SCIENCE

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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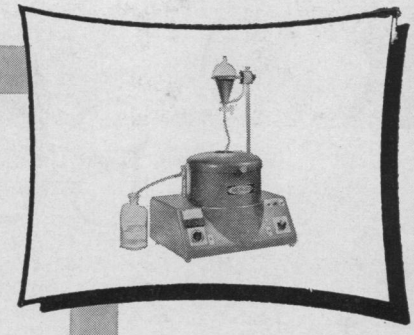

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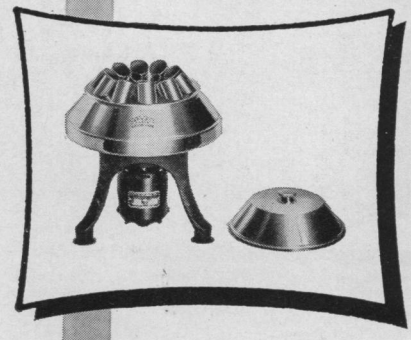

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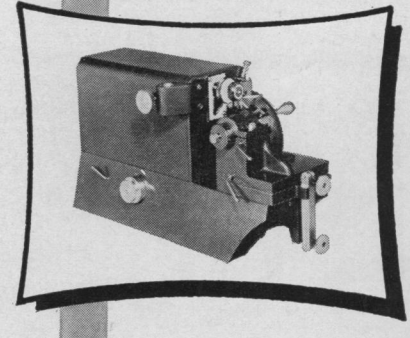

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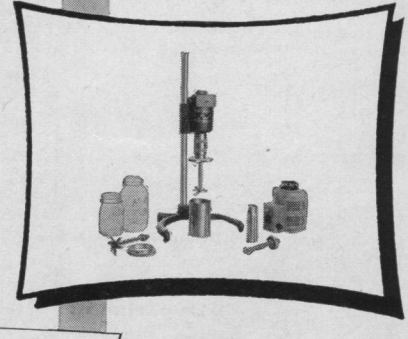

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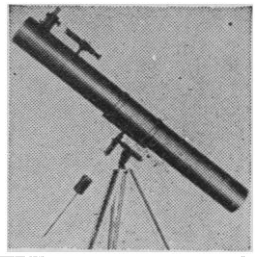

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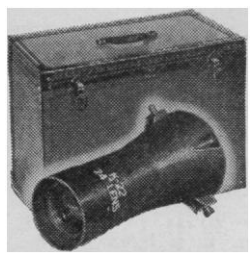

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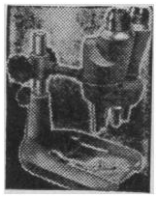

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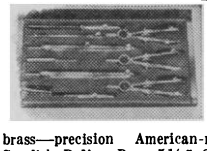

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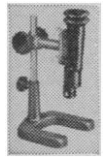

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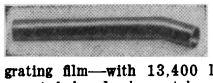

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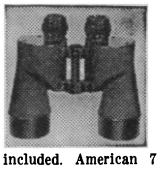

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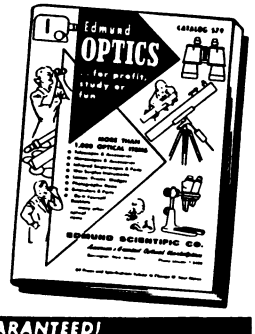

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Letters

Cholinesterase Activity

The recent article by L. S. Rubin (*1*) suggesting a relationship between "acetylcholine-cholinesterase imbalance" and "functional psychoses" raises interesting possibilities. We are particularly interested in this suggestion since we have reported studies (*2, 3*) which indicate a relationship between cholinesterase activity in the cerebral cortex and adaptive behavior among normal animals. However, there seem to be serious difficulties with Rubin's interpretation of his data, and with his proposed "experimental therapy" with schizophrenic patients.

Although Rubin measured only cholinesterase activity, he states that there are differences in acetylcholine-cholinesterase *balance* among his groups of subjects. Unless the amount of acetylcholine is identical for all subjects, or unless there is a negative relationship between the amounts of acetylcholine and cholinesterase (both rather doubtful assumptions), it would seem necessary to measure acetylcholine as well as cholinesterase in order to determine the balance between them. From Rubin's data, all that can be said is that groups of subjects appear to differ in cholinesterase activity. Two subjects who differ in cholinesterase activity might, in fact, have identical acetylcholine-cholinesterase balances if the relationship were linear. At the present time we are attempting to determine the acetylcholine-cholinesterase balance by measuring both acetylcholine and cholinesterase activity in the same animal subjects.

An even more puzzling question is Rubin's use of *erythrocyte* cholinesterase activity as a measure of the enzyme activity in the central nervous system. In our own work (*3*) we have consistently found that even within the central nervous system the correlations of cholinesterase activity among different loci (for example, cerebral cortex and subcortical brain), although generally positive, vary from −0.08 to 0.52, depending upon the strain of animals used. It would therefore be surprising if cholinesterase activity obtained from a blood sample provided a highly valid index for cholinesterase activity of neural tissue—yet this is the assumption which Rubin appears to make without giving any justification for it.

On the basis of both of these assumptions—that erythrocyte cholinesterase activity is a measure of central nervous system cholinesterase activity and that the level of cholinesterase activity is a valid index of acetylcholine-cholinesterase balance—Rubin proposes diisopropylfluorophosphonate therapy for schizophrenic patients showing a high level of erythrocyte cholinesterase activity. It would seem questionable whether such therapy should be undertaken as "the next step," prior to a more careful experimental determination of the validity of the assumptions. Diisopropylfluorophosphonate is, in any effective dose, a poison which inflicts a biochemical lesion on the central nervous system. The field of chemotherapy of mental disease may well benefit from a more cautious and systematic experimental approach.

DAVID KRECH
MARK R. ROSENZWEIG
EDWARD L. BENNETT
University of California, Berkeley

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1. L. S. Rubin, *Science* **128**, 254 (1958).
2. D. Krech, M. R. Rosenzweig, E. L. Bennett, B. Krueckel, *Science* **120**, 994 (1954); *J. Comp. Physiol. Psychol.* **49**, 261 (1956).
3. M. R. Rosenzweig, D. Krech, E. L. Bennett, in *Neurological Basis of Behaviour* (Churchill, London, 1958).

Krech and his associates have raised several pertinent criticisms of the interpretation of the data which I presented in a recent article (*1*) in which significant differences in the hydrolysis rate of acetylcholine by erythrocyte cholinesterase were found between the blood samples obtained from psychiatric patients and those obtained from normal human beings.

The first objection pertains to use of the concept of an *imbalance* between acetylcholine and cholinesterase. The in vitro study was in fact restricted to the action of cholinesterase on a measured, constant quantity of acetylcholine chloride. It must be admitted that in interpreting the data, I was reminded of the finding of Nachmansohn and Rothberg (*2*) that the specific cholinesterase of nervous tissue has an optimal substrate concentration (about 10^{-2} *M* for acetylcholine) and that at higher or lower substrate concentrations the cholinesterase activity drops off markedly. The in vivo interaction between cholinesterase and acetylcholine has also been demonstrated by Early and his associates (*3*). They found that after intravenous injection of from 4 to 8 mg of acetylcholine into rabbits, the true cholinesterase content of serum, 4 minutes after injection, decreased in four experiments, was unchanged in one, and increased in a sixth. In spite of the above suggested interaction between cholinesterase and acetylcholine in vivo, it is admitted that an experimental demonstration of this presumed balance in human beings was not demonstrated in the reported study.

The second objection of Krech *et al.* to my interpretation is one with which researchers in the area of psychophar-

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macology are familiar. Nevertheless, familiarity does not preclude embarrassment when one is asked to establish the identity between peripheral and central enzymatic activity. There is evidence, however, which does suggest a relationship between the specific cholinesterase of erythrocytes and the specific cholinesterase of the brain. Mazur and Bodansky (*4*) in their work on the rabbit and monkey and in work with human beings found that the cholinesterases of the red cells and brain are nearly equally sensitive to diisopropylfluorophosphate. This finding is in agreement with the report of Nachmansohn and Rothberg (*2*) in which it was demonstrated that nervous tissue and erythrocytes contained specific cholinesterase. Oberst and Christensen (*5*) studied the rate of regeneration of erythrocyte and brain cholinesterase in the rat following exposure to isopropylmethylphosphonofluoridate and found that although the rate of regeneration of erythrocyte cholinesterase is somewhat faster than that of brain cholinesterase activity, still the pattern of recovery was similar for both. Cohen *et al.* (*6*) concluded from their animal study that significant depression of erythrocyte cholinesterase activity by isopropylmethylphosphonofluoridate preceded significant depression of brain cholinesterase.

The third objection of Krech *et al.* requires but a brief comment. The objection is directed against the suggestion that diisopropylfluorophosphate be employed experimentally in the treatment of schizophrenic patients showing a high level of erythrocyte cholinesterase activity. Actually, reference was made to the use of members of the class of anticholinesterases. In selecting diisopropylfluorophosphate as the focal point for their objection, the authors caution against its use because "in any effective dose [it is] a poison which inflicts a biochemical lesion on the central nervous system." It is well known that diisopropylfluorophosphate has been used in the treatment of glaucoma and myasthenia gravis. Furthermore, it has been employed by Rowntree *et al.* (*7*), who administered from 1 to 2 mg/day to psychotic patients for as long as 37 days without untoward, measurable, permanent effects.

LEONARD S. RUBIN
Eastern Pennsylvania Psychiatric Institute, Philadelphia

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1. L. S. Rubin, *Science* 128, 254 (1958).
2. D. Nachmansohn and M. A. Rothberg, *J. Biol. Chem.* 158, 653 (1945).
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6. B. S. Cohen, F. W. Oberst, J. W. Crook, C. Harris, *ibid.*, p. 209.
7. D. W. Rowntree, S. Nevin, A. Wilson, *J. Neurol. Neurosurg. Psychiat.* 13, 47 (1950).

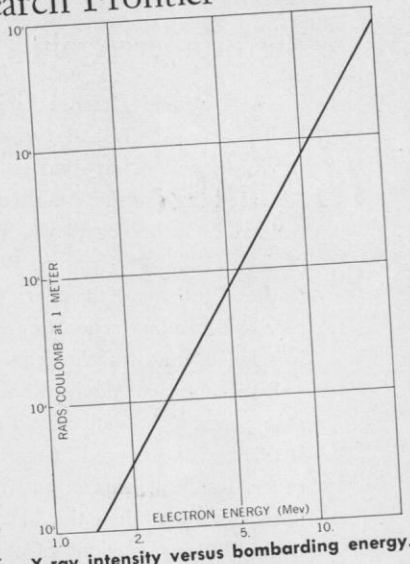
The place of the Particle Accelerator in Basic Research...

Accelerators at the Research Frontier — XII

The needs of science for charged particles in the nuclear binding-energy range continue to create a dynamic and demanding interest in Van de Graaff and microwave linear accelerators. In the last of this series, typical requirements will be considered regarding higher energy, greater intensity, and more exacting specifications of stability and pulsing. The uses for such advanced accelerator techniques are not clearly known. It is felt that a consideration of attainable performance from accelerators may stimulate action on research programs now lying dormant because of a lack of appropriate apparatus. The advanced characteristics outlined below, although not exhibited by standard equipment, can be contemplated now, due to recent technical advances in the design of accelerator components.

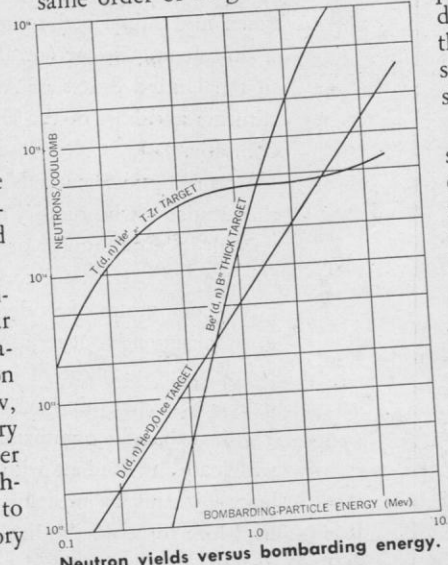
Energy: The successful performance of the tandem Van de Graaff has already demonstrated the availability of 45-Mev oxygen ions. By utilizing 3- or 4-stage ion-exchange and acceleration systems, heavy ions in the 100-Mev realm are not inconceivable. The normal Van de Graaff criteria of energy-homogeneity and low dispersion would be maintained.

The new modular design concept for the microwave linear accelerator extends the availability of high-energy electron beams to hundreds of Mev, limited primarily by budgetary considerations. Microwave power tubes and flexible design techniques can now be utilized to provide more versatile laboratory apparatus.



X-ray intensity versus bombarding energy.

Intensity: Electron or ion-beam currents in the one-ampere range, at a few Mev, can now be considered seriously. Pulsed beams with these instantaneous intensities are closer to realization than continuous beams of the same order of magnitudes.



Neutron yields versus bombarding energy.

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Among the research fields in which it is believed these particle-accelerator characteristics may make a considerable contribution, are the following: nuclear physics, biology, solid-state, radiation damage, plasma physics, the ignition of thermonuclear systems, and space-environment studies.

A great variety of fruitful research can clearly be covered by existing accelerators now considered by HIGH VOLTAGE ENGINEERING to be standard items. Physicists and radiation chemists at HIGH VOLTAGE are prepared to explore on an individual basis, long-range and immediate problems that could utilize our accelerator systems.

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Chalk River Laboratories, Atomic Energy of Canada, Ltd., reported at Am. Phys. Soc. Meeting, Vancouver (Aug. 1958)

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F St. between 18th and 19th Sts., N.W.; tour lasts 1½ hours. (ii) Morning and afternoon. U.S. Geological Survey, Computation Branch. Demonstration of the use of the Datatron 205 electronic computer as applied to the fields of crystallography, geophysics, and water resources data reduction, and explanation of the Datatron computer system. Tours start at Room 1449, Interior Department Building, C St. between 18th and 19th Sts., N.W.; tour lasts 1½ hours. (iii) Afternoon. U.S. Geological Survey, Topographic Division, Atlantic Area Headquarters, 1109 North Highland St., Arlington, Va. This division is a topographic mapping facility and research laboratory. There will be demonstrations of the operation of photogrammetric instruments and of cartographic and map-finishing operations. Bus leaves from Sheraton-Park Hotel. (iv) Afternoon. U.S. Geological Survey, nuclear geology installation (located at the U.S. Bureau of Standards, Bldg. 14, 50 yards west of Connecticut Ave. on the first driveway north of Van Ness St.). This installation makes studies in nuclear geology and geochronology for which mass spectrometric, coding, and other physical measurements are employed.

In addition, visitors are welcome at the laboratories of the Paleontology and Stratigraphy Branch, U.S. Geological Survey, located in the U.S. National Museum, Constitution Ave. at 10th St. N.W.

Zoological Sciences

Section F. Zoologists' dinner and vice-presidential address of Section F: "Biology and Politics: Some Thoughts After Visits to Universities in the U.S.S.R.," by Harold H. Plough, Amherst College; 29 Dec.; Karl M. Wilbur, Duke University, presiding.

American Society of Zoologists. Four-session symposium: "Vertebrate Zoology"; arranged by Alfred S. Romer, Harvard University; 27 and 28 Dec.

Part I, Alfred S. Romer, presiding. Papers by Robert H. Denison, Chicago Natural History Museum; Horace E. Wood, II, Newark College of Arts and Sciences; Harvey I. Fisher, Southern Illinois University; Perry W. Gilbert, Cornell University; Donald Baird, Princeton University; Tilly Edinger, Harvard University; Howard E. Evans, Cornell University; Richard J. Baldauf, Agricultural and Mechanical College of Texas; Everett C. Olson, University of Chicago; and Walter Auffenberg, University of Florida.

Part II, Bobb Schaeffer, American Museum of Natural History, presiding. Papers by George C. Christensen, Purdue University; H. Clark Dalton, New York University; Hans Elias, Chicago Medical School; David H. Dunkle, U.S. National Museum; Theodore H. Eaton, Jr., Kansas University; Malcolm Jollie, University of Pittsburgh; Edward M. Nelson, Loyola University, Chicago; A. Gordon Edmund, Royal Ontario Museum; and Karl F. Koopman, Academy of Natural Sciences of Philadelphia.

Part III, Perry W. Gilbert, Cornell University, presiding. Papers by Uno Holmgren, Harvard University; Nicholas Hotton, III, University of Kansas; F. Gaynor Evans, Wayne State University; Donn Eric Rosen, New York Zoological Society; Carl Gans, University of Buffalo; Stuart O. Landry, University of Missouri; Bobb Schaeffer; Alfred S. Romer; E. Lloyd DuBrul, University of Illinois; and D. Dwight Davis, Chicago Natural History Museum.

Part IV, Alfred S. Romer, presiding. Papers by Thomas S. Parsons, Harvard University; Charles A. Reed, University of Illinois; Richard Ritland, College of Medical Evangelists; William L. Straus, Jr., Johns Hopkins University; Samuel Booker McDowell, Jr., Newark College of Arts and Sciences; Ernest E. Williams, Harvard University; Albert E. Wood, Amherst College; and Rainer Zongerl, Chicago Natural History Museum.

Five-session symposium: "Arthropod Physiology"; arranged by John B. Buck, National Institutes of Health; 27–29

Dec. Part I, V. G. Dethier, University of Pennsylvania, presiding. Papers by Jack Colvard Jones, University of Maryland; Timothy H. Goldsmith, Harvard University; Daniel S. Grosch, North Carolina State College; Calvin A. Lang, Johns Hopkins University; Donald M. Maynard, University of Michigan; James M. Moulton, Bowdoin College; Michael Menaker, Princeton University; Shepherd K. deF. Roberts, Princeton University; and J. W. Green, M. Harsch, and L. Barr, of Rutgers University, with C. L. Prosser, University of Illinois.

Part II, C. A. G. Wiersma, California Institute of Technology, presiding. Papers by Edward R. Baylor, Woods Hole Oceanographic Institution, and Donald Kennedy, Syracuse University; Frederick E. Smith, University of Michigan; Talbot H. Waterman, Yale University; Saul B. Barber, Lehigh University; Melvin J. Cohen, University of Oregon; David R. Evans, Johns Hopkins University; Miriam Salpeter and Charles Walcott, Cornell University; W. G. Van der Kloot, New York University; and C. A. G. Wiersma.

Part III, K. D. Roeder, Tufts University, presiding. Papers by R. L. Beard, Connecticut Agricultural Experiment Station; Edward G. Boettiger, University of Connecticut; James Case, University of Iowa; John B. Buck, National Institutes of Health; Ernst Florey, University of Washington; Donald Kennedy; James B. Preston, Syracuse University; Jay Robbins, Columbia University; Philip Ruck, Tufts University; and Myron L. Wolbarsht, Naval Medical Research Institute.

Part IV, Alexander Wolsky, Fordham University, presiding. Papers by Arnold M. Clark, University of Delaware; John D. Costlow, Jr., Duke University; David Hanlon, University of New Hampshire; Robert I. Levy and Howard A. Schneiderman, Cornell University; Helen Park and John Buck, National Institutes of Health; David Shappirio, University of Michigan; A. N. Siakatos, Cornell University; William H. Telfer and William E. Koch, University of Pennsylvania; Alexander Wolsky; and Henrietta G. Kalicki, Manhattanville College.

Part V, Howard A. Schneiderman, Cornell University, presiding. Papers by Dorothy M. Skinner, Harvard University; Dorothy E. Bliss, American Museum of Natural History; Patricia Cannon Sprague, Albert Einstein College of Medicine; James B. Durand, Rutgers University; F. Engelmann, Albert Einstein College of Medicine; Judith Haskell and Richard C. Sanborn, Purdue University; E. S. Hodgson, Columbia University; S. Ozbas, University of Ankara; Kenneth D. Roeder, Tufts University; and Donald H. Bucklin, Betty F. Berrend, Betty J. Montag, and Nancy A. Schneider, University of Wisconsin.

Eight sessions of contributed papers: "Physiology," "Protozoology and Cytology," "Cellular Biochemistry," "Histology," "Endocrinology," "Developmental Biology," "Developmental Biology (Chemical)," and "General Zoology and Evolution"; 27–29 Dec.; 78 papers to be read, 55 additional papers to be read by title only.

Society of Systematic Zoology.

Session for contributed papers; 28 Dec.; ten papers to be read.

Linnaean Bicentennial Celebration, five sessions, cosponsored by AAAS Section G (Botanical Sciences, American Microscopical Society, American Society of Plant Taxonomists, Association of Southeastern Biologists, Section A of the Entomological Society of America, and the Society for the Study of Evolution.

Symposium: "Linnaeus and Nomenclatorial Codes"; 28 Dec.; Reed. C. Rollins, Harvard University, presiding. Papers by W. T. Stearn, British Museum of Natural History; H. W. Rickett, New York Botanical Garden; R. E. Buchanan, Iowa State College; and E. G. Linsley and R. L. Usinger, University of California, Berkeley.

Symposium, cosponsored in addition by the American Society of Zoologists and AAAS Section F (Zoological Sciences): "Basic Concepts of Systematic Order"; 29 Dec.; Alfred E. Emerson, University of Chicago, presiding. Papers by M. R. Irwin, University of Wisconsin; H. H. Ross, Illinois Natural History Survey; and C. H. Seevers, Roosevelt University.

Symposium, cosponsored in addition by the American Society of Zoologists and AAAS Section F (Zoological Sciences): "Systematics, Present and Future"; 29 Dec.; A. Remington Kellogg, Smithsonian Institution, presiding. Papers by F. A. Stafleu, International Association for Plant Taxonomy; R. E. Blackwelder, Southern Illinois University; David D. Keck, New York Botanical Garden; and G. W. Wharton, University of Maryland.

Panel discussion: "London Meeting on Nomenclature"; 30 Dec.; Curtis W. Sabrosky, U.S. National Museum, presiding. Panel members include Philip Hershkovitz, Chicago Natural History Museum; Ernst Mayr, Museum of Comparative Zoology; G. Winston Sinclair, Geological Survey of Canada; and R. L. Usinger.

Panel discussion: "Problems in Systematics"; 30 Dec.; panel is composed of members of previous symposia.

Biological Sciences

Symposium, joint program of Sections F (Zoological Sciences) and G (Botanical Sciences), cosponsored by the American Society of Zoologists, Botanical Society of America, Society of Systematic Zoology, American Society of Naturalists, and Society of General Physiologists: "Some Unsolved Problems in Biology, 1958"; 30 Dec.

Part I: "Problems in Plant and Animal Behavior"; arranged by Karl M. Wilbur, Duke University; Harold H. Plough, Amherst College, presiding. Papers by Marion W. Parker, Agricultural Research Service, U.S. Department of Agriculture; V. G. Dethier, University of Pennsylvania; and Donald R. Griffin, Harvard University.

Part II: "Problems in Differentiation"; arranged by Barry Commoner, Washington University; Kenneth V. Thimann, Harvard University, presiding. Papers by Frederick C. Steward, Cornell University; John T. Bonner, Princeton University; and James D. Ebert, Johns Hopkins University.

American Society of Naturalists. Symposium: "Integrative Mechanisms in Biology"; 28 Dec.; arranged by Jack Schultz (Institute for Cancer Research, Philadelphia), who will preside. Papers by M. G. F. Fuortes, Institute of Neurological Diseases and Blindness, Bethesda, Md.; Ralph O. Erickson, University of Pennsylvania; Efraim Racker, Public Health Research Institute, New York; and Henry Quastler, Brookhaven National Laboratory.

Special closed-circuit color television program, part II, jointly sponsored by Sections F (Zoological Sciences) and G (Botanical Sciences); arranged by a subcommittee of the American Institute of Biological Sciences Committee on Education and Professional Recruitment, H. Burr Roney, University of Houston, chairman; 28 Dec.

Presidential address, "Homage to Santa Rosalia, or Why There Are so Many Different Kinds of Animals," by G. Evelyn Hutchinson, Yale University; 30 Dec.; Bruce Wallace, Cornell University, presiding.

Biometric Society, Eastern North American Region. Invited papers, jointly with the American Statistical Association: "Mathematical Models in Biology"; 31 Dec.; arranged by Jerome Cornfield, Johns Hopkins University, who will preside.

Ecological Society of America. Contributed papers: "Plant and General Ecology"; 28 Dec.; Herbert C. Hanson, Catholic University of America, presiding.

Contributed papers, jointly with the American Society of Zoologists: "Animal Ecology"; 28 Dec.; David E. Davis, Johns Hopkins University, presiding.

Contributed papers, jointly with the American Society of Zoologists and the Section on Animal Behavior and Sociobiology of both societies: "Animal Behavior and Sociobiology"; 29 Dec.; John T. Emlen, University of Wisconsin, presiding.

Symposium, jointly with Section I

(Psychology), cosponsored by the American Society of Zoologists: "Early Expeperience and Imprinting"; arranged by A. M. Guhl, Kansas State College, and Eckhard H. Hess, University of Chicago; 29 Dec.; A. M. Guhl, presiding. Papers by William S. Verplanck, Hunter College; Eckhard H. Hess; N. E. Collias, University of California; and Paul J. Scott, Roscoe B. Jackson Memorial Laboratory, Bar Harbor.

Botanical Sciences

Section G. Contributed papers; 28 Dec.; Oswald Tippo, Yale University, presiding.

Symposium, cosponsored by the American Society of Plant Physiologists: "The Physiology of Algae"; 29 Dec.; arranged by Robert W. Krauss, University of Maryland, who will preside. Papers by John H. Ryther, Woods Hole Oceanographic Institution; Osmund Holm-Hansen, University of Wisconsin; Theodore R. Rice, Fish and Wildlife Service, Radiobiological Laboratory; and Constantine Sorokin, University of Maryland.

Botanists' dinner and vice-presidential address of Section G, jointly with the botanical societies: "Botany and the Educational Ferment," by Oswald Tippo; 29 Dec.; Barry Commoner, Washington University, presiding.

Anthropology

Section H. Vice-presidential address by Leslie A. White, University of Michigan; 27 Dec.; A. Irving Hallowell, University of Pennsylvania, presiding.

Symposium: "Anthropological Research in Government"; arranged by John M. Corbett, National Park Service; 27 Dec.; Ronald F. Lee, National Park Service, presiding. Papers by Howard Cline, Library of Congress; Frank H. H. Roberts, Jr., Smithsonian Institution; and John M. Corbett.

Psychology

Symposium: "Psychopharmacology: Behavior Profiles and Drug Action"; 28 Dec.; arranged by Joseph V. Brady, Walter Reed Army Medical Center, who will preside. Papers by John J. Boren, Merck Institute of Therapeutic Research, West Point, Pa.; William Morse, Harvard University; and Donald Bullock, Institute of the Pennsylvania Hospital, Wyncote. Discussants: B. F. Skinner, Harvard University; Murray Sidman, Walter Reed Army Medical Center; and Louis Lasanga, Johns Hopkins School of Medicine.

Invited paper on the identification, development, and utilization of human talents (John T. Dailey, American Institute of Research, Washington, D.C.); 28 Dec.

Symposium: "The Human as a Measuring Instrument"; 28 Dec.; arranged by Frank A. Geldard, University of Virginia, who will preside. Papers by Clarence H. Graham, Columbia University; Wendell R. Garner, Johns Hopkins University; and S. Smith Stevens, Harvard University.

Vice-presidential address: "The Effects of Drugs on Behavior," by B. F. Skinner. Harvard University; 28 Dec.; Clifford T. Morgan, Johns Hopkins University, presiding.

Symposium: "How Phylogenetically Older Parts of the Brain Relate to Behavior"; 29 Dec.; arranged by Robert B. Livingston, National Institutes of Health, who will preside. Papers by H. W. Magoun, University of California School of Medicine; Paul D. MacLean, National Institute of Mental Health; W. J. H. Nauta, Walter Reed Army Medical Center; Robert Galambos, Walter Reed Army Medical Center; and David Shakow, National Institute of Mental Health.

Symposium: "The Future of Contemporary Learning Theories"; 29 Dec.; arranged by H. H. Kendler, New York University, who will preside. Papers by Abram Amsel, Tulane University; R. J. Herrnstein, Walter Reed Army Medical Center; Frank Restle, Michigan State University; and Donald A. Riley, University of California.

Meetings

International Institute of Sociology

The Institut International de Sociologie held its 18th biennial congress at Nürnberg, Germany, 10–18 September. There were 295 participants, of which 221 were delegates from 31 countries. Four days were spent at the Technical University, where panel discussions were devoted to the several hundred contributed papers. After the panel sessions, the members traveled for 5 days in large busses to see postwar Germany. One day was spent viewing the reconstruction of Kassel, the big railroad and textile city almost completely destroyed during the war; the other four were spent in East Germany and East and West Berlin.

The IIS is the oldest sociological organization, having been founded by René Worms at Paris in 1893. Papers for its meetings may be written in English, French, Spanish, Italian, or German. A summary of each paper is given in a second language, and an oral presentation in a third. After every meeting, the proceedings are printed in bound volumes for distribution to the members. Since the war, meetings have been held in Rome, Istanbul, Lebanon, and Paris.

Membership is elective; national quotas prevent domination by any country. Religious and political discussion is prohibited. Other than a first membership fee of about $5, there are no dues. A subscription to the biennial meeting, which includes the right to present a scientific paper, is also about $5.

The sociologist Hans Freyer, formerly of the University of Leipzig, but now in the West Zone, was president of the recent congress. K. Valentin Muller of the Technical University at Nürnberg and general secretary of the IIS, was host this year. Carle C. Zimmerman of Harvard University is secretary for the United States and Canada.

New England Geology

The New England Intercollegiate Geological Conference held its 50th meeting, 11–12 October, in southern Connecticut, with over 200 in attendance. Wesleyan and Yale Universities were joint hosts. On the first day, the following field trips were held: "Stratigraphy and structure in the Middle Haddam quadrangle and vicinity," led by John L. Rosenfeld, University of California, Los Angeles, and Gordon P. Eaton of Wesleyan; "Stratigraphy and structure in the Triassic rocks of central Connecticut," led by John E. Sanders of Yale; and "Pleistocene geology of the lower Quinnipiac Valley," led by Stephen C. Porter of Yale. The second-day trips included "Structure and metamorphism

in the Deep River quadrangle and vicinity," Lawrence Lundgren of the University of Rochester, and "Triassic border fault and associated sedimentary rocks," John Rodgers of Yale.

At the annual business meeting, it was voted to accept the invitation of E-an Zen of the University of North Carolina to run a series of trips in western Vermont in October 1959. Details will be announced next spring.

Crystallographic Apparatus

The Commission on Crystallographic Apparatus of the International Union of Crystallography has announced two conferences to be held at the Karolinska Institutet, Stockholm, Sweden: 11 June 1959, Precision Lattice Parameter Determination; and 12 June 1959, Counter Methods for Crystal Structure Analysis. Attendance will be limited to 50 people actively engaged in either of these fields. Those wishing to participate should notify the chairman, Dr. William Parrish, Philips Laboratories, Irvington-on-Hudson, New York, N.Y., no later than *1 March 1959*. Those wishing to present a paper should send a title and preliminary abstract to the chairman by *1 December*.

The Second Symposium on X-Ray Microscopy and X-Ray Microanalysis will also be held at the Karolinska Institutet; it is scheduled for 15–17 June 1959. Information on the symposium may be obtained from Dr. G. Höglund, Inst. f. Medicinsk Fysik, Karolinska Institutet, Stockholm 60, Sweden. Hotel reservations should be arranged before 1 March 1959 through Reso Travel Bureau, Barnhusgatan 16, Stockholm 1, Sweden.

Agricultural Meteorology

The second session of the Commission for Agricultural Meteorology of the World Meteorological Organization finished its work on 17 October in Warsaw, Poland. The session lasted 3 weeks and was attended by representatives from 32 countries from all the climatic regions of the world.

The meeting dealt with all aspects of meteorology of interest to agriculture and forestry, such as weather forecasting for agriculture, frost warnings, weather forecasting for forest-fire prevention, and the influence of weather on the incidence and development of infectious diseases in livestock. The major part of the session was devoted to preparing an international guide for agricultural meteorological services.

The important contribution of meteorology to the fight against plant diseases and pests was also discussed. In this connection, a working group of the commission has prepared a valuable report that

has been published by the secretariat of WMO. This report describes the work of a WMO technical assistance mission to Chile in 1955 and 1956 that used weather data to combat potato blight, with excellent results.

The commission created a working group which is to prepare an international guide for setting up shelter belts for frost protection. Another working group is to prepare a technical note on meteorological aspects of forest fires. In view of the increasing importance of the use of aircraft for agricultural purposes, another working group was set up to prepare international instructions concerning meteorological service for such aircraft.

The role of meterological assistance in locust control was reviewed, and a report on experience gathered throughout the world in this field was examined. Since 1955, WMO has had a meteorological technical assistance mission in Nairobi, consisting of meteorological experts and a team of locally employed draftsmen and weather-chart plotters. This group conducts basic research on tropical meteorology in connection with locust swarm movements and locust breeding habits. The life and movements of the desert locust are very largely determined by weather factors. In this field, close collaboration is maintained with FAO.

The Warsaw session was presided over by J. Burgos of Argentina, and at the end of the meeting the commission elected Austin Bourke of Ireland to serve as president for the coming 4-year period. M. S. Kulik of the U.S.S.R. was elected vice president for the same period.

Forthcoming Events

December

15–17. American Soc. of Agricultural Engineers, winter, Chicago, Ill. (J. L. Butt, American Soc. of Agricultural Engineers, St. Joseph, Mich.)

15–19. Radiation Biology, 2nd Australian conf., Melbourne, Australia. (J. H. Martin, Physics Dept., Cancer Inst. Board, 483 St. Lonsdale St., Melbourne.)

17. Institute of Aeronautical Sciences, Washington, D.C. (R. R. Dexter, IAS, 2 E. 64 St., New York 21.)

18–20. American Physical Soc., Los Angeles, Calif. (K. K. Darrow, APS, Columbia Univ., New York 27.)

26–31. American Assoc. for the Advancement of Science, annual, Washington, D.C. (R. L. Taylor, AAAS, 1515 Massachusetts Ave., NW, Washington 5.)

The following 47 meetings are being held in conjunction with the AAAS annual meeting.

AAAS Committee on the Social Aspects of Science (C. D. Leake, Ohio State Univ. College of Medicine, Columbus, Ohio). 27 Dec.

AAAS Cooperative Committee on the Teaching of Science and Mathematics (J. W. Buchta, Univ. of Minnesota, Minneapolis, Minn.). 28 Dec.

Academy Conf. (J. A. Yarbrough, Meredith College, Raleigh, N.C.). 27–28 Dec.

Alpha Epsilon Delta (M. L. Moore, 7 Brookside Circle, Bronxville, N.Y.). 27 Dec.

American Assoc. of Clinical Chemists (Miss E. G. Frame, Clinical Center, Natl. Institutes of Health, Bethesda 14, Md.). 29–30 Dec.

American Assoc. of Scientific Workers (R. J. Rutman, 6331 Ross St., Philadelphia 44, Pa.).

American Astronautical Soc. (R. Fleisig, 58 Kilburn Rd., Garden City, N.Y.). 27–30 Dec.

American Geophysical Union (W. E. Smith, AGU, 1515 Massachusetts Ave., NW, Washington 5).

American Meteorological Soc. (K. Spengler, 3 Joy St., Boston, Mass.).

American Nature Soc. (S. Mulaik, Biology Dept., Univ. of Utah, Salt Lake City). 26–30 Dec.

American Physiological Soc. (F. A. Hitchcock, Ohio State Univ., Columbus).

American Political Science Assoc. (E. M. Kirkpatrick, APSA, 1726 Massachusetts Ave., NW, Washington, D.C.). 27 Dec.

American Psychiatric Assoc. (L. J. West, Univ. of Oklahoma School of Medicine, Oklahoma City 4). 27–28 Dec.