

SCIENCE

26 April 1968

Vol. 160, No. 3826

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



FORGERY



'67 VW, '68 RGA.

Just by looking, it's hard to tell our new model from last year's, too. But run it through its paces and you'll see all the major improvements in the 1968 Ultek/EAL QUAD 150A residual gas analyzer. Our Ultek salesmen can give you a demonstration, even one a bit more exhaustive than the one shown above. Some of the improved features are: (1) mass range selections (1 to 150 or 10 to 300); (2) resolution of

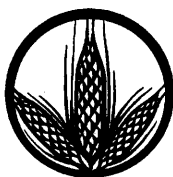
600 using $m/\Delta m$; (3) calibrated sweep speed. Also included are ease of operation, resistance to contamination, and reliable solid state plug-in construction. The basic QUAD 150 RGA has been proven in use in air pollution control studies, vacuum tube exhaust analysis, molecular beam studies and space satellite research, biological and medical research, dry box systems, thin film work, and as a comprehensive leak detection sys-

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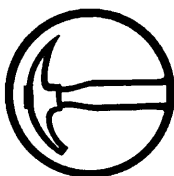
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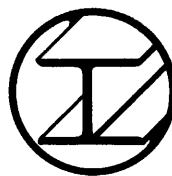
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K-.0007
Ca-.0001
Mg-.000025



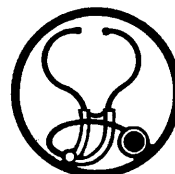
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Pt-.032



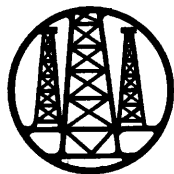
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Cr-.00030
Ni-.0050
As-.4



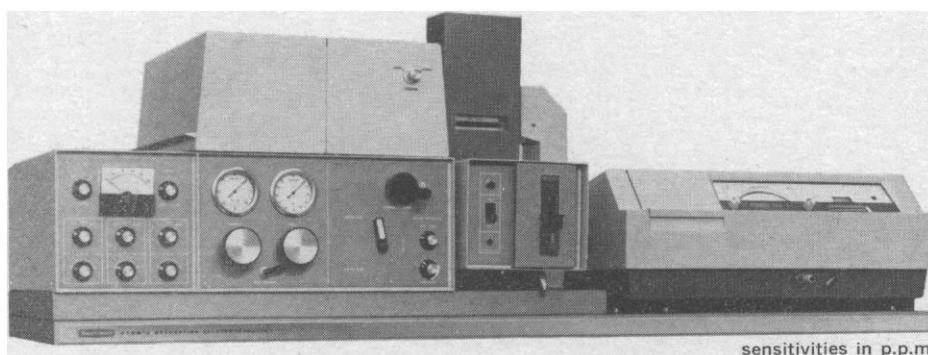
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Sn-.25
Al-.12
Tr-.012



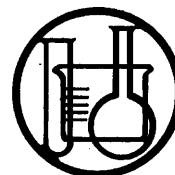
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"Boy Smoking," a painting by an unknown artist in the style of Hals. A method of discerning between old and modern white lead has objectively confirmed the 20th-century origin of this painting and others which at one time were falsely attributed to old masters and so purchased. See page 413. [Courtesy of Gröninger Museum voor Stad en Lande, Gröningen, Netherlands]

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

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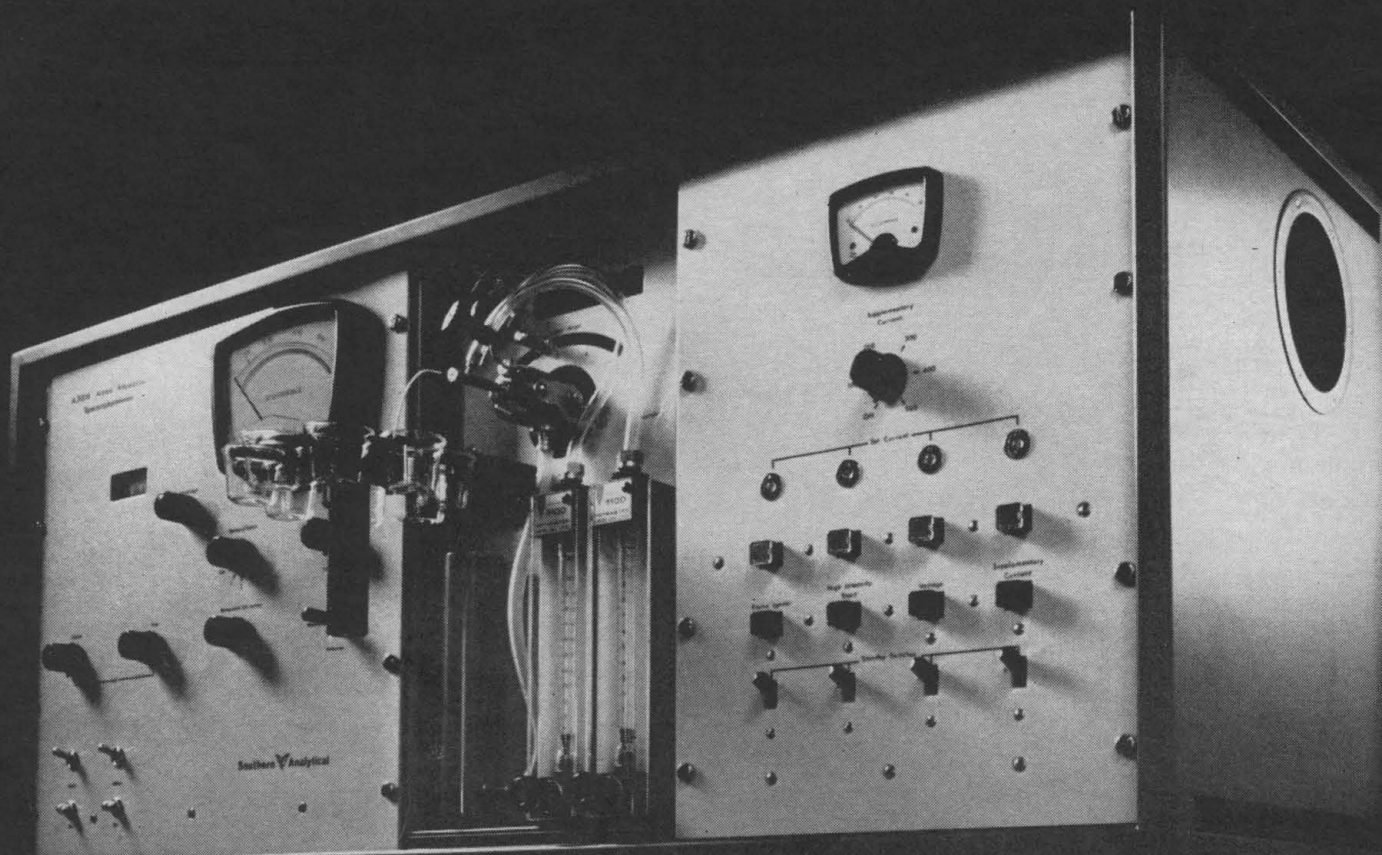
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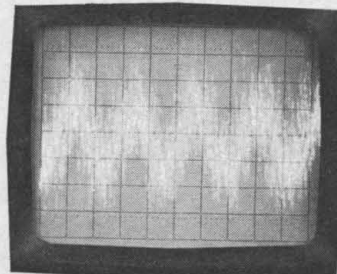
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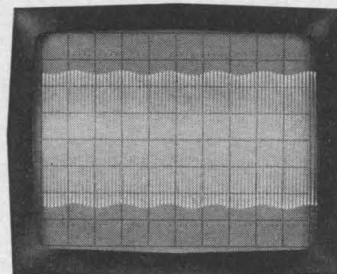
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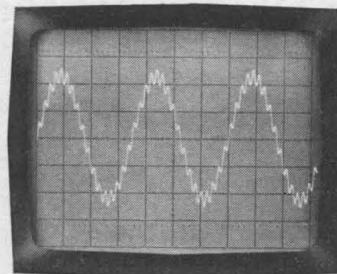
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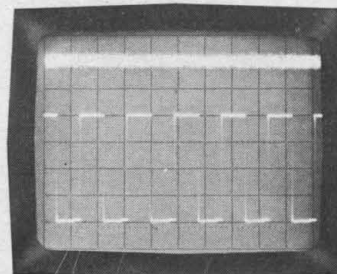
Measure 1 μ V, 500 kHz signal out of 40 dB noise.



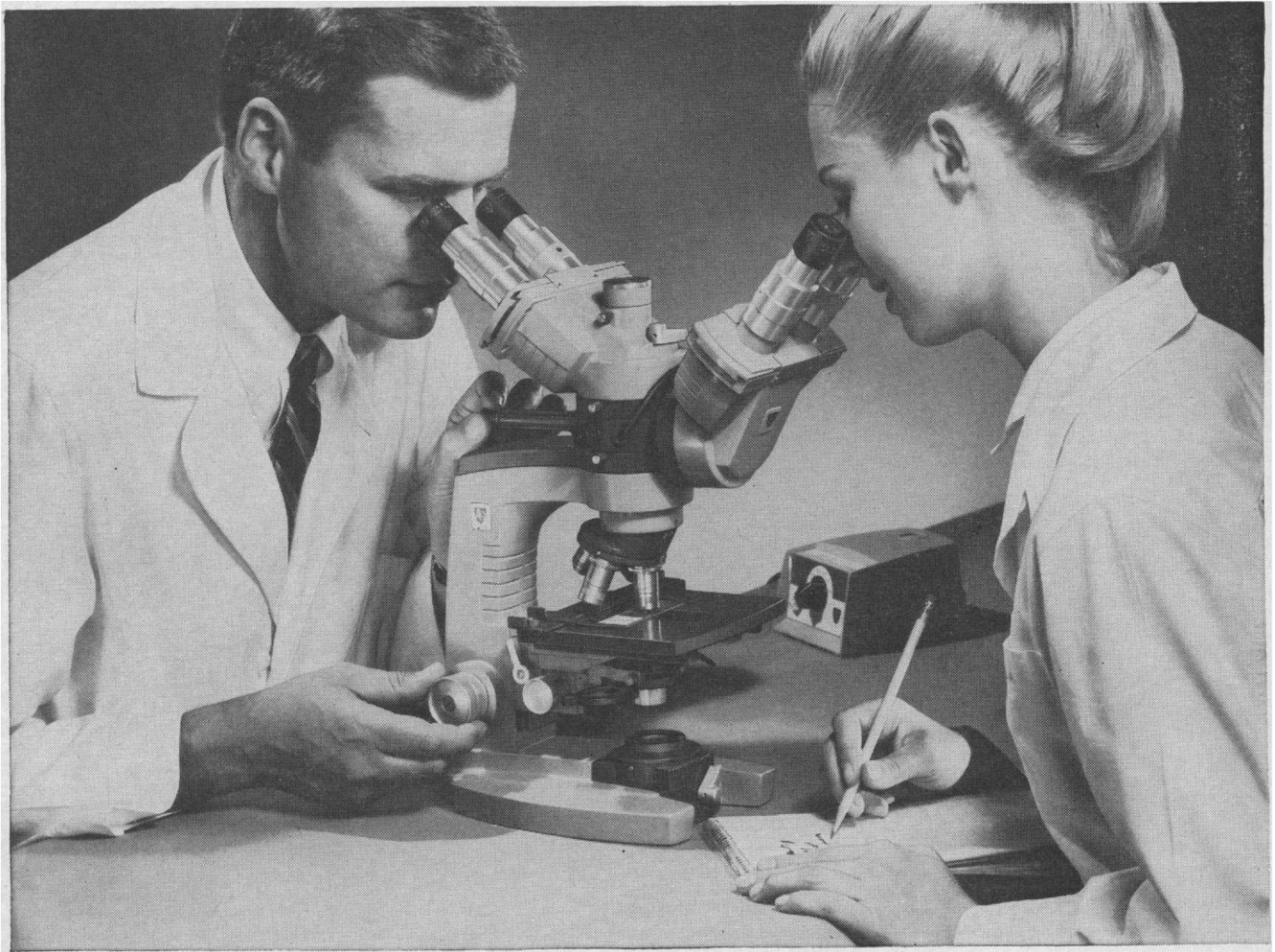
Measure 10 mV, 5 Hz amplitude modulating
1 V, 400 Hz.



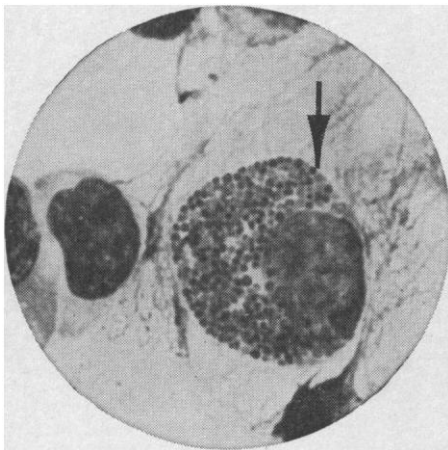
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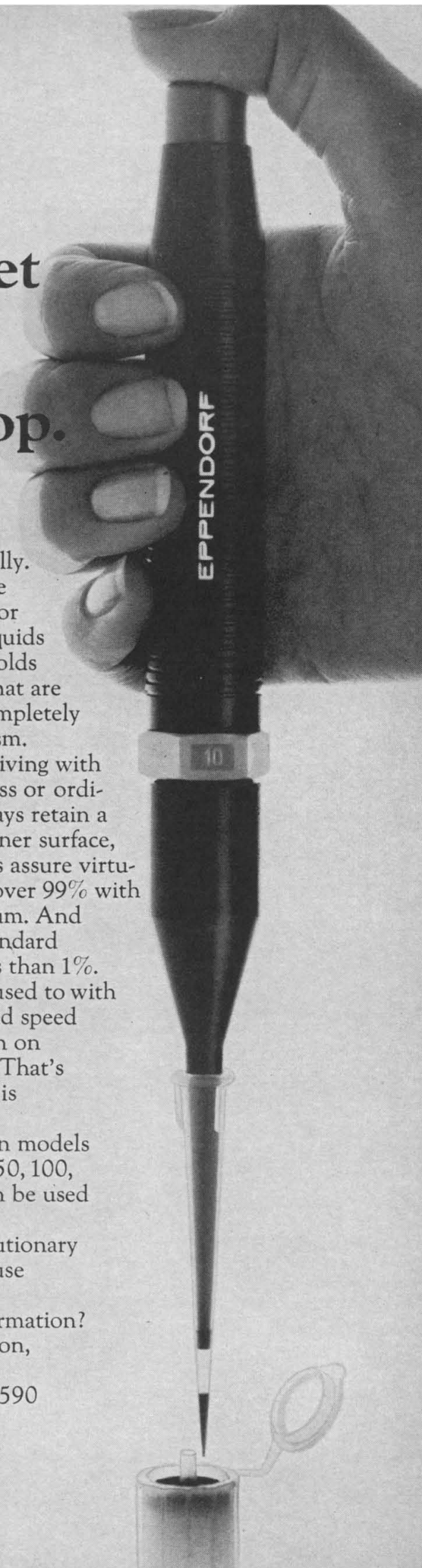
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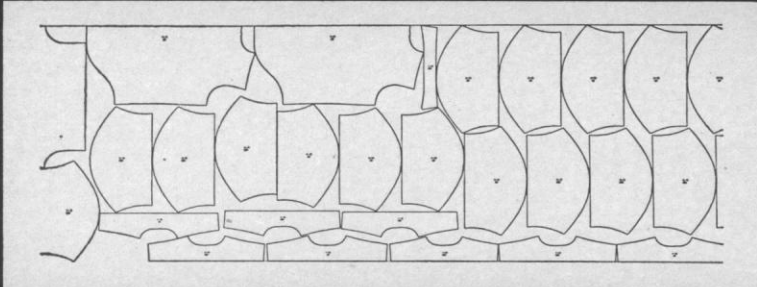
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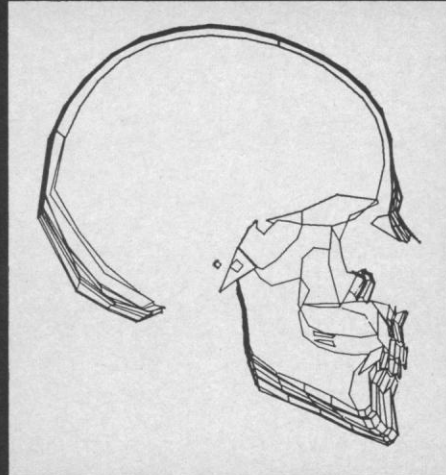
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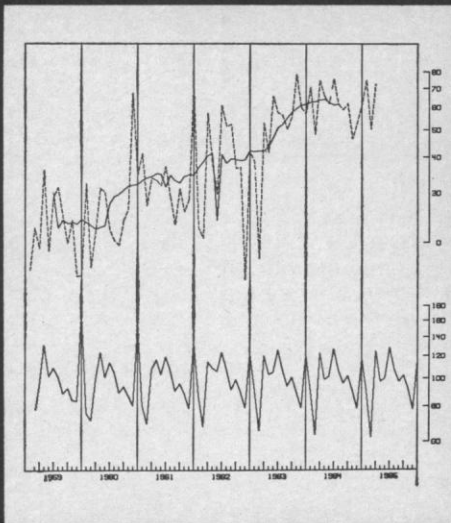
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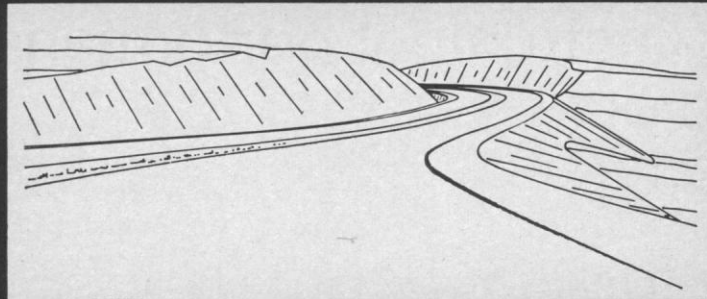
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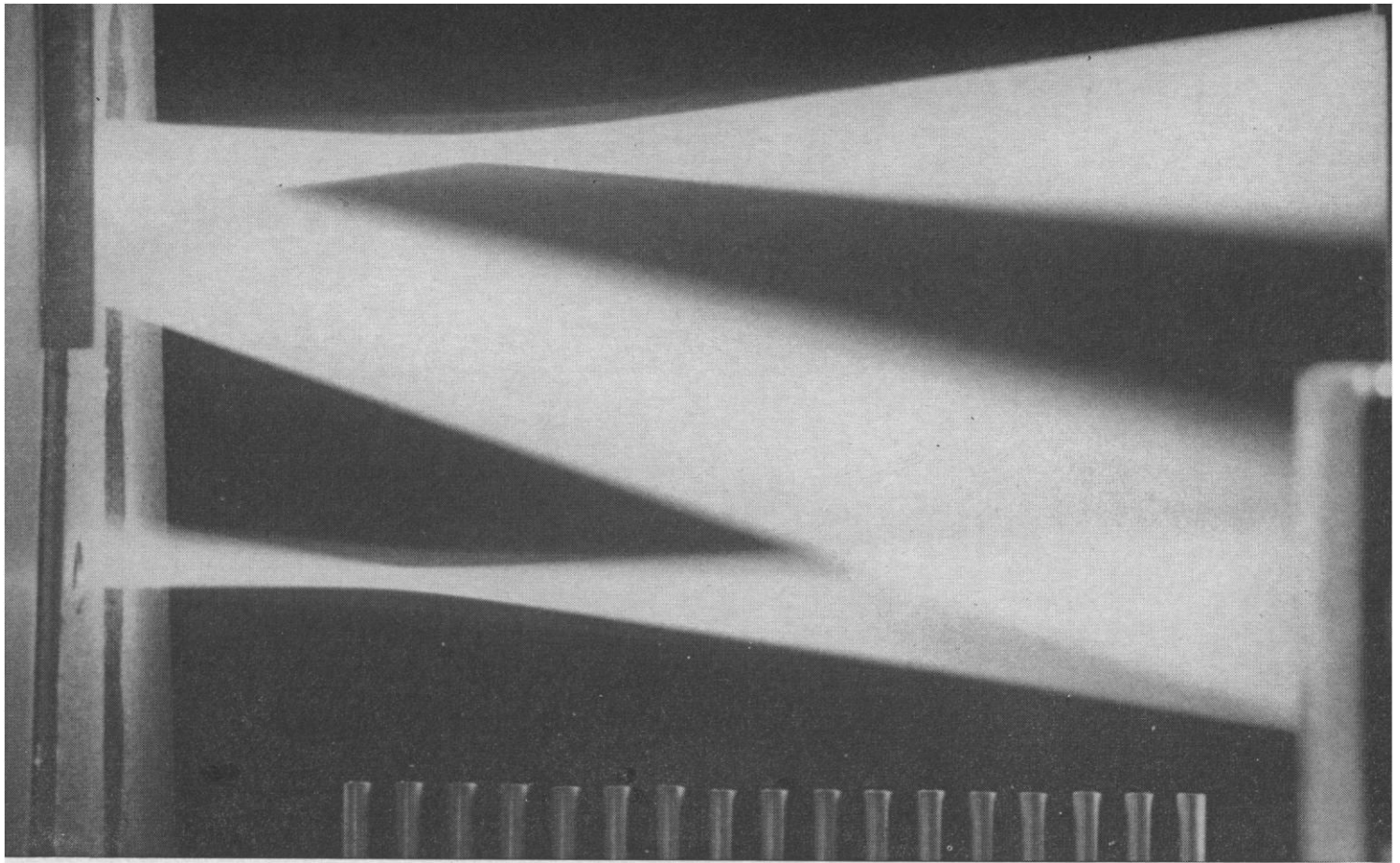
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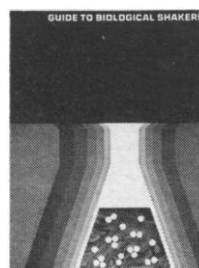
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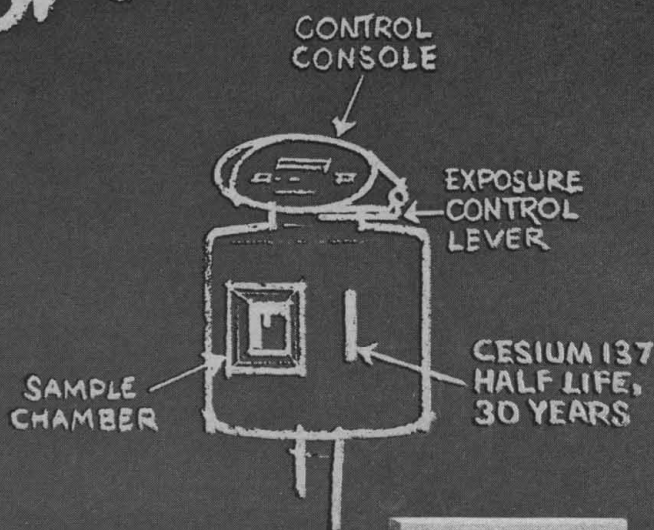
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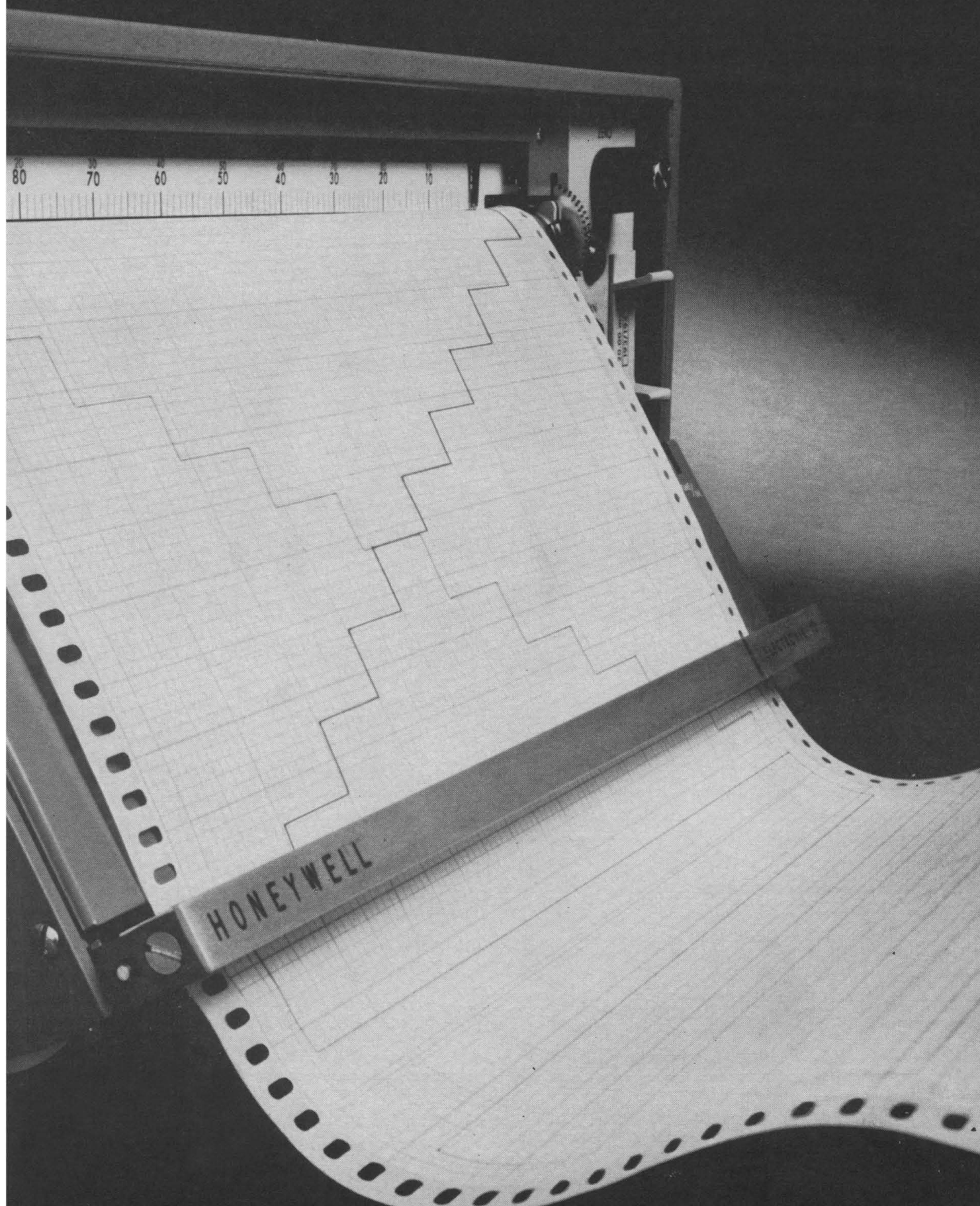
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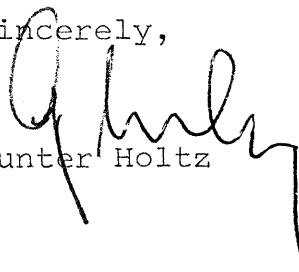
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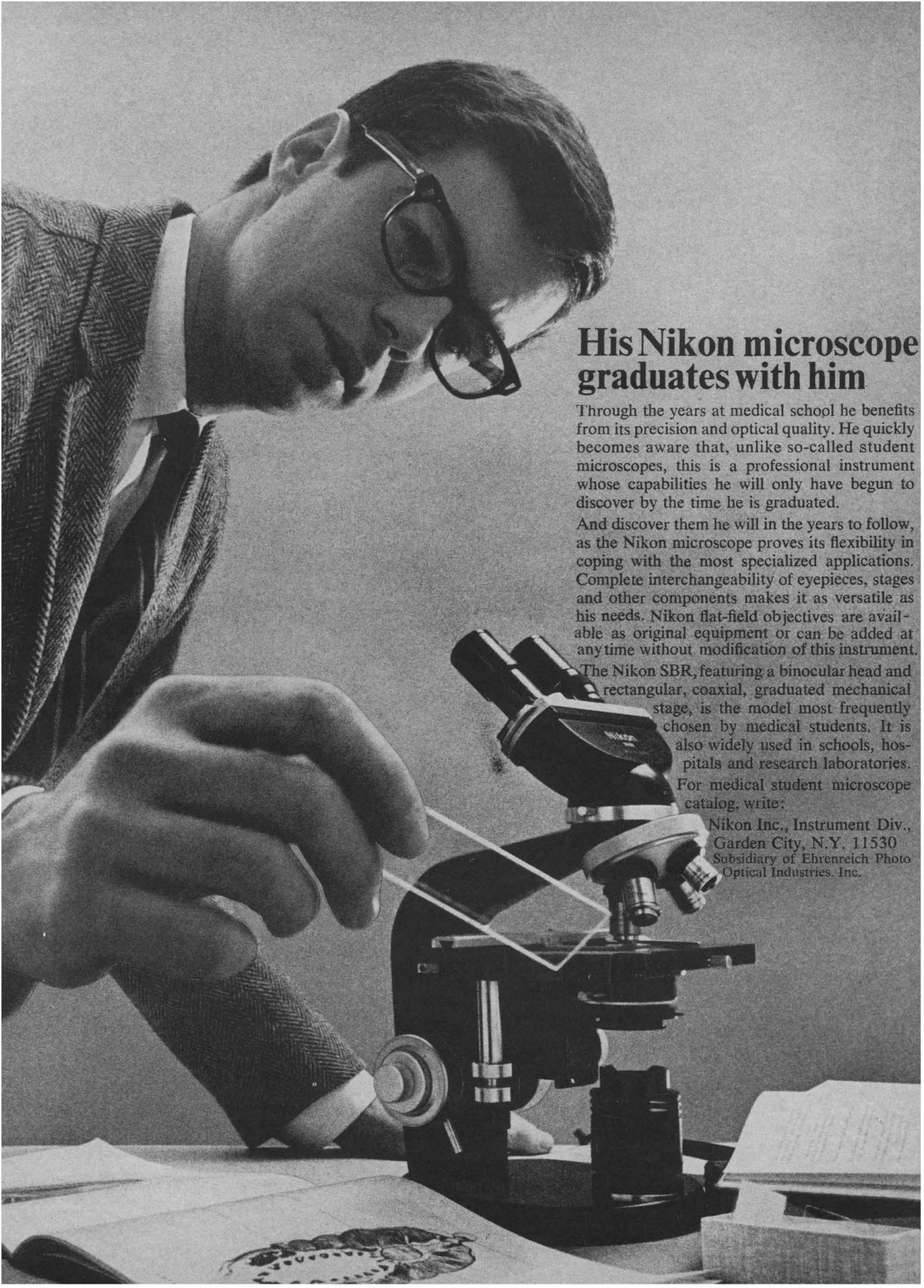
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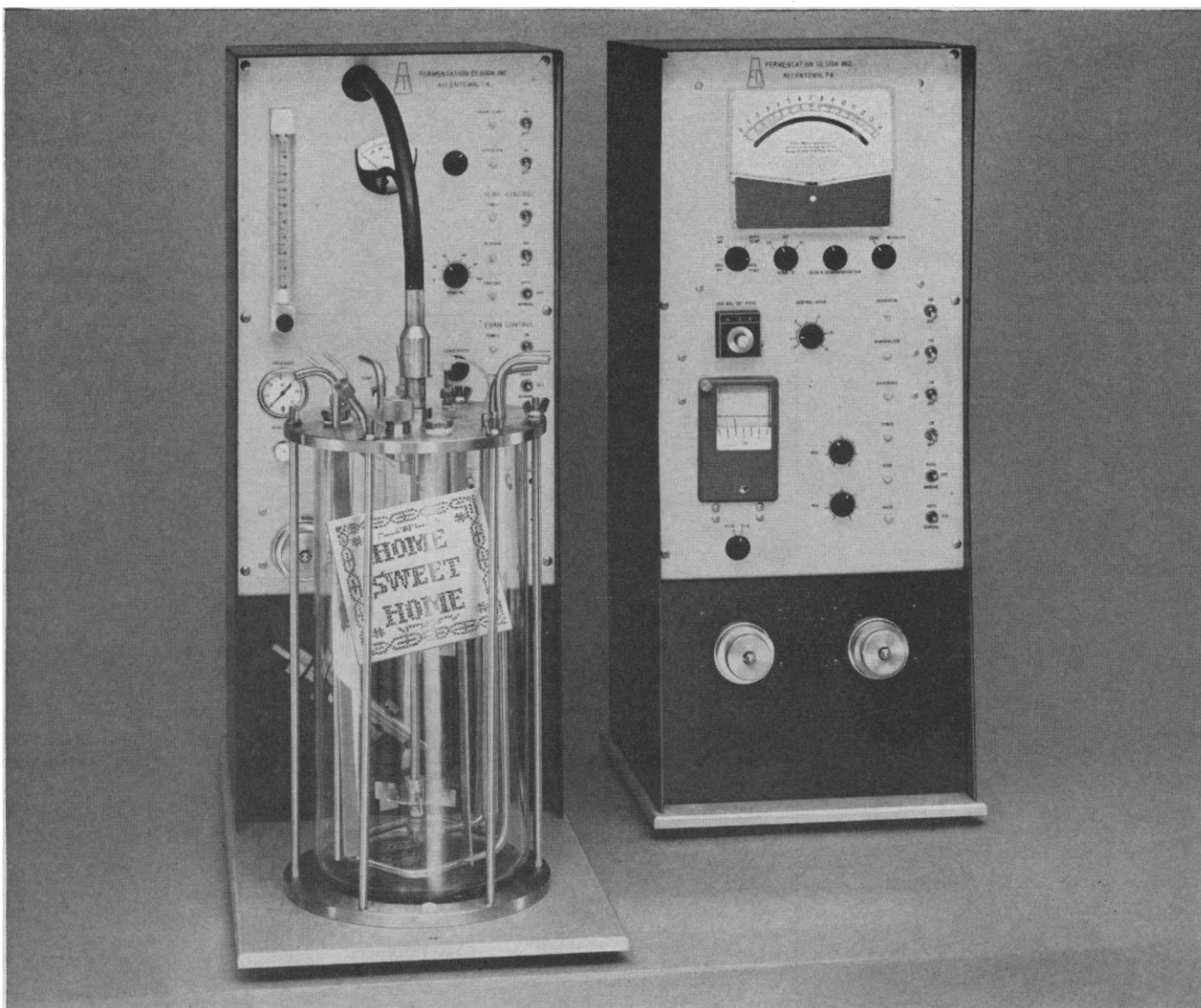
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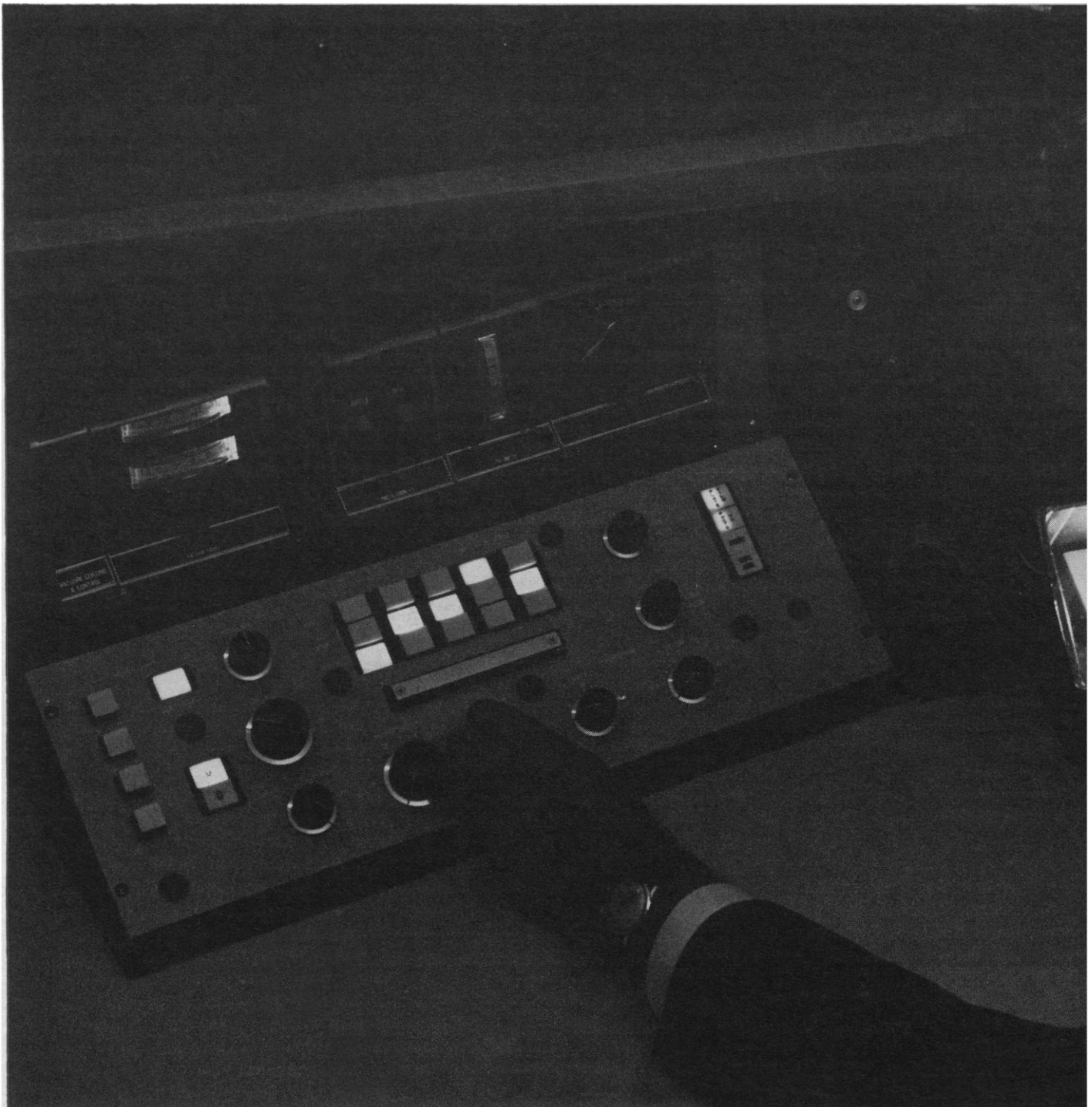
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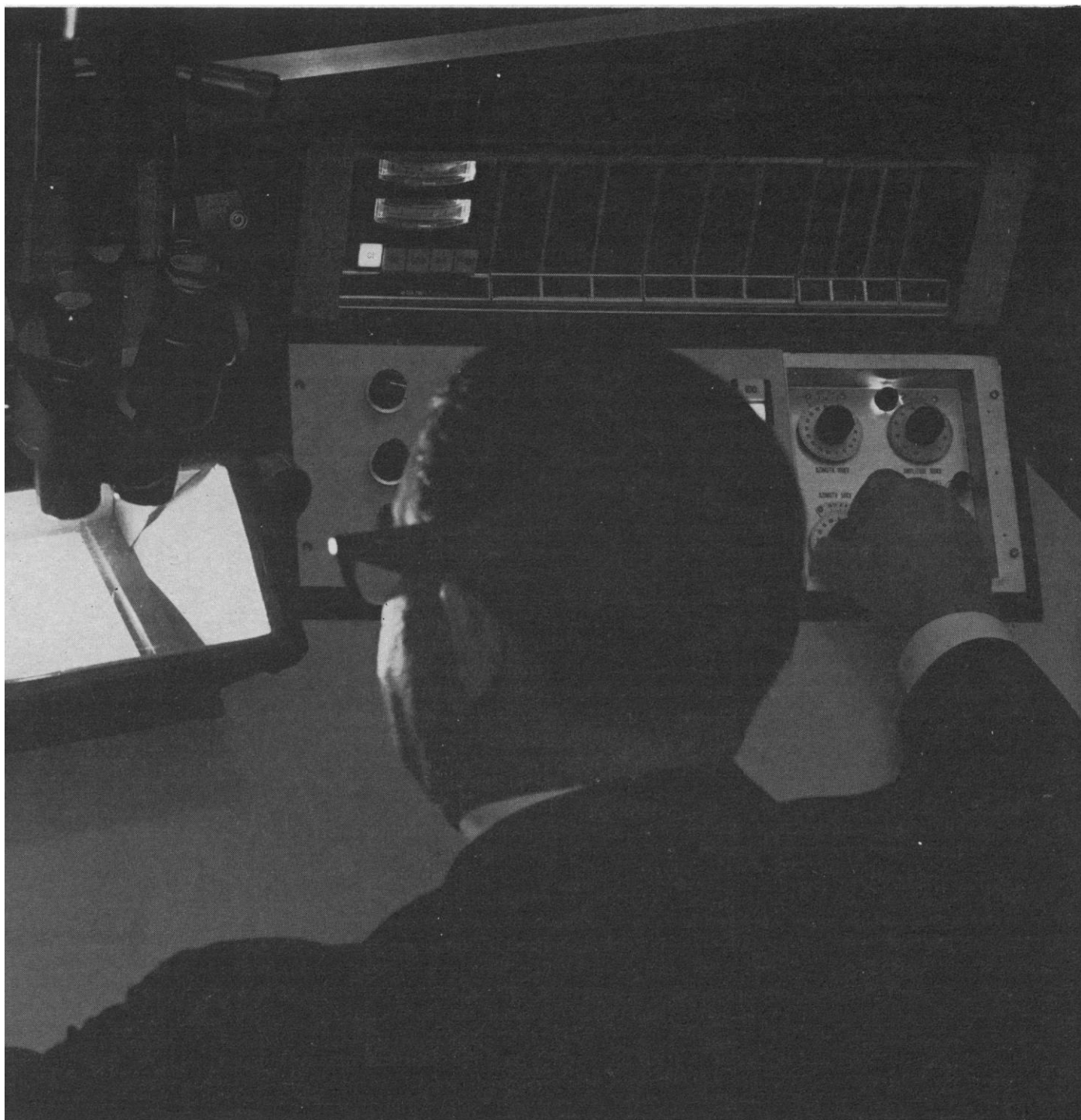
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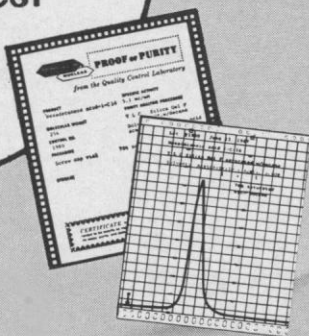
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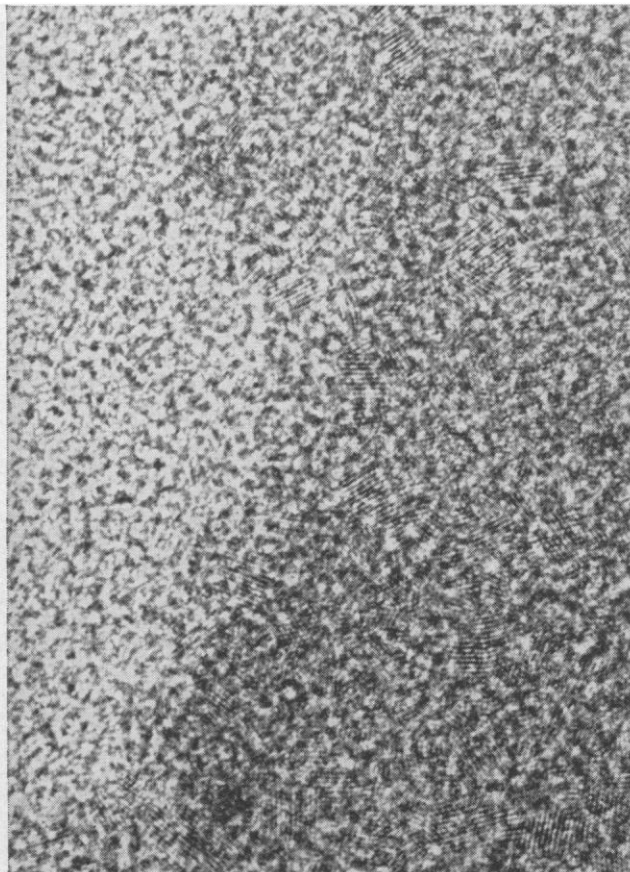
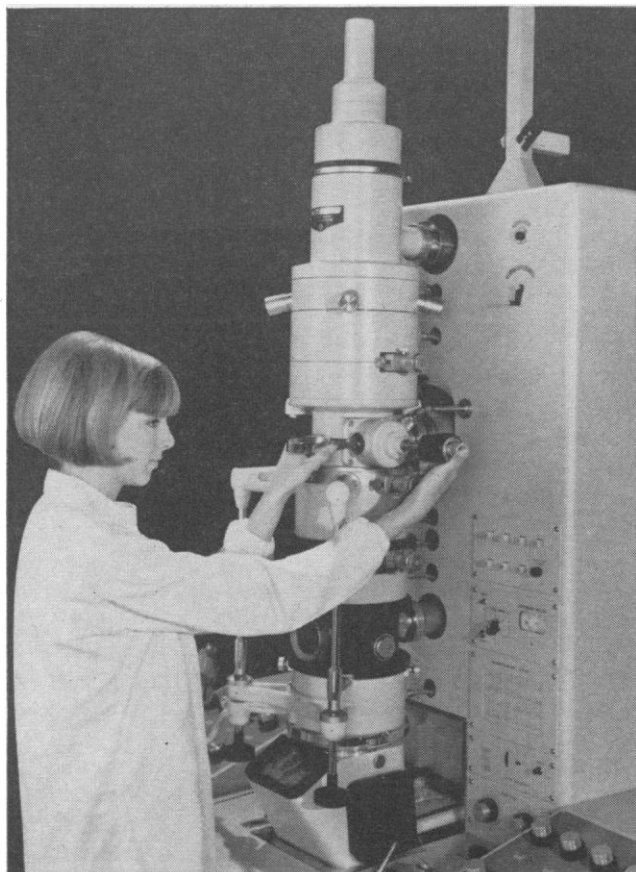
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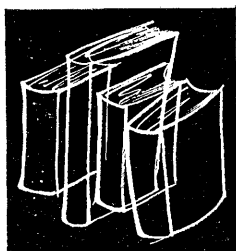
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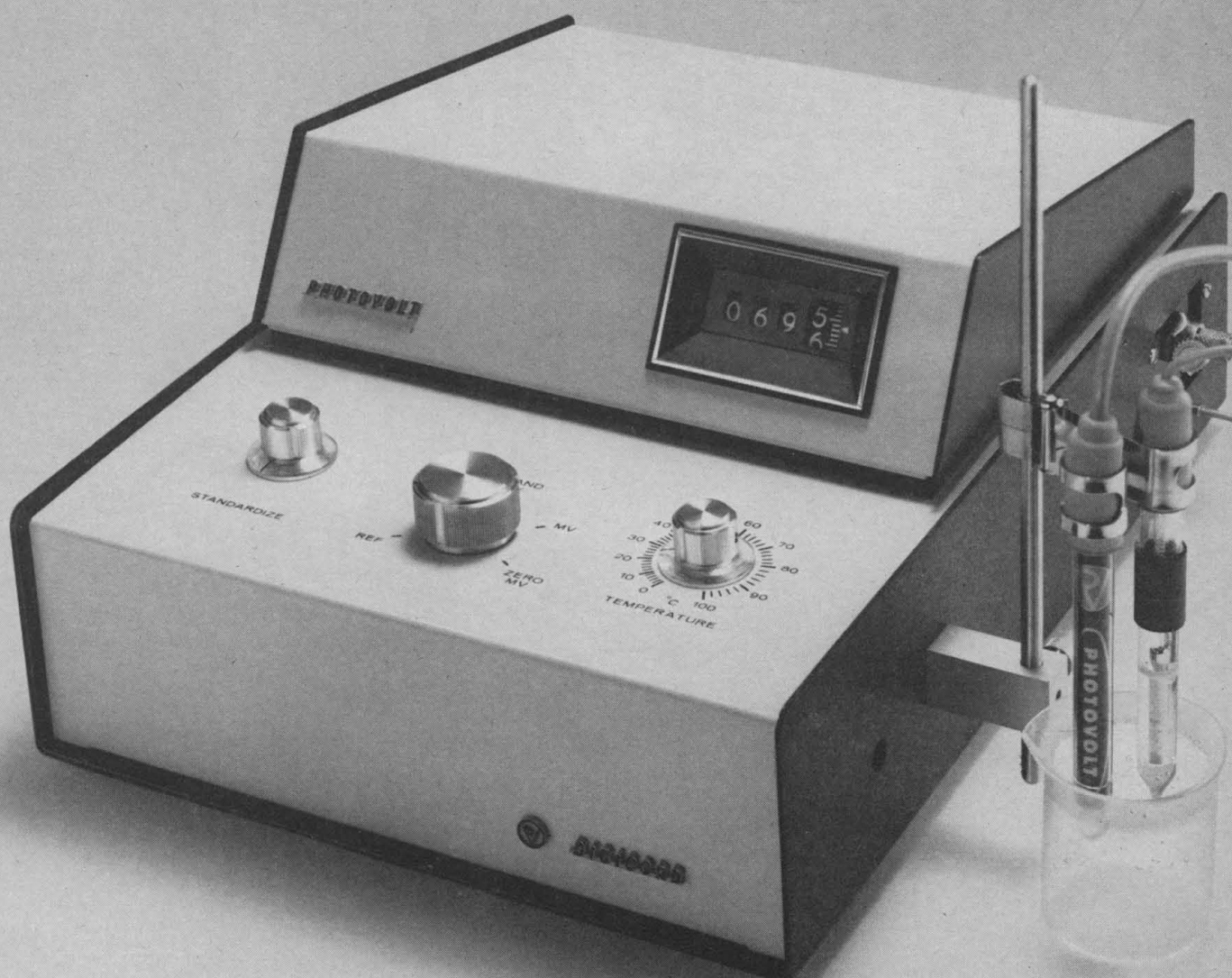
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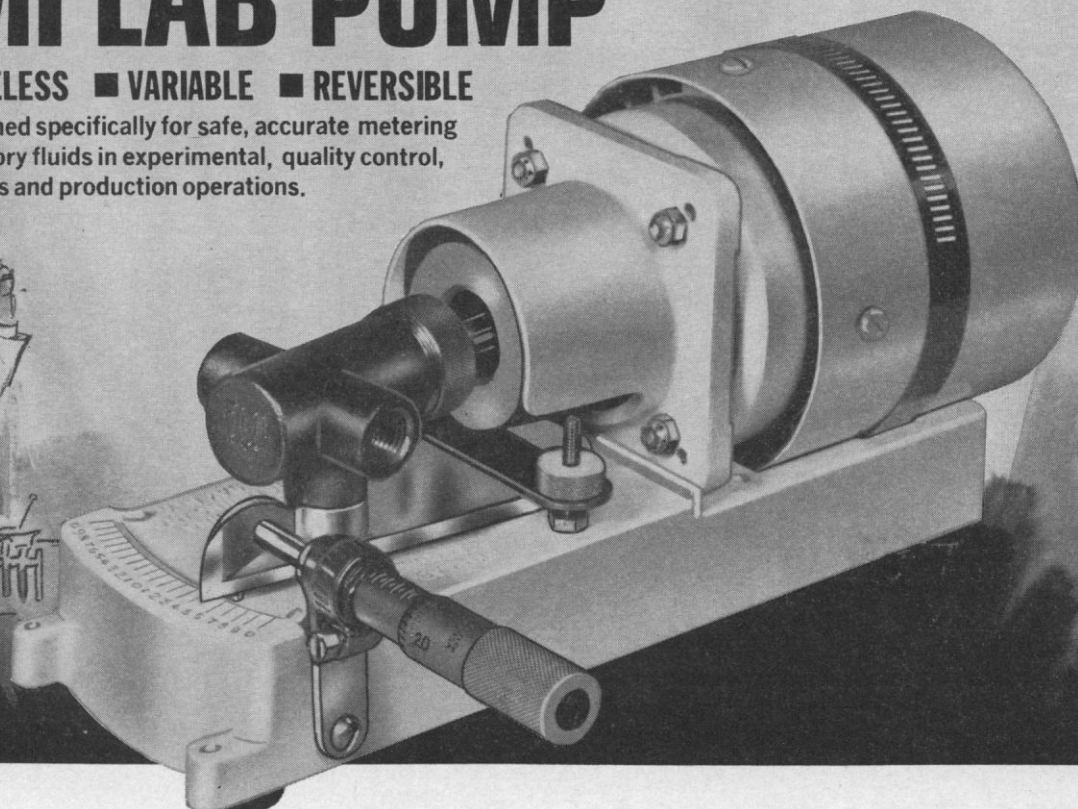
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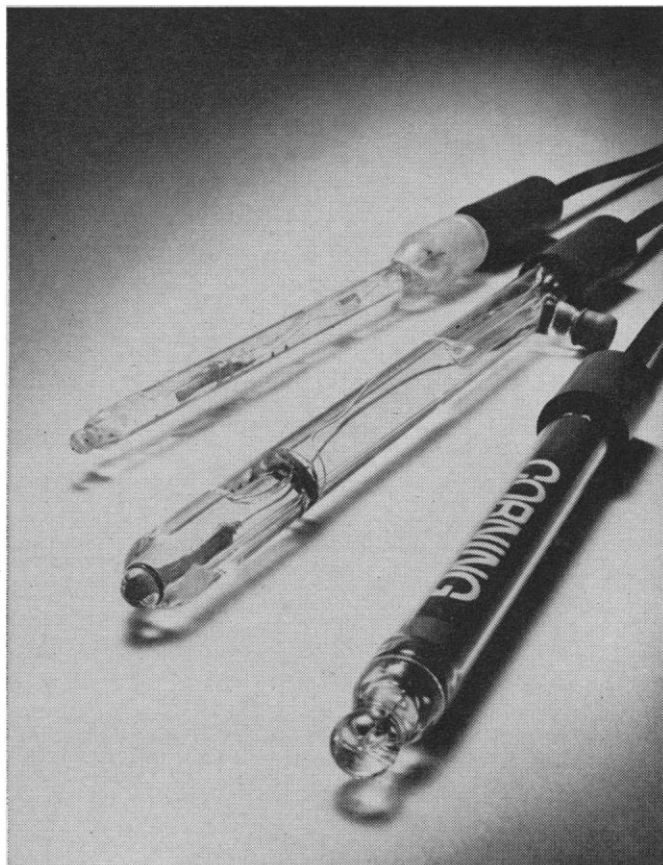
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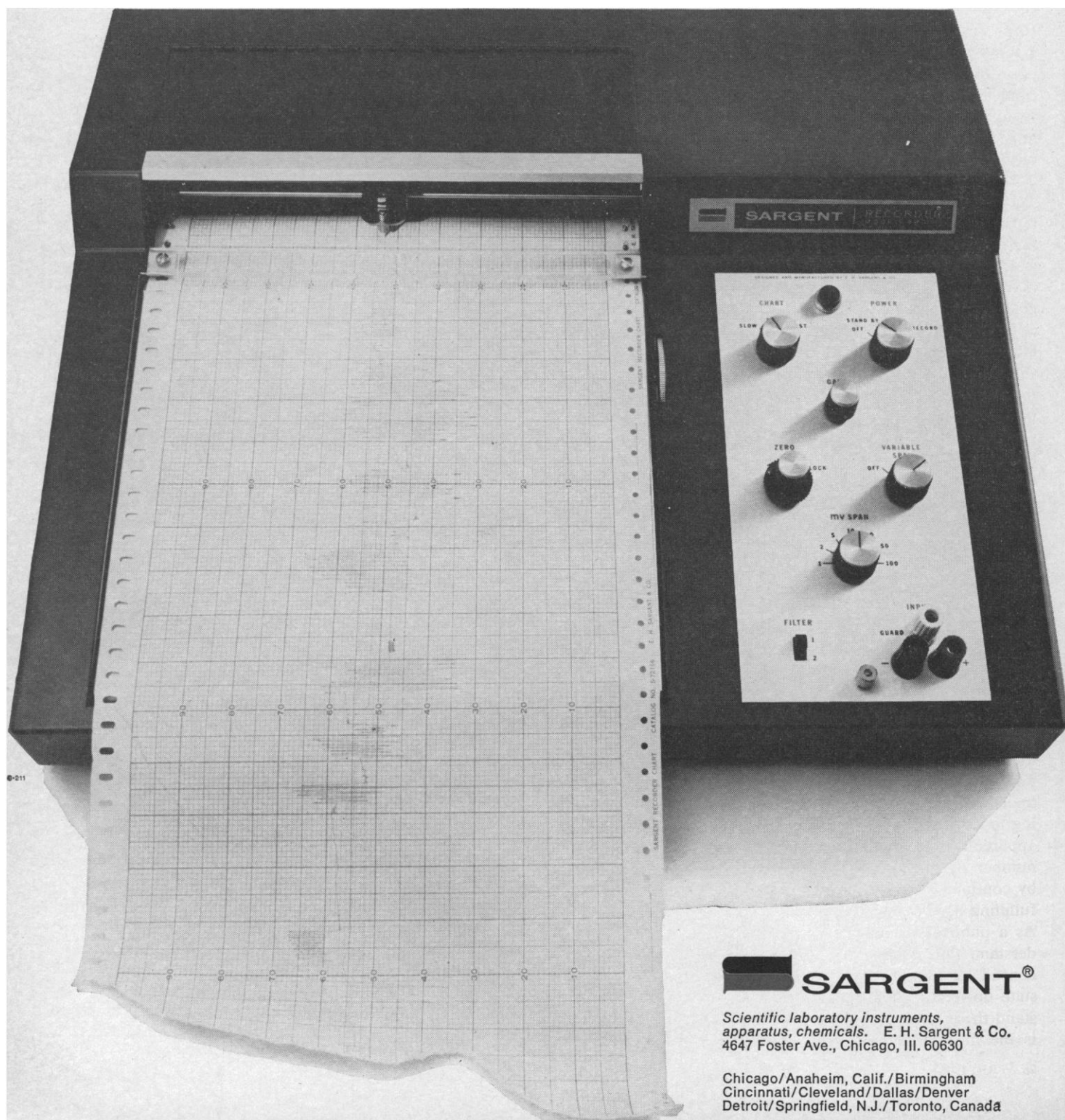
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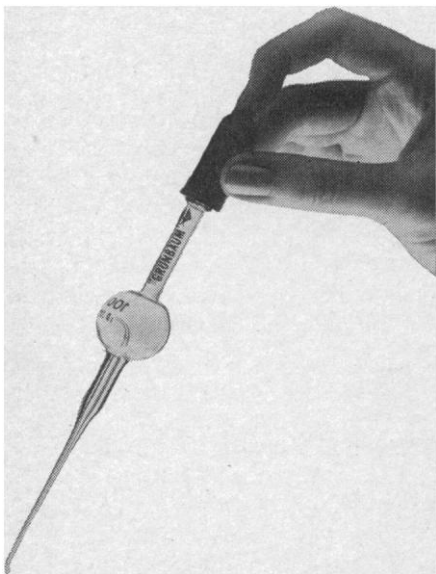


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order of probability with respect to some of the chronic diseases, then dramatic breakthroughs in their elimination are not to be expected.

Control of the factors which exacerbate disease brings us to the second of Rogers' challenges. Will knowledge of the values and goals of societies or subsets of societies lead to public health policies congruent with these goals and values? I doubt it. Controversies over fluoridation, pollution, cigarette advertising, and a number of other problems, some of which were mentioned by Rogers, suggest that the goals and values at different levels of society (individual, family, and various levels of government) and among various groups in society (corporations, professional groups, and so forth) are often basically incompatible. In a democratic society, the multiple allegiance of individuals to a number of these groups is probably one of the basic deterrents to the war of all against all. Health values and goals occupy a variable position in this labyrinth of value and organizational structures. The result may be a uniqueness of each type of health problem which prevents one from developing an overall rational health plan.

There is little doubt that medical sociologists have much to contribute and could make their findings more relevant to clinical medicine and public health. And the pessimism expressed above does not mean that one should not try to accomplish the ends outlined by Rogers. However, as every good scientist knows, one must be prepared for failure.

LEON S. ROBERTSON

Medical Care Research Unit,
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Rogers is concerned that public health and medical sociology are frustrated in the absence of a "holistic ecological concept of human organization." Sociology has been, and still remains, primarily an investigative field. It has filled libraries with detailed descriptions (sometimes mathematical) of how man acts or interacts in given situations. The point is, however, that it has never developed a conceptual responsibility of action. It has never set for itself the practical goal of how man should change as part of action to effect change. A "holistic ecological concept of human organization" is a nice academic formulation. In practice, it is

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quite utopian. What is needed is a human ecology that is action-oriented—that puts practice as primary. In this context public health fundamentally is practice. The philosophy will emerge only from the experience of action.

LEO KARTMAN

199 Bel Mar Avenue, No. 39,
Daly City, California 94015

Medical Research:

Fragmented or Goal-Oriented

I agree with Leaf ("Government, medical research, and education," 9 Feb., p. 604) that, in our rush to fund increased application of medical research, we should not allow funding of basic and applied medical research to falter. Not only must this research compete increasingly with other welfare programs, but it becomes increasingly expensive as it becomes more and more complex and detailed; hence the funding should probably accelerate. . . .

Leaf's attack on the awarding of some medical research contracts to industrial research laboratories (as opposed to awarding all research grants and research contracts to universities and university-operated research laboratories) is unwarranted. Has Leaf ever worked in private industry and experienced the freedom of action and goal-oriented programing possible when everybody on a project is working 100 percent of the time on the project, and is not splitting himself up into many little pieces between research, teaching, patient care, committee meetings, seminars, and government consultation? The point Leaf seems to be missing is that some industrial research laboratories are actually better qualified than any university group to do a certain task by virtue of hard-won expertise. After all, it is industry which gives us many of our really great scientific and technological breakthroughs . . . and even some of the medical ones.

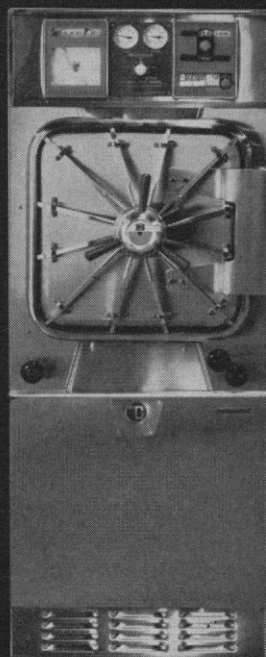
HENRY LEE

*EpoxyLite Corporation,
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All of us undoubtedly share Leaf's frustrations with the effort report and would welcome its abolition. But even if the report cannot be stopped, at least it could be changed so that it makes sense. Effort reports should have a fourth category, self-education. Tabulated under this heading would be the many hours of the week spent in reading,

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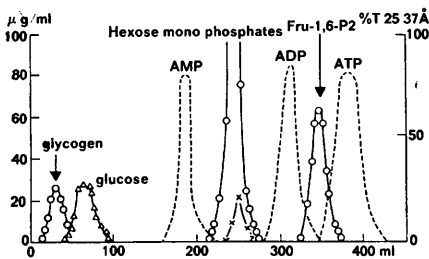


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Model experiment with glycogen, glucose, sugar phosphates and adenosine phosphates on a column of DEAE-Sephadex A-25. (From *Biochim. Biophys. Acta* 74 (1963) 588, by permission of the author)

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WILLIAM G. VAN DER KLOOT
Department of Physiology,
New York University Medical Center,
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Subpoenas: Show Probable Cause

Readers of *Science*, including especially Stamler and Hall ("Un-American activities: Court rule aids Stamler in contempt case," 1 Dec., p. 1249) and Glass and Pond (Letters, 1 Mar.), may be interested in a "Note" in the *Minnesota Law Review* [52, 665 (1968)] entitled "The application of the Fourth Amendment to congressional investigations." Brief excerpts will suffice:

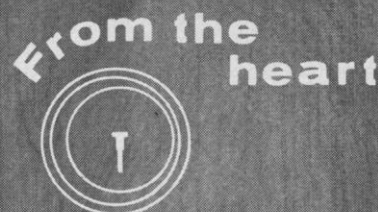
It is suggested that the (Supreme) Court should require a showing of probable cause, as required by the fourth amendment, before allowing the issuance of a subpoena requiring an appearance before a congressional investigation.

The whole philosophical basis for the fourth amendment's protection against searches and seizures without probable cause is the notion that the individual has the right to keep the affairs of his life private. While this right is admittedly not absolute . . . it is a right so basic to our concept of limited government that it should not be lightly disregarded.

Furthermore, the right of privacy must protect the individual's mind as well as his possessions. The Court has protected certain contents of the mind from governmental invasions in criminal proceedings under the fifth amendment. However, the basic recognition that a person's mind is his most sacred possession and should be accorded the greatest protection from governmental invasion is equally applicable to all forms of governmental action. Moreover, the individual's mind should be accorded as much, if not more, protection than his possessions for he therein keeps his most private possessions—his memory and his thoughts.

The protection which this requirement would afford the witness, in comparison with the burden it imposes upon Congress, is significant. The individual will be able to force investigators to show reason to believe that he will be able to provide useful information before they can interrupt this life. This will force the investigation to

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evaluate its need for his testimony before going to the trouble of subpoenaing him. Once subpoenaed, the individual will have a basis upon which to contest his duty to testify. He will not have to risk criminal prosecution in order to contest this duty for he will be able to challenge the probable cause for his subpoena prior to testifying. If the court finds that the individual does have a duty to testify, he will either have to rely on the fifth amendment, risk criminal prosecution for contempt, or provide the information required.

E. S. FETCHER

Laboratory of Physiological Hygiene,
University of Minnesota, Minneapolis

A Just View of Systematics

When a systematist talks to his own set, a congratulatory tone is expected. But publication of Mayr's address, "The role of systematics in biology" (1), exposing it to the nonsystematic public, irresistibly invites a rejoinder! Systematists may not have received due credit for their great contributions to biology but neither perhaps have they got just treatment for abetting biologists in the mistaken belief that taxonomic aggregates, such as populations, are substantial objects-in-nature.

Every ecologist, for example, who sets it down in chapter one that *population and community* are levels-of-integration (and hence "systems") comparable in status to, though midway in complexity of organization between, individual organisms and individual ecosystems is a victim of taxonomy. The levels-of-integration that are demonstrable in nature and those that exist in the minds of systematists are rarely if ever discriminated. Some of the resulting problems were adumbrated in Ehrlich and Holm's article "Patterns and populations" (2) where the authors wrote (unfortunately at the end rather than at the beginning): "The basic units of population biology (*sic*) are not communities, species or even populations, but individual organisms," and in a footnote that should be pondered: "... if historically we had begun to think about biology in ecological rather than taxonomic terms we would now deal with biological 'facts' very differently."

J. S. ROWE

Department of Plant Ecology,
University of Saskatchewan,
Saskatoon, Canada

References

1. E. Mayr, *Science* 159, 595 (1968).
2. P. R. Ehrlich and R. W. Holm, *ibid.* 137, 652 (1962).

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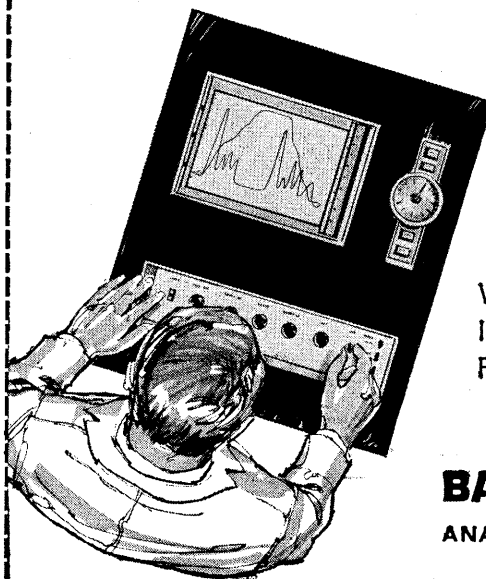
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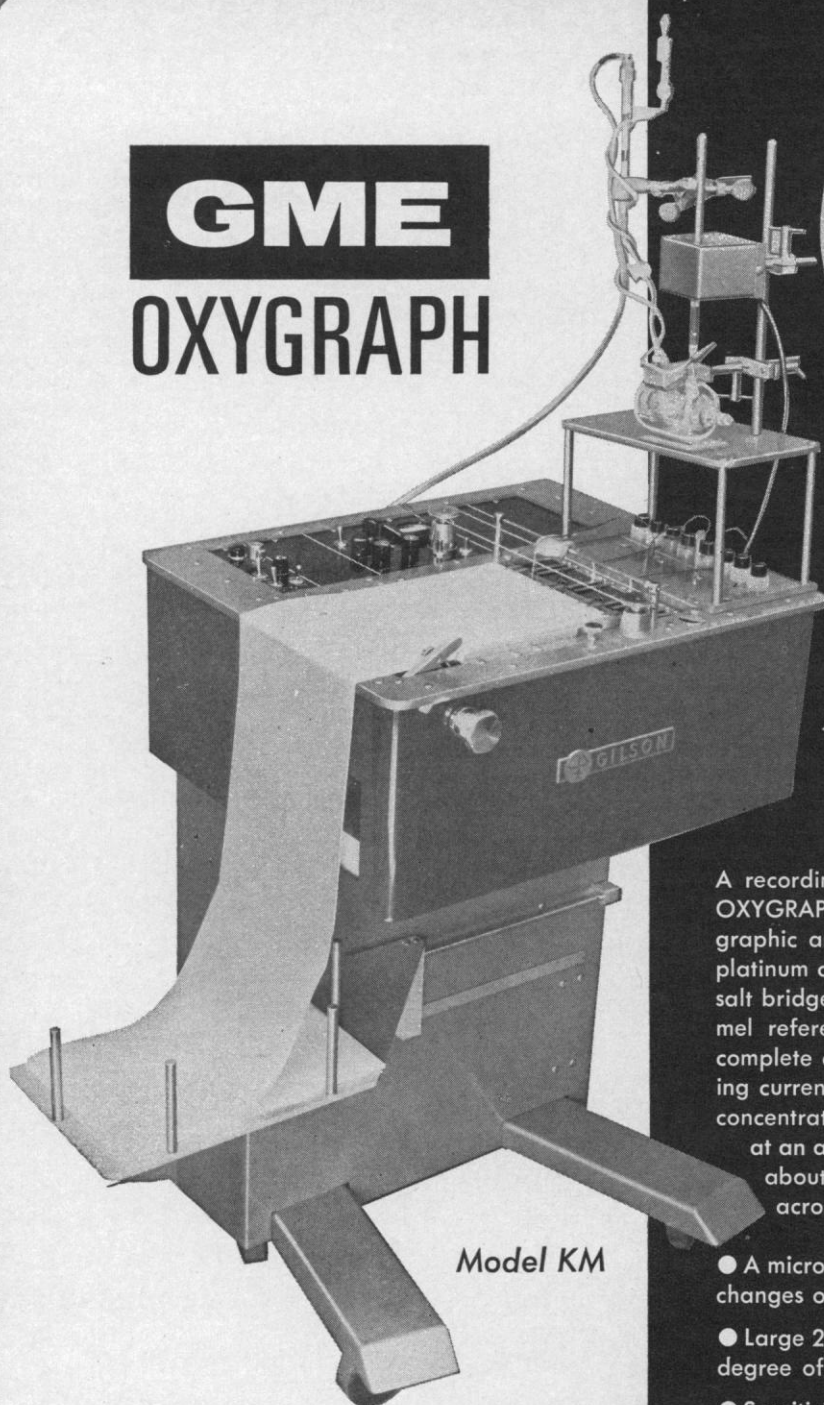


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Universities and the Technology Gap

In a provocative and sure-to-be controversial analysis* of the origins of what has come to be called the technology gap, Professor Joseph Ben-David of Israel last month told the ministers of science of the OECD countries that the gap began around the turn of this century, and began in the universities. American university departments could keep pace with science and its applications because their flexibility of organization allowed them to follow up on the implications and ramifications of new developments. European universities, being bound by tradition and centralized authority, remained frozen in the 19th-century mode. German universities continued the system that had earlier served them so remarkably well: a professorial chair, an associated institute, and a few assistants and *Privatdozenten*. British universities were somewhat freer, for they were more influenced by the American pattern, but in France the only changes were those aimed "at incorporating the by then obsolete German experience."

The key to the American success is what Ben-David calls the entrepreneurial system. The way to maximize the practical uses of science "is not by trying to guess in advance (and in vain) what will be useful, but by developing science according to its immanent potentialities (as perceived by the scientific community) and by subsequently exploiting the scientific findings through imaginative enterprise for whatever purposes they may be useful."

And the way to encourage practical, imaginative enterprise is "by increasing the density of both . . . [fundamental and practical work] and the velocity of the circulation of ideas and problems from both areas of activity in spaces which ensure interaction."

The best "spaces" for ensuring interaction between fundamental science and practical problems are large, complex universities and large, multipurpose research institutions, in either of which there is a mixture of basic and applied interests. The United States has many such places; Europe has few. Ben-David thinks the number could be increased through more effective use of whatever funds a central government can put into higher education and research. Most of his recommendations were directed at Europe, but his recommendations for getting maximum value from the money a national government can provide for higher education and university research are worth considering here. This is what he proposes:

1) Money for higher education should be allotted among universities in proportion to the number of students.

2) Part of the money for research should be granted to universities competitively, on the basis of their overall research attainment during, say, the preceding 5 years.

3) The remaining research money should be granted competitively for individual projects.

4) To foster competition and cooperation among institutions and mobility and interchange of individuals—all of which increase the velocity of interchange of ideas and problems—the universities should be free to use funds in categories 1 and 2 as their own judgment determines.

The prescription is partly based on the success of American practices and experience, but, except for item 3, it goes beyond our standard practice in decentralization of responsibility. In suggesting to European governments a means to narrow the gap, Ben-David has also offered the U.S. Government a challenging prescription for getting greater returns from the monies it invests in higher education and university research.

—DAEL WOLFLE

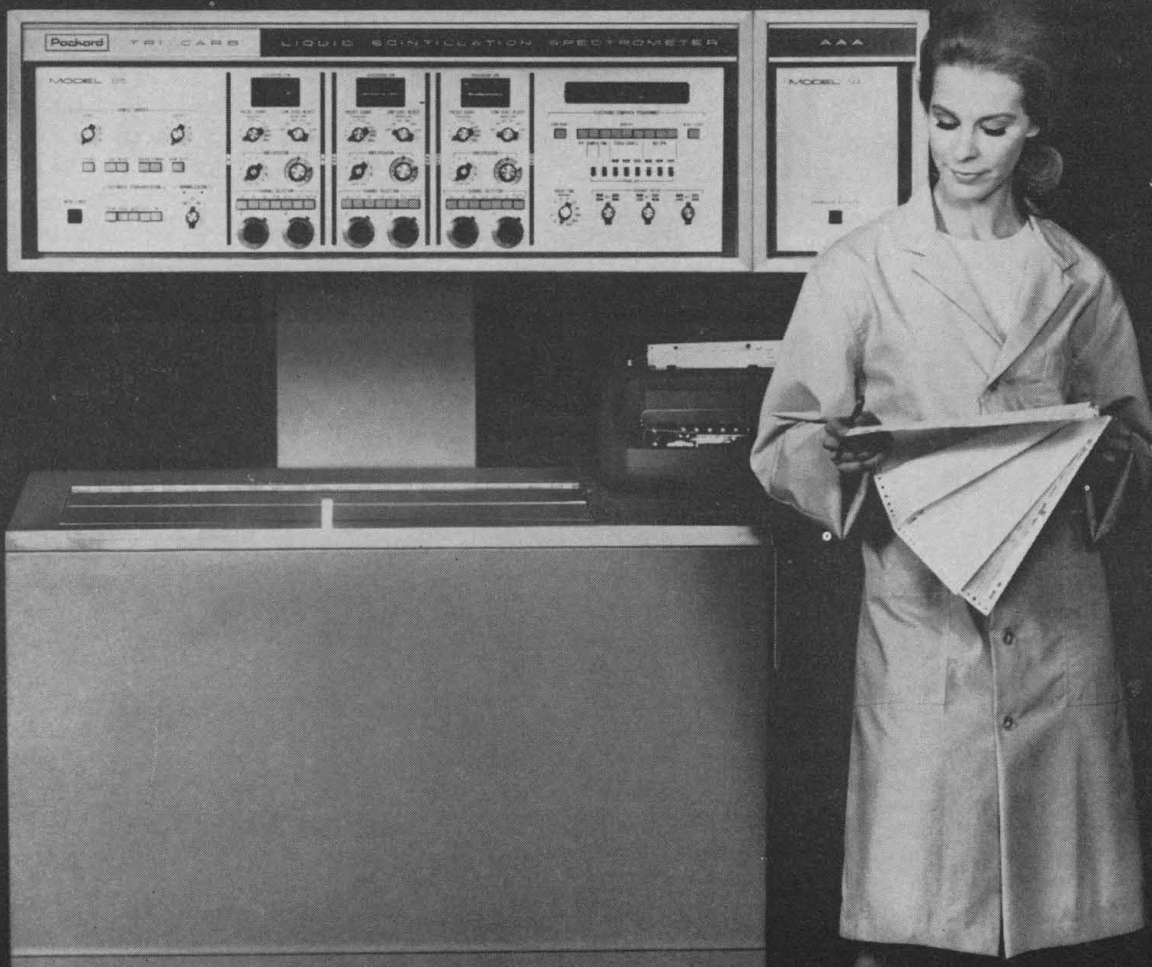
* J. Ben-David, *Fundamental Research and the Universities* (Organisation for Economic Co-operation and Development, Paris, 1968).

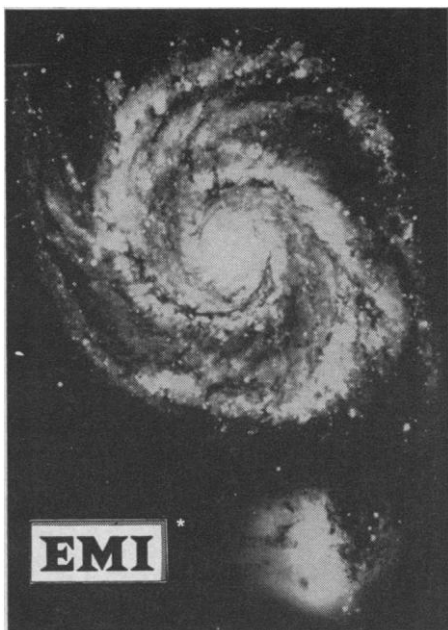
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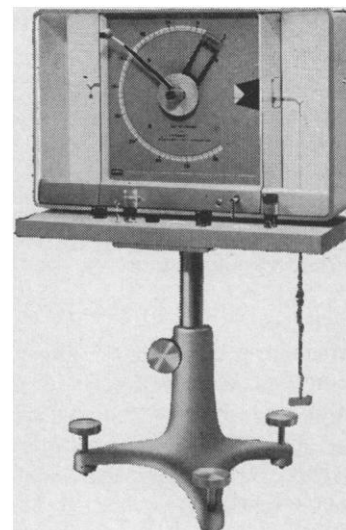
relations for organomercuric compounds and on the mechanism of fungicidal action. The action of two fungicidal organophosphorus compounds useful in rice blast control, *O,O*-diethyl and *O,O*-diisopropyl *S*-benzyl phosphorothiolates, was reported by M. Kado (Ihara Chemicals Co., Shimizu, Shizuoka). Pentachlorobenzyl alcohol is highly active for rice blast control; it specifically prevents penetration of hyphae into leaves but fails to control other plant diseases. M. Ishida (Sankyo Co., Tokyo) reported that, when pentachlorobenzyl alcohol- C^{14} is administered orally to rats in metabolism studies, the unchanged compound is excreted in the feces, and pentachlorobenzoic acid and the β -glucuronide of pentachlorobenzyl alcohol appear in urine.

Strychnine nitrate is potentially useful for control of brown bears, which frequently are a pest in Hokkaido; it is metabolized in the bear so that toxic products do not persist in the meat (T. Inukai, Hokkaido University, Sapporo).

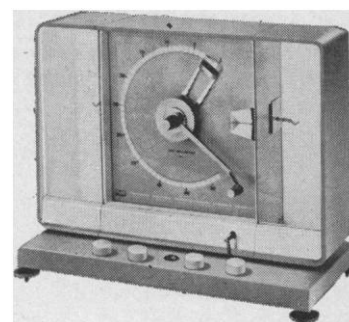
Insecticide metabolism and mode of action were the major topics of discussion. The general steps involved in radiotracer studies on insecticide action include (i) selection of the site of radiolabeling, (ii) performing the radiosynthesis, (iii) introduction of the labeled compound into an appropriate biological system or degradation situation, (iv) determination of the chemical and physical fate of the compound, and (v) interpretation of the results in relation to the mechanism, selectivity, and efficiency of action of the insecticide chemical (J. Casida, University of California, Berkeley). The toxicity of nicotinoids is conferred by the highly basic nitrogen, a carbon-atom bridge, and the pyridine ring (I. Yamamoto, Tokyo University of Agriculture, Setagaya, Tokyo). Studies on structure-activity relations and metabolism of pyrethroids and rotenoids were also reviewed. Detoxification primarily involves initial oxidation of one methyl group in the isobutenyl moiety of pyrethroids and of the isopropenyl group of rotenone.

Specificity in cholinesterase inhibition and in detoxification are factors contributing to the selective toxicity of *O,O*-dimethyl trichlorohydroxyethyl- and dichlorohydroxyethyl phosphonates and related compounds (T. Saito, Nagoya University). The type of biological activity of saligenin cyclic phosphorus esters is remarkably affected by the exocyclic substituent group on the phosphorus (M. Eto, Kyushu Univer-

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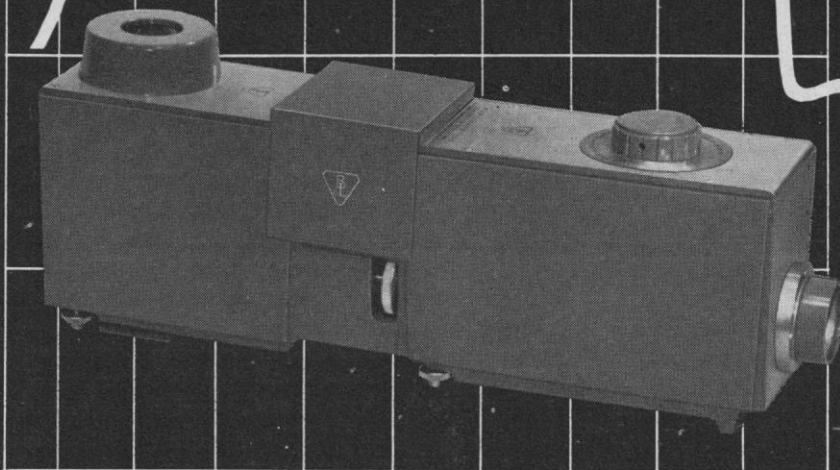
sity). The inhibitor specificity for target esterases is also greatly influenced by steric factors resulting from varying the size of the exocyclic substituent group, although the reactive site with the esterase is probably, in all cases, the enolic ester portion of the hetero ring.

Toxicity of certain organophosphorothionates to mammals is antagonized by compounds that induce microsomal enzymes; these enzymes catalyze detoxification reactions, particularly phosphorothionate cleavages (S. Murphy, Harvard University School of Public Health, Boston). Increased activity of liver A-esterase and of liver and plasma aliesterase, in response to certain drugs, may result in additional sites for reaction with the esterase inhibitors, thus sparing the more vital target enzyme, acetylcholinesterase. Organophosphorus esters potentiate malathion and dimethoate if, at low doses, they inhibit carboxyesterases and carboxyamidases in species in which these pathways of detoxification are critical. According to K. Fukunaga (National Institute of Agricultural Sciences and Institute of Physical and Chemical Research, Tokyo), soluble enzymes from mammalian liver and insect fat body and midgut, which require reduced glutathione for activity, may contribute to the selective toxicity of *O,O*-dimethylphosphorothionates by virtue of their *O*-demethylation activity. Pathways for diazinon metabolism by oxidation, hydrolysis, and conjugation reactions were defined by in vitro studies with enzyme preparations from rats and American cockroaches. Studies with insect microsomal enzymes, which oxidize many insecticides, are limited by natural inhibitors of the enzymes released during homogenization. The mechanism of low mammalian toxicity of sumithion, as compared with methyl parathion, was discussed by J. Miyamoto (Sumitomo Chemical Co., Osaka). Differences in metabolism by pathways involving phosphorothionate oxidation, hydrolysis, and *O*-demethylation probably do not play a major role in the selective toxicity of the two compounds. The low toxicity of sumithion probably results, in part, from the relatively poor penetration of sumioxon into the brain compared to that of methyl paraoxon and, as a result, there is a lower degree of brain cholinesterase phosphorylation in the case of sumioxon.

Acetylcholinesterase from housefly heads differs from that purified from vertebrate sources in hydrolyzing butyrylcholine as well as acetylcholine

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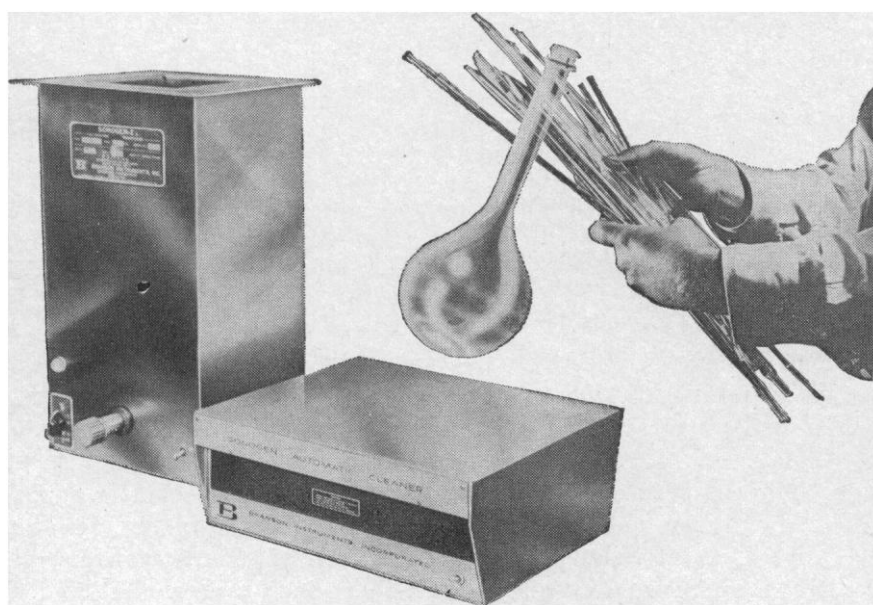
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(C. Kearns, University of Illinois, Urbana). Chromatography of diethylaminoethyl-cellulose partially resolves the fly preparation into two fractions, which differ in extent of activation by butanol and in the ratio of activity on acetyl- and butyrylcholine. Nerve components from insects and mammals were also considered with respect to the binding of various insecticides. Data were presented on the marked differences in binding of dieldrin, DDT, BHC, phthal-thrin, and nicotine to nerve components which were prepared and separated centrifugally from rat brain, and from axonic and ganglionic portions of cockroach nerve cords (F. Matsumura, University of Wisconsin, Madison). Electrophysiological approaches (involving arthropod nerve preparations) to the mode of action of insecticides were discussed by T. Narahashi (Duke University Medical School, Durham, North Carolina). The voltage-clamp method proved highly successful in analyzing the actions of DDT and allethrin. DDT delays the turning-off process of peak sodium current and suppresses steady-state potassium current. Allethrin suppresses both peak sodium and steady-state potassium currents from either side of the nerve membrane and it also delays the turning-off process of peak sodium current when applied internally.

Insecticide resistance mechanisms in houseflies in relation to biochemical genetics were reviewed by M. Tsukamoto (Nagasaki University). The linkage-group distribution of major insecticide resistance factors was defined and the importance of factors on each of the 2nd, 3rd, 4th, and 5th chromosomes was emphasized. Enzymes involved in insecticide metabolism, including DDT-dehydrochlorinase, organophosphate-detoxifying esterases, and mixed functional oxidases of microsomes depend on factors present on the 5th chromosome. A factor on the 2nd chromosome confers low nerve sensitivity to DDT.

A relation was reported between electronic and hydrophobic characters of substituents and the activity of substituted phenols causing chlorosis in *Lemna minor* (T. Fujita and M. Nakajima, Kyoto University). The results suggest action or factors limiting the action, such as a one-step partitioning involving adsorption of the molecule to the cell surface. With regard to organophosphorus insecticides, there is good correlation between anticholinesterase activity and reactivity of the phosphorus ester, as determined by such parameters



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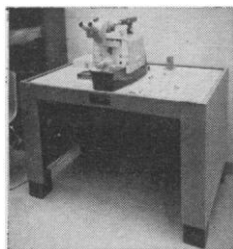
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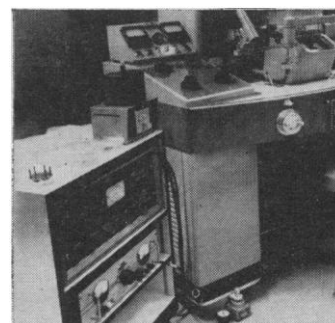
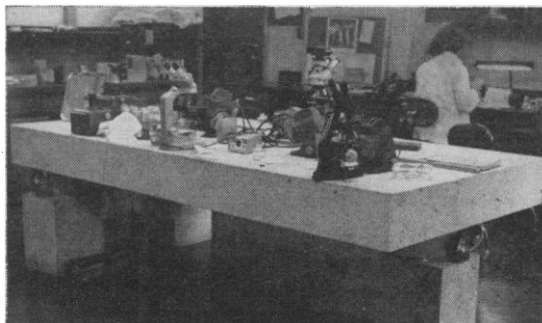
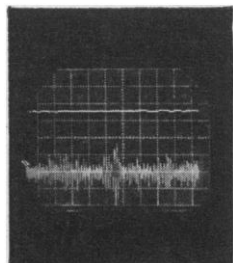
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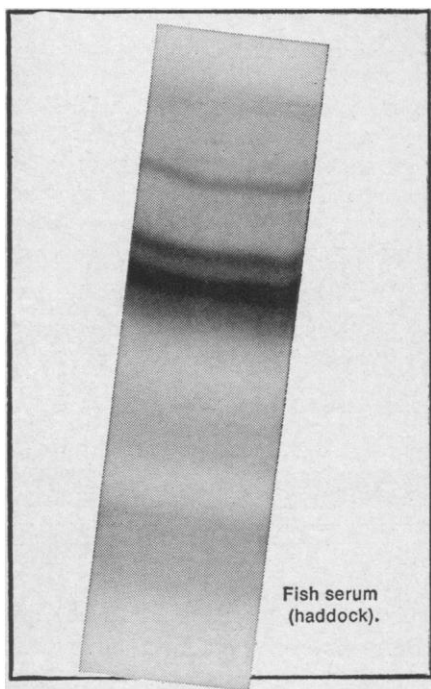
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as hydrolysis and solvolysis, Hammett's sigma constants, and shifts in infrared absorption (T. Fukuto, University of California, Riverside). Improved correlations result from taking steric factors into account. Additional effects are: (i) the stereospecificity in cholinesterase inactivation associated with an asymmetric center, and (ii) the possible contribution to selective toxicity of the significant structural difference between insect and mammalian enzymes. Absorption phenomena on the surface of insects and considerations of insecticide chemical transport into the body were discussed by M. Suwanai (Tokyo University of Agriculture and Technology, Fuchu, Tokyo). A method for calculating the rate of insecticide action based on kinetic and diffusion equations was illustrated.

The papers presented at the Nikko seminar are scheduled for publication as a separate volume of the international book series, *Residue Reviews*, edited by F. Gunther and published by Springer-Verlag New York, Inc.

Both Japan and the United States were among the first to recognize certain serious problems resulting from the adverse effects on animals and plants arising from the rapidly increasing use of pesticides. Cooperation between the two countries can accelerate a solution to problems arising from contamination by pesticides.

J. E. CASIDA

Division of Entomology, University
of California, Berkeley

K. FUKUNAGA

National Institute of Agricultural
Sciences and Institute of Physical and
Chemical Research, Tokyo, Japan

Calendar of Events

May

National Meetings

3-4. **Physical Medicine and Rehabilitation**, Northwest Assoc., Palo Alto, Calif. (J. C. Montero, Div. of Rehabilitation Medicine, Stanford Univ. School of Medicine, Palo Alto 94394)

3-4. **Society for Pediatric Research**, Atlantic City, N.J. (Secretary, The Society, % Dept. of Pediatrics, J. H. Miller Health Center, Univ. of Florida, Gainesville, Fla.)

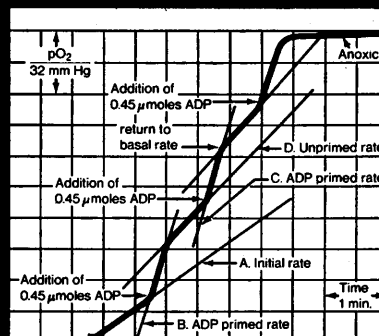
3-5. **Parts, Materials, and Packaging Technical Conf.**, Washington, D.C. (W. Hepner, Electronic Industries Assoc., 2001 Eye St., NW, Washington, D.C. 20006)

4. **American Society for Clinical Nutrition**, Atlantic City, N.J. (A. B. Eisenstein, Secretary-Treasurer, The Society, 818 S. Meramec Ave., St. Louis, Mo. 63105)

4-5. **Economics and Evaluation Symp.**,



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4-9. American Soc. of **Planning Officials**, natl. planning conf., San Francisco, Calif. (The Society, 1313 E. 60 St., Chicago, Ill. 60637)

5. American Federation for **Clinical Research**, annual mtg., Atlantic City, N.J. (J. E. Bryan, Executive Secretary, AFRC, 2000 P St., NW, Washington, D.C. 20036)

5-7. American Assoc. of **State Geologists**, 60th annual, Tuscaloosa, Ala. (T. A. Simpson, Assistant State Geologist, Geological Survey of Alabama, P.O. Drawer O, University 35468)

5-8. American Inst. of **Chemical Engineers**, 64th natl., Tampa, Fla. (R. W. Fahien, Univ. of Florida, Gainesville)

5-8. **Industrial Research Inst.**, Boca Raton, Fla. (G. W. McBride, Secretary-Treasurer, The Institute, 100 Park Ave., New York 10017)

5-8. American Soc. of **Lubrication Engineers**, annual mtg., Cleveland, Ohio. (D. B. Sanberg, Executive Secretary, The Society, 838 Busse Highway, Park Ridge, Ill. 60068)

5-8. American Soc. of **Maxillofacial Surgeons**, annual mtg., Philadelphia, Pa. (D. Gouliau, Jr., Executive Secretary, The Society, 116 E. 68 St., New York 10021)

5-9. American Soc. of **Brewing Chemists**, annual mtg., St. Paul, Minn. (B. A. Burkhart, Executive Secretary, The Society, 501 N. Walnut St., Madison, Wis. 53705)

5-9. American Soc. for **Microbiology**, 68th annual, Detroit, Mich. (Executive Secretary, The Society, 115 Huron View Blvd., Ann Arbor, Mich.)

5-9. **Electrochemical Soc., Inc.**, 133rd natl., Boston, Mass. (The Society, 30 E. 42 St., New York 10017)

5-10. American **Pharmaceutical Assoc.**, Miami Beach, Fla. (G. B. Griffenhagen, Director, Division of Communications, The Association, 2215 Constitution Ave., NW, Washington, D.C. 20037)

5-10. Society of **Plastics Engineers**, 26th annual technical conf., New York, N.Y. (R. D. Forger, Director of Memorial Activities, 65 Prospect St., Stamford, Conn. 06902)

6. **Clinical Investigation**, annual mtg., Atlantic City, N.J. (D. S. Fredrickson, National Heart Inst., Bethesda, Md. 20014)

6-7. **Human Factors in Electronics**, symp., Washington, D.C. (R. M. Emberson, Inst. of Electrical and Electronics Engineers, 345 E. 47 St., New York 10017)

6-7. Institute on **Lake Superior Geology**, 14th annual, Superior, Wis. (A. B. Dickas, Dept. of Geology, Wisconsin State Univ., Superior)

6-8. American **Public Power Assoc.**, annual conf., Seattle, Wash. (The Association, Suite 830, 919 18th St., NW, Washington, D.C. 20006)

6-8. American Soc. for **Quality Control**, 22nd annual technical conf. and exhibit, Philadelphia, Pa. (R. W. Shearman, The Society, 161 W. Wisconsin Ave., Milwaukee, Wis.)

6-8. Cine Angiographic Techniques in **Cardiovascular Pulmonary Diseases**, Cleveland, Ohio. (H. L. Kruse, Executive Assistant, American College of Chest Physicians, 112 E. Chestnut St., Chicago, Ill.)

6-8. **Coding Theory**, symp., Madison, Wis. (H. B. Mann, Mathematics Research Center, Univ. of Wisconsin, Madison)

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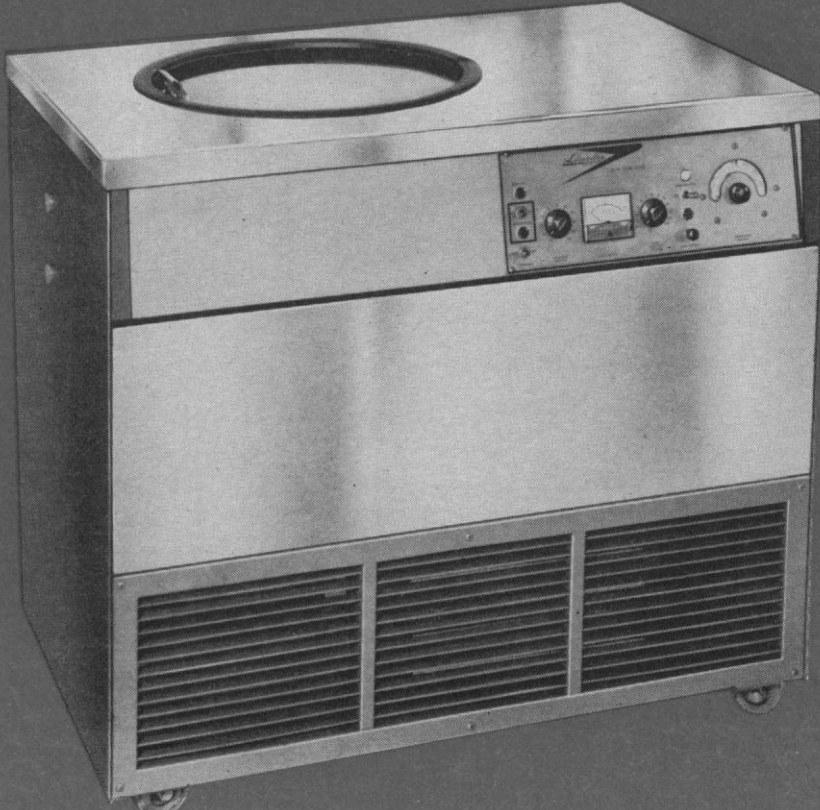
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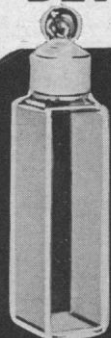
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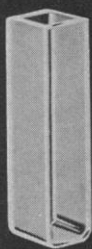
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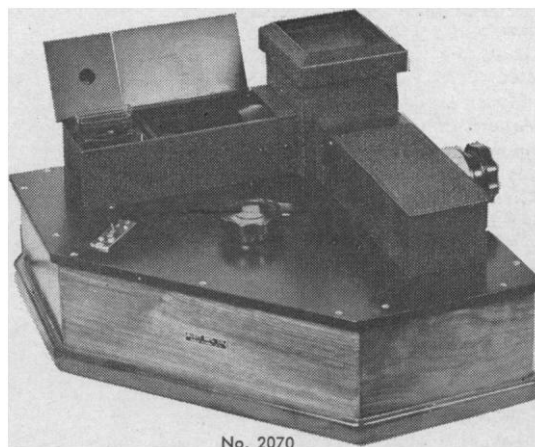
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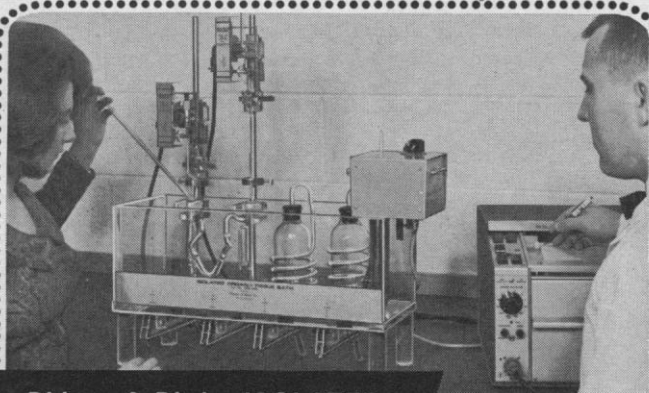
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6-9. **Aerospace Medical Assoc.**, 39th annual science mtg., Miami Beach, Fla. (W. J. Kennard, Washington National Airport, Washington, D.C. 20001)

6-9. **Aerospace Meteorology**, 3rd conf., New Orleans, La. (K. C. Spengler, American Meteorological Soc., 45 Beacon St., Boston, Mass. 02108)

6-9. **American College of Obstetricians and Gynecologists**, Chicago, Ill. (M. Newton, 79 W. Monroe St., Chicago 60603)

6-9. **Civil Aviation Medical Assoc.**, annual mtg., Miami Beach, Fla. (W. Gillespie, The Association, 3720 Washington St., St. Louis, Mo. 63108)

6-9. **American Soc. of Mechanical Engineers**, Fluids Engineering Div., Philadelphia, Pa. (Meetings Manager, The Society, 345 E. 47 St., New York 10017)

6-9. **Soc. of Aeronautical Weight Engineers**, natl. conf., New Orleans, La. (N. J. Carraway, Box 60024, Terminal Annex, Los Angeles, Calif. 90054)

7-8. **Association of American Physicians**, annual mtg., Atlantic City, N.J. (E. Stead, Jr., Executive Secretary, The Association, Duke Hospital, Durham, N.C.)

7-9. **Industrial and Commercial Power Systems**, technical conf., St. Louis, Mo. (Inst. of Electrical and Electronics Engineers, Office of the Technical Activities Board, 345 E. 47 St., New York 10017)

7-9. **Purdue Industrial Waste Conf.**, Lafayette, Ind. (D. E. Bloodgood, Civil Engineering Bldg., Purdue Univ., Lafayette 47907)

7-9. **Soc. of Aerospace Material and Process Engineers**, 13th natl. symp., Chicago, Ill. (P. Fina, 222 Scottswood Drive, Riverside, Ill.)

7-10. **Society of Experimental Stress Analysis**, spring mtg., Albany, N.Y. (B. E. Rossi, Executive Secretary, 21 Bridge Sq., Westport, Conn. 06880)

8-10. **American Assoc. of Genitourinary Surgeons**, annual mtg., Ponte Vedra, Fla. (H. M. Spence, Executive Secretary, The Association, 4105 Live Oak St., Dallas, Tex. 75221)

8-10. **American Helicopter Soc.**, 24th annual natl. forum, Washington, D.C. (H. M. Lounsbury, Executive Secretary, 141 E. 44 St., New York 10017)

8-10. **Electronic Components**, technical conf., Washington, D.C. (W. Hepner, Electronic Industries Assoc., 2001 Eye St., NW, Washington, D.C. 20006)

9. **Recent Significant Developments in Medicine and Surgery**, John F. Kennedy symp., Boston, Mass. (E. G. Toomey, Concord Medical Center, Concord, Mass.)

9-10. **American Chemical Soc.**, central regional, Akron, Ohio. (G. Brown, Dept. of Chemistry, Kent State Univ., Kent, Ohio)

9-10. **The Child with Heart Disease**, Richmond, Va. (W. D. Nelligan, Executive Director, American College of Cardiology, 9650 Rockville Pike, Washington, D.C. 20014)

9-11. **Anesthesiology**, midwest conf., Chicago, Ill. (A. P. Winnie, Illinois Soc. of Anesthesiologists, 1825 W. Harrison St., Chicago 60612)

9-11. **Society of American Archeology**, 33rd annual, Sante Fe, N.M. (Museum of New Mexico, P.O. Box 2087, Sante Fe 87501)

9-11. **American Inst. of Industrial En-**

gineers, Tampa, Fla. (R. C. Hutchinson, IMC, Box 867, Bartow, Fla.)

10-11. **Arizona Acad. of Science**, Flagstaff. (K. E. Bean, Faculty Box 4058, Northern Arizona Univ., Flagstaff 86001)

10-11. **Association of University Radiologists**, Columbus, Ohio. (S. Rogoff, Dept. of Radiology, Univ. of Rochester Medical School, Rochester, N.Y. 14620)

10-13. **American Psychoanalytic Assoc.**, Boston, Mass. (H. Fischer, The Association, 1 E. 57 St., New York 10022)

11. **Kroeber Anthropological Soc.**, 12th annual, Berkeley, Calif. (A. J. Almquist, Dept. of Anthropology, Univ. of California, Berkeley 94720)

12-16. **American Assoc. of Orthodontists**, San Francisco, Calif. (J. E. Brophy, Executive Secretary, 7477 Delmar Blvd., St. Louis, Mo. 63130)

12-16. **Technical Assoc. of the Pulp and Paper Industry**, 19th coating conf., Miami Beach, Fla. (D. Most, Box 542, Marblehead, Mass.)

12-17. **Mass Spectrometry**, 16th annual conf., Pittsburgh, Pa. (J. L. Franklin, Dept. of Chemistry, Rice Univ., Houston, Tex. 77001)

13-15. **Aerospace Electronics**, natl. conf., Dayton, Ohio. (Inst. of Electrical and Electronics Engineers, Dayton Office, 1220 E. Third St., Dayton 45402)

13-15. **American Astronomical Soc.**, 14th annual, Dedham, Mass. (J. Crone, Northrop-Nortronics, 100 Morse St., Norwood, Mass.)

13-15. **Power Instrumentation Symp.**, 11th natl., Chicago, Ill. (R. K. LaCrosse, Sargent and Lundy, 140 S. Dearborn St., Chicago 60603)

13-16. **Corporate Aircraft Safety Seminar**, Chicago, Ill. (C. Etnyre, Director of Special Affairs, Flight Safety Foundation, 468 Park Ave., S., New York 10016)

13-17. **American College of Psychiatrists**, Boston, Mass. (J. M. Myers, American College of Psychiatrists, 111 N. 49 St., Philadelphia, Pa. 10139)

13-17. **American Industrial Hygiene**, conf., St. Louis, Mo. (G. D. Clayton, Executive Secretary, The Association, 14125 Prevost St., Detroit, Mich.)

13-17. **American Nurses Assoc.**, Dallas, Tex. (A. R. Warner, Director, PR Program, 10 Columbus Circle, New York 10019)

13-17. **Environmental Engineering Conf.**, Chattanooga, Tenn. (W. H. Wisely, American Soc. of Civil Engineers, 345 E. 47 St., New York 10017)

13-17. **Soc. for Applied Spectroscopy**, 7th natl., Chicago, Ill. (J. W. Burroughs, % Borg-Warner Corp., R. C. Ingersoll Research Center, Wolf and Algonquin Rds., Des Plaines, Ill. 60018)

14. **Heart Sounds and Murmurs**, Loma Linda, Calif. (W. D. Nelligan, American College of Cardiology, 9650 Rockville Pike, Washington, D.C. 20014)

14-16. **Power Sources Conf.**, 22nd annual, Atlantic City, N.J. (H. W. Schwartz, Power Sources Div., AMSEL-KL-PT, Fort Monmouth, N.J. 07703)

14-18. **American Assoc. for Contamination Control**, 7th annual technical mtg. and exhibit, Chicago, Ill. (W. T. Maloney, Executive Secretary, Suite 620, 6 Beacon St., Boston, Mass. 48201)

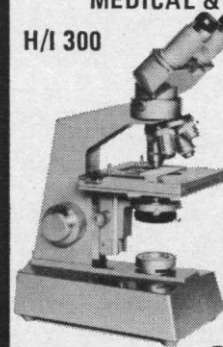
14-18. **Armed Forces Communications and Electronics Assoc.**, 22nd annual conv.,

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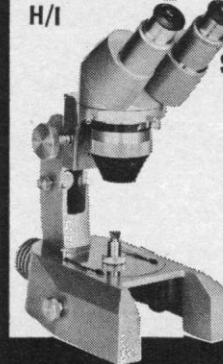
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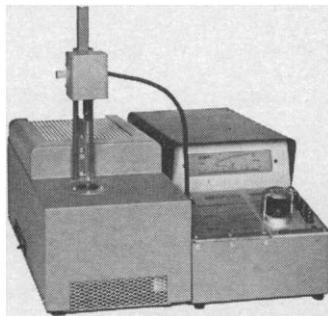
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Washington, D.C. (W. J. Baird and J. H. Shreve, The Association, 1725 Eye St., NW, Washington, D.C. 20006)

15. American Soc. for **Gastrointestinal Endoscopy**, annual mtg., Philadelphia, Pa. (B. H. Sullivan, Jr., The Society, 2020 E. 93 Street, Cleveland, Ohio 44106)

15-16. American **Urological Assoc.**, Miami Beach, Fla. (W. P. Didusch, Executive Secretary, The Association, 1120 N. Charles St., Baltimore, Md.)

15-17. American **Petroleum Inst.**, Div. of Refining, 33rd midyear mtg., Philadelphia, Pa. (R. R. Wright, The Institute, 1271 Ave. of the Americas, New York 10020)

15-17. **Pulp and Paper**, 14th conf., Milwaukee, Wis. (Inst. of Electrical and Electronics Engineers, Office of the Technical Activities Board, 345 E. 47 St., New York 10017)

15-17. **Treatment of Myocardial Infarction**, Atlanta, Ga. (W. D. Nelligan, American College of Cardiology, 9650 Rockville Pike, Washington, D.C. 20014)

15-18. American **Gastroenterological Assoc.**, annual mtg., Philadelphia, Pa. (H. D. Janowitz, % Mt. Sinai Hospital, 11 E. 100 St., New York 10029)

15-18. **Neurosurgical Soc. of America**, annual mtg., San Francisco, Calif. (C. H. Davis, Jr., Bowman Gray School of Medicine, Winston-Salem, N.C. 27103)

16-17. **Metallurgical Soc.**, 22nd New England regional conf., Hartford, Conn. (J. V. Richard, The Society, 345 E. 47 St., New York 10017)

16-17. **Southern Textile Research Conf.**, Hilton Head Island, S.C. (E. E. St. Louis, % Astro Chemical Corp., 1613 E. North St., Greenville, S.C. 29607)

16-19. **Association of Clinical Scientists**, spring mtg., Little Rock, Ark. (R. P. MacFate, The Association, 300 N. State St., Chicago, Ill. 60610)

17-19. American **Osteopathic Acad. of Orthopedics**, instructional courses, Detroit, Mich. (J. P. Leonard, Secretary, The Academy, 2673 W. Grand Blvd., Detroit 48208)

19-22. American **Thoracic Soc./National Tuberculosis Assoc.**, joint mtg., Houston, Tex. (S. Wicker, National Tuberculosis Assoc., 1740 Broadway, New York 10019)

19-22. **Analysis Instrumentation Symp.**, 14th natl., Philadelphia, Pa. (R. G. Krueger, Leeds and Northrup Co., 4901 Stenton Ave., Philadelphia 19144)

19-23. **Institute of Food Technologists**, annual mtg., Philadelphia, Pa. (C. L. Willey, Executive Secretary, 221 N. La Salle St., Chicago, Ill. 60601)

20-22. **Microwave Symp.**, Detroit, Mich. (M. C. Horton, Bendix Research Laboratories Div., Southfield, Mich. 48075)

20-23. **Cement Industry**, technology conf., St. Louis, Mo. (Inst. of Electrical and Electronics Engineers, R. M. Emberson, 345 E. 47 St., New York 10017)

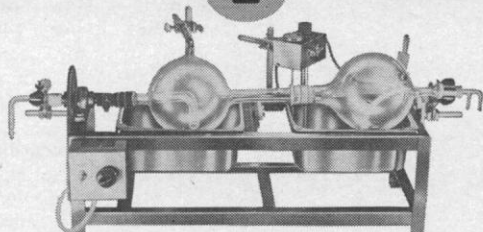
20-24. **Fire Protection Assoc.**, 72nd natl., Atlanta, Ga. (D. Richardson, Manager, PR Dept., National Fire Protection Assoc., 60 Batterymarch St., Boston, Mass.)

20-24. **Inter-American Conf. on Materials Technology**, San Antonio, Tex. (R. D. Wylie, Southwest Research Inst., 8500 Culebra Road, San Antonio)

20-24. **Society of Automotive Engineers**, midyear mtg., Detroit, Mich. (W. I. Marble, Meetings Div. Manager, The Society, 485 Lexington Ave., New York 10017)

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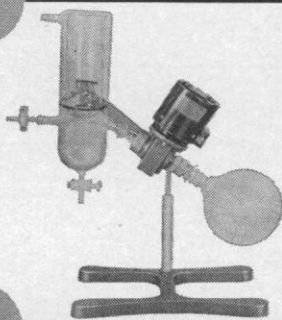
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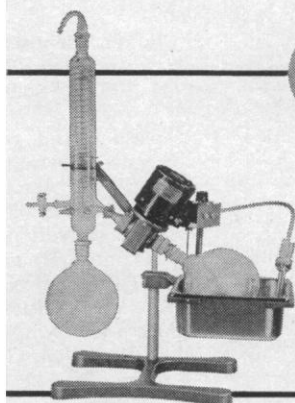
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21-23. **Computer**, joint spring conf., Atlantic City, N.J. (H. G. Asmus, American Federation of Information Processing Societies, 211 E. 43 Street, New York 10017)

21-23. **National Microfilm Assoc.**, Chicago, Ill. (V. D. Tate, Executive Secretary, The Association, Box 386, Annapolis, Md.)

21-23. **Telemetering**, 18th natl. conf., Hollywood, Fla. (R. E. Blue, IBM Corp., 7900 N. Astronaut Bldg., Cape Kennedy, Fla. 32920)

21. **Association for the Advancement of Psychoanalysis**, New York, N.Y. (E. Schattner, Secretary, The Association, 147 E. 50 St., New York 10022)

22-23. **American Iron and Steel Inst.**, general mtg., New York, N.Y. (The Institute, 150 E. 42 St., New York 10017)

22-25. **Society of Technical Writers and Publishers**, 15th annual, Los Angeles, Calif. (C. T. Youngblood, Suite 421, 1010 Vermont Ave., NW, Washington, D.C.)

23-24. **Marine Aquiculture**, conf., Newport, Ore. (W. J. McNeil, Oregon State Univ., Marine Science Center, Marine Science Drive, Newport 97365)

23-25. **American Gynecological Soc.**, annual meeting, Hot Springs, Va. (G. W. Douglas, The Society, 550 First Ave., New York 10016)

23-25. **Biomedical Sciences**, instrumentation symp., Pittsburgh, Pa. (R. D. Allison, Scott and White Clinic, Temple, Tex. 76501)

24-25. **American Podiatry Assoc.**, 6th regional mtg., Sioux Falls, S.D. (M. D. Scofield, Chairman, 120 W. 11 St., Sioux Falls 57102)

24-25. **American Podiatry Assoc.**, 12th regional mtg., San Francisco, Calif. (A. G. Roos, Room 412, 209 Post St., San Francisco 94108)

27-29. **American Ophthalmological Soc.**, Hot Springs, Va. (S. D. McPherson, Secretary-Treasurer, The Society, 1110 W. Main St., Durham, N.C. 27701)

International and Foreign Meetings

12-14. **Sugar Industry Technologists**, 27th annual, Montreal, P.Q., Canada. (P.O. Box 47, Medford, Mass. 02155)

12-16. **Automobile Technical Congr.**, 12th intern., Barcelona, Spain. (Sociedad de Technicos de Automacion, Av. Generalísimo 999, Barcelona 14)

12-16. **Canadian Anaesthetists Soc.**, 19th annual, Montebello. (S. M. Campbell, Executive Director, The Society, 178 St. George St., Toronto 5, Ont., Canada)

12-16. **Pacific Coast Oto-Ophthalmological Soc.**, Vancouver, B.C., Canada. (G. E. Morgan, The Society, 960 E. Green St., Pasadena, Calif. 91101)

12-17. **Federation of Societies of Cosmetic Chemists**, 5th intern. congr., Tokyo, Japan. (T. Koyama, Shiseido Co., Ltd., 3, Ginza Hishi, 7-Chome, Chuo-Ku, Tokyo)

12-18. **Universal Aspects of Atmospheric Electricity**, 4th intern. conf., Tokyo, Japan. (S. C. Coroniti, % Space Systems Div., Avco Corp., 201 Lowell St., Wilmington, Mass. 01887)

12-19. **Data Processing for Climatological Purposes**, Asheville, N.C. (World Meteorological Organization, 41, Avenue Guiseppe Motta, Geneva, Switzerland)

13-16. **Canadian Public Health Assoc.**,



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56th annual, Vancouver, B.C., Canada. (Executive Director, The Association, 1255 Yonge St., Toronto 7, Ont., Canada)

13-16. **Circumventricular Organs and Cerebrospinal Fluid**, symp., Reinhardtbrunn, Germany. (G. Sterba, Zoologisches Institut, Karl-Marx-Universität, Talstr. 33, Leipzig, Germany)

13-17. **International Congr. Against Noise**, 5th, London, England. (Mr. Connel, % Noise Abatement Soc., 6 Old Bond St., London, W.1)

13-17. **Mechanical Pulping**, 6th intern. congr., Atlanta, Ga. (K. G. Chesley, Technical Secretary, Technical Assoc. of the Pulp and Paper Industry, 360 Lexington Ave., New York 10017)

13-18. **Instruments, Electronics, and Automation**, intern. exhibition, London, England. (Industrial Exhibitions Ltd., 9 Argyll St., London, W.1)

13-18. **International Union for Electroheat**, 6th intern. congr., Brighton, England. (British Natl. Committee on Electroheat, 2 Savoy Hill, London W.C.2, England)

13-18. **Water Studies**, 21st intern. conf., Liege, Belgium. (Ceredeau, 2, rue A. Stevart, Liege)

14-16. **Steam Generating and Other Heavy Water Reactors**, conf., London, England. (A. McDonald, Secretary, British Nuclear Soc., 1-7 Great George St., Westminster, London, S.W.1)

14-17. **Quantum Electronics**, intern. conf., Miami Beach, Fla. (L. Winner, 152 W. 42 St., New York, 10036)

14-19. **European Federation of Chemical Engineering**, 4th symp., Brussels, Belgium. (J. G. Van De Vusse, Koninklijke/Shell Laboratorium Badhuisweg 3, Amsterdam, Netherlands)

15-17. **Canadian Phytopathological Soc.**, annual mtg., Winnipeg, Manitoba, Canada. (W. C. McDonald, Canada Dept. of Agriculture, Research Station, 25 Dafoe Rd., Winnipeg 19)

16-18. **Experimental Zoology**, intern. congr., Vienna, Austria. (Wiener Medizinische Akademie, Reisedienst Stadiongasse 6-8, A-1010 Vienna)

17-19. **Royal Astronomical Soc. of Canada**, general assembly, Calgary, Alta. (The Society, 252 College St., Toronto 2B, Ont., Canada)

18-22. **Cytology**, 3rd intern. congr., Rio de Janeiro, Brazil. (C. Ferreira, Emilio Berla 46-3 Copacabana, Rio de Janeiro)

18-28. **Eocene Stratigraphy**, symp., Paris, France. (Ch. Pomerol, Laboratoire de Geologie, 1, rue de la Brosse, Paris 5)

19-22. **Canadian Urological Assoc.**, annual mtg., Houston, Tex. (A. H. Irvine, 1105 Carling Ave., Suite 207, Ottawa 3, Ontario, Canada)

19-26. **Elementary Particle Theory**, Nobel symp., Goteborg, Sweden. (Nobel Foundation, Sturegatan 14, Stockholm 5, Sweden)

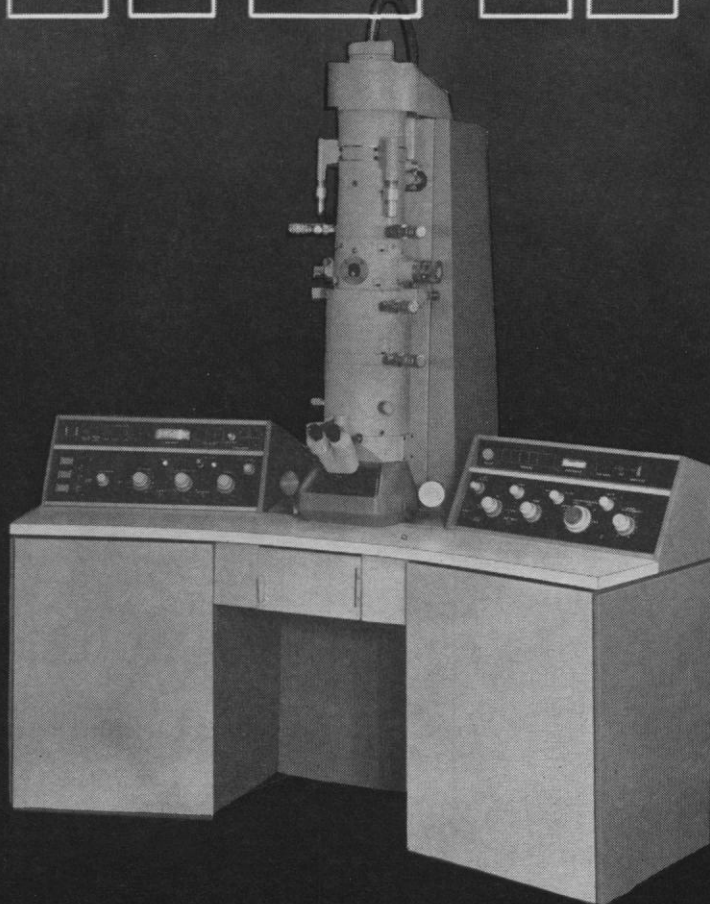
20-23. **Powder Technology**, intern. conf., Chicago, Ill. (M. Jackson, Research Inst., Illinois Inst. of Technology, 10 W. 35 St., Chicago 60616)

20-24. **Acoustical Soc. of America**, spring mtg., Ottawa, P.Q., Canada. (E. A. G. Shaw, Natl. Research Council, Sussex Drive, Ottawa)

20-24. **Inelastic Scattering of Neutrons**, symp., Copenhagen, Denmark. (International Atomic Energy Agency, Karntner Ring 11, Vienna 1, Austria)

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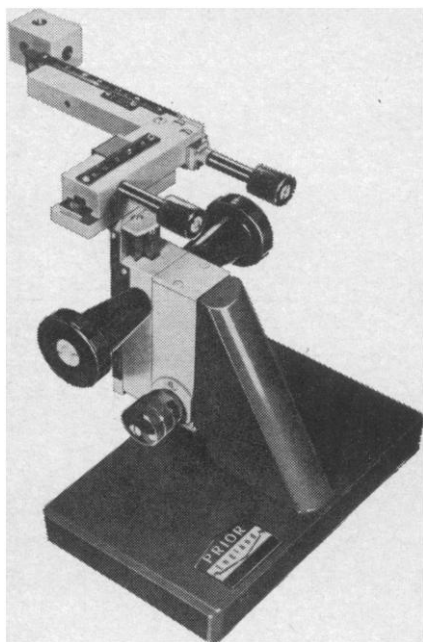
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BOOKS RECEIVED

(Continued from page 412)

mon, New York, 1968. xii + 191 pp., illus. Cloth, \$5.50; paper, \$4. Commonwealth and International Library, Applied Electricity and Electronics Division.

Basic Number Theory. André Weil. Springer-Verlag, New York, 1967. xviii + 294 pp. \$12. Die Grundlehren der mathematischen Wissenschaften, vol. 144.

Bau und Leben der Rhinogradentia. Harald Stümpke. Fischer, Stuttgart, 1967 (distributed in the United States by Abel, Portland, Ore.). vi + 85 pp., illus. Paper, \$3.

Biennial Review of Anthropology 1967. Bernard J. Siegel and Alan R. Beals, Eds. Stanford University Press, Stanford, Calif., 1967. x + 368 pp. \$9.

Biochemical Preparations. Vol. 12. W. E. M. Lands, Ed. Wiley, New York, 1968. xii + 152 pp., illus. \$8.50.

Biographical Memoirs of Fellows of the Royal Society, 1967. Vol. 13. Royal Society, London, 1967. viii + 402 pp., illus. \$9.

Biologie Générale. Vol. 2, Physiologie Cellulaire. J. Trémolières. Dunod, Paris, 1967. viii + 399 pp., illus. Paper, 28 F.

Bivariate Normal Offset Circle Probability Tables with Offset Ellipse Transformations. C. Groenewoud, D. C. Hoaglin, and J. A. Vitalis. Prepared with cooperation from Environmental Science Services Administration by Cornell Aeronautical Laboratory, Buffalo, N.Y., 1967. Two volumes (xxii + 1320 pp.). Paper, \$12.50. CAL No. XM-2464-G-1.

Bladder Cancer. Proceedings of the 5th Inter-American Conference on Toxicology and Occupational Medicine, Coral Gables, Fla., 1966. Kenneth F. Lampe, Rafael A. Penalver, and Aida Soto, Eds. Aesculapius, Birmingham, Ala., 1967. xii + 296 pp., illus. \$15.

BMD Biomedical Computer Programs. W. J. Dixon, Ed. University of California Press, Berkeley, ed. 2, 1967. x + 600 pp., illus. Paper, \$6. University of California Publications in Automatic Computation, No. 2.

The Broad Scope of Psychoanalysis. Selected Papers of Leopold Bellak. Donald P. Spence, Ed. Grune and Stratton, New York, 1967. viii + 392 pp. \$14.75.

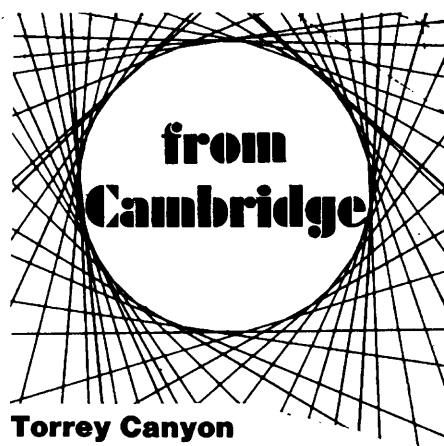
Canada Builds, 1867-1967. T. Ritchie and the staff of the Division of Building Research, National Research Council of Canada. University of Toronto Press, Toronto, Ontario, 1967. x + 331 pp., illus. \$12.50.

Cell Function. L. L. Langley, Illustrated by Frances Langley. Reinhold, New York, ed. 2, 1968. xvi + 364 pp. \$10. Reinhold Books in the Biological Sciences.

Changing Patterns in Fertilizer Use. Proceedings of a symposium, Chicago, February 1967. Richard C. Dinauer, Ed. Soil Science Society of America, Madison, Wis., 1968. xiv + 466 pp., illus. \$7.50; to members of ASA, CSSA, SSSA, \$6.

Chemical Zoology. Marcel Florkin and Bradley T. Scheer, Eds. Vol. 1, Protozoa. George W. Kidder, Ed. Academic Press, New York, 1967. xvi + 912 pp., illus. \$38.

Chemistry and Industry. Applications of Basic Principles in Research and Process Development. D. G. Jones, Ed. Oxford



Torrey Canyon Pollution and Marine Life

This is a report by the Plymouth Laboratory of the Marine Biological Association of the United Kingdom of some biological consequences resulting from the release of 117,000 tons of crude oil from the *Torrey Canyon* wrecked off Cornwall in March 1967.

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University Press, New York, 1967. x + 217 pp., illus. Cloth, \$6.40; paper, \$3.20.

Die Chromosomenmutationen. Rigomar Rieger and Arnd Michaelis. Fischer, Jena, 1967. 433 pp., illus. Paper, 51.50 MDN. Genetik: Grundlagen, Ergebnisse und Probleme in Einzeldarstellungen, vol. 6.

The Clinical Professorship in Teacher Education. Report of a conference, Evanston, Ill., October 1966, in cooperation with the Carnegie Corporation of New York. William R. Hazard, Ed. Northwestern University Press, Evanston, 1967. xiv + 154 pp. Paper, \$2.

Clocks, Calendars, and Carousels. John Gabriel Navarra. Illustrated by Al Nagy. Doubleday, Garden City, N.Y., 1967. 63 pp. \$3.95.

The Collection and Processing of Field Data. A CSIRO symposium, Canberra, Australia, August–September 1966. E. F. Bradley and O. T. Denmead, Eds. Interscience (Wiley, New York, 1967. xx + 597 pp., illus. \$17.50.

Communication Systems. B. P. Lathi. Wiley, New York, 1968. xiv + 431 pp., illus. \$12.95.

Computer Modeling and Simulation. Francis F. Martin. Wiley, New York, 1968. xiv + 331 pp., illus. \$12.95.

The Contractile Process. Proceedings of a symposium, sponsored by the New York Heart Association. Little, Brown, Boston, 1967. xii + 299 pp., illus. \$7.

Controlling Delinquents. Stanton Wheeler and Helen MacGill Hughes, Eds. Wiley, New York, 1968. xx + 332 pp., illus. \$8.50.

Coronary Circulation and Energetics of the Myocardium. Proceedings of an international symposium, Milan, Italy, 1966. G. Marchetti and B. Taccardi, Eds. Karger, Basel, 1967 (distributed in the United States by Phiebig, White Plains, N.Y.). xvi + 320 pp., illus. \$18.

Coulometry in Analytical Chemistry. G. W. C. Milner and G. Phillips. Pergamon, New York, 1967. xii + 207 pp., illus. Cloth, \$5.50; paper, \$4.

The Counseling of College Students. Function, Practice and Technique. Max Siegel, Ed. Free Press, New York; Collier-Macmillan, London, 1968. xx + 467 pp. \$9.95.

A Decade Later: A Follow-Up of Social and Mental Illness. Jerome K. Myers and Lee L. Bean. Wiley, New York, 1968. xiv + 250 pp. \$7.95.

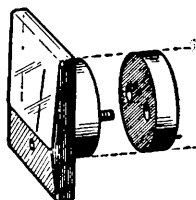
A Decade of Health Services. Social Survey Trends in Use and Expenditure. Ronald Andersen and Odin W. Anderson. University of Chicago Press, Chicago, 1967. xx + 244 pp., illus. \$13. Graduate School of Business: Third Series, Studies in Business and Society.

The Design and Construction of Small Vacuum Systems. Geoffrey W. Green. Chapman and Hall, London; Barnes and Noble, New York, 1968. x + 181 pp., illus. \$5.50. High Vacuum Series.

Determined to Live. Pia Paoli. Translated from the French edition (1967) by Diana Athill. Harcourt, Brace and World, New York, 1968. vi + 152 pp. \$3.95.

Display Systems Engineering. H. R. Luxenberg and Rudolph L. Kuehn, Eds. McGraw-Hill, New York, 1968. xviii + 444 pp., illus. \$16.50. Inter-University Electronics series, vol. 5.

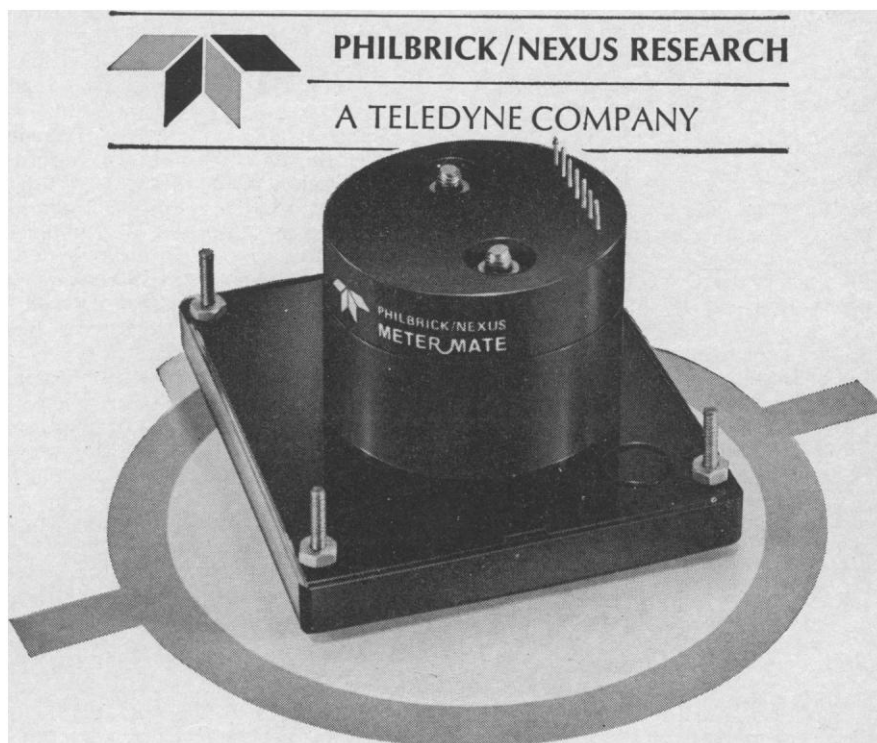
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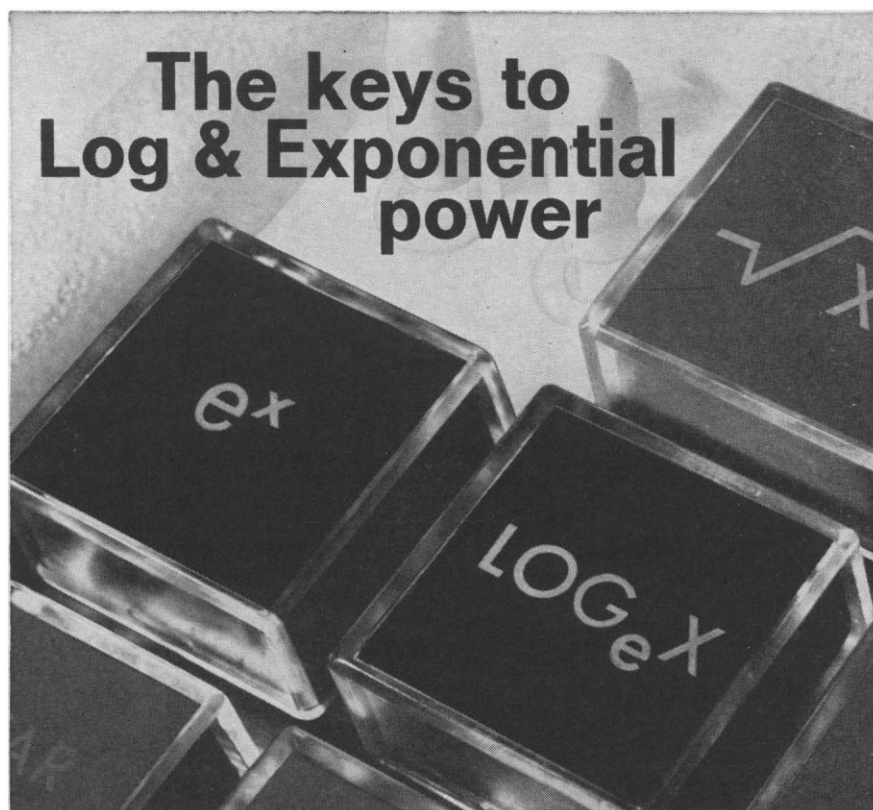


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The Dissenting Academy. Theodore Roszak, Ed. Pantheon, New York, 1968. x + 304 pp. \$6.95.

Divination and the Historical and Allegorical Sources of the I Ching, the Chinese Classic or Book of Changes. Joe E. McCaffree. Presented to the American Academy of Chinese Culture and its founder and president, Wen-Shan Huang. Miniverse Services, Los Angeles, 1967. viii + 70 pp., illus. Paper, \$4.

A Doctor Among the Addicts. Nat Hentoff. McNally, Chicago, 1968. 136 pp. \$4.50.

The Doctors Mayo. Helen Clapesattle. University of Minnesota Press, Minneapolis, 1967. xiv + 426 pp., illus. Paper, \$2.25. Reprint of the 1954 edition.

Echte Mehltupilze (Erysiphaceae). Ein Bestimmungsbuch für die in Europa vorkommenden Arten. Samuel Blumer. Fischer, Jena, 1967 (distributed in the United States by Abel, Portland, Ore.). 436 pp., illus. \$14.20.

Electron Spin Resonance in Chemistry. Peter B. Ayscough. Methuen, London, 1967 (distributed in the United States by Barnes and Noble, New York). xviii + 451 pp., illus. \$13.50.

The Electronic Revolution. S. Handel. Penquin Books, Baltimore, 1967. 252 pp., illus. Paper, \$1.45.

Elementary Statistical Methods. G. Barrie Wetherill. Methuen, London, 1967 (co-distributed in the United States by Barnes and Noble, New York). xiv + 315 pp., illus. \$7.95.

Elements and Formulae of Special Relativity. E. A. Guggenheim. Pergamon, New York, 1967. x + 63 pp. Cloth, \$4.50; paper, \$2.50. Commonwealth and International Library, Physics Division.

Emotional Stress. Physiological and Psychological Reactions; Medical, Industrial and Military Implications. Proceedings of an international symposium arranged by the Swedish Delegation for Applied Medical Defense Research, Stockholm, February 1965. Lennart Levi, Ed. Elsevier, New York, 1967. 280 pp., illus. \$18.50.

Essays on Medical Anthropology. Thomas Weaver and Charles Hudson, Eds. Southern Anthropological Society, 1968 (distributed by the University of Georgia Press, Athens). vi + 98 pp., illus. Paper, \$3. Southern Anthropological Society Proceedings, No. 1.

The Evoked Potentials. Proceedings of an international meeting, Siena, Italy, June-July 1966. William Cobb and Cristoforo Morocutti, Eds. Elsevier, New York, 1967. xvi + 218 pp., illus. \$22.50. Electroencephalography and Clinical Neurophysiology, Supplement No. 26.

Die Evolution der Organismen. Ergebnisse und Probleme der Abstammungslehre. Vol. 1. Gerhard Heberer, Ed. Fischer, Stuttgart, ed. 3, 1967 (distributed in the United States by Abel, Portland, Ore.). xvi + 448 pp., illus. \$32.

The Evolution of Differentiation. William S. Bullough. Academic Press, New York, 1967. viii + 206 pp., illus. \$8.

L'Exploration Spatiale et Ses Techniques. Trajectoires, Fusées, Satellites. Bertrand Manuali. Hermann, Paris, 1967. 216 pp., illus. Paper, 15 F.

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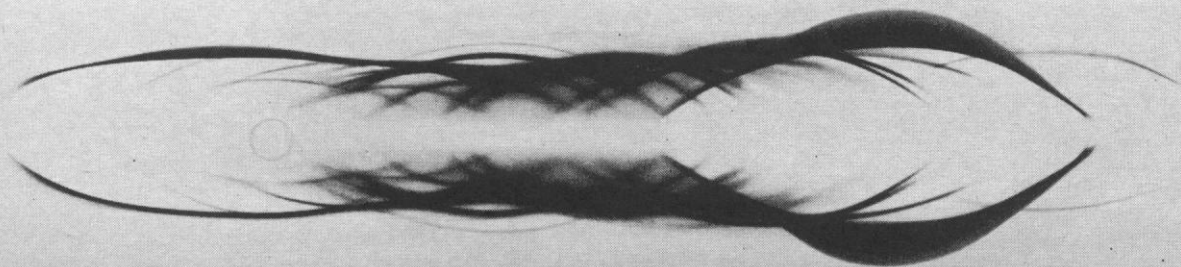
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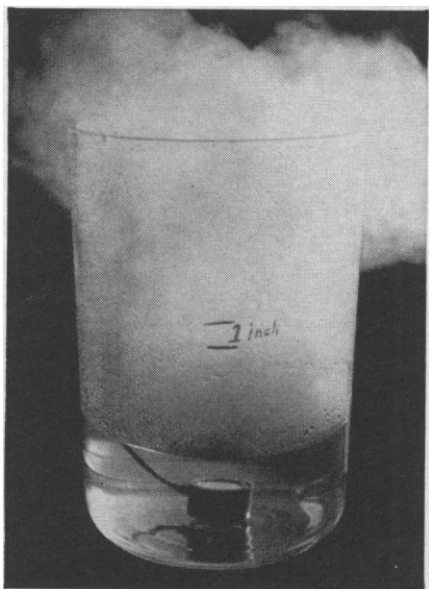
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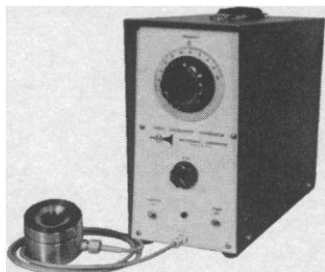
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tractility. Ralph D. Tanz, Frederic Kavalier, and Jay Roberts, Eds. Academic Press, New York, 1967. xxvi + 693 pp., illus. \$28.

Famous Astronomers. James S. Pickering. Dodd, Mead, New York, 1968. 128 pp., illus. \$3.50. Famous Biographies for Young People.

Fast Breeder Reactors. Proceedings of a conference organized by the British Nuclear Energy Society, London, May 1966. P. V. Evans, Ed. Pergamon, New York, 1967. viii + 951 pp., illus. \$37. International Series of Monographs in Nuclear Energy, vol. 103.

Fatigue of Materials. An Introductory Text. J. Y. Mann. Melbourne University Press, Carlton, Victoria; Cambridge University Press, New York, 1967. xvi + 155 pp., illus. \$6.50.

A First Course in Linear Algebra. Daniel Zelinsky. Academic Press, New York, 1968. x + 266 pp., illus. \$6.50.

First Steps in Electronics. Cours de 1^{re} Année. Clément Duval. Presses Universitaires de France, Paris, 1967. viii + 111 pp. Paper, 12 F.

Forest Wildlife Management. Proceedings of the 16th Annual Forestry Symposium, 1967. Bryant A. Bateman. Published for the School of Forestry and Wildlife Management and the General Extension Division by Louisiana State University Press, Baton Rouge, 1967. x + 107 pp., illus. \$5.

Fundamentals of Acid-Base Regulation. James R. Robinson. Davis, Philadelphia, ed. 3, 1967. xiv + 109 pp., illus. Paper, \$2.50.

Game Theory. Guillermo Owen. Saunders, Philadelphia, 1968. xii + 228 pp., illus. \$9.

Gehölzphysiologie. Horst Lyr, Hans Polster, and Hans-Joachim Fiedler. Fischer, Jena, 1967 (distributed in the United States by Abel, Portland, Ore.). 444 pp., illus. \$12.90.

General Physics. Mechanics and Molecular Physics. L. D. Landau, A. I. Akhiezer, and E. M. Lifshitz. Translated from the Russian edition (Moscow, 1965) by J. B. Sykes, A. D. Petford, and C. L. Petford. Pergamon, New York, 1967. x + 372 pp., illus. \$8.

Geographische Anthropologie. Rassen und Volker der Erde. Bertil Lundman. Fischer, Stuttgart, 1967 (distributed in the United States by Abel, Portland, Ore.). xii + 228 pp., illus. \$9.60.

Geometrical and Physical Optics. R. S. Longhurst. Wiley, New York, ed. 2, 1967. xvi + 592 pp., illus. Paper, \$6.50.

German-English, English-German Dictionary for Physicians. Vol. 1, German-English. Fritz Lejeune and Werner E. Bunes. Thieme, Stuttgart; Intercontinental Medical Book Corp., New York, ed. 2, 1968. xxiv + 459 pp. \$17.50.

Graphic Communication. William J. Bowman. Wiley, New York, 1968. xii + 210 pp., illus. \$9.95. Wiley Series on Human Communication.

Great Waters. A Voyage of Natural History to Study Whales, Plankton and the Waters of the Southern Ocean. Sir Alister Hardy. Harper and Row, New York, 1967. 542 pp., illus. \$10.95.

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Grundzüge der anorganischen Kristallchemie. Heinz Krebs. Enke, Stuttgart, 1968. xii + 376 pp., illus. 45 DM.

Halogen Chemistry. Vol. 2. Viktor Gutmann, Ed. Academic Press, New York, 1967. xiv + 481 pp., illus. \$20.

Halogen Chemistry. Vol. 3. Viktor Gutmann, Ed. Academic Press, New York, 1967. xiv + 471 pp., illus. \$20.

Handbook of Experimental Immunology. D. M. Weir, Ed. Davis, Philadelphia, 1967. xiv + 1245 pp., illus. \$32.

Handbook of Physiology. A Critical, Comprehensive Presentation of Physiological Knowledge and Concepts. Section 6: Alimentary Canal, vol. 2, Secretion. Charles F. Code, Ed. American Physiological Society, Washington, D.C., 1967. viii + 655 pp., illus. \$32.

Handbook of the Crayfishes of Ontario. Denton W. Crocker and David W. Barr. Published for the Royal Ontario Museum by the University of Toronto Press, Toronto, Ontario, 1968. xiv + 158 pp., illus. \$6.50. Life Sciences Miscellaneous Publications, Royal Ontario Museum.

Harvest of the Sea. John Bardach. Harper and Row, New York, 1968. xii + 301 pp., illus. \$6.95.

Die historischen Pflüge der Hohenheimer Sammlung landwirtschaftlicher Geräte und Maschinen. Ein kritischer Katalog. Ernst Klein and Wilhelm Krepela. Fischer, Stuttgart, 1967 (distributed in the United States by Abel, Portland, Ore.). vi + 230 pp., illus. \$21.65. Quellen und Forschungen zur Agrargeschichte, vol. 16.

Humphry Davy. Harold Hartley. Nelson, London, 1966. viii + 160 pp., illus. 35s. British Men of Science.

The Hyoid and Its Associated Muscles in Snakes. David A. Langebartel. University of Illinois Press, Urbana, 1968. viii + 156 pp., illus. Paper, \$4.95. Illinois Biological Monographs, No. 38.

Induced Mutations and Their Utilization. Erwin-Baur-Gedächtnisvorlesungen 4, 1966. Veranstaltet vom Institut für Kulturpflanzenforschung Gatersleben, June 1966. H. Stubbe, Ed. Akademie-Verlag, Berlin, 1967. viii + 468 pp., illus. Paper, 59 DM. Abhandlungen der Deutschen Akademie der Wissenschaften.

Information Retrieval. The User's Viewpoint, an Aid to Design. 4th Annual National Colloquium on Information Retrieval, Philadelphia, May 1967. Albert B. Tonik, Ed. International Information Inc., Philadelphia, 1967. xii + 225 pp., illus. \$12.

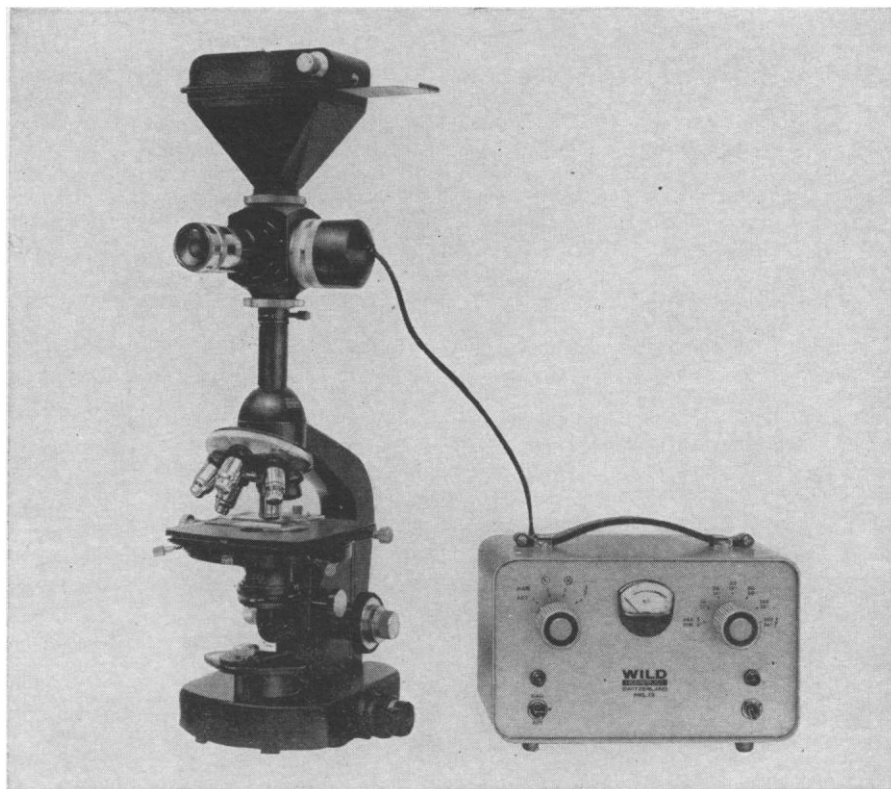
Innovation Diffusion as a Spatial Process. Torsten Hägerstrand. Translated from the Swedish edition (Lund, 1953) by Allan Pred, with the assistance of Greta Haag. University of Chicago Press, Chicago, 1967. xvi + 334 pp., illus. \$16.

The Innovators. The Economics of Technology. Michael Shanks. Penguin Books, Baltimore, 1967. 294 pp., illus. Paper, \$1.45.

Integration. Adriaan Cornelis Zaanen. North-Holland, Amsterdam; Interscience (Wiley), New York, 1967. xiv + 604 pp. \$16.75. Revised edition of *An Introduction to the Theory of Integration*.

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The Interactions of Hadrons. Hartmut Pilkuhn. North-Holland, Amsterdam; Interscience (Wiley), New York, 1967. xii + 375 pp., illus. \$16.

International Dictionary of Geophysics. Seismology, Geomagnetism, Aeronomy, Oceanography, Geodesy, Gravity, Marine Geophysics, Meteorology, the Earth as a Planet and Its Evolution. S. K. Runcorn *et al.*, Eds. Pergamon, New York, 1967. Two volumes (xxiv + 1728 pp., illus.; book of maps). \$120.

Introduction à la Théorie Générale du Transfert des Particules. V. Kourganoff. Gordon and Breach, New York; Dunod, Paris, 1967. xvi + 200 pp., illus. Cloth, \$10; paper, \$6. Cours et Documents de Mathématiques et de Physique.

An Introduction to Analytic Geometry and Calculus. A. C. Burdette. Academic Press, New York, 1968. xii + 412 pp., illus. \$8.95.

Introduction to Technological Economics. Duncan Davies and Callum McCarthy. Wiley, New York, 1967. xviii + 194 pp., illus. \$5.

Ions for Breathing. Control of the Air-Electrical Climate for Health. Chr. Bach. Translated from the Danish edition (Copenhagen, 1963) and edited by the Pilcox Consultant Service. Pergamon, New York, 1967. xii + 104 pp., illus. \$4.50.

Kleine Kryptogamenflora. Helmut Gams, Ed. Vol. 3, Flechten (Lichenes). Helmut

Gams. Fischer, Stuttgart, 1967 (distributed in the United States by Abel, Portland, Ore.). viii + 244 pp., illus. \$7.

The Komarov Botanical Institute. 250 Years of Russian Research. Stanwyn G. Shetler. Smithsonian Institution Press, Washington, D.C., 1967 (distributed by Random House, New York). xiv + 240 pp., illus. \$5.95.

Landschaftspflege und Naturschutz. Eine Einführung in ihre Grundlagen und Aufgaben. Ludwig Bauer and Hugo Weinitschke. Fischer, Jena, ed. 2, 1967 (distributed in the United States by Abel, Portland, Ore.). 302 pp., illus. \$5.90.

Learning, Language, and Cognition. Theory, Research, and Method for the Study of Human Behavior and Its Development. Arthur W. Staats. Holt, Rinehart and Winston, New York, 1968. xx + 614 pp., illus. \$9.50.

Lectures on Advanced Numerical Analysis. Fritz John. Gordon and Breach, New York, 1967. xiv + 179 pp. Cloth, \$9.50; paper, \$6.25. Notes on Mathematics and Its Applications.

Lehrbuc der Theoretischen Physik. L. D. Landau and E. M. Lifschitz. Vol. 8, Elektrodynamik der Kontinua. Translated from the Russian edition (Moscow, 1956) by G. Heber. Akademie-Verlag, Berlin, 1967. xii + 480 pp., illus. 32 DM.

Lehrbuc und Atlas der Anatomie des Menschen. Vol. 1, Bewegungsapparat, Knochen — Gelenke — Muskeln. Wolfgang Bargmann, Helmut Leonhardt, and Gian Töndury. Thieme, Stuttgart, 1968 (distributed in the United States by Interconti-

nental Medical Book Corp., New York). xii + 569 pp., illus. \$14.93.

Life Sciences Research and Lunar Medicine. Proceedings of the 2nd Lunar International Laboratory symposium, Madrid, October 1966. Frank J. Malina, Ed. Pergamon, New York, 1967. viii + 121 pp., illus. \$10.

Macromolecular Metabolism. Proceedings of a symposium, July 1966, sponsored by the New York Heart Association. Little, Brown, Boston, 1966. xii + 366 pp., illus. \$6.

Many-Electron Systems: Properties and Interactions. Serafin Fraga and Gulzari Malli. Saunders, Philadelphia, 1968. xvi + 196 pp. \$7.50. Studies in Physics and Chemistry, No. 7.

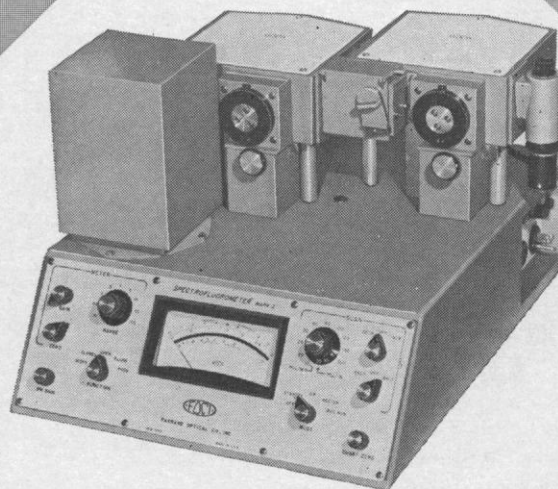
Mathematical Handbook for Scientists and Engineers. Definitions, Theorems, and Formulas for Reference and Review. Granino A. Korn and Theresa M. Korn. McGraw-Hill, New York, ed. 2, 1968. xx + 1130 pp., illus. \$25.

Mathematics for Technical and Vocational Schools. Samuel Slade, Louis Margolis, and John G. Boyce. Wiley, New York, ed. 5, 1968. xii + 515 pp., illus. \$5.96.

Medical Reference Works, 1679-1966. A Selected Bibliography. John B. Blake and Charles Roos, Eds. Medical Library Association, Chicago, 1967. viii + 343 pp. \$10.

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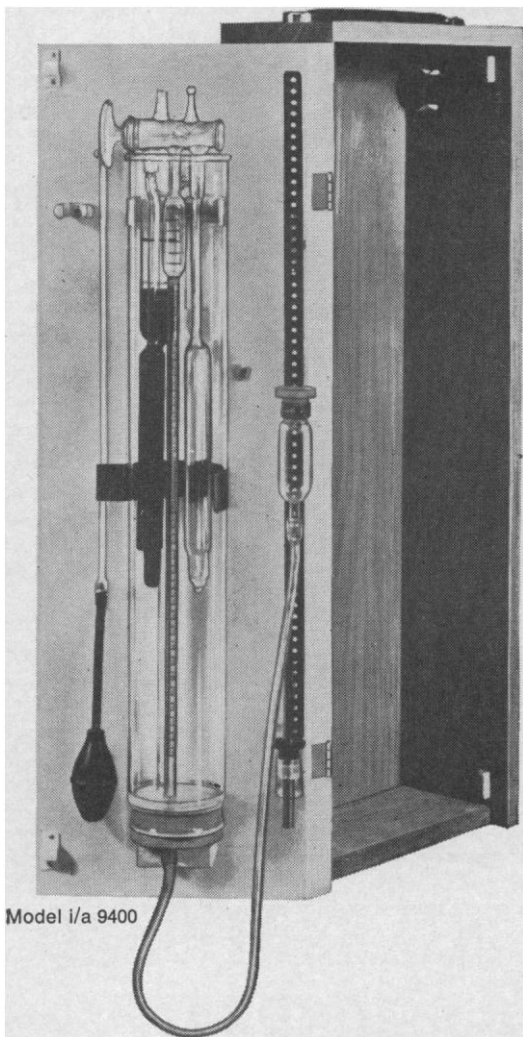
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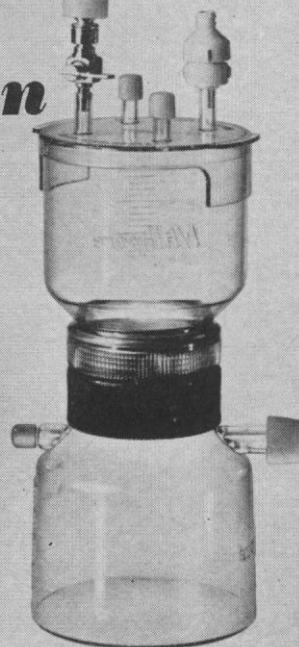
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cations, Oxford, 1967 (distributed in the United States by Davis, Philadelphia). x + 62 pp., illus. Paper, \$1.25. IBP Handbook, No. 2.

Methods in Developmental Biology. Fred H. Wilt and Norman K. Wessells, Eds. Crowell, New York, 1967. xvi + 813 pp., illus. \$18.

Microbial Protoplasts, Spheroplasts and L-Forms. Proceedings of a conference, Kalamazoo, Mich., November 1966. Lucien B. Guze, Ed. Williams and Wilkins, Baltimore, 1968. xxii + 523 pp., illus. \$24.50.

A Monograph on the Polychaeta of Southern Africa. J. H. Day. Part 1, Errantia; part 2, Sedentaria. Trustees of the British Museum (Natural History), London, 1967. xxvi + 878 pp., illus. £15. British Museum (Natural History) Publication No. 656.

Myocardial Infarction. Proceedings of the 9th conference of the International Society of Geographical Pathology, Leiden, September 1966. J. R. Rüttner. Karger, Basel, 1967 (distributed in the United States by Phiebig, White Plains, N.Y.). 321 pp., illus. Paper, \$19.

Nature in Miniature. Richard Headstrom. Illustrated by the author. Knopf, New York, 1968. xviii + 425 pp. \$10.

The Nature of Human Intelligence. J. P. Guilford. McGraw-Hill, New York, 1967. xiv + 538 pp., illus. \$14.75.

The Nature of Physics. A Physicist's Views on the History and Philosophy of His Science. Robert Bruce Lindsay. Brown University Press, Providence, R.I., 1968. viii + 212 pp. \$7.50.

North America. Its Countries and Regions. J. Wreford Watson. Praeger, New York, ed. 2, 1967. xxii + 881 pp., illus. \$12. Praeger Advanced Geographies.

On Course to the Stars. The Roger B. Chaffee Story. As told to C. Donald Chrysler by Don L. Chaffee and family. Kregel Publications, Grand Rapids, Mich., 1968. 155 pp., illus. \$3.95.

On the Origin of Species or, the Causes of the Phenomena of Organic Nature. Thomas H. Huxley. University of Michigan Press, Ann Arbor, 1968. xii + 144 pp. Paper, \$1.75; library ed., \$4.40. Reprint, with an introduction by Ashley Montagu.

Où Vont les Mathématiques? Réflexions sur l'Enseignement et la Recherche. Jean Kuntzmann. Illustrated by Avoine. Hermann, Paris, 1967. 168 pp. Paper, 15 F.

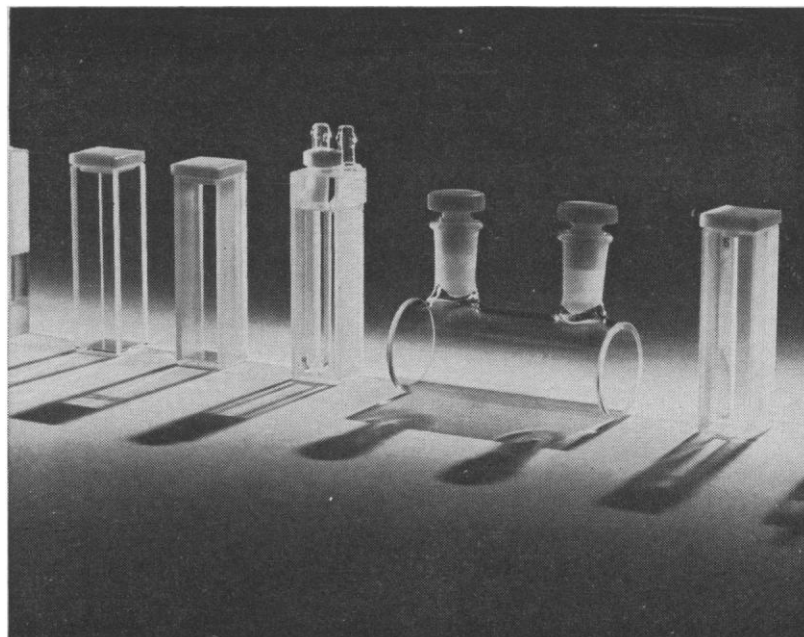
Oxidation and Combustion Reviews. Vol. 2. C. F. H. Tipper, Ed. Elsevier, New York, 1967. viii + 301 pp., illus. \$21.

Petrogenesis of Metamorphic Rocks. H. G. F. Winkler. Translated from the German by N. D. Chatterjee and E. Froese. Springer-Verlag, New York, ed. 2, 1967. x + 237 pp., illus. Paper, \$5.80.

The Physics of Engineering Solids. T. S. Hutchison and D. C. Baird. Wiley, New York, ed. 2, 1968. xx + 534 pp., illus. \$12.95.

Physics of Geomagnetic Phenomena. Vol. 2. S. Matsushita and Wallace H. Campbell, Eds. Academic Press, New York, 1967. xviii + 773 pp., illus. \$29. International Geophysics Series.

Physikalische Grundlagen der Medizin Abhandlungen aus der Biophysik, part 7. Proceedings of a symposium, Leipzig, October 1965. Walter Beier, Ed. Theime,



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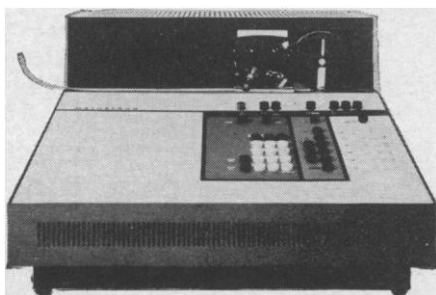
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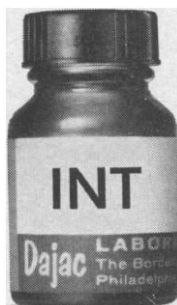
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Leipzig, 1967. 205 pp., illus. Paper, 44.75 MDN.

Physiological Plant Pathology. R. K. S. Wood. Blackwell Scientific Publications, Oxford, 1967 (distributed in the United States by Davis, Philadelphia). xiv + 570 pp., illus. \$11.50. Botanical Monographs, vol. 6.

Pigeons and Doves of the World. Derek Goodwin. Illustrated by Robert Gillmor. Trustees of the British Museum (Natural History), London, 1967. vi + 446 pp. £6 6s. British Museum (Natural History) Publication No. 663.

Practical Clinical Biochemistry. Harold Varley. Heinemann, London; Interscience (Wiley), New York, ed. 4, 1967. x + 802 pp., illus. \$11.50.

Prelude to Riot. A View of Urban America from the Bottom. Paul Jacobs. Sponsored by the Center for the Study of Democratic Institutions. Random House, New York, 1967. xii + 298 pp. \$5.95.

Pressure Measurement in Vacuum Systems. J. H. Leck. Chapman and Hall and Science Paperbacks, London, 1967 (distributed in the United States by Barnes and Noble, New York). xii + 221 pp., illus. Paper, \$4.25. Reprint of the 1964 edition.

Principles of Insect Chemosterilization. Germain C. Labrecque and Carroll N. Smith, Eds. Appleton-Century-Crofts, New York, 1968. xii + 354 pp., illus. \$16.

Probability. James R. Gray. Oliver and Boyd, Edinburgh; Interscience (Wiley), New York, 1967. viii + 267 pp., illus. \$3.95. University Mathematical Texts, No. 36.

Proceedings of the 1967 International Conference on Particles and Fields. Rochester, N.Y., August–September 1967. C. R. Hagen, G. Guralnik, and V. S. Mathur, Eds. Interscience (Wiley), New York, 1967. x + 708 pp., illus. \$10.

Proceedings of the Seventh International Congress of Nutrition. Hamburg, 1966. J. Kühnau, Ed. Vol. 1, Nutrition and Health (xvi + 372 pp., illus.); vol. 2, Regulation of Hunger and Satiety (viii + 272 pp., illus.); vol. 3, Nutrition under Various Geographic and Climatic Conditions (viii + 371 pp., illus.); vol. 4, Problems of World Nutrition (xvi + 1091 pp., illus.); vol. 5, Physiology and Biochemistry of Food Components (xx + 880 pp., illus.). \$100. Vieweg, Braunschweig; Pergamon, New York, 1967.

Processes of Coastal Development. V. P. Zenkovich. J. A. Steers and Cuchlaire A. M. King, Eds. Translated from the Russian edition (Moscow, 1962) by D. G. Fry. Interscience (Wiley), New York, 1967. xvi + 738 pp., illus. \$37.50.

Progress in Nuclear Magnetic Resonance Spectroscopy. Vol. 3. J. W. Emsley, J. Feeney, and L. H. Sutcliffe, Eds. Pergamon, New York, 1967. vi + 421 pp., illus. \$18.

Progress in Primatology. First Congress of the International Primatological Society, Frankfurt, July 1966. D. Starck, R. Schneider, and H.-J. Kuhn, Eds. Fischer, Stuttgart, 1967 (distributed in the United States by Abel, Portland, Ore.). viii + 446 pp., illus. \$21.40.

³¹P Nuclear Magnetic Resonance. Marvin M. Crutchfield, Claude H. Dungan, John H. Letcher, Victor Mark, and John

R. Van Wazer. Interscience (Wiley), New York, 1967. x + 492 pp., illus. \$23.50. Topics in Phosphorus Chemistry, vol. 5.

Quantum Mechanics. R. A. Newing and J. Cunningham. Oliver and Boyd, Edinburgh; Interscience (Wiley), New York, 1967. x + 225 pp., illus. \$4.50. University Mathematical Texts, No. 35.

Les Quasars. Radiosources Quasi Stellaires. Philippe Veron. Presses Universitaires de France, Paris, 1967. 136 pp., illus. "Que sais-je," No. 1267.

Race Relations. Michael Banton. Basic Books, New York, 1968. xiv + 434 pp., illus. \$7.95.

Report on the UFO Wave of 1947. Ted Bloecher. The author, Washington, D.C., 1967 (available from Ted Bloecher, 1536 Connecticut Ave., NW, Washington, D.C.). xiv + 176 pp., illus. Paper, \$5.

Research in the Service of Man. Biomedical Knowledge, Development and Use. A conference sponsored by the Subcommittee on Government Research and the Frontiers of Science Foundation of Oklahoma for the Committee on Government Operations (U.S. Senate), Oklahoma City, October 1966. U.S. Government Printing Office, Washington, D.C., 1967. x + 246 pp., illus.

Tribesmen. Marshall D. Sahlins. Prentice-Hall, Englewood Cliffs, N.J., 1968. x + 118 pp., illus. Cloth, \$4.50; paper, \$1.75. Foundations of Modern Anthropology series.

The Tutorial and Clinical Program of Teacher Education. A Study of Teacher Education in cooperation with the Carnegie Corporation of New York. William R. Hazard. Northwestern University Press, Evanston, Ill., 1967. xiv + 71 pp. Paper, \$1.20.

UFOs—Identified. Philip J. Klass. Random House, New York, 1968. viii + 290 pp., illus. \$6.95.

Ultrasonic Techniques in Biology and Medicine. D. Brown and D. Gordon, Eds. Thomas, Springfield, Ill., 1967. viii + 264 pp., illus. \$14.75.

Urea as a Protein Supplement. Michael H. Briggs, Ed. Pergamon, New York, 1967. xii + 466 pp., illus. \$18.

UV Atlas of Organic Compounds. Vol. 3. Published in collaboration with the Photoelectric Spectrometry Group, London, and the Institut für Spektrochemie und Angewandte Spektroskopie, Dortmund. Plenum, New York, 1967. Unpagged. In ring binder, \$27.50.

Variable Complexe. Jean Kuntzmann. Hermann, Paris, 1967. 169 pp., illus. Paper, 18 F. Collection Méthodes, Série Outils Mathématiques de la Physique et de la Chimie.

L. von Bertalanffys organismische Auffassung des Lebens in ihren philosophischen Konsequenzen. Arno Bendmann. Fischer, Jena, 1967. 94 pp., illus. Paper, 10.80 MDN.

The Weapons Culture. Ralph E. Lapp. Norton, New York, 1968. 230 pp. \$4.95.

S. S. Wilks: Collected Papers. Contributions to Mathematical Statistics. T. W. Anderson, Ed. Wiley, New York, 1967. xxxiv + 693 pp., illus. \$12.50.

Wirtschaftsphilosophie des 20. Jahrhunderts. Theo Surányi-Unger. Fischer, Stuttgart, 1967 (distributed in United States by Abel, Portland, Ore.). xiv + 312 pp. \$12.

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