–28. National Assoc. for **Mental Health**, annual conf., London, England. (General Secty., 39 Queen Anne St., London, W.C.1)

27–29. American Acad. of **Forensic Sciences**, Chicago, Ill. (W. J. R. Camp, 1853 W. Polk St., Chicago 12)

27–29. American **Physical** Soc., Tucson, Ariz. (K. K. Darrow, American Physical Soc., Columbia Univ., New York, N.Y.)

March

1–4. Canadian Assoc. of **Radiologists**, annual, Vancouver, B.C. (A. I. Ekstrand, 1555 Summerhill Ave., Montreal 25, P.Q., Canada)

2–4. Fundamental **Cancer Research**, 18th annual symp., Houston, Tex. (R. J. Shalek, Dept. of Physics, Univ. of Texas, Houston)

2–6. **Analytical Chemistry** and Applied Spectroscopy, Pittsburgh, Pa. (R. B. Fricioni, Allegheny Ludlum Steel Corp., Research Center, Brackenridge, Pa.)

2–6. Applied **Meteorology**, 5th conf., American Meteorological Soc., Atlantic City, N.J. (A. Hilsenrod, Federal Aviation Agency, Atlantic City)

3–7. Inter-American **Nuclear Energy** Commission, 5th, Valparaiso, Chile.) Pan American Union, Constitution Ave., NW, Washington, D.C. 20006)

3–21. World **Health** Assembly, 17th annual, Geneva, Switzerland. (WHO, Palais des Nations, Geneva)

4–6. **Thermal Radiation** of Solids, symp., San Francisco, Calif. (W. D. Harris, Engineering and Sciences Extension, Univ. of California, Berkeley 4)

4–7. **Psychoanalysis**, first Pan-American congr., Mexico City, Mexico. (The Congress, Insurgentes 421 "C"-108, Mexico 11, D.F.)

5–6. Theoretical and Applied **Mechanics**, southeastern meeting, Atlanta, Ga. (Dept. of Short Courses and Conferences, Georgia Inst. of Technology, Atlanta)

5–7. Evaluation and Mechanisms of **Drug Toxicity**, conf., New York, N.Y. (New York Acad. of Sciences, 2 E. 63 St., New York 21)

5–7. **Macromolecular** Colloquium, Freiburg im Breisgau, Germany. (Institut für Makromolekulare Chemie, Univ. Freiburg, Stefan-Meier-Str. 31, 78 Freiburg im Breisgau)

5–7. Pacific **Sociological** Assoc., Coro-

nado, Calif. (S. M. Dornbusch, Stanford Univ., Stanford, Calif.)

6–8. Society of **Nuclear Medicine**, southwestern chapter, Houston, Tex. (S. N. Turiel, SNM, 333 North Michigan Ave., Chicago 1, Ill.)

6–8. National **Wildlife** Federation, 28th annual, Las Vegas, Nev. (NWF, 1412 16th St., NW, Washington, D.C. 20036)

7–12. **Proctology**, 16th teaching seminar, Miami Beach, Fla. (J. Reichert, 147-41 Sanford Ave., Flushing, N.Y. 11355)

8–12. **Water Resources** Engineering, conf., Mobile, Ala. (American Soc. of Civil Engineers, 345 E. 47 St., New York 10017)

8–15. North American **Clinical Dermatologic Soc.**, Mexico City, Mexico. (E. F. Finnerty, 510 Commonwealth Ave., Boston, Mass.)

9–10. **Aerodynamic Testing** Conf., American Inst. of Aeronautics and Astronautics, Washington, D.C. (J. N. Fresh, David Taylor Model Basin, Code 630, U.S. Navy, Washington, D.C.)

9–11. **Computers in Education**, conf., Eugene, Ore. (J. W. Loughary, School of Education, Univ. of Oregon, Eugene)

9–11. Society of **Toxicology**, annual, Williamsburg, Va. (C. S. Weil, Mellon Inst., 4400 Fifth Ave., Pittsburgh, Pa. 15213)

9–13. National Assoc. of **Corrosion Engineers**, 20th conf., Chicago, Ill. (W. H. Schultz, Dearborn Chemical Corp., Chicago, Ill.)

9–13. Peaceful Applications of **Nuclear Energy**, 5th inter-American symp., Valparaiso, Chile. (J. D. Perkinson, Inter-American Nuclear Energy Commission, Pan American Union, Washington, D.C.)

10. **Wildlife Telemetry**, annual, Las Vegas, Nev. (L. Adams, Univ. of California, Carmel Valley)

10–12. **Exploding Conductor** Phenomena, 3rd conf., Boston, Mass. (W. G. Chace, Air Force Cambridge Research Laboratories, Hanscom Field, Bedford, Mass.)

10–13. **Raman** Colloquium, Freudenstadt/Schwarzwald, Germany. (J. Gobeau, Dept. of Chemistry, Technische Hochschule Stuttgart, 7 Stuttgart, Germany)

10–14. American Inst. of **Chemical Engineers**, New Orleans, La. (AIChE, 345 E. 47 St., New York 17)

11–12. Instrument Soc. of America, 14th conf. on **instrumentation** for the iron and steel industry, Pittsburgh, Pa. (N. F. Simcic, Research Laboratory, Jones and Laughlin Steel Corp., 900 Agnew Rd., Pittsburgh 30)

12. **Interplanetary Monitoring Platform** Experiments, symp., Greenbelt, Md. (C. P. Boyle, Code 207, Goddard Space Flight Center, Greenbelt, Md. 20771)

12–13. **Information** Organization, New Brunswick, N.J. (S. Artandi, Graduate School of Library Service, Rutgers Univ., New Brunswick)

13–14. **Louisiana Acad.** of Sciences, Baton Rouge. (H. J. Bennett, Dept. of Zoology, Louisiana State Univ., Baton Rouge)

13–14. Institute of **Management** Sciences. 11th intern., Pittsburgh, Pa. (IMS, Box 273, Pleasantville, N.Y.)

13–14. Effects of **Shock and Vibration** on the human body, Denver, Colo. (A. E. Paige, Dept. of Electrical Engineering, University of Denver, Denver)

14–15. **Endocrinology**, 2nd annual symp., Salisbury, N.C. (H. Nushan, Medical Service, Veterans Administration Hospital, Salisbury)

14–19. American Assoc. of **Psychiatric Clinics for Children**, annual, Chicago, Ill. (AAPCC, 250 W. 57 St., New York 19)

15–19. **Microcirculation**, 3rd European conf., Jerusalem, Israel. (E. Davis, Capillary Research Laboratory, Hadassah Univ. Hospital, P.O. Box 499, Jerusalem)

15–21. American Soc. of **Photogrammetry**, congr. on surveying and mapping, Washington, D.C. (American Soc. of Photogrammetry, 44 Leesburg Pike, Falls Church, Va.)

17–18. **Hypervelocity Flight** Techniques. symp., Denver, Colo. (W. G. Howell Denver Research Inst., Univ. of Denver, Denver, Colo. 80210)

17–19. Society for **Nondestructive Testing**, Los Angeles, Calif. (D. E. O'Halloran, Northrop Corp., 1001 E. Broadway, Hawthorne, Calif.)

17–19. Statistical Assoc. Methods for **Mechanized Documentation**, symp., Washington, D.C. (M. E. Stevens, Natl. Bureau of Standards, Washington, D.C. 20234)

17–20. Society of **Biological Chemistry**, Paris, France. (P. Malangeau, Executive Committee, 4, Avenue de l'Observatoire, Paris 6e)

18–19. **Mycotoxins in Foodstuffs**, intern. symp., Cambridge, Mass. (G. N. Wogan, Rm 16-210-B, Massachusetts Inst. of Technology, Cambridge 02139)

18–20. **Chemurgic Council**, 28th natl. conf., Philadelphia, Pa. (J. W. Ticknor, Chemurgic Council, 350 Fifth Ave., New York 1)

18–21. Latin **Medical** Union, intern. congr., Rome, Italy. (B. Urso, Policlinico Umberto I, Viale Policlinico, Rome)

18–21. American **Orthopsychiatric** Assoc., Chicago, Ill. (M. F. Langer, 1790 Broadway, New York 19)

21–24. **Cybernetic Medicine**, 3rd intern. congr., Naples, Italy. (A. DeChiara, 348, Via Roma, Naples)

23–24. Society for **Economic Botany**, 5th annual, Chapel Hill, N.C. (D. J. Rogers, New York Botanical Garden, Bronx Park, N.Y.)

23–25. Federation of European **Biochemical** Societies, 1st, London, England. (FEBS, Lister Inst., Chelsea Bridge Rd., London, S.W.1)

23–26. Institute of **Electrical and Electronics Engineers**, intern. conv., New York, N.Y. (IEEE, Box A, Lenox Hill Station, New York 21)

23–26. **Gas Chromatography**, 2nd intern. symp., Houston, Tex. (A. Zlatkis, Dept. of Chemistry, Univ. of Houston, Houston)

23–26. American **Physical** Soc., Philadelphia, Pa. (K. K. Darrow, Columbia Univ., New York 27)

20–24. National Assoc. for **Research in Science Teaching**, Chicago, Ill. (G. G. Mallinson, Western Michigan Univ., Kalamazoo)

20–24. National **Science Teachers** Assoc., Chicago, Ill. (R. H. Carleton, 1201 16th St., NW, Washington, D.C.)

21–3. British **Computer** Soc., conf.,

Edinburgh, Scotland. (Secretariat, I.E.E., Savoy Pl., London, W.C.2, England)

21–23. Asian-Pacific **Dental** Federation, 4th congr., Singapore and Malaya. (B. B. Eraña, Manila Doctors Hospital, Isaac Peral St., P.O. Box 373, Manila, Philippines)

22–25. American Assoc. of **Dental Schools**, 41st annual, Los Angeles, Calif. (AADS, 840 Lake Shore Dr., Chicago 11, Ill.)

24–26. Physics and Dynamics of **Clouds**, conf., American Meteorological Soc., Chicago, Ill. (Miss D. L. Bradbury, Dept. of Geophysical Sciences, Univ. of Chicago, Chicago)

25–27. **Aerospace Bearings**, USAF-Southwest Research Inst. conf., unclassified, San Antonio, Tex. (P. M. Ku, SwRI, 8500 Culebra Rd., San Antonio)

25–27. **Entomological** Soc. of America, Northcentral branch, Omaha, Neb. (G. E. Guyer, Dept. of Entomology, Michigan State Univ., East Lansing)

26–28. **Michigan Acad.** of Science, Arts and Letters, East Lansing (G. G. Mallinson, Western Michigan Univ., Kalamazoo)

26–28. Southern Soc. for **Philosophy and Psychology**, 56th annual, Lexington, Ky. (D. Calvin, Psychology Dept., Univ. of Kentucky, Lexington)

26–29. International Assoc. for **Dental Research**, 42nd, Los Angeles, Calif. (J. C. Muhler, 1120 W. Michigan St., Indianapolis, Ind. 46202)

27–28. American **Ethnological** Soc., Pittsburgh, Pa., (N. F. S. Woodbury, U.S. National Museum, Smithsonian Institution, Washington, D.C.)

27–28. **Seismological** Soc. of America, annual, Seattle, Wash. (K. V. Steinbrugge, SSA, 465 California St., San Francisco 4, Calif.)

27–29. Society for the Study of **Evolution**, annual, Chapel Hill, N.C. (H. H. Ross, Illinois Natural History Survey, Urbana)

28–30. American Assoc. of Colleges of **Pharmacy**, Detroit, Mich. (C. W. Bliven, 1507 M St., NW, Washington, D.C. 20005)

29–2. Association of American **Geographers**, annual, Syracuse, N.Y. (AAG 1201 16th St., NW, Washington, D.C.)

30–2. American Assoc. of **Junior Colleges**, Bal Harbour, Fla. (W. G. Shannon, AAJC, 1777 Massachusetts Ave., NW, Washington, D.C. 20036)

31–3. American Assoc. of **Anatomists**, Denver, Colo. (L. B. Flexner, Dept. of Anatomy, Univ. of Pennsylvania, Philadelphia 4)

31–3. **Calcified Tissues**, European symp., Liége, Belgium. (L. J. Richellè, 32, Boulevard de la Constitution, Liége)

April

1. **Thermoplastic Materials**, conf., Soc. of Plastics Engineers, Akron, Ohio. (W. H. Nicol, RETEC, Goodyear Tire and Rubber Co., Akron 16)

1–2. **Engineering Aspects of Magnetohydrodynamics**, symp., Cambridge, Mass. (G. S. Janes, Avco Everett Research Laboratories, Everett 49, Mass.)

1–2. Methods for Measurement of **Weak Beta-Emitters**, Karlsruhe-Leopoldshaven, Germany. (Gesellschaft Deutscher Chimiker, Gesellschaftsstelle, Postfach 9075, Frankfurt/Main, Germany)

1–3. **Structures and Materials**, American Inst. of Aeronautics and Astronautics, 5th annual conf., Palm Springs, Calif. (R. R. Dexter, AIAA, 2 E. 64 St., New York, N.Y.)

1–3. **Optical** Soc. of America, spring meeting, Washington, D.C. (M. E. Warga, OSA, 1155 16th St., NW, Washington, D.C. 20036)

1–4. National Soc. for **Programmed Instruction**, annual, San Antonio, Tex. (NSPI Program Committee, Trinity Univ., 715 Stadium Dr., San Antonio, Tex.)

1–5. Latin **Oto-Rhino-Laryngology** Soc., 15th congr., Bologna, Italy. (G. Motta, Via Modica 6, Milan, Italy)

2–3. American Soc. of **Civil Engineers**, Engineering Mechanics Div., spring conf., Boston, Mass. (ASCE, 33 W. 39 St., New York 18)

2–3. Alexander Graham Bell Assoc. for the **Deaf**, southeastern meeting, New Orleans, La. (R. Tegeder, Utah School for the Deaf, 846 20th St., Ogden)

2–3. **Obstetrics and Gynecology**, seminar, Gainesville, Fla. (Mrs. D. Miller, Div. of Postgraduate Education, College of Medicine, Univ. of Florida, Gainesville)

2–3. Industrial Applications of New **Technology**, conf., Atlanta, Ga. (Director, Short Courses and Conferences, Georgia Inst. of Technology, Atlanta, Ga. 30332)

2–4. American Acad. of **Oral Pathology**, Bethesda, Md. (R. J. Gorlin, Univ. of Minnesota, Minneapolis)

2–4. Association of **Surgeons** of Great Britain and Ireland, annual, St. Andrews, Scotland (Secretariat, 47 Lincoln's Inn Fields, London, W.C.2, England)

2–5. British **Medical** Assoc., clinical meeting, Northampton, England. (D. Gullick, Tavistock Sq., London, W.C.1)

3–4. **Biology** colloquium, Corvallis, Ore. (C. M. Gilmour, School of Science, Oregon State Univ., Corvallis)

3–5. **Fleming's Lysozyme**, 3rd intern. symp., Milan, Italy. (G. Podio, Museo della Scienza e della Tecnica, Via Modica, 6, Milan)

3–5. American Soc. of **Internal Medicine**, annual, Atlantic City, N.J. (A. V. Whitehall, 3410 Geary Blvd., San Francisco, Calif.)

3–5. American Assoc. of **Pathologists and Bacteriologists**, annual, Chicago, Ill. (E. A. Gall, Dept. of Pathology, Cincinnati General Hospital, Cincinnati 29, Ohio)

4. Arizona Acad. of Science, Tempe. (H. B. Whitehurst, Dept. of Chemistry, Arizona State Univ., Tempe)

4–5. American **Psychosomatic** Soc., San Francisco, Calif. (C. Binger, 265 Nassau Rd., Roosevelt, N.Y.)

4–6. **Neurobiology**, 2nd symp. (by invitation), Phoenix, Ariz. (E. Eidelberg, Barrow Neurological Inst., St. Joseph's Hospital, 350 W. Thomas Rd., Phoenix)

5–8. International Acad. of **Pathology**, annual, Chicago, Ill. (F. K. Mostofi, Armed Forces Inst. of Pathology, Washington, D.C. 20012)

5–10. American **Chemical Soc.**, 147th natl., Philadelphia, Pa. (A. T. Winstead, 1155 16th St. NW, Washington, D.C.)

5–10. Asia-Pacific Acad. of **Opthalmol-**

ogy, 2nd congr., Melbourne, Australia. (R. N. Mellor, 82 Collins St., Melbourne C1)

6–8. **Nonlinear Magnetics** Conf., Washington, D.C. (R. C. Barker, Dept. of Engineering and Applied Science, Yale Univ., New Haven, Conn.)

6–8. Association of Schools of **Public Health**, annual, Toronto, Ont., Canada. (R. E. Coker, Jr., Drawer 229, Chapel Hill, N.C. 27515)

6–9. French Soc. of **Biological Chemistry**, 50th, Paris. (P. Malangeau, 4 Avenue de l'Observatoire, Paris 6e)

7–9. **Atomic Energy** Soc. of Japan, Tokyo. (Atomic Energy Research Inst., 1-1, Shiba-tamura-cho, Minato-ku, Tokyo)

7–9. **Chemical Soc.**, Birmingham, England. (General Secretary, Burlington House, London, W.1, England)

7–11. Applied **Mathematics and Mechanics**, Giessen, Germany, (K. Maruhn, Mathematisches Institut, Justus Liebig Univ., Giessen)

8–10. **Textile Research** Inst., 34th, New York, N.Y. (TRI, Princeton, N.J.)

9. **British Cardiac** Soc., annual, London, England. (J. Shillingford, Postgraduate Medical School, Ducane Rd., London, W. 12)

9–11. American Assoc. for **Cancer Research**, annual, Chicago, Ill. (H. J. Creech, AACR, Institute for Cancer Research, Fox Chase, Philadelphia 11, Pa.)

9–11. Association of **Clinical Pathologists**, spring meeting, London, England. (G. Cunningham, Dept. of Pathology, 47 Lincoln's Inn Fields, London, W.C.2)

9–11. **Geological** Soc. of America, southeastern section, Baton Rouge, La. (R. J. Martin, 1426 Harvard Rd., NE, Atlanta, Ga.)

9–11. Southwestern **Psychological** Assoc., annual, San Antonio, Tex. (C. C. Cleland, 2104 Meadowbrook Dr., Austin, Tex. 78703)

9–13. **Roentgen** Congr., German, Wiesbaden, Germany. (H. Lossen, Deutscher Röntgenkongress, Fichterplatz 20 III, Mainz, Germany)

10. **Natural Phenolic Compounds**, symp., Tokyo, Japan. (M. Shimokoriyama, Dept. of Botany, Univ. of Tokyo, Hongo, Tokyo)

10–11. American **Laryngological** Assoc., San Francisco, Calif. (L. G. Richards, 12 Clovelly Rd., Wellesley Hills 82, Mass.)

10–11. Association of **Physicians** of Great Britain and Ireland, annual, Oxford, England. (G. de J. Lee, Dept. of Medicine, Radcliffe Infirmary, Oxford)

11. **Paleontological Research** Inst., Ithaca, N.Y. (R. S. Harris, 109 Dearborn Place, Ithaca)

11–12. **Histochemical Soc.**, 15th annual, Chicago, Ill. (A. D. Deitch, Dept. of Microbiology, Columbia Univ., 630 W. 168 St., New York 32)

12. **Industrial Fibers**, European inst., Milan, Italy. (F. Tommy-Martin, 40 rue du Stand, Geneva, Switzerland)

12–13. American Soc. for **Artificial Internal Organs**, Chicago, Ill. (B. K. Kusserow, Dept. of Pathology, Univ. of Vermont College of Medicine, Burlington)

12–17. Federation of American Societies for **Experimental Biology**, Chicago, Ill. (H. B. Lemp, The Federation, 9650 Wisconsin Ave., Bethesda, Md.)