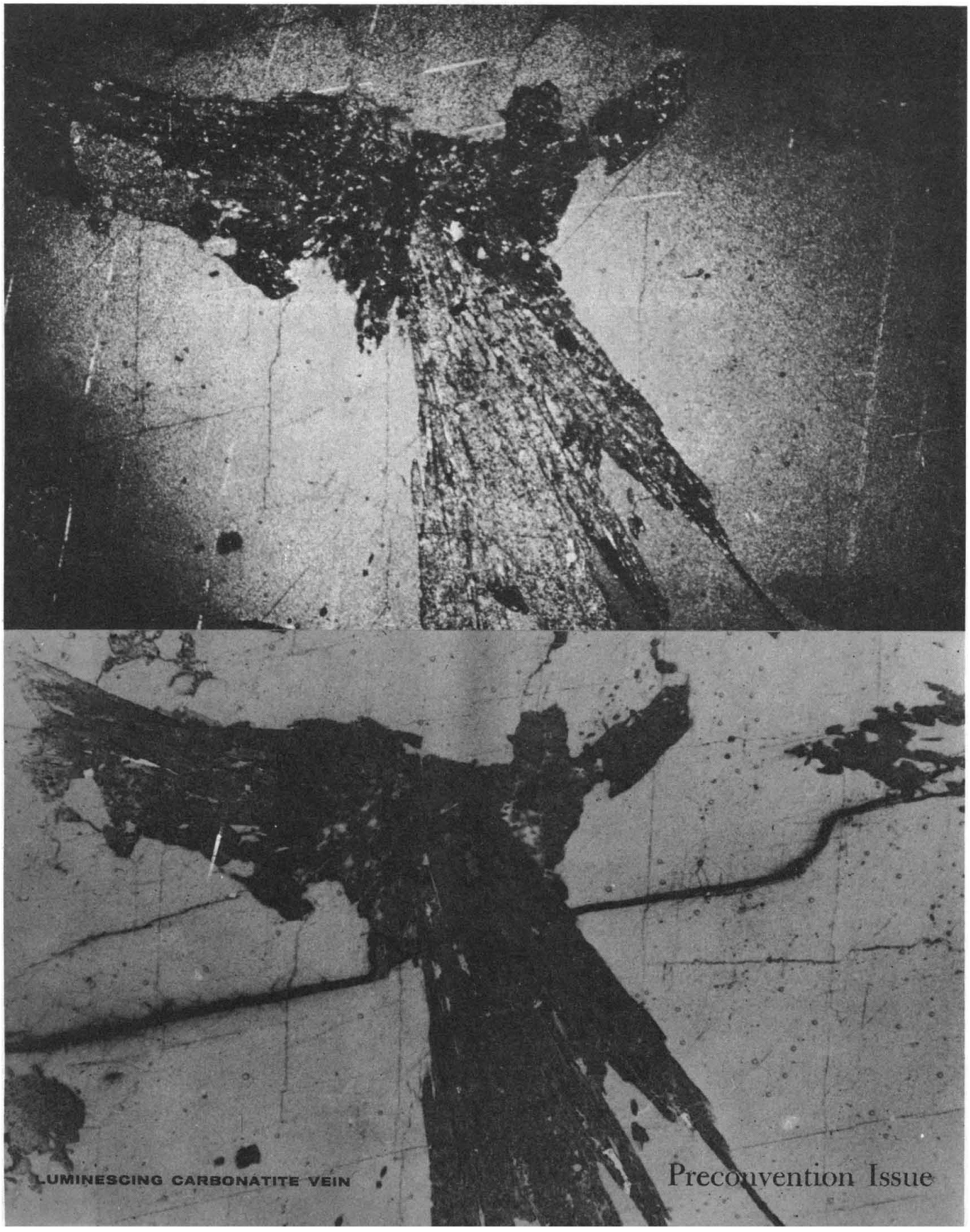
SCIENCE

3 December 1965
Vol. 150, No. 3701

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



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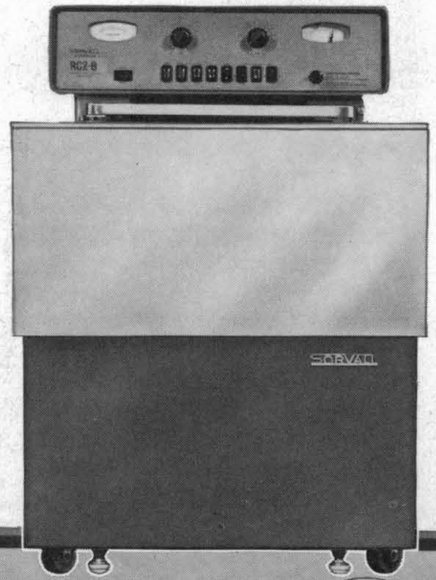

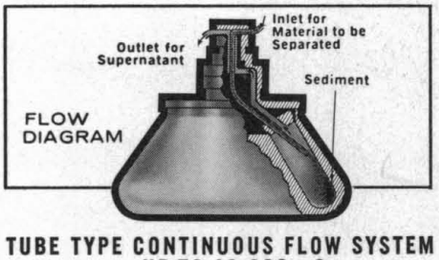

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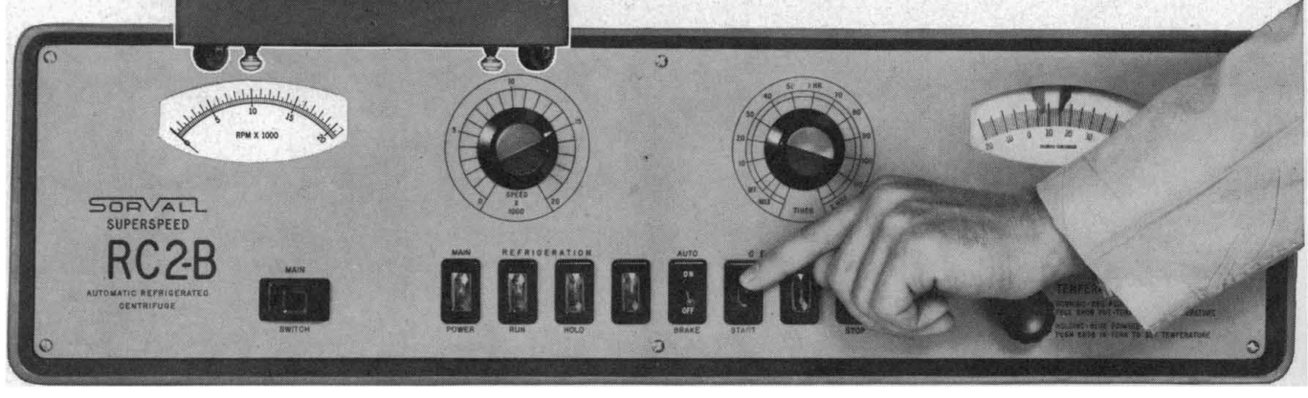

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COVER

Luminescence petrography reveals a vein structure in carbonatite which is not revealed by ordinary petrographic techniques. The vein luminesces brilliant orange, the bladed apatite crystals light violet, and the surrounding calcite dull orange. The upper photograph shows the same area of the thin section under tungsten illumination and between crossed Nicols (width of photograph about 1 centimeter). See page 1283. [R. F. Sippel and E. D. Glover, Socony Mobil Field Research Laboratory]

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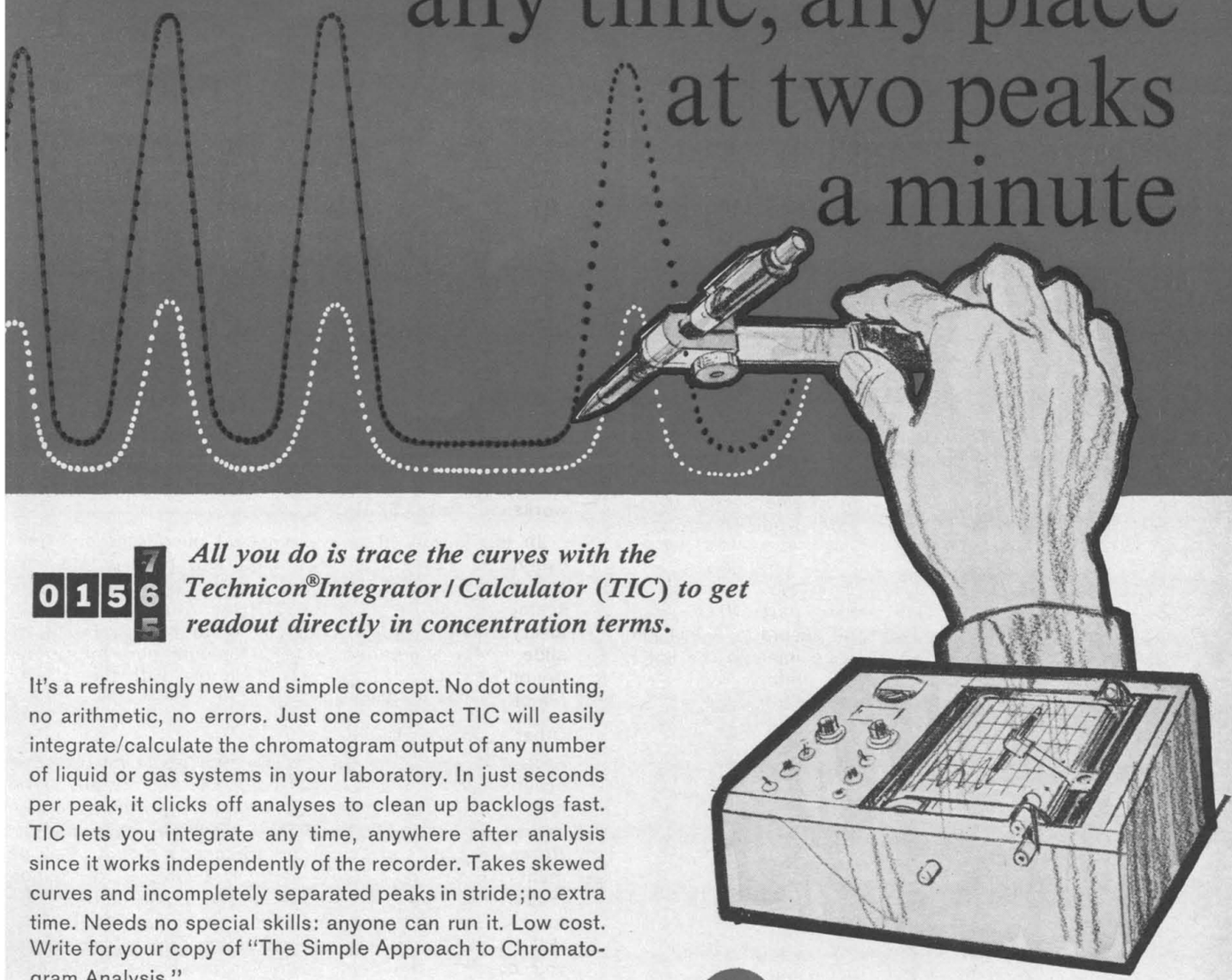

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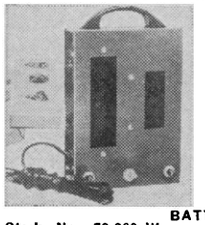

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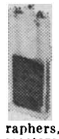

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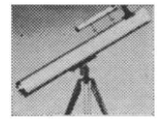

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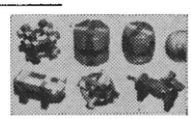

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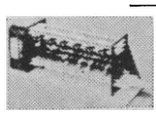

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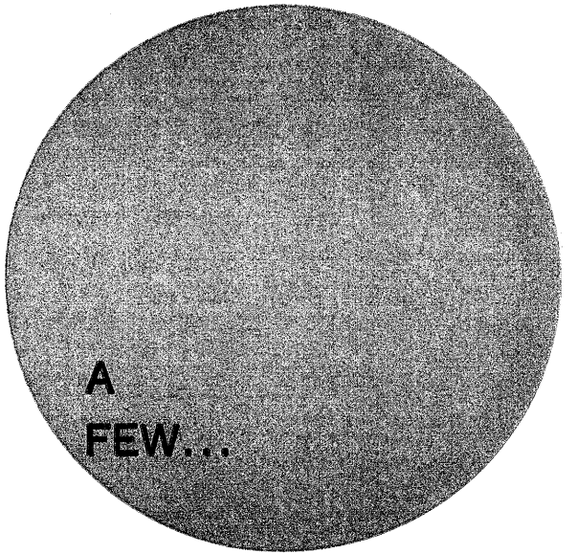

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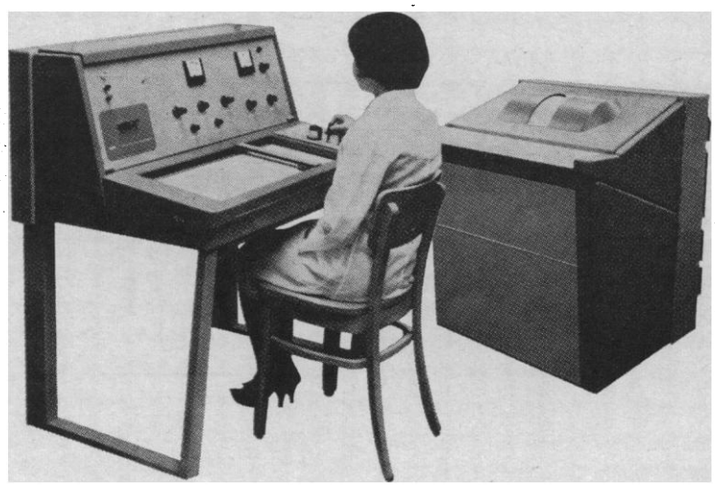

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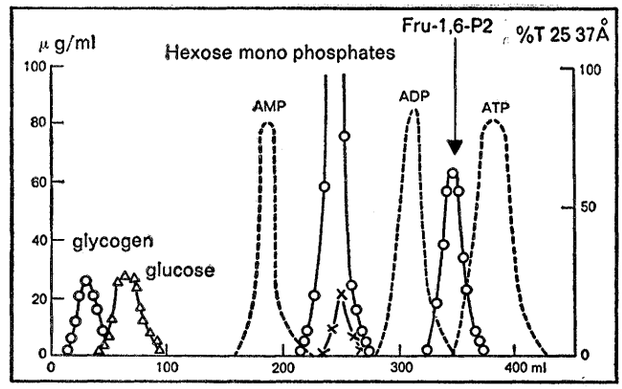

Model experiment with glycogen, glucose, sugar phosphates and adenosine phosphates on a column of DEAE-Sephadex A-25. Reproduced from Biochim. Biophys. Acta 74 (1963) 588, by permission of the author.

Type	Description	Ionic form	Capacity meq/g	Hemoglobin cap. g/g at pH	Particle size microns	Availability
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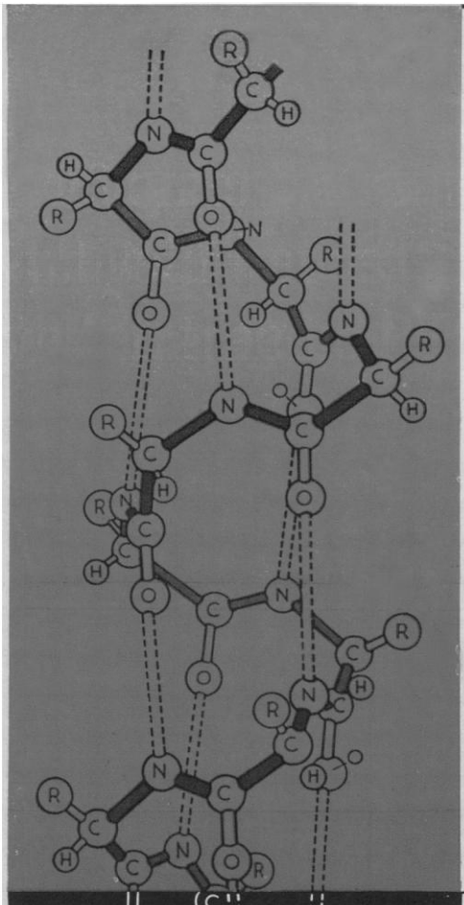

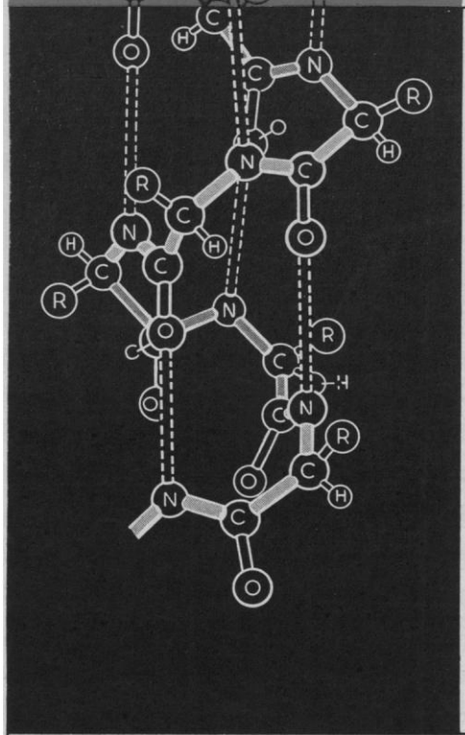

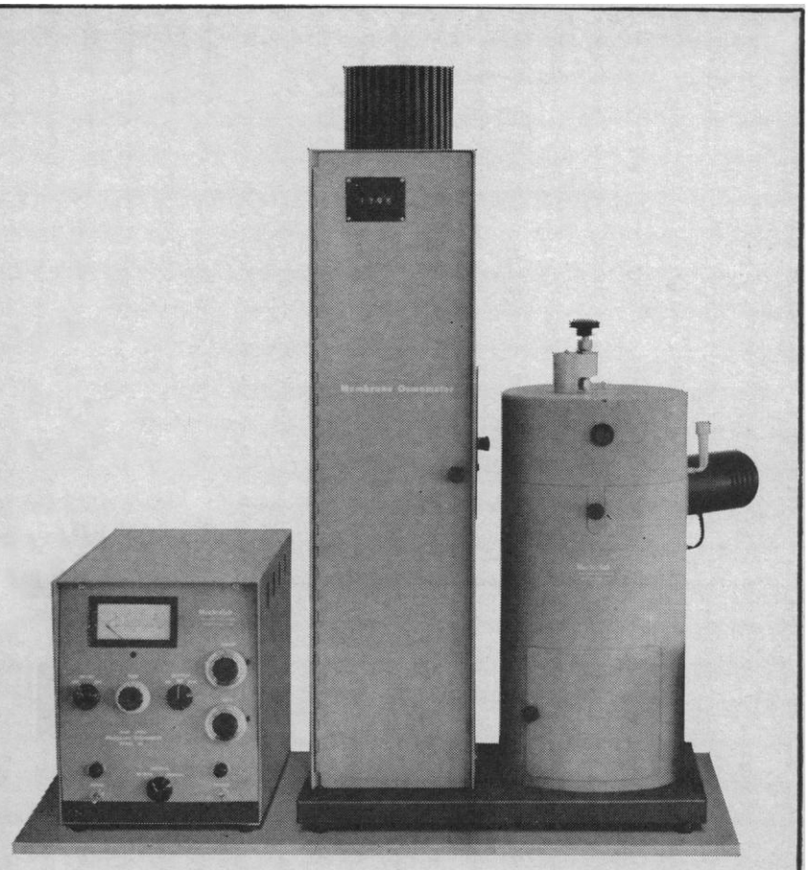

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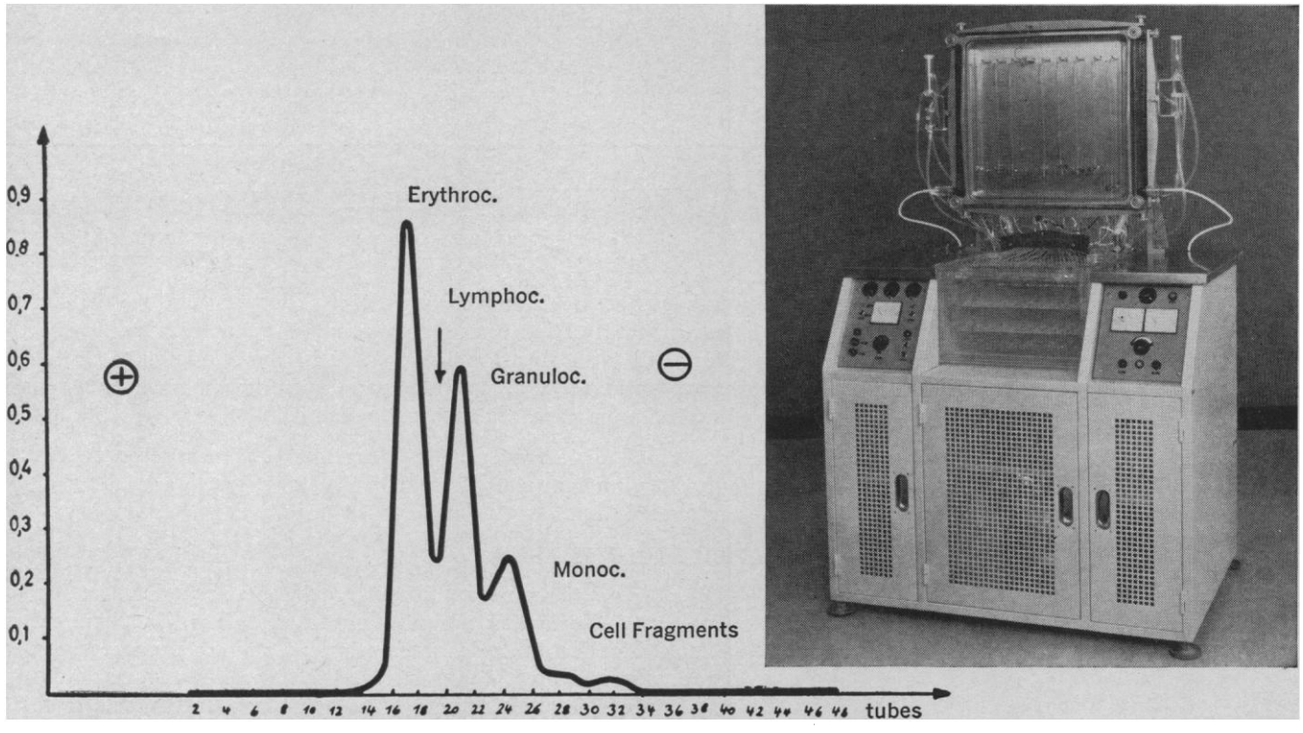

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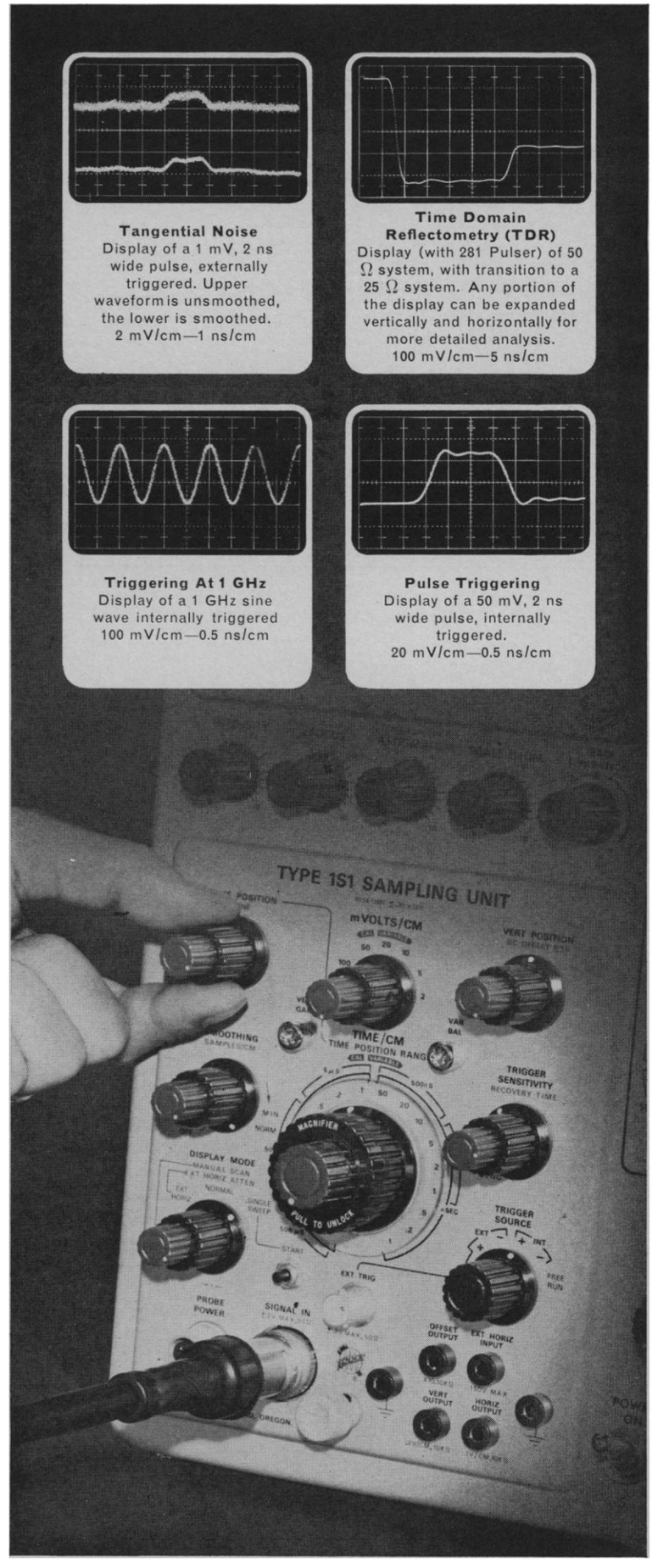

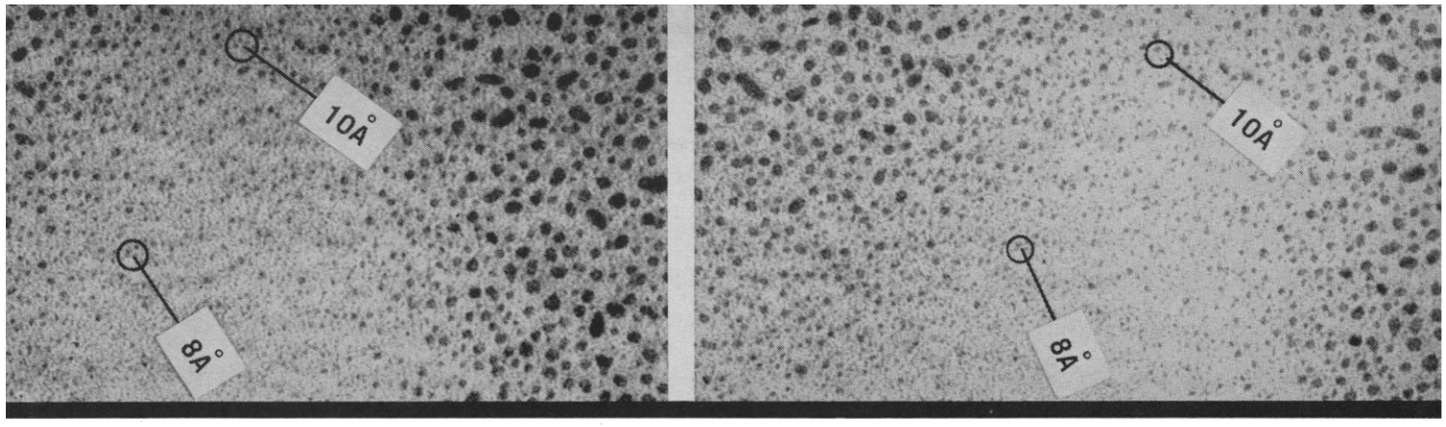

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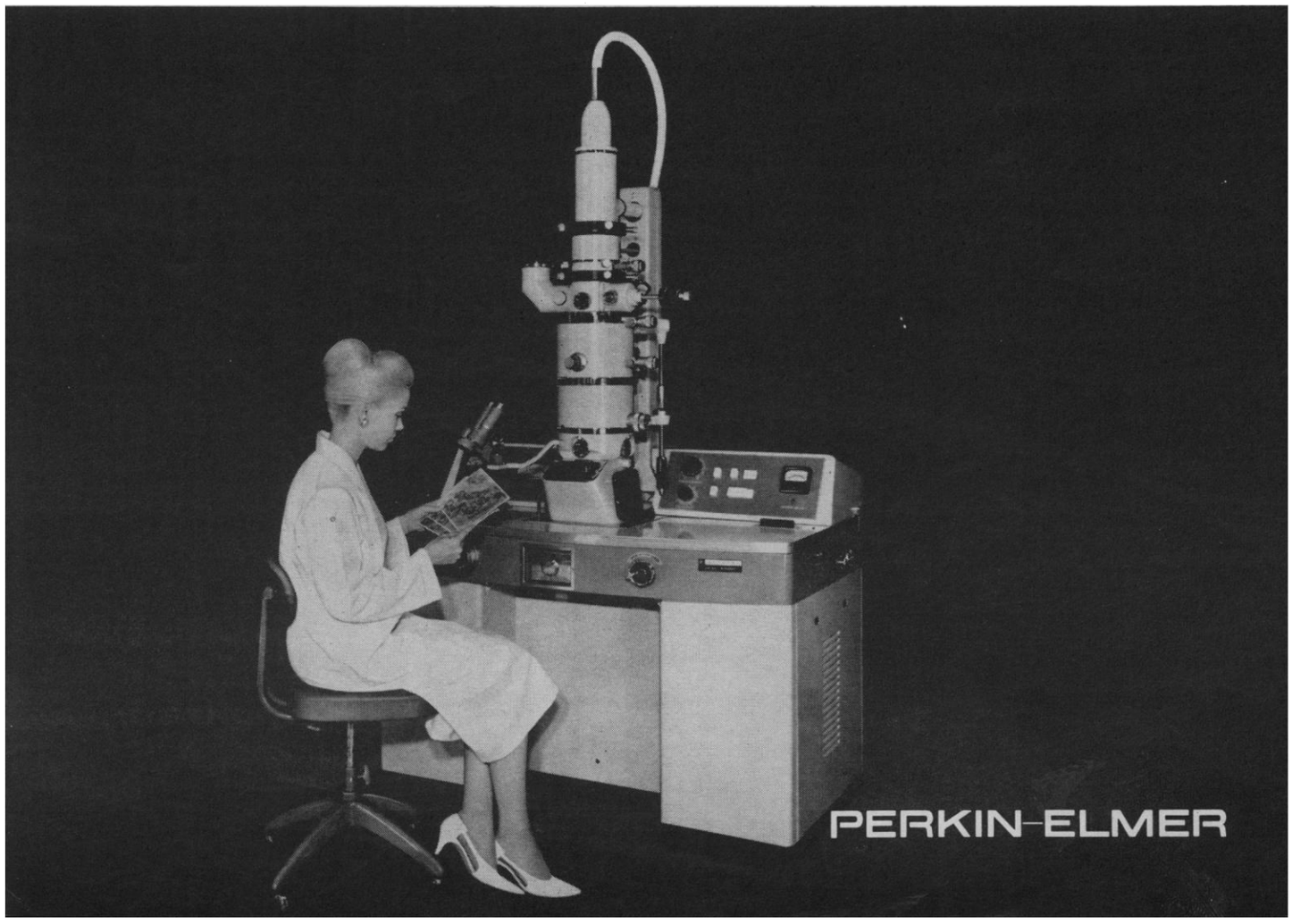

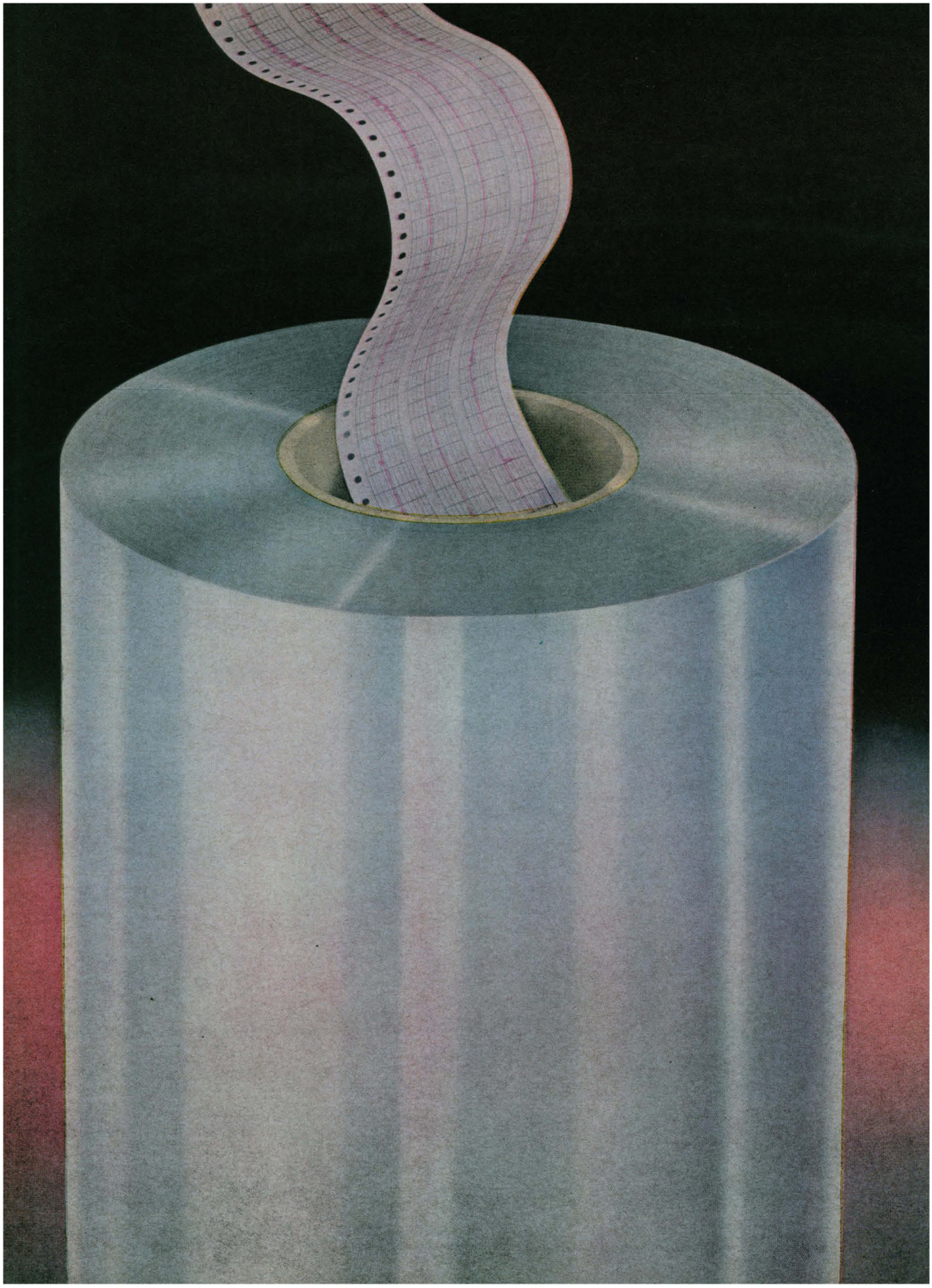

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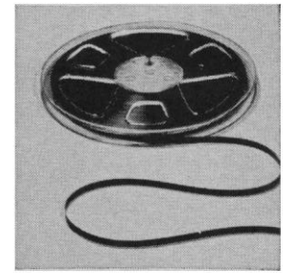

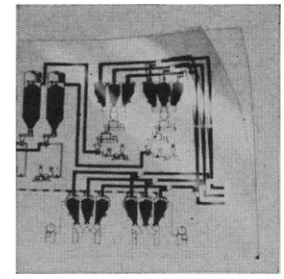

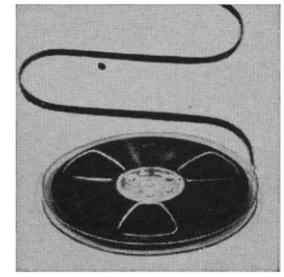

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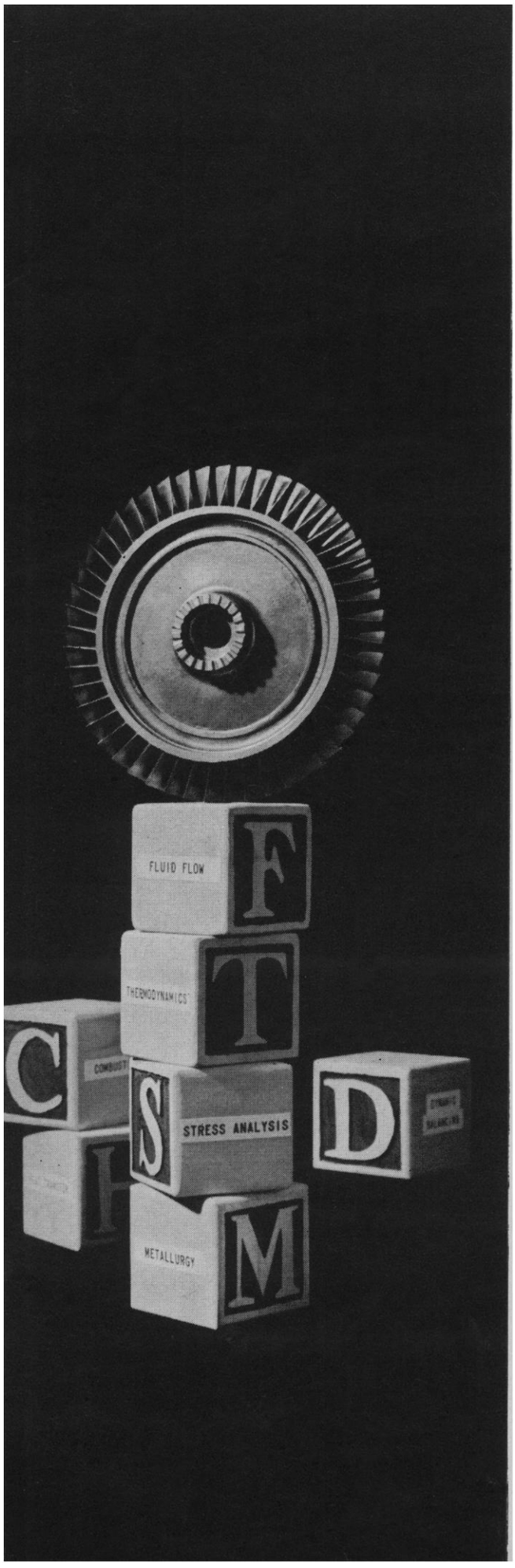

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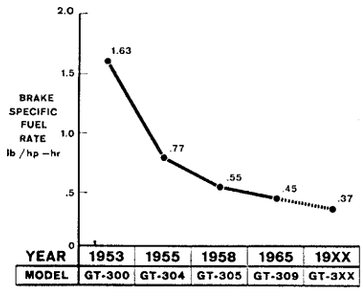

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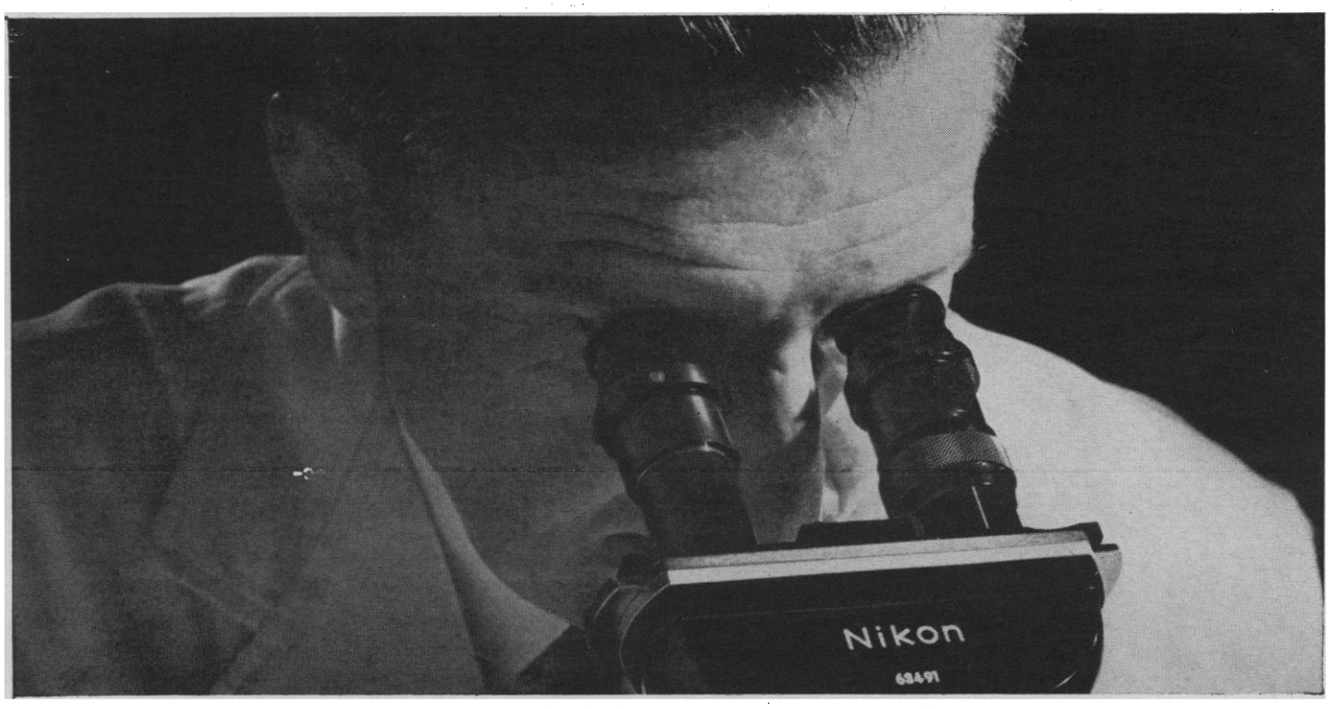

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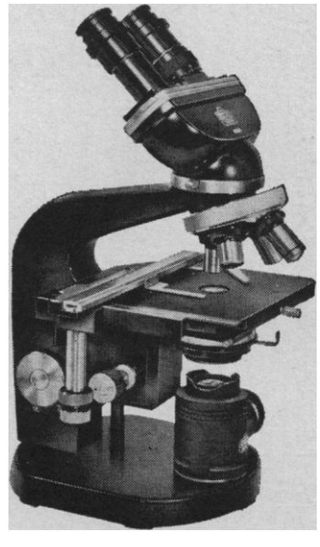

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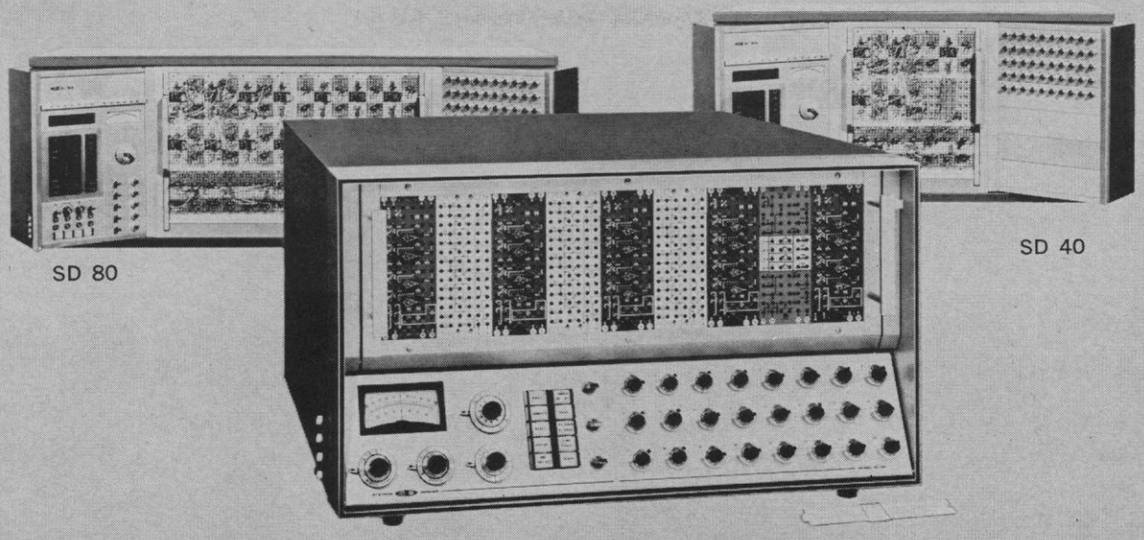

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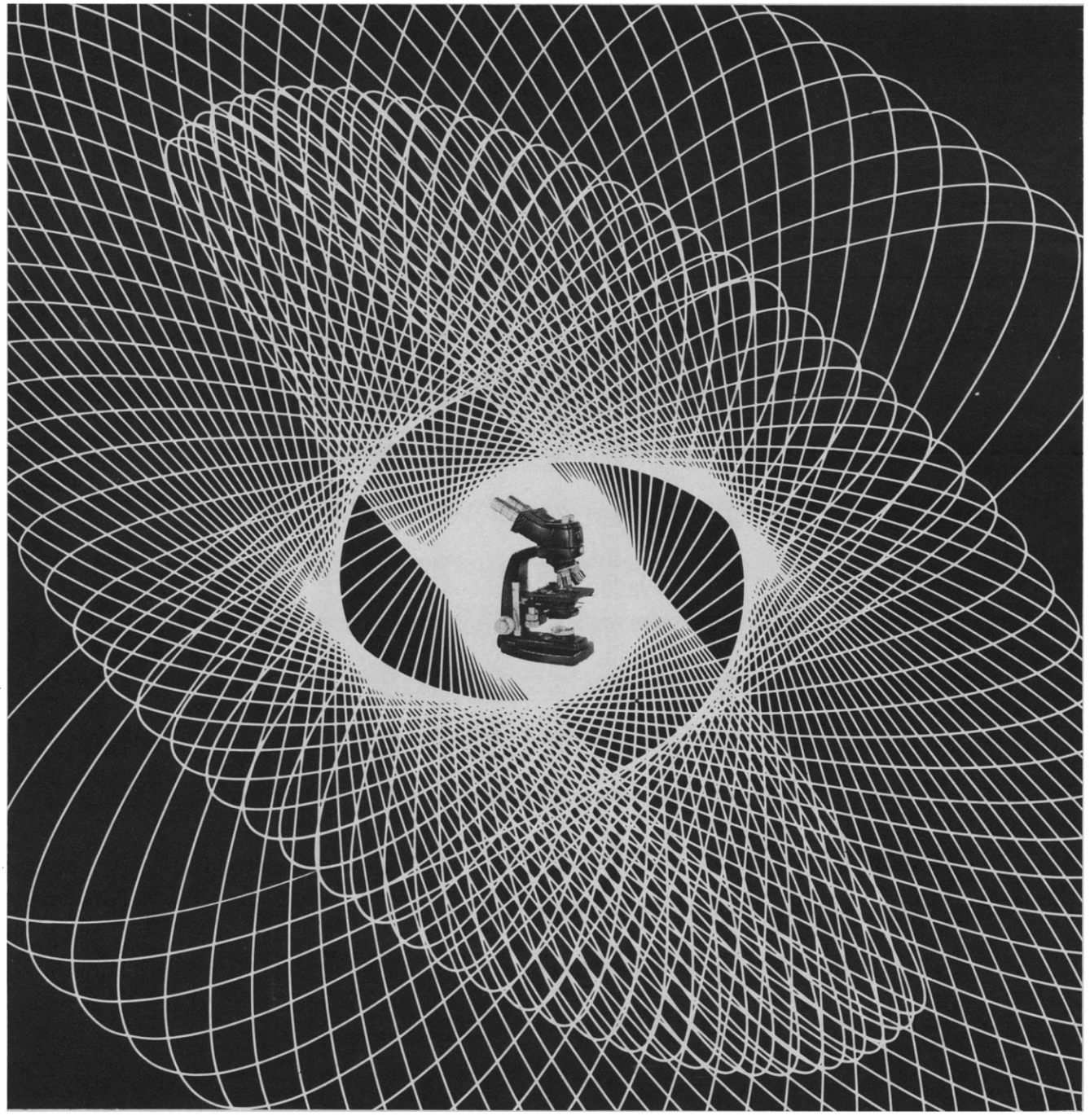

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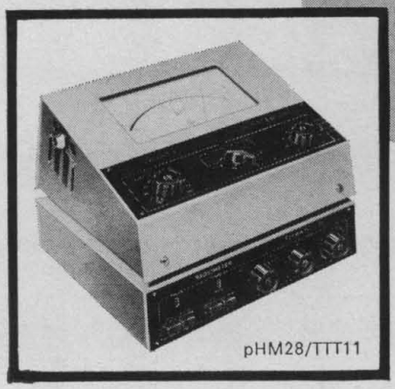

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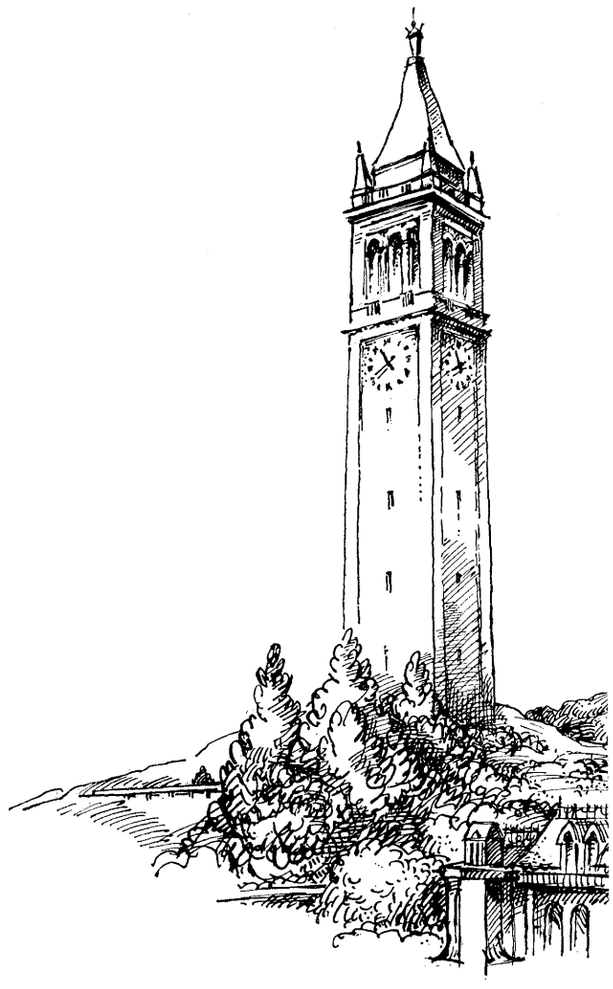

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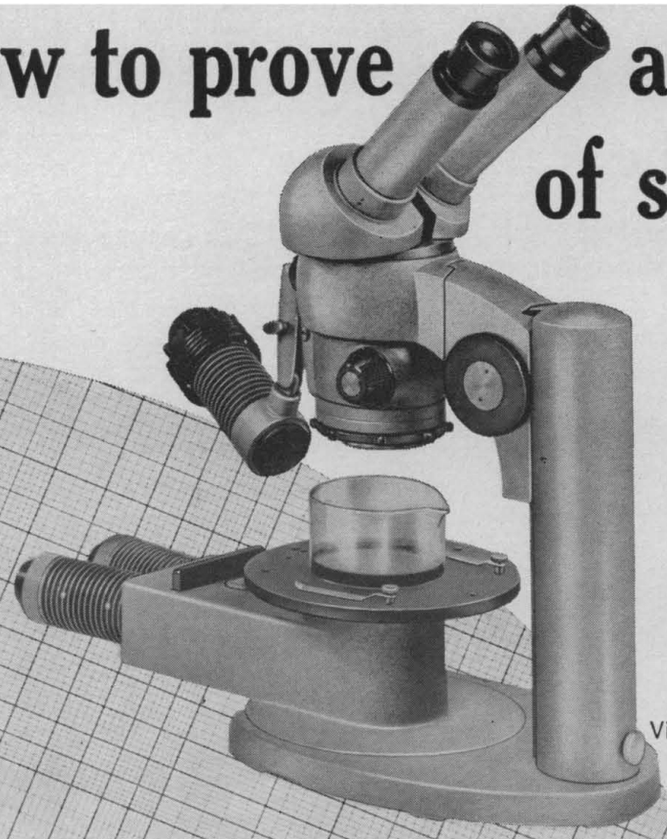

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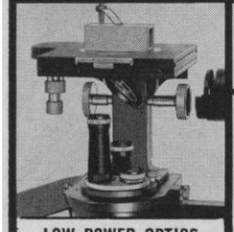

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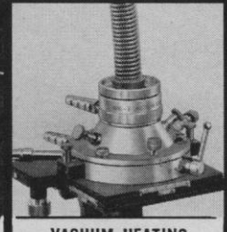

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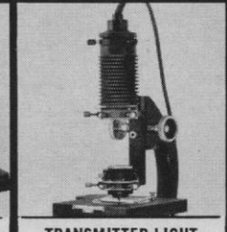

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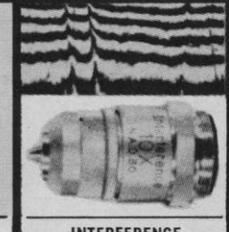

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they have indeed established that alpha rhythm can be made to appear in one twin as a result of evoking it in the other, this finding is surely the most profound scientific discovery of the present century. Such coupling from one brain to another over a distance of 6 meters would constitute as great a mystery for physics as for biology or psychology. The authors do not appear to appreciate the revolutionary implications of their results. Otherwise, they would certainly not have failed to present their data in such a way that the reader could evaluate them. The authors have not supplied the following necessary information:

1) How many non-twin pairs were studied?

2) How long a time sample was obtained from each pair of subjects?

3) How many elicitations of alpha were performed with each pair of subjects?

4) What proportion of those elicitations displayed the "induction" effect?

5) What proportion of the time did alpha spontaneously occur?

6) The authors report that the records were analyzed by gross inspection. Were those doing the inspection aware or unaware of whether or not the records were obtained from twins or nontwins? Were they aware of the points in the record at which one of the twins was instructed to close his eyes?

7) The authors say the tests were repeated on "several different occasions." How many replications is "several," and how many opportunities were provided for the effect to show itself or fail to appear?

In reading *Science* one comes to expect a standard of reporting far higher than this in matters of much less fundamental importance. It is paradoxical that this report should have been published completely unsupported by any of the usual experimental safeguards.

THOMAS R. SCOTT
Veterans Administration Hospital, Columbia, South Carolina

. . . A great variety of factors influence the appearance of the alpha rhythm, and there is a very real possibility of contamination by one or more of these. While alpha itself is not under voluntary control, some of these factors are, including the one—eye closure—that the authors used to induce it. And, as the parapsychologists Rhine and Pratt (*1*) put it, "If a test [of ESP] is to be at all crucial, there is no excuse for using conditions that leave the question of sensory cues as one to be answered by judgment or interpretation." The report is almost devoid of the procedural detail that is essential to an adequate judgment of whether or not such sensory cues were, in fact, excluded. For instance, the first twin supposedly was instructed from time to time to close his eyes. What instructions were issued to the other twin, beyond being asked to sit quietly and keep his eyes open? Was he given any kind of warning signal that a trial was about to start? Where was the recording apparatus? Any auditory signal or any distraction from the visual "task" of keeping the eyes open can bring on alpha (*2*). On the other hand, was the second twin allowed to sit for a long time without any further instruction? If he did so without any "anxiety or apprehension," as the authors believe, then the danger arises of boredom developing; and boredom is known to bring on alpha (*2*). Were eye closures of both twins monitored? Since eye closure induces alpha, it is essential that we know whether the second twin's eyes were, in fact, open at the time the first twin was closing his; the records reproduced in the article show only the eye-closure record for one subject, the sender. It would also be helpful to know whether the two successful pairs, who "happened to possess a prior knowledge of biological sciences and were relatively unconcerned about the tests," were among the subjects whom the authors say they knew. Just how much did the successful subjects know about the purposes of the experiment?

The report also suffers grievously from a lack of firm data. . . . Two electroencephalographic records are offered as proof of the principal conclusions of the paper. One shows simultaneous alpha rhythm in both twins when only one was supposed to have his eyes closed. Since no sample of the prestimulation EEG is given, we are at a loss to interpret the poststimulation records. The fact that the presumed monozygotic twins gave highly similar records is, in itself, not remarkable, since it has been known for a long time that the EEG records of identical twins are indistinguishable from each other (*3*). The proper control for the phenomenon the authors wish their figure to show would be the demonstration of a lack of alpha in the second twin when the first twin

has not closed his eyes. Instead, we are given an irrelevant (in this context) record showing that the first twin's eye closure did not influence alpha in an unrelated subject. . . .

VICTOR G. LATIES
BERNARD WEISS
University of Rochester School of Medicine and Dentistry, Rochester 20, New York

References

1. J. B. Rhine and J. G. Pratt, *Parapsychology: Frontier Science of the Mind* (Thomas, Springfield, Ill., 1957), p. 32.
2. I. Oswald, *Sleeping and Waking* (Elsevier, Amsterdam, 1962), pp. 72–73.
3. H. Davis and P. A. Davis, *Arch. Neurol. Psychiat.* **36**, 1214 (1936).

The report of Duane and Behrendt . . . has so heated the mail to my usually quiet ivory tower that I now need insurance. One nonparascientist even asked: "Ought I not to resign from the AAAS?" Should the editors have accepted this paper? The pro answer is: Galileo. Science is hindered when the Establishment undertakes censureship. The contra answer is: Space is too precious nowadays to allow for the printing of raw data, and these data are raw, for they state merely an empirical relation, an empty correlation, that lies out of further relation to any understood body of scientific fact. Besides, there is a literature which these authors do not cite and seem not to know. It seems clear that Soal's marvelous Welsh schoolboys connived by what now seems clearly to have been trickery to fool many important investigators [S. G. Soal and H. T. Bowden, *The Mind Readers* (London, Faber and Faber, 1959)]. Those boys were in separate rooms. How well shielded were the twins of Duane and Behrendt from each other? Did the recipient twin have his eyes continuously open or continuously closed? Could he have known when the sending twin was asked to close his eyes? Identical twins are accustomed to cooperate, and these twins were the only ones who knew the biology of what was going on. Anyhow, the major difficulty is that these twins (two out of 15 pairs) presented the experimenters with a correlation that they could not explain. So it has always been. The parascientist (as does his complement) pits his ingenuity against the inscrutability of nature, and when the parascientist fails he has succeeded, for he has discovered the inexplicable!

EDWIN G. BORING
Harvard University, Cambridge, Massachusetts

Evolution in Tennessee

In his letter headed "After Scopes" (22 Oct., p. 435), Thomas A. Cowan remarks, "Apparently no one else in the State of Tennessee has cared since the trial to challenge the constitutionality of the [anti-evolution statute]." No one, to my knowledge, has brought the matter to the state Supreme Court, but there has been concern about the issue. Around 1960, Arlo I. Smith led a group of professors, business leaders, and clergymen in appealing to the Tennessee legislature to remove this unfortunate law from the statute books. The legislative committee concerned refused to act, and consequently the matter was never brought to the floor of the legislature. Yet those of us who are native Tennesseans may still hope that the Renaissance will some day reach Tennessee.

KENNETH R. BARKER
Department of Zoology, University of Texas, Austin 78712

Cowan's letter implies that the theory of evolution is not being taught in state-supported schools in Tennessee. This is not true. At the University of Tennessee this subject is included in general zoology and botany courses, and courses on evolution and speciation are being taught at the upper-division and graduate level; this has been true for many years. I have made no survey to determine the extent to which evolution is taught within the state, but I know that the subject is included in courses in other state-supported universities and colleges and many of the textbooks used in high school biology courses.

One reason the statute has not been repealed is that it has so commonly been disregarded.

JAMES T. TANNER
Department of Zoology and Entomology, University of Tennessee, Knoxville 37916

Help Sought with History

I am writing a history of the Huxley family, which is to be published in the United States and Britain next year, and would be grateful to hear from anyone who has recollections or reminiscences of interest.

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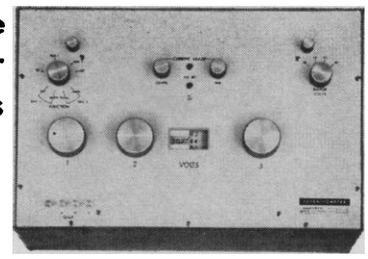

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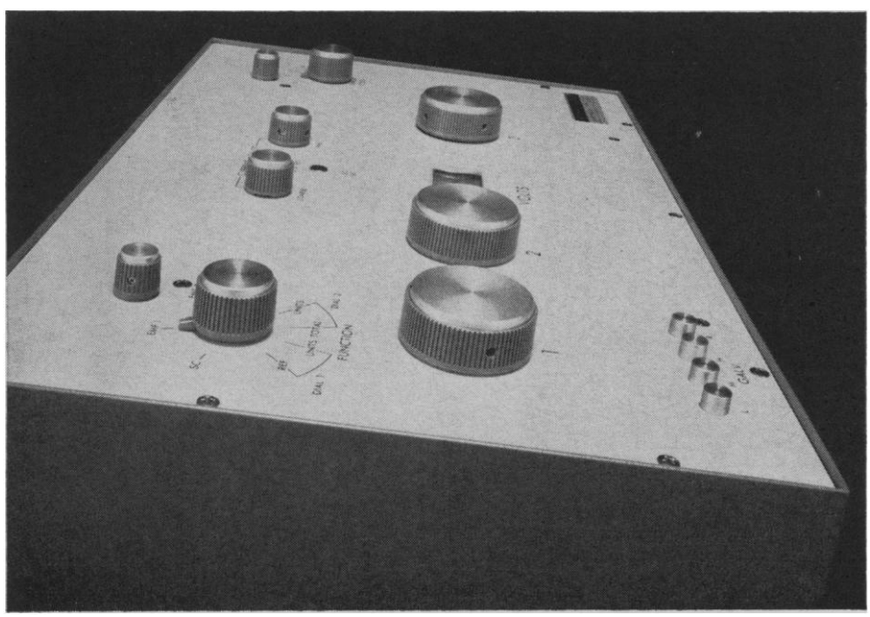

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Chemistry: Opportunities and Needs

The report of the Committee for the Survey of Chemistry* (*see* p. 1267, this issue) is a well-conceived, well-edited document that outlines opportunities for research in chemistry and discusses the central role of the science in many types of fundamental research and its relevance to industry, agriculture, medicine, and defense. The report emphasizes that chemistry is in the midst of a great renaissance triggered by development of new instrumentation.

Before 1945, laboratory techniques in organic chemistry were little different from those of 1895; today, electronic equipment of many kinds is an essential adjunct of the chemical laboratory. Modern methods have revolutionized the determination of molecular structure in both organic and inorganic chemistry. The new empirical knowledge, coupled with advances in theory, has permitted synthesis of a host of important substances, such as penicillin, reserpine, and sterols. Many interesting molecules that do not exist in nature have been synthesized, including types that were sought only after their stability had been predicted by theory.

The new instrumentation has been helpful in other areas, such as reaction kinetics. It has been possible to elucidate very fast reactions such as occur in flames. Experiments are being performed that take into account the structure, vibration, and rotation of individual molecules. Modern physical chemists have revitalized the molecular kinetic theory by interpreting experimentally observed reactions occurring in shock waves and in colliding beams and reactions involving excited molecules.

The impact of chemistry on other fields of science has also expanded. Advances in solid-state physics and in many phases of earth science are contingent on chemistry. Research in biology and medicine has become increasingly chemical in nature. A major hope for future medical advance lies in the chemistry laboratory.

The role of applied chemistry has increased. Sales of chemical products total $36 billion a year. In addition, the petroleum industry, which is in fact a great chemical industry, has sales of $42 billion. Nearly every article of commerce is coated, colored, cleaned, protected, stabilized, or otherwise modified by synthetic chemicals. Chemistry in some form enters into perhaps half of our gross national product.

The cornerstone of these tremendous contributions is fundamental research at the universities. These institutions train men needed by industry, but they do more. University laboratories are the source of a large part of the fundamental knowledge that is later exploited by industry. The committee's analysis of a group of papers, published since 1946, announcing about 40 inventions or practical discoveries shows that 60 percent of the literature citations in the announcements were to university-based research.

The renaissance in chemistry has required expanded use of instrumentation. Use of major instruments has increased sixfold during the past 12 years. Nevertheless, the inventory of major equipment in the 125 chemistry departments that grant the Ph.D. degrees totals only $55 million, and much more new equipment is required. However, as needs and opportunities in chemistry have expanded, federal agencies have been slow to respond.

Chemistry is essential to food, clothing, shelter, health, and defense, but these needs are prosaic and have not been able to compete with headline-catching spectaculars for the administrator's or the politician's attention. The new report may correct this. Though conservative in tone and language, the document, through its intellectual excellence, presents a compelling case. If the report is read, it will be implemented.

—PHILIP H. ABELSON

**Chemistry: Opportunities and Needs*, "A Report on Basic Research in U.S. Chemistry by the Committee for the Survey of Chemistry, National Academy of Sciences–National Research Council."

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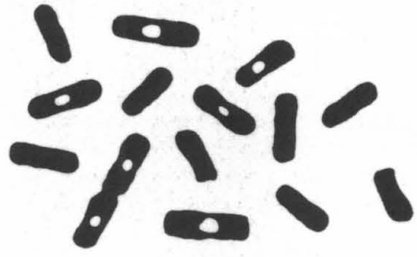

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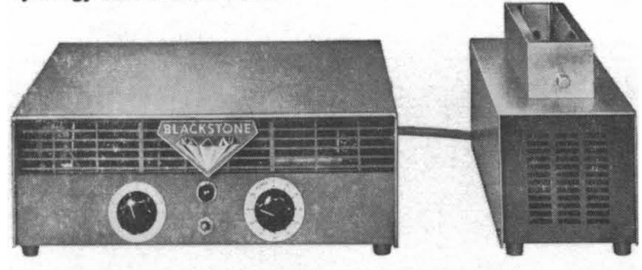

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3. All members receive the quarterly newsletter of Association affairs, the *AAAS Bulletin* and may order SYMPOSIUM volumes, reporting advanced work in selected fields of science, at a reduced price for direct, prepaid orders.

4. Members may subscribe at reduced rates to the magazines, DAEDALUS, THE ADVANCEMENT OF SCIENCE, and PERSPECTIVES IN BIOLOGY AND MEDICINE.

5. Members share the satisfaction of supporting AAAS work to

- Improve the effectiveness of science in the promotion of human welfare.
- Increase public understanding of science.
- Improve science education at all levels.

American Nature Study Society Session IV. Natural history of the West with emphasis on the Bay Region. Arthur H. Nelson (San Francisco State College) will preside. Reading the landscape—an introduction to ecology, May T. Watts (Morton Arboretum, Lisle, Illinois). Western rivers and man's impact on them, Stanley B. Mulaik (University of Utah). Regional natural history guides, Arthur C. Smith (California State College at Hayward). Fauna of the Bay Area with special references to the intertidal zone, Howard Cogswell (California State College at Hayward). Intertidal fishes of northern California, Donald Hanham, Jr., and Robert R. Rofen (Aquatic Research Institute, Stockton, California). The distribution and occurrence of vertebrates in the San Francisco Bay area, Ferdinand S. Ruth (Lawrence Hall of Science, University of California, Berkeley). Geology and fossil life—the Irvingtonian fauna of the Bay Region, Wes Gordon (San Lorenzo School District).

National Association of Biology Teachers Session IIa. Teacher Training and Resource Use in Biology. Robert Brandeberry (Aragon High School, San Mateo) will preside. Cytology for in-service biology teachers, Thomas R. Mertens and Jerry J. Nisbet (Ball State College, Muncie, Indiana). Biology methods for in-service teachers, Jerry J. Nisbet and Thomas R. Mertens. Use of community resources in teaching biology concepts at the secondary level. Kenneth J. Bandelier (New Haven, Indiana, High School). New attitudes in science education toward science archives, Myrl C. Lichtenwalter (Wells High School, Chicago, Illinois).

National Science Teachers Association Session IV. Planning a Local Action Program in Science Curriculum Development. Joint program of NSTA and CASMT. Robert A. Rice (University of California, Berkeley) will preside. Developing a program for local action, Albert F. Eiss (associate executive secretary, NSTA). The role of in-service education, Mauri Gould (University of California, Berkeley). The role of evaluation, Paul deH. Hurd (Stanford University).

CETS Session. Improving College Science Programs. Stanley E. Williamson (Oregon State University) will preside. *College Science for General Education*: Biological sciences, James H. Mathewson (San Diego State College); Physical sciences, Arnold A. Strassenburg (University of Kansas); and

Earth-space sciences, Chalmer J. Roy (Iowa State University). The role of the NSTA Commission on the Education of Teachers of Science, Herbert A. Smith (chairman, CETS). Efforts of individual colleges, V. L. Parsegian (Rensselaer Polytechnic Institute).

National Association of Biology Teachers Session IIb. Developments in Biology Teaching. Robert Brandeberry (Aragon High School, San Mateo). A model biology curriculum, Alfred Novak (Stephens College, Columbia, Missouri). Multiple response systems and science teaching, Charles Ostrander (Merced, California, College). New developments in elementary school biology, John D. Cunningham (Florida State University).

National Science Teachers Association Report Session. Reports of Junior College Discussion Groups. Robert A. Rice (University of California, Berkeley) will preside.

Joint Field Trip of American Nature Study Society and National Association of Biology Teachers. The trip includes Lake Merritt, Tilden Nature Areas, Tilden Botanical Garden, Lafayette Reservoir, and Diablo Valley College Science Center. Tom Stayeart (Diablo Valley College) will serve as guide.

Thursday 30 December

Research Tour, All Science Teaching Societies. Arranged by Don Granholm (Cubberly High School, Palo Alto, California). The trip includes a visit to Chevron Research Company, Richmond, and Richmond Field Station, University of California.

Information and Communication (T)

Monday 27 December

Panel. Current Issues in Communication of Science II. The Scientific Meeting and Related Publications. Arranged by Richard Kenyon (American Chemical Society, Washington, D.C.), who will also preside. *Panel members*: Philip H. Abelson (editor, *Science*, AAAS); Walter M. Carlson (Department of Defense, Washington, D.C.), Julius Comroe (School of Medicine, University of California, San Francisco), Norwood Russell Hanson (Yale University), and Michael J. Moravcsik (Lawrence Radiation Laboratory).

Vice-Presidential Address of Section T. Phyllis V. Parkins (*Biological Ab-*

stracts, Philadelphia, Pennsylvania) will preside. The Greeks had a word for it, Robert C. Miller (California Academy of Sciences; vice president for Section T).

Communication in Animals and Men. Symposium, arranged by Robert C. Miller, who will also preside. Communication in monkeys and apes —and man, Peter Marler (University of California, Berkeley). Signaling systems for control of trained marine mammals in the open ocean, W. E. Evans (U.S. Naval Ordnance Test Station, China Lake, California, and University of California, Los Angeles) and F. G. Wood (Naval Missile Center, Point Mugu, California). Biological sonar, Thomas R. Poulter (Stanford Research Institute).

Luncheon and Address. Mark Hopkins and the one-eyed monster, James Day (Station KQED, San Francisco). Price of the luncheon ticket is $3. Persons who will attend should send money (by 17 December) to Ann L. Farren, *Biological Abstracts*, 3815 Walnut Street, Philadelphia, Pennsylvania.

Thursday 30 December

Panel. Strengthening the Scientist's Communicative Skills. Joint program of Section T and the Society of Technical Writers and Publishers. Arranged by Gunther Marx (Illinois Institute of Technology Research Institute, Chicago), who will also preside. *Panel members*: Harold Hornby (NASA Ames Laboratory, Sunnyvale, California), Carl M. Johnson (U.S. Navy Electronics Laboratory, San Diego, California), H. C. McDaniel (Westinghouse Electric Corporation, Pittsburgh, Pennsylvania), James W. Souther (University of Washington), and Milton Silverman (California Wine Research Institute, San Francisco).

National Association of Science Writers (T1)

The program of the Association consists of a business meeting and address, and the annual dinner and announcement of AAAS-Westinghouse Science Writing Awards (27 Dec.).

Society of Technical Writers and Publishers (T2)

The Society has a joint program with Section T, Strengthening the Scientist's Communicative Skills, 30 Dec.

Statistics (U)

Wednesday 29 December

Experiments on Operating Information Systems. Symposium, joint program of Sections T—Information and Communication and U and cosponsored by the American Statistical Association and the Institute of Mathematical Statistics. Arranged by Ezra Glaser (National Bureau of Standards, Washington, D.C.), who will also preside. Experiments with search systems of the U.S. Patent Office, Edward C. Bryant and Donald W. King (Westat Research Analyst, Inc., Bethesda, Maryland). Experiments using graph-theoretic techniques for characterizing users according to professional interests and retrieval effectiveness, Chacko Abraham (Thomas J. Watson Research Center of IBM, Yorktown Heights, New York). *Discussant*: Eugene Wong (University of California, Berkeley).

Thursday 30 December

Vice President's Session. Special Invited Address. Joint session of Section U and 5th Berkeley Symposium on Mathematical Statistics and Probability. Jerzy Neyman (University of California, Berkeley) will preside. The classical problem—goodness of fit, Oscar Kempthorne (Iowa State University).

American Statistical Association (U1)

The Association is a cosponsor of Section U's entire program.

BIO (Biomedical Information-Processing Group) Association for Computing Machinery (U3)

The Biomedical Information Processing Organization is a cosponsor of the two-session symposium of the Society of Systematic Zoology, Biological Data Retrieval and Computer Analysis, 30 Dec.

Biometric Society, Eastern North American Region (U3)

Thursday 30 December

Statistical Methods in Bioassay. Symposium, joint program of Sections Np—Pharmaceutical Sciences and U, and the Biometric Society, ENAR. Arranged by Douglas S. Robson (Cor-

nell University), who will also preside. Using prior information to plan routine assays, Byron William Brown (University of Minnesota). The "up and down method" in bioassay, Wilfred J. Dixon (University of California, Los Angeles). Statistical procedures for quantitative response bioassay when parallelism does not obtain, Charles Philip Cox (Iowa State University) and Paul E. Leaverton (State University of Iowa).

Biometric Society, Western North American Region (U3)

Program cosponsored by Section U.

Session for Contributed Papers I. Dimensions of total and sex-specific mortality in the United States, Harley B. Messinger (University of California, Berkeley). Life testing for biometricians, Benjamin Epstein (statistical consultant, Palo Alto, California). An empirical Bayes approach in routine parallel line assay, Gerald R. Chase (Stanford University). Some additional applications of stochastic models to the effect of antibiotics on bacterial populations, Sven Nissen-Meyer (University of California, Berkeley). Nonparametric tests and estimates of scale in the two-sample problem, Galen R. Shorack (University of Washington).

Studies on Pregnancy and Child Development. Jacob Yerushalmy will preside. (The chairman and all speakers are members of the Division of Biostatistics, School of Public Health, University of California, Berkeley). On the methodology of group comparisons in longitudinal growth studies, John Wingerd. On the relationship of maternal height and weight to pregnancy outcome, Robert Scholtz. Differences in low birth weight infants of short and long gestation, Bea van den Berg and Michael Zwerdling. Factors pertaining to prolonged pregnancy and its outcome, Michael Zwerdling. Fetal, infant, and childhood mortality in relation to mother's previous losses, Roberta Christianson.

Fifth Berkeley Symposium on Mathematical Statistics and Probability (U4)

Monday 27 December

Weather Control. Five-session program of the Weather Modification Section of the 5th Berkeley Symposium on Mathematical Statistics and Probability and cosponsored by Section U

—Statistics and the American Meteorological Society.

The 5th symposium sessions on Carcinogenesis and on Sequential Clinical Trials could not be incorporated into the AAAS meeting and will be held 3–7 January 1966.

Session I. William B. Fretter (University of California, Berkeley) will preside. Welcoming address by Jerzy Neyman. Physical factors in precipitation processes and their influence on the effectiveness of cloud seeding, Morris Neiburger (University of California, Los Angeles). Cloud seeding experiments in Australia, E. J. Smith (Commonwealth Scientific and Research Organization, Sydney, Australia). Weather modification experiments in France, J. Bernier (Laboratoire d'Hydraulique de Chatou, Paris, France). Design and evaluation of randomized wintertime cloud seeding at high elevation, Donald L. Eberly and Lewis H. Robinson (Pacific Gas and Electric Company, San Francisco, California). The Bureau of Reclamation's atmospheric water resources research program, Archie Kahan (U.S. Department of the Interior, Denver).

Session on Information Processing, and Cognition. Cornelius A. Tobias (University of California, Berkeley) will preside. Paper by Mary A. B. Brazier (University of California, Los Angeles). Modeling the formation and use of concepts, percepts, and rules, Walter Reitman (University of Michigan). Elementary perceiver and memorizer III: processes and structures, Edward A. Feigenbaum (Stanford University). Recognition of pattern in periodic binary sequences, Julian Feldman (University of California, Irvine). Measures of self-organization in a system of turing automata, Walter R. Stahl (Oregon Regional Primate Research Center). Quantum noise and information, Hans J. Bremermann (University of California, Berkeley). Mathematical models for neural networks, Violet R. Cane (Cambridge University, England). Adaptive processes and artificial intelligence, Richard Bellman (University of Southern California).

Weather Control, Session II. Morris Neiburger will preside. Summary of results of a randomized cloud seeding project in Arizona, Louis J. Battan and A. R. Kassander, Jr. (University of Arizona). Weather modification experiments in Bavaria, Hans G. Muller (Institut für Physik der Atmosphäre, München, Germany). Statistical as-

pects of the Climax, Colorado, weather modification experiment, Lewis O. Grant (Colorado State University). Some problems with the statistical analysis of weather modification experiments, Wendell Mordy (University of Nevada). Freezing nuclei measurements and their interpretation, Dwight B. Kline (U.S. Weather Bureau, Washington, D.C.)

Session on Astronomy. Rudolph Minkowski (University of California, Berkeley) will preside. Age distribution of galaxies, W. H. McCrea (University of London, England). Evolution of galaxies, E. Margaret Burbidge (University of California, San Diego). Masses of galaxies: singles and in systems, Thornton L. Page (Van Vleck Observatory, Middletown, Connecticut, and Smithsonian Astrophysical Observatory, Cambridge, Massachusetts). Space distribution of dark nebulae, Beverly Lynds (University of Arizona). Correlations between magnetic field, radical velocity, and brightness on the sun, William C. Livingstone (Kitt Peak National Observatory, Tucson).

Session on Demography. Jacob Yerushalmy will preside. Stochastic models for the evaluation of population policies I: approaches to data analysis, Mindel C. Sheps (Columbia University). Stochastic models for the evaluation of population policies II: results of a Monte Carlo program, E. B. Perrin (University of Washington). Estimating the trajectory of a population, Nathan Keyfitz (University of Chicago).

Tuesday 28 December

Weather Control. Session III. Lincoln Moses (Stanford University) will preside. Cloud seeding experiments in Israel, K. R. Gabriel (Hebrew University, Jerusalem, Israel). On an experiment for hail suppression in Switzerland, P. Schmid, (Eidg. Anstalt für das Fortstliche Versuchswesen, Zurich, Switzerland). The design and execution and evaluation of a physical experiment in weather modification, Charles L. Hosler (Pennsylvania State University). Paper by Vujica M. Yevdjevich (Colorado State University). Randomized cloud seeding in the United States, Arnold Court (San Fernando Valley State College, San Fernando, California).

Session on Statistical Theory. Erich L. Lehmann (University of California, Berkeley) will preside. Spectral analysis of line processes, M. S. Bartlett (Uni-

versity College, London, England). On sequences of random events, Walter L. Smith (University of North Carolina). The deterministic-stochastic transition in control problems, and use of maximum and integral transforms, Peter Whittle (University of Manchester, England). Sequences of statistical decision problems, James F. Hannan (Michigan State University). Two action compound decision problems, M. V. Johns, Jr. (Stanford University).

Weather Control. Session IV. Round Table Discussion of Statistical Aspects of the Weather Modification Problem. Lucien LeCam (University of California, Berkeley) will be moderator. *Opening paper*: Variability factor in weather modification evaluation, James E. McDonald (University of Arizona). *Discussants*: Ralph Bradley (Florida State University) and Lincoln Moses (Stanford University). *Closing paper*: Some outstanding problems, Jerzy Neyman and E. L. Scott (University of California, Berkeley).

Session on Chance Mechanisms in Live Organisms. Sanford S. Elberg (University of California, Berkeley) will preside. Problem of single cell vs. multicell origin of a tumor, David Linder (San Francisco Children's Hospital). *Discussant*: W. Buhler (University of California, Berkeley). Stochastic model for the distribution of radioactive material in a connected system of compartments, S. R. Bernard, L. R. Shenton, and V. R. Rao Uppuluri (Oak Ridge National Laboratory). Distribution under LeCam's model of the number of virulent bacteria at time of death of the host, Prem S. Puri (University of California, Berkeley). Comparison of two survival series in the presence of different censoring distributions, Brad Efron (Stanford University).

Weather Control. Session V. James Hughes (Office of Naval Research, Washington, D.C.) will preside. Latent heat of vaporization released experimentally by adding sodium chloride particles to the atmosphere, A. T. Spencer (Woods Hole Oceanographic Institution) and Alfred H. Woodcock (University of Hawaii).

Wednesday 29 December

Session on Decision Theory Applied to Medical Diagnosis. David Blackwell (University of California, Berkeley) will preside. Sequential rank tests, Ralph A. Bradley (Florida State Uni-

versity). Some decision making techniques applicable to medical sciences, John T. Chu (University of Pennsylvania). Decision theoretical comparison of three screening procedures for a single disease, Charles Flagel (Johns Hopkins Hospital). Frequentist decision theoretical approach to automated medical diagnosis, Morris F. Collen and Leonard Rubin (The Permanente Medical Group, Oakland, California). Logical analysis in medical diagnosis, Lee B. Lusted (Oregon Regional Primate Research Center). On the asymptotic behavior of k-means, James Macqueen (University of California, Los Angeles).

Statistical Problems of Genetics. Session I. Spencer W. Brown (University of California, Berkeley) will preside. Stochastic processes reflecting lineage, G. Malecot (University of Lyon, France). The number of isoalleles maintained in a locus, Samuel Karlin (Stanford University). Formation of recombinants of closely-linked loci in a finite population, James McGregor (Stanford University). Linkage and natural selection, Richard C. Lewontin (University of Chicago).

Session II. Everett Dempster (University of California, Berkeley) will preside. The concept of genes being identical by descent, Oscar Kempthorne (Iowa State University). A bacteriophage model, J. Gani (University of Sheffield, England). Models for DNA mediated bacterial transformations, Walter F. Bodmer (Stanford University School of Medicine). Physical abnormalities, chromosome patterns, and fingerprints, F. N. David (University College, London). Statistical analysis of chromosome patterns, D. E. Barton (University College, London).

Session III. Jerzy Neyman will preside. Genetic diversity and diversity of environment: biological aspects, Th. Dobzhansky (Rockefeller Institute). Genetic diversity and diversity of environment: mathematical aspects, Howard Levene (Columbia University).

Thursday 30 December

Session on Statistical Problems of Ecology. Thomas Park (University of Chicago) will preside. Stochastic processes in ecology, Douglas G. Chapman (University of Washington). The role of statistical research in salvaging our deteriorating environment, LaMont C. Cole (Cornell University). The use of

information theory in the study of diversity of biological populations, E. C. Pielou (Department of Forestry, Ottawa, Canada). Seasonal periodicity in ecological populations, J. G. Skellam (The Nature Conservancy, London, England).

Session on Statistical Problems of Epidemiology. Reuel A. Stallones (University of California, Berkeley) will preside. Some results of empirical epidemiological studies, C. C. Spicer (General Register Office, London, England). Space-time contagion, Evelyn Fix (University of California, Berkeley). The distribution of the total size of an epidemic, H. E. Daniels (University of Birmingham, England). Papers by Norman T. J. Bailey (Oxford University) and J. O. Irwin (University of Sydney, Australia).

Institute of Mathematical Statistics (U5)

The Institute is a cosponsor of all sessions of Section U.

Science in General

The following are programs of organizations not affiliated with any single section.

Academy Conference (XI)

Monday 27 December

Business Meeting

Academies of Science between Meetings II: Improvement of Science Teaching. Karlem Riess (Tulane University) will preside. How academies of science can improve science teaching in their own states, John R. Mayor (director of education, AAAS). *Discussants*: Ted F. Andrews, (Commission on Undergraduate Education in the Biological Sciences, Washington, D.C.) and Paul Klinge (Indiana University Foundation).

Open Discussion. The Undergraduate College Curriculum. James A. Rutledge (president elect, Academy Conference) will preside. *Speaker*: Martin W. Schein (Commission on Undergraduate Education in the Biological Sciences, Washington, D.C.). *Discussion leader*: George E. Lindsay (California Academy of Sciences).

Academy Conference Dinner and Presidential Address. J. Teague Self (past president, Academy Conference) will preside. Presentation of Distinguished Service Awards by Clinton L. Baker (Southwestern College, Memphis). Academy highlights—historic and otherwise, Karlem Riess.

Tuesday 28 December

American Junior Academy of Science Program I. Wilmer W. Tanner (Brigham Young University) will preside. Resonant detection of light pressure in air, Timothy Strand (Laurel High School, Iowa). The gravitational separation of ions in solution, Robert E. Galloway (Central High School, Tulsa, Oklahoma). A generalization of the methods of continuous field study, Alan A. Wray (Fayetteville High School, Arkansas). Thirty-day weather forecasting—review of a fifty-month experiment, Grant Eichler (Lyons Township High School, La Grange, Illinois). Water binding by a glycoprotein, Tee Guidotti (Burroughs High School, Burbank, California). An experimental magnetohydrodynamic three-phase alternating current power generator, Aubrey Strode, Jr. (Liberty High School, Bedford, Virginia). Hydrogen isotope substitutions in algae, Varel Freeman (Hinckley High School, Aurora, Colorado). A study of a minimum surface for a volume with base restrictions, Bruce J. Preston (Bayley-Ellard High School, Madison, New Jersey).

American Junior Academy of Science Program II. William W. Scott (National Science Foundation) will preside. Do pesticides used by farmers of the Maniece Bayou drainage district kill fish in the bayous and lakes?, Jim Lloyd Pickren (Lewisville High School, Arkansas). A study of the effect of aspirin on the nervous systems of white rats, Terrance Godar (Marion High School, Iowa). A study of the effects of six drugs on chick embryo development, Cynthia A. Fite (Donart High School, Stillwater, Oklahoma). The auxin factor in hydrotropism, Mary Peg Marsh and Barbara Lee (Regina Dominican High School, Wilmette, Illinois). Reptiles and amphibians of the City and County of San Francisco, David Morafka (Lowell High School, San Francisco, California). Experimentation in genetics, Alice Earlene Mitchell (William Byrd High School, Vinton, Virginia). Skin graft-

ing, Larry Martin (Woodlin High School, Woodrow, Colorado). Natural inhibition in plants, Kurt Meyers, Teaneck High School, New Jersey).

19th Annual Junior Scientists Assembly (31 Dec.). Program chairman is Robert A. Rice (University of California, Berkeley).

Scientific Research Society of America (X2)

Wednesday 29 December

Joint Luncheon of the Society of the Sigma Xi and the Scientific Research Society of America.

Annual Address of the Scientific Research Society of America and Award of the William Procter Prize. William E. Hanford will preside and present the award. *Speaker*: Col. W. H. Pickering (Jet Propulsion Laboratory).

17th Annual Convention of the Scientific Research Society of America. William E. Hanford will preside.

Sigma Delta Epsilon (X3)

The program of the society consists of National Council meetings (I-II, 27 Dec.; III, 30 Dec.) Grand Chapter dinner and meeting (29 Dec.), and luncheon for all women in science. Agnes Hansen (president, Sigma Delta Epsilon) will preside at the luncheon; Mary L. Willard (Pennsylvania State University) will discuss criminalistics.

Society of the Sigma Xi (X4)

Wednesday 29 December

66th Annual Convention of the Society of the Sigma Xi. (Two parts). Farrington Daniels (University of Wisconsin) will preside.

Joint Sigma Xi-RESA Luncheon.

Joint Annual Address of the Society of the Sigma Xi and the United Chapters of Phi Beta Kappa. Alfred S. Romer (president elect, AAAS) will preside. The logic of the mind, J. Bronowski (Salk Institute for Biological Studies, San Diego, California).

United Chapters of Phi Beta Kappa

The program consists of the joint address of Phi Beta Kappa and Sigma Xi (29 Dec.).

Forthcoming Events

December

16–17. **Computers and Scanning**, New Orleans, La. (S. Crain, University College, Tulane Univ., New Orleans 70118)

19–21. Middle East **Neurological** Soc., Jerusalem, Jordan. (F. S. Haddad, Orient Hospital, Beirut, Lebanon)

19–23. Indian **Statistical** Inst., Malleswaram, Bangalore. (S. R. Ranganathan, Indian Statistical Inst., Documentation Research and Training Centre, 112 Cross Rd. 11, Malleswaram)

20–21. **Molecular Transport and Rate Phenomena**, 32nd annual chemical engineering symp., Stanford Univ., Stanford, Calif. (A. Acrivos, Dept. of Chemical Engineering, Stanford Univ., Stanford, Calif.)

20–21. **Nuclear Medicine**, 2nd natl. congr., Tel Aviv, Israel. (P. Czerniak, Israel Atomic Commission, Soreq Nuclear Research Center, Doar Yavne)

20–22. British **Biophysical** Soc., 20th winter meeting, London, England. (R. E. Burge, Physics Dept., Queen Elizabeth College, Campden Hill Rd., London W.8)

20–22. American **Physical** Soc., Los Angeles, Calif. (W. Whaling, California Inst. of Technology, Pasadena 91109)

26–31. **American Assoc. for the Advancement of Science**, annual, Berkeley, Calif. (R. L. Taylor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

In addition to the 20 sections of the Association and five AAAS committees, the following organizations have arranged sessions at the AAAS annual meeting 26–31 December at Berkeley:

Mathematics

American Mathematical Soc. (R. S. Pierce, Univ. of Washington, Seattle)

Association for Computing Machinery. (H. D. Huskey, Univ. of California, Berkeley)

National Council of Teachers of Mathematics. (J. D. Gates, 1201 16 St., NW, Washington, D.C.)

Society for Industrial and Applied Mathematics (J. H. Griesmer, IBM, Yorktown Heights, N.Y.)

Physics

American Astronautical Soc. (P. B. Richards, General Precision, Little Falls, N.J.)

Chemistry

American Chemical Soc., California Section. (R. L. LeTourneau, Chevron Research Co., Richmond, Calif.)

Astronomy

American Astronomical Soc. (G. C. McVittie, Univ. of Illinois, Urbana)

Geology and Geography

Association of American Geographers. (M. Mikesell, Univ. of Chicago, Chicago, Ill.)

National Geographic Soc. (R. Gray, 17th & M Sts., NW, Washington, D.C.)

National Speleological Soc. (G. W. Moore, U.S. Geological Survey, Menlo Park, Calif.)

Zoological Sciences

American Fisheries Soc. (H. K. Chadwick, California Dept. of Fish and Game, Sacramento)

American Soc. of Zoologists. (A. G. Richards, Univ. of Minnesota, St. Paul)

Animal Behavior Soc. (E. M. Banks, Univ. of Illinois, Urbana)

Herpetologists' League. (F. B. Turner, Univ. of California, Los Angeles)

Society of Systematic Zoology. (J. G. Rozen, Jr., American Museum of Natural History, New York, N.Y.)

Zoological and Botanical Sciences

American Soc. of Naturalists. (C. Hubbs, Scripps Inst. of Oceanography, La Jolla, Calif.)

Ecological Soc. of America (G. M. Woodwell, Brookhaven Natl. Laboratory, Upton, L.I., N.Y.)

Western Soc. of Naturalists. (J. M. Craig, San Jose State College, San Jose, Calif.)

Psychology

Western Psychological Assoc. (G. A. Mendelsohn, Univ. of California, Berkeley)

Social and Economic Sciences

American Economic Assoc. (R. R. Nelson, RAND Corp., Santa Monica, Calif.)

American Political Science Assoc. (J. F. Triska, Stanford Univ., Stanford, Calif.)

American Soc. of Criminology. (C. Newman, Univ. of Louisville, Louisville, Ky.)

American Sociological Assoc. (W. Form, Michigan State Univ., East Lansing)

Metric Assoc. (R. Fischelis, Ohio Northern Univ., Ada)

National Inst. of Social and Behavioral Science. (D. P. Ray, 863 Benjamin Franklin Station, Washington, D.C)

Population Assoc. of America (E. S. Lee, Univ. of Pennsylvania, Philadelphia)

Society for the Scientific Study of Religion. (C. Y. Glock, Univ. of California, Berkeley)

History and Philosophy of Science

Philosophy of Science Assoc. (C. W. Churchman, Univ. of California, Berkeley)

Society for General Systems Research. (H. Thal-Larsen, Univ. of California, Berkeley)

Science Courses for Baccalaureate Education Project. (V. L. Parsegian, Rensselaer Polytechnic Inst., Troy, N.Y.)

Medical Sciences

Alpha Epsilon Delta. (M. L. Moore, 7 Brookside Circle, Bronxville, N.Y.)

American Assoc. of Bioanalysts, Western Region. (M. Menesini, 1287 Rudgear Rd., Walnut Creek, Calif.)

American Physiological Soc. (R. M. Iverson, Univ. of Miami, Coral Gables, Fla.)

American Soc. for Microbiology, Northern California–Hawaiian Branch. (K. J. Taylor, Cutter Laboratories, Berkeley, Calif.)

California Veterinary Medical Assoc. (A. G. Edward, Univ. of California, Davis)

Society for Experimental Biology and Medicine, Pacific Coast Section. (E. L. Dobson, Donner Laboratories, Univ. of California, Berkeley)

Education

Commission on Science Education. (J. R. Mayor, AAAS, 1515 Massachusetts Ave., NW, Washington, D.C. 20005)

American Nature Study Soc. (H. E. Weaver, Univ. of Illinois, Urbana)

National Assoc. for Research in Science Teaching. (F. B. Dutton, Michigan State Univ., East Lansing)

National Assoc. of Biology Teachers. (H. K. Wong, Menlo-Atherton High School, Atherton, Calif.)

National Science Teachers Assoc. (A. F. Eiss, 1201 16 St., NW, Washington, D.C. 20005)

Information and Communication

National Assoc. of Science Writers. (L. S. Zahn, Hill and Knowlton Inc., 150 E. 42 St., New York, N.Y.)

Society of Technical Writers and Publishers. (G. Marx, Illinois Inst. of Technology, Chicago)

Statistics

BIO: Biomedical Information-Processing Organization. (M. Woodbury, New York Univ. Medical Center, New York, N.Y.)

Biometric Soc., ENAR. (D. S. Robson, Cornell Univ., Ithaca, N.Y.)

Biometric Soc., WNAR. (S. W. Nash, Univ. of British Columbia, Vancouver, Canada)

Mathematical Statistics and Probability, 5th Berkeley symp. (J. Neyman, Statistical Laboratory, Univ. of California, Berkeley)

Science in General

Academy Conf. (J. T. Self, Univ. of Oklahoma, Norman)

Scientific Research Soc. of America (D. B. Prentice. 51 Prospect St., New Haven, Conn.)

Sigma Delta Epsilon. (Miss A. Hanson, Univ. of Minnesota, Minneapolis)

Society of the Sigma Xi. (T. T. Holme, 51 Prospect St., New Haven, Conn.)

27–29. Academy of **Management**, New York, N.Y. (P. P. LeBreton, College of Business Administration, Univ. of Washington, Seattle)

27–30. **Differential Equations and Dynamical Systems**. Univ. of Puerto Rico, Mayaguez. (Center for Dynamical Systems, Brown Univ., Providence, R.I.)

27–30. **Phi Delta Kappa**, Professional Education Fraternity, Univ. of Oklahoma, Norman. (M. Bemis, Phi Delta Kappa, 8th and Union, Bloomington, Ind. 47402)

28–30. Indian **Medical** Assoc., 41st conf., Baroda (Gujarat). (Indian Medical Assoc. House, Indraprastha Marg., New Delhi 1)

29–4. **Pugwash Conf. on Science and World Affairs**, Addis Ababa, Ethiopia. (J. Rotblat, Pugwash Continuing Committee, 8 Asmara Rd., London, N.W.2, England)

January

4–7. **Solid State Physics**, conf., Manchester College of Science and Technology, Manchester, England. (S. F. Edwards, Dept. of Physics, Victoria Univ. of Manchester, Manchester 13)

5–8. National Soc. of **Professional Engineers**, winter mtg., Bal Harbour, Fla.

(NSPE, 2029 K St., NW, Washington, D.C. 20006)

6–7. Society for **General Microbiology**, 45th general mtg., London, England. (P. H. Clarke, Biochemistry Dept., University College, Gower St., London, W.C.1, England)

6–10. International Council of **Scientific Unions**, 11th general assembly, Bombay, India. (Intern. Council of Scientific Unions, Via Sebenico 2, Rome, Italy)

7–8. **Surgical Research** Soc., winter mtg., London, England. (A. P. M. Forrest, Cardiff Royal Infirmary, Newport Rd., Cardiff, Wales)

10–13. **Radioactive Isotopes** in Clinical Medicine and Research, 7th intern. symp., Bad Gastein, Austria. (R. Hofer, Second Medical Univ. Clinic, Garnisongasse 13, Vienna 9)

11–12. Man's Extension into the **Sea**, symp. on SEALAB II, Washington, D.C. (T. Evans, Conference Management Organizer, Colonial Bldg., 105 N. Virginia Ave., Falls Church, Va. 22046)

12–14. **Medicinal and Aromatic Plants in India**, symp., Central Indian Medicinal Plants Organization, Lucknow, India. (S. C. Datta, CIMPO, 4 Sapru Marg, Lucknow)

12–20. International **Fertility** Assoc., Latin American mtg., Acapulco, Mexico. (M. Roland, 109-23 71st St., Forest Hills, N.Y. 11375)

13–14. Institute of **Mathematical Sciences**, 4th Matscience anniversary symp., Madras, India. (C. P. Ramaswami Aiyer, Inst. of Mathematical Sciences, Madras)

13–16. Indian Institute of **Metals**, 19th annual mtg., Hyderabad. (The Institute, 31 Chowringhee Road, Calcutta 16)

16–21. American **Chemical** Soc., winter mtg., Phoenix, Ariz. (ACS, 1155 16th St., NW, Washington, D.C. 20036)

17–19. **Labelled Proteins in Tracer Studies**, conf., Pisa, Italy. (Euratom, Labelled Compounds Div., 51-53, rue Belliard, Brussels, Belgium)

19–21. **Instrumentation** for the Process Industries, Texas A&M symp., College Station. (P. T. Eubank, Dept. of Chemical Engineering, Texas A&M Univ., College Station)

20–21. Anharmonic **Phonon Interactions** in Solids, Princeton Univ., Princeton, N.J. (W. B. Daniels, Dept. of Solid State Sciences, Princeton Univ., N.J.)

20–22. Regulation of **Antibody Response**, intern. symp., Toronto, Ont., Canada. (B. Cinader, Subdivision of Immunochemistry, Univ. of Toronto, Toronto, Ont.)

20–22. **Diabetes** in the Tropics, world congr., Bombay, India. (Organizing Secretary, Diabetic Assoc. of India, Maneckji Wadia Bldg., Mahatma Gandhi Rd., Bombay 1)

20–22. **Symmetry Principles at High Energy**, conf., Univ. of Miami, Coral Gables, Fla. (D. R. Lehman, Air Force Office of Scientific Research, Tempo D, 4th and Independence Ave., SW, Washington, D.C.)

21–22. Physiology of **Hemostasis and Thrombosis**, 14th annual Wayne State Univ. symp. on blood, Detroit, Mich. (W. H. Seegers, Dept. of Physiology and Pharmacology, Wayne State Univ., Detroit)

22–27. American Acad. of **Orthopedic Surgeons**, Chicago, Ill. (J. K. Hart, 29 E. Madison, Chicago 2)

23–28. American **Library** Assoc., midwinter mtg., Chicago, Ill. (D. H. Clift, ALA, 50 E. Huron St., Chicago 60611)

24–26. **Aerospace Sciences**, 3rd mtg., American Inst. of Aeronautics and Astronautics, New York, N.Y. (AIAA, 1290 Sixth Ave., New York 10019)

24–27. Modern Methods of **Analytical Chemistry**, 19th annual, Louisiana State Univ. symp., Baton Rouge. (P. W. West, LSU, Baton Rouge)

24–27. American Soc. of **Heating, Refrigerating, and Air-Conditioning Engineers**, semiannual mtg., Houston, Tex. (ASHRAE, 345 E. 47 St., New York 100017)

24–27. American **Meteorological Soc.**, 46th annual mtg., Denver, Colo. (K. C. Spengler, AMS, 45 Beacon St., Boston, Mass.)

24–28. Animal and Clinical **Pharmacologic Techniques in Drug Evaluation**, part 1, mtg., Philadelphia, Pa. (J. H. Nodine, Hahnemann Medical College and Hospital, 230 N. Broad St., Philadelphia 19102)

24–30. **CNS–Drugs**, symp., Regional Research Laboratory, Hyderabad, India. (P. B. Sattur, Regional Research Laboratory, Hyderabad 9)

25. Research and Industrial Applications of the **Mössbauer Effect**, New York, N.Y. (M. Ress, New England Nuclear Corp., 575 Albany St., Boston, Mass.)

25–27. **Reliability**, 12th annual symp., Inst. of Electrical and Electronics Engineers, San Francisco, Calif. (A. R. Park, General Precision Inc., 1378 Encinatas Rd., San Marcos, Calif.)

26. Current and Future Problems in **Chemistry at High Temperatures**, Rice Univ., Houston, Tex. (M. A. Paul, Div. of Chemistry and Chemical Technology, National Acad. of Sciences, Washington, D.C. 20418)

26–27. **Sulfur**, symp., Wilson Dam, Ala. (V. J. Kilmer, Div. of Agricultural Development, Tennessee Valley Authority, Wilson Dam 35661)

26–28. **Light Nuclei**, symp., Lyon, France. (R. Radvanyi, Lab. Joliot-Curie de physique nucléaire, Faculté des Sciences, B.P. 1, Orsay, France)

26–28. **Mathematical** Assoc. of America, 49th annual mtg., Chicago, Ill. (H. M. Gehman, State Univ. of New York, Buffalo 14214)

26–29. American **Physical** Soc., annual mtg., New York, N.Y. (K. K. Darrow, APS, 335 E. 45 St., New York 10017)

26–29. American Assoc. of **Physics Teachers**, annual mtg., New York, N.Y. (M. Phillips, Ryerson Physical Laboratory, Univ. of Chicago, Chicago, Ill. 60637)

27–29. American **Group Psychotherapy** Assoc., Philadelphia, Pa. (AGPA, 1790 Broadway, New York 10019)

27–29. International **Medical Assembly** of Southwest Texas, San Antonio. (S. E. Cockrell, Jr., 202 W. French Pl., San Antonio 78212)

31–3. Scientific Aspects of **Pest Control**, symp., Washington, D.C. (Agricultural Board, Natl. Acad. of Sciences, 2101 Constitution Ave., Washington 20418)

(Continued from page 1282)

Explorations in Chemistry. Charles A. Gray. Dutton, New York, 1965. 221 pp. Illus. $5.95.

From Atoms to Infinity: Readings in Modern Science. Clifford D. Simak, Ed. Harper and Row, New York, 1965. 350 pp. Illus. $4.95. Thirty-eight articles published during 1963 and 1964 by the Minneapolis *Tribune* in its Science Reading Series. The articles are by Isaac Asimov, Willard Bascom, John Chapman, Victor Cohn, Frank C. Hibben, Willy Ley, Hugh Odishaw, John A. O'Keefe, Harlow Shapley, Clifford D. Simak, and Harry Wexler.

From My Life: The Memoirs of Richard Willstätter. Arthur Stoll, Ed. Translated from the German edition by Lilli S. Hornig. Benjamin, New York, 1965. 479 pp. Illus. $8.75.

A Fundamental Survey of the Moon. Ralph B. Baldwin. McGraw-Hill, New York, 1965. 159 pp. Illus. $4.95.

Graphical Methods in Research. A. S. Levens. Wiley, New York, 1965. 225 pp. Illus. $5.95.

Hospitals, Doctors, and the Public Interest. John H. Knowles, Ed. Harvard Univ. Press, Cambridge, Mass., 1965. 351 pp. Illus. $8.50. Sixteen papers.

Hysteria: The History of a Disease. Ilza Veith. Univ. of Chicago Press, Chicago, Ill., 1965. 318 pp. Illus. $7.95.

An Inquiry into Enoughness: Of Bombs and Men and Staying Alive. Daniel Lang. McGraw-Hill, New York, 1965. 232 pp. Illus. $5.50.

An Invitation to Phenomenology: Studies in the Philosophy of Experience. James M. Edie, Ed. Quadrangle Books, Chicago, Ill., 1965. 286 pp. Illus. Paper, $2.25; cloth, $6.50. Fourteen papers.

Island Life: A Natural History of the Islands of the World. Sherwin Carlquist. Published for the American Museum of Natural History by the Natural History Press, Garden City, N.Y., 1965. 463 pp. Illus. $9.95.

Jahrbuch der Deutschen Akademie der Wissenschaften zu Berlin, 1964. Akademie-Verlag, Berlin, 1965. 958 pp. MDN. 52.50.

The Kennedy Assassination and the American Public: Communication in Crisis. Bradley S. Greenberg and Edwin B. Parker, Eds. Stanford Univ. Press, Stanford, Calif., 1965. 406 pp. $8.95.

Man Adapting. René Dubos. Yale Univ. Press, New Haven, Conn., 1965. 549 pp. Illus. $10.

Man-Machine Engineering. Alphonse Chapanis. Wadsworth, Belmont, Calif.; Tavistock, London, 1965. 144 pp. Illus. Paper, $1.75. Behavioral Science in Industry Series, edited by Victor H. Vroom.

Matter and Method. R. Harré. Macmillan, London; St. Martin's Press, New York, 1965. 134 pp. $3.25.

The Measurement of Efficiency of Scientific Research. Ben-Ami Lipetz. Intermedia, Carlisle, Mass., 1965. 278 pp. $7.

Mechanisms, Linkages, and Mechanical Controls. Nicholas P. Chironis, Ed. McGraw-Hill, New York, 1965. 366 pp. Illus. $9.75. A compilation of material, mostly from *Product Engineering* magazine.

Native Wild Plants of Northeastern

United States and Eastern Canada. F. H. Montgomery. Warne, New York, 1965. 231 pp. Illus. $3.95.

A New Calendar for the Space Age. A. W. Payne Le Sueur. Vantage Press, New York, 1965. 63 pp. Illus. $3.

New Frontiers in Medicine. Stanley Englebardt. Pyramid, New York, 1965. 159 pp. Illus. Paper, 75¢. The Worlds of Science Series, vol. 20.

Newtonian Studies. Alexandre Koyré. Harvard Univ. Press, Cambridge, Mass., 1965. 296 pp. Illus. $7.95.

New Worlds of Oceanography. E. John Long. Pyramid, New York, 1965. 221 pp. Illus. Paper, 75¢. The Worlds of Science Series, vol. 19.

Ivan Pavlov: The Man and His Theories. Hilaire Cuny. Translated from the French edition by Patrick Evans. Eriksson, New York, 1965. 174 pp. Illus. $5.

The Politics of American Science: 1939 to the Present. J. L. Penick, Jr., C. W. Pursell, Jr., M. B. Sherwood, and D. C. Swain, Ed. Rand McNally, Chicago, Ill., 1965. 295 pp. Illus. Paper. Rand McNally History Series. A collection of readings.

Professional Lives in America: Structure and Aspiration, 1750–1850. Daniel H. Calhoun. Harvard Univ. Press, Cambridge, Mass., 1965. 247 pp. Illus. $5.95.

Psychology of Union-Management Relations. Ross Stagner and Hjalmar Rosen. Wadsworth, Belmont, Calif.; Tavistock, London, 1965. 157 pp. Illus. Paper, $1.75. Behavioral Science in Industry Series, edited by Victor H. Vroom.

Publications of Goddard Space Flight Center, 1963. Vols. 1 and 2. Vol. 1, *Space Sciences* (1676 pp. $9.75); vol. 2, *Space Technology* (1038 pp. $7). Natl. Aeronautics and Space Administration, Washington, D.C., 1965 (available from Superintendent of Documents, Washington, D.C.). Illus. A collection of articles, papers, talks, and reports by members of the scientific and engineering staff of Goddard Space Flight Center.

Readings in Psychology. Ruth E. Hartley and Eugene L. Hartley. Crowell, New York, ed. 3, 1965. 624 pp. Illus. Paper, $4.25. Fifty-seven papers.

Saints and Fireworks: Religion and Politics in Rural Malta. Jeremy Boissevain. Univ. of London Press, London; Humanities Press, New York, 1965. 166 pp. Illus. $6. London School of Economics Monographs on Social Anthropology, No. 30.

Science and Philosophy. Vincent Edward Smith. Bruce, Milwaukee, Wisc., 1965. 280 pp. Illus. $5.50.

Science Year, 1965. The World Book Science Annual. Field Enterprises Educational Corp., Chicago, Ill., 1965. 393 pp. Illus. $6.96.

Stonehenge Decoded. Gerald S. Hawkins and John B. White. Doubleday, Garden City, N.Y., 1965. 216 pp. Illus. $5.95.

Stories From Science. vols. 3 and 4. A. Sutcliffe and A. P. D. Sutcliffe. Cambridge Univ. Press, New York, 1965. vol. 3, 128 pp.; vol. 4, 120 pp. Illus. $2.95 each. In volume 3 accounts are given of incidents in early surgery, Pasteur's work, and the discovery of penicillin; volume 4, a miscellany of stories about discovery, contains such essays as "The first pressure cooker" and "Apple pie and the conduction of heat."

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hopes, with strong participation by the governors themselves, it is difficult to imagine any major federal legislative program's being developed without OE officials going to the Compact in search of ideas and political support.

A strong Compact organization would appear to have major implications for established professional groups such as the National Education Association (NEA). Without a close working relationship with the Compact, their relative influence might be diminished. The NEA, for example, is built largely on a mass membership of classroom teachers, who represent but one element in the complex of forces that work upon legislative bodies faced with education problems. Recommendations from the Compact's Educational Commission would appear to reflect more nearly all of the forces at play, and, for that reason, to be more persuasive. On the other hand, the professional education groups might find it convenient and effective to work within the Compact to build support for their goals.

The Compact, at this early stage, lends itself better to conjecture than to firm conclusions. Much will depend upon whether all, or nearly all, of the states join the Compact. Sanford said at Kansas City that 29 governors had indicated they intended to join. It would seem especially important for the less-developed states, in the South and elsewhere, which are apart from the main currents in education, to get the benefit of the Compact's prodding and informational exchange.

In Sanford's judgment the personal participation of the governors will be vital to the Compact's success. "This is the chance for the governors to revitalize state government by taking an active interest in this number one function of state government," he said.

The Compact's aims and practices, however much discussed, actually will be defined by the action of the governors and other delegates who will serve on the Educational Commission. Hatfield indicated that the Compact is not a weapon in "another skirmish . . . for control of education." Conant, too, has no quarrel with the federal government, and he applauds the new federal programs. But Governor George Wallace of Alabama, if he takes part in the Compact, is not likely to view its role as Conant or Hatfield will. Nor will a conservative Republican gov-

ernor such as Tim Babcock of Montana regard the Compact in the same way that Hughes of New Jersey or some other liberal Democratic governor does. The Compact, despite the skeptics, may be a promising development for education, but it probably will be shaped more by experience and the people guiding it than by the prospectus that Sanford and his fellow enthusiasts have provided.—LUTHER J. CARTER

Announcements

The **Atomic Energy Commission** is considering amending its regulations on filing appeals from decisions of hearing examiners or atomic-safety and licensing boards that conduct hearings for the commission. Present rules require anyone who wants to file an appeal to obtain AEC permission; appeals and briefs can be filed only on questions allowed by the commission. The proposed amendment, however, would permit an appeal to be made simply by filing a brief and a statement of exceptions to the initial decision. The simplified procedure is intended to expedite action on appeals without increasing their number.

The proposed amendment to AEC regulations, 10 CFR, Part 2, "Rules of Practice," appeared in the *Federal Register* for 5 November; 60 days will be allowed for public comment. Suggestions or comments should be sent to the Secretary, AEC, Washington, D.C. 20545.

Grant, Fellowships, and Awards

Two of the nation's large grantors of fellowships, the National Science Foundation and the Department of Health, Education, and Welfare, have established **Fellowship Review Panels** to provide a "fair and impartial hearing in the event that substantial questions arise about the moral character or loyalty" of holders or applicants for federal fellowships. Awards may be denied on such grounds if they are determined not to be in the best interests of the country.

Safeguards specified in the new regulations allow individuals to have a hearing before a fellowship is denied or terminated on these grounds, to be represented by counsel at the hearing, to appear in person, to present witnesses, to cross-examine persons, and to decide whether the hearing should be

open or closed to the public. The procedures are to apply to fellowship holders under the National Science Foundation Act, and the National Defense Education Act.

Panel members will serve both agencies, and will be designated by the chairman to review individual cases.

Michael H. Cardozo, executive director of the Association of American Law Schools, is chairman. The other members include:

R. Jean Brownlee, dean, college of liberal arts for women, University of Pennsylvania

Mortimer M. Caplin, of Caplin, Battle, and Harris, Washington, D.C.

Manfred S. Guttmacher, associate professor of clinical psychiatry, University of Maryland, Baltimore

Eugene N. Hanson, dean, law school, Ohio Northern University

Fred H. Harrington, president, University of Wisconsin

Lyle H. Lanier, provost, University of Illinois

Thomas Lauritsen, professor of physics, California Institute of Technology

George N. Shuster, former president, Hunter College, New York

Eli M. Spark, professor of law, Catholic University, Washington, D.C.

Alan T. Waterman, former director, National Science Foundation.

Scientists in the News

Ward Darley, visiting professor of medicine at the University of Colorado, recently received the J. M. Russell award from the Markle Foundation for "outstanding contribution to academic medicine."

Arthur E. Maxwell, head of the geophysics branch, Office of Naval Research, has been appointed an associate director of the Woods Hole Oceanographic Institution.

Truman Botts, associate professor of mathematics at the University of Virginia, has taken a year's leave of absence to serve as executive director of the National Academy of Sciences committee on support of research in the mathematical sciences (COSRMS), at Columbia University.

William C. Davidon, associate professor of physics at Haverford College, has been elected president of the Society for Social Responsibility in Science.