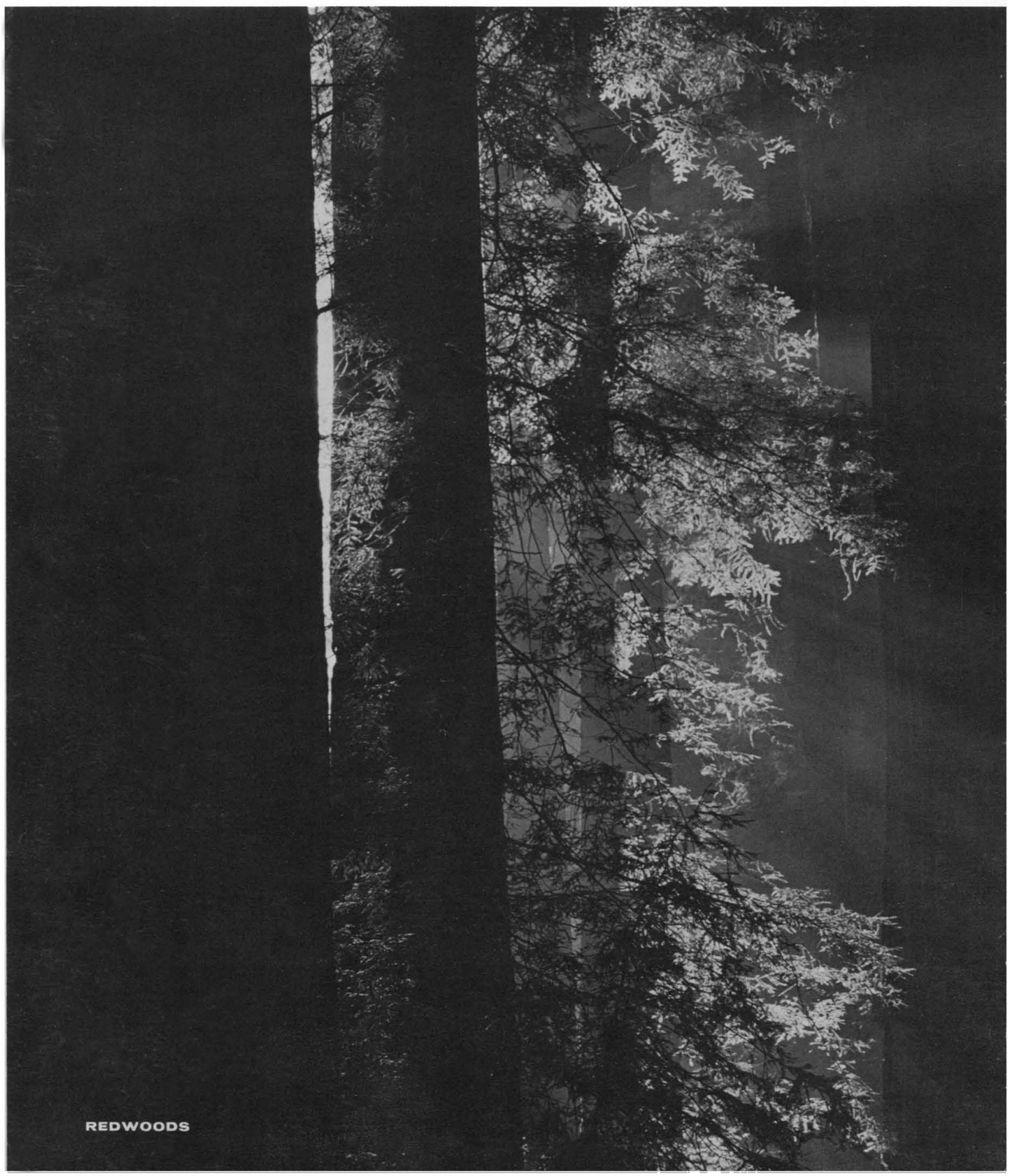
SCIENCE

24 April 1964
Vol. 144, No. 3617

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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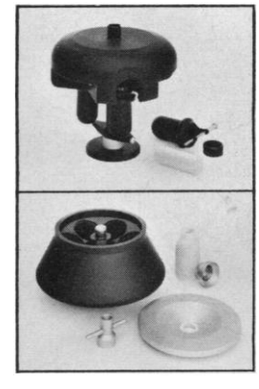

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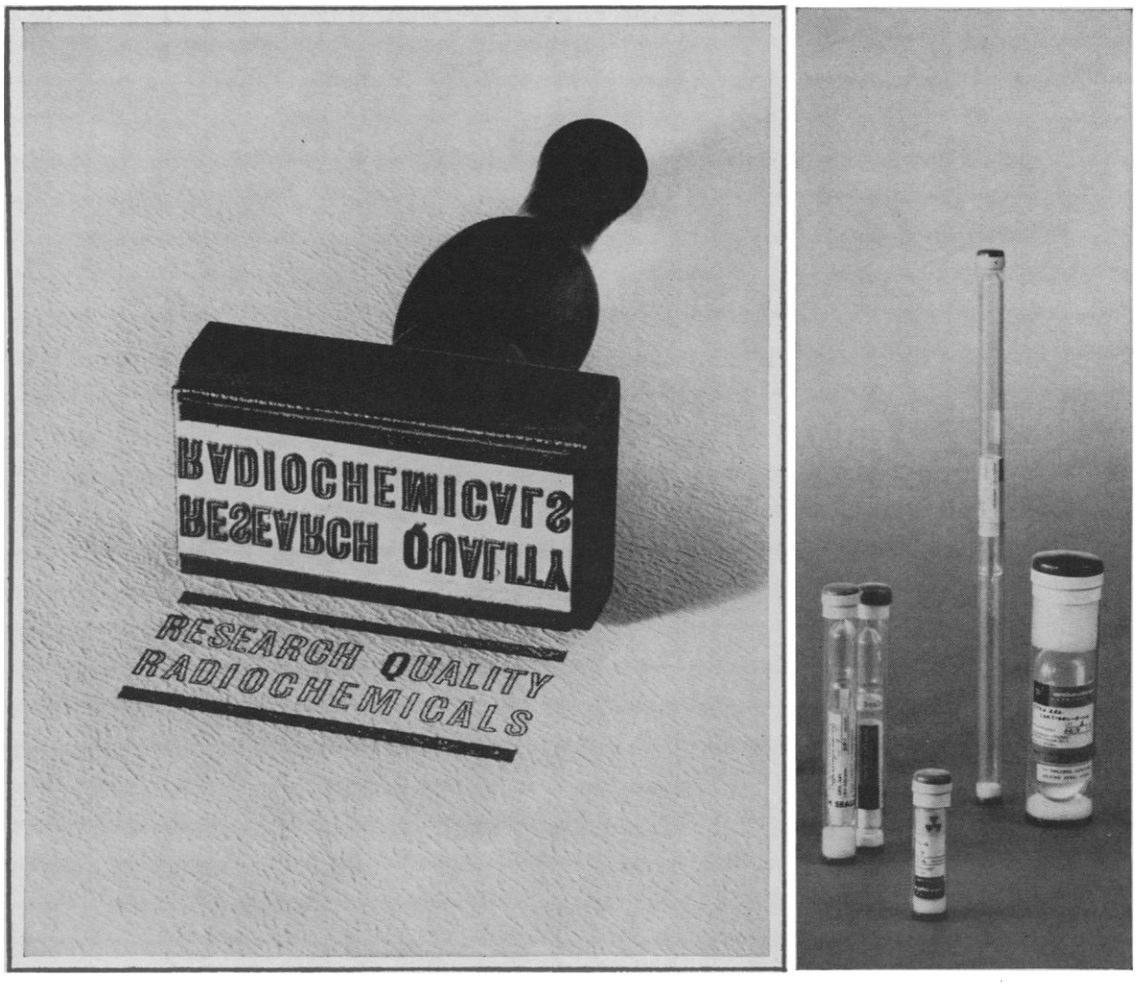
COVER

Redwoods at Humboldt River State Park, California. Because the rate at which these trees are being cut exceeds the rate of natural or artificial replacement, the existence of such forests in California may be threatened (see review of *The Last Redwoods*, page 401). [Philip Hyde]



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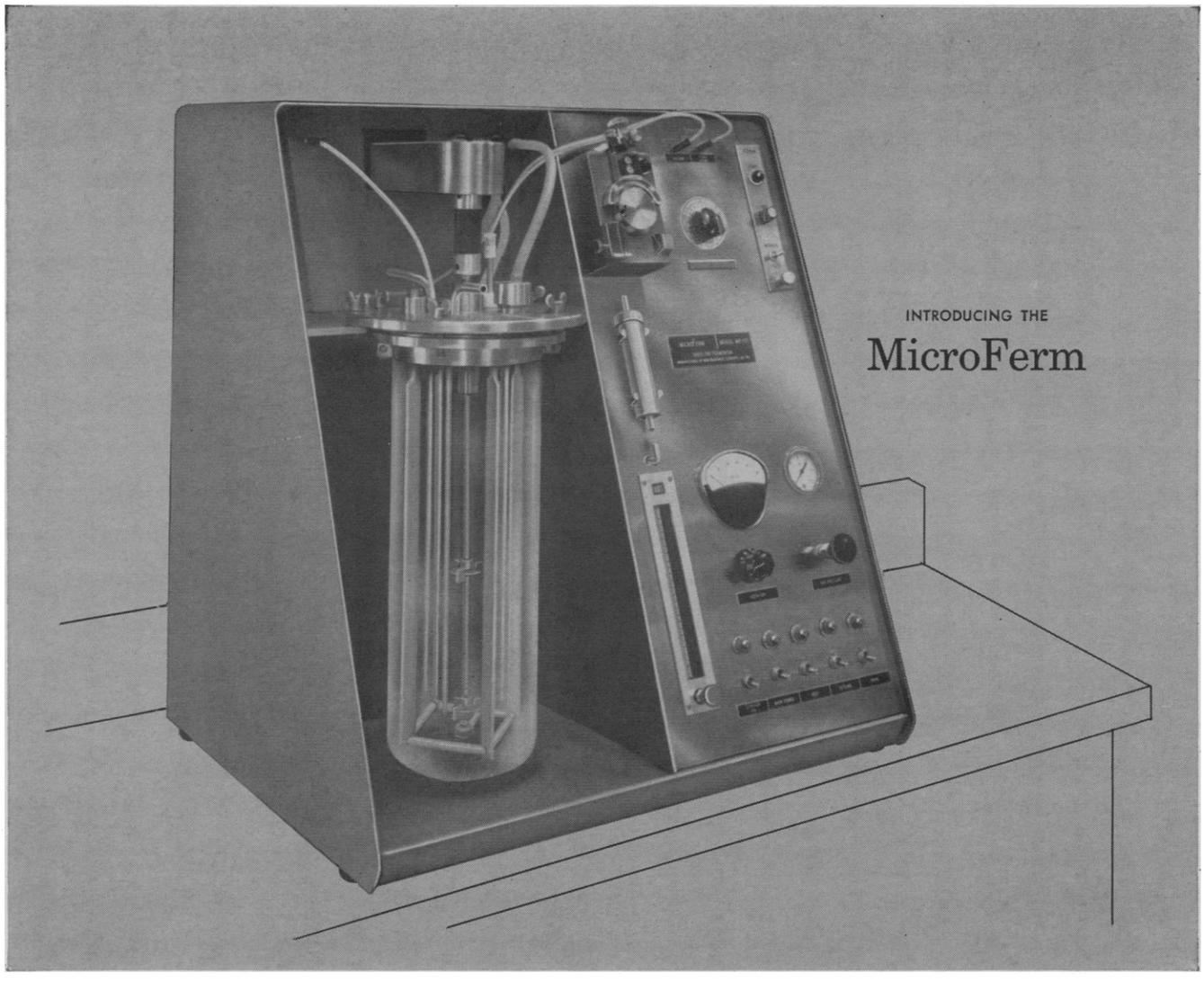

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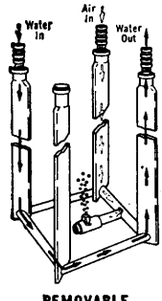

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To conserve space and achieve more efficient temperature regulation, the conventional water bath has been eliminated. A new design permits tempered water to flow through hollow baffles* in the fermentor from an integral recirculating system. Temperature is adjustable from 5°C above water-supply temperature to 60°C, by means of a Thermistor controller. Accuracy is within ±0.25°C. Cold water is introduced automatically for close thermal regulation at temperatures approaching ambient.

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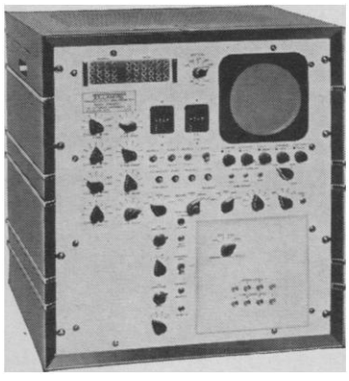

FEATURES

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Built-in variable HV
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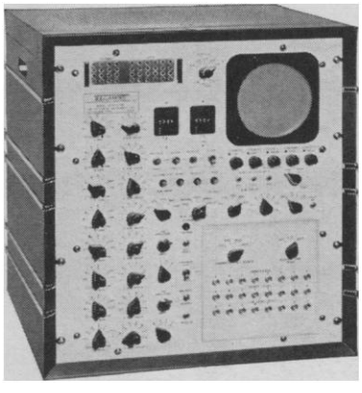

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10^6 or 10^5—1 counts/channel
Up to 4 inputs with differential data accumulation

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10^6 or 10^5—1 counts/channel
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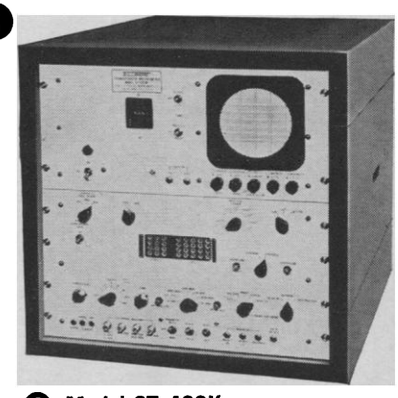
*Separate linear gate for multiple input standard



3 Model ST-400K 400-Channel Analyzer
10^6 or 10^5—1 counts/channel
Single input or up to 4 inputs with mixer

4 Model ST-400DL* 400-Channel Analyzer
10^5—1 counts/channel
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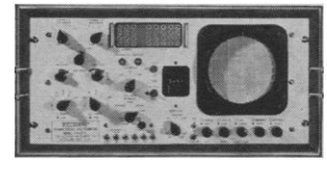

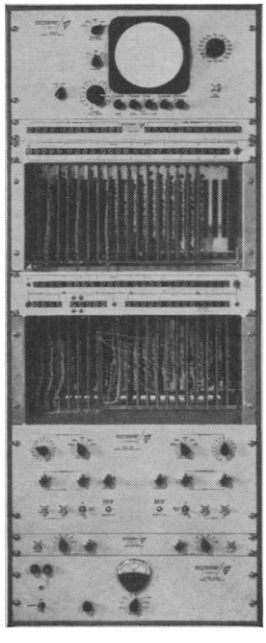

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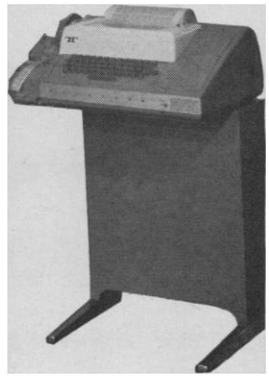

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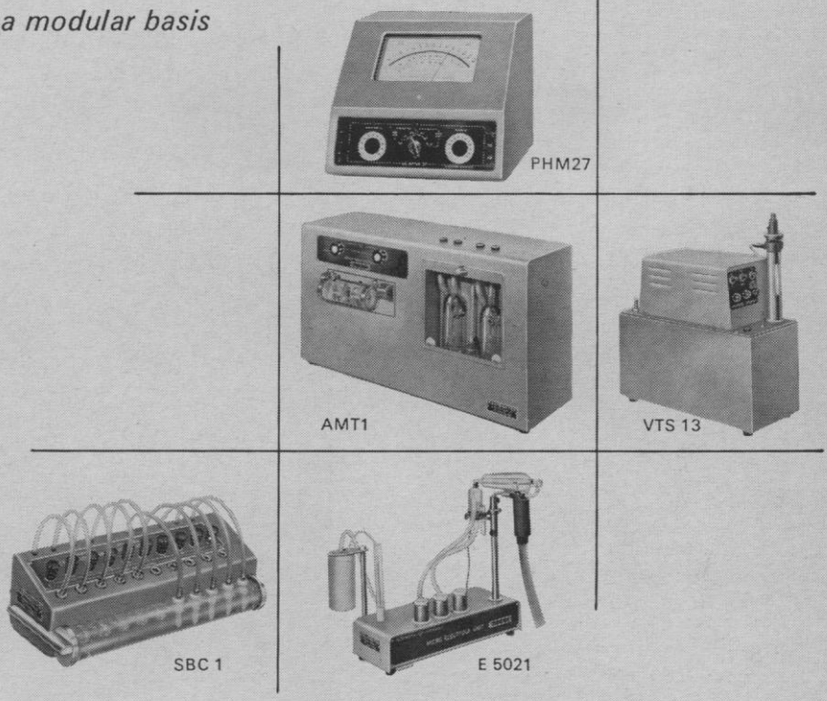

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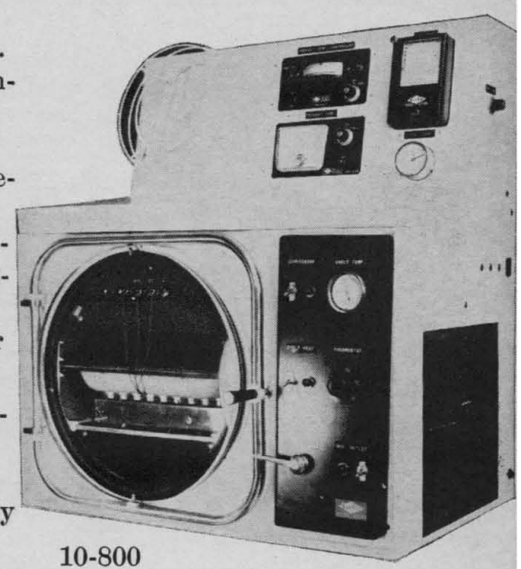

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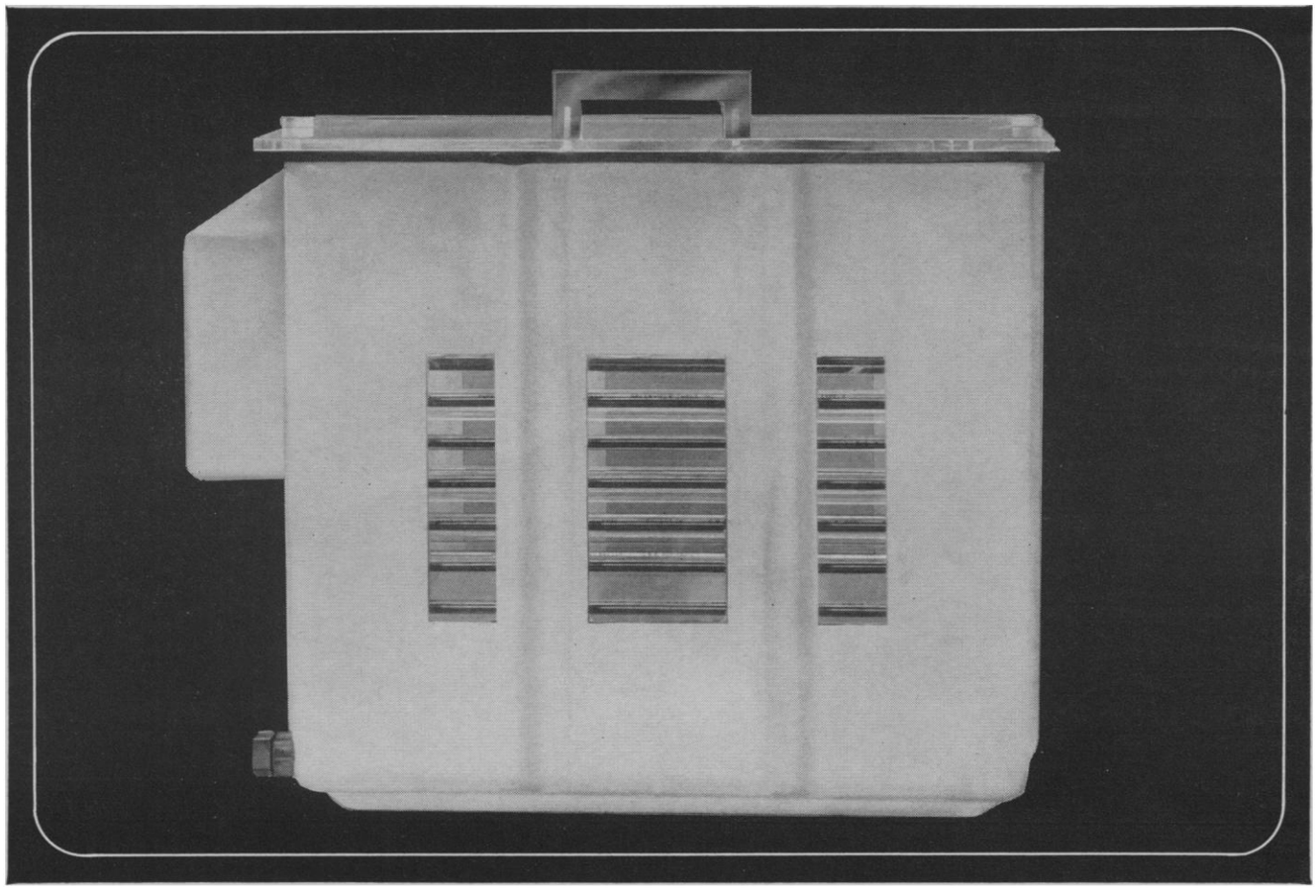

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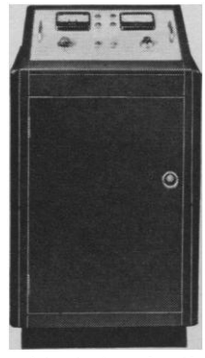

Model 905
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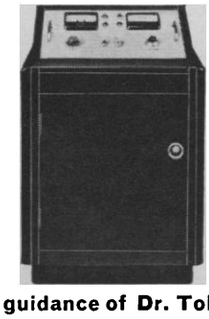

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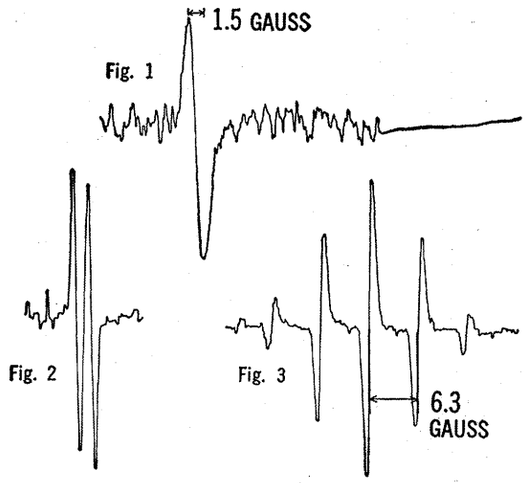
How can Electron Paramagnetic Resonance (EPR) provide a scientist with information about free radical reaction mechanisms?

First, he can detect transient free radicals in the course of a reaction. He can then identify the free radical by obtaining information concerning the molecular environment of the unpaired electron. In addition, he can make a quantitative measurement of the free radical concentration; and finally, measure this concentration as a function of time.

IDENTIFICATION OF FREE RADICALS

Free radicals are known to exist as intermediates in a variety of organic reactions. Previous examples in this series illustrated the effectiveness of EPR in detecting these intermediates in dynamic reactions. The problem for the scientist, however, does not end with mere detection of free radicals—identification of the intermediate is equally important.

An important aspect of the EPR phenomenon which allows absolute identification of free radical intermediates has likewise been previously discussed. This phenomenon is the classical hyperfine interaction involving an unpaired electron interacting with neighboring magnetic nuclei (n) of spin quantum number (1). The interaction results in a splitting of the electron resonance absorption into multiplets, the number of which is equal to $(2 \cdot nI + 1)$ when all nuclei are alike.



To illustrate how such identifications are made possible we can examine EPR spectra obtained during the enzymic oxidation by peroxidase—H_2O_2 of several substrates.

Fig. 1 is the spectrum of the substrate radical generated from dihydroxyfumaric acid and the single line is consistent with the molecular structure of the intermediate

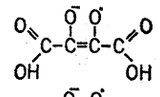


Fig. 2 is the spectrum of the substrate radical from ascorbic acid. The doublet indicates an interaction with a single hydrogen and is consistent with the structure

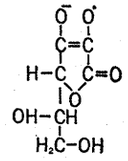
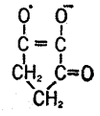


Fig. 3 is the spectrum of the substrate radical from the substrate reductic acid and indicates an interaction with 4 equivalent hydrogens yielding a quintet which is consistent with the structure



Detection and identification of free radicals are not the only results obtainable from the EPR spectrum, however. It is also possible to measure the rate of free radical formation for studies of complete reaction kinetics.

If you would like to see a demonstration of our EPR systems and their accessories, write the EPR Product Group, Palo Alto, for an appointment at one of our Applications Laboratories. They are located at Pittsburgh, Penna.; Palo Alto, Calif.; and Zurich, Switzerland. In Europe, contact Varian A. G., Zug, Switzerland.

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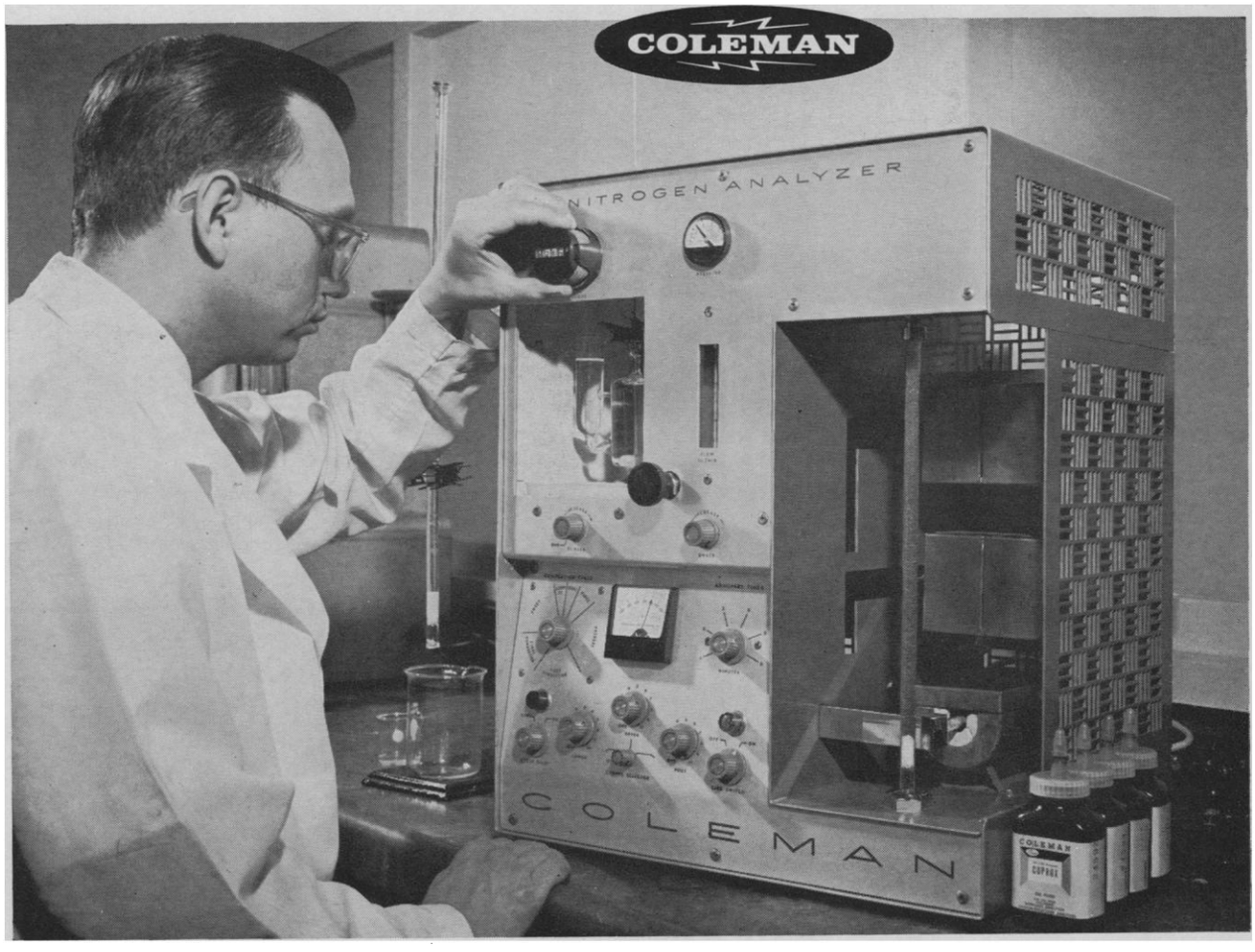

Scope of Coleman Nitrogen Analyzer extended to 20 ppm in trace studies by California Research Corporation*

* *California Research Corporation is the research arm of Standard Oil of California. Results of the work are reported in "Automatic Dumas Nitrogen Analysis of Lubricating Oils and Additives," by Farley, Fuffy and Winkler, ANALYTICAL CHEMISTRY, Vol. 36, Page 1060, May 1964. Reprints and product literature are available from Coleman Instruments Corporation.*

With the Coleman Model 29 Nitrogen Analyzer, trace quantities of nitrogen in lubricating oils and additives are determined at Calresearch and in an increasing number of the California Chemical Company** (Oronite) customers' laboratories. With only slight procedure modifications, the instrument is being used with samples containing as little as 0.2% nitrogen.

At lower nitrogen levels—down as far as 20 ppm—a specially-developed concentration technique provides adsorption of the nitrogen compounds on alumina. The trace analyses are then made on this nitrogen-bearing adsorbent.

Expanded use of nitrogen-containing additives in lubricating oils brought increased interest in nitrogen determination, a convenient method for correct preparation of additives and for proper product blending.

Prior to the use of the Coleman Nitrogen Analyzer in this application, California Research employed alternate methods which left much to be desired from standpoints of speed, convenience and economy.

**Chemical marketing company of Standard Oil Company of California.

With sample materials from rose petals to natural fertilizers, from industrial compounds to biological fluids, the unit is proving its versatility in laboratories throughout the world. It is equally valuable in process control and in research, in both the physical and life sciences.

If your work involves any aspect of nitrogen determination, investigate the Coleman Nitrogen Analyzer. Ask your laboratory supply dealer for a demonstration.

CONDENSED SPECIFICATIONS:	
Sample Size	Normally 5 to 50 mg; 1 to 500 mg or more, depending upon nitrogen content of sample.
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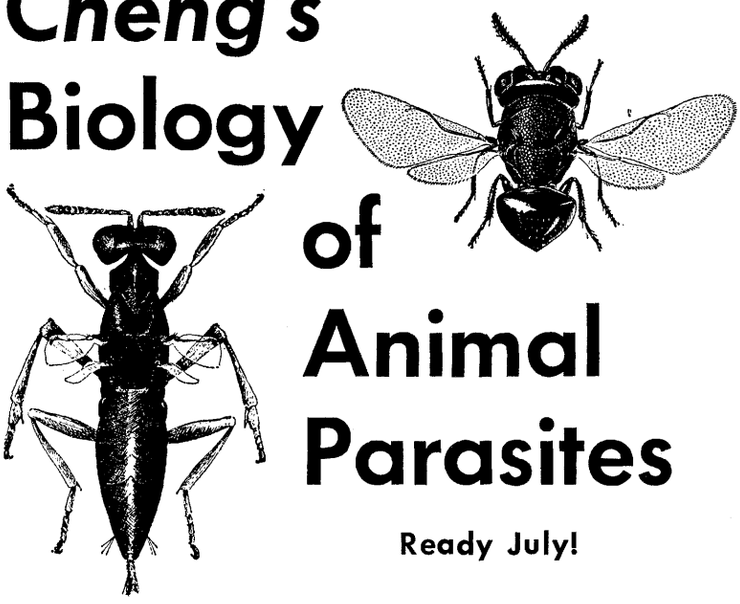

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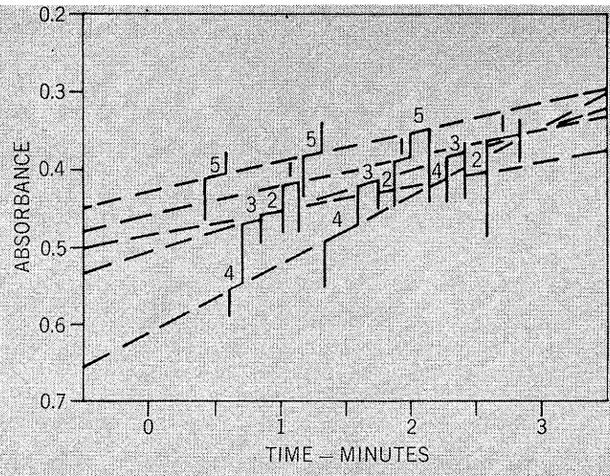

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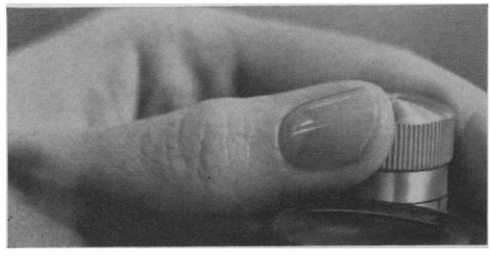

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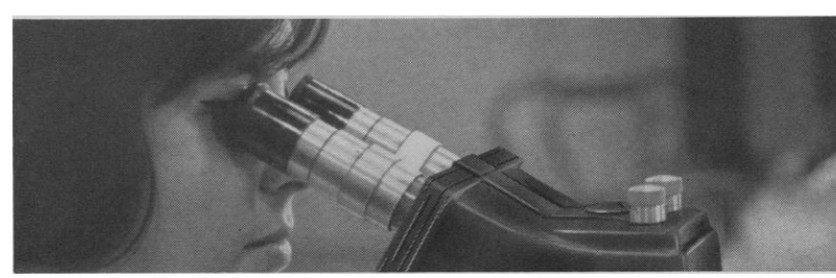

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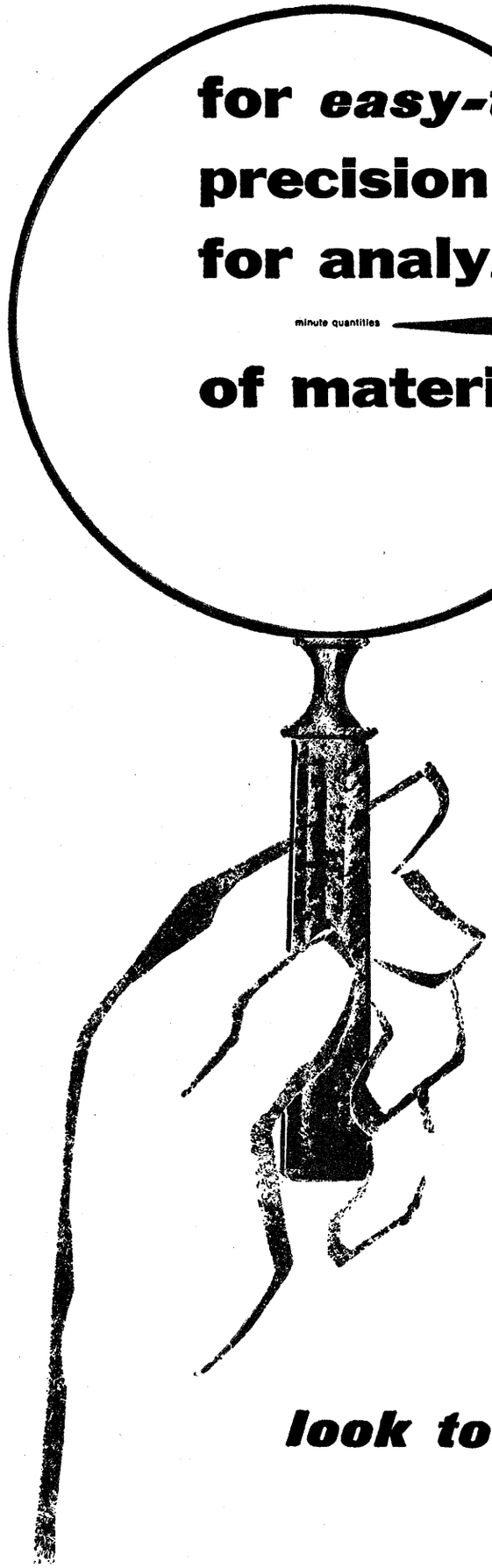

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			Carbon Dioxide	2.5
			Xenon	less than 1
			Nitrous Oxide	1
			Water	3.7
Argon, UHP	99.999%	99.999%	Water	4.8
			Oxygen	1-2
			Hydrogen	less than 1
			Total CO, CO_2 and Hydrocarbons	2 (as CO_2)
			Nitrogen	3-4
Helium, UHP	99.999% (excluding Neon)		Hydrogen	0.0
			Methane	0.0
			Water	3.0
			Neon	12.8
			Nitrogen	0.4
			Oxygen	0.1
			Argon	0.0
			Carbon Dioxide	0.0
Methane, UHP	99.99%	Nominal	Carbon Dioxide	40-50
			Nitrogen	less than 20
			Ethane	70-75
			Propane	less than 5
			Oxygen	6
			Water	5.6
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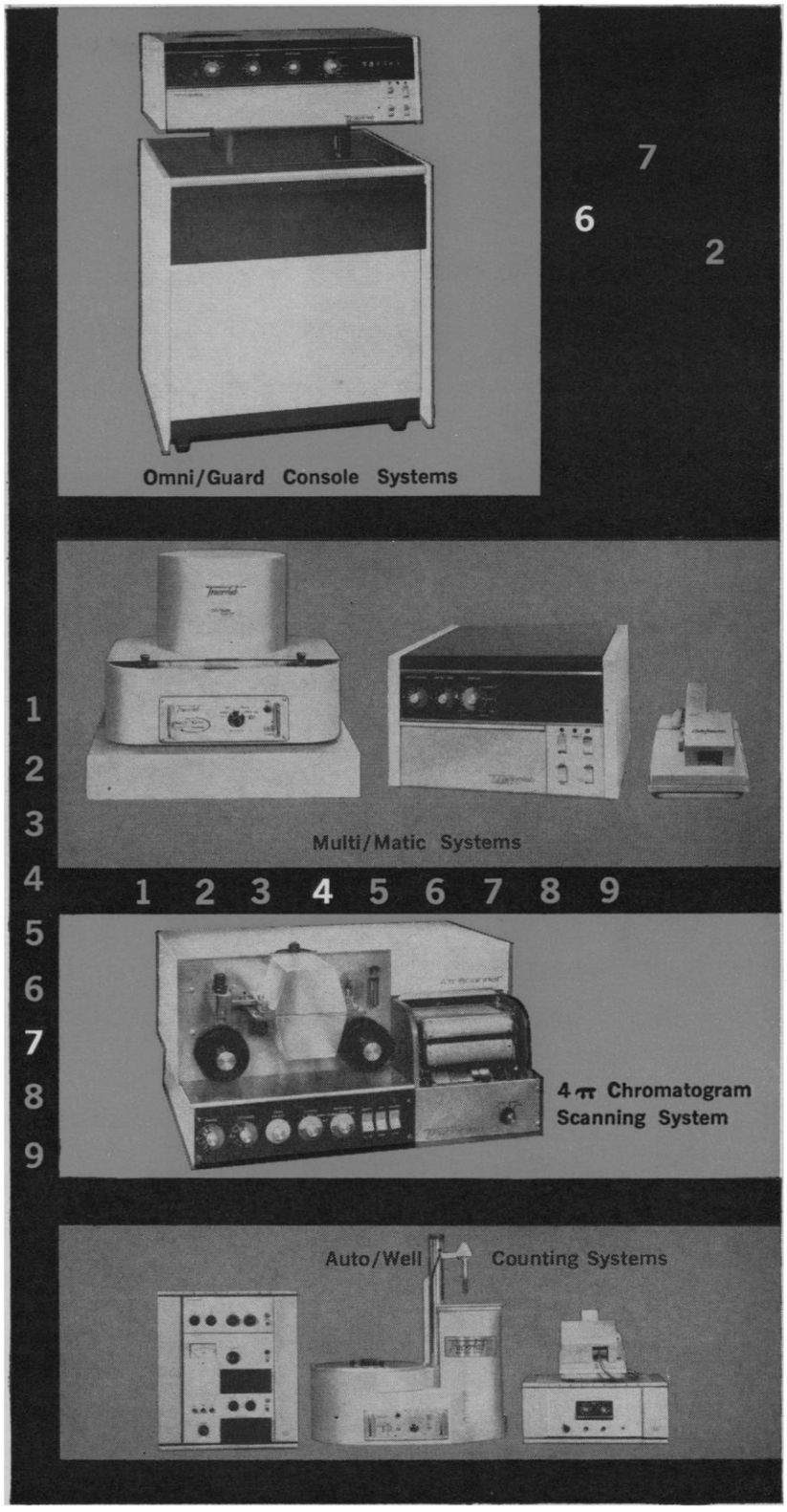

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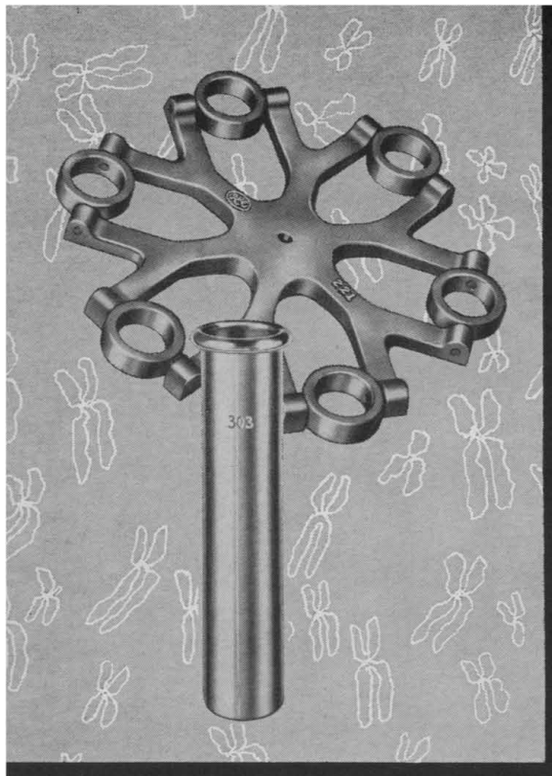

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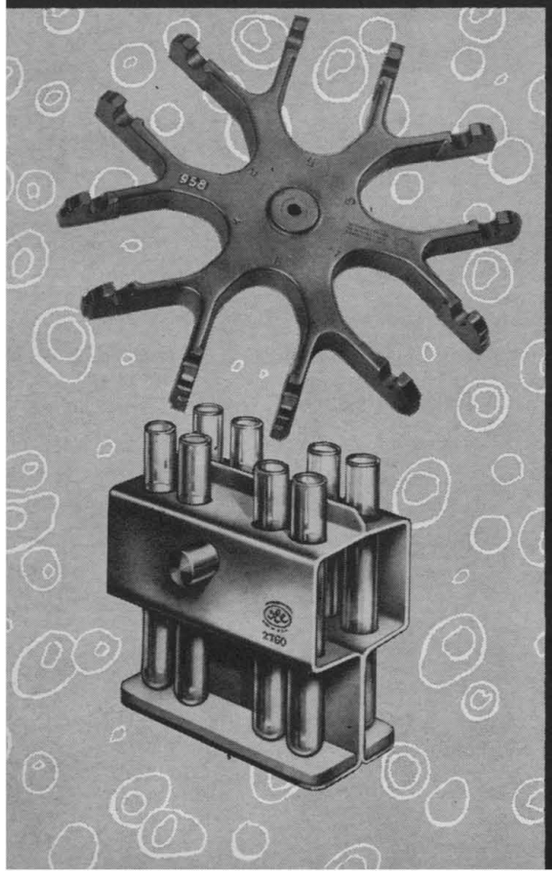

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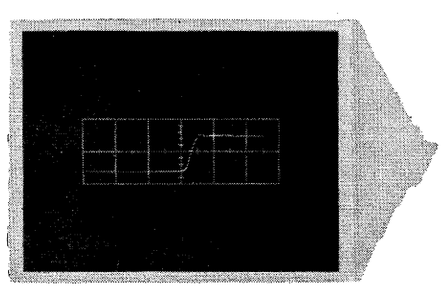

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while borderline ones are inspected many times each year. The inspector, of course, must have authority to ensure that his recommendations are carried out, and this is where voluntary accreditation and similar schemes fall down. Admirable though voluntary schemes may be for responsible institutions, they leave untouched precisely those places where improved standards are most needed.

In the hope of stemming effective legislation, many groups have recently advocated voluntary codes for humane treatment of animals. This rush of activity suggests the need for such codes. Unfortunately, many scientists seem to regard a college degree as a certificate not only of professional standing but of moral integrity, the holder of which is henceforth beholden to no man for his actions. The infliction of pain on animals, like the infliction of pain on humans, involves moral and social standards which cannot be left solely to individual judgment but should, in a civilized society, also be governed by law.

Individual licensing of scientists, another provision of the Clark-Neuberger bill, has proved most successful in England for over 80 years. In my own experience as a Ph.D. student in physiology at London University I found that the licensing laws had a beneficial effect upon research, particularly among young scientists. Like good research technique, good standards of animal care must be learned, and they cannot be learned unless they are first defined and, where necessary, enforced. The cordial relations between the Home Office and the British scientific community are founded on a mutual interest in maintaining humane standards for laboratory animals, standards under which fruitful scientific work has not been impaired and under which, indeed, scientists are protected from criticism or prosecution by uninformed or mischievous persons.

F. BARBARA ORLANS
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Bethesda 34, Maryland

The Randall bill actually is more stringent than the Clark-Neuberger bill. However, its chances of becoming law are infinitesimal, and the Clark-Neuberger bill is the strongest that has any chance whatever of passing.

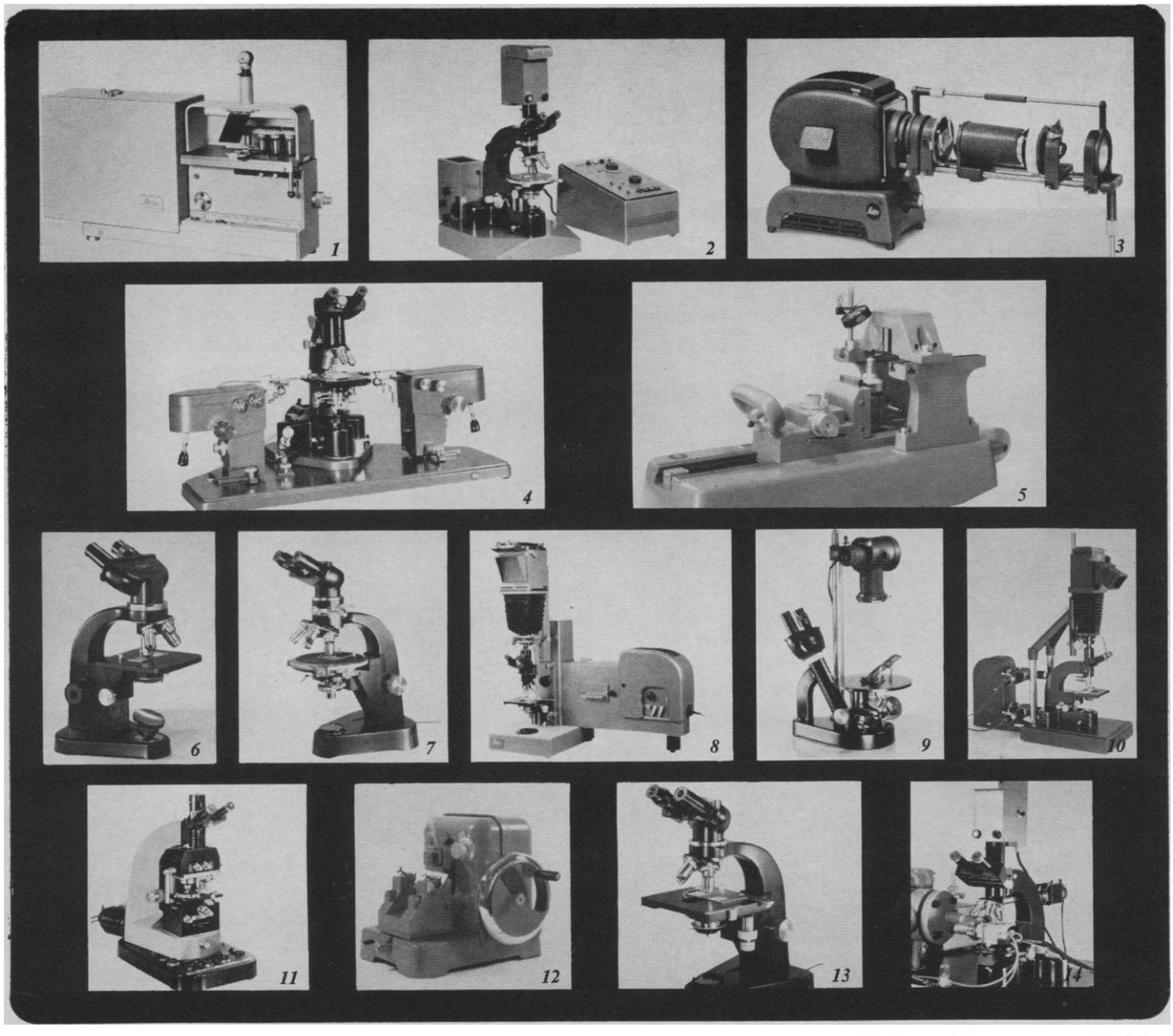
On the other point, Mrs. Orlans is quite right that all the bills discussed would affect grantees of federal agencies as well as the agencies themselves. The way in which they would be affected, however, is quite different. Under the Fogarty proposal, for example, the investigator would merely affirm in writing his agreement to comply with standards of humane care, handling, and treatment of laboratory animals, set by the Surgeon-General. The Clark-Neuberger proposal would have a far more intimate effect on the laboratory. It requires that animals used in pain-causing experiments be anesthetized whenever this would not interfere with the direct purpose of the experiment, and that animals suffering prolonged pain be painlessly killed. It requires not only the registration of investigators with the Secretary of Health, Education, and Welfare as part of their general responsibilities, but the filing with the Secretary of a project plan before the conduct of each set of experiments in which animals are to be used.—ELINOR LANGER

Advice on Science Fair Projects

As director of the Southeastern Wisconsin Fair, I was somewhat perturbed by a letter that appeared in your issue of 6 March ("Science Fair projects," p. 992). I would suggest that when requests are received from students for advice, they should be told that most, if not all, of the necessary information is to be obtained from their teacher-advisers; that any advice from outsiders is given only after the project has been selected, and then only on minor points. If the project is such that most of the guidance cannot be supplied by the teacher, then it should not be undertaken. The teacher should *certify* that the work is that of the pupil. We have used this system quite extensively and have had good results with it.

It seems to me that it is the teacher's prerogative to insist on a Science Fair project. This is no different from an English teacher's insisting on a book report or an essay from all students, or a speech teacher's requiring all students to participate in a dramatics contest. It would seem advantageous to require some extra work of students in high schools, as this better prepares them for college work.

KENNETH E. MILLER
Chemistry Department,
Marquette University, Milwaukee



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24 April 1964, Volume 144, Number 3617 **SCIENCE**

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Bigotry in Science

One of the most astonishing characteristics of scientists is that some of them are plain old-fashioned bigots. Their zeal has a fanatical, egocentric quality characterized by disdain and intolerance for anyone or any value not associated with a special area of intellectual activity.

This attitude may have its beginnings in undergraduate studies; it is strongly nourished in graduate work. During this period the student is subjected to enormous pressures toward specialization. His course work is directed toward a limited area of science. His thesis research is even more strongly focused on a tiny area of inquiry. To achieve his Ph.D. degree he must work hard and spend especially long and devoted hours. He must give his graduate studies overriding priority above any other physical or intellectual pursuit. He is driven by the situation but he also must become his own most hard-eyed taskmaster. To achieve the necessary concentration of effort he uses every kind of psychological weapon on himself. One of the most useful processes is to convince himself that the area of knowledge under study is indeed the most important possible. As a corollary all other intellectual pursuits can be ignored as worthless. It is necessary for virtually all scientists to adopt such rationalizations from time to time. To achieve success one must concentrate on performing a series of specific tasks with complete rigor. Putting the blinkers on is a great help toward this accomplishment. The trick is to know how and when to take them off. One must be able to specialize but one must be able to escape the web of his own rationalizations. Many have not the will or wit to do this. Thus they are cut off from the rest of the evolving fund of knowledge. For a time such specialization has survival value after graduate school. It can lead to early establishment of a scientific reputation. In the end, however, it is often bitterly self-defeating.

A frequent consequence of bigoted overspecialization is early obsolesence. Areas of science which are at the center of the stage at one time are destined be to mined out in a few years. As the mining process nears completion many concern themselves with ever more specialized and trivial aspects. Ultimately they discover that the rest of the world has passed them by, that few others are even slightly interested in what they are doing. They face the need, first of overthrowing deep-seated prejudices and then of acquiring a whole new body of knowledge and techniques. Few succeed. Some turn sour and in effect die intellectually thirty years before they are buried.

Avoidance of bigotry carries with it important bonuses. If one is tolerant and willing to admit quality in others, the world can be a great teacher. In universities professors give guidance as to what is important and worth while. After university days, the scholar has a more difficult problem. He must become aware of the existence of an important body of information, he must somehow select that limited portion which he has time to absorb, and then he must study it. Thus he must be both professor and scholar. But if he is tolerant enough he can let the world become his professor. With some effort he can identify a host of others who have wisdom and taste. With their help he can enjoy a continuous process of self-renewal.

—PHILIP H. ABELSON

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Packard 7200 Series Chromatogram Scanning Systems provide accurate, automatic assay of low energy beta-emitting activity deposited on paper strips or TLC glass plates. Analog data presentation is provided in Model 7201; Model 7211 provides digital display.

The new 7200 Series instruments incorporate many features designed to provide optimum detection accuracy, greater instrument utility, and time-saving user convenience. Ultra-sensitive detection is ensured by two windowless gas flow Geiger detectors arranged in 4 pi configuration to scan simultaneously both sides of a paper chromatogram. 2 pi scanning with either upper or lower detector may also be selected with a front panel switch.

Quick, precise positional resolution of activity is achieved by collimators containing slit widths of 2½, 5, 7, and 10mm. Sixteen scanning speeds may be selected by depressing push-button selector switches which are illuminated when they are actuated. A push-button cam on the detector shield permits quick separation of the collimators for fast, easy front loading of the paper strip. Because the chromatogram strip enters the detector at a constant horizontal angle, thick paper (such as Whatman 3M) may be scanned without chromatogram damage.

Collected data are presented on a Packard Model 380 Recording Ratemeter. The Ratemeter offers 8 time constants and 9 linear count ranges. The interrelated Ratemeter and Recorder may be operated in either LINEAR or LOG modes. In the Linear mode, both the Ratemeter and Recorder display cpm on a linear scale; in the Log mode, they display cpm on a logarithmic scale from 10 to 10^6 cpm. Logarithmic presentation of data permits the user to prepare a preliminary run to establish settings for a final linear run or to accurately compare peak values in a minimum of time.

A valuable feature incorporated in this system is precise maintenance of a 1:1 speed ratio between the paper being scanned and the recording chart, enabling the user to quickly compare the strip and chart for precise activity location upon completion of a run. Another time and labor saving feature provided in the 7200 Series instruments is automatic chart indication of origin, solvent fronts, and other areas of interest.

Your Packard Sales Engineer can provide complete details on these versatile new Scanning Systems.

FEATURES:

- **Completely automatic operation**
- **4 pi counting geometry**
- **May be quickly converted for TLC scanning**
- **Automatic shut-off of gas and power**
- **Handle chromatograms ½ to 2 inches wide and lengths to 150 ft; also accommodates thick paper (such as Whatman 3M) without damage**
- **Automatic indication of origin, solvent fronts, etc.**
- **16 scanning speeds, 8 time constants, 9 linear count ranges**
- **Analog or digital data presentation**
- **Linear and Logarithmic display**
- **Quickly demountable components for decontamination**

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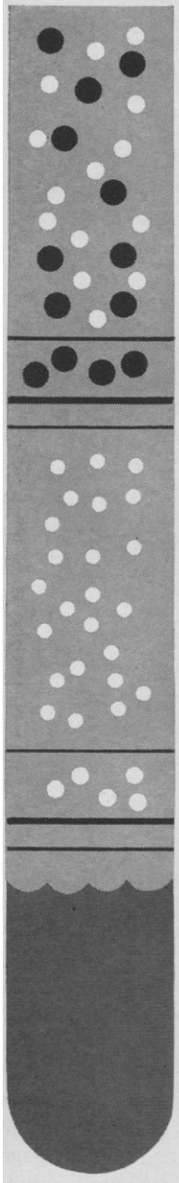
FILTERFUGE TUBE T.M.

ADDS CENTRIFUGAL FORCE TO FILTRATION TO PROVIDE RAPID MICROFILTRATION IN THE RANGE FROM 8 MICRONS DOWN TO A FEW MILLIMICRONS.



1. Material is introduced into the top chamber of the Filterfuge tube.

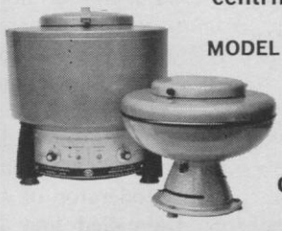
FILTER
SCREEN

2. Centrifugal force drives the material through the first filter stage (pre-filter) depositing larger particles on the surface of the filter. Smaller particles pass through to the lower filter stage.

FILTER
SCREEN

3. Last stage filter retains smaller particles which pass through the pre-filter. Clear filtrate collects in the bottom.

Speeds up and improves filtration through the increased forces of centrifugation. Designed for use in HN, Clinical or other IEC centrifuges.



MODEL HN

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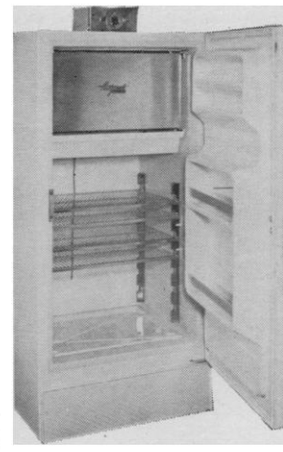
3 NEW REFRIGERATED INCUBATORS BY Hotpack



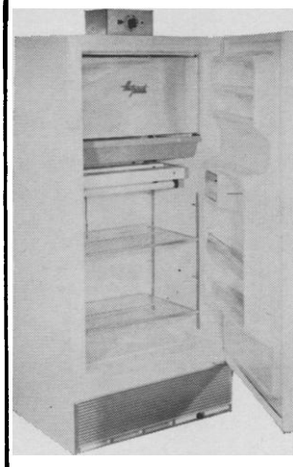
1 CONTROLLED TEMPERATURE 5° to 50°C

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

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

Model 525 10 cu. ft. capacity

- **Immediate Delivery from Stock**

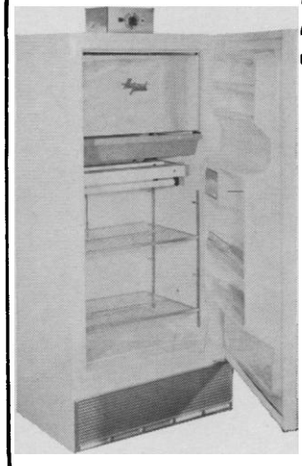


2 BUILT-IN GROWTH LIGHTING AND 5° to 50°C

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

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

Model 525-1 10 cu. ft capacity



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

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

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

Model 525-2 10 cu. ft. capacity

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comments on the morning's papers, then for more speculative suggestions and remarks which might shape future research programs.

Proceedings of this conference, which was sponsored by the Office of Naval Research, will be published and made available to interested firms and individuals.

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Forthcoming Events

April

26–27. **Water and Geology**, conf., Bloomington, Ind. (A. F. Agnew, Dept. of Geology, Indiana Univ., Bloomington)

26–30. **Cereal Chemists**, 49th annual, Toronto, Ont., Canada. (N. G. Irvine, Grain Research Laboratory, 190 Grain Exchange Bldg., Winnipeg 2, Canada)

26–30. **AAAS, Southwestern and Rocky Mountain Div.**, Lubbock, Tex. (M. G. Anderson, P.O. Box 97, University Park, New Mexico 88070)

26–30. American **Industrial Hygiene** Assoc., Philadelphia, Pa. (G. D. Clayton, 14125 Prevost, Detroit 27, Mich.)

27. **Tooth Transplant** in Humans, intern. seminar, New York, N.Y. (S. J. Behrman, New York Inst. of Clinical Oral Pathology, 101 E. 79 St., New York 21)

27–28. **Molecules of Life**, colloquium, Yeshiva Univ., New York, N.Y. (B. Horecker, Dept. of Molecular Biology, Yeshiva Univ., 1300 Morris Park Ave., New York 61)

27–29. American Assoc. for **Thoracic Surgery**, Montreal, Quebec, Canada. (AATS, 311 Carondelet West, 7730 Carondelet Ave., St. Louis, Mo. 63105)

27–29. **National Acad. of Sciences**, annual, Washington, D.C. (Office of the Home Secretary, NAS, 2101 Constitution Ave., NW, Washington, D.C.)

27–29. National **Watershed** Congr., 11th, Little Rock, Ark. (G. K. Zimmerman, 1424 K St., NW, Washington, D.C.)

27–30. American **Physical** Soc., Washington, D.C. (K. K. Darrow, APS, Columbia Univ., New York 27)

27–1. **Photographic Science and Engineering**, intern. conf., New York, N.Y. (W. Clark, Eastman Kodak Laboratories, Rochester, N.Y. 14650)

28–30. **Micrographic** Congr., intern. conv., Philadelphia, Pa. (C. E. Nelson, 313 N. First St., Ann Arbor, Mich.)

28–1. Dallas-Southwest **Industrial Trade** Fair, Dallas, Tex. (C. L. Wells, P.O. Box 26010, Dallas 26)

29–1. **Acoustical Fatigue**, 2nd intern. conf., Dayton, Ohio. (D. M. Forney, Research and Technology Div., U.S. Air Force Systems Command, Wright-Patterson Air Force Base, Dayton)

29–2. **Peaceful Uses of Space**, 4th natl. conf., Boston, Mass. (G. A. Rogovin, 501 Boylston St., Boston 16)

29–2. American **Thyroid** Assoc., annual, Rochester, Minn. (T. Winship, ATA, 110

Irving St., NW, Washington, D.C. 20010)

30–1. Institute of **Hospital Administrators**, annual, Edinburgh, Scotland. (IHA, 75 Portland Place, London, W.C.1, England)

30–1. **Zonal Centrifugation Systems**, Oak Ridge, Tenn. (F. C. Von der Lage, Office of Industrial Cooperation, Oak Ridge Natl. Laboratory, P.O. Box X, Oak Ridge, Tenn. 37831)

30–2. **Agricultural History** Soc., annual, Cleveland, Ohio. (A. G. Bogue, History Dept., Univ. of Iowa, Iowa City)

30–2. American **Cleft Palate** Assoc., 22nd annual, Los Angeles, Calif. (ACPA, Parker Hall, Univ. of Missouri, Columbia 65202)

30–2. Midwestern **Psychological** Assoc., 36th annual, St. Louis, Mo. (F. A. Mote, Psychology Dept., Univ. of Wisconsin, Madison 53706)

30–3. Wilson **Ornithological** Soc., Kalamazoo, Mich. (P. B. Hofslund, Biology Dept., Univ. of Minnesota, Duluth)

30–6. Mexican Natl. Acad. of **Medicine**, Mexico City. (A. Lavarez-Bravo, Unidad de Congresos del Centro Mexico, Bloque "B", Av. Chauhtenoc 330, Mexico, D.F.)

May

1. Chemical Inst. of Canada, **Rubber Chemistry** Div., annual, Niagara Falls, Ont. (CIC, 48 Rideau St., Ottawa, Ont.)

1–2. American **Type Culture** Collection, symp., Washington, D.C. (W. A. Clark, 12301 Parklawn Dr., Rockville, Md.)

1–2. Association of **Clinical Scientists**, Philadelphia, Pa. (R. P. MacFate, 54 W. Hubbard St., Chicago, Ill. 60610)

1–2. **Minnesota Acad. of Science**, Moorhead. (M. R. Boudrye, 3100 38th Ave. S., Minneapolis 6, Minn.)

1–2. **Nebraska Acad. of Sciences**, Lincoln. (C. B. Schultz, 101 Morrill Hall, Univ. of Nebraska, Lincoln 8)

1–2. **North Dakota Acad. of Science**, Fargo. (B. G. Gustafson, Univ. of North Dakota, Extension Div., Grand Forks)

1–3. Society of **Biological Psychiatry**, Los Angeles, Calif. (H. E. Himwich, SBP, Galesburg State Research Hospital, Galesburg, Ill.)

1–3. **Wisconsin Acad. of Sciences, Arts, and Letters**, annual, Wausau. (W. E. Scott, 1721 Hickory Dr., Madison, Wis.)

1–4. American **Psychoanalytic** Assoc., annual, Los Angeles, Calif. (Mrs. H. Fischer, APA, 1 E. 57 St., New York, N.Y.)

2–3. Academy of **Psychoanalysis**, annual, Los Angeles, Calif. (J. R. Royce, The Academy, 125 E. 65 St., New York, N.Y. 10021)

3–7. **Electrochemical** Society, spring meeting, Toronto, Ont., Canada. (ES, 30 E. 42 St., New York, N.Y. 10017)

3–7. American Soc. for **Microbiology**, annual, Washington, D.C. (American Inst. of Microbiology, 115 Huron View Blvd., Ann Arbor, Mich.)

3–9. **Medical Biological** Congr., Mutters, Austria. (P. Newhaüser, Abilindastr. 52a, München-Gräfelfing, Germany)

4–5. **Bioengineering**, 1st annual Rocky Mountain symp., U.S. Air Force Acad., Colorado Springs, Colo. (R. J. Gowan, Dept. of Electrical Engineering, U.S. Air Force Acad., Colorado Springs 80840)

4–5. **Chemical and Petroleum Instrumentation**, 5th natl. symp., Instrument Soc. of America, Wilmington, Del. (G. H. Robinson, Engineering Dept., E. I. duPont de Nemours Co., Wilmington)

4–6. Instrument Soc. of America, **Biomedical Sciences** Div., 2nd natl. symp., Albuquerque, N.M. (R. F. Rust, Brooks, Feeger Assoc., 1238 Ortiz S.E., Albuquerque)

4–6. American Inst. of Aeronautics and Astronautics, **Aerospace Propulsion** meeting, Cleveland, Ohio. (AIAA, 500 Fifth Ave., New York, N.Y. 10036)

4–6. Aerospace **Instrumentation**, 10th natl. symp., Instrument Soc. of America, New York, N.Y. (ISA, 530 William Penn Pl., Pittsburgh 19, Pa.)

4–6. Asymptotic Solutions of **Differential Equations** and Their Applications, symp., Madison, Wis. (C. Wilcox, Mathematics Research Center, Univ. of Wisconsin, Madison 53706)

4–6. American Soc. for **Quality Control**, 18th annual conv., Buffalo, N.Y. (ASQC, 161 West Wisconsin Ave., Milwaukee 3, Wis.)

4–6. Inhaled **Radioactive Particles and Gases**, symp., Richland, Wash. (W. J. Bair, Biology Laboratory, Hanford Laboratories, Richland, Wash.)

4–7. **Biomedical Sciences Instrumentation**, 2nd natl. symp., Instrument Soc. of America, Univ. of New Mexico, Albuquerque. (P. F. Salisbury, St. Joseph Hospital, 501 S. Buena Vista St., Burbank, Calif.)

4–8. American **Psychiatric** Assoc., 120th annual, Los Angeles, Calif. (W. E. Barton, 1700 18th St., NW, Washington, D.C.)

4–8. **Strata Control and Rock Mechanics** intern. conf., New York, N.Y. (S. Boshkov, School of Mines, Columbia Univ., New York, N.Y.)

4–22. United Nations Commission on **Narcotic Drugs**, 19th session, Geneva, Switzerland. (UN, Palais des Nations, Geneva)

5–6. **Human Factors in Electronics**, 5th natl. symp., San Diego, Calif. (M. Freitag, 1910 Shire Dr., El Cajon, Calif.)

5–7. **Electronic Components Conf.**, Washington D.C. (J. Bohrer, 401 N. Broad St., Philadelphia, Pa.)

5–9. **Nuclear Radiation** Hazards, intern. symp., Intern. Civil Defence Organization, Monaco. (ICDO, 28 avenue Pictet-de-Rochemont, Geneva, Switzerland)

5–9. **Virginia Acad. of Science**, Charlottesville. (R. C. Berry, P.O. Box 8315, Richmond, Va.)

6–7. **Laser/Electron Beam**, seminar, Chicago, Ill. (R. Aptekar, Information Services Dept., American Soc. of Tool and Manufacturing Engineers, 10700 Puritan Ave., Detroit, Mich. 48238)

6–7. **Optical Masers** Symp., Toronto, Ont., Canada. (R. N. Hall, General Electric Research Laboratory, P.O. Box 1088, Schenectady, N.Y.)

6–8. American Assoc. of **Genito-urinary Surgeons**, Rye, N.Y. (2020 93rd St., Cleveland 6, Ohio)

6–8. **Psychosomatic Research**, European conf., Athens, Greece. [G. S. Philippopoulos, 4 Monis Petraki St., Athens (140)]

6–8. Society for **Experimental Stress Analysis**, spring meeting, Salt Lake City,

Utah. (B. E. Bossi, 21 Bridge Sq. Westport, Conn.)

6–9. **Acoustical Soc.** of America, 66th spring meeting, New York, N.Y. (W. Waterfall, 335 E. 45 St., New York, N.Y.)

7–8. **Vacuum Microbalance Techniques**, 4th conf., Pittsburgh, Pa. (F. A. Brassart, Westinghouse Research and Development Center, Beulah Rd., Pittsburgh 35)

7–8. International College of **Surgeons**, British section, summer meeting, London. (Secretariat, 1516 Lake Shore Dr., Chicago, Ill. 60610)

7–9. Society for American **Archaeology**, 30th, Chapel Hill, N.C. (W. H. Sears, Florida State Museum, Gainesville)

7–9. Society of **Neurological Surgeons**, Rochester, Minn. (SNS, Duke Univ. Medical Center, Durham, N.C.)

7–10. International Assoc. for **Bronchology**, 14th congr., Vienna, Austria. (Secretariat, Vienna Acad. of Medicine, 4, Alserstr., Vienna 9)

8–9. **Colorado-Wyoming Acad. of Science**, Denver, Colo. (Mrs. C. Norton, Dept. of Botany, Colorado State Univ., Fort Collins)

8–9. **North Carolina Acad. of Science**, Davidson. (J. A. Yarbrough, Meredith College, Raleigh, N.C.)

8–9. **Surgical Research** Soc., Sheffield, England. (A. P. M. Forrest, Surgical Unit, Cardiff Royal Infirmary, Newport Rd., Cardiff, South Wales)

8–9. **Surface Physics**, Washington State Univ. Pullman. (E. E. Donaldson, Physics Dept., Washington State Univ., Pullman)

8–20. **Space Research**, 7th plenary meeting, ICSU committee, Florence, Italy. (E. R. Dyer, Jr., National Acad. of Sciences–National Research Council, 2101 Constitution Ave., Washington, D.C.)

10–14. **Cardiology**, 3rd Asian-Pacific congr., Kyoto, Japan. (S. Hayase, Medical Clinic, Kyoto Univ. Hospital, Sakyo-ku, Kyoto)

10–14. French Soc. of **Ophthalmology**, 71st congr., Paris. (M. A. Dollfus, Societé Français d'Ophthalmologie, 27, rue du Faubourg-Saint-Jacques, Paris 16e)

10–14. American **Proctologic** Soc., Philadelphia, Pa. (APS, 7815 East Jefferson, Detroit 14, Mich.)

10–15. **Photographic Science and Engineering**, intern. conf., Palisades Park, N.J. (Executive Secretary, Soc. of Photographic Scientists and Engineers, Box 1609, Main Post Office, Washington, D.C.)

11–13. **Aerospace Electronics**, 16th natl. conf., Dayton, Ohio. (Y. Jacobs, 1917 Burbank Dr., Dayton 45406)

11–14. Society for **Industrial and Applied Mathematics**, spring meeting, Washington, D.C. (SIAM, Box 7541, Philadelphia 1, Pa.)

11–14. American **Urological** Assoc., annual, Pittsburgh, Pa. (AUA, 1120 North Charles St., Baltimore, Md.)

11–16. Assessment of **Radioactive Body Burdens** in Man, symp., IAEA, Heidelberg, Germany. (IAEA, Div. of Public Information Kärntnerring 11, Vienna, Austria)

11–14. **Aerospace Medical** Assoc., 35th annual, Bal Harbour, Fla. (W. J. Kennard, c/o Washington Natl. Airport, Washington, D.C. 20001)

11–14. **Biological Editors**, conf., Ann Arbor, Mich. (R. L. Zwemer, Committee on European Editors, c/o American Physiological Soc., 9650 Wisconsin Ave., Bethesda, Md. 20014)

11–16. International College of **Surgeons**, 14th intern. congr., Vienna, Austria. (S. E. Henwood, 1516 Lake Shore Dr., Chicago, Ill. 60610)

12. American Inst. of **Chemical Engineers**, tri-sectional symp., Newark, N.J. (R. H. Dodds, Gibbs & Hill, Inc., 393 Seventh Ave., New York, N.Y.)

13–14. Society of **Plastics Engineers**, plastics in space, conf., Garden City, N.J. (D. Hassel, Grumman Aircraft Engineering Corp., Bethpage, L.I., N.Y.)

13–15. **Biomathematics and Computer Science** in the Life Sciences, 2nd annual symp., Houston, Tex. (Univ. of Texas Graduate School of Biomedical Sciences, 102 Jesse Jones Bldg., Texas Medical Center, Houston 77025)

13–15. Society of Professional **Well Log Analysts**, 5th intern. symp., Midland, Tex. (F. Wheeler, SPWLA, P.O. Box 4713, Tulsa 14, Okla.)

14–15. **Radiochemical Processing** Symp., Buffalo, N.Y. (R. F. Lumb, Western New York Nuclear Research Center, Power Drive, Buffalo 14214)

14–15. **Scandinavian Biochemistry** Meeting, Stockholm, Sweden. (Sveriges Biokemiska Förenig, Karolinska Inst., Stockholm 60)

14–16. American Inst. of **Industrial Engineers**, 15th annual conf., Philadelphia, Pa. (W. J. Jaffe, Dept. of Management Engineering, Newark College of Engineering, Newark, N.J.)

14–16. Central States **Anthropological** Soc., annual, Milwaukee, Wis. (N. O. Lurie, Dept. of Anthropology, Univ. of Wisconsin, Milwaukee 11)

14–16. Society of **Technical Writers and Publishers**, 11th annual convention, San Diego, Calif. (C. M. Johnson, U.S. Navy Electronics Laboratory, San Diego 92132)

16–2. European **Energy** Conf., Paris, France. (H. Perdon, Institut Français des Combustibles et de l'Energie, 3, rue Henri-Heine, Paris 16e)

17–20. American Inst. of **Chemical Engineers**, natl. meeting, Pittsburgh, Pa. (F. J. Van Antwerpen, 345 E. 47 St., New York, N.Y. 10017)

18–20. **Radiation Research** Soc., 12th annual, Miami Beach, Fla. (G. D. Adams, Radiological Laboratory, Univ. of California Medical Center, San Francisco 22)

18–20. **Water**, 2nd conf., Technical Assoc. of the Pulp and Paper Industry, Green Bay, Wis. (H. O. Teeple, TAPPI, 360 Lexington Ave., New York, N.Y.)

18–21. Society of **Economic Paleontologists and Mineralogists**, Toronto, Ont., Canada. (R. H. Dott, Box 979, Tulsa 1, Okla.)

18–21. American Assoc. of **Petroleum Geologists**, 49th annual conv., Toronto, Ont., Canada. (R. E. King, American Overseas Petroleum, Ltd., 485 Lexington Ave., New York, N.Y. 10017)

19–20. Council on **Medical Television**, 6th annual, Atlanta, Ga. (S. A. Agnello, Duke Univ. Medical Center, Box 3163, Durham, N.C. 27706)

19–21. **Microwave** Theory and Techniques, intern. symp., New York, N.Y.

(H. L. Browman, Airborne Instruments Laboratory, Deer Park, N.Y. 11729)

19–22. **German Metallurgical** Soc., general assembly, Bremen. (Deutsche Gesellschaft für Metallkunde, An der Alteburger Mühle 12, Köln-Marienburg, Germany)

19–22. German Soc. for **Applied Optics**, 65th, Gmunden am Traunsee. (H. Volkmann, Deutsche Gesellschaft für Angewandte Optik, Zeppelinstr. 23, 7920 Heidenheim, Germany)

19–23. **Energy Metabolism**, 3rd symp., Ayr, Scotland. (European Assoc. for Animal Production, Corso Trieste, 67, Rome, Italy)

19–30. International **Electrotechnical** Commission, general meeting, Aix-les-Bains, France. (American Standard Assoc., 10 E. 40 St., New York 16)

20. Memorial Hospital of Long Beach, **medical staff** symp., Long Beach, Calif., (G. X. Trimble, 2801 Atlantic Ave., Long Beach 6)

20–23. Canadian Assoc. of **Geographers**, 14th annual, London, Ont. (CAG, P.O. Box 421, Ottawa, Ont., Canada)

20–28. Modern Methods for **Analysis of Organic Compounds**, symp., Eindhoven, Netherlands. (Gesellschaft Deutscher Chemiker, Postfach 9075, Frankfurt-am-Main, Germany)

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. 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^{e}, France)

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

27–29. American **Ophthalmological** Soc.,

Hot Springs, Va. (AOS, 108 E. 68 St., New York, N.Y. 10021)

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)

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 Pa-

thology Laboratory, Hatching Green, Herpenden, 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 **Opthalmological** 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. 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 7e, 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 7e)

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.)

14–18. **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 45226)

14–18. American **Nuclear** Soc., 10th annual, Philadelphia, Pa. (O. J. DuTemple, 244 E. Ogden Ave., Hinsdale, Ill. 60502)

14–19. **Alpha Chi Sigma** Fraternity, Greenvale, L.I., N.Y. (M. L. Griffin, 5503 E. Washington St., Indianapolis, Ind. 46219)

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

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. 10032)

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

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

15–19. **Antibiotics**, intern. congr., Prague, Czechoslovakia. (V. Vlček, 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. 91304)

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.)

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., Franfurt 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)

New Products

Glass column gas chromatographs provide all glass injection and glass or metal column systems for medical, biological and pesticide residue analyses. By use of the differential flame ionization detector supplied with the basic instrument, analyses can be performed on steroids from synthetic mixtures and biological fluids, on "dirty" samples such as pesticide residue extracts, and on other materials requiring the use of glass injection and column systems. Glass columns are available in 3-, 6-, and 12-ft (0.9-, 1.8-, and 3.7-m) sizes either empty or packed, with an inside diameter of 0.075 inch (0.19 cm) and outside diameter of 0.25 inch (0.635 cm). Single- or dual-column models are offered for which the injection port is either an integral part of the column or a removable, all glass section. Injection port temperature is separately controlled to assure uniformity. The columns, which can be operated up to 350°C are kept free of temperature gradients and hot or cold spots by a heating system which circulates the column oven air at the rate of 5 cy/sec. In addition to the differential flame ionization detector supplied, three additional detectors are available as accessories: differential flame/hot wire detector for dual column thermal conductivity operation; differential flame electron capture detector for critical pesticide residue analyses and determinations of the silyl ether derivatives of steroids; and the differential flame/micro-cross-section detector for sensitivity for all compounds including the inert gases. These detectors are available in combination with the basic instrument or can be added later, and are easily mounted and interchanged when desired.—D.J.P. (Perkin-Elmer Corp., Main Ave., Norwalk, Conn.)

Circle 1 on Readers' Service card

Micro laboratory clamps are designed to hold objects 1/32 inch to 1 inch (2.54 cm) in diameter. These three-point gripping "Alumaloy" clamps are 6½ inches long and are available with or without clamp holders and with vinyl dipped jaws or asbestos sleeves. The clamp holder slides on the clamp extension rod and can rotate 360°, permitting fastening to support rods in various configurations. The "Alumaloy" clamps have nickel-plated brass pivot pins, stainless-steel springs, and a large thumb screw for easy tightening.—D.J.P. (Lab-Line Instruments, Inc., Lab-Line Plaza, Melrose Park, Ill. 60160)

Circle 2 on Readers' Service card

Cylindrical vacuum oven designed for applications requiring vacuum and constant temperature is especially useful for operations requiring accelerated drying or drying of materials that decompose under normal atmospheric pressure. The oven is controlled by a hydraulic type thermostat in a range from 35° to 200°C with a sensitivity of ±3°C; at 200°C it is ±5°C. The cylindrical work chamber measures 14 inches (35.6 cm) in diameter by 11 inches in depth and is fabricated of heavy-duty aluminum. Separating the aluminum work chamber from the steel outer cabinet is 2 inches (5 cm) of glass wool insulation. Outside dimensions of the steel cabinet are 19 inches in width by 14 inches deep by 21 inches high. Set in the steel oven door is a 13-inch-diameter, ½-inch-thick tempered plate glass window for viewing the oven contents. A floating hinge and latch arrangement with two handles provides a positive seal of the door against the silicone rubber gasket of the oven. The oven controls are mounted on a panel immediately under the door. Controls include a thermostat control knob, a two-heat switch knob, a power pilot light, and a heater pilot light. Outside connections enable the chamber to be filled with dry air or inert gas during the drying process. Both the vacuum and dry air connections are made through precision-ground stopcocks. The dry air connector can also be used for bleeding off the vacuum before opening the door and for introducing inert gases in batch processing without the need for shutting down the vacuum pump. Three removable perforated aluminum shelves, a 0° to 200°C thermometer, and a three-conductor connecting cord with grounding type plug are included with the oven. Power consumption of the vacuum oven at low temperature is 350 watts; at high temperature, 700 watts. —D.J.P. (Cenco Instruments Corp., 1700 W. Irving Park Rd., Chicago, Ill.)

Circle 3 on Readers' Service card

Transducer - controlled oscillator (model BVA) operates with variable reluctance, strain gage, and other resistance ratio transducers to deliver a subcarrier frequency output deviation proportional to transducer output. It is designed as a plug-in module for Pace telemetry systems and is available for use on any of the standard telemetry bands. An internally generated 5-kcy square wave carrier is used to excite external half-bridge inductance or resistance ratio transducers. The resulting output is used to control the frequency of the subcarrier oscillator. The subcarrier output is fed through a band pass filter with linear phase characteristics to assure dynamic accuracy. To monitor frequency during adjustment, a signal from the high-level filtered output is available. The open circuit output level of the filter is approximately 3 volts r.m.s., sufficient to avoid the need for a composite signal amplifier in most instances. The output resistance varies for each band, allowing the outputs to be summed together with an approximate linear taper deviation schedule. Controls for adjustment of transducer balance, sensitivity, oscillator center frequency, and output level are included. Silicon solid-state circuitry is used throughout to assure performance

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

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

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

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. A Readers' Service card for use in mailing inquiries concerning the items listed is included on pages 355 and 457. Circle the department number of the items in which you are interested on this card.

accuracy over wide environmental extremes. Requires 20 ma at 28 volts d-c for power.—R.L.B. (Pace Engineering Co., 13035 Saticoy St., North Hollywood, Calif.)

Circle 4 on Readers' Service card

Mounting medium for microscope slides preserves specimens indefinitely by forming an airtight seal between the slide and cover glass. This synthetic medium, called Histoclad, is colorless, nonreactive, and neutral in *p*H. Its refractive index of 1.51 insures transparency, and either daylight or artificial light can be used. Because of its low viscosity, it applies easily and uniformly to minimize the occurrences of air bubbles. A relatively high melting point of 120°C makes it suitable for microprojection. In addition to preserving tissue specimens, this medium is useful for mounting cytology and blood smears which are to be kept for long periods.—D.J.P. (Cortez F. Enloe Inc., 551 Fifth Ave., New York 17)

Circle 5 on Readers' Service card

Medical infrared detector is a high-speed temperature imager for recording and displaying infrared radiation as it occurs in the human body. Thermography, as it is called, has been shown to be a valuable diagnostic and research tool in the areas of cancer research, vascular surgery, dermatology, thermobiochemistry, and thermopharmacology. The detector is an infrared scanning camera using an indium antimonide detector with thermoelectric cooling. It has a detection range of from 15° to 67°C and is sensitive to a 0.2°C temperature differential on an object at 30°C. At higher temperatures the sensitivity is less. The field of view is 20° × 20° with a corresponding resolution of 3.5 milliradians. This is sufficient to resolve two objects 0.1 inch (2.5 mm) square spaced 0.1 inch apart at a distance of 18 inches (46 cm) from the instrument. With the 20° × 20° field, a scan time of 1 minute is required. A spot of light projected through the radiometer optics indicates the field of view and focus. A Polaroid camera photographs a cathode ray tube display, recording temperature profiles in shades of gray. Output terminals are provided for continuous recording of electrical output so that measurements of temperature over the entire range can be made to an accuracy of 0.2°C. —D.J.P. (Infrared Industries, Santa Barbara, Calif.)

Circle 6 on Readers' Service card

Dissymmetries

In our first DISSYMMETRIES [Anal. Chem. *36*, 42A, (1964); Science *143*, 617 (1964)], we have discussed the extremely high molecular weights, up to one billion, of certain polysaccharides as determined by the light scattering technique. This time we are turning to the other extreme of the molecular weight scale, i.e., to the application of the Brice-Phoenix Light Scattering Photometer in the study of solution properties of low molecular weight electrolytes, such as complex ions and heteropoly acids.

Hydrolysis and polymerization of zirconium(IV) in aqueous solutions have been studied previously by a variety of techniques, and conclusions have been drawn concerning the degree of polymerization (or aggregation) of the zirconyl ion and the predominant charged species. The same problem was studied recently at the Department of Chemistry, University of North Carolina, Chapel Hill, N. C., by R. L. Angstadt and S. Y. Tyree [J. Inorg. Nucl. Chem., *24*, 913 (1962)], who applied the light scattering technique. The theoretical basis for the application of light scattering to the investigation of polymerization in solutions of inorganic electrolytes was developed earlier by R. S. Tobias and S. Y. Tyree [J. Am. Chem. Soc., *81*, 6385 (1959)]. The method involves determination of turbidities of solutions with varied concentration of zirconyl chloride (from 0.01 to 0.11M) in the presence of a constant amount of hydrochloric acid (2.80 and 0.75M, respectively, for the two sets of experiments performed by Angstadt and Tyree). The solutions were brought to 3M in counterion concentration by adding sodium chloride in order to minimize the fluctuations of activity coefficients. Consistently with the low molecular weight of scatterers in these solutions, the observed excess turbidities of zirconyl ion species were much lower (comparable to the scattering by pure water) than those usually encountered in light scattering experiments. Nevertheless, the results of this investigation agree with the conclusions of the more recent studies. In highly acidic solutions (2.8 M HCl) the principal species is a trimer with a charge of plus three. At the lower acid concentration (0.75 M HCl) the predominant species is apparently a hexamer with a charge between plus five and plus six. Thus, the charge per zirconium atom in both series studied appears to be about one, which is also in accord with ultracentrifugation experiments.

Another paper in which the Brice-Phoenix Light Scattering Photometer was applied to the study of low molecular weight solutes is by M. Kerker, J. P. Kratohvil, R. H. Ottewill, and E. Matijevic [J. Phys Chem., *67*, 1097 (1963)] of the Department of Chemistry, Clarkson College of Technology, Potsdam, New York. This is, in fact, their second report on the correlation of turbidity and activity data in solutions of heteropoly compounds. These compounds, intermediate between simple electrolytes and polyelectrolytes with respect to molecular weight and charge, have a remarkably high solubility in water. In this work, 12-tungstosilicic acid (formula weight 2878) and 9-tungstophosphoric acid (formula weight 4369) were used.

For ideal solutions, light scattering can be used to obtain molecular weight. In the case of heteropoly acids, the ideal conditions can be approximated by adding to the solution a larger amount of the swamping electrolyte (e.g., NaCl) and extrapolating the results to the infinite dilution. In this way, Kerker et al. were able to obtain molecular weights of the heteropoly acids within 5% of the formula weights. In the absence of swamping electrolyte, activities are obtainable from light scattering, and it is of interest to compare these activities with those measured by vapor pressure techniques. For this purpose, activities of water were determined from isopiestic experiments and compared with those calculated from the observed excess turbidities of the two heteropoly acids mentioned above. The concentrations of the acids were varied up to 1 g per ml of solution. Great care was exercised in the purification of the acids, clarification of solutions, performance of the instrument, checking for stray light, and in selection of the cells. This was essential to success since the measured excess turbidities, even at the highest concentrations, were lower than the apparent turbidity of pure benzene. For both heteropoly acids, excellent agreement was obtained between activities of water from vapor pressure (isopiestic) measurements and from light scattering. The same is true for the equivalent comparison of experimentally observed excess turbidities with those calculated from isopiestic activities.

We were pleased to learn that in these rather "tricky" experiments (in view of very low scattering intensities) the standard model of the Brice-Phoenix Light Scattering Photometer performed so well. Inquiries concerning instrumentation for these or other applications of light scattering technique may be directed to the manufacturer, Phoenix Precision Instrument Company, 3803–05 N. Fifth Street, Philadelphia, Penna. 19140. Watch for the next DISSYMMETRIES in the May issue of this journal.

New Books

(Continued from page 404)

ment. Proceedings of the third conference sponsored by Manhattan College (New York), April 1960. W. W. Eckenfelder, Jr., and Joseph McCabe, Eds. Pergamon, London; Macmillan, New York, 1963. 448 pp. Illus. $20.

Advances in Clinical Chemistry. vol. 6. Harry Sobotka and C. P. Stewart, Eds. Academic Press, New York, 1963. 411 pp. Illus. $14. Five papers: "Micromethods for measuring acid-base values of blood," by P. Astrup and O. Siggaard-Andersen; "Magnetism," by C. P. Stewart and S. C. Frazer; "Enzymatic determinations of glucose," by A. H. Free; "Inherited metabolic disorders: errors of phenylalanine and tyrosine metabolism," by L. I. Woolf; "Normal and abnormal human hemoglobins," by T. H. J. Huisman.

Advances in Food Research. vol. 12. C. O. Chichester, E. M. Mrak, and G. F. Stewart, Eds. Academic Press, New York, 1963. 445 pp. Illus. $14. Seven papers: "Chemistry of nonenzymic browning; pt. 1: The reaction between aldoses and amines," by T. M. Reynolds; "Osmophilic yeasts," by Hiroshi Onishi; "The use of carbon dioxide in the transport and storage of fruits and vegetables," by W. Hugh Smith; "Refrigerated transport on shipboard," by K. C. Hales; "Physiology, chemistry, and technology of passion fruit," by J. S. Pruthi; "Utilization of synthetic gums in the food industry," by Martin Glicksman; and "Fish sausage and ham industry in Japan," by Eiichi Tanikawa.

Advances in Veterinary Science. vol. 8. C. A. Brandly and E. L. Jungherr, Eds. Academic Press, New York, 1963. 465 pp. Illus. $16. Eight papers: "The bovine viral diarrhea-mucosal disease complex," by W. R. Pritchard; "The metabolism of iron in farm animals under normal and pathologic conditions," by Erich Kolb; "Gonadal hormones in domestic animals," by Weiert Velle; "The stress concept as we see it today," by R. Veilleux; "Weather, climate, and the bionomics of ruminant nematode larvae," by Norman D. Levine; "Equine infectious anemia or swamp fever," by Susumu Ishii; "African swine fever," by D. E. DeTray; and "Toxoplasmosis in domestic animals," by J. Chr. Siim, U. Biering-Sørensen, and Tage Møller.

Antibiotic and Chemotherapy. Mary Barber and Lawrence P. Garrod. Williams and Wilkins, Baltimore, Md., 1963. 374 pp. Illus. $8.

The Architecture of the Germplasm. Verne Grant. Wiley, New York, 1964. 251 pp. Illus. $9.75.

Atherosclerosis and Its Origin. Maurice Sandler and Geoffrey H. Bourne, Eds. Academic Press, New York, 1963. 584 pp. Illus. $22.

Bacteria and Fungi Pathogenic to Man and Animals. M. A. Soltys. Williams and Wilkins, Baltimore, 1963. 548 pp. Illus. $16.

Bacterial Photosynthesis. A symposium (Yellow Springs, Ohio), March 1963. Howard Gest, Anthony San Pietro, and Leo

P. Vernon, Eds. Antioch Press, Yellow Springs, Ohio, 1963. 541 pp. Illus. $6.

Basic Physiology and Anatomy. Ellen E. Chaffee and Esther M. Greisheimer. Lippincott, Philadelphia, 1964. 668 pp. Illus. $7.

Basic Readings in Neuropsychology. Robert L. Isaacson, Ed. Harper and Row, New York, 1964. 443 pp. Illus. Paper, $4.95.

Biochemical Lesions and Lethal Synthesis. Rudolph A. Peters. Pergamon, London; Macmillan, New York, 1963. 333 pp. Illus. $10.

Biochemistry and Physiology of Plant Immunity. B. A. Rubin and Ye. V. Artiskhovskaya. Translated from the Russian edition (Moscow, 1960) by Helen Wareing. Pergamon, London; Macmillan, New York, 1963. 368 pp. Illus. $14.

Biochemistry of the Alligator. A study of metabolism in slow motion. Roland A. Coulson and Thomas Hernandez. Louisiana State Univ. Press, Baton Rouge, 1964. 158 pp. Illus. $10.

Biogenesis of Natural Compounds. Peter Bernfeld, Ed. Pergamon, London; Macmillan, New York, 1963. 944 pp. Illus. $28.

Biological Effects of Deuterium. J. F. Thomson. Pergamon, London; Macmillan, New York, 1963. 141 pp. Illus. $7.

Biologie de l'Amérique Australe. vol. 2, *Études sur la faune du sol*. Delamare Deboutteville and Eduardo Rapoport, Eds. Editions du Centre National de la Recherche Scientifique, Paris, 1963. 399 pp. Illus. F. 82.

The Biosynthesis of Vitamins and Related Compounds. T. W. Goodwin. Academic Press, New York, 1963. 376 pp. Illus. $11.

Bio-Telemetry. The use of telemetry in animal behavior and physiology in relation to ecological problems. Proceedings of the Interdisciplinary Conference (New York), March 1962. Lloyd E. Slater, Ed. Pergamon, London; Macmillan, New York, 1963. 384 pp. Illus. $18.50. Sessions: The Potential for Telemetry in Biological Research; The Current State of Biological Telemetry; Reports on Telemetry in Animal Tracking, Orientation, and Ecology; Reports on Telemetry in Studies of Animal Social Behavior; Reports on Telemetry in Studies of Animal Physiology; Reports on Telemetry in Studies of Physiology of Man. 36 papers.

Blood Pressure Sounds and their Meanings. pt. 3, *The Heart and the Crystalline Structure of the Body*. John Erskine Malcolm. Thomas, Springfield, Ill., 1963. 75 pp. Illus. $6.

Bone Metabolism. In relation to clinical medicine. Proceedings of a symposium (London), September 1962. H. A. Sissons, Ed. Lippincott, Philadelphia, 1963. 139 pp. Illus. Paper, $6.

The Cell. Carl P. Swanson. Prentice-Hall, Englewood Cliffs, N.J., ed. 2, 1964. 128 pp. Illus. Paper, $1.75; cloth, $3.95.

The Character of Danger. Psychiatric symptoms in selected communities. Dorothea C. Leighton, John S. Harding, David B. Macklin, Allister M. Macmillan, and Alexander H. Leighton. Basic Books, New York, 1963. 559 pp. Illus. $10.

Color Atlas of Pathology: Central Nervous System. Charles F. Geschickter

and Albert Cannon. Lippincott, Philadelphia, 1963. 396 pp. Illus. $25.

Comparative Biochemistry. A comprehensive treatise. vol. 6, *Cells and Organisms.* Marcel Florkin and Howard S. Mason, Eds. Academic Press, New York, 1964. 581 pp. Illus. $20.

Comparative Endocrinology. vol. 2, pt. 1, *Invertebrate Hormones*; pt. 2, *Tissue Hormones.* U. S. von Euler and H. Heller, Eds. Academic Press, New York, 1963. 298 pp. Illus. $12.

Counterpoint: Libidinal Object and Subject. A tribute to Rene A. Spitz on his 75th birthday. Herbert S. Gaskill, Ed. International Univ. Press, New York, 1963. 210 pp. $4.50.

Craig and Faust's Clinical Parasitology. Ernest Carroll Faust and Paul Farr Russell. Lea and Febiger, Philadelphia, ed. 7, 1964. 1099 pp. Illus. $16.50.

Desert Animals. Physiological problems of heat and water. Knut Schmidt-Nielsen. Oxford Univ. Press, New York, 1964. 293 pp. Illus. $7.20.

Determinants of Infant Behavior. vol. 2. Proceedings Second Tavistock Seminar (London), September 1961. B. M. Foss, Ed. Methuen, London; Wiley, New York, 1964. 260 pp. Illus. $7.75.

The Development of the Brain and Its Disturbance by Harmful Factors. B. N. Klosovskii. Translated from the Russian edition (Moscow, 1960) by Basil Haigh. Pergamon, London; Macmillan, New York, 1963. 289 pp. Illus. $9.75.

The Distribution and Abundance of Tsetse. J. P. Glasgow. Pergamon, London; Macmillan, New York, 1963. 253 pp. Illus. $8.50.

Diuretics. George deStevens. Academic Press, New York, 1963. 200 pp. Illus. $7.

The Ecology of Waste Water Treatment. H. A. Hawkes. Pergamon, London; Macmillan, New York, 1963. 213 pp. Illus. $5.

Elastolysis and Ageing. David A. Hall. Thomas, Springfield, Ill., 1963. 174 pp. Illus. $6.75.

Elementary Biophysics: Selected Topics. Herman T. Epstein. Addison-Wesley, Reading, Mass., 1963. 128 pp. Illus. Paper, $1.75; cloth, $2.95.

Elementary Human Anatomy. Andrew J. Berger. Wiley, New York, 1964. 550 pp. Illus. $7.75.

Enzyme Chemistry of Phenolic Compounds. Proceedings of the Plant Phenolics Group symposium (Liverpool), April 1962. J. B. Pridham, Ed. Pergamon, London; Macmillan, New York, 1963. 152 pp. Illus. $7.50. Introductory address and 13 papers.

Enzymes in Blood Plasma. Benno Hess. Translated from the German edition (Stuttgart, 1962) by Keith S. Henley. Academic Press, New York, 1963. 179 pp. Illus. $8.

The Evolution and Eradication of Infectious Diseases. Aidan Cockburn. Johns Hopkins Press, Baltimore, 1963. 269 pp. Illus. $7.50.

Experimental Biochemistry. John M. Clark, Jr., Ed. Freeman, San Francisco, 1964. 240 pp. Illus. Paper, $4.75.

Experimental Biology. Measurement and analysis. R. H. Kay. Reinhold, New York; Chapman and Hall, London, 1964. 432 pp. Illus. $12.

Experimental Pathogenic Microbiology. John M. Slack, Vincent F. Gerencser, and Samuel J. Deal. Burgess, Minneapolis, ed. 2, 1964. 177 pp. Illus. Paper, $4.50.

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Foundations of Embryology. Bradley M. Patten. McGraw-Hill, New York, ed. 2, 1964. 642 pp. Illus. $10.50.

Foundations of Experimental Embryology. Benjamin H. Willier and Jane M. Oppenheimer, Eds. Prentice-Hall, Englewood Cliffs, N.J., 1964. 237 pp. Illus. $7.95.

Freshwater Ecology. T. T. Macan. Longmans, Green, London; Wiley, New York, 1963. 348 pp. Illus. $6.50.

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General Physiology of Cell Specialization. Symposium (Corvallis, Ore.), August 1962. Daniel Mazia and Albert Tyler, Eds. McGraw-Hill, New York, 1963. 448 pp. Illus. $13.50.

Generic Names of Orchids. Their origin and meaning. Richard Evans Schultes and Arthur Stanley Pease. Academic Press, New York, 1963. 347 pp. $12.

Genetics and Metabolism. Robert P. Wagner and Herschel K. Mitchell. Wiley, New York, ed. 2, 1964. 683 pp. Illus. $14.

Genetics Today. Proceedings of the 11th International Congress of Genetics (The Hague, Netherlands), September 1963. vol. 1, *Abstracts.* S. J. Geerts, Ed. Pergamon, London; Macmillan, New York, 1963. 340 pp. $15. Abstracts of contributed papers.

Geriatric Psychiatry. Kurt Wolff. Thomas, Springfield, Ill., 1963. 135 pp. $5.75.

Germfree Life and Gnotobiology. Thomas D. Luckey. Academic Press, New York, 1963. 526 pp. Illus. $17.50.

The Handbook of British Mammals. Edited for the Mammal Society of the British Isles by H. N. Southern. Blackwell, Oxford; Davis, Philadelphia, 1964. 487 pp. Illus. $6.50.

The Harvey Lectures, 1962–1963. Delivered under the auspices of the Harvey Society of New York. Series 58. Academic Press, New York, 1963. 347 pp. Illus. $9.50. Lectures by O. H. Lowry, F. J. Dixon, K. Schmidt-Nielsen, C. W. Gottschalk, M. C. Bessis, W. E. LeGros Clark, N. S. Scrimshaw, J. F. Danielli, and G. Moruzzi.

Hemoglobin: Its Precursors and Metabolites. Proceedings of a seminar (Washington, D.C.). F. William Sunderman and F. William Sunderman, Jr., Eds. Lippincott, Philadelphia, 1964. 374 pp. Illus. $16.

Histochemistry and Cytochemistry. Proceedings of the First International Congress (Paris), 1960. R. Wegmann, Ed. Pergamon, London; Macmillan, New York, 1963. 499 pp. Illus. $15. This volume contains 14 reports (in French, German, or English) given at the plenary sessions of the congress.

Hormones and the Kidney. Proceedings of the 89th meeting of the Society for Endocrinology (Cambridge, England), September 1962. Peter C. Williams, Ed. Academic Press, New York, 1963. 399 pp. Illus.

Human Vibration Research. A collection of articles sponsored by the Human Factors Society. S. Lippert, Ed. Pergamon, London; Macmillan, New York, 1963. 119 pp. Illus. $5.

Insect Physiology. Proceedings of a colloquium (Corvallis, Ore.), Victor J. Brookes, Ed. Oregon State Univ. Press, Corvallis, 1963. 124 pp. Illus. $4. Papers by D. Bodenstein, W. H. Telfer, G. R. Wyatt, S. D. Beck, W. W. Doane, and M. E. Martignon.

International Review of Connective Tissue Research. vol. 1. David A. Hall, Ed. Academic Press, New York, 1963. 415 pp. Illus. $14. Eight papers: "The fibroblast," by A. Whitley Branwood; "The hormonal control of connective tissue," by G. Asboe-Hansen; "Chemical aspects of collagen fibrillogenesis," by D. A. Lowther; "Molecular structure of collagen," by G. N. Ramachandran; "The enzymes of the elastase complex," by W. A. Loeven; "Connective tissue changes in atherosclerosis," by Joseph Baló; "Diabetes and vascular degeneration," by J. W. Czerkawski; and "Calcification of skeletal tissues," by S. M. Weidmann.

An Introduction to Body Fluid Metabolism. A. V. Wolf and Norman A. Crowder. Published for the Univ. of Illinois College of Medicine by Williams and Wilkins, Baltimore, Md., 1964. 271 pp. Illus. Paper, $4.95.

Introduction to Radiological Health. Hanson Blatz. McGraw-Hill, New York, 1964. 329 pp. Illus. $12.75.

An Introduction to Respiratory Cytology. Winifred Liu. Thomas, Springfield, Ill., 1963. 127 pp. Illus. $5.75.

Irradiation and the Nervous System. Charles D. Van Cleave. Rowman and Littlefield, New York, 1963. 434 pp. Illus. $9.75.

Klinik der Lungenkrankheiten. H. W. Knipping and H. Rink. Schattauer, Stuttgart, Germany, 1964 (order from Intercontinental Medical Book Corp., New York). 1021 pp. Illus. $44.50.

The Liver. Morphology, biochemistry,

physiology. vol. 1. C. Rouiller, Ed. Academic Press, New York, 1963. 697 pp. Illus. $26.

Livestock and Livestock Products. Theodore C. Byerly. Prentice-Hall, Englewood Cliffs, N.J., 1964. 432 pp. Illus. $10.

The Lower Metazoa. Comparative biology and phylogeny. Ellsworth C. Dougherty, Zoe Norwood Brown, Earl D. Hanson, and Willard D. Hartman, Eds. Univ. of California Press, Berkeley, 1963. 490 pp. Illus. $17.50.

Mechanisms of Hard Tissue Destruction. A symposium. AAAS Publ., No. 75. Reidar F. Sognnaes, Ed. AAAS, Washington, D.C., 1963. 778 pp. Illus. Members, $11; others $13. Twenty-six papers based on a four-session symposium organized by the Section on Dentistry of the AAAS and held during the AAAS annual meeting, December 1962.

Die Mediastinoskopie. Bioptische exploration des oberen mediastinums nach E. Carlens. Ernst Knoche and Hans Rink. Schattauer, Stuttgart, Germany, 1964 (order from Intercontinental Medical Book Corp., New York). 74 pp. Illus. $5.50.

Medical Pharmacology. Principles and concepts. Andres Goth. Mosby, St. Louis, Mo., ed. 2, 1964. 585 pp. Illus. $11.75.

Metabolic Inhibitors. A comprehensive treatise. vol. 2. R. M. Hochster and J. H. Quastel, Eds. Academic Press, New York, 1963. 771 pp. Illus. $28.

Methods in Enzymology. vol. 6. Sidney P. Colowick and Nathan O. Kaplan, Eds. Academic Press, New York, 1963. 1078 pp. Illus. $28.

The Neural Control of Sweating. G. H. Wang. Univ. of Wisconsin Press, Madison, 1964. 139 pp. Illus. $5.

New Thinking in School Biology. Report on the OECD Seminar (La Tour de Peilz, Switzerland), September 1962. Organization for Economic Co-operation and Development, Paris, 1963 (order from McGraw-Hill, New York). 328 pp. Illus. Paper, $3.

Normal and Abnormal Pulmonary Circulation. vol. 1, **Progress in Research in Emphysema and Chronic Bronchitis.** Robert F. Grover, Ed. Karger, Basel, Switzerland, 1963. 458 pp. Illus. $17.75. Some 40 papers presented at the fifth annual conference on research in emphysema, which was held at Aspen, Colorado, in 1962.

Ocular Fine Structure. Selected electron micrographs. Marie A. Jakus. Little, Brown, Boston, 1964. 214 pp. Plates. $15.

The Oculomotor System. A symposium (New York), April 1961. Morris B. Bender, Ed. Harper and Row, New York, 1964. 572 pp. Illus. $16.

Pacific Basin Biogeography. A symposium of the Tenth Pacific Science Congress (Honolulu), August-September 1961. J. Linsley Gressitt, Ed. Bishop Museum Press, Honolulu, 1963. 571 pp. Illus. Paper, $12.

Parasitic Copecoda and Branchiura of Fishes. Satyu Yamaguti. Interscience (Wiley), New York, 1963. 1114 pp. Illus. $75.

The Pathology of Development. A study of inherited skeletal disorders in animals. Hans Grüneberg. Wiley, New York, 1964. 323 pp. Illus. $12.

Physics of Plant Environment. W. R. van Wijk, Ed. North-Holland, Amsterdam; Interscience (Wiley), New York, 1963. 398 pp. Illus. $12.50.

Plankton and Productivity in the Oceans. John E. G. Raymont. Pergamon, London; Macmillan, New York, 1963. 668 pp. Illus. $15.

Plant Diseases: Epidemics and Control. J. E. Van der Plank. Academic Press, New York, 1963. 365 pp. Illus. $10.

Plant Viruses and Virus Diseases. F. C. Bawden. Ronald, New York, ed. 4, 1964. 371 pp. Illus. $8.75.

The Prevention of Hospitalization. Treatment without admission for psychiatric patients. Milton Greenblatt, Robert F. Moore, Robert S. Albert, and Maida H. Solomon. Grune and Stratton, New York, 1963. 198 pp. Illus. $7.50.

Principles of Angiosperm Taxonomy. P. H. Davis and V. H. Heywood. Van Nostrand, Princeton, N.J., 1963. 576 pp. Illus. $15.

Principles of Numerical Taxonomy. Robert R. Sokal and Peter H. A. Sneath. Freeman, San Francisco, 1963. 377 pp. Illus. $8.50.

The Porphyrias. A story of inheritance and environment. Geoffrey Dean. Lippincott, Philadelphia, 1964. 129 pp. Illus. $7.

Programed Genetics. vol. 1, *The Basic Concepts*. Chester A. Lawson and Mary Alice Burmester. Heath, Boston, 1963. 336 pp. Illus. Paper, $4.40.

Progress in Biophysics and Molecular Biology. vol. 13. J. A. V. Butler, H. E. Huxley, and R. E. Zirkle, Eds. Pergamon, London; Macmillan, New York, 1963. 338 pp. Illus. $12.75. Six papers: "Radiobiological mechanisms: comparative distribution and role of ionization, excitation, and energy and charge migration," by L. G. Augenstein; "The radiation chemistry of aqueous solutions of nucleic acids and nucleoproteins," by G. Scholes; "X-ray small angle scattering with substances of biological interest in diluted solutions," by O. Kratky; "Enzymatic synthesis of nucleic acids," by M. Grunberg-Manago; "Ultrastructure and kinetic aspects of solute translocation in the stems of plants," by R. D. Preston; "The mechanochemistry of muscular contraction, a critical revaluation of in vivo studies," by F. D. Carlson.

Progress in Medicinal Chemistry. vol. 3, G. P. Ellis and G. B. West, Eds. Butterworth, Washington, D.C., 1963. 417 pp. Illus. $15.75. Seven papers: "Some chemical aspects of neuromuscular block," by J. B. Stenlake; "The chemotherapy of trypanosomiasis," by L. P. Walls; "Antitussive drugs," by C. I. Chappel and C. Von Seeman; "The chemistry and pharmacology of the Rauwolfia alkaloids," by R. A. Lucas; "Statistics as applied to pharmacological and toxicological screening," by G. A. Stewart and P. A. Young; "Anticonvulsant drugs," by A. Spinks and W. S. Waring; "Local anaesthetics," by S. Wiedling and C. Tegner.

Progress in Nucleic Acid Research. vol. 2. J. N. Davidson and Waldo E. Cohn, Eds. Academic Press, New York, 1963. 359 pp. Illus. $11. Nine papers: "Nucleic acids and information transfer," by L. F.

Cavalieri and B. H. Rosenberg; "Nuclear ribonucleic acid," by H. Harris; "Plant virus nucleic acids," by R. Markham; "The nuclease of *Escherichia coli*," by I. R. Lehman; "Specificity of chemical mutagenesis," by D. R. Krieg; "Column chromatography of oligonucleotides and polynucleotides," by M. Staehelin; "Mechanism of action and application of azapyrimidines," by J. Skoda; "The function of the pyrimidine base in the ribonuclease reaction," by H. Witzel; "Preparation, fractionation, and properties of sRNA," by G. L. Brown.

Progress in the Chemistry of Fats and Other Lipids. vol. 7, pt. 1, *The Higher Saturated Branched Chain Fatty Acids*. Sixten Abrahamsson, Stina Stallberg-Stenhagen, and Einar Stenhagen. Pergamon, London; Macmillan, New York, 1963. 172 pp. Illus. Paper, $5.75.

Protein Nutrition and Metabolism. Proceedings of a conference (Urbana, Ill.), October 1962. Joseph Kastelic, Harold H. Draper, and Harry P. Broquist, Eds. Univ. of Illinois Press, Urbana, 1963. 160 pp. Illus.

The Proteins. Composition, structure, and function. vol. 1. Hans Neurath, Ed. Academic Press, New York, ed. 2, 1963. 679 pp. Illus. $22.

The Psittacosis Group as Bacteria. James W. Moulder. Wiley, New York, 1964. 103 pp. Illus. $4. The Ciba Lectures in Microbial Biochemistry.

Psychopharmacological Methods. Proceedings of a symposium held under the auspices of the Society for the Study of Higher Nervous Activity, Czechoslovak Medical Society (Prague), October–November 1961. Zdeněk Votava, Milan Horváth, and Oldřich Vinař, Eds. Pergamon, London; Macmillan, New York, 1963. 360 pp. Illus. $14.

Psychophysiologie, Neuropharmacologie et Biochimie de la Crise Audiogène. International colloquium (Gif-Sur-Yvette, France), November 1961. Editions du Centre National de la Recherche Scientifique, Paris, 1963. 531 pp. Illus. F. 58.

Quantitative Plant Ecology. P. Greig-Smith. Butterworth, Washington, D.C., ed. 2, 1964. 268 pp. Illus. $8.95.

The Rat. A study in behaviour. S. A. Barnett. Aldine, Chicago, Ill., 1963. 304 pp. Illus. $7.95.

Readings in Pharmacology. Selected and edited by B. Holmstedt and G. Liljestrand. Pergamon, London; Macmillan, New York, 1963. 405 pp. Illus. $7.50.

Research with Primates. Proceedings of a conference (Beaverton, Ore.), May 1962. Donald E. Pickering, Ed. Oregon Regional Primate Research Center, Beaverton, 1963. 108 pp. Illus. $2.50.

The Senses of Animals. L. Harrison Matthews and Maxwell Knight. Philosophical Library, New York, 1963. 240 pp. Illus. $7.50.

Some Biochemical and Immunological Aspects of Host-Parasite Relationships. Harold E. Whipple, Ed. New York Acad. of Sciences, New York, 1963. 510 pp. Illus. Paper. $7. Thirty-two papers "concerned primarily with biochemical and immunological interactions between host and parasite. . . ." The papers were presented at a conference sponsored by the Academy and held in April 1963.

Southern Forests and Southern People. 12th annual forestry symposium (Baton Rouge, La.), 1963. Thomas Hansbrough, Ed. Louisiana State Univ. Press, Baton Rouge, 1964. 123 pp. $4.

Speciation in the Sea. A symposium organized jointly by the Systematics Association and the Challenger Society, and held at Plymouth Laboratory of the Marine Biological Association, September 1961. J. P. Harding and Norman Tebble, Eds. Systematics Assoc., London, 1963. 199 pp. Illus. Paper, $2.

Specifications for Reagents Mentioned in the International Pharmacopoeia. World Health Organization, Geneva, Switzerland, 1963 (order from Columbia Univ. Press, New York). 267 pp. $6.

The States of Human Consciousness. C. Daly King. University Books, New Hyde Park, N.Y., 1963. 192 pp. $7.50.

The Swedish Cancer Society Year Book, 1960–1962. Hilding Bergstrand, Ed. Almquist and Wiksell, Stockholm, 1963. 509 pp. Illus.

Symbolism of Masculinity and Femininity. Gerard A. DeWit. Springer, New York, 1963. 107 pp. Paper, $3.

Systems of Psychotherapy. A comparative study. Donald H. Ford and Hugh B. Urban. Wiley, New York, 1963. 724 pp. $10.95.

Techniques in Photomicrography. E. B. Brain and A. R. Ten Cate. Van Nostrand, Princeton, N.J., 1963. 157 pp. Illus. $6.75.

Techniques in Endocrine Research. Proceedings of a NATO Advanced Study Institute (Stratford-Upon-Avon, England), held under the auspices of the University of Birmingham, September 1962. Peter Eckstein and Francis Knowles, Eds. Academic Press, New York, 1963. 335 pp. Illus. $11.

Temporal Organization in Cells. A dynamic theory of cellular control processes. B. C. Goodwin. Academic Press, New York, 1963. 173 pp. Illus. $6.50.

A Textbook in Analytic Group Psychotherapy. S. R. Slavson. International Universities Press, New York, 1964. 573 pp. Illus. $10.

A Textbook of Human Embryology. R. G. Harrison. Davis, Philadelphia, ed. 2, 1963. 260 pp. Illus. $9.50.

Textbook of Mental Deficiency (Subnormality). R. F. Tredgold and K. Soddy. Williams and Wilkins, Baltimore, ed. 10, 1963. 542 pp. Illus. $12.50.

Traité de Biochimie Générale. P. Boulanger and J. Polonovski, Eds. vol. 2, *Les Agents des Synthèses et des Dégradations Biochimiques*; pt. 2, *Les Enzymes*. M. Javillier, M. Polonovski, M. Florkin, P. Boulanger, M. Lemoigne, J. Roche, and R. Wurmser. Masson, Paris, 1964. 761 pp. Illus. Paper, $28.55; cloth, $31.65.

The Transfer of Calcium and Strontium Across Biological Membranes. Proceedings of a symposium (Ithaca, N.Y.), May 1962. R. H. Wasserman, Ed. Academic Press, New York, 1963. 463 pp. Illus. $11.50.

Ultrastructure of Protein Fibers. Proceedings of the 19th annual meeting of the Electron Microscope Society of America, August 1961. Rubin Borasky, Ed. Academic Press, New York, 1963. 202 pp. Illus. $9. Six papers.

Vegetative Anatomy of Plants. H. G. Burström and Camilla Odhnoff. Svenska Bokforlaget, Stockholm, 1963. 157 pp. Illus.

Vegetation and Flora of the Sonoran Desert. vols. 1 and 2. vol. 1, pt. 1, *Vegetation of the Sonoran Desert* (reprint of Carnegie Institution of Washington Publ. No. 591, 1951), Forrest Shreve; pt. 2, *Flora of the Sonoran Desert*, Ira L. Wiggins (850 pp. Illus. Plates.); vol. 2, Forrest Shreve and Ira L. Wiggins (906 pp.). Stanford Univ. Press, Stanford, Calif., 1964. Set, $22.50.

Virus Diseases of Apples and Pears. A. F. Posnette, Ed. Commonwealth Agricultural Bureaux, Farnham Royal, Bucks, England, 1963. 153 pp. Illus. $5.25.

Viruses, Nucleic Acids, and Cancer. Papers presented at the 17th annual symposium on fundamental cancer research, 1963. Published for the University of Texas M. D. Anderson Hospital and Tumor Inst. by Williams and Wilkins, Baltimore, Md., 1963. 675 pp. Illus. $16.

The Year Book of Veterinary Medicine, 1963. vol. 1. William F. Riley, Jr., Kenneth W. Smith, and Robert J. Flynn, Eds. Year Book, Chicago, 1963. 456 pp. Illus. $10.

Viruskrankheiten des Menschen. Unter besonderer Berücksichtigung der experimentellen Forschungsergebnisse. vol. 1, pt. 9. Eugen Haagen. Steinkopff, Darmstadt, Germany, 1963. 95 pp. Illus. Paper, DM. 24.

Vitamins and Coenzymes. Arthur F. Wagner and Karl Folkers. Interscience (Wiley), New York, 1964. 548 pp. Illus. $17.50.

Economics and the Social Sciences

Alcohol Education for Classroom and Community. A source book for educators. Raymond G. McCarthy, Ed. McGraw-Hill, New York, 1964. 320 pp. Illus. $7.50.

The Annual Survey of Psychoanalysis. A comprehensive survey of current psychoanalytic theory and practice. vol. 7. John Frosch and Nathaniel Ross, Eds. International Universities Press, New York, 1964. 531 pp. $12.

Behaviorism and Phenomenology. Contrasting bases for modern psychology. T. W. Mann, Ed. Published for William Marsh Rice Univ. by Univ. of Chicago Press, Chicago, 1964. 202 pp. $5.

Biennial Review of Anthropology, 1963. Bernard J. Siegel, Ed. Stanford Univ. Press, Stanford, Calif., 1963. 325 pp. $7.50.

Career Training in Child Psychiatry. Report of a conference (Washington, D.C.), January 1963. Othilda Krug *et al.*, Eds. American Psychiatric Assoc., Washington, D.C., 1964. 270 pp. $3.

Classification and Human Evolution. Sherwood L. Washburn, Ed. Aldine, Chicago, 1964. 381 pp. Illus. $7.50.

The Conduct of Inquiry. Methodology for behavioral science. Abraham Kaplan. Chandler, San Francisco, 1964. 448 pp. $8.

Critical Essays on Psychoanalysis. Stanley Rachman, Ed. Pergamon, London; Macmillan, New York, 1963. 298 pp. $7.50.

(Continued from page 397)

their own figures of accuracy: the Navy, for example, held that the instrument was 70-percent reliable. But since no evidence was brought forth to support any of these claims, they had more the appearance of mystical revelation than of reliable fact.

Not only is there a lack of evidence to support claims that the machine is reliable, there is some positive evidence that it confuses more than it clarifies. In an article in the May 1963 issue of the *American Journal of Psychiatry*, called "Unconscious Motivation and the Polygraph Test," H. B. Dearman and B. M. Smith reported the case of a young bank vice-president referred to them for psychiatric aid. During the course of a routine polygraph examination of all bank employees, the patient had reacted violently to the question, "Have you ever stolen any money from the bank or its customers?" The patient denied having taken money, but in four tests the reaction was consistent, and finally, convinced that he could not "fool the machine," the patient broke down, confessed that he had stolen money from the bank, and provided a description of how he had done it. When the bank's books were audited, however, it was discovered "not only that he had not used the method that he had stated but that no shortage of that amount had occurred in his branch since he had been employed there." The explanation for the false confession, as developed by Dearman, was that, for reasons deep in his past, the patient felt strong guilt feelings toward his wife and mother, both of whom were customers of the bank, and with both of whom he had some financial involvement, about which he also felt guilty. Dearman and Smith assumed that the identification of the patient's wife and mother with the phrase "customers of the bank" was responsible for the patient's reaction. They emphasized that many combinations of psychological factors, other than conscious deception, could produce false results on the polygraph, and they concluded that "the application of . . . the technique is fraught with too many variables and sources of error for it to be used as it is currently being used in business and industry. Its use in criminal investigations and in other situations involving the commonweal (such as screening employees for sen-

sitive government positions) should be carefully and continually scrutinized lest we find that George Orwell's *1984* is upon us."

Nonetheless, though skepticism may be growing in some quarters, the device continues to have some strong advocates. To quote from an endorsement supplied the manufacturer of Keeler Polygraphs by the sheriff of Ouachita Parish, Louisiana, "The lie detector's use in law enforcement is becoming more widespread every day, and we here in the Ouachita Sheriff's Office feel that its effective use as a scientific aid is limited only by our imaginations, and its application is unlimited."—ELINOR LANGER

Announcements

The Committee on the Undergraduate Program in Mathematics (CUPM) of the Mathematical Association of America has prepared a draft of recommendations for the **mathematical preparation of students** in the biological, management, and social sciences (BMSS). The committee's BMSS panel is making these recommendations available to interested persons, and invites their comments on the report's appropriateness and feasibility. Copies of these recommendations can be obtained from the CUPM, P.O. Box 1024, Berkeley, Calif. 94701.

Case Institute of Technology has established a Ph.D. program in "**organizational behavior**," headed by Herbert A. Shepard, director of the Organizational Behavior Group in the school's Division of Organizational Sciences. The program will emphasize the "process of social adaptation in an era of rapidly changing technology, particularly as it affects human behavior in organizations." Candidates will be chosen on the basis of their academic records and personal interviews; the equivalent of a year's college work in statistics is required. (H. A. Shepard, Case Institute of Technology, Cleveland 6, Ohio)

Meeting Notes

New techniques in the use of the motion picture as a research tool, a means of communication of research findings, and as an instrument for science education will be discussed at

the science film exposition and annual meeting of the American **Science Film** Association, scheduled 11–13 May in Washington. The films presented will include single-concept educational films, time-lapse and high-speed cinematography, and computerized animation. (ASFA, 704 17th St., NW, Washington, D.C. 20006)

A symposium on **learning and associated phenomena in invertebrates** is scheduled 6–9 July at Cambridge University, England. It is sponsored by the Association for the Study of Animal Behavior, Great Britain, and the American Society of Zoologists' division of animal behavior. (D. Davenport, Department of Biological Sciences, University of California, Santa Barbara)

Scientists in the News

The following persons have been appointed to 3-year terms on the National Research Council of Canada:

William H. Gauvin, research manager, Noranda Research Centre, Pointe Claire, Quebec;

D. J. LeRoy, head, chemistry department, University of Toronto;

H. Rocke Robertson, principal, McGill University, Montreal;

H. H. Saunderson, vice chancellor and president, University of Manitoba, Winnipeg.

The other members of the NRC are: **H. E. Duckworth**, dean of graduate studies, McMaster University, Hamilton, Ontario;

R. F. Farquharson, chairman, Medical Research Council;

H. E. Gunning, professor and head, chemistry department, University of Alberta, Edmonton;

Claude Jodoin, president, Canadian Labour Congress.

The Atomic Energy Commission has named five persons to receive the 1964 Ernest Orlando Lawrence award in atomic energy. Each scientist will be presented a medal, citation, and $5000 honorarium, 30 April in Washington. The recipients are:

Jacob Bigeleisen, Brookhaven National Laboratory, Upton, N.Y.; for "theoretical contributions and experimental advances in the separation of isotopes."

Albert L. Latter, Rand Corporation, Santa Monica, Calif.; for his work on the "determination of the destructive effects [and] . . . detection of nuclear