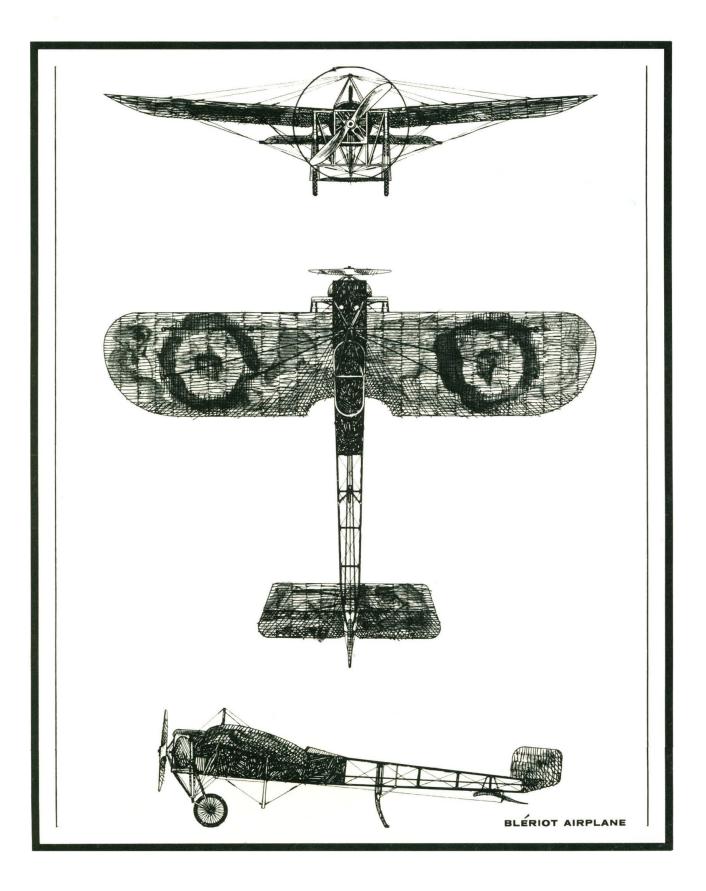


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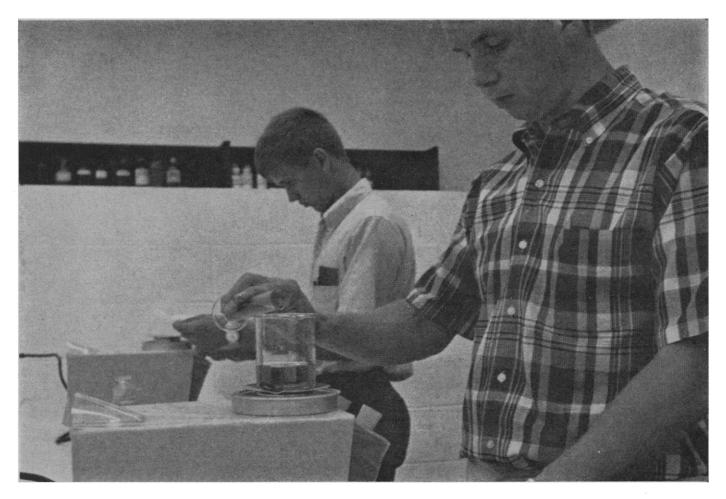
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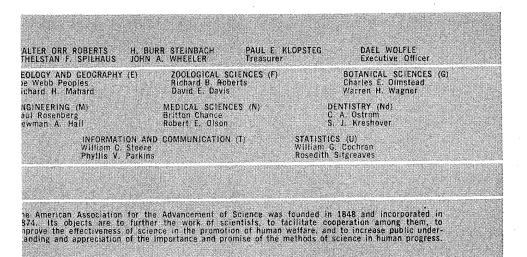
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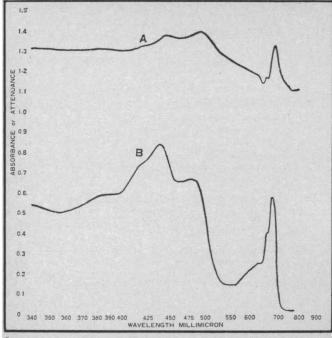
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#### COVER

Early 20th-century monoplane constructed by Louis Blériot, designer and aviator who made the first flight across the English Channel in 1909. Slow but reliable, the Blériot actually contained many design features of a far more advanced craft. See review of *The Invention of the Aeroplane* 1799–1909, page 635. [©Custom Component Switches, Inc., Chatsworth, California; Harleyford Publications Ltd., Letchworth, England]



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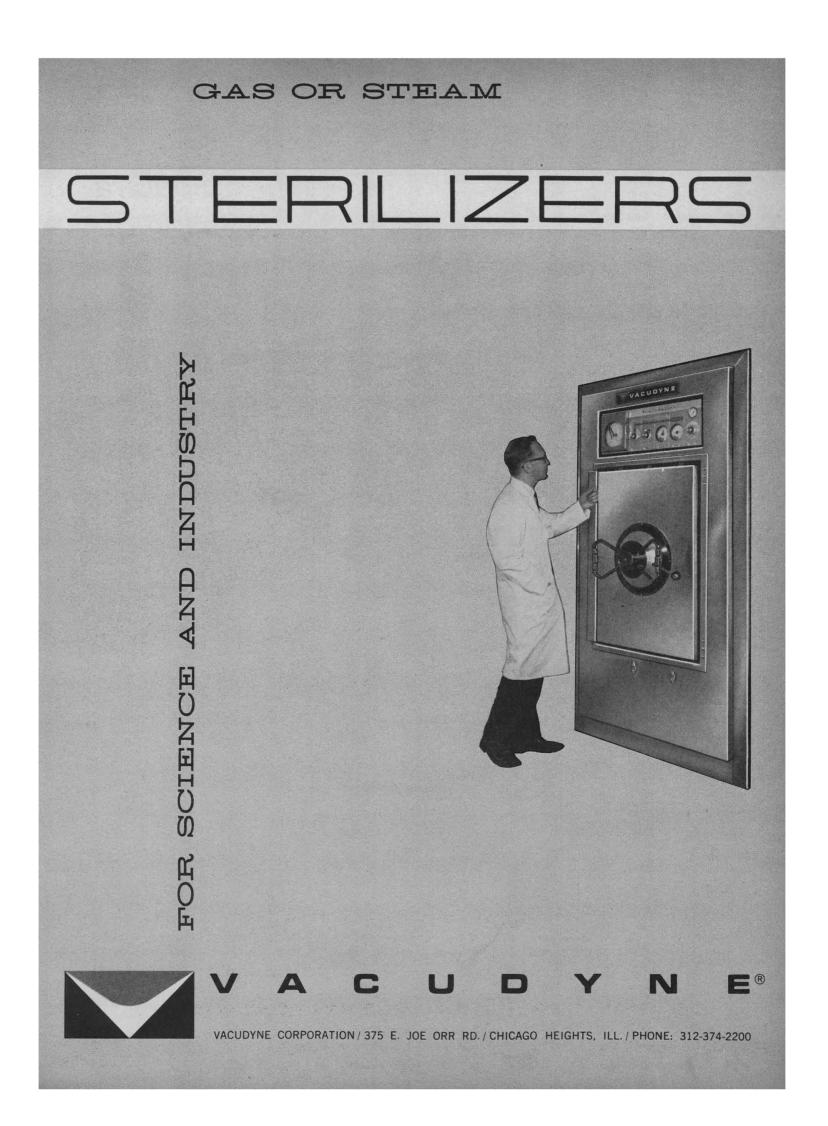
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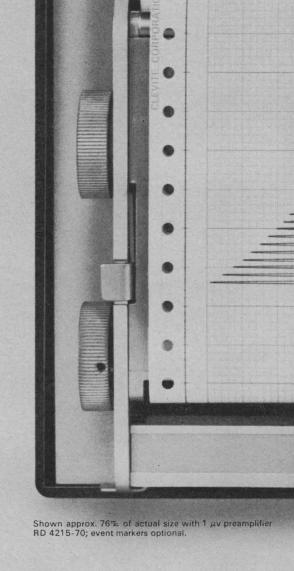
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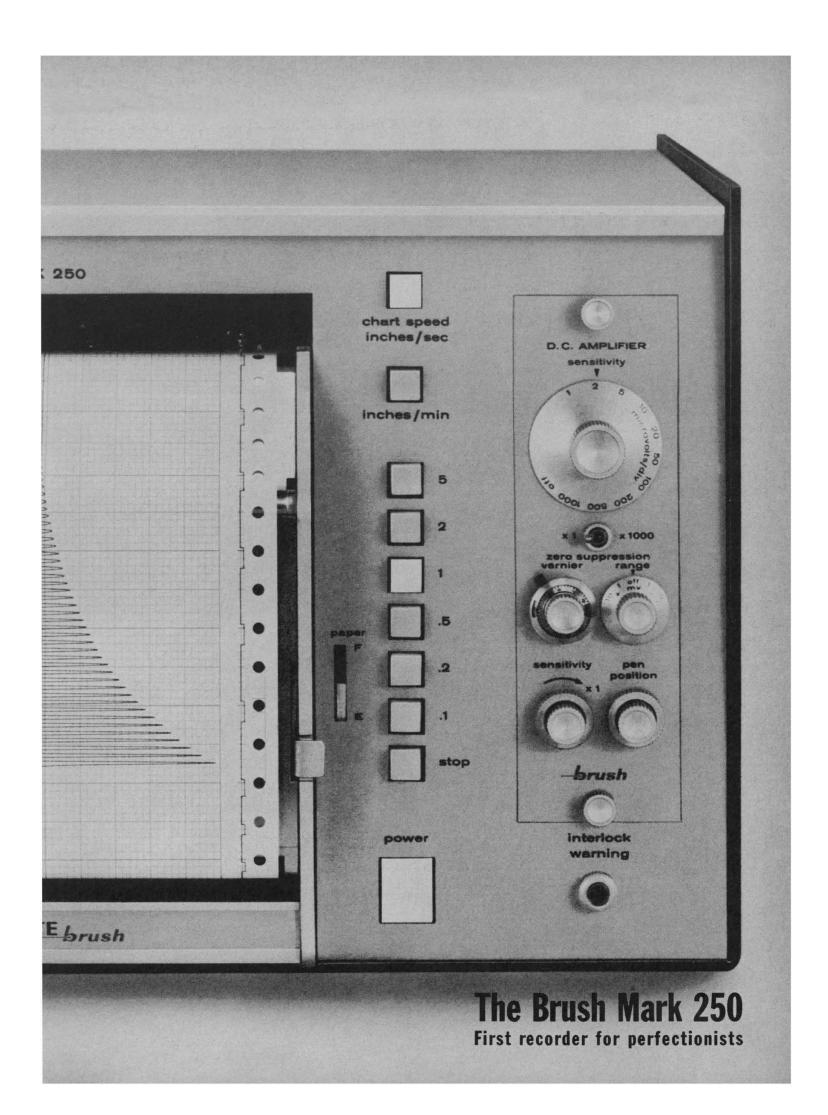


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#### Fact V

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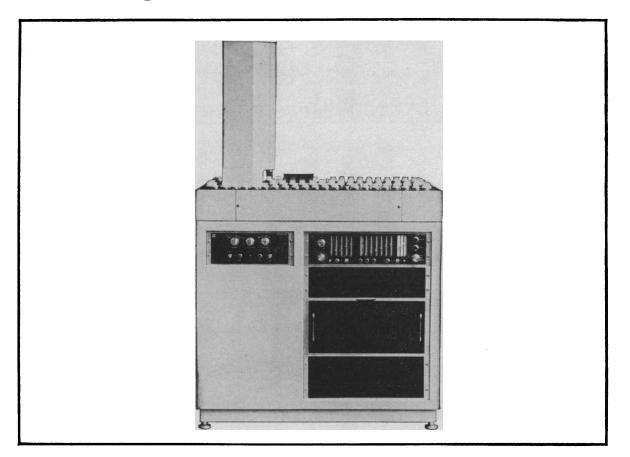
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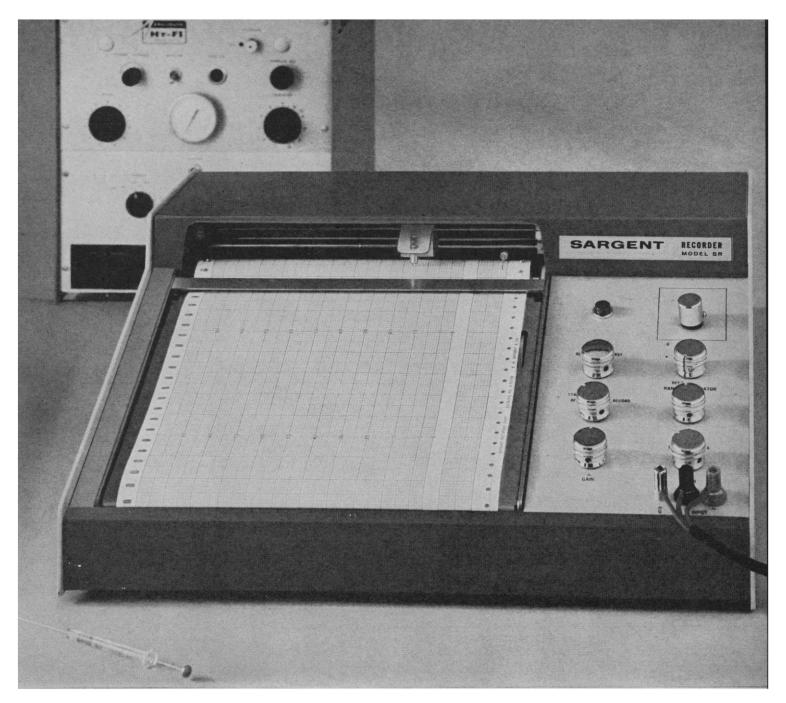
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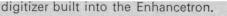
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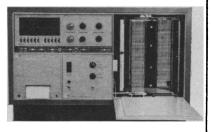
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SCIENCE, VOL. 154



(chum), n. (Origin obscure) Chopped fish, or bait, chum thrown overboard to draw fish.

Sulfamide

H<sub>2</sub>N

llied

hemical

- NH2

chum, v. i. To fish with the aid of chum.

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Oxalyl Chloride	acetyl group in a variety of organic syntheses. Synthesis of acid chlorides. Con- densation reagent with AICl <sub>3</sub> for	Methylene Sulfate OSO <sub>2</sub> O CH <sub>2</sub> CH <sub>2</sub> OSO <sub>2</sub> O	Reacts with alcohols & glycols to give formals; with tertiary amines such as pyridine, quinoline & di- methylaniline compounds of a type analogous to betaine results.
c = 0   c = 0   C	ethers of aromatic hydrocarbons to form open diketones.	Sulfur Trioxide Pyridine Sulfur Trioxide Trimethy Sulfur Trioxide Triethyla	lamine Complex
N,N-Dimethyl Sulfamyl C CH <sub>3</sub> O N – S – Cl CH <sub>3</sub> O	hloride Reacts with amines, sodium alco- holates, sodium phenates, etc. to give the corresponding amides and esters.	Mucochloric Acid Cl Cl C = C H-C C-OH	This compound and its derivatives exhibit bactericidal, fungicidal and insecticidal properties.
Hydroxylamine-O-Sulfoni O    H₂NOSOH    O	<b>c Acid</b> Reacts with organic amines to form hydrazines.	ÖÖ Thioacetamide, Tech. CH₃CSNH₂	Highly reactive with organic hal- ides, aldehydes, nitriles, acid chlo- rides, etc.
Sodium 2-Chloroethane S O II CICH <sub>2</sub> CH <sub>2</sub> SONa II O	Sulfonate For introducing the sulfoethyl group in organic synthesis.		your mouth water, don't hesitate ormation. B&A Fine Chemicals, poration.

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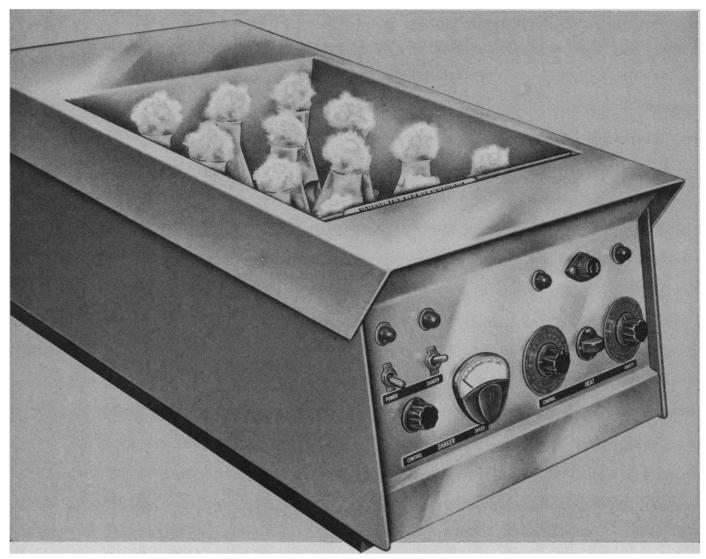
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The versatility of the Wadsworth Spectrograph is demonstrated by the diversity of the fields in which it is currently used. These include chemistry (both organic and inorganic), biology, toxicology, geology, physics, metal and semi-conductor, forensic, test labs and even art museums.

Illustration at right shows operator loading specimen on Model 19-300 Arc Stand. A large variety of arc/spark stands, sources and accessories are provided for the instrument. Shown below is the Model 78-000 Wadsworth Spectrograph on portable stand.

For information on this spectrograph and how it is used for analysis and research, write for Bulletin 78-000 to: Jarrell-Ash Company, 530 Lincoln Street, Waltham, Massachusetts 02154. Tel. (617) 899-4300.







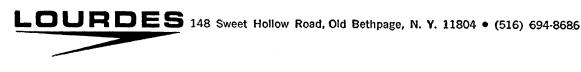
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SCIENCE, VOL. 154

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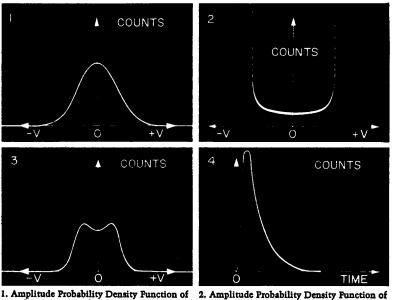


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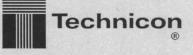
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4 NOVEMBER 1966

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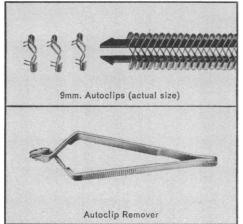


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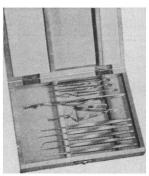
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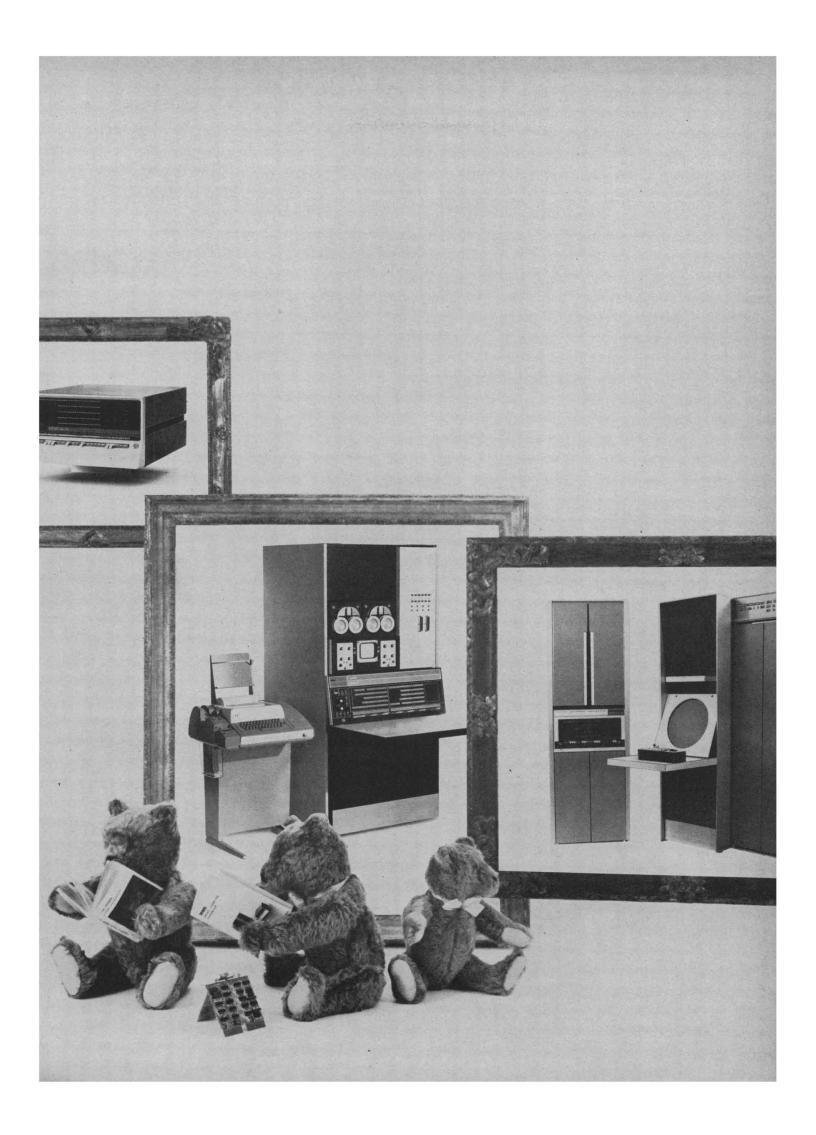
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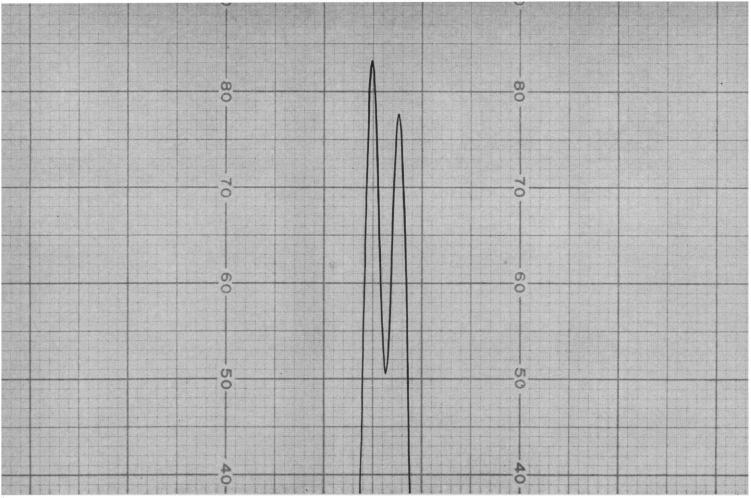


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Here's a quick look at the real expense —in data as well as dollars—of signalaveraging devices, including our averager, the Model 7100 Data Retrieval Computer.



Will you pay for less than excellent resolution? You will in any signal averager that has a minimum dwell-time per data point of more than 39 microseconds. Resolution, after all, is a function of the number of data points that can be placed within a region of interest. Our Model 7100 Data Retrieval Computer (DRC) uses all 400 of its data points for signals occurring within as little as 15.6 milliseconds. The DRC, therefore, gives much better resolution than averagers that use only a fraction of their data points to represent the signal of interest.

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For more information, consult your local Nuclear-Chicago sales engineer or write to us.



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#### **Detroit Fluoride Conference**

In his article, "Fluoridation: A meeting in Detroit raises some questions" (23 Sept., p. 1499), Greenberg focused attention on some important aspects of the continuing controversy over water fluoridation, not the least of which is the urgent need for top-level scientific symposia on the physiological properties of fluoride at which all sides are adequately and competently represented. He correctly pointed out that the newly formed American (name now changed to International) Society for Fluoride Research must still prove itself worthy of being considered a proper scientific organization for this or any other legitimate purpose.

With respect to the "curious" timing of the recent conference, it is pertinent to note that such a meeting was actually proposed over a year ago, long before there was even any intimation that there would be a referendum on fluoridation in Detroit this fall. However, owing to the problem of raising funds, final plans could not be made until late spring. My letters of invitation were composed and signed by me as a member of the program committee. At least a half dozen of those scientists who attended the conference were invited personally by Waldbott. Several others who came in response to his invitation would probably be considered "pro-fluoridationists."

The comments about Waldbott and his new book neglected to indicate that since 1955 he has published detailed clinical reports of reversible ill effects from fluoridated drinking water. These have appeared in such distinguished medical journals as Acta Medica Scandinavica. International Archives of Allergy and Applied Immunology, Acta Allergologica, Confinia Neurologica, Deutsche Medizinische Wochenschrift, Hautarzt, Nordisk Medicin, and others. Without this fact being stated, many readers might gain the impression that touring the country "proclaiming an association between fluorine and an immense catalog of misfortunes" is Dr. Waldbott's sole activity concerning the medical aspects of fluoride.

Actually, for anyone who is thoroughly familiar with Waldbott's clinical findings, it is clear that they present evidence for reproducible toxic effects from fluoride in drinking water, which has been disputed but not refuted. Those findings certainly appear to be as valid, say, as those of Ignaz Semmelweis who charged that unsanitary delivery room instruments and procedures were the primary cause of childbed fever. The weight of prevailing medical opinion was against Semmelweis, but that did not prove him wrong! After all, a physician does have a duty to his profession and to society to report any previously unnoticed side effects from an accepted medical practice. He is considered derelict if he does not do so, and justly so.

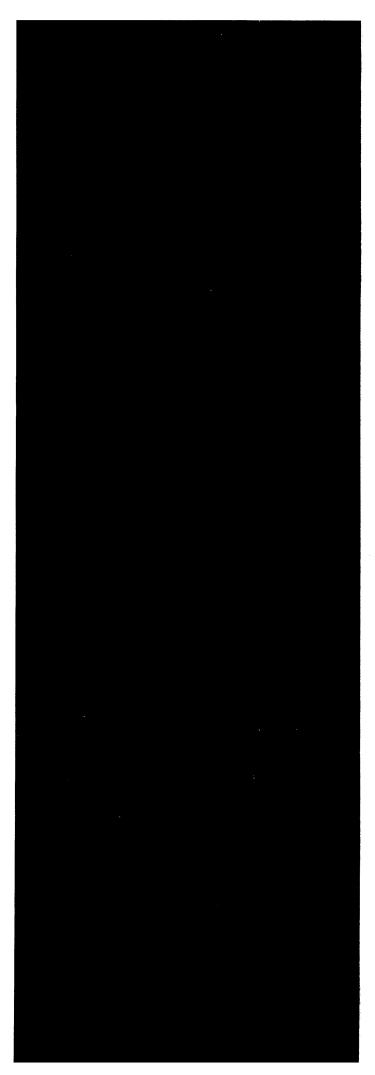
By the same token, was it not a little presumptuous to imply that the conference in Detroit would probably produce "little but scientific-sounding scare stories" without having knowledge of the actual content of the papers that were to be presented and discussed? Science cannot be expected to make advances if it can operate only in a climate of conformity to viewpoints that rest on older, rather than newer, data.

ALBERT W. BURGSTAHLER Department of Chemistry, University of Kansas, Lawrence 66044

#### Graduate Training in Astronomy

From 1930 to early 1957, I was active in training graduate students in astronomy at Harvard. From 1957 until last April, I was in Australia, establishing a graduate school of astronomy at the Australian National University, and I am now head of the department of astronomy at the University of Arizona. During my absence abroad, I visited the United States several times to attend meetings of the American Astronomical Society and kept closely in touch with graduate schools of astronomy at several universities. Last spring when I returned, I was impressed by the great increase in the number of graduate students. Further, it seemed to me that, while many new universities have entered the graduate training picture, the admission standards appear to have been lowered, and that there are, at the end of the first and second years, fewer dropouts now than there were 10 to 20 years ago. Moreover, the quality of the education does not seem as high as it was formerly. I have found also that many graduate students do not seem to be putting forth their maximum effort. The 1966 student is not so fully committed to his training for a future career as was the graduate student of the early and middle fifties.

The number of fellowships for gradu-



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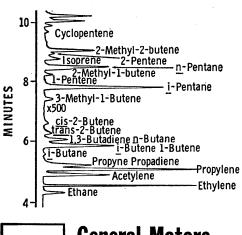
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MARK OF EXCELLENCE



Section of chromatogram of hydrocarbons in exhaust gas—from a recent paper.

### General Motors Research Laboratories Warren, Michigan 48090

## MEASURE 10<sup>-17</sup> M SULFIDE ION ACTIVITY

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The electrode can be used with any expanded scale pH meter and a conventional pH reference electrode. Technique is similar to simple pH measurements. This electrode, available through major laboratory supply dealers, is priced at \$160.00.

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ate study has fortunately increased, especially through the programs of NSF, NASA, and NDEA. With this new affluence, stability, and opportunity, something seems to have been lost. The better graduate students of 10 to 20 years ago were young people in a hurry, whereas the 1966 model seems to take his time. In the past, most students who did graduate work in astronomy felt that it was a real privilege to be admitted to graduate school and be awarded a fellowship or assistantship. From the start, there was a sense of urgency. The few who did not try hard enough, or who lacked ability, were dropped after 1 year or, at most, 2 years in graduate school. The pressures on the student to work during the initial years should not be less than those on students in professional schools of medicine and law

Predoctoral examinations in the field of astronomy seem to require more time for preparation than they did in the past and, as a result, the start of work on the doctoral thesis is delayed. Thesis work is often not really begun until 3 years after the student enters graduate school. It is not at all unusual now to see a student take 5 to 7 years to complete the work for the doctorate. The normal time, I believe, should be 4 years. If the student enters graduate school with an adequate preparation in physics and mathematics and with a fair knowledge of one or two foreign languages, the 2 years should suffice for his formal course work, which would leave 2 years for completing the doctoral thesis. The search for a thesis topic should start in earnest early in the second year.

Another example of the leisurely approach to the doctorate is the time consumed to fulfill the foreign language requirement. This has become such a major undertaking that students often spend most of a summer getting ready for the language examination, and, during that time, they suspend all their professional graduate study.

The generous fellowship support programs have had one further unfortunate side effect. In the past, a graduate student generally spent at least 1 year as an assistant teaching an elementary or intermediate course related to his field of study. It is now difficult to get promising students to do any teaching and this is leading to a generation of professional astronomers with practically no background in teaching. This is a pity, since I know of no better way for a graduate student to learn the general background for his professional work.

Under the present system a student is not thoroughly examined as to his capabilities for future professional work until 2 or 3 years after he has entered graduate school. We used to be able to eliminate our poor prospects generally at the end of the first year, and certainly at the end of the second year. But if a student remains in graduate school for as long as 3 years, he is generally firmly ensconced and it is difficult to get rid of him. I wish to comment briefly on another discouraging development. Ten to twenty years ago, graduate students were active questioners and spoke up regularly in colloquia and at AAS meetings. Now, even though the student goes through the ordeal of presenting his own paper, first in the departmental colloquium, and then in a professional meeting, he is inclined to become less engaged in open question periods than he did formerly. Questioning is generally limited to the staff members in the first few rows at colloquia and to a few distinguished astronomers at professional meetings. This is too high a price to pay for bigness.

Since I have taken on the responsibility for a relatively young graduate school of astronomy, I have naturally given thought to improving these matters. In summary, it seems obvious that strict admission standards must be set. and that each student's case must be reviewed thoroughly and comprehensively at the end of the first and second year of graduate study. It should not be assumed as a matter of course that a student will spend 5 or more years in graduate school; 4 years on the average should suffice. Students should be urged increasingly to participate in scientific discussions and most would benefit from 1 year of teaching elementary or intermediate courses. Finally, the foreign language requirements should be fulfilled preferably during the undergraduate years.

Two concluding comments: it has been a source of regret to return to the United States after 10 years and find, first, that there are still very few graduate schools in which the study of optical and radio astronomy is naturally interwoven, and second, that women graduate students in astronomy are still so rare.

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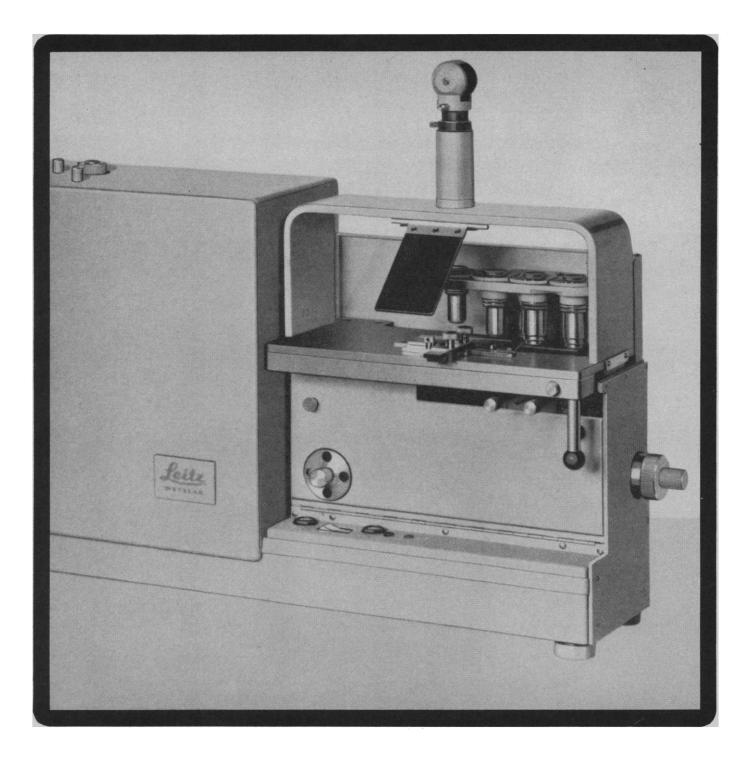
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### Science Critics\*

Scientific problems should be presented to the general public from several points of view. Factual knowledge must, of course, be communicated through articles, books, lectures, and exhibits in terms that are meaningful for the nonscientist yet do not distort the truth. Great progress has been made in such popularization of science during the past decades; the Pacific Science Center in Seattle is a notable example of achievement in this direction.

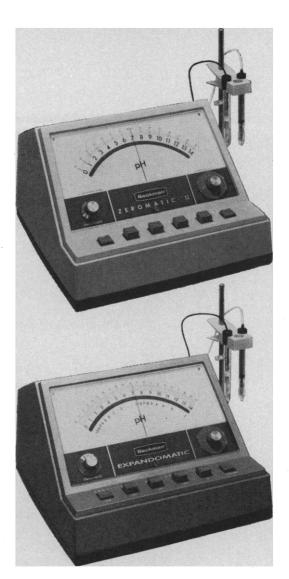
It is essential also that scientists discuss more thoroughly in public the implications of their findings with regard not only to the practical applications of science but also to its influence on the concepts of man's place in the order of things. The philosophical and social uncertainties that are emerging from scientific progress must be emphasized just as much as the prospects of technological breakthroughs. Science and the technologies derived from it will increasingly create economic, educational, and ethical problems for which our communities can make responsible choices only if steps are taken to increase general scientific awareness. A few organizations, such as Scientists' Institute for Public Information, have begun developing a public forum for the social implications of science, but much more will have to be done before the relation between science and society can develop on a basis of mutual understanding.

Most importantly, perhaps, public discussions of the sociology of science should reach into the organization of the scientific enterprise itself. The congressional hearings, in the Senate and in the House, have made clear that new social techniques must be developed to determine more rationally the relative amount of support for free basic research, mission-oriented research, and applied research. There is no doubt, furthermore, that certain fields of science are neglected even though their exploration would be of benefit to human understanding and welfare. For a balanced and orderly development of knowledge, it is essential that the public be given the opportunity to participate in the formulation of the overall strategy of scientific research.

All important human activities have given rise to a highly sophisticated profession concerned with the criticism of their values, achievements, trends, and potentialities. The professional critics of art, music, literature, economics, government, and so on play an essential and creative role even when they do not themselves contribute directly to the fields of activity they evaluate. Science would certainly benefit from the kind of evaluation that professional critics give to other human activities. Whether scientific criticism should develop from within the community of experimental scientists or outside of it remains a moot question. But what is certain is that the higher criticism of science cannot have much vitality without public participation.

A society that blindly accepts the decisions of experts is a sick society. The time has come when we must produce, alongside specialists, another class of scholars and citizens who have broad familiarity with the facts, methods, and objectives of science and thus are capable of making judgments about scientific policies. As Warren Weaver has repeatedly emphasized, persons who work at the interface of science and society have become essential because almost everything that happens in society is influenced by science.--RENÉ DUBOS, Rockefeller University

\* From the response by Dr. Dubos to the first public announcement that he had been named winner of the 1966 Arches of Science Award of the Pacific Science Center. The award was presented in Seattle on 19 October.



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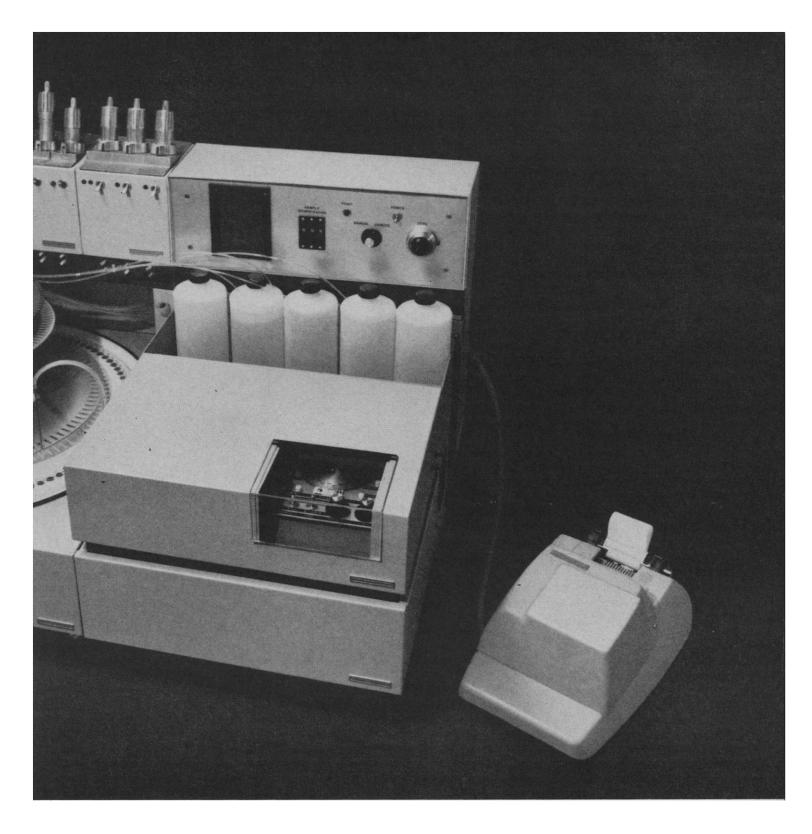


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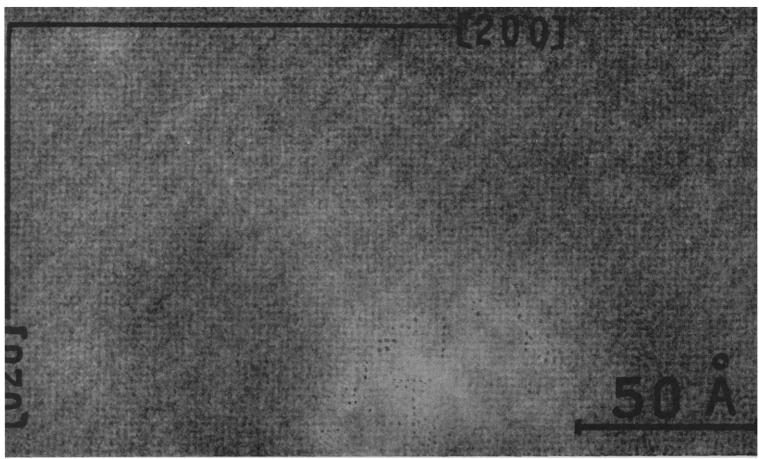
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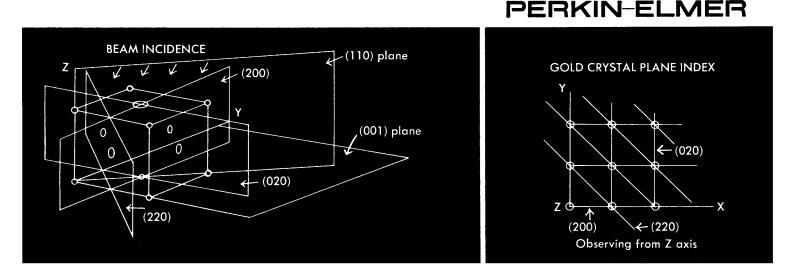
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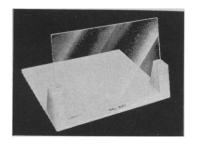


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20–22. Water Resources, 2nd annual conf., Univ. of Chicago, Chicago, Ill. (American Water Resources Assoc., P.O. Box 434, Urbana, Ill. 61801)

21–23. American Physical Soc., Div. of Fluid Dynamics, mtg., Stanford Univ., Palo Alto, Calif. (R. J. Emrich, Dept. of Physics, Lehigh Univ., Bethlehem, Pa.)

21-24. Communications in Science: Documentation and Automation, Ciba Foundation symp., London, England. (Ciba, 41 Portland Pl., London, W.1)

21-24. Central American Geologists, 2nd conf., Guatemala City, Guatemala. (G. Dengo, Central American Inst. of Research and Industrial Technology, Apt. Postal 1552, Guatemala City)

21-25. Radioisotope Tracers in Industry and Geophysics, symp., Prague, Czechoslovakia. (J. H. Kane, Conferences Branch, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

22. Manufacturing Chemists Assoc., 16th semiannual mtg. and midyear conf., New York, N.Y. (The Association, 1825 Connecticut Ave., NW, Washington, D.C.)

23. Chemical Economics Div., Chemical Inst. of Canada, mtg. on Internationalization of the Chemistry Industry and Its Effect on Canada, Montreal, Quebec. (H. A. Bowler, Central Development Dept., Dotmar, 1155 Dorchester Blvd. W., Montreal 2)

26-4. Pharmacy and Biochemistry, 7th Pan American congr., Buenos Aires, Argentina. (Z. M. Lugones, Univ. of Buenos Aires, Calle Viamonte 444, Buenos Aires)

28-29. Parkinson's Disease Information and Research Center, 3rd research conf., College of Physicians and Surgeons, New York, N.Y. (M. D. Yahr, New York Neurological Inst., 710 W. 168 St., New York 10032)

28-30. American Soc. of Hospital Pharmacists, 1st annual midyear mtg., Washington, D.C. (J. A. Oddis, The Society, 4630 Montgomery Ave., NW, Washington 20014)

28-30. Reticuloendothelial Soc., 3rd natl. mtg., Natl. Institute of Health, Bethesda, Md. (M. Landy, Laboratory of Immunology, Natl. Inst. of Allergy and Infectious Diseases, NIH, Bethesda, Md. 20014)

28-1. Aerospace Medicine, intern. mtg., Sydney, Australia. (Secretariat, Aviation Medical Soc. of Australia, G.P.O. Box 1207, Sydney)

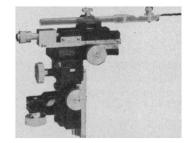
28-2. Alkali Metal Coolants—Corrosion Studies and System Operation Experience, Intern. Atomic Energy Agency symp., Vienna, Austria. (J. H. Kane, Conferences Branch, Div. of Technical Information, U.S. Atomic Energy Commission, Washington, D.C. 20545)

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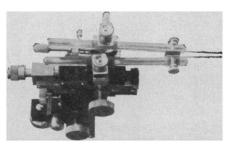
29-30. Treatment and Control of Injection Waters, 3rd biennial symp., Anaheim, Calif. (A. J. Bogart, Oilwell Research, Inc., 1539 W. 16 St., Long Beach, Calif. 90813)



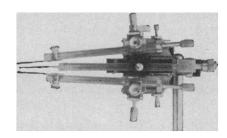
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### December

1-2. UNESCO, 75th executive board session, Paris, France. (Pl. de Fontenoy, Paris 7)

1-3. Medicine and Sociology, intern. symp., East Berlin, Germany. (K. Winter, Hygiene-Institut Humboldt-Universität, Otto-Grotewohl-str. 1, 108 Berlin, East Germany)

1-8. Heads of National Research Insts., mtg., Bangkok, Thailand. (U.N. Economic Commission for Asia and the Far East, Sala Santitham, Rajadamnern Ave., Bangkok)

2. American Industrial Hygiene Assoc., mtg., Metropolitan New York, New Jersey, Delaware sections, Sterling Forest, N.Y. (O. M. Banks, Shell Chemical Co., 110 W. 51 St., New York 10020)

2-3. Perspectives in Leukemia, symp., New Orleans, La. (W. Dameshek, Leukemia Society, 211 E. 43 St., New York 10017)

2-3. Nuclear Power Stations Operation, conf., Bern, Switzerland. (Swiss Assoc. for Atomic Energy, P.O. Box 2613, 3001 Bern)

3-4. Space Flight, conf., Bremen, Germany. (Secretariat, Hermann Oberth Soc., Fritz-Beindorff-allee 9, 3000 Hanover, West Germany)

3-8. American Acad. of **Dermatology** and **Syphilology**, 25th annual mtg., Miami Beach, Fla. (The Academy, 636 Church St., Evanston, Ill.)

3-11. Aviation and Aerospace, intern. exposition, New York, N.Y. (F. S. Doman, Aviation and Aerospace Exposition, Inc., 500 Fifth Ave., New York 10036)

4–7. American Inst. of Chemical Engineers, 59th annual mtg., Detroit, Mich. (E. B. Chriswell, California Research Corp., Room 807, 200 Bush St., San Francisco, Calif.)

4-8. American Inst. of Chemical Engineers, 59th annual mtg., Detroit, Mich. (R. E. Greenhaigh, Dow Corning Corp., Midland, Mich.)

5-7. Antennas and Propagation, intern. symp., Palo Alto, Calif. (R. L. Deadabrand, Radio Physics Laboratory, Stanford Research Inst., Menlo Park, Calif.)

7. American Institute of the City of New York, mtg., New York. (Mrs. G. E. Peterson, American Institute of the City of New York, 2 E. 63 St., New York 10021)

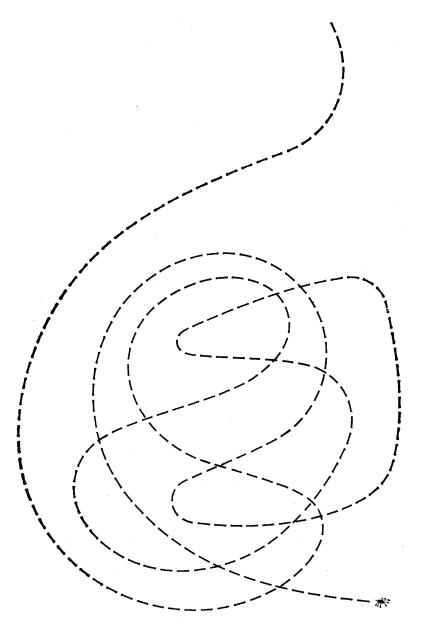
5-7. Theory and Application of Gas Chromatography in Industry and Medicine, Hahnemann Medical College, Philadelphia, Pa. (H. S. Kroman, Dept. of Medicine, Medical College and Hospital, 230 N. Broad St., Philadelphia 19102)

5-8. Magnesium in Biophysiopathology and Therapeutics, intern. congr., Buenos Aires, Argentina. (A. Vidal Freyre, Ayacucho 1427, Buenos Aires)

5-8. Polarized Targets and Ion Sources, intern. conf., Saclay, France. (A. Abragam, Direction de la Physique, Centre d'Etudes Nucleaires de Saclay, B.P. 2, Gif-sur-Yvette, Seine-et-Oise, France)

5-9. **Operating Metallurgy**, 2nd conf. and exposition, Philadelphia, Pa. (C. L. Hopkins, American Inst. of Mining, Metallurgical, and Petroleum Engineers, 345 E. 47 St., New York 10017)

4 NOVEMBER 1966

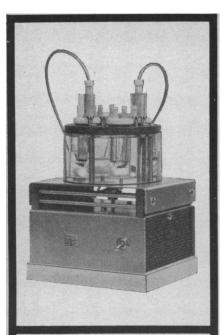


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6-7. Unconventional Inertial Sensors, symp., Washington, D.C. (J. W. Lindberg, AIR 53321G, Naval Air Systems Command, Washington, D.C. 20360)

7-9. International Scientific Radio Union, fall mtg., Palo Alto, Calif. (R. A. Helliwell, Radioscience Laboratory, Stanford Univ., Stanford, Calif. 94305)

8-11. Rodents, Indian symp., Calcutta. (D. W. Parrack, Johns Hopkins Univ. Center for Medical Research and Training, All-India Inst. of Hygiene and Public Health, 110 Chittaranjan Ave., Calcutta 12)

9-10. Contractile Process, symp., New York Heart Assoc., New York. (The Association, 10 Columbus Circle, New York 10019)

9-11. American Acad. of **Psychoanal**ysis, mtg., New York, N.Y. (M. Carroll, The Academy, 125 E. 65 St., New York 10021)

12-14. Air Pollution, natl. conf., Washington, D.C. (A. C. Stern, Div. of Air Pollution, U.S. Public Health Service, Washington, D.C. 20201)

12-14. Renal Failure, 17th symp., Hahnemann Medical College, Philadelphia, Pa. (A. N. Brest, Section of Vascular Diseases and Renology, Hahnemann Medical College and Hospital, 230 N. Broad St., Philadelphia 19102)

12-17. History of Oceanography, intern. congr., Monte Carlo. (R. Novella, Villa Girasole, 16, boulevard de Suisse, Monaco)

12-19. Heads of National Standards Institutes, mtg., Bangkok, Thailand. (U.N., Economic Commission for Asia and the Far East, Sala Santitham, Rajadamnern Ave., Bangkok)

14-16. Fundamentals of Gas-Surface Interactions, symp., San Diego, Calif. (H. Saltsburgh, General Dynamics/General Atomic, P.O. Box 608, San Diego 92112)

14-16. Fluid Logic and Amplification, 2nd intern. conf., Cranfield, England. (H. Stephens, British Hydromechanics Research Assoc., South Rd., Harlow, Essex, England)

15-16. International **Brain Research** Organization, central council and executive committee, mtg., Paris, France. (UNESCO, Pl. de Fontenoy, Paris 7)

16-18. American **Psychoanalytic** Assoc., fall mtg., New York, N. Y. (American Psychoanalytic Assoc., 1 E. 57 St., New York 10022)

19-20. British **Biophysical** Soc., winter mtg., London, England. (W. Gratzer, Biophysics Dept., King's College, 26 Drury Lane, London W.C.2)

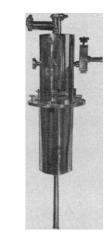
19-21. Acceleration Biology, Sunnyvale, Calif. (Univ. of California Extension, Berkeley 94720)

26-31. American Assoc. for the Advancement of Science, 133rd annual Washington, D.C. (R. L. Taylor, AAAS, 1515 Massachusetts Ave., Washington, D.C. 20005)

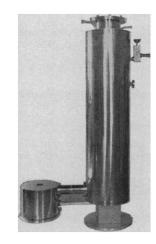
27-30. American Astronomical Soc., 123rd mtg., University of California, Los Angeles, (G. C. McVittie, American Astronomical Soc. Univ. of Illinois Observatory, Urbana) 28-30. Econometric Soc., winter mtg.,

28-30. Econometric Soc., winter mtg., San Francisco, Calif. (Box 1264, Yale Station, New Haven, Conn.)





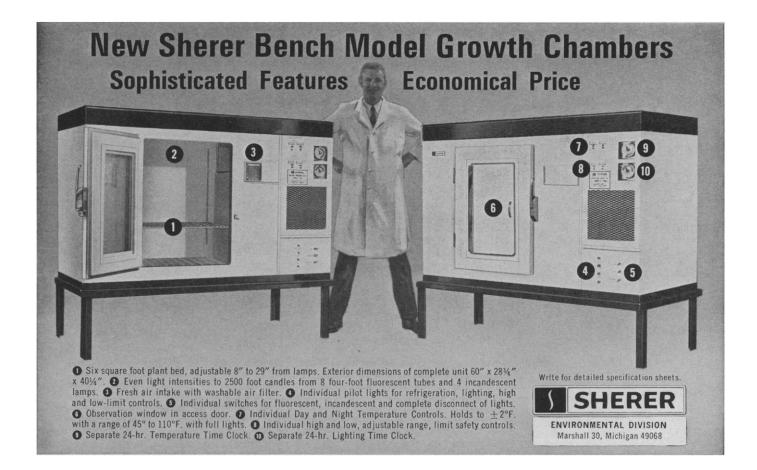
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### NEW BOOKS

(Continued from page 642)

**Electron Radiation Damage in Semiconductors and Metals.** James W. Corbett. Academic Press, New York, 1966. 420 pp. Illus. \$16.50. Solid State Physics Series, Suppl. 7.

Elements of Thermodynamics. D. ter Haar and H. Wergeland. Addison-Wesley, Reading, Mass., 1966. 174 pp. Illus. \$9.75. Addison-Wesley Series in Advanced Physics.

First Concepts of Topology: The Geometry of Mappings of Segments, Curves, Circles, and Disks. W. G. Chinn and N. E. Steenrod. Random House, New York, 1966. 168 pp. Illus. Paper, \$1.95. Fourier Transforms and the Theory

Fourier Transforms and the Theory of Distributions. J. Arsac. Translated from the French edition (Paris, 1961) by Allen Nussbaum and Gretchen C. Heim. Prentice-Hall, Engiewood Cliffs, N.J., 1966. 334 pp. Illus. \$14.

Gas Phase Reaction Rate Theory. Harold S. Johnston. Ronald, New York, 1966. 372 pp. Illus. \$10. Modern Concepts in Chemistry.

Gases and Plasmas. Paul D. Thompson. Lippincott, Philadelphia, 1966. 176 pp. Illus. \$4.25.

Gear Lubrication. Proceedings of a symposium organized by the Mechanical Tests of Lubricants Panel of the Institute of Petroleum (Brighton, England), October 1964. Published for The Institute of Petroleum, London. Elsevier, New York, 1966. Unpaged. Illus. \$20. There are 40 papers.

Hill's Equation. Wilhelm Magnus and Stanley Winkler. Interscience (Wiley), New York, 1966. 135 pp. Illus. \$8.50.

Infra-red Instrumentation and Techniques. A. E. Martin. Elsevier, New York, 1966. 190 pp. Illus. \$12.

Intelligent Life in the Universe. I. S. Shklovskii and Carl Sagan. Based on a translation of the Russian edition by Paula Fern. Holden-Day, San Francisco, 1966. 525 pp. Illus. \$8.95.

Introduction to Free Radical Chemistry. William A. Pryor. Prentice-Hall, Englewood Cliffs, N.J., 1966. 128 pp. Illus. Paper, \$2.50; cloth, \$5.50 Prentice-Hall Foundations of Modern Organic Chemistry Series.

Introduction to Real Analysis. Casper Goffman. Harper and Row, New York. 1966. 174 pp. Illus. \$7.50. Harper's Series in Modern Mathematics.

Introduction to the Chemical Process Industries. Richard M. Stephenson. Reinhold, New York, 1966. 480 pp. Illus. \$14.75.

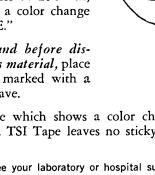
A Laboratory Manual for Experimental General Chemistry. C. R. McLellan and W. C. Tucker. Davis, Philadelphia, 1966. 317 pp. Illus. Paper, \$4.50. The Laser. William V. Smith and

The Laser. William V. Smith and Peter P. Sorokin. McGraw-Hill, New York, 1966. 510 pp. Illus. \$15.50.

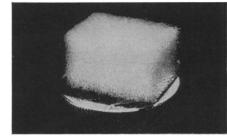
Linear Spaces of Analytic Functions. Pasquale Porcelli. Rand McNally, Chicago, 1966. 168 pp. Illus. \$8.

Liquids and Solutions. Dale Dreisbach. Houghton, Mifflin, Boston, 1966. 204 pp. Illus. Paper, \$2.95. Classic Researches in General Chemistry Series.

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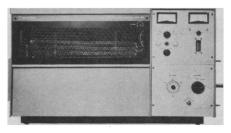


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cians. Paul L. Evans. Wiley, New York, 1966. 400 pp. Illus. \$7.

Modern Foundations of Systems Engineering. William A. Porter. Macmillan, New York 1966. 509 pp. Illus. \$14.95.

Modern University Calculus: With Coordinate Geometry. Stoughton Bell, J. R. Blum, J. Vernon Lewis, and Judah Rosenblatt. Holden-Day, San Francisco, 1966. 1975 pp. Illus. \$11.75.

A New Look at Geometry. Irving Adler. Day, New York, 1966. 414 pp. Illus. \$7.95.

Organic Insertion Reactions of Group IV Elements. Edmund Yanovich Lukevits and Mikhail Grigor'evich Voronkov. Translated from the Russian edition (Riga, 1964) by Michael J. Newlands. Consultants Bureau, New York, 1966. 425 pp. Illus. \$25.

Outline of Historical Geology. A. K. Wells and J. F. Kirkaldy. Murby, London; Barnes and Noble, New York, ed. 5, 1966. 503 pp. Illus. \$7.75.

Perspectives in Geometry and Relativity. Essays in honor of Václav Hlavatý. Banesh Hoffmann, Ed. Indiana Univ. Press, Bloomington, 1966. 505 pp. Illus. \$15. There are 47 papers.

The Physics and Astronomy of Galaxies and Cosmology. Paul W. Hodge. Mc-Graw-Hill, New York, 1966. 189 pp. Illus. Paper, \$2.95; cloth, \$4.95.

Plasma Physics in Theory and Application. Wulf B. Kunkel, Ed. McGraw-Hill, New York, 1966. 512 pp. Illus. \$15.50. There are 13 papers.

Plastics Extrusion Technology and Theory. Gerhard Schenkel. Translated from the second German edition (Munich, 1963) by L. A. H. Eastman. B. S. Glyde, Translation Ed. Iliffe, London; Elsevier, New York, 1966. 477 pp. Illus. \$24. Principles and Methods of Sheet-Metal

Principles and Methods of Sheet-Metal Fabricating. George Sachs. Revised and enlarged by Henry E. Voegeli. Reinhold, New York, ed. 2, 1966. 572 pp. Illus. \$15.

**Project Surveying.** General adjustment and optimization techniques with applications to engineering surveying. P. Richardus and J. S. Allman. North-Holland, Amsterdam; Interscience (Wiley), New York, 1966. 479 pp. Illus. \$20.

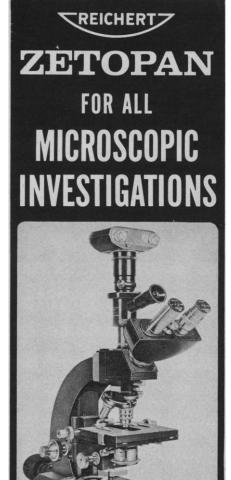
Relativity is Dead. Otto Luther. Key Research Corp., Yorba Linda, Calif., 1966. 159 pp. Illus. \$7.50.

Research Program Effectiveness. Proceedings of the conference sponsored by the Office of Naval Research (Washington, D.C.), July 1965. M. C. Yovits, D. M. Gilford, R. H. Wilcox, E. Staveley, and H. D. Lerner, Eds. Gordon and Breach, New York, 1966. 560 pp. Illus. \$10. There are 24 papers.

Reviews of Plasma Physics. vol. 2. M. A. Leontovich, Ed. Translated from the Russian edition (Moscow, 1963) by Herbert Lashinsky. Consultants Bureau, New York, 1966. 305 pp. Illus. \$12.50. Four papers.

Séminaire Bourbaki. 12 vols. Benjamin, New York, 1966. Unpaged. Individual volumes, \$12.25; set, \$129. There are 294 invited papers in theoretical mathematics, presented at the seminar, most of them in French, in the years 1948–1965.

Statistical Physics. Gregory H. Wannier. Wiley, New York, 1966. 544 pp. Illus. \$11.50.



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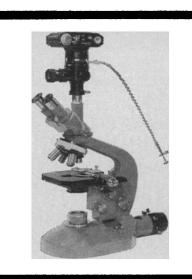
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Studies of Nuclear Reactions. Proceedings of the P. N. Lebedev Physics Institute, vol. 33. D. V. Skobel'tsyn. Translated from the Russian edition (Moscow, 1965) by S. Chomet. Consultants Bureau, New York, 1966. 230 pp. Illus. Paper. \$22.50.

The Structure of Glass. vol. 6, Properties, Structure, and Physical-Chemical Effects. E. A. Porai-Koshits, Ed. Translated from the Russian edition (Moscow, 1965) by E. Boris Uvarov. Consultants Bureau, New York, 1966. 242 pp. Illus. \$25. There are 54 papers that were given at the Fourth All-Union Conference on the Glassy State (Leningrad), March 1964.

Survey of Progress in Chemistry. vol. 3. Arthur F. Scott, Ed. Academic Press, New York, 1966. 304 pp. Illus. \$7.95. Five papers.

Textbook on Mechanized Information Retrieval. Allen Kent. Interscience (Wiley), New York, ed. 2, 1966. 391 pp. Illus. \$10.95.

UV Atlas of Organic Compounds. vol. 1. Published in collaboration with the Photoelectric Spectrometry Group, London, and the Institut für Spektrochemie und Angewandte Spektroskopie, Dortmund. Plenum Press, New York, 1966. Unpaged. \$6.

### **Biological and Medical Sciences**

Actions of Chemicals on Dividing Cells. Bengt A. Kihlman. Prentice-Hall, Englewood Cliffs, N.J., 1966. 272 pp. Illus. \$10.

Advances in Optical and Electron Microscopy. vol. 1. R. Barer and V. E. Cosslett, Eds. Academic Press, New York, 1966. 293 pp. Illus. \$11.50. Six papers.

Advances in Reproductive Physiology. vol. 1. Anne McLaren. Logos Press, London: Academic Press, New York, 1966. 295 pp. Illus. \$12.50. Nine papers.

**Biochemistry**. Israel S. Kleiner and James M. Orten. Mosby, St. Louis, ed. 7, 1966. 927 pp. Illus. \$11.50.

Biology of Parasites: Emphasis on Veterinary Parasites. Proceedings of the Second International Conference of the World Association for the Advancement of Veterinary Parasitology (Philadelphia), September 1965. E. J. L. Soulsby, Ed. Academic Press, New York, 1966. 370 pp. Illus. \$13.50. There are 19 papers.

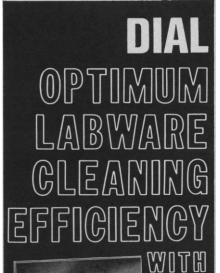
The Biology of Populations. Robert H. MacArthur and Joseph H. Connell. Wiley, New York, 1966. 216 pp. Illus. \$5.95.

**Brain and Conscious Experience.** Study Week of the Pontificia Academia Scientiarum (Rome), September–October 1964. John C. Eccles, Ed. Springer-Verlag, New York, 1966. 613 pp. Illus. \$16.80. There are 21 papers.

The Chemistry of Fats and Other Lipids. vol. 9, pt. 1, *Polyunsaturated Acids*. Ralph T. Holman, Ed. Pergamon, New York, 1966. 161 pp. Illus. Paper, \$7.75. Four papers.

The Chromosomes of the Algae. Maud B. E. Godward. St. Martin's Press, New York, 1966. 222 pp. Illus. \$11. Six papers.

Clinical Pathology of the Serum Electrolytes. Proceedings of an Applied Seminar on the Serum Electrolytes in Clinical



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Medicine under the auspices of the Association of Clinical Scientists (Washington, D.C.). F. William Sunderman and F. William Sunderman, Jr., Eds. Thomas, Springfield, Ill., 1966. 460 pp. Illus. \$24.50.

**Community Psychiatry.** Proceedings of a Symposium on Community Psychiatry, sponsored by the University of Wisconsin Department of Psychiatry, the Wisconsin Psychiatric Institute, and the Wisconsin State Department of Public Welfare, Division of Mental Hygiene. Leigh M. Roberts, Seymour L. Halleck, and Martin B. Loeb, Eds. Univ. of Wisconsin Press, Madison, 1966. 262 pp. Illus. \$6. There are 12 papers.

**The Comparative Ethology and Evolu**tion of the Sand Wasps. Howard E. Evans. Harvard Univ. Press, Cambridge, Mass., 1966. 544 pp. Illus. \$15.

**Comparative Leukaemia Research**. Proceedings of an International Wenner-Gren Symposium (Stockholm), September 1965. G. Winqvist, Ed. Pergamon, New York, 1966. 278 pp. Illus. \$13.50. There are 29 papers.

Comprehensive Biochemistry. vol. 14, Biological Oxidations. Marcel Florkin and Elmer H. Stotz, Eds. Elsevier, New York, 1966. 530 pp. Illus. \$25. Ten papers.

Differentiation and Growth of Hemoglobin- and Immunoglobulin-Synthesizing Cells. A symposium (Gatlinburg, Tenn.), April 1966. Sponsored by the Biology Division, Oak Ridge National Laboratory. Wistar Institute Press, Philadelphia, 1966. 234 pp. Illus. Paper. There are 14 papers reprinted from Journal of Cellular Physiology, vol. 67, Suppl. 1, June 1966.

**Dynamics of Development: Euthenic Pediatrics.** Dorothy V. Whipple. McGraw-Hill, New York, 1966. 664 pp. Illus. \$15.

Ecological Energetics. John Phillipson. St. Martin's Press, New York, 1966. 61 pp. Illus. Paper, \$1.50. Studies in Biology, No. 1.

The Ecology of Malnutrition in Central and Southeastern Europe: Austria, Hungary, Rumania, Bulgaria, Czechoslovakia. Jacques M. May. Hafner, New York, 1966. 306 pp. Illus. \$10.50. Studies in Medical Geography, vol. 6. Enzymes in Serum: Their Use in Di-

**Enzymes in Serum: Their Use in Diagnosis.** Keith S. Henley, Ellen Schmidt, and Friedrich W. Schmidt. Thomas, Springfield, Ill., 1966. 132 pp. Illus. \$5.75. American Lecture Series.

**Essentials of Biological Chemistry.** James L. Fairley and Gordon L. Kilgour. Reinhold, New York, ed. 2, 1966. 334 pp. Illus. \$9. Reinhold Chemistry Textbook Series.

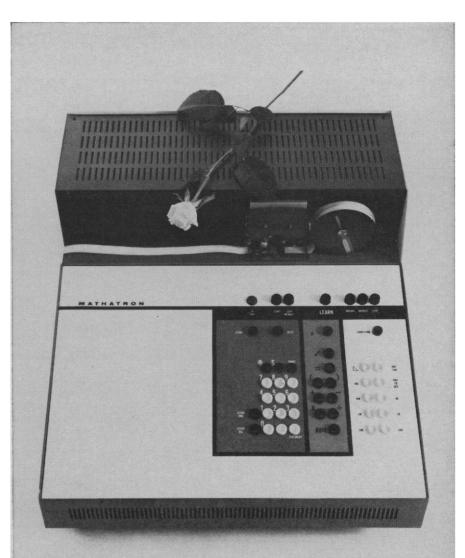
An Experimental Approach to Biology. Peter Abramoff and Robert G. Thomson. Freeman, San Francisco, 1966. 265 pp. Illus. Paper, \$3.75.

The Genetics of Tribolium and Related Species. Alexander Sokoloff. Academic Press, New York, 1966. 224 pp. Illus. \$8.50. Advances in Genetics Series, Suppl. 1.

The Graduate Education of Physicians. Report of the Citizens Commission on Graduate Medical Education. Council on Medical Education, American Medical Association, Chicago, 1966. 128 pp. Paper. Hypochondriacal Syndromes. G. A.

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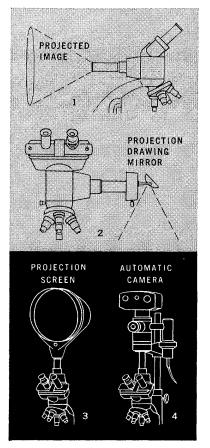


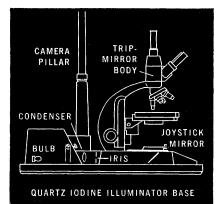
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Hypotensive Peptides. Proceedings of the International Symposium on Hypotensive Peptides (Florence, Italy), October 1965. Ervin G. Erdös, Nathan Back, Federigo Sicuteri, and Anne F. Wilde. Eds. Springer-Verlag, New York, 1966. 686 pp. Illus. \$18.60. There are 59 papers.

**Insect Physiology.** Sir Vincent B. Wigglesworth. Methuen, London; Wiley, New York, ed. 6, 1966. 144 pp. Illus. \$3.75. Methuen's Monographs on Biological Subjects.

International Encyclopedia of Pharmacology and Therapeutics. Section 12, Ganglionic Blocking and Stimulating Agents. vol. 1, Muscarinic and Nicotinic Stimulant Actions at Autonomic Ganglia. R. L. Volle. Pergamon, New York, 1966. 118 pp. Illus. \$5.

Introduction to Physiological and Pathological Chemistry. L. Earle Arnow and Marie D'Andrea Loftus. Mosby, St. Louis, ed. 7, 1966. 544 pp. Illus. \$7.25.

Die Kulturpflanze. Berichte und Mitteilungen, Institut für Kulturpflanzenforschung, Deutschen Akademie der Wissenschaften zu Berlin. vol. 13. S. Danert, P. Metzner, W. R. Müller-Stoll, A. Rieth, H. Sagromsky, K. Schreiber, and H. Stubbe, Eds. Akademie Verlag, Berlin, 1965. 799 pp. Illus. Paper, MDN. 150.

Laboratory Handbook for Oil and Fat Analysts. L. V. Cocks and C. van Rede. Academic Press, New York, 1966. 443 pp. Illus. \$15.

Laser Cancer Research. Leon Goldman. Springer-Verlag, New York, 1966. 72 pp. Illus. \$4. Recent Results in Cancer Research, vol. 4.

Life in the Soil. Richard M. Jackson and Frank Raw. St. Martin's Press, New York, 1966. 64 pp. Illus. Paper, \$1.50. Studies in Biology, No. 2.

The Life of Yeasts: Their Nature, Activity, Ecology, and Relation to Mankind. H. J. Phaff, M. W. Miller, and E. M. Mrak. Harvard Univ. Press, Cambridge, Mass., 1966. 200 pp. Illus. \$5.50.

Lucrarile Institutului de Cercetari Veterinare si Biopreparate "Pasteur." vol. 3, No. 1. Redactia Revistelor Agricole, Bucuresti, Roumanie, 1966. 365 pp. Illus.

Mechanisms of Animal Behavior. Peter Marler and William J. Hamilton III. Wiley, New York, 1966. 783 pp. Illus. \$14.95.

Modern Genetics. vol. 2. J. A. Serra. Academic Press, New York, 1966. 628 pp. Illus. \$21.50.

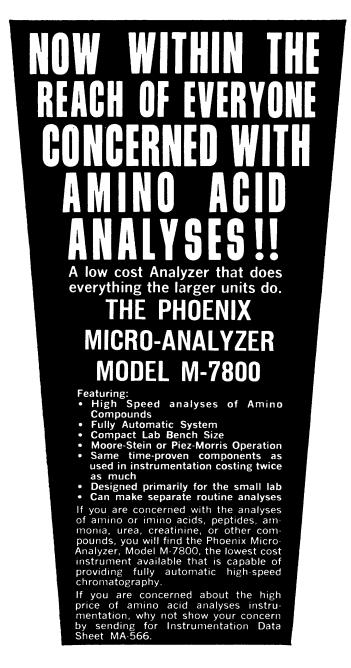
Molecular Psychobiology: A Chemical Approach to Learning and Other Behavior. John Gaito, Thomas, Springfield, Ill., 1966. 279 pp. Illus. \$9.50.

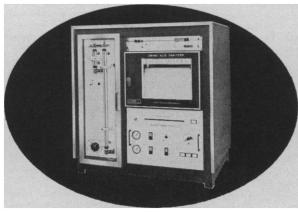
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Nerve, Muscle, and Synapse. Bernard Katz. McGraw-Hill, New York, 1966. 205 pp. Illus. Paper, \$2.25.

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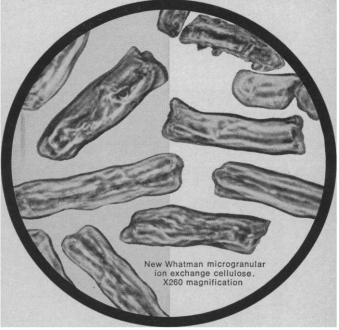


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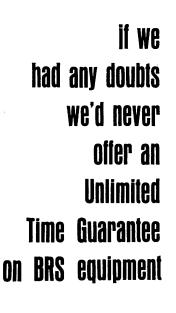
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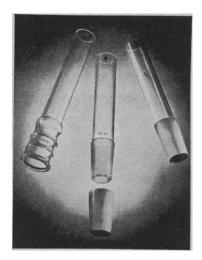
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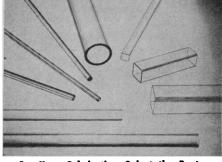




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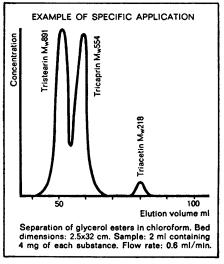
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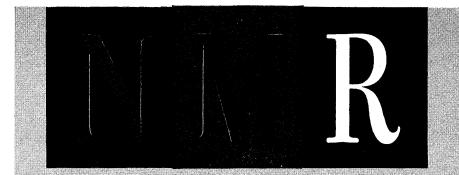
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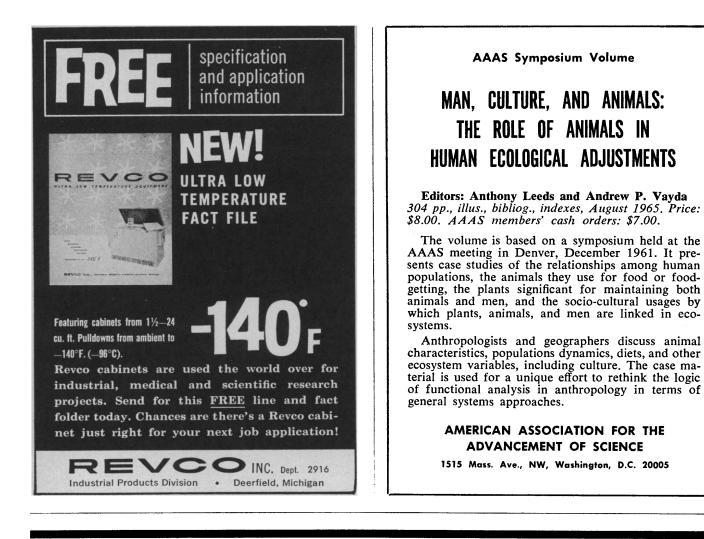
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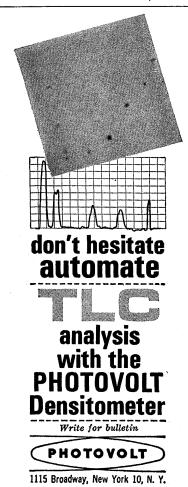
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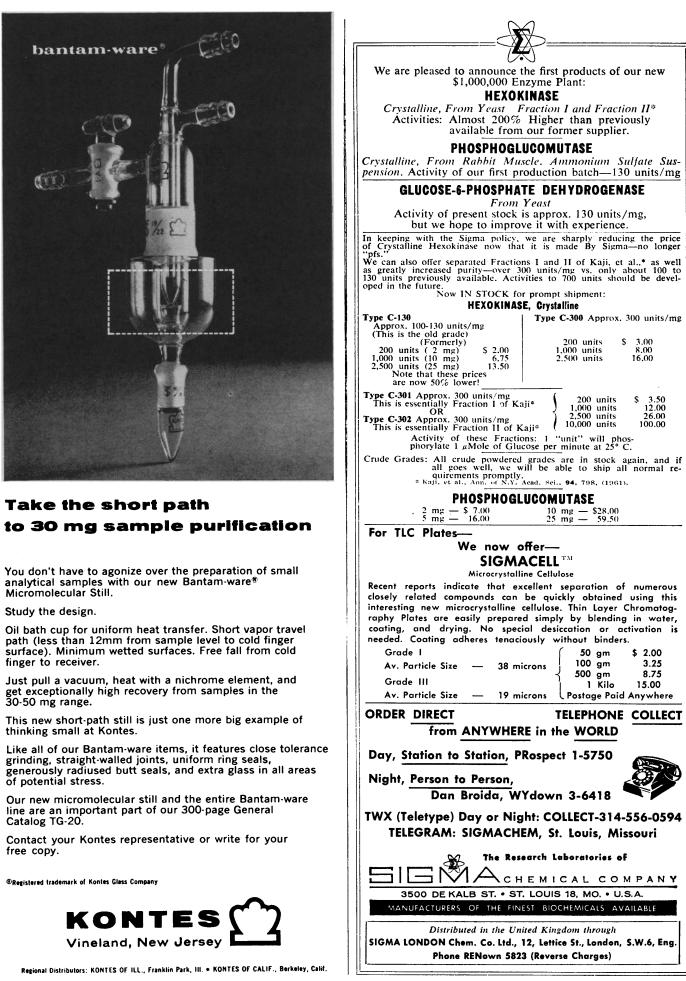


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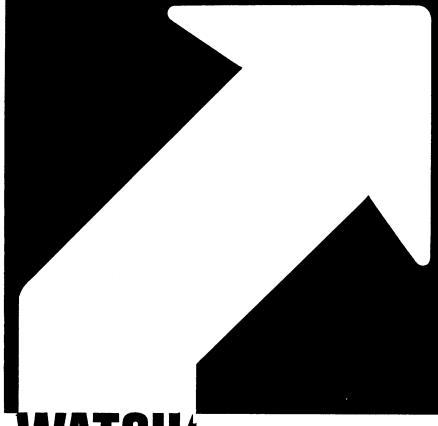
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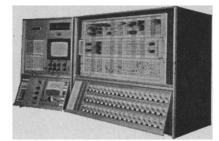


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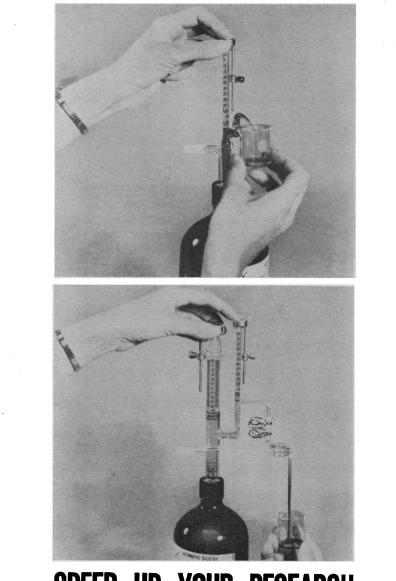
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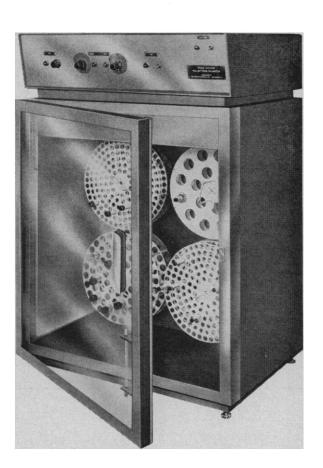
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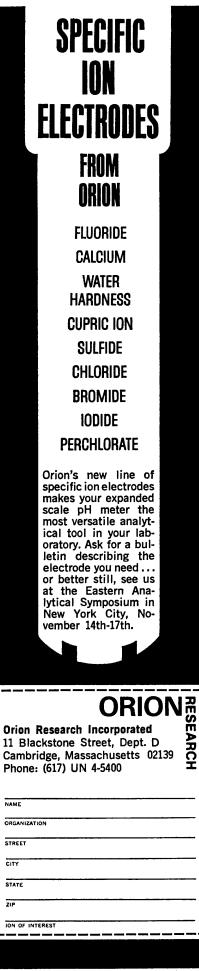
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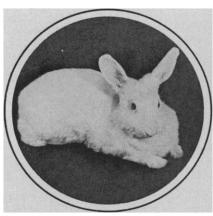
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