

CLEVELAND—130th MEETING

26–30 December

(Left) *The Allen Memorial Library Building which houses the Cleveland Medical Library and the Dittrick Museum of Historical Medicine, an outstanding collection of historical medical artifacts. (Top) Nela Park, national headquarters of General Electric's Lamp Division. During this outdoor lighting display, 8500 electric light sources of scores of types, colors, and sizes were employed. (Left, under top photo) Lewis Research Center. The Plum Brook Research Reactor is within the dome structure and the "hot" laboratory is at the right. [NASA] (Right, under top photo) Cleveland Museum of Art.*

"We are not convened for a light duty—our self-imposed task is not an amusing child's play, and we have not accepted the liberally offered hospitalities of this beautiful city for the enjoyment of a social festival. We have come

to give and receive instruction and inspiration." This statement by Benjamin Peirce, president of the AAAS, in the opening address at the first Cleveland meeting of the AAAS in 1853 still applies as the reason for holding the annual meetings of the AAAS—the dissemination of scientific knowledge. This year's meeting in Cleveland (26–30 December) will include about 300 sessions which have been planned by the 65 participating societies. In addition to the general sessions, several special sessions presented by outstanding authorities in their fields have been planned. They have been scheduled so as to not conflict with any other symposia. Headquarters for the meeting will be the Sheraton-Cleveland Hotel.

Some interesting and informative symposia which will be presented at this year's meeting include: "Recent Results of Space Research" (details will be announced at the last moment);

"Economics of Medicine," arranged by economist Bert F. Hoselitz, M.I.T.; "The Sciences in Japan," 17 papers reporting on the Japanese accomplishments in as many disciplines; "The Uses of Lasers and Masers," arranged by R. J. Collins, University of Minnesota; "Infrared and Optical Lasers," Arthur L. Schawlow, Stanford University; "Science and the New Humanism," Hudson Hoagland, Worcester Foundation for Experimental Biology; "Space Biology," arranged by Dale W. Jenkins, NASA; "Next Steps After the Test Ban," arranged by Karl W. Deutsch, Yale; "Telltale Dust," address by Paul B. Sears, Yale; "The Planning and Management of Science Research Programs," arranged by Zola Bronson, National Science Foundation.

For more complete details concerning the Cleveland meeting, consult the following pages of this issue and the *General Program*.

CLEVELAND—

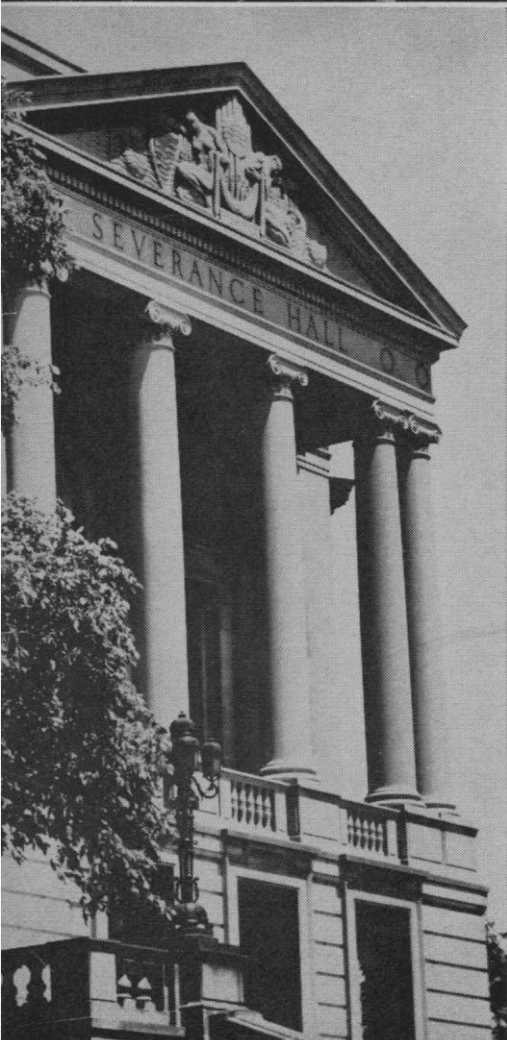
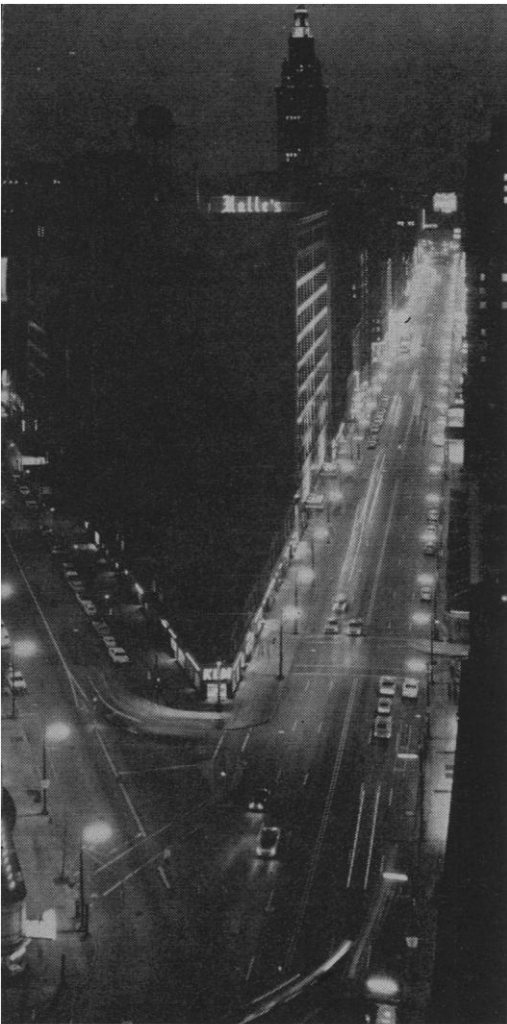
Cleveland, one of the leading cultural, trading, and manufacturing centers of the midwest, offers its visitors many places to visit and sights to see.

Downtown Area: *The Mall*, a "T"-shaped tract of land about 104 acres in the heart of the city, includes City Hall, Cuyahoga County Court House, Cuyahoga County Office Building, the Federal Building, Board of Education Building, Public Auditorium, Public Library, and the Municipal Stadium . . . *Union Station*, adjoining Public Square, is in the heart of downtown . . . *Monumental Park* is in the heart of the business section and contains the Soldiers and Sailors Monument in its southeast section and a statue of General Moses Cleaveland, founder of the city, in the southwest section in front of the Terminal Tower . . . *Terminal Tower* soars to a height 708 feet above the concourse level and has on the 42nd floor an Observation Area where visitors may view the city . . . *Burkefront Airport*, Lakefront east of 12th St., handles regional and local-service airline traffic . . . *Shopping District* extends eastward along Euclid Avenue from Public Square to E. 22nd St. . . *Electrama Exhibit*, lobby of Illuminating Building, 55 Public Square . . .

Builders Exchange Exhibit, 1737 Euclid Ave., features latest building products and materials . . . *Playhouse Square* includes five large theaters in the Euclid Avenue-14th Street district.

East Side Area: *The Cleveland Aquarium*, Lakefront Blvd. and East 72nd St. in Gordon Park, houses native, tropical, and Lake Erie food and game fish . . . *Thompson Products Auto Album and Aviation Museum*, Chester Avenue at E. 30th St., contains a collection of antique automobiles which are completely restored and in running condition. A 1910 Curtis plane, early aircraft engines, the original Thompson Trophy, and miniature aircraft models are also on display . . . *Dunham Tavern*, 6709 Euclid Ave., was built in the 1830's and was the last stopping place for travelers from the east before reaching the then little city of Cleveland . . . *Cleveland Health Museum*, 8911 Euclid Ave., is the first permanent health museum established in America and contains "Juno," the transparent talking woman who provides information about the human body as she dramatically lights up her 20 life-size organs . . . *University Circle*, a center of edu-

(Top left) Cleveland's "Great White Way." (Bottom left) Severance Hall.



Places to Visit

cational, religious, business, and social life, offers much in architectural and natural beauty. The Circle surrounds a natural amphitheater which includes a small lake and beautiful gardens. Behind them is the Cleveland Museum of Art. Nearby are Western Reserve University and its Medical Center, Case Institute of Technology, Cleveland School of Art, Cleveland School of Architecture, Western Reserve Historical Society ("The Spirit of '76" by Archibald Willard is one of its valuable possessions), Severance Hall, Allen Memorial Library, Natural Science Museum (the Ralph Mueller Planetarium and the Thomas Burnham Research Laboratory are also part of the Museum's complex), the Freiberger Library of Western Reserve and the Newton D. Baker Cleveland College Building, and numerous churches . . . *Cleveland Medical Library Association and the Howard Dittrick Museum of Historical Medicine*, 11000 Euclid Ave., feature medical books and displays of historic medical objects . . . *Garden Center*, 11190 E. Boulevard, offers seasonal exhibits and consultation on garden problems . . . *Shakespeare and Cultural Gardens*, Rockefeller Parkway, north of Super-

rior Avenue near North Boulevard, is representative of the culture of the countries from which Cleveland residents immigrated . . . *City Greenhouse*, 750 E. 99th St., contains among its exhibits a tropical house and an orchid house . . . *Nela Park* (General Electric Company). E. Cleveland near Euclid Ave. at 16100 block, has a display of electric lighting history from early arc and carbon lamp to present range of light uses and techniques. Christmas outdoor lighting display tours.

West Side Area: Cleveland Hopkins Airport, Riverside Rd., near Brookpark Rd., is one of the largest and busiest airports in the world. Adjoining the airport is the *Lewis Flight Propulsion Laboratory* of the National Advisory Committee for Aeronautics . . . *Cleveland Zoo*, in Brookside Park on W. 25th St. south of Denison Ave. at Fulton Parkway, contains a representative collection of animals and land and water birds.

Industrial scenes, including bridges, ore boats, cement and ore docks, steel mills, and oil refineries can be seen by automobile along such streets as Front St. N.W., W. 11th St. N.W., Riverbed St. N.W., Center St. N.W., Merwin St. N.W., Carter Rd. N.W.,

Columbus Rd. N.W., W. 3rd St. south from the Eagle Street ramp to Clark Ave. S.W. From the Clark Avenue Bridge and Harvard Denison Bridge one can view coke ovens, rolling mills, and blooming mills.

Cleveland will offer a variety of recreational activities for participants and their families. There will be concerts by the famous Cleveland Orchestra, presentations at The Playhouse, Karamu Theater, and Lakewood Little Theater (daily newspapers should be consulted for production schedules), and movies. For the gourmet, Cleveland will prove more than satisfactory. The variety of restaurants and menus reflect the international character of this port city. Some of the more famous eating places include: Gigi's (French), 2120 E. 4th St.; Kon-Tiki (Polynesian), Sheraton-Cleveland Hotel; Guarino's (Italian), 12309 Mayfield Rd.; Blue Point Restaurant (Seafood), 2030 E. 9th St.; Grecian Gardens (Greek), 2230 E. 4th St.; Chin's Red Dragon (Cantonese), 3048 St. Clair Ave.; and Gazelle Restaurant (Steaks), 1132 Euclid Ave.

For details of the AAAS Cleveland meeting, 26-30 December, see page 1326 of this issue.

(Below) Aerial view of downtown Cleveland.



AAAS Special Sessions

One of the characteristic and most important features of the annual meetings of the Association is the series of outstanding general addresses by distinguished scientists, sponsored by the Association or by organizations that meet regularly with it. These special events are open to the general public.

Moving Frontiers of Science. Part I, 26 Dec., evening. "The evolution of an active mathematical theory," Andrew M. Gleason, professor of mathematics, Harvard. "The deep structure of continents," Gordon J. F. MacDonald, University of California, Los Angeles. Mina S. Rees, member, AAAS board of directors, will preside.

AAAS Distinguished Lecture. 27 Dec., evening. "Ideology and income," John Kenneth Galbraith, Paul M. Warburg professor of economics, Harvard, and recent U.S. Ambassador to India. Don K. Price, member, AAAS board of directors, will preside.

Moving Frontiers of Science. Part II, 28 Dec. "Infrared and optical masers," Arthur L. Schawlow, professor of physics, Stanford. "Microscopic brains," Vincent G. Dethier, professor of zoology, University of Pennsylvania. H. Bentley Glass, member, AAAS board of directors, will preside.

George Sarton Memorial Lecture. 28 Dec. "Science and the new humanism," Hudson Hoagland, executive director, Worcester Foundation for Experimental Biology and president, American Academy of Arts and Sciences. Chauncey D. Leake, professor of pharmacology, School of Medicine, University of California, San Francisco, and past president of AAAS, will preside.

AAAS Presidential Address. 28 Dec., evening. "The fifth estate in the seventh decade," Paul M. Gross, retiring president of the AAAS. Alan T. Waterman, president of the AAAS, will preside. Before the address, Charles E. Spahr, president of the Standard Oil Company of Ohio and general chairman of the Cleveland meeting, will speak briefly, and AAAS awards will be announced.

After the address there will be an informal reception for the president and retiring president of the AAAS. All registrants and members of the local committees are invited to attend.

Joint Annual Address of the Society of the Sigma Xi and the United Chapters of Phi Beta Kappa. 29 Dec., evening. "Telltale dust," Paul B. Sears, director emeritus, Conservation Program, Yale, and past president of AAAS. Wal-

lace R. Brode, past president of AAAS, will preside. The Sigma Xi representative will be Frederick R. Rossini, University of Notre Dame; the Phi Beta Kappa representative, H. Bentley Glass.

Annual Illustrated Lecture of the National Geographic Society. 30 Dec., evening. "Mozambique, the land of the good people," Volkmar Wentzel, foreign editorial staff, National Geographic Society. Laurence M. Gould, president elect of AAAS, will preside.

AAAS General Sessions

The general sessions are broad interdisciplinary programs, sponsored by the Association as a whole, or by sections, committees, or affiliates of AAAS; they are given here in chronological sequence.

The Sciences in Japan. Part I. 26 Dec., morning. Joint program of the Science Council of Japan and AAAS. Alan T. Waterman will preside. "Organization and financial support of scientific activities in Japan," Tomizo Yoshida, vice president, Science Council of Japan; "Recent developments in sociological studies in the modernization of Japanese society," Kizaemon Ariga, Keio University, Tokyo; "Development in Japan of the algebraic theory of numbers and allied topics," Shokichi Iyanaga, University of Tokyo; "Theory of computer circuit and logical design," Motinori Goto, Tokyo Institute of Technology; "Statistical studies on nonlinear control systems," Yoshikazu Sawaragi, Kyoto University; "Development of earthquake-resistant construction and its international cooperation," Kiyoshi Muto, University of Tokyo.

Part II. 27 Dec., morning. Harry C. Kelly, dean of the faculty, North Carolina State College, Raleigh, will preside. "Ionosphere and space research in Japan," Ken-ichi Maeda, Kyoto University; "Recent developments and future program in Japan of high energy physics," Gyo Takeda, Tohoku University, Sendai; "Recent developments in structural chemistry in Japan," Ken-iti Higasi, Hokkaido University, Sapporo; "Recent advances in the chemistry of plant components in Japan," Tatsuo Kariyone, National Institute of Hygienic Sciences, Tokyo; "Industrial microbiology in Japan," Koichi Yamada, University of Tokyo; "Studies of experimental Vincent's infection, with special emphasis on the role of *Neisseria septicaemiae*, new

species," Masao Onisi, Tokyo Medical and Dental University.

Part III. 27 Dec., afternoon. Tomizo Yoshida, vice president, Science Council of Japan, will preside. "Socio-ecological study of the Japanese macaque," Denzaburo Miyadi, Kyoto University; "Recent developments in experimental psychology," Kinichi Yuki, Hokkaido University; "Studies on lowland rice in Japan—ecological studies on the yield of lowland rice with reference to its components," Yoshiji Togari, University of Tokyo; "Origin of cultivated wheats in the light of recent genetic investigations," Kosuke Yamashita, Kyoto University; "Recent advances in physiological and pathological studies of the silk worm," Tadao Yokoyama, Ministry of Agriculture and Forestry, Tokyo; "Program of the U.S.-Japan Committee on Scientific Cooperation," Harry C. Kelly.

Committee on Desert and Arid Zones Research. Part I. 27 Dec., morning. Symposium, Arid Lands of Latin America: Their Problems and Approaches to Solution. H. E. Dregne, New Mexico State University, will preside. "Types and distribution of dry climates in Latin America," Peveril Meigs, U.S. Army Natick Laboratories, Mass.; "The desert soil process and its significance in arid zone development in Latin America," Charles S. Wright, FAO Assessor in Soils, Santiago, Chile; "Regeneration blocks in vegetation of Patagonian semi-desert," Alberto Soriano, Universidad de Buenos Aires; "Environment and civilization in the northern Mexican arid zone," Pedro Armillas, Southern Illinois University; "Arid lands under agrarian reform in northwest Mexico," David A. Henderson, University of Arizona.

Part II. 27 Dec., afternoon. Donald D. MacPhail, University of Colorado, will preside. "Investment criteria for the development of arid zones in underdeveloped countries," Manfred A. Max-Neef, Pan American Union; "Operating programs for the Brazilian Nordeste in the light of the natural and cultural environment," Hilgard O'Reilly Sternberg, Universidade do Brasil; "Social solutions for real and perceived aridity in the Andes," Henry F. Dobyns, Cornell; "Small irrigation projects in the Peruvian Sierra," Atilio Gonzales Portilla, National Planning Bureau, Lima, Peru; "Accomplishments of the Scientific Conference on the Arid Regions of Latin America, held in Buenos Aires, Argentina, 16-21 September, 1963," W. G. McGinnies.

AAAS Day—Interdisciplinary Symposium on the Federal Government, Science, and the Universities. 28 Dec., morning. Arranged by John T. Wilson, National Science Foundation, who will also preside. Speakers include: A. Hunter Dupree, University of California, Berkeley; Delphis C. Goldberg, U.S. House of Representatives; William D. Carey, Bureau of the Budget; and Paul M. Gross, Duke.

AAAS Day—Interdisciplinary Symposium in the Physical Sciences. The Uses of Lasers and Masers. 28 Dec., morning. Arranged by R. J. Collins, University of Minnesota, who will also preside. "Frequency mixing and other nonlinear optical effects," Robert W. Terhune, Ford Motor Company, Dearborn, Mich.; "Lasers, fiber optics, and their applications," N. S. Kapany, Optics Technology, Inc., Belmont, Calif.; "Ring laser rotation sensing," George R. White, Sperry-Gyroscopic Corp., Great Neck, N.Y.; "Satellite experiments using lasers," Henry H. Plotkin, Goddard Space Flight Center.

AAAS Day—Interdisciplinary Symposium in the Physical-Philosophical Sciences. Philosophical Aspects of Cosmology and Cosmogony. 28 Dec., morning. Joint program of sections on History and Philosophy of Science (L), Physics (B), and Astronomy (D). Arranged by Adolf Grünbaum, University of Pittsburgh. Grover Maxwell, University of Minnesota, will preside. "Aspects of modern cosmology," Otto Heckmann, Southern European Observatory, Hamburg, Germany; "The analysis of observations in cosmology," G. C. McVittie, University of Illinois Observatory.

AAAS Day—Interdisciplinary Symposium in the Biological-Medical Sciences. Developmental Aspects of Immunity. 28 Dec., morning. Program of the section on Zoological Sciences (F), cosponsored by the section on Medical Sciences (N) and the American Society of Zoologists. Arranged by David W. Bishop, Carnegie Institution of Washington, Baltimore, and Jonathan W. Uhr, New York University Medical Center. James D. Ebert, Carnegie Institution of Washington, Baltimore, will preside and present the introduction. "The heterogeneity of the immune response," Jonathan W. Uhr; "The relationship of the thymus to the development of immunologic responsiveness," J. F. A. P. Miller, Chester Beatty Research Institute, London, England; "Phylogeny of the immune response," Robert A. Good, Variety Club Heart

Hospital, Minneapolis; "Ontogeny of the immune response," Arthur M. Silverstein, Armed Forces Institute of Pathology.

AAAS Day—Interdisciplinary Symposium in the Social Sciences. Biological and Sociological Research on the Effects of Human Reproduction Control. 28 Dec., morning. Program of the section on Social and Economic Sciences (K). Arranged by Kingsley Davis, University of California, Berkeley, who will also preside. "Demographic consequences," M. Jean Bourgeois-Pinchat, Institut National d'Etudes Demographiques, Paris; "Economic effects," W. Lee Hansen, University of California, Los Angeles; "Medical effects," Christopher Tietze, National Committee on Maternal Health, New York; "Sociological consequences," Kingsley Davis.

Committee on Science in the Promotion of Human Welfare. 29 Dec., afternoon. Symposium, The Scientist Looks at Air Conservation. James P. Dixon, Jr., president of Antioch College and chairman of the AAAS Air Conservation Commission, will preside. "The biologist's view," John R. Goldsmith, California State Department of Public Health; "The physical scientist's view," François N. Frenkiel, David Taylor Model Basin; "The social scientist's view," Howard Higman, University of Colorado.

AAAS Committee on Meetings. The Committee on Meetings planned the Moving Frontiers of Science, the AAAS Distinguished Lecture, and the Interdisciplinary Symposia on AAAS Day.

AAAS Science Theatre

The AAAS Science Theatre, a permanent feature of the Association's annual meeting, presents each year a selection of the latest domestic and foreign scientific films throughout the meeting period. Programs are repeated at different times to increase the opportunities for those attending the sessions to see particular films. Malcolm S. Ferguson, National Institutes of Health, assisted in the planning of this year's film program.

The AAAS Science Theatre may be reached by passing through the Exposition of Science and Industry on the mezzanine level of the Sheraton-Cleveland Hotel. Admission is restricted to registrants. In general, persons under 16 are not registered.

The following is a schedule of the film program. The titles of the films are in italics; the names of the producers follow.

Friday 27 December 10 A.M. to 2 P.M.

The Rhesus Monkeys of Santiago Island. National Institutes of Health.

Galaxy of Elements. Svensk Filmindustri for The Swedish Institute.

Electron Microscopy. Associated Electrical Industries, Ltd., England.

Chemical Man. Graphic Films Corp.

Apollo Mission. North American Aviation.

Secret in the Hive. Sakura Motion Picture Company, Ltd., Japan.

The Case of the Persian Student with Painless Hemoptysis: Pulmonary and Cardiac Echinococcosis. David S. Ruhe, Kansas University Medical Center.

Human Kidney Transplantation. A Warren Sturgis Production available at Winthrop Laboratories.

Fish, Moon, and Tides—The Grunion Story. Academy Films.

Black Widow Spider. Ken Middleham Productions.

Hot Wire Technique with Chick Embryo. Thorne Films, Inc.

Power for Continent Seven. The Martin Company.

Bats in Flight. Lincoln Laboratory.

Friday 27 December 2 P.M. to 6 P.M.

Biology for the Bathyscaph Trieste. U.S. Navy Electronics Laboratory.

Baboon Ecology. University of California, Berkeley.

Principles of the Optical Maser. Bell Telephone Laboratories.

The Effect of Tobacco Smoke on the Human Respiratory Cilia. John J. Ballenger, Winnetka, Illinois.

Courtship Behavior of the Queen Butterfly. L. P. Brower, Amherst College.

Observations on Cultured Chick Myocardial Cells. University of Washington School of Medicine.

The Seven Bridges of Königsberg. Cornwell-Hilton.

Apollo Spacecraft to the Moon. North American Aviation.

Magnetic Field Spark Chamber Studies. Argonne National Laboratory.

Nauru. Australian News and Information Bureau.

Goblin on the Doorstep. Grumman Aircraft Engineering Corp., with cooperation by the U.S. Navy.

Krystallos. Owen Murphy Productions.

Maori Carving and Decoration. New Zealand National Film Unit.

Saturday 28 December 10 A.M. to 2 P.M.

Baboon Social Organization. University of California, Berkeley.

Cinicrography of the in vivo Lung. Wiltz Wagner and Giles Filley, University of Colorado Medical Center.

Kidney Transplantation in the Rat. Paul Nathan and E. E. Gonzalez, May Institute for Medical Research of the Jewish Hospital of Cincinnati.

Quartz Crystal Growing. Western Electric.

Eye for Tomorrow. Pennsylvania State University.

It Started with Muybridge. Naval Ordnance Laboratory.

Innovations in Transfusion Therapy. American College of Surgeons.

Ultra High Speed Cinematographic Analysis of Muscle Contraction. Robert E. Haupt, Iowa State University of Science and Technology.

Life Cycle of the Hookworm. Sakura Motion Picture Company, Ltd., Japan.

Behavior of Ord's Kangaroo Rats after Removal of the Semicircular Canals. University of Oklahoma.

Science Serves the Snowy. Snowy Mountain Authority, Australia.

Project Man-in-Sea. Rediffusion, England.

Strato-Scope. J. C. Koukos, Office of Naval Research.

Saturday 28 December 2 P.M. to 6 P.M.

Baboon Behavior. University of California, Berkeley.

Measuring Oxygen Consumption. Thorne Films, Inc.

Dynamics of Tumor Embolism. Wood, Knaack, Mulholland, Arnold, and Johnson, Johns Hopkins University.

The World of Phosphorus. Bureau of Mines and sponsored by American Agricultural Chemical Company.

Fiordland Expedition. New Zealand National Film Unit.

Slow Motion Sound. Lincoln Laboratory.

Cine Coronary Arteriography. American Heart Association.

The Development of the Cardio-Vascular System of the Chick: The Heart. Indiana University.

Work vs. Load in Frog Skeletal Muscle. Thorne Films, Inc.

Beta Ray Spectrometer. Argonne National Laboratory.

Big River. Mississippi River Commission, Corps of Engineers, United States Army.

Observations on Jigabachi-Modoki, A

Hunting Wasp. Rokuro Yoshida, Scientific Film Production, Tokyo.

Carbon-14. New Zealand National Film Unit.

Ultra High Speed Cinematographic Analysis of Muscle Contraction. Iowa State University.

Sunday 29 December 10 A.M. to 2 P.M.

Same as Friday 27 December 10 A.M. to 2 P.M.

Sunday 29 December 2 P.M. to 6 P.M.

Same as Friday 27 December 2 P.M. to 6 P.M.

Monday 30 December 9 A.M. to 1 P.M.

Same as Saturday 28 December 10 A.M. to 2 P.M.

Monday 30 December 1 P.M. to 3:30 P.M.

The Rhesus Monkeys of Santiago Island.

Chemical Man.

The Case of the Persian Student with Painless Hemoptysis: Pulmonary and Cardiac Echinococcosis.

Observations on Jigabachi-Modoki, A Hunting Wasp.

Principles of the Optical Maser.

Courtship Behavior of the Queen Butterfly.

Apollo Spacecraft to the Moon.

Bats in Flight.

Exposition of Science and Industry

The AAAS Annual Exposition of Science and Industry will be held in the Whitehall Room and Main Exhibition Hall on the mezzanine floor of the Sheraton-Cleveland. In the best interests of both the attendees and the exhibitors, only registrants can be admitted and, in general, children under 16 are neither registered nor admitted. Hours: 27-29 Dec., 10 A.M. to 6 P.M.; 30 Dec., 9 A.M. to 4 P.M.

The following is a listing of exhibitors at this year's meeting.

Books and Publications. AAAS Science Library Program; Academic Press; Association of American University Presses; *Biological Abstracts*; Blaisdell Publishing Company; Cambridge University Press; Childrens Press, Inc.; Columbia University Press; Combined Book Exhibit, Inc.; F. A. Davis Company; Doubleday & Company; Encyclopaedia Britannica; Great Books with the Syntopicon; Grolier Incorporated; Hafner Publishing Company, Inc.;

Harcourt, Brace & World, Inc.; Harvard University Press; Hayden Book Companies; D. C. Heath and Company; Holt, Rinehart & Winston, Inc.; *Journal of Conflict Resolution*; Lea & Febiger; J. B. Lippincott Company; Macmillan Company; McGraw-Hill Book Company, Inc.; Melmont Publishers, Inc.; G. & C. Merriam Company; C. V. Mosby Company; National Geographic Society; New American Library of World Literature, Inc.; Oxford University Press; Reinhold Book Division; W. B. Saunders Company; Science Council of Japan; Sigma Press Publishers; Special Libraries Association Translations Center; Springer Verlag; University of Chicago Press; D. Van Nostrand Company, Inc.; Wadsworth Publishing Company; John Wiley & Sons, Inc.; and Yale University Press.

Industrial. Barnes Engineering Company; Cleveland Electric Illuminating Company; General Electric Lamp Division; General Electric Re-entry Systems Department; Glidden Company; Harshaw Chemical Company; Polaroid Corporation; RCA Astro-Electronics Division; E. R. Squibb & Sons, Inc.; Thompson Ramo Wooldridge Inc., Electromechanical Division; and TRG Incorporated.

Instruments and Supplies. Applied Research Laboratories, Inc.; Applied Sciences, Inc.; Atomic Accessories, Inc.; Cadillac Optical Corporation; Cambosco Scientific Company, Inc.; Carolina Biological Supply Company; Connecticut Valley Biological Supply Company; George F. Cram Company, Inc.; Denoyer-Geppert Company; Elgeet Optical Company; Encyclopaedia Britannica Films, Inc.; General Biological Supply House, Inc.; Germfree Laboratories, Inc.; Graf-Apsco Company; E. Leitz, Inc.; Lipshaw Manufacturing Company; Macalaster Scientific Corporation; Miles Reproducer Company; Minnesota Mining and Manufacturing Company; Mistaire Laboratories; Parco Scientific; Pickett & Eckel, Inc.; Science Electronics, Inc.; Science Teaching Aids; Technical Measurement Corporation—Mnemotron Division; Universal Scientific Company, Inc.; Ward's Natural Science Establishment; and Welch Scientific Company.

Special. Coca Cola Company; Division of Air Pollution, Public Health Service; Division of Research Grants, NIH, Public Health Service; Greater Cleveland Growth Board; Medical Bureau, Inc.; National Bureau of Standards; National Institute of Dental Re-

search; National Institute of General Medical Sciences; National Science Foundation; Oak Ridge Institute of Nuclear Studies; Office of Aerospace Research; Office of Naval Research; Office of Technical Services; and Tobacco Industry Research Committee.

AAAS Business Sessions

Board of Directors. The Board of Directors of the Association will meet in a private suite in the Sheraton-Cleveland Hotel, 27 Dec., at 9 A.M.

Council of the Association. The Council of the Association will meet in two sessions. The first one will take place on 27 Dec. at 4 P.M. and the second, on 30 Dec. at 9 A.M. Both will be held in the Cleveland Room, Sheraton-Cleveland Hotel.

Subjects to be considered by the Council (in addition to the agenda prepared) usually are first brought before the Board of Directors through the Executive Officer. During the meeting, communications for the Board of Directors should be submitted in writing and left at the Sheraton-Cleveland Hotel mail desk, addressed to Dael Wolffe.

Joint Meeting of Section Officers and Committee on AAAS Meetings. The Section Officers and members of the Committee on AAAS Meetings will meet at a luncheon and planning session for the 1964 meeting on 28 Dec. Dael Wolffe and Raymond L. Taylor are cochairmen for this meeting.

Registration

Main Registration-Information Center. The AAAS Main Registration-Information Center will be located in the lobby of the Sheraton-Cleveland Hotel. It will be open as follows: 26 Dec., 8 A.M. to 10 P.M.; 27-29 Dec., 8 A.M. to 8 P.M.; and 30 Dec., 8 A.M. to 4 P.M.

Badges and general programs may be obtained at the supplementary registration desks, but supplementary literature, maps, and so forth will be available only at the Main Registration Center. Advance registrants (who will have received programs and badges prior to the meeting) are advised to visit the Main Registration Center to obtain these additional items.

Supplementary Registration Desk. For the convenience of those attending the 130th meeting, there will be

four supplementary hotel registration desks, at the Pick-Carter, Statler Hilton, and Manger hotels. (The supplementary desk at the Sheraton-Cleveland will be located at the entrance to the exhibits.) These will be open as follows: Pick-Carter: 26 Dec., 9 A.M. to 9 P.M.; 27-28 Dec., 8 A.M. to 8 P.M.; 29 Dec., 8 A.M. to 8 P.M. Statler Hilton: 26 Dec., 10 A.M. to 9 P.M.; 27-28 Dec., 8 A.M. to 8 P.M.; 29 Dec., 8 A.M. to 8 P.M. Manager: 26 Dec., noon to 9 P.M.; 27 Dec., 8 A.M. to 8 P.M.; 28 Dec., noon to 8 P.M.; 29 Dec., 8 A.M. to 6 P.M. Sheraton-Cleveland: 27 Dec., 10 A.M. to 6 P.M.; 28-29 Dec., 10 A.M. to 6 P.M.; 30 Dec., 9 A.M. to 4 P.M.

Registration Fee. The AAAS registration fee, which has been kept to a minimum, is \$5. A spouse or child who does not want a separate program may register for \$2 if he or she registers at the same time as the accompanying regular registrant. Each regular registrant will receive a receipt, a convention badge, and the *General Program*—the only publication containing the programs of the 20 AAAS sections and of the 65 participating organizations. Any person who purchases an advance copy of the *General Program* but does not register in advance and who then attends the meeting has agreed to complete his registration and is expected to do so by paying \$2 at the Main Registration Center or at one of the four supplementary registration desks; after this he will receive his convention badge and the accompanying privileges.

The AAAS convention badge indicates that you are participating fully in this 130th convention of the Association. The badge should be worn throughout the meeting because (i) it reminds others to register; (ii) it is needed for admission to the Annual Exposition of Science and Industry, the Science Theater, and the reception that follows the AAAS presidential address; and (iii) it aids in locating friends.

Visible Directory of Registrants. The directory will be located in the grand ballroom foyer on the mezzanine floor of the Sheraton-Cleveland Hotel; it will be open day and night.

The registration cards of all registrants are placed alphabetically in the directory soon after registration. The cards of advance registrants will have been typed and completely al-

phabetized prior to the meeting. All other cards are filed to the second or third letter of the surname. Members of the press, exhibit personnel, and guests are also listed in the directory—on blue cards instead of yellow.

Mail, Telegrams, and Messages. Mail and telegrams addressed in care of the AAAS will be held at the AAAS office on the mezzanine floor of the Sheraton-Cleveland. Telephone and personal messages will also be filed alphabetically in the AAAS office and the names for whom they are intended will be posted on a bulletin board near the office or entrance to the exhibits. The Association assumes no responsibility for the delivery of mail or of telegrams.

Society Dinners and Luncheons. Tickets to the dinners and luncheons of any section or any participating society will be obtainable from representatives of the section or society either during preceding sessions or at the Main Registration-Information Center in the lobby of the Sheraton-Cleveland.

Hotel Headquarters

The Sheraton-Cleveland is the official headquarters hotel of the AAAS. There the Council of the Association will meet and other business sessions will be held. The pressroom, the center for receipt of authors' abstracts and the only source of press releases, will be located in rooms P34-P36, on the Parlor Floor.

The AAAS Office, Main Registration-Information Center, Visible Directory of Registrants, AAAS Science Theater, and the Annual Exposition of Science will all be located at the Sheraton-Cleveland.

The headquarters of the 20 sections and of the participating societies will be as follows (the societies are grouped in the sequence of the letters of the sections with which they are affiliated).

Sheraton-Cleveland (1000 rooms), Public Square

AAAS, AAAS Office, AAAS Pressrooms.

AAAS Main Registration-Information Center, Visible Directory of Registrants, AAAS Annual Exposition of Science and Industry, AAAS Science Theater.

AAAS Business Sessions (Board of Directors, Council), General Events, and Special Sessions.

AAAS Committee on Desert and Arid Zones Research, AAAS Committee on Meetings, AAAS Committee on Science in the Promotion of Human Welfare, Science Council of Japan.

AAAS sections B-Physics, D-Astronomy, F-Zoological Sciences, H-Anthropology, N-Medical Sciences, and Nd-Dentistry.

(B) American Astronautical Society, Cleveland Physics Society, National Aeronautics and Space Administration, Sigma Pi Sigma.

(C) American Association of Clinical Chemists.

(D) Cleveland Astronomical Society.

(E) National Geographic Society.

(F) American Society of Zoologists, Herpetologists' League, Society of Systematic Zoology.

(FG) American Society of Limnology and Oceanography, American Society of Naturalists, Beta Beta Beta Biological Society, Biomedical Information-Processing Organization, Ecological Society of America, Mountain Lake Biological Station "Alumni," Society for the Study of Evolution.

(H) American Anthropological Association.

(N) American Dietetic Association, American Physiological Society.

(Nd) American College of Dentists, American Dental Association, International Association for Dental Research (North American Division).

(T) National Association of Science Writers.

(X) American Geophysical Union, Scientific Research Society of America, Sigma Delta Epsilon, Society of the Sigma Xi, United Chapters of Phi Beta Kappa.

**Statler Hilton (1000 rooms),
Euclid Avenue at East 12th Street**

AAAS Section Officers Luncheon.

AAAS sections C-Chemistry, K-Social and Economic Sciences, L-History and Philosophy of Science, M-Engineering, O-Agriculture, P-Industrial Science, T-Information and Communication, and U-Statistics.

(C) American Chemical Society (Cleveland Section).

(K) American Economic Association, American Political Science Association, American Society of Criminology, American Sociological Association, Metric Association, National Institute of Social and Behavioral Science, Population Association of America.

(L) American Philosophical Association,

Philosophy of Science Association, Society for General Systems Research.

(M) American Society for Metals, Cleveland Engineering Society.

(O) American Society for Microbiology.

(P) The Institute of Management Sciences.

(T) Society of Technical Writers and Publishers.

(U) American Statistical Association, Biometric Society (Eastern North American Region), Institute of Mathematical Statistics.

(X) National Science Foundation Office of Economic and Statistical Studies.

**Manger (450 rooms),
East 13th and Chester Streets**

AAAS sections E-Geology and Geography and I-Psychology.

(B) American Meteorological Society.

(E) Association of American Geographers (East Lakes Division), Geological Society of America, National Speleological Society.

(I) Society for Research in Child Development.

**Pick-Carter (600 rooms),
1012 Prospect Avenue**

AAAS Academy Conference, AAAS Cooperative Committee on the Teaching of Science and Mathematics.

AAAS sections A-Mathematics, G-Botanical Sciences, Np-Pharmaceutical Sciences, and Q-Education.

(A) Association for Computing Machinery, Committee on the Undergraduate Program in Mathematics of the Mathematical Association of America, National Council of Teachers of Mathematics, Society for Industrial and Applied Mathematics.

(G) Botanical Society of America.

(Np) American Association of Colleges of Pharmacy, American College of Apothecaries, American Pharmaceutical Association (Scientific Section), American Society of Hospital Pharmacists, National Association of Boards of Pharmacy.

(Q) American Educational Research Association, American Nature Study Society, Central Association of Science and Mathematics Teachers, Council for Exceptional Children, National Association for Research in Science Teaching, National Association of Biology Teachers, National Science Teachers Association, Science Service.

The following hotel provides additional convenient sleeping accommodations.

**Auditorium (300 rooms),
St. Clair Avenue at East 6th Street**

Guests in this hotel should register for the AAAS meeting at the Sheraton-Cleveland.

AAAS Public Information Service

The general public must be kept informed, whenever feasible, of the results of the scientific research and development that it supports, directly or indirectly. Organized science and the individual scientist must have the understanding and support of intelligent citizens in all walks of life if they are to contribute effectively to the advance of American democracy. It is, of course, equally important that information concerning advances in science be disseminated clearly and accurately and without sensationalism. Progress in this direction in recent years has been in most instances outstanding, thanks largely to members of the National Association of Science Writers, other accredited science reporters, managing editors of American newspapers, and program managers of radio and television stations.

One of the four objectives of the AAAS is to try to increase public understanding and appreciation of the importance and promise of the methods of science in human progress. For this reason, and to protect authors of papers from being misquoted by the press, the Association maintains a public information service for each of the annual meetings. In the interest of accuracy and completeness, science writers frequently wish to discuss various research results with investigators during the meeting. If an author is asked to cooperate in this respect or to participate in a press conference, he is encouraged to do so—not only for his own protection, but also for the benefit of science in general. Scores of science writers will be covering this scientific convention from the pressroom in the Sheraton-Cleveland Hotel. News stories filed by them will be published and broadcast throughout the world. The assistance of authors in helping to make these stories accurate is earnestly solicited by the Association.

The AAAS public information staff

for the Cleveland meeting will include Edward G. Sherburne, Jr., Kneeland A. Godfrey, Jr. (full-time AAAS staff members) and Thelma Heatwole (consultant, Philip Morris, Inc.). Bill M. Sansing (executive vice president, McCann-Marschalk Company) will be in charge of the Local Committee on Public Information.

Cleveland Committees

General Chairman

Charles E. Spahr, president, The Standard Oil Company (Ohio).

Vice Chairmen

T. Keith Glennan, president, Case Institute of Technology; John S. Millis, president, Western Reserve University.

Committee on Exhibits

J. N. BAUMAN, president, The White Motor Company, *chairman*.

R. M. BESSE, president, The Cleveland Electric Illuminating Co.

A. T. COLWELL, director and consultant, Thompson Ramo Wooldridge, Inc.

F. R. ECKLEY, president, The Ohio Bell Telephone Co.

W. G. LAFFER, president, Clevite Corporation.

J. C. VIRDEN, chairman of the board and president, Eaton Manufacturing Co.

A. J. WEATHERHEAD, JR., president, The Weatherhead Co.

Committee on Physical Arrangements

JOHN BORZA, chief, Bureau of Visual Education, Cleveland Public Schools, *chairman*.

WILLIAM KOFRON, Bureau of Visual Education, Cleveland Public Schools, *associate chairman*.

JOSEPH BUTANO, Cleveland Public Schools.

THOMAS BUTANO, Cleveland Public Schools.

JOHN S. EDWARDS, Department of Biology, Western Reserve University.

DONALD ELLIOTT, Cleveland Public Schools.

HAROLD GORDON, Cleveland Public Schools.

KEITH RICHARDS, Cleveland Public Schools.

KENNETH STEVENS, Cleveland Public Schools.

Committee on Public Information

BILL M. SANSING, executive vice

president, McCann-Marschalk Company, Inc., *chairman*.

ROBERT BUCHANAN, general manager, Station WJW-TV.

W. R. CROWELL, public relations director, Thompson Ramo Wooldridge, Inc.

C. M. DAVIS, public relations director, Western Reserve University.

DAVID DIETZ, columnist, *Cleveland Press*.

DONALD J. DUNHAM, columnist, *Cleveland Press*.

C. DUDLEY FOSTER, public relations director, General Electric Company.

JOSEPH GEFFERT, public relations director, Cleveland Engineering Society.

E. C. HUGHES, research director, Standard Oil Company (Ohio).

ROBERT A. LANG, Academy of Medicine of Cleveland.

LYNN MANLEY, public relations director, Lewis Research Center, National Aeronautics and Space Administration.

GEORGE MANN, public relations director, Case Institute of Technology.

MRS. GEORGE MANN, Natural Science Museum.

SANFORD MARKEY, public relations director, John Carroll University.

GEORGE MATHIESON, general manager, Station KYW-TV.

CHARLES NEKVASIL, public relations director, United Appeal of Cleveland.

DON PERRIS, assistant general manager, Station WEWS-TV.

MRS. JOSEPHINE ROBERTSON, columnist, *Cleveland Plain Dealer*.

L. J. STRAITS, Standard Oil Company (Ohio).

HASSEL TIPPIT, managing partner, Ernst and Ernst; chairman of the board, Cleveland Chamber of Commerce.

Committee on Women's Events

MRS. JOHN S. MILLIS, Western Reserve University, *chairman*.

Honorary Reception Committee

NORMAN P. AUBURN, president, University of Akron.

ALFRED B. BONDS, JR., president, Baldwin-Wallace College.

CARL C. BRACY, president, Mount Union College.

LAWRENCE P. CAHILL, president, St. John College of Cleveland.

ROBERT K. CARR, president, Oberlin College.

EVERETT L. CATTELL, president, Malone College.

DAVID A. CHAMBERS, secretary,

Cleveland Medical Library Association.

MEREDITH B. COLKET, JR., director, Western Research Historical Society.

EDWIN CRANKSHAW, president, Cleveland Engineering Society.

HUGH E. DUNN, president, John Carroll University.

G. BROOKS EARNEST, president, Fenn College.

RT. REV. CLARENCE ELWELL, superintendent of schools, Diocese of Cleveland.

BENJAMIN T. FRANKLIN, manager, Air Foundation.

JAY R. GATES, president, Dyke College.

BRUNO GEBHARD, director, Cleveland Health Museum.

T. KEITH GLENNAN, president, Case Institute of Technology.

CHARLES L. HUDSON, president, Cleveland Medical Library Association.

WM. TRAVERS JEROME III, president, Bowling Green State University.

HOWARD W. JONES, president, Youngstown University.

WILLIAM E. KELLEY, director, Cleveland Aquarium.

ROBERT A. LANG, executive secretary, Academy of Medicine of Cleveland.

HON. FRANK J. LAUSCHE, U.S. Senator for Ohio, Washington, D.C.

SHERMAN E. LEE, director, Cleveland Museum of Art.

WILLIAM B. LEVENSON, superintendent of schools, Cleveland Board of Education.

RAYMOND C. LINDQUIST, director, Cleveland Public Library.

HON. RALPH S. LOCHER, mayor, City of Cleveland.

HOWARD F. LOWRY, president, College of Wooster.

F. EDWARD LUND, president, Kenyon College.

S. W. MCCUSKEY, director, Warner and Swasey Observatory.

JOHN SCHOFF MILLIS, president, Western Reserve University.

ROGER W. PRYOR, president, Cleveland Dental Society.

CHARLES A. RANDALL, president, Ohio Academy of Science.

HON. JAMES A. RHODES, Governor, State of Ohio.

WILLIAM E. SCHEELE, director, Natural Science Museum.

PAUL F. SHARP, president, Hiram College.

ABE SILVERSTEIN, director, Lewis Research Center, NASA.

SISTER MARY INEZ, president, Notre Dame College.

PAUL WEAVER, president, Lake Erie College.

ROBERT I. WHITE, president, Kent State University.

TERRY WICKHAM, president, Heidelberg College.

W. LLOYD YORK, president, Cleveland Dental Society.

HON. STEPHEN M. YOUNG, U.S. Senator for Ohio, Washington, D.C.

Mathematics

Thursday 26 December

Mathematics for the Biological, Management, and Social Sciences. Part I. Invited papers, joint program of section on Mathematics (A) and the Committee on the Undergraduate Program in Mathematics of the Mathematical Association of America. B. E. Rhoades, associate director of CUPM, will preside. Mathematics training for biology-medicine, Theodore D. Sterling, University of Cincinnati. Mathematics for social sciences, Paul Lazarsfeld, Columbia.

Friday 27 December

Mathematics for the Biological, Management, and Social Sciences. Part II. Report of the Panel. John G. Kemeny, Dartmouth, will preside. CUPM—its history and activities, B. F. Rhoades. Recommendations of the CUPM Panel on Mathematics for the Biological, Management, and Social Sciences, John G. Kemeny. A discussion period will follow presentation of the two reports.

National Council of Teachers of Mathematics

Friday 27 December

Invited Paper I. George S. Cunningham, Greater Cleveland Mathematics Program, will be the first speaker of this program. Donald Buckeye, Greater Cleveland Council of Teachers of Mathematics, will preside.

Invited Paper II. Harold C. Trimble, Ohio State, will present the second paper. Carl E. Clements, president of the Greater Cleveland Council of Teachers of Mathematics, will preside.

This two-session program is cosponsored by the Greater Cleveland Council of Teachers of Mathematics.

Monday 30 December

Relation of Education and Research in Computer Sciences to Science as

a Whole. Symposium, joint program of the Association for Computing Machinery and section on Mathematics. Arranged by John W. Carr III, University of Pennsylvania, who will also preside. The relationship of computer science to liberal undergraduate education, A. J. Perlis, Carnegie Institute. The computer and information sciences as a separate discipline, Saul Gorn, University of Pennsylvania.

Vice-Presidential Address. Variational theory and optimal control problems, by the retiring vice president of the section on Mathematics, Magnus R. Hestenes, University of California at Los Angeles. Wallace Givens, Argonne National Laboratory, will preside.

Communication Mathematics. Invited papers. Program of the Society for Industrial and Applied Mathematics, cosponsored by the section on Mathematics. Arranged by John W. Cell, North Carolina State College at Raleigh. J. P. LaSalle, RIAS, will preside. Communication through randomly disturbed channels, Robert M. Fano, M.I.T. Some recent communication applications of statistical estimation and decision, Paul E. Green, Jr., Lincoln Laboratory, M.I.T. Analysis of information processing systems, Dean Gillette, Bell Telephone Laboratories.

Physics

Friday 27 December

Vice-Presidential Address and Luncheon. Information exchange in physics, by Elmer Hutchisson, director of the American Institute of Physics and vice president for section on Physics (B). Stefan Machlup, president, Cleveland Physics Society, will preside. This is a joint session of the section on Physics and Sigma Pi Sigma, cosponsored by the Cleveland Physics Society.

Contemporary Physics. Invited Papers. Program of the section on Physics, cosponsored by Sigma Pi Sigma and the Cleveland Physics Society. Arranged by Stanley S. Ballard, University of Florida. John K. Major, Western Reserve, will preside. Neutrino physics, Frederick Reines, Case Institute of Technology. Recent developments in high-field superconductors, B. S. Chandrasekhar, Western Reserve. Rooms for speech and music, Robert S. Shankland, Case Institute of Technology. Unique processes in stars of high density, Joseph W. Weinberg, Western Reserve.

American Meteorological Society

Friday 27 December

Meteorology of the Great Lakes Region. Part I. Special Observations in the Great Lakes Region. Program of the American Meteorological Society, cosponsored by the section on Physics and the American Geophysical Union. Arranged by Tetsuya Fujita, University of Chicago. Joe R. Fulks, U.S. Weather Bureau, will preside. Some recent research on turbulent transfer process on Lake Michigan, Donald J. Portman and Floyd C. Elder, University of Michigan. Wind and current relationships in southern Lake Michigan, James L. Verber, Public Health Service, and George C. Williams, U.S. Weather Bureau. Some unmanned weather buoy and current meter mooring systems, John S. Farlow, Public Health Service, and Paul Ferris Smith, Geodyne Corp. The meteorological aspects of ice cover on the Great Lakes, T. L. Richards, Department of Transport, Toronto, Canada. Hydrology of Lake Erie, Ivan W. Brunk, U.S. Weather Bureau.

Part II. Radar and Satellites. T. L. Richards will preside. WSR-57 radar storm investigation in southeastern lower Michigan and western Lake Erie, Frank Grabowski, U.S. Weather Bureau. Field and radar observation of lake effect snow in the Lake Erie-Ontario area, Livingston Lansing, State University of New York at Buffalo, and B. L. Wiggin, U.S. Weather Bureau. The Chicago WSR-57 radar—plans and first impressions, George W. Polensky, U.S. Weather Bureau. Weather satellite observations of sea and lake ice, R. W. Popham and H. Neiss, U.S. Weather Bureau. Cloud distribution over the Great Lakes region as observed by TIROS meteorological satellite, Tetsuya Fujita and Rene Mendez, University of Chicago, and Say-Yuo J. M. Gargard, St. Louis University.

National Aeronautics and Space Administration

Sunday 29 December

Space Biology. Part I. Biosatellites. Symposium, joint program of the American Physiological Society and NASA, cosponsored by the Ecological Society of America. Arranged by Dale W. Jenkins, NASA. Loren D. Carlson, University of Kentucky Medical Center, will preside. The NASA biosatellite program, Dale W. Jenkins. Biosatellite

experiment on brain function and performance in the primate, W. R. Adey, University of California School of Medicine. Results of biological space experiments, Hans G. Clamann, Brooks Air Force Base. Life support systems in biosatellites, Robert E. Smith, University of California Health Sciences Center. Biosatellite spacecraft and missions, Nick Dragann, General Electric Co.

Part II. Bioregenerative Systems. Allan H. Brown, University of Pennsylvania, will preside. The need for bioregenerative systems, Allan H. Brown. Algal bioregenerative systems, Calvin H. Ward, Brooks Air Force Base. Leaf plants for bioregenerative systems, Dale N. Moss, Connecticut Agricultural Experiment Station. The hydrogenomonas bacteria-electrolysis bioregenerative system, Leonard H. Bongers, Martin Co. Chemically defined synthetic diet for space use, Wallace L. Chan and Milton Winitz, Medical Sciences Research Foundation.

American Astronautical Society

Monday 30 December

Bioastronautics. Part I. Fundamental Problems in Bioastronautics. Program of the American Astronautical Society. Arranged by Maj. W. C. Kaufman, Wright-Patterson Air Force Base. Loren D. Carlson, University of Kentucky Medical Center, and W. C. Kaufman will preside. The necessity for biological experimentation in space, Loren D. Carlson. Acceleration, vibration, and impact, Neville P. Clarke, Wright-Patterson Air Force Base. The pathology of disuse and some problems of prolonged weightlessness, Michael McCally, Yale University School of Medicine. Biological rhythms and how space travel may affect them, Frank A. Brown, Northwestern. Extraterrestrial life, Allan H. Brown, University of Pennsylvania. The role of man in space, Harold C. Urey, University of California, La Jolla.

Part II. Practical Problems of Space Exploration. Arranged by W. C. Kaufman. Don Flickinger, Life Sciences, and W. C. Kaufman will preside. Selecting the man for space exploration, Don Flickinger. The life support problem, John Billingham, NASA. The cost of space exploration, Edward R. van Driest, North American Aviation, Inc. The space sciences and Capitol Hill, Charles A. Moser, Congressman 13th District, Ohio.

Chemistry

Friday 27 December

Chemistry of Radical-Ions. Part I. Symposium, program of section on Chemistry (C), cosponsored by the Cleveland Section of the American Chemical Society. Arranged by I. L. Mador, U.S. Industrial Chemicals Co. R. L. Dannley, Western Reserve, will preside. Chemistry of positive ions, W. F. Libby, University of California, Los Angeles. Reactivities of gaseous hydrocarbon positive ions, M. S. B. Munson, Humble Oil Co. Some aspects of the reactivity of radical-ions, T. F. Williams, University of Tennessee.

Part II. R. A. Lad, Lewis Research Center, will preside. Radical-ions in heterogeneous catalysis, H. P. Leftin, M. W. Kellogg Co. Applications of aromatic hydrocarbon free radical-ions to the synthesis of polycyclic hydroaromatic hydrocarbons, D. Lipkin, Washington University. Reactions of labile radical-ions and the chemistry of some intermediates, M. Szwarc, State University of New York College of Forestry. Electronic processes in radical-ions, S. I. Weissman, Washington University.

Monday 30 December

Chemistry of the Excited State. Part I. Symposium, program of the section on Chemistry, cosponsored by the Cleveland Section of the American Chemical Society. Arranged by H. H. Jaffee, University of Cincinnati. G. S. Barrow, Case Institute of Technology, will preside. The chemistry of aromatic molecules in electronically excited states, G. Porter, University of Sheffield, Sheffield, England. Delayed fluorescence of solid solutions of polyacenes, S. P. McGlynn and T. Azumi, Louisiana State University. Spectroscopic observations on some triplet excited states, G. W. King, McMaster University, Hamilton, Canada.

Part II. Milton Burton, University of Notre Dame, will preside. Protolytic dissociation of electronically excited phenols, P. J. Lucchesi and W. Bartok, Esso Research and Engineering Co. Photochemistry of carbonyl compounds in solution, N. C. Yang, University of Chicago. The role of the triplet state in photosensitized *cis-trans* isomerization, J. Saltiel, University of California, Los Angeles, and G. Hammond, California Institute of Technology. The photochemistry of phytochrome, W. L. Butler, U.S. Department of Agriculture.

American Association of Clinical Chemists

Thursday 26 December

General Papers. Session I. Miriam Reiner, District of Columbia General Hospital, Washington, D.C., will preside. Measurement of the hepatic glucose output in the human, Jack R. Leonards, Western Reserve University School of Medicine. Electrophoretic aids in identification of proteins, Lena A. Lewis, Cleveland Clinic Foundation. The analysis of crystalline materials in pathology using x-ray diffraction methods, Jonathan Parsons, Edsel B. Ford Institute for Medical Research. Use of the oscilloscope in the clinical chemistry laboratory, Thomas C. Sweeney, Euclid-Glenville Hospital. Paternity exclusion by paper electrophoresis, John W. King, Geneva Carson and Milcent Gardner, Cleveland Clinic Foundation. Erythrocyte glucose-6-phosphate dehydrogenase deficiency, George C. Hoffman and Dan F. Keller, Cleveland Clinic Foundation. A simplified micro-precipitation method for plasma fibrinogen estimation, Norval M. Simms, Harlen D. Myers, Lois M. Bergquist, and Ronald L. Searcy, Los Angeles County General Hospital and California College of Medicine.

Chromatography. Session II. Samuel Meites, Children's Hospital, Columbus, will preside. Applicability of chromatography to clinical problems, Erich Heftmann, National Institute of Arthritis and Metabolic Diseases. Paper chromatography as an aid in steroid structural analysis: some new R_m values in the C_{10} and C_{21} series, David J. Watson, Ohio State University. The effect of column design on the chromatographic separation of neutral lipids, George Fischer and Jon J. Kabara, University of Detroit. Determination of acetone in breath using a gas chromatograph, Stanley Levey and Oscar J. Balchum, University of Southern California School of Medicine. Quantitation of thin-layer chromatograms, Jon J. Kabara, Ray Wojtalik, and Ginger C. Kabara, University of Detroit. Practical multiple colorimetric determinations with digital output, D. James Lowell, J. Aroner, R. Pierce, and D. Tomaszewski, Reference Laboratory. Modified transport system for sequential colorimetric determinations, D. James Lowell, J. Aroner, R. Pierce, G. Danielson, and W. Marshall, Reference Laboratory.

General Papers. Session III. Oliver

H. Gaebler, Edsel B. Ford Institute for Medical Research, will preside. The application of electronics to automated microanalysis, Harry L. Pardue, Purdue. Construction of a special purpose slide rule, David L. Barrett and Adrian Hainline, Jr., Cleveland Clinic Foundation. Rapid ultramicro spectrophotometric determination of magnesium, Eugene W. Rice and Cynthia Z. Lapara, Allegheny General Hospital, Pittsburgh. Chemical tests for the evaluation of the effects of drugs on cancer, Henry C. Damm, Western Reserve University School of Medicine. Hemodynamic studies on angiotensin in unrestrained dogs, Frederick Olmstead, Cleveland Clinic Foundation. Difference spectra of cerebral spinal fluid, Cornelius W. Kreke, Nicholas G. Barbella, Barbara Cupac, and Diane Dugan, Mount Mercy College and Veterans Administration Hospital, Pittsburgh. Micro-estimation of hemoglobin, total cholesterol, and total lipid using a new specimen-measuring device, Ronald L. Searcy, Galal S. Gough, and Lois M. Bergquist, Los Angeles County General Hospital and California College of Medicine.

Astronomy

Monday 30 December

Degenerate Stars. Symposium, joint program of sections on Astronomy (D) and Physics (B). Arranged by Hong-Yee Chiu, Goddard Institute for Space Studies, who will also preside. Physics of degenerate matter, Alastair G. W. Cameron, Goddard Institute for Space Studies. Idealized stellar models with degenerate matter, Charles Misner, University of Maryland. Atmospheres of degenerate stars, Volker Weidemann, Physikalisches Technische Bundesanstalt, Braunschweig, Germany. Observation of dwarf stars, J. B. Oke, California Institute of Technology and Mount Palomar Observatory.

Meteorites. Symposium, joint program in sections on Astronomy and Physics and cosponsored by sections on Chemistry (C) and the American Geophysical Union. Arranged by John H. Pomeroy, U.S. Atomic Energy Commission. Harold C. Urey, University of California, will preside. Meteorites: their scientific significance, Brian Mason, American Museum of Natural History. Isotopic measurements and isotopic anomalies in meteorites, Robert O. Pepin, University of California, Berkeley. Implications of the analysis of

trace elements in meteorites, George W. Reed, Argonne National Laboratory. Meteorites and the origin of the solar system, Harold C. Urey.

Retiring Vice-Presidential Address. Program of section on Astronomy, cosponsored by the Cleveland Astronomical Society. A. L. Jones, president of the Cleveland Astronomical Society, will preside. The Kitt Peak National and the Cerro Tololo Inter-American Observatories, Frank K. Edmondson, director, Goethe Link Observatory and retiring vice president for the Astronomy Section.

Geology and Geography

Thursday 26 December

Geology. Contributed Papers. Program of the section on Geology and Geography (E), cosponsored by the Geological Society of America. Arranged by Richard H. Mahard, Denison University, who will also preside. Symmetry models of the space groups, Harold J. Zabsky, Fontbonne College, St. Louis, and Albert J. Frank, St. Louis University. Instrumental neutron activation analyses of chondritic meteorites and some geochemical implications, Gordon G. Goles, University of California, San Diego, and Roman A. Schmitt, General Dynamics. Playa mud-cracks: regular and king-size, Raymundo J. Chico, U.S. Army Limited War Laboratory. Guinea fracture zone in the equatorial Atlantic, Dale C. Krause, University of Rhode Island.

Friday 27 December

Polar Geology. Part I. Symposium, program of the section on Geology and Geography, cosponsored by the Geological Society of America. Arranged by Arthur Mirsky, Ohio State. John C. Reed, Arctic Institute of North America, will preside. Geology of a portion of the Tasersiaq area, southwestern Greenland, S. B. Treves, University of Nebraska and Ohio State. Soil development and classification at margin of Sukkertoppen Ice Cap, southwestern Greenland, K. R. Everett, Ohio State. Limnological studies, Tasersiaq area, southwestern Greenland, D. D. Koob, Ohio State. Report on moss-covered ice blocks in northwest Greenland displaying annual genesis and dissolution, D. R. Spearing, University of Michigan. The structure of the Arctic Ocean basin, N. A. Ostenso, University of Wisconsin. Terrestrial tertiary vertebrates in Alaska—the lack

thereof, J. A. Dorr, Jr., University of Michigan. Strength and deformation of sea ice, H. R. Peyton, University of Alaska. Variations in Antarctic sea ice distribution, J. A. Heap, University of Michigan. An estimate of mass flux in Antarctica, Mario Giovinetto, University of Wisconsin. Submarine geomorphology of eastern Ross Sea and Sulzberger Bay, Antarctica, L. K. Lepley, Texas A. and M. University.

Polar Geology. Part II. Arthur Mirsky will preside. Sedimentary section of Robert Scott Glacier area, Queen Maud Range, Antarctica, V. H. Minshew and C. H. Summerson, Ohio State. Geologic outline of the Ellsworth Mountains, West Antarctica, C. Craddock, University of Minnesota; J. J. Anderson, University of Texas; and G. F. Webers, University of Minnesota. Cretaceous sedimentation in southern Chile and the Antarctic Peninsula, Kevin M. Scott, M. Halpern, and R. H. Dott, Jr., University of Wisconsin. Regional geology and crustal thickness in the Transantarctic Mountains and adjacent ice-covered areas in Antarctica, Edwin S. Robinson, University of Wisconsin. Paleobotanical studies in Antarctica, J. M. Schopf, U.S. Geological Survey and Ohio State. Present status of soil arthropod surveys in Antarctica, Madison E. Tryer, Ohio State. Antarctic interglacial deposits, R. L. Nichols, Tufts. Chemistry of three saline lakes, Victoria Land, Antarctica, and suggested geologic implications. E. E. Angino, Texas A. and M. University. Summer climate of the ice-free areas of southern Victoria Land, Antarctica, C. Bull, Ohio State. Distribution of particulate matter in a firn core from Eights Station, Antarctica, L. D. Taylor and J. Gliozzi, Ohio State.

Sunday 29 December

Retiring Vice-Presidential Address. John C. Reed will preside. Morphometry of the terrain: advances and challenges, Guy-Harold Smith, Ohio State and retiring vice president for section on Geology and Geography.

Association of American Geographers

Sunday 29 December

The St. Lawrence Seaway in Relation to the Great Lakes. Symposium, program of the Association of American Geographers (East Lakes Division), cosponsored by the section on Geology and Geography. Arranged by Albert G. Ballert, Great Lakes Commission,

who will also preside. The region's response to the St. Lawrence Seaway, Maurice E. McGaugh, Central Michigan University. The Great Lakes overseas vessel traffic, Albert G. Ballert. The influence of the Seaway on Northeastern Ohio, Mildred M. Walmsley, Western Reserve. Port of Chicago and Great Lakes overseas traffic, Edwin H. Draine, Loyola. The Lake Erie region as a theoretical and practical planning unit, Edward G. Pleva, University of Western Ontario. Projecting foreign trade for the Great Lakes ports: method and traffic, Howard E. Olson, U.S. Corps of Engineers. The Great Lakes commerce statistics: an appraisal of the source materials, discussion by program members.

Sunday 29 December

Session of Invited Papers Honoring Guy-Harold Smith. Program of the Association of American Geographers (East Lakes Division), cosponsored by section on Geology and Geography. Arranged by Alden Cutshall, University of Illinois. Richard Mahard and Cutshall will preside. The design of a map projection, Arthur H. Robinson, University of Wisconsin. A proposed modification of climatic classification, David W. Lantis, Chico State University. The synoptic climatology of winter snowfall over the lower peninsula of Michigan, Val L. Eichenlaub, Western Michigan University. Philippine minerals: geographic foundations and prospects, Alden Cutshall.

National Geographic Society

Monday 30 December

Annual Illustrated Lecture. Laurence M. Gould, president elect of AAAS, will preside. Mozambique, the land of the good people, Volkmar Wentzel, foreign editorial staff, National Geographic Society.

National Speleological Society

Friday 27 December

Cave Geology. A series of invited papers on the Mammoth Cave region. Program of the National Speleological Society, cosponsored by the section on Geology and Geography and the Geological Society of America. George W. Moore, U.S. Geological Survey, will preside. The central Kentucky karst—a review, R. A. Watson, University of Michigan; E. R. Pohl and R. W.

Brucker, Cave Research Foundation; and W. B. White, Pennsylvania State University. Hydrochemistry and sedimentation in Mammoth Cave, C. R. Collier, R. A. Krieger, and G. W. Whetstone, U.S. Geological Survey. Paleohydrology of Mammoth Cave and the Flint Ridge cave system, W. B. White and G. H. Deike, Pennsylvania State University. Origin of sulfate minerals in central Kentucky caves, E. R. Pohl and W. B. White. Out-of-phase seasonal fluctuation of the top of the geothermal gradient at Cathedral Cave, Kentucky, G. W. Moore and Brother G. Nicholas, LaSalle College.

Zoological Sciences

Sunday 29 December

Vice-Presidential Address and Zoologists' Dinner. Joint session of section on Zoological Sciences (F), American Society of Zoologists, Herpetologists' League, and the Society of Systematic Zoology. Arranged by M. Neil Macintyre, Western Reserve University School of Medicine, and David W. Bishop, Carnegie Institution of Washington, Baltimore. Theodosius Dobzhansky, president of the American Society of Zoologists, will preside. Difficulties in the interpretation of organ multiplications in insects, Dietrich Bodenstern, University of Virginia and vice president for section on Zoological Sciences.

The section on Zoological Sciences is also a cosponsor of the symposia of the American Society of Zoologists and the Society of Systematic Zoology and the symposium, "Chemical Suppression of Cellular Synthesis and Mitosis," of the section on Medical Sciences.

American Society of Zoologists

Friday 27 December

Refresher Course in Behavior Genetics. Part I. Formal and Physiological Genetics. Arranged by Ernst W. Caspari, University of Rochester, who will also preside and present introductory remarks. (Title to be announced), John L. Fuller, Roscoe B. Jackson Memorial Laboratory. Genetic analysis of behavioral characters in the honey bee, Walter C. Rothenbuhler, Ohio State. Genetic analysis of behavior traits in mouse strains, Jan H. Bruell, Western Reserve. Analysis of behavior by means of selection, Jerry Hirsch, University of Illinois.

Part II. Evolutionary Genetics. Arranged by Ernst W. Caspari. John L. Fuller will preside. Mating behavior and fitness as a function of single allele differences, William B. Cotter, University of Kentucky. Courtship and mating behavior as a reproductive isolation mechanism in *Drosophila*, Lee Ehrmann, Rockefeller Institute. Interaction between genetic and experimental influences in the development of species-typical behavior, William C. Dilger, Cornell. Genetics and the development of social behavior in dogs, J. P. Scott, Center for Advanced Study in the Behavioral Sciences. Summary and synthesis, Ernst W. Caspari.

Part III. This will consist of an open discussion. Ernst W. Caspari will preside.

Saturday 28 December

Osmoregulation. Part I. Symposium, program of the Division of Comparative Physiology. Arranged by Ralph I. Smith, University of California, Berkeley, who will also preside. Osmotic regulation in migratory salmon, A. H. Houston, University of Manitoba. Euryhalinity and terrestriality among the vertebrates, Malcolm Gordon, University of California, Los Angeles. Osmotic regulation in the extreme terrestrial (desert) habitat, Knut Schmidt-Nielsen, Duke.

Contributed Papers, Section I. Animal Behavior, I. Physiology and Behavior. Joint program of the Division of Animal Behavior and Sociobiology of the American Society of Zoologists and the section of Animal Behavior and Sociobiology of the Ecological Society of America. C. Richard Terman, College of William and Mary, will preside. Patterns of energy flow in populations of the house mouse (*Mus musculus*), Robert Z. Brown, University of Texas. Effects of intra- and interspecific social stimulation on implantation in deer mice, F. H. Bronson, R. B. Jackson Memorial Laboratory, and B. E. Eleftheriou, Kansas State University. Adrenal weights and eosinophil levels of *Peromyscus leucopus* in relation to social climate, Charles H. Southwick, Johns Hopkins. Early social experience, aggressive behavior, and social stress in laboratory rats, W. R. Knight, Hiram College. Hormonal determinants of mating behavior; the display of feminine behavior by adult male rats castrated neonatally, Kenneth L. Grady and Charles H. Phoenix, University of Kansas. The inhibition by progesterone of normal sexual behavior in the male

guinea pig, Milton Diamond, University of Louisville. Threshold values for electroreception in some gymnotids, F. Reed Hainsworth and George Camougis, Clark University, and Louis P. Granath, Worcester Polytechnic Institute. Forebrain function in avoidance conditioning, Lester R. Aronson and Harriett Kaplan, American Museum of Natural History. Specific subtotal labyrinthectomy of both superior semicircular canals of the kangaroo rat, Robert D. Burns, Kenyon College, and David L. Clark, University of Oklahoma.

Contributed Papers, Section II. Developmental Biology, I. Norman E. Kemp, University of Michigan, will preside. Effects of rare earth chlorides on development in the chick, Hani K. Battikh and Howard L. Hamilton, University of Virginia. Relationship of osmoregulation and teratogenesis in the chick embryo, Casimer T. Grobowski, University of Miami. Teratogenic action of sodium salicylate in the embryonic chick, Harry K. Lane and John D. Eshleman, Franklin and Marshall College. Some effects of phenothiazine, compazine, and thiorazine on the development of chick embryos, John M. Mallette and Ozzie L. Adams, Tennessee Agricultural and Industrial State University. The effect of low temperature storage on the development capacity of mouse zygotes, Julie Kiesling, Vanderbilt University. Protein synthesis and development of sea urchin embryos in relation to potassium and magnesium, H. Timourian, P. C. Denny, and Albert Tyler, California Institute of Technology. Chromosome damage and developmental arrest in *Rana pipiens* embryos injected with protein extracts, Donald L. Kimmel, Jr., Johns Hopkins University. Enzyme activities in the dipteran salivary gland during metamorphosis, H. Laufer, Yasukiyo Nakase, and Jerome Vanderberg, Johns Hopkins University. The occurrence and distribution of malate dehydrogenase isozymes in molluscan development, Erwin Goldberg, Northwestern, and James N. Cather, University of Michigan. Early ontogenic changes in alkaline phosphatase in Hawaiian sea urchins, Sidney C. Hsiao and Walter K. Fujii, University of Hawaii.

Contributed Papers, Section III. Vertebrate Morphology, I. Richard J. Baldauf, Texas A. and M. University, will preside. A sensory system of the head of the apodan, *Schistometopum*

thomensis, Malcolm Jollie, University of Pittsburgh. The evolution of cranial kinesis in early tetrapods, Walter J. Bock, University of Illinois. The phylogenetic significance of the venom apparatus in snakes, Elazar Kochva, State University of New York at Buffalo. An analysis of forces developed at the feet of turtles during walking, Warren F. Walker, Jr., Oberlin College. The probable origin and evolution of the order strigiformes based on the study of the hind limb musculature of three species of owls, O. G. W. Berlin, Oberlin College. Patterns of the main cervical and thoracic arteries in six genera of flightless birds, Fred H. Glenney, Fairleigh-Dickinson University. A sebaceous gland complex in the gerbil, *Meriones*, Douglas B. Webster, New York University. Growth of brain in bony fish, Charles G. Wilber and Richard Schneider, Kent State University.

Saturday 28 December

Contributed Papers, Section IV. Cytology and Genetics, Grover C. Stephens, University of Minnesota, will preside. Fluorescence microscopy of the vaginal smear of the mouse during the estrous cycle, Sister M. Jean Vianney, University of Notre Dame. Fixation of the mitotic apparatus for electron microscopy, L. E. Roth, H. J. Wilson, and C. C. Bowen, Iowa State. The formation of multivesicular organelles in the retinula cells of the larval mosquito eye, Richard H. White and Albert E. Vatter, Purdue. The capsule of virus-induced lymphocystis cells of fish, Roland Walker, Rensselaer Polytechnic Institute. Amino acid analyses of tryptic peptides of the α -chain of mouse hemoglobin, Raymond A. Popp, Diana M. Popp, and Brenda C. Webb, Oak Ridge National Laboratory. Amino acid metabolism of ebony and non-ebony *Drosophila melanogaster*, M. E. Jacobs, Eastern Mennonite College. Geographic distributions of Y-chromosome types in *Drosophila athabasca*, Dwight D. Miller and Reena Roy, University of Nebraska. Breeding of the female *Xenopus* with WW sex chromosome constitution, Kazuya Mikamo, State University of Iowa.

Osmoregulation. Part II. Arranged by Ralph I. Smith, University of California, Berkeley. Knut Schmidt-Nielsen will preside. Salt transport at the cellular level, T. I. Shaw, University of California, Los Angeles. Role of the sodium-potassium transport system in osmoregulation epithelia, Leonard Kirsch-

ner, Washington State University. The role of cholinesterases in membrane transport of ions, Warren Fleming, University of Missouri.

The Evolution of External Construction by Animals. Symposium, program of the Division of Animal Behavior and Sociobiology of the American Society of Zoologists, cosponsored by the Section of Animal Behavior and Sociobiology of the Ecological Society of America, Society of Systematic Zoology, and the Society for the Study of Evolution. Arranged by Nicholas E. Collias, University of California, who will also preside and present the first paper on evolution of nests in birds. Evolution of spider webs, Benjamin J. Kaston, Central Connecticut State College. Evolution of caddis worm cases and nets, Herbert H. Ross, Illinois State Natural History Survey. Evolution of termite nests, Robert S. Schmidt, Billings Hospital, Chicago. Evolution of nests in bees, Charles D. Michener, University of Kansas.

Contributed Papers, Section V. Comparative Endocrinology, I. James H. Leatham, Rutgers, will preside. Pregnancy maintenance in protein deficient rats, Ian P. Callard and James H. Leatham, Rutgers. Production of steroids by embryonic adrenal glands, Thomas B. Roos, Dartmouth. Masculinization of fetal mouse ovaries, C. Donnell Turner and Hiroshi Asakawa, Duquesne. Response of intraocular ovarian isografts to administration of luteinizing hormone, Henry C. Browning, University of Texas Dental Branch. Precocious spermatogenesis in intratesticular homotransplants of fetal mouse testes, Hiroshi Asakawa, Duquesne. Effects of removal of Cowper's glands in the adult male albino rat on reproductive performance, Robert G. Hart and Julius S. Greenstein, Duquesne. Liver glycogen and liver weight in hypothyroid chicks, James G. Snedecor, University of Massachusetts. Endocrinological and ontogenetic problems posed by hermaphroditic fishes, James W. Atz, American Museum of Natural History and New York University.

Contributed Papers, Section VI. Developmental Biology, II. Michael Locke, Western Reserve, will preside. Factors involved in black-red pigment differentiation in the fowl, J. A. Brumbaugh, Cedarville College. On the mechanism of hair growth stimulation in wound healing, Thomas S. Argyris and Mary Ellen Trimble, Syracuse University. Reactivity of developing placental skin glands

to thyroid hormone, Jerry J. Kollros and Judith E. Heady, State University of Iowa. Thyroxine effects on mitotic activity in the tadpole spinal cord, W. Ann Reynolds, Ball State Teachers College. Photoc influences on *Xenopus* melanophores in tissue cultures, Masataka Obika and Joseph T. Bagnara, University of Arizona. Effects of hypophysectomy on pectoral fin regeneration in *Fundulus heteroclitus* (Killifish), Richard A. Liversage, University of Toronto. Growth in a crustacean, Dorothy M. Skinner, New York University Medical Center. Possible ecdysone activity in the embryo of the grasshopper, *Melanoplus differentialis*, Richard K. Boohar and Donald H. Bucklin, University of Wisconsin. A method for studying the establishment of organismal polarity in *Hydra*, Robert P. Davis, Western Reserve.

Contributed Papers, Section VII. Vertebrate Morphology, II. Malcolm Jollie will preside. An investigation of neural pathways involved in visual conditioning in cats, Theodore J. Voneida, Western Reserve. Effect of splenectomy on absorption of intraperitoneal transfusion of homologous packed red blood cells, Paul T. Medici, Valerie A. Mutter and Sam J. Piliero, St. John's University. Effects of anemic bovine serum on normal and leukeran-treated rats, Paul T. Medici, Jane A. Butler, and Anna Defonte, St. John's University. Relation of existence energy requirement to size of bird, S. Charles Ken-deigh, University of Illinois. Cartilages of the cranial roof in modern anurans, Richard J. Baldauf. The ear-air bladder connections of the menhaden, James M. Moulton and Jules M. Lerner, Bowdoin College. Open discussion of radiation of the osteichthyes, led by Bobb Schaeffer, American Museum of Natural History.

Film Session. Program of the Division of Animal Behavior and Sociobiology, cosponsored by the Ecological Society of America. E. M. Banks, University of Toronto, will preside. The marriage flights of formicine ants, Paul B. Kannowski, University of North Dakota. Aktivitätsperiodik bei Tieren (English sound), G. Tembrok, Deutsches Institut für Lehemittel, Berlin. Penguins of Macquarie Island, and Seals of Macquarie Island, Robert Carrick, C.S.I.R.O., Canberra, Australia. Distance navigation in the Adelie penguin, Richard Penney and John T. Emlen, University of Wisconsin. Canine Kasper Hausers, John L. Fuller, Jack-

son Memorial Laboratory. The rhesus monkeys of Santiago, C. B. Koford and J. C. Vandenberg, National Institutes of Health, Puerto Rico.

Sunday 29 December

Osmoregulation. Part III. Arranged by Ralph I. Smith, University of California, Berkeley, who will also preside. Osmotic stress and amino acid metabolism, Kenneth Allen, University of Maine. The role of active transport mechanisms in ion regulation in the crustacea, John Shaw, University of Durham, England. More about chloride cells, vertebrate and invertebrate, Eugene D. Copeland, Tulane.

Arachnid Behavior. Symposium, program of the Division of Invertebrate Zoology of the American Society of Zoologists, cosponsored by the Society for the Study of Evolution. Arranged by Clarence J. Goodnight, Purdue, who will also preside. Some aspects of mite behavior, G. W. Wharton, Ohio State. Some little known aspects of spider behavior, B. J. Kaston, Central Connecticut State College. Comparative ethology and spider systematics, John D. McCrone, Florida Presbyterian College. Some aspects of scorpion behavior, Herbert L. Stahnke, Arizona State University. Observations on opiloid behavior, Arlan L. Edgar, Alma College. Some aspects of whip scorpion behavior, Clarence J. Goodnight.

Contributed Papers, Section VIII. Animal Behavior and Sociobiology, II. Behavioral Ecology. James M. Moulton, Bowdoin, will preside. Food selection by rhesus monkeys and orangutans: size constancy, William A. Draper and Emil W. Menzel, Jr., Yerkes Laboratories of Primate Biology. The relationship between habitat density and the pitch of songs in parulidae and other birds, Robert W. Ficken and Millicent S. Ficken, University of Maryland. Geographic variation in nest construction of four stocks of *Peromyscus*. J. A. King, D. M. Maas, and R. G. Weisman, Michigan State. Behavioral thermoregulation and rewarding ability in hibernators, J. A. Panuska, Georgetown.

Contributed Papers, Section IX. Comparative Endocrinology, II. I. Alden Macchi, Boston University, will preside. Effect of estradiol-17B and estradiol on uterine weight and B-glucuronidase, Leonard L. Grosso, Long Island University. Effects of gonadotrophins on the in vitro metabolism of the ovary, Darhl Foreman, Western Reserve. Gonadal influences on adrenal function,

Gloria V. Callard and James H. Leatham, Rutgers. Effects of diethylstilbestrol on B-glucuronidase activity of hamster liver and kidney, J. P. Manning, University of South Dakota. Thin-layer chromatography of corticosteroids from the teleost fish, *Tilapia mossambica*, Jean Nandi and Howard A. Bern, University of California, Berkeley, and Hawaii Marine Laboratory. The effects of ACTH and prolactin on the salt and water metabolism of *F. kansae*, Jon G. Stanley and W. R. Fleming, University of Missouri. The effect of microinjections into the frog's brain of acetylcholine and novocain upon the release of MSH, Kay E. Dierst, C. L. Ralph, and Jack L. Pecharsky, University of Pittsburgh. The effect of hypophysectomy and pituitary implants on the peripheral blood picture of *Molliensia formosa* (Girard), Anna M. Slicher, Yale University; John N. Ball, Liverpool University; Klaus D. Kallman, American Museum of Natural History.

Contributed Papers, Section X. Developmental Biology, III. Charles B. Metz, Florida State University, will preside. Strain differences in egg structure in *Drosophila hydei*, S. J. Counce and Nancy M. Hartman, Yale. Cortical granules in brachiopod development, John A. Long, University of Washington. Extrusion of cortical granules from fertilized eggs of *Rana pipiens*, Normane E. Kemp and Nancy L. Istock, University of Michigan. Immunoelectrophoretic analysis of the aspermatogenic factor in guinea pigs, David W. Bishop. Tissue and species-specificity of Chinese hamster sperm antigens, Lajos Piko and Albert Tyler, California Institute of Technology. Immunochemical studies of frog egg fertilization, Lora Lavin, University of Michigan. Action of polyuridylic acid on incorporation of C^{14} -L-amino acids by sea urchin eggs before and after fertilization, Albert Tyler, California Institute of Technology. Protein synthesis in artificially activated non-nucleate fragments of sea urchin eggs, Paul C. Denny, California Institute of Technology. Adenosine triphosphatase activity in the mitotic figure of sea urchin eggs, Walter Auclair, University of Cincinnati.

Contributed Papers, Section XI. Animal Behavior and Sociobiology, III. Invertebrate Behavior. Robert D. Burns, Kenyon College, will preside. Sex attraction studies with the house fly, Chad M. Murvosh, G. C. Labrecque, and Carroll N. Smith, U.S. Department of

Agriculture. Factors governing case-building behavior of trichopteran larvae, Dorothy Merrill, University of Michigan. Some effects of sound on the honey bee, *Apis mellifera*, L. R. E. Showers and F. E. Moeller, University of Wisconsin. Inhibition of contraction responses of *Hydra pirardi* by reduced glutathione, Norman B. Rushforth and Ivan T. Krohn, Western Reserve. Flight duration as a function of age in *Oncopeltus fasciatus* (Dallas) (Hemiptera, Lygaeidae) and its bearing on insect migration, Hugh Dingle, University of Cambridge, England. Relationship of photoperiod to the circadian rhythm of the "drop-off" of *Haemaphysalis leporispalustris*, John E. George, University of Kansas. A mutation causing abnormal courtship and mating behavior in males of *Drosophila melanogaster*, Kulbir S. Gill, Yale. A mechanism underlying selection or choice behavior which is not based on previous experience, Ernst S. Reese, University of Hawaii.

Contributed Papers, Section XII. Comparative Endocrinology, III. Rev. John R. Cortelyou, De Paul University, will preside. Some ultrastructural aspects of the neurohypophysis of the white-crowned sparrow, Richard S. Nishioka and Howard A. Bern, University of California, Berkeley; and L. Richard Mewaldt, San Jose State College. Steroids and terpenes in the cecropia silkworm, Robert D. Goodfellow and Lawrence I. Gilbert, Northwestern. Evidence for two kinds of neurosecretory fibers in the caudal neurosecretory system of *Tilapia mossambica*, Kinji Yagi and Howard A. Bern, University of California, Berkeley. Influence of thyroxine on the differentiation of the neurosecretory mechanism of the tadpole, William Etkin, Albert Einstein College of Medicine, and Sakae Kikuyama, Tokyo University. The effect of hypothalectomy at open neurula embryos in *Rana pipiens*, Yoichi Hanaoka, State University of Iowa. Parathyroid extract-induced calcification of the ovarian follicle, Howard S. Grob, Hunter College. Comparison between lympholytic effects of corticosterone and testosterone propionate in white leghorn fowl, M. P. Dieter and R. P. Breitenbach, University of Missouri. Serum glucose levels and pancreatic islet cytology in the normal and alloxan diabetic goldfish, Jack E. Young and Walter Chavin, Wayne State.

Contributed Papers, Section XIII. Developmental Biology, IV. Marcus Singer, Western Reserve, will preside.

Regulation and the development of avian limb buds, John M. Cairns, Roswell Park Memorial Institute. Induction of limb regeneration in the frog by xenoplastic transplantation of newt or lizard adrenal tissue, Merle Mizell, Tulane. Tissue grafts in amputated aneurogenic limbs of *Ambystoma*, C. S. Thornton, Michigan State, and Trigve Steen, Yale. A histochemical study of succinic and lactic dehydrogenases in the regenerating forelimb of the adult newt, *Triturus*, Eleanor A. Johnson and Marcus Singer, Western Reserve. The fine structure of the frog renal adenocarcinoma before and during serial intracular transplantation, Joseph Zambarnard and Merle Mizell, Tulane. RNA and lens induction in *Xenopus laevis*, R. G. Babcock, University of Virginia. Hierarchical order in the anatomical patterns established by heteronomic combinations of chick embryonic cells and tissues, Malcolm S. Steinberg, Johns Hopkins. Electrokinetic properties of some embryonic cell surfaces, Michael Collins, Johns Hopkins. Long-term cultivation of beating chick heart cells in fluid medium, Thomas E. Smith, Jr., Army Chemical Center, and William O. Berndt, Dartmouth Medical School. Changes in total calcium content of the amphibian embryo during gastrulation, Louis T. Stableford, Lafayette.

Contributed Papers, Section XIV. Comparative physiology, I. Donald M. Maynard, Jr., will preside. Joint proprioceptors in the antennule of the spiny lobster, *Panulirus argus*, Gordon A. Wyse, Bermuda Biological Station, and Donald M. Maynard. Proprioceptive reflexes in the crab leg, William H. Evoy and M. J. Cohen, University of Oregon. Sensitivity of cockroach campaniform sensilla to adrenergic drugs, Nancy S. Milburn, Tufts. Threshold vs. rate of activation studies of earthworm giant fibers, H. C. Sabelli and J. E. P. Toman, Chicago Medical School. The properties of crayfish motoneurons, Kimihisa Takeda and Donald Kennedy, Stanford University. The organization of input to complex crayfish interneurons, Donald Kennedy and DeForest Mellon, Jr., Stanford. Multiple conducting systems in the stalk of a hydroid, Robert K. Josephson, University of Minnesota. The echo-location of flying insects by the bat, *Chilonycteris*, Alvin Novick and Juozas R. Vaisnys, Yale. Analysis of the electrical activity of *Sternarchus albifrons*, Bruce S. Maccabee, Louis P. Granath, and Donald W. Howe, Wor-

cester Polytechnic Institute, and George Camougis, Clark University.

Contributed Papers, Section XV. General Zoology. H. E. Finley, Howard University, will preside. Fine structure of the dermal membrane of the sponge *Microciona prolifera*, Roland Bagby, University of Illinois. Assays of the "collagenase" activity of various venoms on an azo-labeled collagen, P. L. Szabo and J. F. Gennaro, Jr., University of Florida. Fractionation of mammalian erythrocytes, David A. Pack and M. A. Lessler, Ohio State. Tocopherol, ubiquinone, and ubiquinol concentrations in the nulliparous rat uterus after estrogen conditioning, Nicholas A. B. Szabo, University of Florida. Some aspects of the nutritional requirements of the peritrichous ciliate *Tetotrichidium* in monoxenic and axenic media, H. E. Finley and David McLaughlin, Howard. Lateral line activity in rheotactic orientation of schooling fishes, Phyllis H. Cahn and Evelyn Shaw, American Museum of Natural History. The response to amine "F" by six species of marine fish, H. Kleerekoper, McMaster University. Daily (circadian) physiological rhythms of Arctic carnivores in continuous light, G. Edgar Folk, Jr., G. L. Shook, R. S. Hedge, M. C. Brewer, and M. A. Folk, State University of Iowa.

Monday 30 December

Perspectives and Problems in Teaching Vertebrate Morphology. Panel, arranged by Warren F. Walker, who will also preside and present introductory remarks. Speakers include: Milton Hildebrand, University of California, Davis; Thomas S. Parsons, University of Toronto; Florence Moog, Washington University; Malcolm S. Steinberg, Johns Hopkins; Walter Bock, University of Illinois; and Douglas B. Webster, New York University.

Contributed Papers, Section XVI. Animal Behavior and Sociobiology, IV. Ontogeny of Behavior. Irwin S. Bernstein, Yerkes Laboratories of Primate Biology, will preside. Growth of juvenile big brown bats, Elizabeth Smith and Woodrow Goodpaster, Pennsylvania State University. Effects of fostering on the behavior of two inbred mouse strains, Anthony J. Reading, Johns Hopkins. Development of various components of sexual behavior in dairy bulls, E. B. Hale and J. O. Almquist, Pennsylvania State University. The non-reflexogenic nature of embryonic behavior of the chick, Martin Balaban and Viktor Hamburger, Wash-

ington University. The facilitatory effect of the parental exodus call on the following-response of ducklings: one test of the self-stimulation hypothesis, Gilbert Gottlieb, Dorothea Dix Hospital. The permanent effect of imprinting in turkeys, Martin W. Shein, Pennsylvania State University. The role of experience in the nest-building of the zebra finch, Theodore David Sargent, University of Massachusetts. Flexibility of the parental cycle in the teleost *Cichlasoma biocellatum*, Bernard Greenberg, Roosevelt University. Photic response in the brown bullhead, *Ictalurus nebulosus*, Philip B. Armstrong, State University of New York at Syracuse.

Contributed Papers, Section XVII.

Comparative Physiology, II. John M. Dean, Hanford Laboratories, will preside. Energetic relationships of a very small passerine, *Estrilda troglodytes*, Walter R. Moberly, University of Michigan, and R. C. Lasiewski and Susan W. Hubbard, University of California at Los Angeles. Energy and nutrient requirements of the red-winged blackbird, Fred J. Brenner, Pennsylvania State University. Daily torpor and aestivation in the pygmy mouse, *Baiomys taylori*, Jack W. Hudson, Rice University. A comparison of pulmonary and cutaneous gas exchange in salamanders, Walter G. Whitford and Victor H. Hutchison, University of Rhode Island. Effects of temperature acclimation on some aspect of carbohydrate metabolism in decapod crustacea, John M. Dean and F. John Vernberg, Duke University Marine Laboratory. Lipid release from the fat body of silkworm pupae, Haruo Chino and Lawrence I. Gilbert, Northwestern. The relationship of cellular blood components to activity in certain marine teleosts, David W. Engel and Edna M. Davis, Bureau of Commercial Fisheries. Nitrogen excretion in tadpoles of *Leptodactylus albilabris* and *Rana catesbiana*, Graciela C. Candelas and Mercedes Gomez, University of Puerto Rico. Characteristics of amino acid accumulation by *Chy-menella torquata*, Grover C. Stephens, University of Minnesota.

Contributed Papers, Section XVIII.

Invertebrate Zoology. Horton Hobbs, U.S. National Museum, will preside. Mortality in juveniles of *Dugesia dorotocephala* during the first ten weeks after hatching, Marie M. Jenkins, Madison College. Animal associates of the Gorgonian Coral *Leptogorgia virgulata* at Beaufort, North Carolina, Wendell K. Patton, Ohio Wesleyan. The system-

atic position of the Branchiobdellidae, Perry C. Holt, Virginia Polytechnic Institute. The reassignment of *Plumatella orbisperma* and ecological information on the fresh water Ectoprocta, John H. Busness, Jr., Washington and Jefferson College. Observations on the biology of *Lernaea cyprinacea* (Lernaeidae: Copepoda), E. I. Sillman, Duquesne. The biology of a fresh water shrimp, *Palaemonetes ka-diakensis*, in an artificial empoundment in Ohio, A. C. Broad and John W. Born, Ohio State. Comparison of the male reproductive cycles in the dwarf crawfishes *Cambarellus shufeldti* and *Cambarellus puer*, Joe B. Black, Mississippi College. An autoradiographic study of the distribution of ingested nutrients in the starfish *Asterias forbesi*, John Carruthers Ferguson, Florida Presbyterian College. Endocrine influence and the concentration of related metals by *Diazona violacea*, Estes Potter Levine, San Jose State College.

Contributed Papers, Section XIX.

Experimental Zoology. G. W. Wharton will preside. Comparative temperature responses in Antarctic and subantarctic crustacea, M. A. McWhinnie and P. Marciniak, De Paul. Passage of tritium-labeled microorganisms through the hamster cheek pouch, D. Shepro, P. Cohen, and N. Kula, Boston University. Studies on inanition in the red spotted newt, *Diemictylus viridescens*, Sophie Jakowska, Food and Drug Research Laboratories. Effects of methyl 2-cyanoacrylate on split-thickness skin grafts in pigs, Melvin P. Mohn, Bertram E. Bromberg, In Chul Song, and Edzard Koehnlein, University of Kansas Medical Center. Extracellular products of algae symbiotic with *Hydra*, Leonard Muscatine, University of California. A study of serum proteins in *Chrysemys picta*, R. J. Masat and X. J. Musacchia, St. Louis University. Effect of vibration on the endocrine system of male rats, A. Stanley Weltman, A. M. Sackler, H. Owens, and M. Bernstein, Laboratories for Therapeutic Research. Cleavage of rabbit ova in protein-free media, Joseph C. Daniel, Jr., University of Colorado. The determination of distance by echo-locating bats, D. A. Cahlander, J. J. G. McCue, and F. A. Webster, M. I. T.

Evolution and Composition of Vertebrate Hard Tissues. Symposium, program of the Division of Vertebrate Morphology. Arranged by Warren F. Walker, Jr., Carl Gans, State University of New York at Buffalo, will preside and present introductory remarks. Ori-

gin and early evolution of hard tissues, Alfred S. Romer, Harvard. Evolution of dental tissues, Melvin L. Moss, Columbia. Aspects of the ultrastructure of hard tissues, Robert A. Robinson, Johns Hopkins. Regulatory processes in hard tissues, Marshall R. Urist, University of California. Discussant will be Bobb Shaeffer.

Contributed Papers, Section XX.

Animal Behavior and Sociobiology, V. Social Behavior. Robert W. Ficken, University of Maryland, will preside. Sound production and reproductive behavior of the croaking gourami, *Trichopsis vittatus*, Joseph A. Marshall, University of Maryland. Role of size in courtship of the orange chromide (*Etroplus maculatus*; Pisces-Cichlidae), G. W. Barlow, University of Illinois. Behavioral measurements of CFW mice in relation to social stress, Gretchen S. Cutts, Towson State College, and Charles H. Southwick, Johns Hopkins. Fighting and mating mice, Louis Levine, City College of New York. Perception levels of aggressiveness of opponent among chickens, A. M. Guhl, Kansas State University. Successive and simultaneous introductions in the formation of captive primate groups, Irwin S. Bernstein, Yerkes Laboratories of Primate Biology. Effects of estrogen on the behavior of female rhesus monkeys in an enclosure group, John G. Vandenberg. Care of the young by the Indian elephant, Leslie H. Squier, Reed College.

Contributed Papers, Section XXI.

Comparative Physiology, III. G. Edgar Folk, Jr., University of Iowa, will preside. Regulatory function of a primitive vertebrate kidney, William N. McFarland, Cornell, and Frederick W. Munz, University of Oregon. Effects of dehydration on fluid distribution in *Bufo marinus*, Vaughn H. Shoemaker, University of Michigan. Body fluid partitioning in fresh water, marine, and terrestrial chelonians, Thomas B. Thorson, University of Nebraska. Osmotic behavior of vertebrate "salt gland" slices, G. R. Bernard and Gail G. Wynn, Medical College of Georgia. Nasal salt secretion in terrestrial iguanids, James R. Templeton, University of Texas Dental Branch. Evaporative water loss and oxygen consumption of the common nighthawk, *Chordeiles minor*, Robert C. Lasiewski, University of California at Los Angeles, and William R. Dawson, University of Michigan. The regulation of water loss in the clover mite, *Bryobia praetiosa*, W. Winston and V. E. Nelson, University

of Colorado. Respiration of selected tissues from crayfish acclimated to different salinities, A. W. Pritchard and Rosalind Yuen, Oregon State University. Analysis of daily rhythms in isolated hearts, Gerald D. Tharp and G. Edgar Folk, Jr., State University of Iowa.

Contributed Papers, Section XXII. Arthropod Physiology. H. H. Ross, Illinois Natural History Survey, will preside. Longevity of honey bees as affected by chemicals commonly used in beekeeping, Augustine Jones and Robert E. Showers, University of Wisconsin, and F. E. Moeller, U.S. Department of Agriculture. Artificial diet for *Hyalophora cecropia*, Robert Ziegler, Mason Garrison, Frank Wittwer, and Donald Bucklin, University of Wisconsin. The integument as a system for a developmental biologist, M. Locke and L. Hurshman, Western Reserve. The effects of griseofulvin on the integument of giant silkmoths, Myrna B. Miller and Howard A. Schneiderman, Western Reserve. Brain hormone activity of certain terpene derivatives in insects, A. Krishnakumaran and H. A. Schneiderman, Western Reserve. A preliminary investigation of sclerotin precursors in crustacean cuticles, J. Ross Stevenson, Rockefeller Institute. Control of postembryonic development in the firebrat, *Thermobia domestica* (Packard), J. A. L. Watson, Western Reserve. Growth and survival of grasshoppers during continual exposure to high gravity, Lee Eberly, Seddie Cogswell, Jr., and Charles C. Wunder, State University of Iowa. Growth of a thermophilic mite in axenic culture, Austin Phelps, University of Texas. Insect tissue culture, T. Grace, C.S.I.R.O., Australia. In addition, 87 papers are to be presented by title only. For a complete listing, consult the *General Program*.

Herpetologists' League

Friday 27 December

Contributed Papers. John M. Legler, University of Utah, will preside. Fossil lizards from Late Pleistocene cave deposits in the West Indies, Richard Etheridge, San Diego State College. Some Miocene-Pliocene snakes from Nebraska, J. Alan Holman, Illinois State Normal University. Additional remarks on the taxonomy of *Ambystoma tigrinum* (Amphibia: Caudata), Frederick R. Gehlbach, Baylor. Local variation in populations of *Desmognathus*

ochrophaeus from western North Carolina, James E. Huheey, Worcester Polytechnic Institute. Systematics of the salamander genus *Gyrinophilus*, Ronald A. Brandon, Southern Illinois University. A new *Sauromalus obesus* from the upper Colorado basin of Utah, Wilmer W. Tanner and David Avery, Brigham Young University. Variation and distribution of a wide-ranging polytypic species of turtle, *Pseudemys scripta*, John M. Legler, University of Utah. Display patterns of the collard lizards, *Crotaphytus collaris* and *Crotaphytus reticulatus*, Charles C. Carpenter, University of Oklahoma.

Saturday 28 December

Contributed Papers. Wade Fox, Louisiana State University School of Medicine, will preside. Some similarities in the soft anatomy of the blind snake families Leptotyphlopidae and Typhlopidae, Wade Fox. Growth rates of juvenile *Uta stansburiana stejnegeri*, Donald W. Woodard, Concordia College. Sexual dimorphism in the snapping turtle *Chelydra serpentina*, Robert C. Feuer, Purdue. Temperature response and color change in lizards of the White Sands, New Mexico, James R. Dixon, New Mexico State University. The Jogi snake charmers of Sind, Madge R. Minton and Sherman A. Minton, Jr., Indianapolis. An evaluation of density probability function as a means of estimating home range, Donald W. Tinkle, Texas Technological College.

Society of Systematic Zoology

Friday 27 December

The Classification of Animals. Panel discussion. Ross H. Arnett, Jr., Catholic University of America, will be moderator. Panel members: Richard E. Blackwelder, Southern Illinois University; Lawrence S. Dillon, Texas A. and M. University; Robert D. Barnes, Gettysburg College; and Clarence J. Goodnight, Purdue.

Saturday 28 December

Invitational Paper at the Annual Business Meeting of the Society. Nomenclature after the XVI International Congress of Zoology, 1963, by Curtis W. Sabrosky, U.S. Department of Agriculture. A session for contributed papers follows. The study of Cenozoic fresh water fishes in North America: a progress report, Robert Rush Miller, University of Michigan. A branchiob-

dellid from Costa Rica (Oligochaeta), Perry C. Holt, Virginia Polytechnic Institute. Evolution of predator-prey relationships in snail-killing *Tetanocera* (Diptera: Sciomyzidae), Benjamin A. Foote, Kent State University. The faunistic significance of North American sphagnum bog Lepidoptera, Alexander B. Klots, City College, New York. Correlations between structure and function in the mandible and ovipositor of Ichneumonidae (Hymenoptera), Henry Townes, American Entomological Institute.

Sunday 29 December

Zoogeography of Invertebrates, Marine Forms. Symposium, arranged by Robert P. Higgins, Wake Forest College, who will also preside. Advances in Arctic marine invertebrate zoogeography since Ekman, M. J. Dunbar, McGill University. Marine glacial relics of the Canadian Arctic islands, Lionel Johnson, Fisheries Research Board of Canada. The zoogeography of north Atlantic and of north Pacific amplexid amphipods (crustacea), Eric L. Mills, Queens University, Ontario. Cape Code as a barrier for marine invertebrate distribution, with particular reference to the sea urchin *Arbacia punctulata*, John S. Rankin, Jr., University of Connecticut. Distribution of polychaetes and gastropods in estuaries of the Atlantic coast of North America, J. Frances Allen, National Science Foundation. Cape Hatteras as a barrier to the distribution of marine invertebrates. I. E. Gray and M. J. Cerame-Vivas, Duke. Some aspects of the zoogeography of the coelenterates, Cadet Hand, University of California, Berkeley. Are there circumtropical species of shallow-water sponges?, Willard D. Hartman, Yale. The zoogeography of the cirriped subgenus *Megabalanus*, Victor A. Zullo, Woods Hole Marine Biological Laboratory.

Zoological and Botanical Sciences

American Society of Naturalists

Friday 27 December

Time Measurement in Photoperiodic Phenomena. Part I. Symposium, arranged by Colin S. Pittendrigh, Princeton, who will also preside and present the first paper, The entrainment of circadian systems and the time measurement in photoperiodism. The time measurement in plant photoperiodism,

H. A. Borthwick, U.S. Department of Agriculture. Circadian rhythms and plant photoperiodism, Karl Hamner, University of California, Los Angeles. Some aspects of the phytochrome system, W. F. Hillman, Brookhaven National Laboratory.

Part II. Arranged by Colin S. Pittendrigh, who will also preside. The time measurement in vertebrate photoperiodism, D. S. Farner, Washington State College. The time measurement in insect photoperiodism, F. D. Beck, University of Wisconsin. Circadian rhythms and the photoperiodic control of diapause in the pink boll worm (*Pectiniophora gossypiella*), P. L. Adkisson, Texas A. and M.

Saturday 28 December

Presidential Address. Paramutation and the control of gene action, R. L. Alexander Brink, University of Wisconsin and president of the American Society of Naturalists.

Beta Beta Beta Biological Society

Saturday 28 December

Address and Biennial Luncheon. H. P. Sturdivant, Western Maryland College and president of the Beta Beta Beta Biological Society, will preside. Cellular structure and function: a modern Gordian knot, John M. Allen, University of Michigan.

Biomedical Information-Processing Organization (BIO)

Saturday 28 December

Computer Programs to Aid Biology and Medicine. Invited papers, arranged by Robert S. Ledley, National Biomedical Research Foundation, who will also preside. Progress in computer analysis of chromosome photomicrographs, Frank Ruddle, Yale, and Louis S. Rotolo, James B. Wilson, and Robert S. Ledley, National Biomedical Research Foundation. Cryptogramic approaches to the genetic code, Richard Eck, National Biomedical Research Foundation. Computer search for biochemical active site configurations, Margaret O. Dayhoff, National Biomedical Research Foundation. Computer organization of psychological reports, George C. W. Cheng, National Biomedical Research Foundation, and Henry J. Mark, Johns Hopkins Medical School. Automatic computer analysis of ventricular dynamics from cine-

radiographs, Robert S. Ledley, and Edward Fries and Gerald Shugoll, Mt. Alto Veterans Hospital, Washington, D.C.

Ecological Society of America

Thursday 26 December

Plant Ecology. Contributed Papers. Dwight H. Berg, Hiram College, will preside. Determination of the extent of root distribution by the use of radio-tracer techniques, Frank W. Woods and Walter A. Hough, Duke. Regeneration of thermophilic algae and invertebrate animals following severe flooding of a thermal stream, Austin Phelps, University of Texas. Studies on the internal atmosphere of submerged vascular hydrophytes, Richard T. Hartman and Doris L. Brown, University of Pittsburgh. The "Solidago Factor" in jack pine seed germination, Robert T. Brown and Joseph Roti, Michigan College of Mining and Technology. Diurnal variation in α -chlorophyll and light adaptation of the phytoplankton in Grand Traverse Bay, Michigan, Francesco B. Trama, Rutgers. Photosynthesis and respiration of alpine vascular plants on Mt. Washington, New Hampshire, Elmer B. Hadley, Brookhaven National Laboratory, and L. C. Bliss, University of Illinois. Incidence of pine needle gall fly infestation with particular reference to needle length in three pine species two years post-irradiation, Noel N. Nelson, Mary B. Muller, and Lora M. Shield, New Mexico Highlands University, and Robert B. Platt, Emory University. Species-size class relationships in southern Wisconsin white oak forests, Grant Cottam, University of Wisconsin.

Invertebrate Ecology. Contributed papers. Benjamin A. Foote, Kent State University, will preside. Evolution of increased "female sex ratio" in laboratory populations of the housefly (*Musca domestica*) and the blowfly (*Phaenicia sericata*) competing with each other, Edwin H. Feinberg, Stanford. The dynamics of a natural population of an amphipod (*Hyalella azteca*), William E. Cooper, University of Michigan. The mud-daubers community, C. S. Lin, Huston-Tillotson College. A study of the interrelationships of *Allolobophora* and *Lumbricus* species in the decomposition of leaf litter, Albert E. Augustson, Richard E. Puetz, and Grant Cottam, University of Wisconsin. Evaluation of the grid method of sampling adult houseflies, Chad M.

Murvosh, U.S. Department of Agriculture. Coexistence and competition in populations of similar species of whirligig beetles (Gyrinidae), Conrad Istock, University of Michigan. Genetic strains and interspecies competition in flour beetles, Thomas Park, University of Chicago; P. H. Leslie, University of Oxford; and David B. Mertz, University of Chicago.

Marine Ecology. Contributed Papers. T. Edward Perry, East Cleveland Schools, will preside. Ecological and metabolic variability among Antarctic fishes at -1.9° to 0°C , Donald E. Wohlschlag, Stanford. Foraminiferal trends, Laguna Beach outfall area, California, Orville L. Bandy, James C. Ingle, Jr., and Johanna M. Resig, University of Southern California. Hypothermia and blood parameters in the fiddler crab (*Uca pugilator*), John M. Dean, Hanford Laboratories. Aggregation in the sand crab (*Emerita analoga*), Ian E. Efford, University of British Columbia. The hatching process of the American lobster (*Homarus americanus*), Charles C. Davis, Western Reserve.

Friday 27 December

Recent Trends in Ecological Research in the Great Lakes. Part I. Symposium, program of the Ecological Society of America, cosponsored by the American Society of Limnology and Oceanography. Arranged by Charles C. Davis and F. E. J. Fry. Charles C. Davis will preside. Backgrounds of ecological research in the Great Lakes, T. H. Langlois, Ohio State. Recent studies of the geology of the Great Lakes, Howard J. Pincus, Ohio State. Recent studies of water circulation in the Great Lakes, John C. Ayers, University of Michigan. The physical and chemical environment in the Great Lakes, D. V. Anderson and G. K. Rodgers, University of Toronto. Recent studies of the bottom-living organisms in the Great Lakes, E. Bennette Henson, U.S. Public Health Service. Plankton studies in the Great Lakes, Charles C. Davis.

The Use of Morphological and Autecological Characteristics of Plants in Community Gradient Analysis. Symposium, arranged by O. L. Loucks, University of Wisconsin. Grant Cottam will preside. Coordinate methods in construction of submodels of Minnesota forest ecosystems, Egolf V. Bakuzis, University of Minnesota. Gradient analysis by synecological indices compared with synthetic environmental

scalars, O. L. Loucks. A physiological approach to alignment of vegetation along environmental gradients, R. H. Waring, Oregon State University. An analysis of Wisconsin vegetation on the basis of plant structure and function, Dennis H. Knight, University of Wisconsin. Some patterns of multidimensional analysis in plant communities, Pierre Dansereau, New York Botanical Garden.

Plant Ecology. Contributed Papers. Clinton H. Hobbs, Kent State University, will preside. The phytosociology of lichen vegetation on a sandy, glacial outwash plain in northern Michigan, Frederick B. Bevis, Michigan College of Mining and Technology, and Richard J. Krueger, Rufus King High School, Milwaukee. Composition and production of a remnant prairie in southwestern Michigan, Richard Brewer, Western Michigan University. Bioclimatic formations of the eastern and central United States, John O. Sawyer and Alton A. Lindsey, Purdue. Fungal populations in relation to pollution of the Bear River, Utah-Idaho, William Bridge Cooke, Robert A. Taft Sanitary Engineering Center. Plant ecological studies in the Guadalupe Mountains, New Mexico-Texas, Frederick R. Gehlbach, Baylor. Annual vegetation of the northern Mojave Desert, Janice C. Beatley, University of California, Los Angeles. Vegetation and environments of the Nevada Test Site, Janice C. Beatley.

Vertebrate and Human Ecology. Contributed Papers. Lowell P. Orr, Kent State, will preside. Cessation of population growth and the six organs of male prairie deer mice, C. Richard Terman, College of William and Mary. Exploration and social interaction of wild rodents in an extensive laboratory environment, Daniel H. Brant and J. Lee Kavanau, University of California, Los Angeles. Energy flow in two breeding populations of red-winged blackbirds, Fred J. Brenner, Pennsylvania State University. Hormonal determinants of mating behavior: the display of feminine behavior by adult male rats castrated neonatally, Kenneth L. Grady and Charles H. Phoenix, University of Oregon Medical Center. Observations of seasonal changes in metabolic and cardiac rates in hibernating bats, Robert E. Henshaw, State University of Iowa. Blood chemistries of four southwestern ethnic groups dissimilar in incidence of cardiovascular diseases, Lora M. Shields, Roger Kipfer, and William Elmer, New Mexico Highlands

University. Health departments operation: a source for socioecological investigation (Pennsylvania case), Ernest M. Kuhinka, Harrisburg Department of Health. Human ecology in personnel and other environmental studies, George B. Happ, Institute of Human Ecology.

Recent Trends in Ecological Research in the Great Lakes. Part II. Charles C. Davis will preside. Recent studies of the dynamics of fish populations in the Great Lakes, Henry A. Regier, Ontario Department of Lands and Forests. Great Lakes studies of primary production, George W. Saunders, University of Michigan. The direct effects of pollution in the Great Lakes, G. S. Hunt, University of Michigan. The eutrophication of the Great Lakes, Alfred M. Beeton, University of Michigan. Speakers at a forum on future needs and plans will include: David C. Chandler, University of Michigan; G. B. Langford (or R. E. Deane), University of Toronto; Theodore A. Olson, University of Minnesota; Charles A. Dambach, F. T. Stone Laboratory; J. W. Moffett, U.S. Fish and Wildlife Service; K. H. Loftus, Ontario Department of Lands and Forests, and G. F. M. Smith, Fisheries Research Board of Canada.

Cave Ecology. Invited papers, joint program of the Ecological Society of America and the National Speleological Society. Arranged by Thomas C. Barr, Jr., University of Kentucky, who will also preside. The fauna of Mammoth Cave: a study of community composition and evolution, Thomas C. Barr, Jr. Observations on the ecology and behavior of the cave cricket, *Hadenocetus sutteraneus* (Scudder), Orlando Park and David Reichle, Northwestern. Limnological studies in Mammoth Cave, R. A. Kuehne, University of Kentucky. The importance of base level fluctuations in the biology of cave organisms, T. L. Poulson, Yale, and Philip M. Smith, Cave Research Foundation. Molting and reproductive periods in a cave crayfish, Thomas C. Jegla, University of Minnesota. Algae in caves and a study of their ecology, George Claus, New York University Medical Center. Preliminary studies on the geographic distribution of troglolithic invertebrates in the central Appalachians, John R. Holsinger, University of Kentucky. Fall swarming of bats at Dixon Cave, Kentucky, Wayne H. Davis, University of Kentucky. Bat hibernation in the Mammoth Cave region of Kentucky, John S. Hall, Albright College.

Botanical Sciences

Monday 30 December

Plant Biology Today: Advances and Challenges. Part I. Symposium, joint program of section on Botanical Sciences (G) and the Botanical Society of America. Arranged by Harriet B. Creighton, Wellesley College, who will also preside. Cultural and physiological studies of the lichen symbiosis, Vernon Ahmadjian, Clark University. Algal symbionts in marine animals, John J. A. McLaughlin, Haskins Laboratory.

Vice-Presidential Address and Botanists' Luncheon. Harriet B. Creighton will preside. The compleat botanist, Aaron J. Sharp, University of Tennessee and vice president for section on Botanical Sciences.

Plant Biology Today: Advances and Challenges. Part II. Significant advances in our knowledge of higher vascular plants and the origin of seed plants, Henry N. Andrews, Washington University. Electron transport carriers in respiration and photosynthesis, Walter Bonner, University of Pennsylvania. Naturally occurring plant growth regulators, Charles E. Hess, Purdue.

Anthropology

Friday 27 December

Problems in Communication Research. Arranged by Roger W. Wescott, New School for Social Research, who will also preside. Cantometrics and communications, Alan Lomax, Columbia. Kinesic communication, Ray L. Birdwhistell, Eastern Pennsylvania Psychiatric Institute. Phatic and strepitistic communication, R. W. Wescott.

Sunday 29 December

Early Man in North America. Typology, Chronology, and Terminology. Part I. Symposium, arranged by George A. Agogino, Eastern New Mexico University, who will also preside. The present status of Paleo-Indian studies in New York State, William A. Ritchie, State Museum of New York. The Wapanucket No. 8 site, a Clovis-Archaic site in Massachusetts, Maurice Robbins, Bronson Museum, and George A. Agogino. A mastodon kill-site in the valley of Mexico, Cynthia Irwin-Williams, American Museum of Natural History. Possible rock drawings of America which may be attributed to the Archaic Period, David Gebhard, University of California, Los Angeles. The earliest human penetra-

tion in the lower Great Lakes region, Olaf H. Prufer, Case Institute of Technology. Late Paleo-Indian penetration of the lower Great Lakes region, Raymond S. Baby, Ohio State Museum.

Rates and Units in the Evolution of Culture. Part I. Symposium, arranged by Anthony Leeds, University of Texas, who will also preside and present introductory remarks. Toward an operational language of cultural anthropology, Marvin Harris, Columbia. A zero point and scale for the investigation of some social phenomena, Joseph B. Birdsell, University of California, Los Angeles. Rates of change in tool use and brain size, James M. Spuhler, University of Michigan. The rating of cultures and the measurement of cultural growth, Robert L. Carneiro, American Museum of Natural History.

Early Man in North America. Typology, Chronology, and Terminology. Part II. George A. Agogino will preside. Early man in the prairie plains, Adrian D. Anderson, Great Plains Historical Museum. Selection and dispersal of lithic materials in Paleo-Indian cultures, John Witthoft, Pennsylvania Historical and Museum Commission. Some characteristics of fluted points in the eastern United States, James E. Fitting, University of Michigan. The Blackwater draw locality No. 1: excavations at the Clovis type site, summer and fall 1963, Irwin Rovner, University of Wisconsin, and George A. Agogino. The Paleo-Indian stone technology as seen from the standpoint of the Bull Brook site, Douglas Jordan, University of Connecticut.

Rates and Units in the Evolution of Culture. Part II. Anthony Leeds will preside. S curve of trait frequency distribution as related to rates and units of cultural evolution, Roy G. D'Andrade, Stanford. Functional trait clusters and stylistic attributes—two different units for measuring culture change, Lewis R. Binford, University of Chicago. Cycles of consolidation and disintegration among Eurasian empires, Raoul Naroll, Northwestern. Linguistic evolution in the light of remote comparisons, Mauricio Swadesh, Universidad Nacional Autonoma de Mexico. Concluding remarks by Anthony Leeds.

Vice-Presidential Address. Eleanor Leacock, secretary of the section on Anthropology (H) will preside. Archaeological approaches to paleoclimatology in the northern Mississippi Valley, David A. Baerreis, University of Wisconsin and vice president for section on Anthropology.

Early Man in North America. Typology, Chronology, and Terminology. Part III. George A. Agogino will preside. The Angostura and Agatebasin point types: differences and similarities, Richard P. Wheeler, Mesa Verde Archaeological Project. Speculations on the similarity of some notched artifacts in the Folsom culture and in the Old World Paleolithic, Carl Schuster, Woodstock, N.Y. Paleo-Indian and early Archaic projectile forms from Russell Cave, Northern Alabama, Carl F. Miller, Smithsonian Institution.

Present Status and Future Prospect of Paleo-Indian Studies. Panel discussion. Richard P. Wheeler will preside. Discussants include: George A. Agogino; Raymond S. Baby; Joffre L. Coe, University of North Carolina; Richard G. Forbis, University of Alberta; Weldon D. Frankforter, Grand Rapids Public Museum; Ronald J. Mason, Lawrence College; Olaf H. Prufer, Case Institute of Technology; Cynthia Irwin-Williams; and John Witthoft.

Contributed Papers. Arnold R. Pilling, Wayne State, will preside. Fred- eric Ward Putnam—father of American archaeology, Ralph W. Dexter. Some parallels and contrasts between Japanese and early English kinship systems, Erwin H. Johnson and Peter Wolfson, State University of New York at Buffalo. The source of religious structure, Downey Raibourn, Indiana University. Social factors affecting the selection of psychiatric clinic and mental hospital populations, Thomas J. Scheff, University of California, Santa Barbara. Resistance of Alaskan natives to cooling of the extremities: genetic adaptation or seasonal acclimatization?, Charles J. Eagan, Arctic Aeromedical Laboratory.

American Anthropological Association

Saturday 28 December

Cultural Influences and Diet. Symposium, joint session of the American Anthropological Association and the American Dietetic Association, cosponsored by the section on Anthropology. Arranged by Eva D. Wilson, Ohio State University, and Margaret Lantis, McGill. Margaret Mead will preside. American values as they influence diet, Ethel J. Alpenfels, New York University. Sociocultural factors affecting the diet of the northeast coastal Bantu, Luther P. Gerlach, University of Minnesota. Infant feeding practices among

Alaskan Eskimos, Christine Heller, U.S. Public Health Service. Some methodological problems in cross-cultural diet research, Frank W. Moore, Yale.

Psychology

Sunday 29 December

Learning Research Pertinent to Educational Improvement. Symposium, program of section on Psychology (I), cosponsored by section on Education (Q). Arranged by Lee J. Cronbach, University of Illinois. Robert M. Gagné, American Institute for Research, will preside. Discrimination of graphic forms, Anne D. Pick, University of Minnesota. Programmed instruction and the teaching of mathematics, Lawrence M. Stolurow, University of Illinois. Student self-direction: effects on learning, Vincent N. Campbell, American Institute for Research. Facilitation of creative thinking and problem solving in school children, Richard S. Crutchfield and Martin V. Covington, University of California, Berkeley. Discussants will be Robert M. Gagné and E. A. Peel, University of Birmingham, England.

Vice-Presidential Address. Frank W. Finger, University of Virginia and secretary of section on Psychology, will preside. Problems posed to experimental psychology by the evidence for trait instability, Lloyd G. Humphreys, University of Illinois and vice president for section on Psychology.

Investigation of Experimental Psychological Problems by Multivariate Techniques. Program of section on Psychology, cosponsored by section on Statistics (U). Arranged by Ledyard R. Tucker, University of Illinois, who will also preside. Behavioral applications of multivariate analysis of variance, R. Darrell Bock, University of North Carolina. Application of multivariate analysis to the study of pathology of the heart, H. J. A. Rimoldi, Loyola, and Maurice Lev, Northwestern University. Speech and speaker recognition, J. E. Keith Smith, Lincoln Laboratory. Multidimensional analysis of similarity, Warren S. Torgerson, Lincoln Laboratory.

The Development of Perception during the First Six Months of Life. Symposium, program of section on Psychology, cosponsored by the Society for Research in Child Development. Arranged by Herschel W. Leibowitz, Pennsylvania State University, who will also preside. Participants include: Bur-

ton L. White, Brandeis; Robert L. Fantz, Western Reserve; Herbert L. Pick, University of Minnesota; and Robert M. Boynton, University of Rochester.

Engineering Psychology: Contributions of an Infant Science. Symposium, arranged by Lowell Schipper, Pennsylvania State University, who will also preside. Participants include: George E. Briggs, Ohio State; Randall M. Chambers, University of Pennsylvania; and Conrad L. Kraft, The Boeing Company.

Social and Economic Sciences

American Economic Association

Thursday 26 December

Economics of Medicine. Symposium, program of the American Economic Association, cosponsored by sections on Social and Economic Sciences (K) and Medical Sciences (N). Arranged by Bert F. Hoselitz, M.I.T., who will preside. Some economic implications of hospital utilization. Walter J. McNerney and Donald C. Riedel, Blue Cross Association. The pricing problem in medical service, Manuel Gottlieb, University of Wisconsin. Medical care in the United States: an economic work-up, Harry I. Greenfield, Queens College.

American Society of Criminology

The general theme of these sessions will be an eclectic approach to problem areas in criminology. All papers will be abstracted in *Excerpta Criminologica*.

Sunday 29 December

Session I. Juvenile Delinquency. Multidisciplinary Approaches. Jacob Chwast, New York University School of Social Work, will preside. Discussion leader will be Frank Hartung, Southern Illinois University. Spare the rod: the case against corporal punishment in America's schools, Donal E. J. MacNamara, president, American Society of Criminology. Predicting juvenile delinquency among Negroes, Samuel A. Kramer, National Institutes of Health. Self-concepts of juvenile delinquents, Dorothy Miller, California Department of Mental Hygiene. Robert Bruce House: an experimental program, Albert C. Wagner, superintendent, Robert Bruce House. An evaluation of adjustment in a short-term, treatment-oriented

institution for delinquents, Jerome M. Tashbook, Youth Development Center of Philadelphia.

Session II. Criminological Experimentation, Research, and Theory. Part I. Marvin Wolfgang, University of Pennsylvania, will preside. Discussion leader will be Lewis Yablonsky, San Fernando Valley State College. Sociopsychological study of a subculture of violence, Franco Ferracuti, University of Rome, and Marvin Wolfgang. The control of behavior by punishment, James P. Appel, Yale University School of Medicine. Crime to sentence time lapse in Iowa, Walter A. Lunden, State University of Iowa. Some comments on typologies of offenders, Albert Morris, Boston University. Criminological experimentation, research, and training in Holland, H. Van Rooy, Criminologisch Instituut, Rijksuniversiteit, Groningen.

Annual Awards and Memorial Session. Donal E. J. MacNamara will preside. In memoriam, Rev. Joseph Henninger, John Carroll University. Presentation of the August Vollmer Award for 1963. A straight look at drug addiction, Austin MacCormick, The Osborne Association. Presentation of the Edwin Sutherland Awards for 1963. Speakers will be Walter C. Reckless, Ohio State University, and Herbert Wechsler, Columbia University Law School.

Monday 30 December

Session III. Criminological Experimentation, Research, and Theory. Part II. Charles Newman, University of Louisville, will preside. Discussion leader will be Gerhard O. W. Mueller, New York University Law School. McNabb-Mallory: an uneasy accommodation, Lawrence Herman, Ohio State University Law School. The interrelationship of social control agencies, John P. Clark, University of Illinois. A critical analysis of available films for training the staffs of juvenile delinquency control agencies, Leonard Aronson, Irwin B. Gould, and Jacob Chwast, Postgraduate Center for Mental Health. Teenage killers: nothing left but murder, James M. Reinhardt, University of Nebraska. Status differences and the frustration aggression hypothesis, Gerhard J. Falk, State University of New York at Buffalo. Findings of an investigation into the habitual offender, H. Van Rooy, Groningen.

Session IV. Criminological Experimentation, Research, and Theory. Part III. Clyde Vedder, Northern Illinois

University, will preside. Discussion leader will be Barbara Kay, University of Massachusetts. Suicide: comments by a pharmacologist-toxicologist, Mark Luckens, University of Kentucky. The rehabilitative effectiveness of a community correctional residence for narcotics users, Sethard Fisher, Los Angeles State College. Confronting the anonymous letter writer, Pearl and Martin Tytel, Examiners of Questioned Documents, New York, N.Y. Industry-sponsored crime prevention education programs, Michael Fooner, Fred Rosen Associates. Electronic data processing in corrections and law enforcement, Charles P. Smith and Paul E. Resta, Systems Development Corporation, SYANON: an analysis of some dimensions of the social structure of an anti-addiction society, Lewis Yablonsky and Charles E. Dederich, SYANON.

American Political Science Association

Sunday 29 December

Next Steps after the Test Ban. Program of the American Political Science Association, cosponsored by the section on Social and Economic Sciences. Arranged by Karl W. Deutsch, Yale. Leon Epstein, University of Wisconsin, will preside. The political interest of the United States, Hans Morgenthau, University of Chicago. The interests of American and Soviet science, Anatol Rapoport, University of Michigan. The strategic interests of the Soviet bloc, Herbert Dinerstein, Rand Corporation. The interests of France: today and tomorrow, Roy C. Macridis, State University of New York at Buffalo.

American Sociological Association

Friday 27 December

Social Change. Invited papers, joint program of the American Sociological Association and the section on Social and Economic Sciences. Arranged by Robert A. Nisbet, University of California, Riverside, who will also preside. Migration, mobility, and the assimilation of migrants, Irene B. Taeub, Princeton, and Conrad Taeuber, Bureau of the Census. Mobility and changeability in marginal men, Kenneth E. Bock, University of California Berkeley. Mobility and conflict in ship change, Robert A. Nisbet.

Population Studies. Invited papers

joint program of the American Sociological Association and the Population Association of America, cosponsored by the section on Social and Economic Sciences. Arranged by Everett S. Lee, University of Pennsylvania, who will also preside. Rural depopulation in a rapidly growing nation: the demographic consequences of agricultural adjustments in the United States, Calvin L. Beale, U.S. Department of Agriculture. The Negro leaves the south, C. Horace Hamilton, University of North Carolina. The segregation of Negroes in metropolitan centers, Leo Schnore, University of Wisconsin.

National Institute of Social and Behavioral Science

Saturday 28 December

Contributed Papers. Program of the National Institute of Social and Behavioral Science with the collaboration of the section on Social and Economic Sciences. Arranged by Donald P. Raye, National Institute of Social and Behavioral Science, who will also preside. The Latin American policy of communist China, Joseph J. Lee, Michigan State University. Recent developments in the industrial technology of communist China, Sidney Klein, Rutgers. U.S. agricultural exports to the European common market: an econometric approach, Wladimir Naleszkiewicz, Marquette. The accuracy of international balances of payments, Max J. Wasserman, University of Kentucky. The contributions of sociologists to the study of disarmament and arms control, Amitai Etzioni, Columbia. Social change without nonconformity: a connecting link between functional and historical approaches to sociological theory, Lawrence La Fave, Detroit Institute of Technology.

History and Philosophy of Science

The entire program of the section on History and Philosophy of Science (L) is cosponsored by the American Philosophical Association and the Philosophy of Science Association.

Thursday 26 December

Philosophical Aspects of Economic Theory. Symposium. R. S. Cohen, Boston University, will preside. Concepts and constructs in economics, Fritz

Machlup, Princeton. Methodological questions of econometrics, Gerhard Tintner, University of Southern California.

Friday 27 December

Philosophy and Scientific Revolutions. Symposium. Nicholas Rescher, University of Pittsburgh, will preside. Methods for progress, Paul K. Feyerabend, University of California, Berkeley.

The Logic of Statistical Explanation and of Induction. Symposium. Roger Buck, Indiana University, will preside. Induction as vindication, Wilfrid Sellars, University of Pittsburgh. The status of prior probabilities in statistical explanation, Wesley C. Salmon, Indiana University.

Saturday 28 December

Fourth George Sarton Memorial Lecture. Sponsored by the George Sarton Memorial Fund. Chauncey D. Leake will preside. Science and the new humanism, Hudson Hoagland, Worcester Foundation for Experimental Biology and president of the American Academy of Arts and Sciences.

Sunday 29 December

Vice-Presidential Address. Herbert Feigl, University of Minnesota, will preside. The bearing of philosophy on the history of science, Adolf Grünbaum, University of Pittsburgh and vice president for the section on History and Philosophy of Science.

Issues of Contemporary Empiricism. Part I. Symposium. Herbert Feigl will preside. It is false that everything has doubled in size overnight, George Schlesinger, University of Pittsburgh and Australian National University. Is a universal nocturnal expansion falsifiable or physically vacuous?, Adolf Grünbaum.

Monday 30 December

Issues of Contemporary Empiricism. Part II. Herbert Feigl will preside. Criteria of meaning and of demarcation, Grover Maxwell, University of Minnesota. Constructs and fictions, David Gruender, Case Institute of Technology.

Problems in the Philosophy of Mathematics. Symposium. Wilfrid Sellars will preside. Analyticity versus fuzziness, John G. Kemeny, Dartmouth. What numbers couldn't be, Paul Benacerraf, Princeton.

Society for General Systems Research

Friday 27 December

General Systems and the Two Cultures. Symposium. Milton D. Rubin, MITRE Corporation, will preside. Answers or insights: two criteria of knowledge, Anatol Rapoport, University of Michigan. The image of fate: the perception of system and process in politics and art, Karl W. Deutsch, Yale. The inherent isomorphy of culture and personality. Margaret Mead, American Museum of Natural History.

Contributed Papers. Gerald M. Weinberg, IBM Systems Research Institute, will preside. Negentropy and the concepts of freedom, democracy, and justice, Frederick B. Wood, Campbell, Calif. Social systems and adaptation, N. C. Fletcher, AFB System Resources Co., Ltd. General systems theory as a taxonomy of culture and as a curriculum of general education, Giorgio Tagliacozzo, U.S. Information Agency. Social cost-benefit analysis for development policy, John Stuart MacDonald, United Nations.

Engineering

Friday 27 December

The Interface between Science and Engineering. Panel, joint program of the section on Engineering (M) and the American Society for Metals. Arranged by Robert J. Raudebaugh, International Nickel Company, and Allan Ray Putnam, American Society for Metals. Karl B. McEachron, Jr., Case Institute of Technology, will preside. Panel members include: H. K. Work, New York University; E. A. Trabant, University of Buffalo; and R. J. Raudebaugh.

Monday 30 December

Luncheon and Tribute to Retiring Vice President and Chairman of the Engineering Section, Clarence E. Davies. Joint program of the section on Engineering and the Cleveland Engineering Society. AAAS members will have an opportunity to see the Cleveland Engineering Society's unique 2-million-dollar facility for the continuing education of technical people.

The Contribution of Education to Industrial Progress. Invited papers. Program of the Cleveland Engineering Society, cosponsored by the section on Engineering. Arranged by Joseph H. Gepfert, Manufacturing Engineering Council, and Donald H. Cornish,

Cleveland Engineering Society. Warren H. Chase, State of Ohio Board of Regents, will preside and present the first paper, *How Ohio is meeting today's education challenges*. Automation: economic survival and its educational challenges opportunities, Roger Bolz, *Automation Magazine*. The experiences of the chemistry professor in industry, Thomas J. Walsh, Thompson Ramo Wooldridge, Inc. Creativity, the end result of education, John P. DuBois, *Design News*. Scientific method, the bridge between industry and education, Joseph H. Gepfert.

Medical Sciences

The program of the section on Medical Sciences (N) consists of a four-session symposium on the chemical suppression of cellular synthesis and mitosis. Cosponsors are the sections on Chemistry and Zoological Sciences and the American Society of Zoologists. The symposium was arranged by Francis D. Moore, Harvard, and Oscar Touster, Vanderbilt.

Sunday 29 December

Part I. Biochemical and Pharmacological Considerations. Session A. T. H. Jukes, University of California, Berkeley, will preside. Present status of the amino acid code, T. H. Jukes. On the regulation by histones of biosynthetic activities in the nucleus, V. G. Allfrey, Rockefeller Institute. Enzymatic modification of macromolecular nucleic acid structure, Ernest Borek, Columbia. The role of RNA in normal and polio-infected HeLa cells, Sheldon Penman, M.I.T. Chemical control of enzyme synthesis in multicellular organisms, H. C. Pitot, University of Wisconsin.

Part II. Session B. Charles Heidelberger, University of Wisconsin, will preside. Principles of classical and non-classical antimetabolites, B. R. Baker, State University of New York at Buffalo. Studies with fluorinated pyrimidines, Charles Heidelberger. Molecular mechanism of mitomycin effects: cross-linking of the complementary DNA strands, Wacław Szybalski, University of Wisconsin. Some aspects of the biochemistry of actinomycins, Edward Reich, Rockefeller Institute. Mechanisms of resistance to metabolic inhibitors, R. W. Brockman, Southern Research Institute.

Monday 30 December

Part III. Cancer Chemotherapy. A.

D. Welch, Yale University School of Medicine, will preside. Inhibition of lactic dehydrogenase and its application to cancer chemotherapy, V. H. Reynolds, Vanderbilt University School of Medicine. Antineoplastic and antiviral effects of 5-iodo-2'-deoxyuridine (IUdR), Paul Calabresi, Yale University School of Medicine. Incorporation of base analogs into DNA and cellular radiosensitization, J. P. Kriss, Stanford University School of Medicine. Pharmacological control of hormonal synthesis and growth in hormone-producing tumors of man, Roy Hertz, National Cancer Institute.

Part IV. Immunosuppression in Transplantation. R. E. Billingham, Wistar Institute of Anatomy, will preside. Vice-presidential address of section on Medical Sciences: New surgical problems in an era of nuclear chemistry, F. D. Moore. Chemical suppression of the immune response, G. H. Hitchings, Burroughs Wellcome & Co. Antigen-antibody interactions in immunosuppression, R. S. Schwartz, New England Center Hospital. Mechanism of action of drugs in renal homotransplantation, J. E. Murray, Peter Bent Brigham Hospital. Suppression of immune response by methotrexate, E. D. Thomas, University of Washington.

Dentistry

The program of the section on Dentistry (Nd) consists of a four-session symposium on the growth and development of the face, teeth, and jaws. The four sessions are the program of the section on Dentistry, cosponsored by the section on Anthropology, the American Dental Association, International Association for Dental Research (North American Division), and the American College of Dentists. Parts I-III were arranged by Stanley M. Garn, Fels Research Institute; Part IV was arranged by Sholom Pearlman, American Dental Association.

Thursday 26 December

Part I. B. Holly Broadbent, Western Reserve, will preside and present the introduction. Opening remarks and welcome, Paul E. Boyle, Western Reserve. Evolutionary background of dental and facial growth, Albert A. Dahlberg, University of Chicago. Normal variations in dento-facial growth, Coenraad F. A. Moorrees, Forsyth Dental Center. Genetic parameters of dento-facial growth, Harold O. Goodman, Bowman Gray School of Medicine.

Part II. Carl J. Witkop, National Institutes of Health, will preside. Prenatal factors and their evaluate, Uwe Stave, Fels Research Institute. Dental and facial characteristics in Down's syndrome (mongolism), M. Michael Cohen and R. A. Winer, Tufts University School of Dental Medicine. Growth of the face in developmental defects, Frederic N. Silverman, Children's Hospital Research Foundation. Genetics of tooth formation, Stanley M. Garn and Arthur B. Lewis, Fels Research Institute.

Part III. Seymour J. Kreshover will preside. Endocrine factors in tooth formation, Stanley M. Garn, Arthur B. Lewis, and Robert Blizzard, Johns Hopkins. Nutritional modification of dental development, Lawrence R. Fess, National Institutes of Health. Genetic carriers of dento-facial disease, Robert J. Gorlin, University of Minnesota. Primate odontogenesis, Daris R. Swindler, and Harriet Ann McCoy, Medical College of South Carolina. Summary and concluding remarks by Stanley M. Garn.

Part IV. Open Panel and Open Discussion. Directions for Future Research on the Growth and Development of the Face, Teeth, and Jaws. Sholom Pearlman will preside. Themes are: (i) Prevailing concepts and new information, (ii) unexplored areas and crucial questions, and (iii) research methods, resources and needs. Panel: Physiology of growth by Richard C. Greulich, University of California, Los Angeles; Genetics and malformations by Jerry D. Niswander, National Institutes of Health; Growth and development in children, Wilton M. Krogman, Philadelphia Center for Research in Child Growth; Growth and aging of the face and oral tissues by Edward E. Hunt, Jr., Harvard. Concluding remarks by Robert E. Moyers, University of Michigan School of Dentistry.

Pharmaceutical Sciences

The following sessions are the program of the section on Pharmaceutical Sciences (Np), cosponsored by the American Pharmaceutical Association (Scientific Section), American Association of Colleges of Pharmacy, American Society of Hospital Pharmacists, American College of Apothecaries, and the National Association of Boards of Pharmacy.

Friday 27 December

Hospital Pharmacy, I. Part I. Contributed papers, arranged by George F. Archambault, U.S. Public Health Serv-

ice, and Don E. Francke and Joseph A. Oddis, American Society of Hospital Pharmacists. Joseph A. Oddis will preside. Course in administrative principles for the hospital pharmacist, part II, Herbert L. Flack and Charles M. King, Jr., Jefferson Medical College Hospital. Formulation of a corticosteroid suspension for rectal instillation, Sister M. Florentine, Mount Carmel Hospital, Columbus. A method of pharmacy data automation, Scott I. Allen, Patricia S. Hurd, and Arthur W. Dodds, U.S. Public Health Service. Some products of hospital pharmacy research and development, Louis P. Jeffrey, Albany Medical Center Hospital. The emulsification and evaluation of parenteral contrast media for lymphography, Duane Kann and William W. Tester, State University of Iowa.

Vice-Presidential Address. John Autian, University of Texas College of Pharmacy, will preside. International pharmaceutical abstracts—origins and goals, Don E. Francke, vice president for section on Pharmaceutical Sciences.

Hospital Pharmacy. Part II. Contributed papers, arranged by George F. Archambault, Don E. Francke, and Joseph A. Oddis. George F. Archambault will preside. Roles and responsibilities of the pharmacist and nurse under the U.A.M.C. experimental (Centralized Unit-dose Dispensing) system, Eleanor Sheldon and William M. Heller, University of Arkansas Medical Center. The antibiotic regulations and the hospital pharmacist, Daniel Banes, Food and Drug Administration. An analysis of pharmaceutical services in 41 nursing homes, Frederick M. Eckel and Clifton J. Latiolais, Ohio State University Health Center. A look at pharmacy in Poland, Don E. Francke. **Symposium:** Teaching—responsibility of the hospital pharmacist. Moderator will be Clifton J. Latiolais. Pharmacist participation in the hospital team teaching program, Sister M. Gonzales, Mercy Hospital, Pittsburgh. Programmed instruction—an experimental approach in in-service nursing education, Paul J. Pierpaoli and Milton W. Skolaut, National Institutes of Health, and John Autian. Correlation—an effective teaching method in nursing education, Henry J. Derewics and Daniel H. Yeoman, Touro Infirmary, New Orleans.

Sunday 29 December

Contributed Papers. Arranged by Joseph P. Buckley, University of Pittsburgh. William J. Kinnard, University of Pittsburgh, will preside. Studies of

Catharanthus lanceus (*Vinca lancea*) II. Preparation and characterization of leaf alkaloids, W. D. Loub, N. R. Fransworth, and R. N. Blomster, University of Pittsburgh. Central stimulatory effects of catecholamines, D. Papandrianos, W. J. Kinnard, and J. P. Buckley, University of Pittsburgh. Muscarinic involvement in avoidance behavior of albino rats, R. K. Chalmers and C. K. Erickson, Purdue. A gross pharmacologic rating schedule utilizing punch card techniques. I. The rat, W. J. Kinnard, J. P. Buckley, H. Barry III, and N. Watzman, University of Pittsburgh. A pharmacodynamic study of the action of glucagon on smooth muscle, D. M. Altwein, P. F. Geiger, and R. G. Brown, University of Texas. Hypotensive activity of two benzothiadiazine derivatives, A. I. Edlin and J. P. Buckley, University of Pittsburgh. The effect of compression on the release of methapyrilene hydrochloride from tableted ion exchange resin adsorbates, D. B. Paul and G. J. Sperandio, Purdue. Solubility of diverse pharmaceutical solutes as a function of the dielectric constant. I. Sugar solutions, A. N. Paruta, University of Pittsburgh. A study of the toxicity of plastics used in medical practice III. An evaluation of two urinary bags as to their tissue reactivity in animals, John Autian, S. A. Rosenbluth, J. L. Mitchell, and W. I. Guess, University of Pittsburgh. Synthesis of pyrrolidine-2-C¹⁴, W. V. Kessler, J. M. Watts, and John E. Christian, Purdue. The macro quantitative determination of organically bound iodine by neutron activation analysis, R. Grunewald, P. L. Ziemer, and John E. Christian, Purdue. Some cardiac effects of angiotensin II, E. E. Vogin and J. P. Buckley, University of Pittsburgh. A physiologic renal mechanism affecting blood pressure, S. L. Skinner, J. W. McCubbin, and Irvine H. Page, Cleveland Clinic Foundation. Use of infrared and nuclear magnetic resonance in pharmaceutical science, J. Nematollahi, University of Rhode Island, and Pierre F. Smith, University of California.

The Phenomena of Drug Abuse and Drug Dependence. Symposium, arranged by Lee H. Macdonald, Upjohn Company. Lee H. Macdonald and Nathan B. Eddy, consultant, National Institutes of Health, will preside. Clinical aspects of addiction to narcotic analgesics, William R. Martin, National Institute of Mental Health. Some clinical aspects of barbiturate and sedative drug abuse, Carl F. Essig, National Institute of Mental Health. Abuse of central

nervous system stimulants, Robert E. Edwards, National Institute of Mental Health. Alcoholism, John D. Armstrong, Alcoholism and Drug Addiction Research Foundation of the Province of Ontario, Toronto.

Agriculture

The program for the section on Agriculture (O) consists of a four-session symposium on the agricultural sciences for the newly developing nations. The sessions are cosponsored by the American Society for Microbiology and the AAAS Committee on Desert and Arid Zones Research. The arranger is A. H. Moseman, Rockefeller Foundation.

Sunday 29 December

Part I. Characteristics of Agricultural Systems in Emerging Nations. Roland Renne, U.S. Department of Agriculture, will preside. Institutions for agricultural sciences, technology, and service in developing nations, Erven J. Long, Department of State. Animal agriculture in the agricultural systems of emerging nations, R. W. Phillips, U.S. Department of Agriculture. Plant agriculture in the emerging nations, J. B. Peterson, Purdue.

Part II. Research to Devise and Adapt Innovations. Will M. Myers, University of Minnesota, will preside. Research to improve production of cereal crops in Asia, E. W. Sprague, Rockefeller Foundation. Animal and veterinary science programs in developing countries, F. N. Andrews, Purdue. Interactions in agricultural research in the emerging nations, Charles E. Kellogg, U.S. Department of Agriculture.

Monday 30 December

Part III. Education and Development of Human Resources. Roy M. Kottman, Ohio State University, will preside. The role of educated people in developing countries—principles and policies, Richard Bradfield, Cornell. Rural people of developing countries—their attitudes and levels of education, Harold R. Capener, Ohio State University. Development of effective academic programs for foreign students curricular work experience and social aspects, David B. Williams, Cornell.

Part IV. Establishment of Indigenous Institutions to Serve Advancing Agriculture. J. A. Rigney, North Carolina State College, will preside. Organisms for the establishment of indigenous institutions in developing countries, F.

Hill, Ford Foundation. New patterns of agricultural research and education in India, A. H. Moseman. An efficient approach in modernizing agriculture, T. W. Schultz, University of Chicago.

Industrial Science

Monday 30 December

Retiring Vice Presidential Address and Luncheon. Alfred T. Waidelich, The Austin Company, will preside. Instruments and industrial research—some educational implications, Henry F. Dever, Minneapolis-Honeywell Regulator Co. and retiring vice president for section on Industrial Science (P).

The Industrial Science Section together with the Office of Economic and Statistical Studies, National Science Foundation, is sponsoring two additional symposia: "The Role of Instruments and Equipment Use in Science Research Program Planning" and "The Planning and Management of Science Research Programs."

Education

Friday 27 December

Address. Joint session of the section on Education (Q) and the Council for Exceptional Children. Arranged by Dorothy Norris, Cleveland Board of

Education, who will also preside. A study of gifted children in Cleveland's major work program, Edward C. Frier-son, Kent State University.

Sunday 29 December

Contributed Papers, Session I, and Vice-Presidential Address. Arranged by Herbert A. Smith, Pennsylvania State University. Joseph Novak, Purdue, will preside. Remedial research: approach and models available to education research, David Mostofsky, Boston University. Studies of television, 1949-63, Paul A. Witty, Northwestern. Herbert A. Smith will preside at the vice-presidential address, Science and civic responsibility by Harold E. Wise, University of Nebraska.

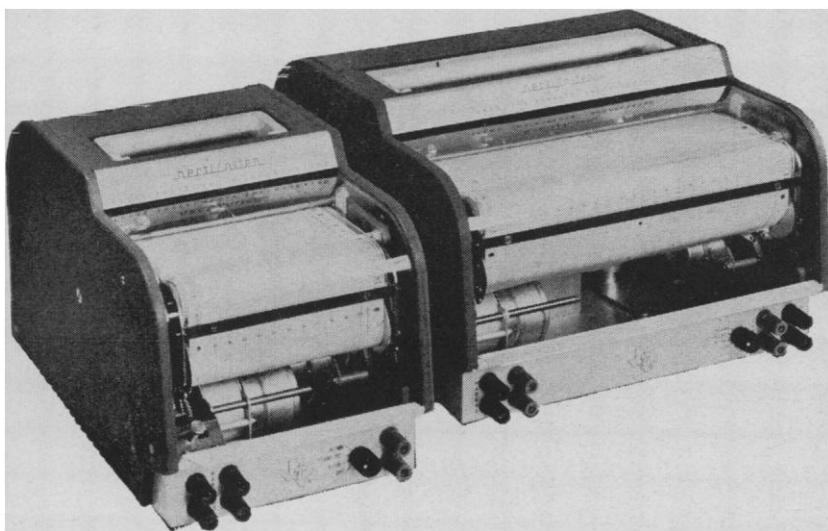
Contributed Papers, Session II. Arranged by Herbert A. Smith. Harold E. Wise will preside. The coming crisis in secondary education, Ivor Kraft, U.S. Department of Health, Education, and Welfare. "Needed: a redefinition of status and roles in American society," Annette Rosenstiel, Mills College of Education. Science, education, and students from the undeveloped nations, Wilbur N. Moulton, Southern Illinois University. Science training program for high ability secondary school students: the development of man, an enrichment program, Dolores Elaine Keller, Fairleigh Dickinson University.

Monday 30 December

Career Developments of Scientists: Grade School to Graduate School. Symposium, joint session of section on Education and the American Educational Research Association. Arranged by William W. Cooley, Harvard, who will also be the principal speaker. Herbert A. Smith will preside. Discussants include Lindsay R. Harmon, National Academy of Sciences, and Howard J. Hausman, National Science Foundation.

Contributed Papers, Session III. Arranged by Herbert A. Smith. William E. Martin, U.S. Office of Education, will preside. Comparison of manifest needs of open and closed minds, C. Gratton Kemp, Ohio State University. Learning, human behavior, and clinical brain anatomy, Ralph H. Pino. The classroom computer in the social and natural sciences, John S. Jackson, University of Kentucky.

Contributed Papers, Session IV. Arranged by Herbert A. Smith. William McCollum, Iowa State University, will preside. Free versus guided experimentation, Brenda Lansdown and Thomas Dietz, Brooklyn College. The role of

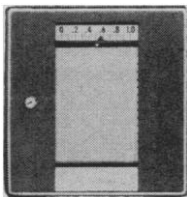


Performance, Reliability and Quality—your best buy

Quality and simplicity of design make the *recti/riter*® recorder an outstanding, reliable performer. Utilizing a large, powerful magnet, the *recti/riter* recorder offers maximum sensitivity, fast response time, and low input impedance

—requires less damping circuitry. True rectilinear recording using the proven

error-free *recti/rite*® system developed by Texas Instruments in 1956—the widest selection of ranges and chart speeds—plus exclusive operator convenience features have made the *recti/riter* a first choice of the most demanding user. There is a *recti/riter* to fit your particular requirement: single and dual channel in both portable and flush-mounting models. Write for complete information.



INDUSTRIAL
PRODUCTS
GROUP



TEXAS INSTRUMENTS
INCORPORATED
P. O. BOX 66027 HOUSTON 6, TEXAS

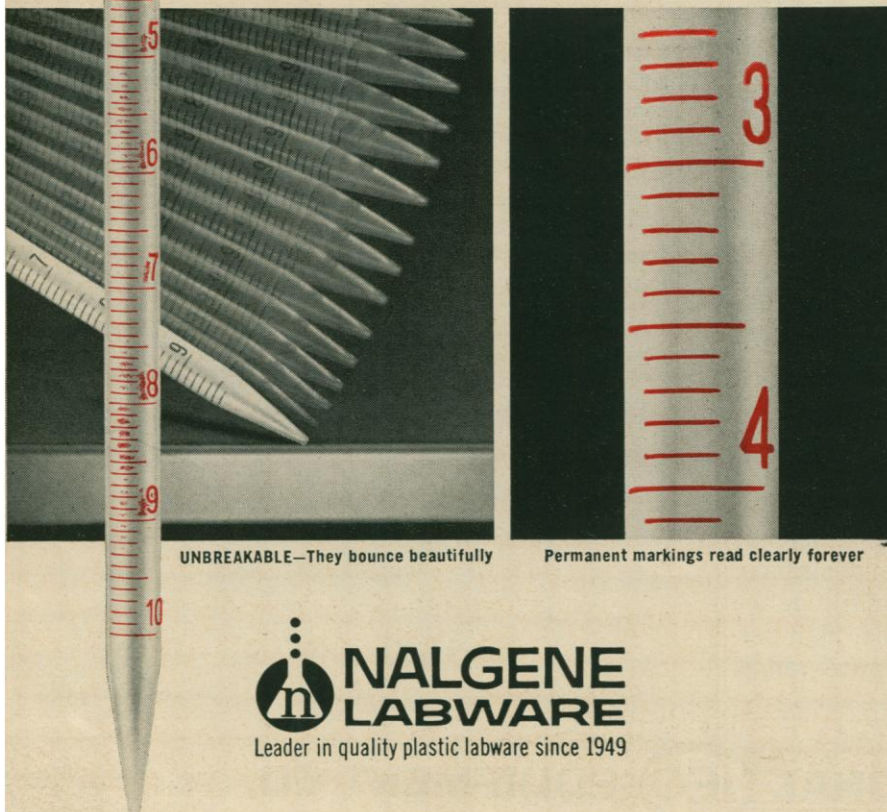
SENSING • RECORDING • TESTING • DIGITIZING INSTRUMENTS
THE INSTRUMENTS OF TEXAS INSTRUMENTS

NOW!

UNBREAKABLE NALGENE® PIPETS...

with Permanent Graduations

Don't just *reduce* pipet breakage . . . *eliminate* it . . . with unbreakable Nalgene pipets. And for the first time you're safe . . . they're chip-proof . . . they can't cut . . . they never get ragged. They're so easy to read, too. Big, bright "Magni-View" markings can't be removed, chemically or mechanically . . . last the full life of the pipet. The non-reflective polypropylene lets you see the entire column of a water-clear liquid, not just the liquid line. See-through clarity simplifies reading. Accuracy, well within published tolerances, is further enhanced because the non-adherent surface eliminates meniscus. Drops form on the inside of the tip, not around it, and are more uniform. The non-wetting surface drains dry . . . to the very last drop . . . faster than ever before. You can autoclave them again . . . and again . . . and again. And price-wise, they're surprisingly inexpensive . . . from \$2.10 to \$2.80 each. Sizes available are 1, 2, 5 and 10 ml, in transfer, serological and measuring styles. Why not get the full story from your lab supply dealer . . . or write Dept. 2136, The Nalge Co., Inc., 75 Panorama Creek Drive, Rochester, New York 14625.



UNBREAKABLE—They bounce beautifully

Permanent markings read clearly forever

**NALGENE
LABWARE**
Leader in quality plastic labware since 1949

the science specialist in the elementary school system, Donald E. Hicks. Term papers versus term projects, Manny Sternlicht, Willowbrook State School, Staten Island, N.Y. Carnegie units required for college admission: an historical study, P. W. Hutson, University of Pittsburgh.

AAAS Cooperative Committee on the Teaching of Science, Mathematics

Sunday 29 December

Panel. Report of the Commissions on College Science. Program of AAAS Arranged by John R. Mayor, AAAS. J. W. Buchta, American Association of Physics Teachers, will preside. Panel: Advisory Council on College Chemistry, Charles C. Price, University of Pennsylvania; Commission on College Physics, E. Leonard Jossem, Ohio State University; Commission on Undergraduate Education in the Biological Sciences, Thomas S. Hall, Washington University; Geological Education Orientation Study, William W. Hambleton, University of Kansas; and Commission on Engineering Education, Newman A. Hall.

Science Service

Monday 30 December

Interrelation of Science Youth Activities. Arranged by Leslie V. Watkins, Science Service. Watson Davis, Science Service, will preside. Science youth activities and the school program, Franklin D. Kizer, State Board of Education, Richmond, Va. Intrastate science youth activities, Thomas Hutto, School of the Ozarks. National organizations can interrelate their science youth activities, John H. Marean, retiring president of the National Science Teachers Association.

Science Teaching Societies

Friday 27 December

Films. Session I. Joint program of the American Nature Study Society, Central Association of Science and Mathematics Teachers, National Association for Research in Science Teaching, National Association of Biology Teachers, and National Science Teachers Association. Arranged by David J. Lockard, University of Maryland.

Address. Joint program of all science teaching societies. Phillip Fordyce,

SCIENCE, VOL. 142

NEW **double dog enclosures**
Methods-Engineered to save time, work, money

Lifetime doors guaranteed against weld breakage.

Sturdy G.E. Textolite resting bench gives animal clean, dry reclining area.

Doors have double safety latches. Finger-tip control. Will not shake open.

Water unit positioned above floor to prevent spills.

Radius corners in back as well as front of enclosure.

Heliarc no-seam construction. 100% stainless steel except casters.

Unit is self-stacking to avoid dirt pockets of angle frame supports.

Equipped with detachable trough and down pipes.

Sloping floor is easily cleaned with hose. No water residue.

Model ME1501. Inside dimensions: 31" high, 32" wide, 32" deep. Custom sizes also available. 16-gauge stainless steel is standard. 20-gauge optional.

For detailed information, send Science inquiry card.



LABCO DIVISION, PARTSCO, INC.
2977 LAMB AVE., COLUMBUS 19, OHIO

Florida State University, will preside. The history of science in science education teaching, Genevieve Miller, Howard Dittrick Museum of Historical Medicine of the Cleveland Medical Library.

Address. Joint program of all science teaching societies. John Brainerd, Springfield College, will preside. Some early naturalists of the Cleveland area, Ralph W. Dexter, Kent State University.

Elementary School Science Symposium. Arranged by Mildred Ballou, Ball State Teachers College, who will also preside. Science and children: partners in discovery, Joseph Zaffaroni, Pennsylvania State University.

Saturday 28 December

Films. Session II. Joint program of all science teaching societies. Arranged by David J. Lockard.

Sunday 29 December

Films. Session III. Same sponsors and arranger as for Parts I and II.

American Nature Study Society

Friday 27 December

Observing Nature: Basic Technique of Arts and Sciences. Symposium, program of the American Nature Study Society, cosponsored by the Association of Interpretive Naturalists. Harold E. Wallin, Cleveland Metropolitan Park District, will preside. Speakers include: Dura Dean, Lakewood (Ohio) Board of Education; William Hopkins, Huron-Clinton Metropolitan Authority; Kenneth Hunt, Antioch; Stanley Mulaik, University of Utah; Charles Roth, Massachusetts Audubon Society; and Howard Weaver, University of Illinois.

Saturday 28 December

Recording Nature I. Sketching. Symposium, program of the American Nature Study Society, cosponsored by the Association of Interpretive Naturalists. William E. Scheele, Cleveland Natural Science Museum, will preside. Panelists will be announced at a later date.

Presidential Address and Luncheon. Picture framing by John A. Gustafson.

Recording Nature II. Photography. Grant W. Sharpe, University of Michigan, will preside. Panelists include Donald T. Ries, Illinois State Normal University, and Morton Strauss, Photographic Society of America.

Nature on Record. Tours to Cleveland Art Museum, Cleveland Natural

It's a pleasure to "Lead a Dog's Life" in K-S-E GERM-FREE ENCLOSURES...

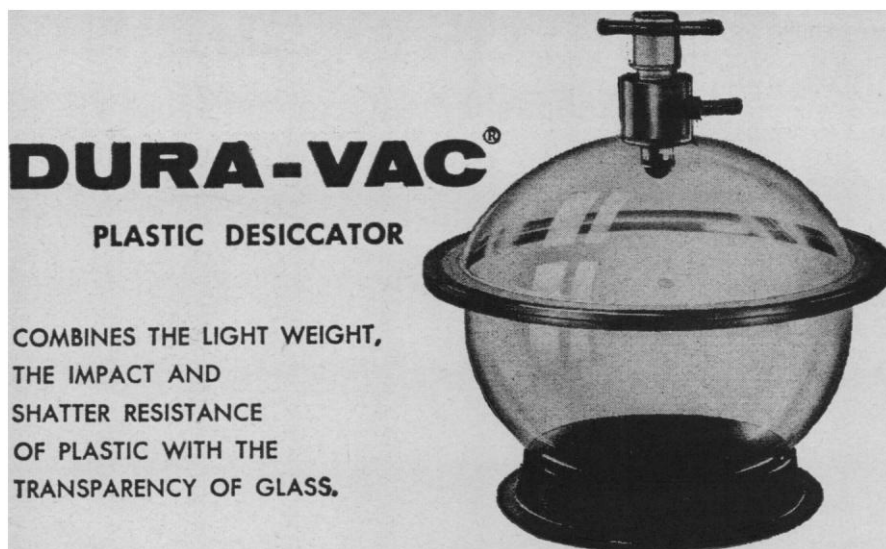
The implication of self sufficiency, expressed by the folded arms on the stainless steel and glass rearing unit above, is most appropriate because it is completely portable.

This, as all K.S.E. equipment, is the result of over 50 years of design, engineering and manufacturing experience. There's a folder available which explains this unit in detail and, also, a new catalog showing the entire K.S.E. line of enclosures.

*Looks like Dopey's getting a lick and a promise.

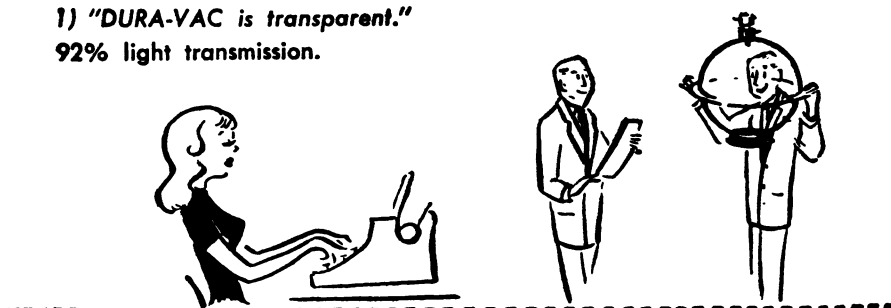
For complete information,
call or write →

K · S · E
KEWAUNEE
SCIENTIFIC
EQUIPMENT
ADRIAN,
MICHIGAN
4004 Logan Street

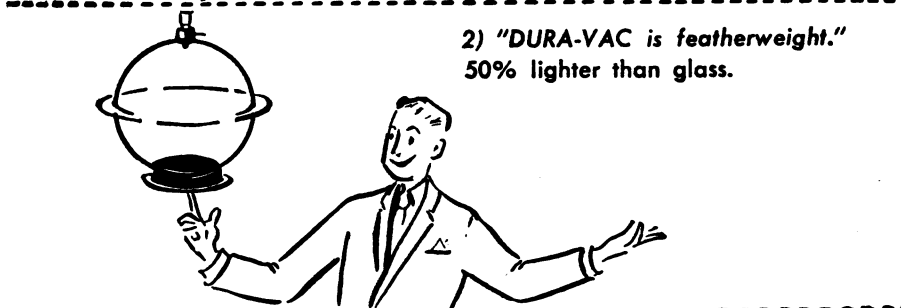


COMBINES THE LIGHT WEIGHT,
THE IMPACT AND
SHATTER RESISTANCE
OF PLASTIC WITH THE
TRANSPARENCY OF GLASS.

1) "DURA-VAC is transparent."
92% light transmission.



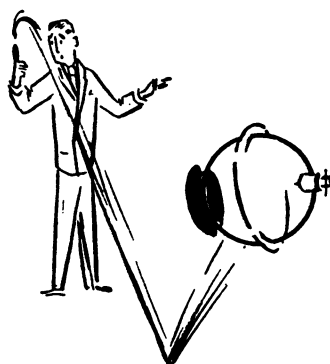
2) "DURA-VAC is featherweight."
50% lighter than glass.



3) "DURA-VAC is strong and safe."
Yes, DURA-VAC is strong and safe.
It is extremely implosion resistant.
You can even drop it and 99 times
out of a 100, DURA-VAC will re-
main intact.

4, 5, 6) "DURA-VAC has other advantages":
The patented self-releasing lid does not
stick, does not freeze to bottom during
evacuation. DURA-VAC has a large work-
ing area: holds 2 lbs. of Drierite or similar
material. DURA-VAC has a unique stopcock
with upward vents that prevent returning
air from disturbing contents.

Find out all about DURA-VAC. Write
Dept. S for Bulletins #5810 and #5815.



® T.M. Ace Glass
Incorporated

ACE GLASS
INCORPORATED

Louisville, Ky., Vineland N. J. Springfield, Mass.

Circle 1356 on Readers' Service card

Science Museum, Cleveland Metropoli-
tan Parks, and the Cleveland Zoo.

Sunday 29 December

Ohio-Michigan Landscapes. Pre-field trip Orientation. Part I. Symposium, joint program of American Nature Study Society and the National Association of Biology Teachers. George F. Linn, Huron County (Ohio) Department of Education, will preside. Biology of man-altered landscapes, Marston Bates, University of Michigan. Geology's contribution to Ohio's landscapes, Jane Forsyth, Ohio Geological Survey Integrating a conservation program, grades K-12, William Stapp, Ann Arbor Public Schools. Swamp Stompers field trips, Earl Cranston, New London (Ohio) Local Schools.

Part II. George F. Linn will preside. Geological setting in north-central Ohio, Jane Forsyth. The role of ecology in high school biology, Marston Bates. The use of school sites as outdoor laboratories, William Stapp. Pre-field-trip orientation, Earl Cranston and George Linn.

National Association of Biology Teachers

Friday 27 December

Recent Developments in Cellular Biology. Session I. Joseph D. Novak, Purdue, will preside. Molecules, membranes, and molds—studies on cellular function, John W. Greenawalt, Johns Hopkins. Differential lytic reactions of some bacterial species, Ted S. Surdy, Kansas State Teachers College. Plant pectins and their function in food texture, Frank J. McArdle, Pennsylvania State University.

Saturday 28 December

Recent Developments in Organismal Biology. Session II. Ann Reynolds, Ball State Teachers College, will preside. Recent advances in the study of social behavior in mammals, J. P. Scott, Jackson Memorial Laboratory. Behavioral studies on reptiles—bobs, nods, and pushups, Charles C. Carpenter, University of Oklahoma. Host-selection behavior in parasitic mites and ticks, Joseph H. Camin, University of Kansas.

Recent Developments in Ecosystem Biology. Session III. John Breukelman, Kansas State Teachers College, will preside. Daily energy budgets in environmental fluids, Jacob Verduin, Bowling Green State University. Microcosm approach to ecosystem biology, Robert J.

new YSI solid state proportioning temperature controller

$\pm .005^{\circ}\text{C}$ stability



- **PROPORTIONAL**—smoothly and continuously varies power to maintain stabilities of $\pm .005^{\circ}\text{C}$ (short term) and $\pm .01^{\circ}\text{C}$ (normal long term). So sensitive that a $.001^{\circ}\text{C}$ change in the controlled medium changes heater power 1% or more.

- **HANDLES 1 MILLIWATT TO 1 KILOWATT LOADS** without loss of control at low end or loss of power at high end.

- **ADJUSTABLE PROPORTIONING BAND** settable from 0.1°C to 3°C with front panel dial; matches controller to control situation to allow temperature to change rapidly and optimally without oscillation.

- **WIDE RANGE, DIRECT DIGITAL DIALING** of control point from 0 to 120°C ; set or reset to a precision of $.01^{\circ}\text{C}$ over the entire controller range.

- **TRANSISTORIZED, ALL SOLID STATE DESIGN** increases reliability on long term experiments.

Get complete specifications from
your YSI dealer or write:



Beyers, University of Texas. Changes in the structure and function of terrestrial ecosystems exposed to ionizing radiation, G. M. Woodwell, Brookhaven National Laboratory.

Sunday 29 December

Innovations in Teaching Biology. Session IV. Jerry J. Nisbet, Ball State Teachers College, will preside. Single concept films for college botany, James Wickliff, Iowa State University. Single concept films for high school biology, James Koevenig, University of Colorado. Laboratory blocks for high school biology, Addison Lee, University of Texas. Impact of testing on new curricula, William Mayer, Wayne State University. Impact of new curricula on facilities for biology, James Dawson, Macalaster Scientific Corporation.

Research Activities in High Schools. Session V (concurrent with IV). G. E. Caraker, Eastridge High School, Rochester, N.Y., will preside. A multiple integrated response device for use in teaching science, Charles Ostrander, Atwater High School, Atwater, Calif. The apparent relationship between smoking and academic performance among high school students, G. E. Caraker.

Collegiate Curricula for Biology Teachers. Session VI. Jack L. Carter, Kansas State Teachers College, will preside. The commission on the undergraduate education in biological sciences, Thomas Hall, Washington University. The commission on the education of teachers of science, Fletcher Watson, Harvard.

Presidential Address and Silver Jubilee Banquet. Ted F. Andrews, Kansas State Teachers College, will preside. Missions, money, and men, Phillip For-dyce, president of the National Association of Biology Teachers.

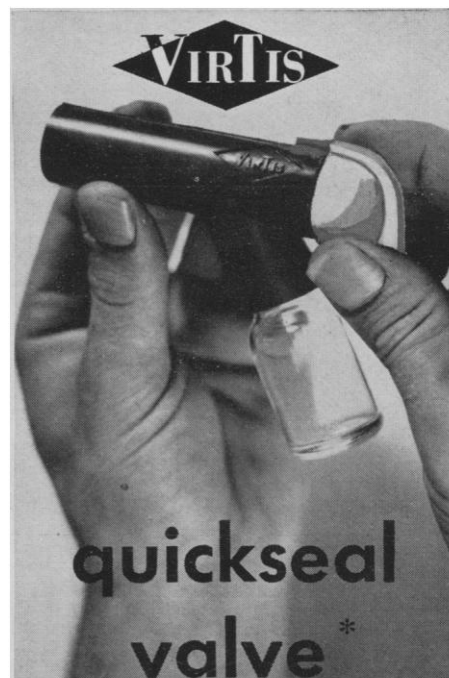
Monday 30 December

Field Trip. Visit to north-central Ohio with Swamp Stompers. Joint trip of American Nature Study Society and the National Association of Biology Teachers.

National Association for Research in Science Teaching

Saturday 28 December

The Improvement of Science Teaching. Research symposium. Arranged by Lloyd K. Johnson, U.S. Office of Education. Cyrus W. Barnes president of the National Association for Research in Science Teaching, will preside. Cur-



A new convenience for manifold freeze-drying procedures.

Quickly connect or remove freeze-drying containers on manifold freeze-dryers without breaking system vacuum. And, without the use of rubber tubing clamps. New Quickseal Valves are specially molded to accommodate all VirTis freeze-drying containers including Quickseal and standard freeze-drying flasks, serum bottles and ampoules. Vacuum tight to 1 micron, Quickseal valves are fabricated in pure gum rubber and Polypropylene. Closed and open positions are clearly indicated.

Catalog No. 10-506-1 Quickseal Valve for $\frac{1}{2}$ " O.D. portsea. \$ 2.50
per dozen \$27.00

Catalog No. 10-507-1 Quickseal Valve for $\frac{3}{4}$ " O.D. portsea. \$ 3.75
per dozen \$42.00

*Additional details will
gladly be sent on re-
quest.*

* PAT. PENDING

The VirTis Company, Inc.
Gardiner, New York

does a liquid metal that
WETS NEARLY EVERYTHING
give you any ideas?

VIKING LS 232 liquid metal alloy has the unique ability to "wet" virtually all metallic and non-metallic surfaces, forming outstanding electrical and thermal contacts. It contacts Teflon, aluminum, stainless, quartz, glass, silicon, germanium, KCl, thermoelectric elements, carbon and graphite, paper, Mylar, wood, piezo ceramics, ruby . . . even makes microcircuit contacts at room temperature. It can be altered in place to make solid contacts on many difficult materials. Brush onto most materials; agitate sonically to make contacts on others.

50 Gram laboratory sample and dispenser, \$50.

VIKING LS
LIQUID ALLOY
RESISTANCE ELECTRICAL
CONTACTS, SEMI CONDUCTORS,
GLASS, PLASTIC, WOOD, RUBBER,
ETC. CONTAINS 10% THIN FILM
NET CONTENTS 50 GRAMS

**VICTOR KING MATERIALS
LABORATORY**
dedicated to the discipline of energy and materials
BOX 11726, STATION A, PALO ALTO, CALIFORNIA 94306
TELEPHONE: (415) 968-9338



Mount a complete setup securely in seconds—without tools!

New! Manostat EZ-Lock Clamps for laboratory support frames

Say goodbye to tedious set-screw tightening, screwdriver groping, misplaced tools. With new EZ-Lock, just a quick turn of the handle and clamp is tightened securely with vise grip to two rods at the same time. Disassembling is equally easy: to release rods, simply turn handle opposite way. Clamp will not mar or scratch, cannot stick. Machined of rustproof aluminum alloy, with plastic cap on handle for sure, comfortable grip.

See your local laboratory supply dealer.

Write for EZ-Lock Clamp bulletin.

MANOSTAT Corporation

A Subsidiary of Greiner Scientific Corporation
26 NORTH MOORE STREET, DEPT. 524, NEW YORK 13, N. Y.



rent research and its meaning for the elementary school, J. Darrell Barnard, New York University. Current research and its meaning for the secondary school, T. Wayne Taylor, Michigan State University. Current research and its meaning for the college, Joseph D. Novak, Purdue.

National Science Teachers Association

Friday 27 December

Youth Looks at Science Education. Arranged by Victor M. Showalter, Ohio State University, who will also act as moderator of this session. Discussants will be high school students.

Saturday 28 December

Newer Efforts to Improve Science Courses and Curricula. Robert H. Carleton, executive secretary, National Science Teachers Association, will preside. A general physical science program for senior high school students, Charles W. Woodfield, Dundalk Senior High School, Baltimore County, Md. The junior high school science project, Mrs. Charles Tanaka, Princeton. The earth science curriculum project—its organization, objectives, and philosophy, Robert C. Stephenson, Ohio State University Research Foundation.

Information and Communication

Friday 27 December

Communication of Research and Development Information and the Role of the Working Scientist and Engineer. Panel, joint program of the section on Information and Communication (T) and the Society of Technical Writers and Publishers, cosponsored by the Engineering Section. Arranged by Stello Jordan, Sperry Rand Corporation, who will also preside. Discussion will be based upon the report of the President's Science Advisory Committee, "Science, Government, and Information," prepared by the Panel of Science Information and issued 10 January 1963. Panel members include: Alvin Weinberg, Oak Ridge National Laboratory; Milton O. Lee, American Societies for Experimental Biology; Klaus Liebold, General Electric Company; Vernon Root, Applied Physics Laboratory; and Robert Speers, E. I. du Pont de Nemours and Company.

Sunday 29 December

Vice-Presidential Address. Phyllis V. Parkins, *Biological Abstracts*, will preside. Dynamics of documentation: a synthetic science, Foster E. Mohrhardt, National Agricultural Library and vice president for Information and Communication Section.

Control of Metallurgical Information. Symposium, joint program of section on Information and Communication and the American Society for Metals, cosponsored by Engineering Section. Arranged by Marjorie R. Hyslop, American Society for Metals. Harry B. Goodwin, Battelle Memorial Institute, will preside. Information problems in metallurgical research, John A. Fellows, Mallinckrodt Chemical Works. Metallurgical information handling by government agencies, Donald A. Shinn, Wright-Patterson Air Force Base. Responsibilities of academic institutions in guiding students in the use of information, Robert S. Taylor, Lehigh University. Inter-society and inter-agency cooperation in metallurgical information: panel discussion by representatives of the American Society for Testing and Materials, Society for Non-destructive Testing, American Institute of Mining (Metallurgical and Petroleum Engineers), Engineers Joint Council, and the American Society for Metals.

Address. A new problem in communication: trying to make contact with intelligent life beyond the solar system, Walter Sullivan, *New York Times*. P. C. Fraley, Council for the Advancement of Science Writing, will preside.

Information Retrieval in the World of Metals—Its Promise and Limitations. Panel, joint program of section on Information and Communication and the American Society for Metals, cosponsored by Engineering Section. Arranged by Marjorie R. Hyslop, who will also preside. Introduction, Norman E. Cottrell, American Society for Metals. Panel presentation by the documentation service staff of the American Society for Metals: Richard Z. Bedy, Betty A. Bryan, Brice Carter, Thomas J. Fitzgerald, and Barbara Shaffer.

National Association of Science Writers

Friday 27 December

Annual Dinner and Announcement of AAAS-Westinghouse Science Writing Awards. Donald J. Dunham, *Cleveland Press*, will preside.

6 DECEMBER 1963

Statistics

The American Statistical Association and the Institute of Mathematical Statistics are general cosponsors of all sessions arranged by the section on Statistics (U).

Friday 27 December

Sessions for Teachers of Statistics.

Arranged by Horace W. Norton, University of Illinois, who will also preside. Statistics today, Fred C. Leone, Case Institute of Technology. A look at statistics on the AAAS program, N. L.

Johnson, North Carolina State University.

Financing Graduate Studies. Program of the section on Statistics, cosponsored by sections on Social and Economic Sciences and Education. Arranged by Thomas J. Mills, National Science Foundation. Elmer D. West, American Council on Education, will preside. Financial support of graduate students, Thomas J. Mills. The federal government interest in graduate education, Peter P. Muirhead, U.S. Office of Education. University financing of graduate education, John W. Hicks, Purdue.

Vice-Presidential Address. S. S. Wilks,

New Hyland Enzo-CleanTM Solubilizes Protein and Starch Residues

...leaves your laboratory glassware "biologically" clean

Now there's a foolproof way to fight protein and starch stick-to-it-iveness. Hyland Enzo-Clean, a combination of proteolytic and amylolytic enzymes, launches a *biological* attack on protein and starch residues. Working at the molecular level, Enzo-Clean gets deep into even the most minute crevices. Your flasks, pipets, stoppers, tubes, caps and rubber goods are freed of toxic biological contaminants.

Enzo-Clean saves you time and energy, too. No scrubbing, a minimum of rinsing. Five grams of this stable, odorless powder make ten liters of cleaning solution that maintains its potency all day long.

For an easy and unconditional victory over contaminants, enlist Enzo-Clean now. List No. 70-790, 100 grams, \$7.50.



HYLAND LABORATORIES
Los Angeles, California 90039

For a Free Sample

send this coupon now to Hyland Laboratories
4501 Colorado Blvd., Los Angeles, California 90039

Name _____

Organization _____

Address _____

City _____

State _____

Zip Code _____

NEW!

NEW TUBING OF

MODIFIED TEFLON[†] FEP

SHRINKS AT 300°F

**Lower in Cost
Transparent
Flame Resistant**

Now you can protect soldered joints, parts, components and fittings of plastic, metal or wood with modified Teflon FEP. Your products that could not be protected before because of the high temperature required for shrinkage can now have a surface of Teflon with a continuous service temperature of 400°F. This opens up new market possibilities for you.

New PENNTUBE® II-SMT—modified Teflon FEP—shrinks at 300°F and lower with no effect on the outstanding properties of the tubing. PENNTUBE II-SMT is available in natural color and lightweight wall thickness. Application service to customer parts is performed on a contract basis.

Write, wire or call for full details on this outstanding, new shrinkable tubing and for information on other PENNTUBE products. Make sure you're not paying too much for one plastic when another, less expensive plastic will do the job.

PENNSYLVANIA FLUOROCARBON CO., INC.

Holley Street & Madison Ave., Clifton Heights, Pa.
(215) MADison 2-2300 TWX: 215-623-1577

PENNTUBE I Teflon[†] TFE; PENNTUBE II Teflon FEP; PENNTUBE III Trifluorochloroethylene (Halon^{**}); PENNTUBE IV Polycarbonate (Lexan[†]); PENNTUBE VI Vinylidene Fluoride (Kynar[‡]).

®P.F. Reg. T.M. *General Electric Reg. T.M.
†DuPont Reg. T.M. ‡Pennsalt Reg. T.M.
**Allied Chemical Reg. T.M.

Princeton, will preside. Statistical teaching in 1974, Harold Hotelling, University of North Carolina and vice president for the Statistics Section.

Monday 30 December

Organization, Search, and Retrieval of Technical and Scientific Information. Symposium, joint program of sections on Statistics and Information and Communication, cosponsored by the Institute of Management Sciences. Arranged by Ezra Glaser, U.S. Patent Office, who will also preside. The role of search in the Patent Office, Richard Spencer, U.S. Patent Office. On some statistical models of search operations, Edward C. Bryant, Westat Research Analysts, Inc. On some recursive models of large-scale information systems, David Rosenblatt, National Bureau of Standards.

Reliability of Complex Systems. Arranged by S. S. Wilks. Landis Gephart, Lockheed Corporation, will preside. Systems reliability and engineering statistical aspects, George Levenbach, Bell Telephone Laboratories. Functional analysis for evaluating systems reliability, William S. Connor, Research Triangle Institute. The concept of monotone hazard rate in systems reliability, Frank Proschan, The Boeing Company.

Science in General

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

Academy Conference

Thursday 26 December

National Junior Academy of Science Program. Charles L. Bickle, Milton Hershey (Pa.) High School, will preside. Titles of papers and lists of participants will be available at the meeting.

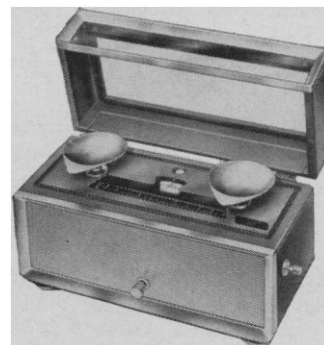
Friday 27 December

Meeting of Directors of Junior Academies of Science. Charles L. Bickle will preside. Summary of final report on the AAAS Academy Conference survey of junior and collegiate academies supported by the National Science Foundation, John D. Hopperton, Oklahoma Academy of Science. Report on national science seminars, J. Teague Self, Oklahoma Academy of Science.

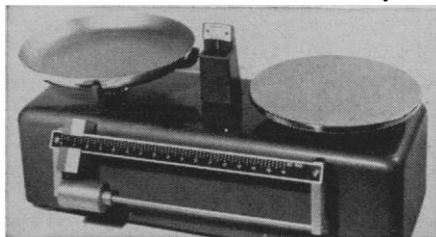
The Activities of the Academies of Science and the Role of the National Science Foundation. Symposium. Ger-

3

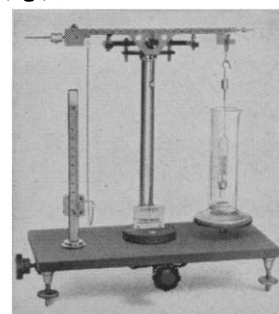
TIME-SAVERS BY TROEMNER



1. Precision laboratory balance—Model 410—Sensitivity 2 mg. Capacity 120 g. No bands or wires to bend or lose "life." Handsome blue-gray heavy metal case. Weighs to full capacity with lid closed. **\$165.**



2. Heavy-duty precision balances—Models 195-B and 2-89B—Capacities 3 or 6 kg. Sensitivity as fine as 100 mg. Locking tare weight. Beams graduated in mg., g., or oz. **From \$95.**



3. Specific-gravity chain balance—Model S100—Ideally suited for S.G. determinations of liquids and solids to within 0.0001. Also operates as a sensitive chain analytical balance. **From \$168.**

Write for complete information on these and the complete line of quality Troemner balances and weights.



Henry Troemner, Inc.
22nd & Master Sts., Philadelphia 21, Pa.
Phone Area Code 215/POplar 9-6386

ald Acker, president of the Academy Conference, will preside. Participants include: John Breukelman, Kansas State Teachers College; J. Teague Self; and John A. Yarbrough, Meredith College. Participants who will discuss the report on national science seminars include: J. Teague Self; Harry J. Bennett, Louisiana State University; Charles L. Bickle; Irving Auerbach, Sandia Corporation; and John D. Hopperton.

Presidential Address and Dinner. E. Ruffin Jones, past president of the Academy Conference, will preside. The day of reckoning, Gerald Acker.

Annual Junior Scientists Assembly

Friday 27 December

Tours. Places that will be visited include Case Institute of Technology, Natural Science Museum, and Western Reserve University.

Student Papers. Sanford Eisler, Cleveland Public Schools, will be master of ceremonies. The keystone address, Antarctica—frontier of international science, will be presented by Laurence M. Gould, president-elect of AAAS. The advanced placement program in science, Ward Ebert, junior at Princeton. Effect of hormones on secondary sexual characteristics of canaries, Larry Spitz, student at Hawken School, South Euclid, Ohio. Journey to a smaller world, Larry Nelson, sophomore at the University of Michigan. An investigation of optimum free convection heat transfer from a finned horizontal cylinder, Richard Karash, a senior at Euclid Senior High School. Opportunities unlimited, Carol Smalheer, a senior at John Marshall High School, Cleveland, Ohio.

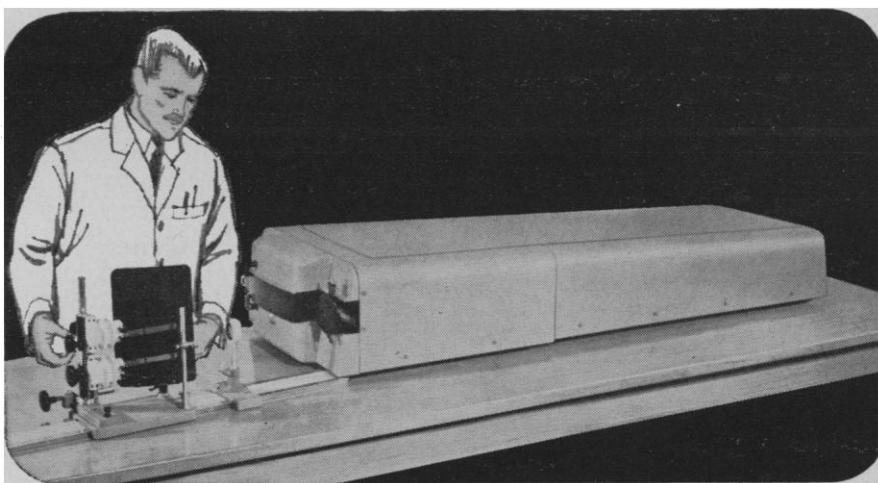
National Science Foundation

Monday 30 December

The Role of Instruments and Equipment Use in Science Research Program Planning. Symposium, joint program of the office of Economic and Statistical Studies, National Science Foundation, and the section on Industrial Science. Arranged by Zola Bronson, National Science Foundation. J. Francis Reintjes, M.I.T., will preside. The issues of instrument and equipment expenditures and use in science research organization planning management, Zola Bronson. The role of instruments and equipment in the planning, management, and design of research experiments, John E. Jacobs, Northwestern. The effect of




**"Wet Method" analyses
take five-and-a-half times longer...**



**than the accurate, low-cost
Bausch & Lomb Spectrograph way**

Let our Consultation Service help you evaluate the need for spectro-analytical methods in your own industrial, research or academic program. No cost or obligation, of course. Just mail the coupon.

BAUSCH & LOMB 

**BAUSCH & LOMB
INCORPORATED**
64248 Bausch Street
Rochester 2, N. Y.

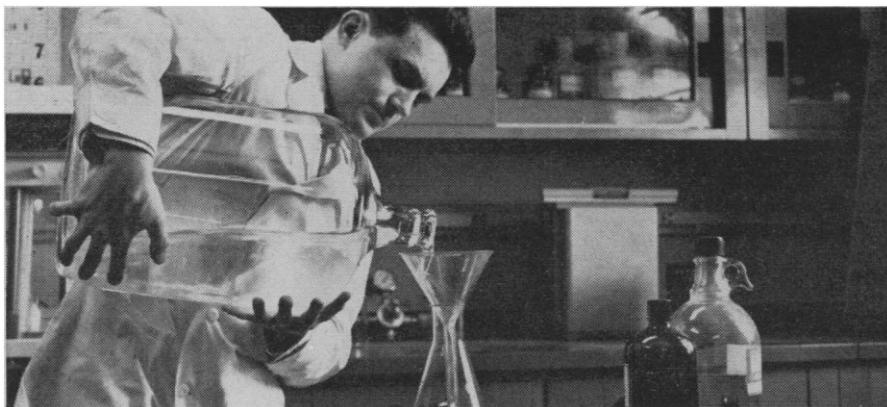
- ☐ Schedule free Consultation at my convenience.
☐ Send me B&L Spectrograph Catalog D-277.

Name

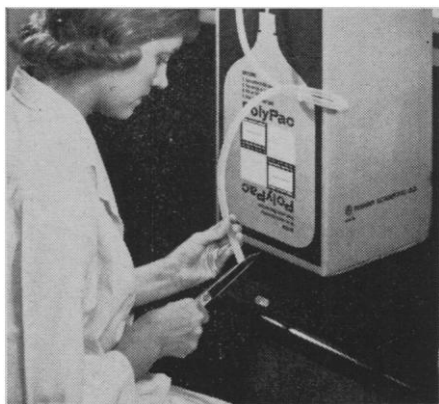
Company

Address

City



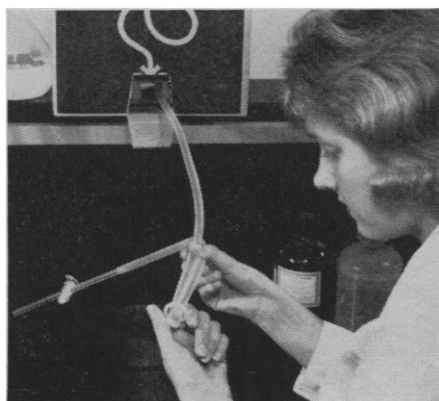
WHY MESS WITH THIS? FISHER'S POLYPAC* MAKES DISPENSING EASY



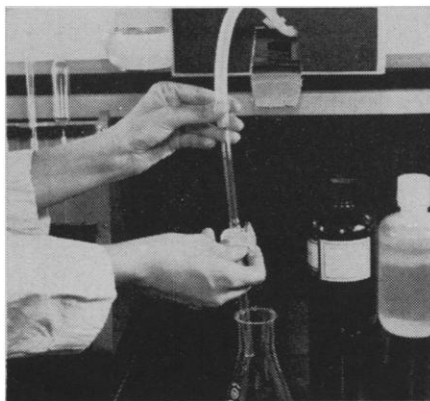
1. Withdraw tubing from carton and cut off sealed end.



2. Attach 2-mm Teflon or glass stopcock to end of tubing.



3. Invert carton and remove safety ring from tubing.



4. Dispense solution directly from the PolyPac container.

There's no reason to open the bottle . . . no need to transfer reagents . . . no chance for contamination . . . no deposits or returns when you buy reagents in Fisher's handy 2-gallon or 5-gallon PolyPac. No storage problem, either. PolyPac sits on the warehouse shelf until you convert it to a sealed, in-the-lab dispenser. Formaldehyde, hydrochloric acid, sulfuric acid, buffers and many other solutions now come in PolyPac. Complete list, plus more details, in **free PolyPac bulletin**. Write Fisher Scientific Company, 139 Fisher Building, Pittsburgh 19, Pennsylvania.

*Fisher Scientific Company Trademark



FISHER SCIENTIFIC

World's Largest Manufacturer-Distributor of Laboratory Appliances & Reagent Chemicals

Atlanta • Boston • Chicago • Fort Worth • Houston • New York • Philadelphia
Pittsburgh • St. Louis • Union, N. J. • Washington • Edmonton • Montreal • Toronto

instrumentation on research, Winston E. Kock, Bendix Corporation. New instrumentation and research management, John J. Grebe, Dow Chemical Company. Policies in the development, acquisition, and utilization of instrumentation in science research, Otto H. Schmitt, University of Minnesota.

The Planning and Management of Science Research Programs. Symposium, joint program of the Office of Economic and Statistical Studies, National Science Foundation, and section on Industrial Science. Arranged by Zola Bronson. Jacob Perlman, National Science Foundation, will preside. Productivity in the ivory tower, John R. Dunning, Columbia. The administration of scientific research in universities, Ralph A. Sawyer, University of Michigan. Planning and management of consumer product-oriented industrial research, William B. Reynolds, General Mills, Inc. Research planning and management in an unchanging world, Erwin G. Somogyi, Somogyi Associates. Research planning and management in the federal government, Nicholas E. Golovin, Office of Science and Technology, Executive Office of the President. Quality, relevance, and rate of research productivity with regard to management, Theodore C. Byerly, U.S. Department of Agriculture.

Scientific Research Society of America

Monday 30 December

Annual Address for the Scientific Research Society of America and Award of the William Procter Prize. William E. Hanford will preside. Speaker will be announced later.

Sigma Delta Epsilon

Friday 27 December

Luncheon for All Women in Science and Address. Ernestine Thurman, National Institutes of Health, will preside. A study of the atmospheric pollen of the Minneapolis Area, Agnes Hansen, University of Minnesota.

Society of Sigma Xi

Friday 27 December

Joint Annual Address of the Society of the Sigma Xi and the United Chapters of the Phi Beta Kappa. Wallace R. Brode, past president of AAAS, will preside. Telltale dust, Paul B. Sears, Yale University and past president of AAAS.