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THE THIRD COLUMBUS MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND ASSOCIATED SOCIETIES

Edited by Dr. F. R. MOULTON
PERMANENT SECRETARY

ON Saturday evening, December 30, the American Association for the Advancement of Science and 47 of its affiliated and associated societies folded up their tents and quietly left Columbus, Ohio, after one of the most successful meetings in the history of these societies. Congestion and lack of adequate facilities could reasonably have been expected because the occurrence of Christmas and New Year's Day on Monday made it advisable to crowd 259 scientific sessions into four days. In spite of these numerous sessions and a very large attendance, the rooms for scientific meetings and the accommodations for scientists were beyond any reasonable criticism.

Forty years ago, in 1899, from August 21 to 26, the association held its first meeting in Columbus; the second meeting of the association in Columbus was held 16 years later, from December 27, 1915, to January 1, 1916; the recent meeting was the third in Columbus and the one hundred fifth meeting of the association. Next summer the association will meet with the Pacific Division in Seattle from June 17 to June 22. The annual meeting next December will be held in Philadelphia, the December meeting in 1941 will be held in Dallas, Texas, and the following one in New York City.

A FEW STATISTICS

There were registrants for the meeting from every one of the 48 states and from ten dependencies and foreign countries. The phrase "foreign countries" is used purely in the political sense, for the word "American" in the name of the association does not refer only to the United States. Even if science were not independent of race and nationality, our Canadian col-

leagues could not be regarded as foreigners, for almost from the beginning large numbers of them have been members of the association and they have held offices, including the presidency, in proportion to their numbers. As an evidence of the attitude of the association toward all American scientists, it has presented copies of each of the symposia it has so far published to the libraries of 24 Latin American universities.

The registration at Columbus by states and countries was as follows: Alabama, 10; Arizona, 2; Arkansas, 13; California, 36; Colorado, 9; Connecticut, 43; Delaware, 5; District of Columbia, 75; Florida, 6; Georgia, 16; Idaho, 1; Illinois, 235; Indiana, 129; Iowa, 76; Kansas, 32; Kentucky, 31; Louisiana, 37; Maine, 17; Maryland, 61; Massachusetts, 95; Michigan, 155; Minnesota, 69; Mississippi, 4; Missouri, 48; Montana, 2; Nebraska, 12; New Hampshire, 11; New Jersey, 63; New Mexico, 2; New York, 292; North Carolina, 27; North Dakota, 5; Ohio, 634 (Columbus, 249); Oklahoma, 14; Oregon, 6; Pennsylvania, 142; Rhode Island, 11; South Carolina, 7; South Dakota, 7; Tennessee, 29; Texas, 30; Utah, 4; Vermont, 3; Virginia, 48; Washington, 11; West Virginia, 36; Wisconsin, 69; Wyoming, 6; foreign countries, 39 (Argentina, 1; Canada, 25; England, 1; Hawaii, 4; India, 1; Holland, 1; Japan, 1; Philippines, 1; Puerto Rico, 2; Scotland, 1; Switzerland, 1).

Statistical comparisons of the meetings of the association that have been held in Cleveland are as follows:

	1899	*1915*	*1939*
Total registration	352	750	2,715
Ohio registration	113	181	634
Attendance (estimated)	400	900	6,000
Papers on programs	273	.....	2,154
Membership of A. A. A. S.	1,721	8,500	20,366

Without such data as these it is not possible to realize how rapidly science has been expanding during the past 40 years. It is quite probable that these figures are not a complete measure of the growth of science, for new scientific societies have been organized in great numbers during the interval. There are now in the United States and Canada more than 1,000 scientific societies and organizations, 174 of which are affiliated or associated with the association. This progressive division and subdivision of science emphasizes the importance of the work of the association as a great integrating agency. The voice of the association is increasingly the voice of science as a whole, powerful because of its large membership and authoritative because of the wide variety of the scientific interests it represents.

GENERAL SESSIONS

There are three principal types of programs at the meetings of the association: *general sessions,* consisting usually of one address by a distinguished speaker; *scientific sessions,* before which briefer technical papers are presented; and *luncheons* and *dinners,* at which addresses are often delivered. At Columbus there were 5 general sessions, 254 other scientific sessions and 45 breakfasts, luncheons and dinners. The following were the general sessions, which were open to not only scientists but also the public.

On Wednesday evening, December 27, Dr. Wesley C. Mitchell, professor of economics in Columbia University and director of research of the National Bureau of Economic Research, delivered his address as retiring president of the association on "The Public Relations of Science." Dr. Walter B. Cannon, president of the association for 1939, presided. After the address the members of the association were guests of the local committee and prominent citizens of Columbus, including Governor Bricker, at an unusually large and enjoyable reception in the Deshler-Wallick Hotel.

On Thursday afternoon, Dr. Isaiah Bowman, president of the Johns Hopkins University, delivered the first public lecture at a meeting of the association under the sponsorship of the Honor Society of Phi Kappa Phi on "Who is Responsible for Peace?" Dr. H. L. Shantz, president of Phi Kappa Phi, presided.

On Thursday evening, the eighteenth annual lecture under the joint auspices of the association and the Society of the Sigma Xi was delivered by Dr. Kirtley F. Mather, professor of geology and director of the Summer School in Harvard University, on "The Future of Man as an Inhabitant of the Earth." Dr. George W. Baitsell, president of the Society of the Sigma Xi, presided.

On Friday afternoon, Dr. Julian S. Huxley, of London, England, delivered the first address in America under the arrangement between the American and British associations for the advancement of science on "Science, War and Reconstruction." These exchange lectures were arranged primarily to promote international understanding and cooperation. It was inspiring to hear a scientist from a country at war pleading for tolerance and justice to his country's enemies in order that an enduring peace might be established among men. The address of Dr. Huxley illustrated the scientific ideals of impartiality, justice and altruism, not simply as ideals without immediate applications but as ideals that are urgently needed at this hour. Obviously there is now a tide in the affairs of scientists that taken at its flood may enable them to make the greatest contribution to the progress of mankind in the history of the world, but neglected may leave them in the position of having provided the bark on which civilization will drift back into the darkness from whence it came. It is gratifying that so many addresses and programs of the association and its affiliated societies gave concrete evidence of a deep feeling of responsibility of scientists to society. These

responsibilities include also the more fundamental one of laying foundations for an organization of society based on the essential nature of man; and they include the still deeper one of deriving from the laws of the inanimate and animate universes about us and within us a basis for ethics whose authority for acceptance shall be in our own hearts.

On Friday evening, the United Chapters of the Phi Beta Kappa presented as their speaker for the fifth annual lecture before the association Dr. Marjorie Hope Nicolson, professor of English and dean of Smith College, who chose for the subject of her address, "Science and Literature." Dr. Royall H. Snow, president of the Ohio State University Chapter of Phi Beta Kappa, presided at the meeting.

SYMPOSIA AND JOINT SESSIONS

The sections of the association and the affiliated societies took advantage of the presence in Columbus of specialists from many fields of science and arranged many symposia and joint sessions on subjects that often were not narrowly limited by the usual boundaries that separate the sciences. The principal symposia and joint sessions were as follows:

Section on Mathematics, Section on Geology and Geography, The American Mathematical Society and The Mathematical Association of America: "Applications of Mathematics to the Earth Sciences," 5 papers.

National Council of Teachers of Mathematics: "Relational Thinking in Secondary Mathematics," 5 papers.

Mathematical Association of America and National Council of Teachers of Mathematics: "Teaching Children to do Relational Thinking," 7 papers.

Section on Chemistry: "Isotopes," 13 papers; "Photosynthesis," 14 papers.

Section on Geology and Geography, The Geological Society of America and Section of Geology, The Ohio Academy of Science: "Glacial and Geomorphic Development of the Ohio Basin," 12 papers; "Paleozoic Stratigraphy of the Ohio Basin," 13 papers. Section on Geology and Geography and The Geological Society of America: "Industrial Minerals," 9 papers; "Teaching Methods and Problems in Elementary Geology," 9 papers. Section on Geology and Geography and the Society for Research on Meteorites: "Meteorite Falls and Meteorite Accretion," 5 papers. Section on Geology and Geography, Geological Society of America, American Geophysical Union, Section on Geology of The Ohio Academy of Science: "Hydrologic Problems in the Ohio and Michigan Basins."

American Society of Zoologists: "Experimental Study of Cellular Organizations," 5 papers.

American Association of Economic Entomologists and Entomological Society of America: "Fifty Years of Entomological Progress," 5 papers. American Association of Economic Entomologists and the American Phytopathological Society: "Viruses and Plant Quarantines," 4 papers.

Botanical Society of America, Physiological Section, American Society for Horticultural Science and American Society of Plant Physiologists: "Physiological Processes of Plants in Relation to Temperature," 5 papers. Botanical Society of America, American Society of Naturalists, American Society of Zoologists, Genetics Society of America and Section on Medical Sciences: "Defense Mechanisms in Plants and Animals," 3 papers.

American Society of Plant Physiologists: "The Teaching of Plant Physiology," 3 papers.

Ecological Society of America: "Relation of Ecology to Human Welfare—The Human Situation," 5 papers.

Genetics Society of America and American Society of Zoologists: "Speciation," 5 papers.

Section on Psychology: "The Internal Environment and Behavior," 5 papers.

Section on Social and Economic Sciences: "Effects of Science upon Human Beings," 3 papers.

Section on Medical Sciences: "Blood, Heart and Circulation," 6 sessions, 39 papers. Subsection on Dentistry: "Definite Oral Manifestations of Systemic Disease," 9 papers.

American Society of Horticultural Science, American Society of Plant Physiologists and Physiological Section of the Botanical Society of America: "The Effect of Temperature on Absorption, Growth and Reproduction of Plants," 5 papers.

ALBERT FRANCIS BLAKESLEE, PRESIDENT-ELECT

(By Edmund W. Sinnott)

Dr. Albert Francis Blakeslee, director of the Carnegie Institution Station for Experimental Evolution at Cold Spring Harbor, Long Island, was elected president of the association at the meeting of the council held on December 30.

Dr. Blakeslee is a particularly happy choice as president of the association because he is an outstanding botanist and is still in full mental and physical vigor. After taking his doctorate at Harvard, he became head of the department of botany at the Connecticut Agricultural College for a number of years, and since 1915 has been in the Department of Genetics of the Carnegie Institution at Cold Spring Harbor, Long Island, New York, and has served as its director for the past four years. He is a member of the National Academy of Sciences and the American Philosophical Society, in both of which organizations he has held important offices. He has been active in other organizations and has received many honors both here and abroad for his researches.

Blakeslee's early reputation was founded on his discovery of sexuality in some of the lower fungi and his demonstration that sexual fusion takes place in many cases only between physiologically different races. This discovery has revolutionized our understanding of sexual reproduction in all the lower plants. In more recent years Blakeslee has worked in the field of cytogenetics of the higher plants and has won an international reputation for his discoveries. The plant with which he has been chiefly concerned is *Datura stramonium,* the jimson weed. He found and studied the tetraploid form of this plant very early; and was able to induce a haploid race of it, the first haploid higher plant known. By a study of heteroploid races of this species in which certain chromosomes were present in extra number, he was able to determine the role which each chromosome played in inheritance. In collaboration with the late Dr. John Belling, he was the first to demonstrate the interchange of segments between nonhomologous chromosomes and the consequent cytological differences by which these could be recognized, and this work has opened up a wide field of cytogenetic inquiry among plants and animals. Blakeslee was able to recognize a number of different "prime types" of this species and has studied their geographical distribution, thus contributing one of the major pieces of evidence as to the relation of genetics to the process of evolution. In recent years he has devoted much attention to the induction of polyploidy artificially by the use of colchicine and other drugs, in which field he is a recognized leader. From these results a whole series of new researches are growing, the results of which are certain to be of much importance not only in genetics but in the studies of plant development.

THE ASSOCIATION PRIZE AWARD

An anonymous friend of the association has provided an annual Thousand Dollar Prize Award. The seventeenth of these prizes was unanimously awarded at Columbus to Dr. I. I. Rabi by a prize committee consisting of Howard A. Meyerhoff, *chairman* (geologist), E. G. Butler (zoologist), Farrington Daniels (chemist), Harvey B. Lemon (physicist) and William J. Robbins (plant physiologist). The report of the committee was as follows:

As in 1938 at Richmond, the committee found it difficult to choose from almost equally meritorious contributions in scientific fields so different that comparison and contrast were impossible. Notwithstanding this difficulty the committee reached a unanimous decision in favor of Dr. Rabi's research as outlined in "Radio Frequency Spectra of Atoms and Molecules," because it extends the range of scientific knowledge regarding atoms in a very significant way. Dr. Rabi has not only discovered radiations, emitted by atoms, that are pitched lower than any hitherto observed, but also devised a method of measuring them. Although they lie within the range of radio, they are too feeble by far for detection by even the most sensitive devices now known in radio.

Dr. Rabi's work has opened a way of measuring such subtle properties of atoms and molecules as the magnetism of their component parts, a hundred times more accurately than was possible by any instrument available up to the present time. Of especial significance is his conclusion that "there are no forces between the nucleus and the electrons other than those arising from the fact that the nucleus, as well as the electron, is a magnet."

The following biographical sketch is based on information supplied by Dr. George B. Pegram. Dr. Rabi was born in Rymanow, a small village in old Austria, on July 29, 1898, and was brought to the United States in infancy. After finishing his preparatory work in Brooklyn, he entered Cornell University in 1916, holding a cash scholarship award on his school record and a state tuition scholarship won in competitive examination. He graduated in 1919, following which he worked for three years. He returned to Cornell for graduate study in 1922, transferred to Columbia University in 1923, became a part-time tutor in the College of the City of New York in 1924 and attained the Ph.D. degree at Columbia in 1927. In 1927 he visited Europe on a Barnard fellowship from Columbia, studying with Sommerfeld at Munich, Bohr at Copenhagen and Pauli at Hamburg. During the year 1928–29 he studied in Europe on an International Education Board fellowship, returning to this country in 1929 and becoming a lecturer in physics at Columbia University, where he rose to the rank of professor in 1937. In 1936 he was awarded the One Thousand Dollar Prize offered by the Society of the Sigma Xi on the occasion of its semi-centennial celebration.

SECRETARIES' CONFERENCE

(From report by Ernest Carroll Faust, secretary)

One of the most important functions of meetings of the association is the annual Secretaries' Conference, for the secretaries of the sections and affiliated societies are essentially the general managers of their respective organizations. At their annual conference they discuss not only their own special problems but methods of more effective cooperation in promoting the objects of the association and its affiliated societies. The program of the conference and dinner at Columbus, which was attended by 31 secretaries, consisted of discussions of three principal topics of special interest to the secretaries as officers of the association. Spirited and profitable discussions were led by J. C. Gilman and E. C. Faust and participated in by most of the secretaries. Otis W. Caldwell, Henry B. Ward, B. E. Livingston and F. R. Moulton, members of the executive committee of the association, joined in the discussions. The importance of the function of the association as an integrating agency in science was repeatedly stressed.

THE ACADEMY CONFERENCE

(*From report by S. W. Bilsing, secretary*)

The Academy Conference, composed of one representative from each of the 33 academies affiliated with the association and the members of the executive committee, held its thirteenth annual meeting on December 27. Twenty-seven affiliated academies were represented at the conference, and three members of the executive committee of the association were present. In addition, a number of guests were present from state academies or other scientific organizations. The program was as follows: Report of the subcommittee appointed to confer with the American Institute on problems of the junior academy, by H. E. Enders, Indiana; a report on the usefulness of the academy research grants of the association—in retrospect and in prospect; a discussion of the basis on which honorary junior memberships in the association should be awarded, by E. C. Faust, New Orleans Academy of Science; a consideration of the question whether the academy can serve as a unifying agent for the various scientific organizations of the state, by P. D. Strausbaugh, West Virginia; and a discussion of the organization of a state academy of science, by J. C. Gilman, Iowa.

The following officers were elected for 1940: *Chairman,* J. C. Gilman, Iowa; *vice-chairman,* P. D. Straus baugh, West Virginia.

RESOLUTIONS

On December 30, the council unanimously passed the following resolution:

The council of the A. A. A. S. expresses its appreciation for the most excellent provisions for this, its third, Columbus meeting. The steady development of the city, of its educational institutions and its material facilities have made it in many respects an ideal place for holding meetings of the association. The Ohio State University, one of the largest and best equipped in the country, has provided unlimited services for the uses of the various divisions of the association.

We are deeply indebted to the local committee in Columbus; to the Convention Bureau of the Columbus Chamber of Commerce; to the Division of Visual Instruction of the Ohio State Department of Education; to the Columbus Public Schools; to the local public press; to the many citizens of Columbus who have helped and have participated in our programs.

On December 30, the council unanimously adopted the following resolution:

The menace of stream pollution has already been given careful consideration, and the A. A. A. S. has expressed its views that any legislation should include provision for reasonable control by constituted authority. At present the Mundt Bill as amended is the only measure yet proposed which conforms to that consideration.

On December 30, the council unanimously passed the following resolution:

The Council of the American Association for the Advancement of Science expresses its obligation and appreciation to the National Association of Science Writers. By the efforts of its members to disseminate through the newspapers accurate news of progress in all fields of science this organization has become a most important agency in changing the picture of science in the public mind, and is performing a distinctive service to science and the public.

The services of this specially trained group of men and women are unique in the history of journalism and of popular education. Their efforts in bringing before the attention of the world the proceedings of the annual summer and winter meetings of the American Association for the Advancement of Science, as well as of the proceedings of other scientific bodies, have proved not only of great value to the public but also to the scientists themselves individually and collectively.

The National Association of Science Writers is keenly aware of the importance of science as the greatest potential force for the betterment of man, and has worked untiringly to make the scientists themselves aware of their social responsibility as the builders of man's future. By keeping the world at large constantly informed of the important developments in pure and applied science they accomplish a threefold purpose—spread knowledge to the millions, materially reduce the lag between discovery and application and give greater impetus to research.

SCIENTIFIC SESSIONS

SECTION ON MATHEMATICS (A) AND AFFILIATED SOCIETIES

(*From reports by E. R. Hedrick and W. L. Ayres*)

On Wednesday afternoon Theodor von Kármán delivered the fifteenth Josiah Willard Gibbs lecture, under the joint auspices of the Section on Mathematics and the American Mathematical Society, on "The Engineer Grappling with Non-linear Problems." On Thursday morning the section held a joint meeting with the American Mathematical Society and the Mathematical Association of America, at which J. R. Kline, vice-president for the section, delivered his retiring address on "The Jordan Curve Theorem." On Friday morning the Section on Mathematics, the Section on Geology and Geography and the American Mathematical Society held a joint session on various applications of mathematics to geophysical problems, at which papers were presented by W. D. Lambert, Lachlan Gilchrist, M. M. Slotnick and Archie Blake. On Thursday evening the section and its affiliated mathematical societies held a joint dinner, at which 283 persons were present.

The American Mathematical Society (W. L. Ayres, *associate secretary*) held sessions from Tuesday afternoon to Friday morning, inclusive, the scientific program consisting of 61 papers in addition to papers presented at joint sessions, and 44 additional papers that were read by title. On Thursday morning the

society awarded the Frank Nelson Cole Prize in algebra to A. A. Albert for three papers on Riemannian matrices.

The Mathematical Association of America held sessions from Thursday morning to Saturday morning, inclusive, at which 8 papers were read in addition to papers presented at joint sessions in which the society participated. The attendance was 255.

The National Council of Teachers of Mathematics held two simultaneous sessions on both Friday morning and Friday afternoon, at which a total of 21 papers was presented.

"Altogether this meeting was one of the largest gatherings of mathematicians ever held under the auspices of the A. A. A. S., and it was also perhaps the most successful in establishing contacts with those outside of the field of mathematics."

Officers of the American Mathematical Society were elected as follows: *Vice-presidents,* T. C. Fry and F. D. Murnaghan; *secretary,* R. G. D. Richardson; *associate secretaries,* W. L. Ayres, M. H. Ingraham and T. M. Putnam.

SECTION ON PHYSICS (B) AND AFFILIATED SOCIETIES

(From reports by Henry A. Barton, Thomas D. Cope, Charles F. Brooks and Marsh W. White)

On Friday afternoon the section held a joint session with the American Physical Society and the American Association of Physics Teachers, with Karl K. Darrow presiding, at which Herbert E. Ives presented an invited paper on "The Measurement of Velocity with Atomic Clocks," and at which I. I. Rabi presented a paper on "Radio Frequency Spectra of Atoms and Molecules," for which, in part, Dr. Rabi was given the seventeenth annual Thousand Dollar Prize Award of the association.

The American Physical Society (Henry A. Barton, reporting) held sessions from Thursday morning to Saturday morning, inclusive, before which 75 papers were presented in addition to those read at joint sessions. A total of about 300 persons attended the meetings of the society. One session included papers dealing with ionization, atomic and molecular spectra, infra-red studies and fluorescence. A second dealt with cyclotrons and electrostatic generators and various researches performed with the aid of these instruments. The latter papers were concerned with a number of aspects of nuclear transmutation and the energetics of such phenomena, the occurrence of radioactive isotopes and excitation functions for certain instances of nuclear change. A third session was devoted to intra-atomic fields, from both the experimental and theoretical points of view and to ionization studies and electronics. A fourth session continued in the general nuclear field of the second session, embracing papers on neutrons, electrons and mesotrons in interaction with other particles. A fifth session was mainly devoted to researches on solid matter using x-rays, but included a paper on electron-rays and several in the field of optics. The sixth session continued with papers on nuclear physics. Among these were several on cosmic-rays. Two of the papers of this session and most of the papers of the seventh session were devoted to miscellaneous subjects, such as experimental techniques, macroscopic physical properties of materials, optics and, finally, several papers on the separation of isotopes. Total attendance, 300.

On Friday evening the Section on Physics, the American Physical Society and the American Association of Physics Teachers joined in a very enjoyable dinner.

The American Association of Physics Teachers (Thomas D. Cope, *secretary*) held three sessions in addition to a joint session with the Section on Physics and the American Physical Society, before which 38 papers were presented. The Oersted Medal, awarded annually for notable contributions to the teaching of physics, was presented to Emeritus-Professor Benjamin H. Brown, of Whitman College, Walla Walla, Washington. Dr. R. M. Sutton, of Haverford College, was elected president of the society. Attendance, 250.

The American Meteorological Society (Charles F. Brooks, *secretary*) held three sessions, the feature of its program being a symposium on "Variations in Zonal Circulation of the Atmosphere and its Application to Long-range Forecasting." C.-G. Rossby led the discussion in the symposium; other contributors were V. Starr and M. Neiberger, H. D. Fletcher, R. Allen and L. F. Page. Eight other papers, mostly relating to climatology or the practical service of meteorology, were presented, and a Japanese motion picture of the artificial production of snow crystals was shown. The society celebrated the twentieth anniversary of its organization by reviewing the doubling of its membership, publication and resources in the past 10 years. Attendance, 45.

Officers were elected as follows: *President,* F. W. Reichelderfer; *vice-president,* Andrew Thomson (Canada); *secretary,* C. F. Brooks; *treasurer,* L. T. Samuels; *councilors* (for three years), Jerome Namias, W. J. Humphreys, Alfredo G. Galmarini, (Argentina), A. J. Connor (Canada) and G. R. Parkinson.

Sigma Pi Sigma Honor Society (Marsh W. White, *executive secretary*) held a luncheon attended by 73 members and guests, including Dr. John Zeleny, president-elect of the American Physical Society.

SECTION ON CHEMISTRY (C)

(From report by Neil Gordon)

The Section on Chemistry (C) held sessions on Wednesday, Thursday and Friday at which 44 papers

were presented. The program on Wednesday was a symposium on "Isotopes," Henry Gilman, presiding. On Thursday the section held a symposium on "Photosynthesis," C. F. Kettering, honorary chairman, and O. L. Inman, chairman. The Friday session was devoted to general papers, under the chairmanship of A. D. Rolston. On Wednesday evening the section held a dinner in honor of Harold C. Urey, retiring vice-president for the section, and on Thursday evening the section held a dinner and round table discussion of the papers on photosynthesis. The attendance at the sessions of the section ranged from about 150 to 350, with a total of about 400 different persons.

The symposium on "Isotopes" consisted of two half-day sessions, the first on separation methods and the physical aspects of the subject and the second on the biological applications of isotopes, the attendance being about 250. A few years ago scientists were seeking methods for separating isotopes, but to-day they are discussing the question of what method is best. Dr. Urey maintained that his own chemical method is best for carbon and nitrogen, but others, notably H. S. Taylor, W. W. Watson, A. K. Brewer and A. O. C. Nier, believed that the thermal diffusion method of Clusius and Dickel is at least a close competitor for these two elements, and all agreed that it is an excellent method for isotopes in general. L. P. Smith presented a method making use of ion beams separated by interrupted accelerating fields, which appears to be the only one generally applicable to metals. A. J. Dempster and A. O. C. Nier discussed precision methods for determining the relative abundances of isotopes in nature. The ratio of isotopes can be determined now within a few parts in 10,000. H. C. Urey delivered his address as retiring vice-president for Section C on the origin of the different properties which make possible his chemical methods of separation.

R. Schoenheimer discussed his experiments on animal metabolism, using the hydrogen and nitrogen isotopes, and the interesting results obtained, including the conversion of various fats into each other in the mammalian body and the transference of nitrogen from one amino acid to another. A new picture of metabolism is presented by these experiments, showing the rapid interconvertibility of the compounds composing living things. V. du Vigneaud showed how deuterium can be used to study the metabolism of sulfur-containing amino-acids in mammals. W. D. Armstrong presented a brief review of the work of Professor Hevesy and his co-workers in Copenhagen and added a discussion of some of his work on the metabolism of phosphorus in mammals. The use of radioactive iron in the study of anemia and iron metabolism was discussed by P. F. Hahn, and W. E. Cohn described his experiments on the permeability of cell membranes to a number of ions. By using radioactive carbon M. Kamen has shown that one of the first compounds to be produced in the photosynthetic process is a carboxylic acid with the carbon in this group of molecular weight in the neighborhood of 1,000.

The symposium on "Photosynthesis," introduced by C. F. Kettering, was attended by about 300 persons, giving evidence of the interest in the subject both because of its theoretical importance and because nearly all life depends on it for existence. Lying on the border line between two sciences, it brought chemists and botanists together to share their problems, points of view and techniques. The symposium will probably lead to discarding many of the hypotheses which have been held in the field of photosynthesis. It has long been taught that under optimum conditions four quanta are sufficient to cause combination in the plant of one molecule of carbon dioxide and one molecule of water, and that the first step is probably the formation of formaldehyde. By several different methods Farrington Daniels, B. M. Duggar, W. M. Manning, J. F. Stauffer and W. E. Moore showed that ten to twelve quanta, rather than four, are required for the process, leading to an energy efficiency of only about 20 per cent.—much lower than previously accepted. In a very careful investigation Robert Emerson checked approximately this lower efficiency.

Using radioactive carbon and making sublimation tests on the material dissolved from freshly photosynthesizing algae, M. Kamen showed that formaldehyde is not produced, but that the early step appears to be the formation of material having a molecular weight of about 800, containing a carboxyl group and a hydroxyl group. Quick methods of recording carbon dioxide by infra-red spectrometry enabled E. D. McAlister to study photosynthesis immediately before and after illumination. Photo-oxidation of algae under conditions of high light intensity and low carbon dioxide concentration was reported by J. E. Meyers and G. O. Burr. In four papers devoted to chlorophyll, O. L. Inman described its structure and properties; F. P. Zscheile, with the aid of spectrophotometric measurements, described its purification and its rapid deterioration on storage; E. L. Smith concluded from absorption spectra and use of the ultracentrifuge that chlorophyll is associated with protein in large molecules, and that chlorophyll A and B may not actually exist as such in the leaf; and W. M. Manning reported that chlorophyll is not the only pigment associated with photosynthesis, since fucoxanthine in diatoms appears to be even more effective. Theories of photosynthesis embracing intermediate steps, energy requirements, time lags and fluorescence were presented by James Franck; theories of energy and the oxidation-reduction potential, by E. Rabinowitch.

The more botanical aspects of photosynthesis were also considered. Absorption of various kinds of radi-

ation by leaves was measured by W. E. Loomis; growth of plants under various types of artificial radiation was described by J. M. Arthur; continuous records of respiration and photosynthesis of a whole apple tree throughout the year were presented by A. J. Heinicke; and relative rates of photosynthesis in yellow, green and blue light were measured in young pine trees by C. R. Burns.

In addition to the two symposia, there was a general program of 17 papers as follows: Alfred B. Garrett measured the solubility of electrolytes in the presence of a salt containing a common ion as a means of determining ion species and their free energy of formation; Harvey V. Moyer and Paul A. Munter showed that an optimum concentration of a colloidal substance reduces the amount of electrolyte necessary to bring about coagulation of analytical precipitates. Laurence L. Quill reported that ceric and cerous salts of oxygen acids give CeO_2 on ignition, which, when strongly ignited, is very insoluble. Francis Earl Ray proposed a mechanism that accounts for the products obtained when certain organic halides are treated with dimethyl sulfides. H. S. Booth applied the Schwartz reaction to a number of the inorganic non-polar halides, yielding fluorine derivatives whose physical properties he studied. Wesley G. France studied the adsorption of 36 azo dyes on potassium sulfate. He found it possible to predict the adsorption on the basis of steric hindrance and a knowledge of the cleavage planes of the crystal. Willy Lange described plants for the manufacture of paraffin from carbon monoxide and hydrogen that have been constructed in Germany. Using manganese as an antioxidant, these paraffins have been oxidized to fatty acids which are suitable for soap-making and the manufacture of edible fats. W. Conrad Fernelius and Norman O. Cappel reported that when 1, 2, 3 benzotriazole is treated with sodium in liquid ammonia two equivalents of hydrogen reacted further with the benzotriazole, indicating a difference in reducing power of sodium and nascent hydrogen. Paul J. Flory showed that, in polymerized polymethylene, a linear relation exists between the logarithm of the viscosity and the square root of the weight average of the chain length. Harry N. Holmes, Ruth E. Corge and W. B. Geiger isolated from the unsaponifiable fraction of bone marrow an oil and four crystalline substances, one of which was cholesterol, while the other compounds have not yet been identified. W. L. Evans confirmed, using several organic bases, the previously announced theory of the fragmentation of reducing sugars in the presence of alkali. John D. Guthrie and Joseph Allerton showed that sulfur reacts with RSH to give hydrogen sulfide, which may be used as a measure of the total cystein in the protein.

V. R. Damerell reported on studies of a method for the determination of sulfate by a double precipitation. C. W. Foulk, D. B. Brooks, R. I. Grady, J. E. Gran and R. V. Sinnett described and demonstrated the chain hydrometer. T. R. Hogness concentrated cytochrome C from bakers' yeast, and the course of the separation was followed spectrophotometrically by measuring the rate of catalyzed oxidation of reduced catalase. Hazel C. Cameron found an increase in the water consumption of vitamin A deficient male rats in the first two weeks of experiment, followed by a deficiency due to an increase in water storage in certain muscles in the later periods. P. Rothemund reported on the preparation and absorption of a number of syntheic porphyrins and their metallic derivatives.

SECTION ON ASTRONOMY (D) AND ASSOCIATED SOCIETIES

(From reports by Harlan T. Stetson, Dean B. McLaughlin and Lincoln La Paz)

The section held joint meetings with the American Astronomical Society on Thursday and Friday, December 28 and 29, the former at Sanborn Hall, Ohio Wesleyan University, the Friday morning session at the Perkins Observatory, Delaware, Ohio, and the Friday afternoon session in the Chemistry Building of The Ohio State University. At this session R. Meldrum Stewart, director of the Dominion Observatory at Ottawa, delivered an address, as retiring vice-president for the section, on "Gravity Clock Escapements." Philip Fox, vice-president of the American Astronomical Society, presided at the first three sessions, and Everett I. Yowell, vice-president of the association and chairman of the section, presided at the last session. The program contained a total of 56 papers, several of which were read by title. Attendance, about 100.

On Saturday morning Section D held a joint session with the Society for Research on Meteorites, for which nine papers were scheduled, representing the instrumental, historical, observational and theoretical aspects of an important and growing branch of astronomy, crossing interests of many allied fields.

As usual in recent years, the majority of the papers of the American Astronomical Society (Dean B. Mclaughlin, *secretary*) dealt with subjects pertaining to the sidereal system, with strong emphasis on spectroscopy and astrophysics. But the solar system also was considered in several significant papers, and advances in instrumental technique were recorded. One field of research which was not represented was the study of external galaxies.

Two papers on instruments were especially noteworthy. S. W. McCuskey (Warner and Swasey Observatory) and R. M. Scott (Harvard) described a photoelectric device for counting star images between assigned limits of brightness on photographs of star fields; R. C. Williams and W. A. Hiltner (Michigan) described the construction of a self-recording micro-

photometer which draws an intensity curve directly, and eliminates the laborious calculation of intensities from the recorded tracings.

Two papers by L. R. Wylie (U. S. Naval Observatory) and Dirk Brouwer (Yale) dealt with the orbit of Neptune. The agreement of theory and observation is improved by calculation of the disturbing action of Pluto. Georg Van Biesbroeck (Yerkes Observatory) showed that the two comets 1889 I and 1935 d, which apparently traveled in hyperbolic orbits, really moved in very long ellipses, and were thus true members of the solar system. In both cases the apparent hyperbolic path was due to perturbations by planets. E. J. Moulton (Northwestern University) suggested a modification of the encounter theory of the origin of the planets.

The reddening of distant stars through absorption of light of shorter wave-lengths by dark material in the galaxy received attention. Stebbins, Huffer and Whitford (Wisconsin), from the colors of early-type stars near the galactic poles, have found some effect of obscuration. James Cuffey (Goethe Link Observatory) reported on a study of two heavily obscured star clusters, and John O'Keefe (Yerkes Observatory) noted two reddened B-type stars near the Omega nebula.

Several papers made contributions to the interpretation of enigmatical, peculiar stellar spectra. J. A. Hynek and S. Whitt (Perkins Observatory) showed that Phi Persei is probably a true binary star, and that the triplet lines of helium are formed chiefly in the atmosphere of the secondary body of the system. R. B. Baldwin (Dearborn Observatory) presented a hypothesis to account for the remarkable variations in the spectrum of Gamma Cassiopeiae. He showed that changes of the temperature and brightness of the star, and of the widths of its spectral lines, can be harmonized by postulating a change of size of the radiating surface of the star and of the extent of its atmosphere, with corresponding variations in the speed of rotation, in accordance with the principle of conservation of angular momentum. New results on "forbidden" spectrum lines of highly ionized atoms of iron were discussed by P. Swings and Otto Struve (Yerkes Observatory).

The high point of the meeting was the exhibition by E. C. Slipher (Lowell Observatory) of photographs of Mars taken at the Lamont-Hussey Observatory in South Africa, which showed important and unquestionable changes in the shape and size of some of the dark areas on the planet. Effects of haze in the atmosphere of Mars were shown, and a number of the "canals" were recorded quite clearly on the photographs.

The final events of the meeting were the dinner at Delaware followed by the exhibition of motion pictures of solar prominences filmed at the McMath-Hulbert Observatory.

At the seventh annual meeting of the Society for Research on Meteorites (Lincoln La Paz, *secretary pro tem*), 21 papers were presented. The diversity of the fields of science (astronomy, geology, geophysics, mathematics, physics, petrography, electrical engineering, mineralogy, metallurgy) involved in investigations of meteorites was illustrated in the joint symposium of the society with the Section on Geology and Geography and the joint session with the Section on Astronomy. The society had an exhibit in the Science Exhibition of the association.

SECTION ON GEOLOGY AND GEOGRAPHY (E) AND ASSOCIATED SOCIETIES

(From report by Howard A. Meyerhoff)

The Section on Geology and Geography (E) met jointly with the Geological Society of America in all its sessions, and in certain of them it collaborated with other sections and organizations. By agreement with the Association of American Geographers, which met simultaneously in Chicago, geographic subjects were omitted from the program and attention was focused on a variety of geologic topics.

At the opening session on Wednesday morning, December 27, Kirk Bryan, vice-president and chairman of the section, presided while a series of glacial and geomorphic papers was presented. Of the twelve papers read, four dealt with Pleistocene geology in the Ohio and Mississippi valleys, two were concerned with limestone caverns and valleys, and five reviewed the erosional landforms of the Appalachian plateaus in Ohio, Pennsylvania and West Virginia. In view of the proprietary interest of the Ohio geologists in the subjects under consideration, the Section of Geology in the Ohio Academy of Science officially participated in the meeting.

At 2:00 P.M. the section convened to hear the address of the retiring vice-president, Walter H. Bucher, on "Problems of the North Atlantic Ocean." The audience was treated not only to a comprehensive view and keen analysis of significant problems which have received scant attention from American geologists, but also to an ingenious hypothesis which may explain the puzzling submarine canyons which furrow the margins of the continental platforms. Dr. Bucher's use of the little-known bottom-currents, generated by recurrent tsunamis, for the excavation of submarine gorges which extend to depths of 12,000 feet sounded more plausible than the lowering of oceanic water levels to this depth, as was argued before the section a year ago at Richmond. Whether or not Dr. Bucher has found the answer to one of the profession's most baffling and embarrassing phenomena, it is plain that the question of origin will be argued for some years to come.

With a little conniving, the section's chairman-elect, Hugh D. Miser, was secured as the first speaker on the program which followed the address of the retiring vice-president; and Heinrich Ries, who presided, skilfully made the most of the occasion to announce Dr. Miser's talk on petroleum geology as an inaugural address. The six ensuing papers dealt with the varied products and problems of the non-metallic mineral industry. Probably the most significant feature of the meeting was the fact that geology, technology and economics were viewed in their proper perspective.

Thursday morning, Chairman Bryan guided an interested audience through an "experience meeting," in which the problems confronting the teacher of elementary geology courses were profitably exposed and explored. Past Chairman Kirtley F. Mather led an animated discussion of the subject, which brought the teachers present face to face with the practical question of whether the elementary course should be made to fit the liberal arts student, or the liberal arts student remade to fit the course.

Otto C. von Schlichten, chairman of the Geology Section in the Ohio Academy of Science, occupied the chair on Thursday afternoon while extended consideration was given to recent and current research in the Paleozoic stratigraphy of the Ohio basin. In thirteen papers the stratigraphy, lithology, paleontology and structure of formations ranging in age from Ordovician to Permian were considered; and it is a high tribute to the content and caliber of the papers that an interested audience remained until the meeting adjourned at 6:40 P.M.

On Friday morning simultaneous sessions with the Section on Mathematics (A) and with the Society for Research on Meteorites provided rival attractions. Approximately 100 mathematicians and geologists heard five analytical and provocative papers on the applications of mathematics in geophysics and seismology. Inspired by the address of W. D. Cairns at Richmond on "Seismology from the Mathematical Point of View," this meeting was a successful effort to acquaint the two professional groups with mutual problems.

The joint meeting with the Society for Research on Meteorites drew a smaller but no less enthusiastic audience. With Frederick C. Leonard, past president of the society, in the chair, papers on the Benld fall, the Odessa crater problem, the rate of meteorite accretion and meteorite structure were read; and of especial interest was the account of Lincoln La Paz's ingenious device for locating buried meteorites. The meeting was the third occasion on which the two organizations have met jointly, and there is no immediate prospect of exhausting research material of mutual interest.

The concluding session on Friday afternoon was arranged with the aid of the Section of Hydrology, American Geophysical Union; and the geologists of the Ohio Academy of Science met in joint session with the Section of Hydrology, the Geological Society of America and Section E to hear six papers on hydrologic problems in the Michigan and Ohio Basins. Under the chairmanship of Dr. Bryan, detailed consideration was given to the groundwater situation, the work of the weather bureau, regional and local flood control problems and projects. The treatment of the subjects' several facets by specialists in each field brought the hydrologic situation as a whole into excellent perspective, and it is hoped that the importance of regional hydrologic studies may be further emphasized by the publication of these six contributions to the subject.

Attendance at all meetings of the section aggregated about 275. The number, which is only slightly larger than the Richmond attendance, suggests that further increases at the winter meetings are likely to be small and will depend partly on the geographic proximity of competing meetings, but chiefly upon growing appreciation of the value to be found in the specialized fields and symposia on which the section is concentrating. It is believed that further improvement in the individual sessions can be effected by a slight reduction in the number of papers listed in the program, for the length of some of the sessions curbed discussion and to that extent diminished the value of the meetings.

SECTION ON ZOOLOGICAL SCIENCES (F) AND ASSOCIATED SOCIETIES

(From reports by George A. Baitsell, E. G. Butler, Ernest M. Cory, Clarence E. Mickel and O. R. McCoy)

The Section on Zoological Sciences (F) (George A. Baitsell, *secretary*) met in joint sessions with the American Society of Zoologists and other associated societies at the Columbus meeting. Section F also joined with the Genetics Society of America and the American Society of Zoologists in a joint symposium on "Speciation," and a joint symposium with the American Society of Naturalists on "Defense Mechanisms in Plants and Animals." The attendance at the general sessions and at the symposia was unusually large, even standing room being at a premium in some instances. It is estimated that 1,000 different persons attended the various zoological programs.

As usual the Biologists' Smoker drew a far larger crowd than could be accommodated. Can it be possible that a great many non-biologists are attending the Biologists' Smoker? It would seem that before another smoker is held it would be well to inquire into possible methods for limiting the attendance to those directly concerned.

The 37th annual meeting of the American Society of Zoologists (E. G. Butler, *secretary*) was held on

December 28, 29 and 30, in conjunction with Section F and in association with several other biological societies. Of special significance were (1) the outstanding character of the two symposia, (2) the large number of general papers and demonstrations presented and (3) the size of the meeting from the point of view of general attendance.

Two symposia were arranged. The first, on "Speciation," under the leadership of Th. Dobzhansky, was held jointly with the Genetics Society of America. The five participants in this symposium presented a critical review of recent work on the important biological problem of speciation and its relation to evolution. The second symposium, "Experimental Study of Cellular Organization," was organized by M. H. Jacobs, a former president of the society. The five participants discussed especially the various methods used in recent studies in cell structure.

The total number of papers scheduled to be presented in person was 158, which was by far the greatest number that ever appeared on a program of the society. In addition, 32 demonstrations were held and 145 papers were included in the program as read by title.

At the annual dinner of the society on Friday evening, December 29, with 258 persons attending, Dr. W. R. Coe delivered an address on "Divergent Pathways in Functional Development."

At the annual business meeting held on Thursday, December 29, the following officers of the American Society of Zoologists were elected: *President,* W. R. Coe, Yale University; *vice-president,* D. H. Wenrich, University of Pennsylvania; *secretary,* L. V. Domm, University of Chicago; *member of executive committee,* J. T. Patterson, University of Texas.

The American Association of Economic Entomologists (Ernest N. Cory, *secretary*) celebrated the 50th anniversary of its founding in a program organized by a committee of which Neale F. Howard was chairman. In addition to 97 papers on general subjects, the program of the society included three symposia, one on "Viruses and Plant Quarantines," held jointly with the American Phytopathological Society, and the other, a joint symposium with the Entomological Society of America, on "Fifty Years of Entomological Progress," which was attended by about 40 entomologists. Of the seven living charter members of the society, only one was present, Herbert Osborn, professor emeritus of The Ohio State University, who presided at the symposium. Each of five speakers discussed a period of 10 years, beginning with 1899 when the society was organized. They were: C. L. Marlatt, formerly chief of the U. S. Bureau of Entomology and Plant Quarantine; Lawson Caesar, Ontario Agricultural College; C. L. Metcalf, University of Illinois; E. O. Essig, University of California, and S. A. Rohwer, U. S. Bureau of Entomology and Plant Quarantine. A pleasant surprise during the joint session was a message of greeting from Dr. L. O. Howard, one of the organizers of the society, whose message was brought over long distance telephone and amplified through a loud speaker. This message was followed by the presidential address, "Undesirable Insect Aliens," by E. R. Sasscer, of the Bureau of Entomology and Plant Quarantine. The third symposium on "Training for the Various Fields of Entomology," was participated in by 5 speakers.

Sectional meetings were held on: (a) Quarantine and Inspection; (b) Apiculture; (c) Extension, and (d) Teaching. Four rooms were devoted to exhibits covering the field of insect biology and control. The Mutual Broadcasting System carried a coast-to-coast broadcast participated in by Wilmon Newell, University of Florida, representing the South; C. L. Metcalf, University of Illinois, representing the Central States, and E. O. Essig, University of California, representing the West. The Entomologists Dinner was attended by over 300 persons and proved to be a very enjoyable affair. Officers of the society were elected as follows: *President,* Harry S. Smith; *first vice-president,* W. A. Price. The association voted on a five-year sequence of meeting places as follows: 1940, Philadelphia; 1941, San Francisco; 1942, New York; 1943, San Antonio; 1944, Chicago.

The Entomological Society of America (Clarence E. Mickel, *secretary-treasurer*) held its 34th annual meeting on Wednesday, Thursday and Friday. Forty-five papers were presented during the regular session. The papers covered a wide range in the general field of entomology, including morphology, taxonomy, physiology, ecology, geographical distribution and nomenclature. Some very fine-colored motion pictures and Kodachrome slides were shown in connection with the techniques of teaching.

A joint symposium was held on Wednesday afternoon with the American Association of Economic Entomologists on the subject, "Fifty Years of Entomological Progress," to commemorate the 50th anniversary of the organization of the American Association of Economic Entomologists.

One of the outstanding features of this year's meeting was the annual public address given on Wednesday evening by A. Avinoff, director of the Carnegie Museum, on "Designs and Patterns in the Lepidoptera and Other Animals." Dr. Avinoff presented a theoretical explanation of the designs and patterns found in lepidopterous wings, pointed out their similarities to patterns of other animals, including birds and mollusks, and demonstrated the analogies between such patterns and sections or slices cut through various types of geometrical figures. Approximately 500 persons were in attendance at the public lecture, and others were turned away for lack of room.

A joint session with the Ecological Society of America was held devoted to papers dealing with the ecology of insects. The papers presented at this joint session were equally divided between the members of the two societies.

The Entomologists' Dinner was held on Thursday evening and was devoted to the celebration of the 50th anniversary of the organization of the American Association of Economic Entomologists. An exceedingly interesting evening's entertainment was arranged by the local committee with the cooperation of the Department of Zoology and Entomology of the Ohio State University.

The presiding officer at the Columbus meeting was President E. M. Walker. Officers for 1940 are: *President,* W. D. Funkhouser; *first vice-president,* James A. G. Rehn; *second vice-president,* Robert Matheson; *secretary-treasurer,* Clarence E. Mickel.

The American Society of Parasitologists (O. R. McCoy, *secretary*) held its fifteenth annual meeting on Thursday, Friday and Saturday under the presidency of Horace W. Stunkard. The program, which was the largest in the history of the society, contained 89 titles representing the fields of protozoology, helminthology and medical entomology. Two sessions were devoted largely to reports on the life histories of the trematode and cestode parasites of wild animals. The Thursday afternoon session was featured by the showing of a colored motion picture film entitled, "How Rocky Mountain Spotted Fever Vaccine is Prepared and Used," by Cornelius B. Philip, of the U. S. Public Health Service.

The presidential address by Dr. Stunkard on "Life History Studies and the Development of Parasitology" was delivered at the conclusion of the Friday morning session. The annual Parasitologists' Luncheon, attended by 133 members and guests, was held on Friday noon. In the afternoon, 32 papers were presented in a demonstration program during which tea was served. The Saturday morning session was devoted to reports of immunological studies of protozoan and helminth parasites, a field which is more and more becoming of major interest to parasitologists. At the concluding session on Saturday afternoon, papers were presented on parasites of importance in human and veterinary medicine. J. F. Mueller reported experiments upon himself and other volunteers, which proved that the sparganum (larva) of *Diphyllobothrium mansonoides,* a tapeworm of the cat, is a potential parasite of human tissues. Extensive discussion was provoked by a paper by T. C. Nelson, in which he proposed to control trichinosis by the skin-testing of hogs to detect infected animals.

At the annual business meeting of the society, the following officers were elected: *President,* David H. Wenrich; *vice-president,* Gotthold Steiner; *secretary* (for two years), Oliver R. McCoy; *members of the council* (for four years), Clay G. Huff and Horace W. Stunkard; *members of the editorial board* (for four years), Harold W. Brown, Harold W. Manter and Reginald D. Manwell. Dr. Charles A. Kofoid was unanimously elected a life member of the society. Dr. N. H. Swellengrebel, Amsterdam, Holland, was elected a foreign honorary member.

SECTION ON BOTANICAL SCIENCES (G) AND AFFILIATED SOCIETIES

(From reports by John T. Buchholz, George S. Avery, Jr., Edwin M. Betts, J. M. Schopf, Paul R. Burkholder, Clyde H. Jones, Howard P. Barss and J. A. Pinckard, R. A. Studhalter, Walter E. Loomis and Elsie G. Whitney)

The Section on Botanical Sciences (John T. Buchholz, *secretary*) met in joint session with the Botanical Society of America, the American Phytopathological Society, the American Society of Plant Physiologists, the Mycological Society of America and the American Fern Society, at 2:00 P.M. on Thursday, December 28, 1939, Neil E. Stevens, presiding. The attendance at this session exceeded 800; the total attendance of the botanical group was estimated to exceed 1,200. Raymond J. Pool, retiring vice-president and chairman for Section G, delivered an address on "White Man Versus the Prairie," in which he traced the history of the utilization of prairie land of our western plains for agricultural purposes in relation to recurrent drought, wind, erosion and floods. Dr. Pool was followed by three invited speakers. Donald Reddick discussed "Problems in Breeding for Disease Resistance," with special reference to potato late blight. He pointed out that while new races of *Phytophthora infestans* are frequently reported from Europe, there is apparently only one in North America. Dr. Reddick summed up the evidence for his belief that *P. infestans* is not native to the cultivated potato, but was probably introduced into Europe and perhaps North America also on some other solanaceous host.

Dr. Barbara McClintock presented "Recent Investigations in the Cytogenetics of Maize." She described many new cytological phenomena observed in material derived from x-ray treatment. This included proof that changes having the effect of gene changes through losses of chromatin may occur during mitosis. These are demonstrable as mosaic tissue in leaves and other parts, and were very effectively illustrated by means of Kodachrome projections.

Kenneth R. Raper discussed the "Communal Nature of the Fruiting Process in the Acrasieae," illustrating by means of a series of lantern slides the responses of these organisms to changes in the food supply, to light and to other environmental factors, including mechanical injuries to the colony. He has succeeded in

"staining" colonies of *Dictyostelium discoideum* by permitting them to feed on bacteria having a crimson pigmentation. The myxamoebae digest the cell bodies of the bacteria but can not digest the pigment.

The Botanical Society of America (George S. Avery, Jr., *secretary*) held its 34th annual meeting from December 28 to 30 with its program organized by the chairmen and secretaries of its four sections. A total of 151 papers was presented before the sectional meetings. The annual dinner for all botanists was held on Friday evening, December 29, at the Neil House, with a total of 433 persons attending. K. M. Wiegand, president of the Botanical Society of America, presided at the dinner and introduced Arthur J. Eames, retiring president, who discussed various aspects of the flora of South Africa and Australia. His address was illustrated with colored slides.

On May 9, 1939, the Botanical Society of America incorporated under the laws of the State of Connecticut, and at the business sessions of the society in Columbus, the by-laws, prepared by the council, were accepted with but few modifications. The committee created for a study of the sectional structure of the society, of which H. W. Popp was chairman, recommended that the society make financial provision for the expenses of the sections. This recommendation was approved by the council of the society and will make possible continued smooth operations of the sections and free section secretaries from the task of collecting section dues.

R. T. Wareham, of the Columbus local committee, looked after arrangements for the Botanical Society. All section meetings were held in the Commerce Building at Ohio State University.

The following are the officers of the society for 1940: *President,* E. N. Transeau; *vice-president,* Neil E. Stevens; *secretary,* Paul R. Burkholder; *treasurer,* Paul Weatherwax.

The General Section of the Botanical Society of America (Edwin M. Betts, *secretary*) held four sessions, one jointly with the Ecological Society of America, at which P. D. Strausbaugh presided. A total of 55 papers was presented, with an average attendance of over 100 persons.

The papers presented at the opening meeting were concerned mainly with observations on the lower plants and on teaching methods. Charles W. Hock gave an illuminating paper on the "Decomposition of Chitin by Marine Bacteria." Two papers were read on the algae. Gilbert M. Smith reported on "Observations on Reproduction of *Ulva lobata,*" and Wanda K. Farr reported observations on "Formation of Cellulose Particles in Halicystis." Three interesting papers were read on the Bryophyta. Marjorie McConaha discussed the "Ventral Specialization of the Marchantiales." Harold C. Bold, in his paper on "Nutrition of the Sporophyte in the Musci," threw new light on the relation of the sporophyte to gametophyte, while Samuel L. Meyer gave conclusive results concerning the growing of gametophytes of certain mosses in liquid media.

Papers presented at the second session dealt mainly with nuclear behavior, chromosomes and physiology. All the papers were of a high order. To mention a few of outstanding interest: W. C. Gregory, "Meiosis and Cultivation of Excised Anthers in Nutrient Solution"; Karl Sax, "The Physiology and Genetic Effect of X-Rays"; Sophia Satina and A. F. Blakeslee, "The Use of Periclinal Chimeras in Tracing Germ-layer Origin of Tissues in Datura"; Wray M. Bowden, "Polyploidy and Winter Hardiness Relationships in Flowering Plants with Reference to Karyogeographical Problems."

The Friday afternoon meeting was held jointly with the Ecological Society of America, Dr. E. N. Transeau, The Ohio State University, presiding. Many papers treating various aspects of ecology were read: "A Botanical Survey of Bois Blanc Island, Mackinac County, Michigan," by Marjorie T. Bingham; "Salt Marsh Plants in Relation to Tide Levels on the Californian Coast," by Ira L. Wiggins; and "Methods in Aerobiology," by O. C. Durham, were outstanding.

At the Saturday morning meeting valuable papers were presented on the morphology of plants. A. S. Foster, J. T. Buchholz and Margaret Kaeiser gave constructive reports on work being done on certain gymnosperms. Work on the Monocotyledonae was reported by James Merry, Herbert P. Riley, D. S. Van Fleet, C. E. Anderson, Ilda McVeigh and Paul Burkholder, and Vernon I. Cheadle, the latter reading a significant paper on "The Occurrence of Vessels in the Monocotyledonae." E. W. Sinnott and W. G. Whaley discussed cells and form changes, while G. S. Avery, Jr., and H. B. Creighton gave a well-prepared discussion of "Cell Number in the *Avena* Coleoptile." The meeting closed with papers by Richard R. Armacost on "The Border-parenchyma and the Vein-ribs of Certain Dicotyledonous Leaves"; by N. L. Higinbotham on "Development of the Female Gametophyte and Embryo in *Regnellidium diphyllum,*" and a report by C. D. LaRue on the part hormones play in the development of the peg of the cucurbits.

Officers of the General Section of the society elected for 1940 are: *Chairman,* Conway Zirkle; *secretary,* Edwin M. Betts.

The Paleobotanical Section of the Botanical Society of America (J. M. Schopf, *secretary*) met for two half-day sessions for technical papers (C. A. Arnold, presiding) and a demonstration program at which many of the specimens mentioned on the program were presented for first-hand observation and informal discussion. In addition, one half-day session was devoted to invitation papers.

The Pteridosperms received special attention in the

first part of the program. H. N. Andrews described *Megatheca thomasi* for the first time and discussed its possible bearing on the origin of the seed. It was suggested that the cupule probably represents a group of originally sterile telomes rather than sterilized sporangial members. Fructifications of the Medullosaceae were discussed in papers by W. E. Steidtmann and by J. M. Schopf. The elongated micropyle and other details of the sclerotesta of the female fructification of *Rotodontiospermum* are now known. Male fructifications of *Dolerotheca* belonging in the tribe Dolerosporeae of the Medullosaceae were illustrated by *Dolerotheca formosa* and *D. villosa* now newly described.

Steidtmann and Schopf discussed the gross anatomy of *Medullosa* stems of Illinois. *Medullosa megactinota* was briefly described and two new forms of *Medullosa noéi* indicated. The periderm-forming potentiality of nearly every living tissue of the stem of *M. noéi* was demonstrated. A. H. Blickle discussed a number of *Psaronius* species from the abundant upper Carboniferous material of Ohio. F. D. Reed presented characteristic features of Lepidodendrid leaves and cones. The morphology of the Harrisburg *Lepidocarpon* was illustrated by a series of illustrations taken tangentially from cone axis to the sporophyll lamina. *Mazocarpon oedipternum* was newly described by J. M. Schopf from abundant material, including male and female cones and cone peduncles. A single archegonium about 250 m diameter is produced by megaspores. *Cordiates iowensis* from coal balls of Des Moines age was described by L. R. Wilson and A. Johnston. Better preservation of protoxylem will be necessary in order to define its relation to *Mesoxylon*. Harlan Banks discussed the characteristics of *Protolepidodendron* and its relationship with other more poorly defined pre-Lepidodendrid groups.

In the group of invitation papers, E. C. Jeffrey showed how a recapitulary interpretation of wound characteristics rendered the phylogeny of conifers more intelligible. Additional study of fossil woods was indicated as a field for much-needed research, for such study reflects on the origin and constitution of coal as well as on phylogeny. Gilbert M. Smith presented a summary of evidence bearing on the origin of plants of Pteridophyte level. Since direct algal origin is upheld principally by negative evidence, this is regarded as insufficiently cogent. The Authoceroteae show many features which may be compared with primitive Psilophytes. Thus Pteridophyte derivation from primitive Bryophytes of the Anthoceras type is thought to be more reasonable. Daniel I. Axelrod presented a discussion of the Tertiary floristic history of the great basin and adjacent areas. The climatic and other conditions which distinguish environments of the Cenozoic are reflected in both past and present distribution of plant associations of this region. Diverse floras are thus interpretable in terms of the geologic chronology.

Fredda Reed presented a summary of the very interesting career of the late Adolph Carl Noé, who functioned as the first chairman of the Paleobotanical Section.

The demonstration program of the section included most of the material newly described in papers of the meeting. One of the most interesting was large silicified *Lepidodendron* stems from the Weber (Pennsylvanian) shales of Colorado demonstrated by the chairman, Chester A. Arnold. The opportunity for first-hand observation of rare material and free informal discussion is provided by the demonstration program, and this feature will be continued at future meetings.

Officers elected by the Paleobotanical Section for 1940 are: *Chairman,* A. J. Eames; *representative* of the section on the editorial board of the *American Journal of Botany,* C. A. Arnold; *secretary,* J. M. Schopf.

The Physiological Section (Paul R. Burkholder, *secretary*) held five sessions for presentation of research papers (J. M. Arthur, presiding), and met with the American Society of Plant Physiologists and the American Society for Horticultural Science in a joint symposium on "Physiological Processes in Relation to Temperature." The number of papers presented in the regular sessions of the section came to a total of 56. Papers dealing with plant chemistry, translocation, respiration, protoplasmic streaming, photosynthesis and the influence of radiation upon growth substances and plant growth were particularly outstanding in the program. The last meeting, held on Saturday afternoon, was devoted to presentation of 18 papers on the behavior of plants in relation to growth substances. The programs of the section filled the room to capacity to the end of the sessions.

The officers of the Physiological Section of the Botanical Society of America elected for 1940 are: *Chairman,* E. C. Miller; *vice-chairman,* B. S. Meyer; *secretary-treasurer,* P. R. Burkholder. The newly elected member of the Plant Physiological Board is L. Knudsen. The board members for 1940 are: E. C. Miller, *chairman,* J. M. Arthur, B. S. Meyer, L. Knudsen, P. R. Burkholder. Advisory member of the Division of Biology and Agriculture of the National Research Council is B. M. Duggar.

The program of the Systematic Section (Clyde H. Jones, *secretary*) consisted of 27 papers presented in four regular sessions, which were held in cooperation with the American Society of Plant Taxonomists, W. H. Camp, presiding. Papers dealing with the distribution of various species of algae were given by Alton H. Gustafson and Glenn C. Couch. A new motile species from New Jersey was described by Harold C. Bold and Tracy E. Hazen. Henry K. Svenson's brief analysis of the components of the

Linnaean descriptions and their relation to pre-Linnaean works inaugurated spirited discussion. Papers of a more specialized systematic nature, dealing with various genera, followed: *Yucca,* Carl Epling and A. L. Haines; *Ophioglossum,* Robert T. Clausen; *Osmunda,* R. M. Tryon, Jr.; *Hartmannia,* W. H. Horr; *Viburnum,* H. A. Gleason; *Lycopersicon,* Cornelius H. Muller (paper read by F. R. Fosberg); *Symphoricarpos,* George N. Jones; and *Hedyotis,* F. R. Fosberg. Interest was shown in two papers dealing wth geographical distribution and generic segregation: *Labiateae,* Carl Epling, and *Ochnaceae,* John D. Dwyer. A comprehensive outline of the data necessary for identification of the *Palmaceae* was presented by Miriam L. Bomhard.

Significant papers on plant distributon in various sections of the United States and Canada were as follows: California, Joseph Ewan; Washington, W. C. Muenscher; Oklahoma, Milton Hopkins; Iowa, W. A. Anderson; New Brunswick, E. W. B. Chase; and Kansas, Frank C. Gates. An interesting method of representing climates in relation to phytogeographical studies was presented by Henry T. Darlington. A thought-provoking paper dealing with continental displacement in relation to plant distribution was presented by W. H. Camp. Two outstanding papers dealing with plant anatomy and its relation to plant taxonomy were presented: *Kalanchoideae,* Albert H. Tillson (read by W. H. Camp), and *Rhus,* Charles Heimsch.

Officers of the Systematic Section of the society for 1940 are: *Chairman,* Edgar T. Wherry; *secretary,* John M. Fogg, Jr.

The 31st annual meeting of the American Phytopathological Society (Howard P. Barss and J. A. Pinckard, reporting), held from December 27 to 30, was marked by a program of 143 papers, in attendance of about 300 persons and reports of important progress in several significant directions. The policy of close cooperation with other groups of scientists was evidenced by the holding of joint sessions with no less than seven different organizations, and at the some time a series of conferences within the society increased the solidarity of its members. These latter were on such subjects as the plant disease survey, disease resistance in plants, fire blight control in apple and pear, testing protective fungicides by standardized techniques, eradicant fungicides for the control of apple scab and other plant diseases and the control of the bacterial ring rot of the potato.

A wide variety of subjects was covered in each group of papers. A number of newly discovered plant disease-producing organisms were reported, including a bacterial stalk rot and a leaf- and ear-attacking fungus of corn, new species or strains of fungi attacking sweet potato, clover, delphinium, oats, tomato, potato and other host plants, new virus diseases of peach, tobacco, sour cherry and cabbage, and a new genus of parasitic eelworm or nematode.

The reported advances in the development and testing of chemicals for use in plant disease control were most encouraging. Workers in a number of state agricultural experiment stations had initiated a program for uniform trials of seed-treatment materials for cereal grains. The committee in charge, headed by M. B. Moore, University of Minnesota, announced that in 1940 vegetable seed-treatment tests would also be included. A group of members headed by G. W. Keitt, University of Wisconsin, volunteered to pool their plans and results in further exploratory work along the line of eradicant fungicides, extending from coast to coast. This method of destroying overwintering stages of plant diseases promises, where applicable, to make growing-season control much easier and less expensive.

The committee on standardized methods of testing fungicides, S. E. A. McCallan, Boyce Thompson Institute, *chairman,* suggested a set of methods aiming to eliminate many of the worst sources of error in evaluating different protective chemicals. That consideration of methods is timely was evidenced by the number of new types of fungicides reported on at the different sessions.

The round table discussion on the problems involved in developing new disease-resistant varieties of plants brought out the wide range of diseases for which control through resistant varieties has been at least partially successful. It also emphasized the necessity for constant cooperation between plant pathologists and plant breeders in combining resistance to a number of plant diseases in locally adapted varieties and in finding and incorporating into future crop lines resistance to the new strains of pathogens which continually arise.

The virus diseases continued to hold a prominent place on the program, along with fungous and bacterial diseases. Among the papers arousing keen interest were those reporting that dodder may serve as an agent for transmitting viruses, and that tobacco may develop and transmit what appears to be a passive immunizing principle protective against the usual effects of the curly top virus. The difficulties of dealing with virus diseases in quarantine and regulatory activities were brought out in a special joint conference with the entomologists, in which the need was set forth for more intensive research both at home and abroad to develop the necessary basis for intelligent governmental action.

The meeting was notable not only for contributions of unusual significance in many other fields, but also for the effective demonstrations of plant disease research put on by members of the society at the Civic Auditorium. These demonstrations included the Helminthosporium disease and the bacterial wilt of corn,

mutations and sexual relationships among fungi, fungi of the order Myriangiales attacking various economic plants, experimental methods for studying the action of volatile fungicides on fungi and plants, and the application of organic vapors for the practical control of tobacco downy mildew (blue mold).

Officers of the society were elected as follows: *President,* Charles Chupp; *vice-president,* J. G. Leach; *councilor,* J. B. Kendrick; *secretary,* R. S. Kirby.

The sixteenth annual meeting of the American Society of Plant Physiologists (Walter E. Loomis, *secretary*) was held from December 28 to 30, President J. W. Shive presiding. Fifty-two papers were read at four regular sessions and four joint sessions or symposia. Among the papers presented, Luyet and Galos reported that live leaves cooled at the rate of 1° C. per hour have only a slightly lower freezing point than dead tissue; with rapid cooling the freezing points of the live tissues were much lower. Wallace and Clum reported that leaves coated with impervious coverings were injured, irrespective of the infrared absorptive characteristics of the covering. Vaseline prevented transpiration at low intensities.

F. W. Went found that growth curves obtained under varying humidities can be explained on the basis of the Munch hypothesis of translocation. J. C. Ireland and F. G. Gustafson reported separately on the production of outwardly normal fruits of cotton and of tomato with indoleacetic acid and other stimulants. H. F. Thut found that growth of asparagus and black bindweed stems and of castor bean and corn leaves is not inhibited by light intensities to 12,000. Growth typically increased in the morning with temperature and dropped only when water deficits had developed in the plants. R. B. and Alice P. Withrow found that wave-lengths in the blue region were relatively ineffective in photoperiodism and in correlative development of various seedlings. L. D. Berry, Jr., reported spontaneous variations in the electrical energy output of onion root tips which were correlated with the rate of elongation of the root section. Gordon Marsh found that *Valonia* cells were killed by pH values of 4− and 10+. Between these values the p.d. was not a regular function of either K+ or K+× OH−.

J. D. Sayre stored corn with 11 per cent. moisture in sealed glass tubes for six years without loss of viability; at 18 per cent. all grains were dead in 6 months. Grain sealed in nitrogen lived longer at 30° C. than that in oxygen. Good germination was obtained after 5 years of storage in nitrogen, oxygen, carbon-dioxide or air when held at low temperatures. In another paper Dr. Sayre reported that the stomates of corn were apparently closed during the season of greatest dry matter production. C. D. Converse and Nathan Gammon, Jr., reported favorably on the use of ion-absorbing materials in gravel culture. S. V. Eaton presented evidence for the re-utilization of sulfur compounds in soybean and tomato. V. G. Lilly and L. H. Leonian reported that the growth of fungi was improved by zinc and in some cases by manganese.

V. H. Morris, C. R. Neiswander and J. D. Sayre found that red spiders on corn were killed by adding 3 p.p.m. sodium selenate to the nutrient culture without affecting the corn. R. B. Dustman and I. J. Duncan showed that thiocyanate sprays markedly increased the coloring of apples without reducing their keeping qualities. Foliage injury was moderate to serious. L. A. Hohl and M. A. Joslyn found that lactic acid was produced directly in yeast fermentations. H. T. Northen found that stimulation decreased the structural viscosity of the protoplasm of *Spirogyra.* Anesthetics had the added effect of reducing the sensitivity of the protoplasmic network to electrical stimulation. G. A. Greathouse and N. E. Rigler showed that natural and derived phenolic compounds are toxic to the root-rot fungus. Isomerism was found to play an important part in toxicity.

At the Annual Teaching Symposium on Friday evening W. E. Loomis reported on laboratory teaching, H. F. Thut on subject-matter and P. J. Kramer on the objectives of the first course in plant physiology. The dinner of the society was held on Thursday evening at the Neil House with an attendance of nearly 200. The retiring president, W. F. Loehwing, spoke on "The Effect of Mineral Nutrients on Flower Physiology." W. J. V. Osterhout, of the Rockefeller Foundation, was awarded the Charles Reid Barnes Honorary Life Membership of the society.

The Mycological Society of America (no report of meetings received) held 4 sessions, in addition to a joint session with the Section on Botanical Sciences and affiliated societies, before which 35 papers were presented.

The Sullivant Moss Society (R. A. Studhalter, *secretary*) held two scientific sessions, before which 13 papers were read. Following the second of these sessions the members of the society joined in an excursion under the leadership of Andrew D. Rodgers to the residences of W. S. Sullivant and Leo Lesquereux.

The American Fern Society (Elsie G. Whitney, reporting) met on Saturday, December 30, with about 25 members and their friends in attendance. Edgar T. Wherry illustrated with slides and maps his talk on the notable ferns of Ohio and their general distribution, giving especial detail to those that find the margin of their range in the state. He also reported the finding last June in South Carolina of a filmy fern, *Hymenophyllum,* new to America. The systematic status of the Pacific sword fern as indicated by its characteristics in different geographical areas was discussed by Joseph Ewan. Informal discussion among those present centered around a series of mounted specimens of *Botrychium* brought by R. T. Clausen.

SOCIETIES RELATED TO THE SECTION ON ZOOLOGICAL SCIENCES (F) AND THE SECTION ON BOTANICAL SCIENCES (G)

(From reports by Ralph E. Cleland, W. J. Hamilton, Jr., E. W. Lindstrom, J. E. Ackert, Paul S. Welch, A. I. Ortenburger, G. W. Jeffers and G. W. Hunter)

The American Society of Naturalists (Ralph E. Cleland, *secretary*) managed the Biologists' Smoker, with 2,000 persons attending, held a dinner attended by more than 100 persons and organized a symposium on "Defense Mechanisms in Plants and Animals," which was presented in joint session with the American Society of Zoologists, the Botanical Society of America, the Genetics Society of America and the Section on Medical Sciences. F. W. Went described some of the reactions of host plants to plant and animal parasites. A wide variety of local responses are known, ranging from death of the parasitized cell to increased growth and the development of new structures, as in the galls. W. C. Price discussed the defense mechanisms built up by plants infected with certain virus diseases. Plants may recover from a virus disease and become immunized to it, and yet still carry the virus; or, in other cases, plants infected with one virus and showing chronic symptoms of this virus may become immunized at the same time against related virus strains. William Bloom discussed local and generalized defense mechanisms in animals, pointing out the role of simple inflammation and of immune inflammation (antibody formation) in combating disease or the introduction of foreign proteins. At the Naturalists' dinner Ivey F. Lewis, president, delivered an address on "Cell Reactions," in which he described striking examples of cooperation between cells in performing certain physiological functions, and pointed out the importance of the biochemical and biophysical approach to the problem of directive control of such phenomena.

The Ecological Society of America (W. J. Hamilton, *secretary*) held its 25th annual meeting from December 27 to 30, at which 68 research papers and an important symposium were presented in 10 sessions, which were attended by at least 270 different persons. On Wednesday morning the society divided into two sections, the first on "Plant Ecology," J. M. Aikman presiding, at which papers were presented by Murray F. Buell, Oliver D. Diller, J. M. Aikman, Ivan L. Boyd, K. Richard Johnson, Dalton M. Brown, Robert M. Warner, R. S. Campbell and J. E. Potzger. The second section on Wednesday morning was on "Animal Ecology," Charles T. Vorhies presiding, at which papers were presented by G. K. Noble, Orlando Park, S. Charles Kendeigh, W. C. Van Deventer, Stanley C. Ball and V. E. Shelford.

On Wednesday afternoon a symposium was held on the "Relation of Ecology to Human Welfare—The Human Situation." The first of the invited papers was on "The Relation of Plant Ecology to Human Ecology," by Homer L. Shantz, which was followed by a paper on "The Relation of Geography to Human Ecology," by C. W. Thornthwaite. The third paper, "Human Society and Human Ecology," by Robert E. Park and A. B. Hollingshead, was followed by a paper, "Ecology and the Integration of the Sciences," by E. C. Lindeman. Spirited discussion of the papers at the close of the symposium was led by Charles C. Adams, presiding officer of the session.

The annual dinner of the society was held on Wednesday evening, 145 members and friends attending. At the close of the dinner, Charles T. Vorhies delivered his presidential address on desert life.

The Thursday morning sessions were in two sections, the first of which was a joint session with the Entomological Society of America, Clarence H. Kennedy presiding. Papers were presented by Stanley E. Flanders, W. W. Stanley, Nellie M. Payne, D. O. Wolfenbarger, Louis J. Milne, Alfred E. Emerson, Eldon J. Strandine, Thomas Park and Eliot C. Williams, Jr. The second Thursday morning session, on "Plant Ecology," was presided over by C. F. Korstian. Those who presented papers were Henry J. Oosting, J. E. Weaver, F. W. Albertson, Stanley A. Cain, Theodore M. Sperry, John B. Moyle, Etlar L. Nielsen and Homer A. Jack. On Thursday afternoon a general ecological session was presided over by A. S. Pearse. The speakers were William T. Penfound, W. C. Allee, J. M. Aikman, C. W. Thornthwaite and Hugh H. Darby.

On Friday morning the sessions were again divided into two sections. The first was a joint session with the Limnological Society of America, at which Paul S. Welch presided. Papers were presented by Chancey Juday, G. E. Hutchinson, George L. Clarke, A. H. Wiebe, W. M. Gersbacher, Ralph V. Bangham, George W. Hunter, III, and Lynn Hutchison. The second morning session had to do primarily with animal populations, Orlando Park presiding. Papers were presented by A. H. Wright, Ralph W. Dexter, E. S. Hathaway, Charles T. Vorhies, W. Frank Blair, W. J. Hamilton, Jr., and George O. Hendrickson. On Friday afternoon a joint session was held with the Botanical Society of America, E. N. Transeau acting as chairman. The speakers were Marjorie T. Bingham, Ira L. Wiggins, Harvey E. Stork, L. J. Gier, J. R. Jackson, Howard J. Dittmer, O. C. Durham, Warren Whitman, Stanley A. Cain, Frank E. Egler and W. E. Booth.

At the final business meeting of the Ecological Society of America, the following officers were elected: *President,* Francis Ramaley; *vice-president,* Orlando Park.

The Genetics Society of America (E. W. Lindstrom, *secretary*) carried out a program consisting of 23

demonstration papers, a symposium on "Speciation," which was participated in by Sewall Wright, E. M. Mayr, L. R. Dice, Warren P. Spencer and Th. Dobzhansky, a symposium on "Defence Mechanisms in Plants and Animals," which was participated in by F. W. Went, W. C. Price and William Bloom, a session for the presentation of 5 invitation papers, a session for the presentation of 16 short papers, and 15 papers to be presented by title. The program was attended by an average of about 150 persons.

The following demonstration papers indicate the newer developments: The Datura investigations of the Carnegie Institution group show no genic position-effect due to interchanges within chromosomes; bacterial mutations induced by x-rays in the bacterial wilt pathogen of maize simulate the natural mutations which can account for host-parasite evolution in the resistance-virulence equilibrium (R. E. Lincoln); measurements of rate of *Tradescantia* x-ray deletions indicate a random 2-hit radiation effect (C. M. Rick); analysis of sex-chromosome system in polyploid *Melandrium* showed the Y chromosome to be male- and the X to be female-determining with autosomes playing a minor role (H. E. Warmke and A. F. Blakeslee); an eco-genetical study of North American toads (A. P. Blair); and a detailed presentation of early embryological development of *Drosophila* gonads, illustrated with models (A. F. Huettner). The formal papers included the following: A determination of the specificity of gene modifiers in the house mouse (L. C. Dunn); an evolutionary picture of natural populations of Mexican fresh-water fish (M. Gordon); serological analysis of pigeon species (M. R. Irwin, R. W. Cumley and L. J. Cole); X-chromosome breaks (inversions) in Drosophila indicate the existence of intercalary regions with a high break frequency, probably correlated with heterochromatic material (B. P. Kaufman); and single break, x-ray-induced aberrations in *Tradescantia* follow a linear relation to dosage, while those dependent upon two breaks increase as the square of the radiation dosage.

The following short papers are especially worthy of mention: R. A. Brink and D. C. Cooper from cytogenetical data on alfalfa and tobacco pointed to the evolutionary significance of double fertilization in the endosperm-embryo balance with the endosperm in necessary ascendancy at early embryological stages; J. W. Gowen showed by x-ray measurements of the size of virus entities in strains and mutant derivatives that the reproductive mass occupies almost the entire volume of the virus particle; C. A. Offerman put interference in linkage tests on a quantitative basis; G. B. Wilson and B. R. Nebel measured the relative sensitivity to x-rays of microspore chromosomes at various stages; and M. R. Zelle and J. W. Gowen discovered that virulence of mouse typhoid bacteria may be genetically altered by passage and reisolation through resistant or susceptible inbred host lines, and that this alteration seems to be due to mutation followed by natural selection within the host.

At the annual Genetics Society of America luncheon and business meeting, authorization for a 1940 summer meeting at Woods Hole and for the regular winter meeting at Philadelphia was made. The following officers for 1940 were elected: *President,* L. J. Cole; *vice-president,* Th. Dobzhansky; *secretary-treasurer,* E. W. Lindstrom.

The American Microscopical Society (J. E. Ackert, *secretary*) met on December 28, 1939. At the executive committee luncheon, which was attended by five past presidents and most of the officers, reports were presented showing that 503 pages of original biological material were published in the quarterly Transactions with the aid of grants from the Spencer-Tolles Fund, an endowment of the society amounting to over $20,000. The following officers were elected: *President,* H. E. Jordan; *first vice-president,* Raymond J. Pool: *second vice-president,* Ruth Marshall; *secretary* (three years), J. E. Ackert; *elective member to the executive committee* (three years), Asa C. Chandler.

The society voted to meet in 1940 at Philadelphia with the American Association for the Advancement of Science and named Secretary J. E. Ackert and Treasurer A. M. Chickering as representatives on the council of the association.

The Limnological Society of America (Paul S. Welch, *secretary-treasurer*) held its fifth annual meeting on December 28 and 29. The scientific program consisted of 40 papers in addition to 7 papers read by title. The papers treated such subjects as limnological methods, stream productivity, lake contamination, reservoir lakes, plankton investigations, biological balance, density currents, stream improvement, fish production and parasites of aquatic animals. Four papers were presented, mostly in the form of motion pictures. The last session was devoted largely to papers which concerned fisheries limnology directly or indirectly. Average attendance, 220.

The following new officers were elected: *President,* W. J. K. Harkness; *vice-president,* James B. Lackey; *elective member of the executive committee,* G. W. Prescott.

The Phi Sigma Society (A. I. Ortenburger, *secretary*) held three sessions for the transaction of business and one for the presentation of 23 papers. National officers were elected as follows: *President,* Leon J. Cole; *secretary,* A. I. Ortenburger; *vice-chancellor,* Fred A. Barkley. At a banquet held in honor of the silver anniversary of the society, a former national president, Paul B. Sears, spoke on "The Scientist as a Citizen."

The National Association of Biology Teachers (George W. Jeffers, reporting) held two sessions at

which 11 papers were presented on various phases of the problem of teaching biology. The program, however, was not limited to methods of teaching, but included also broader questions of sequences in science in high schools, conservation and papers on such scientific subjects as "New Light on the Physical Basis of Heredity," by Edward C. Jeffrey, and "Our New Knowledge of Barnacles," by Paul Visscher. Dr. Jeffrey advised caution in accepting some of the recent theories respecting the nature of genes and chromosomes. There seemed to be universal agreement that the main hindrance to good biology teaching hitherto has been the retarding influences of the colleges, albeit unintentionally. It was stated that high-school biology has been largely a diluted college course, an assertion that appeared to be accepted by such experienced teachers as Henry B. Ward and the dinner speakers, William H. Weston and Edwin G. Conklin. Average attendance, 80.

The Council of the Union of American Biological Sciences (George W. Hunter, III, *secretary*) received and discussed the report of the Committee on Biological Science Teaching, Oscar Riddle, chairman, including replies to over 14,000 questionnaires sent out to schools in all the 48 states with the aid of a grant from the Carnegie Foundation for the Advancement of Teaching. Then the reorganization, aims and accomplishments of Biological Abstracts were discussed by John E. Flynn, editor. It was reported that the number of abstracts has increased almost 11 per cent. and the journal coverage has jumped from 385 at the beginning of 1938 to nearly 1,150 at the close of 1939. The number of subscriptions increased from 1,931, in 1938, to 2,812, in December, 1939, the decrease in subscription rates for the entire volume and the creation of sections resulting in a potential deficit of about $5,000 at the close of 1939.

The following officers were elected for 1940: *President,* A. J. Carlson; *secretary,* George W. Hunter, III; *treasurer,* D. H. Wenrich; *additional members of executive committee,* B. M. Duggar, A. Parker Hitchens and E. V. Cowdry.

SECTION ON ANTHROPOLOGY (H)

(From report by Henry C. Shetrone)

Despite the fact that the American Anthropological Association was in convention in Chicago, the Columbus meetings of Section H were fairly well attended and the quality of the papers offered was exceptionally high. The hope was expressed that the conflict resulting from simultaneous meetings in widely separated cities may be averted in the future, in order that interested individuals may have the advantage of attending sessions of both organizations. Although anthropologists are interested primarily in the Anthropological Association, the fact was stressed that affiliation with the A. A. A. S. not only is of mutual advantage, but that it affords opportunities for participation to many marginal groups whose interest is not specifically anthropological.

The morning session, with Neil M. Judd presiding, was opened with an address of welcome by Henry C. Shetrone, director of the Ohio State Museum. An illustrated paper on "Lithic Laboratory Problems, with Special Reference to the Oklahoma Eccentric Flints" was presented by Richard G. Morgan, archeologist of the Ohio State Museum, who demonstrated the detailed examination by the Lithic Laboratory of the material in question, as a result of which strong evidence of the recent fabrication of these spectacular specimens was adduced.

"Some Aspects of Acculturation Among the Lac du Flambeau Chippewa," as presented by John P. Gillin and Victor Raimy, was an admirable example of ethnological methodology. "Trimethylamine and Certain Superstitions," by M F Ashley-Montagu, was read by title.

At the afternoon session, with Diamond Jenness presiding, in a paper entitled "Physical Measurements of 100 Young Men of Acadian French Ancestry in Louisiana," Harley N. Gould (Tulane University) showed that, with some few minor exceptions, these young men have become physically "Americanized." The stated sessions were followed by an inspection of the displays of the Ohio State Museum. At the annual dinner Dr. Jenness delivered an informal address on "Canada's Indian Problems."

SECTION ON PSYCHOLOGY (I)

(From report by Leonard Carmichael)

Again this year Section I reports a satisfactory series of sessions at which more than 50 special communications were presented, many of them of real scientific interest. Total attendance, about 375.

The symposium on "The Internal Environment and Behavior" was especially well received. One man who had come over 600 miles remarked after the meeting, "I should willingly have traveled twice as far merely to be present at this one significant session." The symposium was organized by Ross A. McFarland, who presented the first paper on "Oxygen and Behavior." In connection with this paper Dr. McFarland discussed many examples from his work on the psychological factors involved in the performance of pilots at high altitudes. Ernst Gellhorn discussed the wide range of significant experiments in blood sugar in relation to behavior, as did Edward F. Adolph the problem of "Water Balance." Curt Richter described his ingenious experiments on the behavior of animals in relation to the internal secretions. At the conclusion of the symposium it was clear to all present that nothing had occurred to date to challenge the psychological truth of Claude Bernard's famous dictum that

"The constancy of the *milieu intérieur* is the condition of a free life."

The retiring vice-president of the section, J. F. Dashiell, spoke at the joint dinner with the Section on Education on "A Neglected Fourth Dimension to Psychological Research." This fourth dimension turned out to be "set" or "determining tendency." Dr. Dashiell's paper considered in an illuminating way the development and current experimental status of this important aspect of mental life. At this joint dinner, G. D. Stoddard, retiring vice-president of the section, also delivered an address of significance and psychological enlightenment on "Reflections upon the I.Q." This address was a valuable summary of the work in a series of different centers tending to demonstrate the value of the intelligence quotient under differing régimes of education.

SECTION ON SOCIAL AND ECONOMIC SCIENCES (K) AND ASSOCIATED SOCIETIES

(From reports by E. P. Hutchinson, Howard Richards)

The fourth science and society conference, sponsored jointly by Section K and the association at large, was devoted to the topic "Effects of Science upon Human Beings." The speakers were Alan Gregg, of the Rockefeller Foundation, President Isaiah Bowman, of the Johns Hopkins University, and Lawrence K. Frank, of the Josiah Macy, Jr., Foundation. Dr. Gregg, while admitting that knowledge of primitive man is insufficient to permit a precise statement of the effects of science upon man, pointed out that one of the principal effects, an increased expectation of life, had led to a number of direct and indirect consequences, including an increase of world population and a growing dependence of this larger population upon the scientific knowledge which had made it possible. Among the other effects of scientific progress was a replacement of superstition by knowledge. Dr. Bowman discussed in terms of specific instances the difficulties attendant upon securing the application of scientific knowledge to the solution of human problems. Mr. Frank, speaking of the cultural effects of science, demonstrated the necessity of incorporating scientific knowledge into our culture.

The Metric Association (Howard Richards, *secretary*) held two sessions for reports and discussions. In addition, F. C. Caldwell showed a party over the Electrical Engineering Laboratory of Ohio State University, and demonstrated how electrical measurements are based on metric units. Another party visited the factory of the Timken Roller Bearing Company, where the Diesel Department is equipped to design and manufacture in terms of millimeters.

The officers of the association for 1940 are: *President,* F. C. Caldwell; *first vice-president,* T. H. Miller; *second vice-president,* J. T. Johnson; *treasurer,* James F. Martin; *secretary,* Howard Richards.

SECTION ON HISTORICAL AND PHILOLOGICAL SCIENCES (L) AND THE HISTORY OF SCIENCE SOCIETY

(From reports by Sarah G. Mayer and Henry R. Viets)

The Section on Historical and Philological Sciences (Sarah G. Mayer, reporting) held one joint session with the History of Science Society at which the address of the retiring vice-president for the section, Nelson G. McCrea, was read by Esmond R. Long.

The History of Science Society (Henry R. Viets, *secretary*) held two sessions for the presentation of papers and a dinner, at which L. C. Karpinski delivered an address on "Organic Unity of the Contributions to the Progress of Mathematical Science." The first session, R. H. Shryock presiding, was devoted to the history of agriculture. The speakers were H. G. Good, who presented a paper on "Amos Eaton, Scientist and Teacher of Science," and C. A. Browne, whose subject was "Origins of Agricultural Chemistry as a Science." The second session was devoted to medical history. The first paper was by L. T. More on "Boyle as an Alchemist." The final paper was read by Esmond R. Long on "The Penetration of Pathological Anatomy in Medical Texts of the Sixteenth Century, as Illustrated by the *Medicina* of Jean Fernel."

SECTION ON ENGINEERING (M)

(From report by Frederick M. Feiker)

The section held a half-day session at which the retiring vice-president of the section, Andrey A. Potter, delivered an address on "Research and Invention in Engineering Colleges." There were, in addition, two papers relating to research and aviation. The first was by Major Carl F. Greene on "Interrelations between Research and Engineering in Aeronautics"; the second was by Dr. W. Randolph Lovelace, II, on "Problems in Aviation Medicine." Dean Emeritus Robert L. Sackett was elected vice-president for the section for 1940.

SECTION ON MEDICAL SCIENCES (N) AND SUBSECTIONS

(From reports by Malcolm H. Soule, Paul C. Kitchin, B. V. Christensen and Glenn L. Jenkins)

A symposium on "Blood, Heart and Circulation" was organized and held by the Section on Medical Sciences in six consecutive sessions at which 39 outstanding papers were presented by eminent specialists, the attendance at each session exceeding 125.

At the first session 8 papers were presented, the subjects discussed including the prothrombin and thrombin content of heart tissue and the relation of the former to vitamin K. Factors influencing the size and shape of the red blood cells, radioactive iron

studies relating to the formation and destruction of hemoglobin and to circulating red blood cell volume, and the role of diphosphoglycerate and other organic acid-soluble phosphorus compounds of the red blood cells in intermediate phosphorus metabolism were subjects which evoked considerable discussion. Dr. Sabin announced a new theory regarding the formation of antibodies by the reticulo-endothelial system.

The physiology of coronary blood flow was the subject of the second session. Each contributor illustrated his paper with lantern slides of hearts in which the coronary arteries had been injected with substances to aid in the clear visualization of the delicate branching of the vessels. Three different patterns were demonstrated from which it was postulated that relationship exists between these arrangements and clinical observations in coronary heart disease. The normal and pathological patterns having thus been thoroughly presented, a consideration of the effects of certain drugs on coronary blood flow ended the session. The subject was considered further at the next session and extended to the pathology of the coronary circulation, particularly as regards factors concerned in the narrowing or occlusion of the coronary vessels.

The next two sessions were devoted to cardiac failure and hypertension, to which 13 contributions were made. These two subjects have developed many interesting differences in points of view regarding their causes. Following the presentation of the formal papers heated discussions ensued from which it was found that the authors were in the main in close agreement, although differing somewhat in terminology. On one subject there remained but little agreement, namely, whether renin or other pressor substances are liberated into the venous blood by ischemic kidneys. The final session dealt with the heart and circulation in special territories, closing with a very interesting paper on traumatic lesions of the heart resulting from purposeful or accidental causes.

It was the unanimous opinion of those present that the symposium was an outstanding success. Clinicians and laboratory workers were afforded an opportunity to integrate their findings for the good of all. The discussions not only advanced scientific knowledge but served as a vehicle for the very practical purpose of removing the barriers of misunderstanding which in many instances were linked with barriers of terminology, thus revealing a clearer vision of common problems. The papers will be published as one of the symposium publications of the association.

The address of the chairman of the section, C. J. Wiggers, was first on the program of the Wednesday morning session and was entitled "Pathways of Medical Progress." "On occasions such as this we gather together from laboratories and hospitals as disciples of scientific medicine. We assemble, primarily, for the purposes of exchanging views on problems which seem to have crystallized for each of us individually. Current reviews thus prepared by thoughtful minds and representing diverse perspectives afford those engaged in other fields an opportunity to keep in touch with the trends of contemporaneous research in specialized fields. . . . The spirit of correlation which is involved in all these plans of advance is a silent force which grows not only through mutual interest in each other's problems but also through frank respectful criticism of each other's trends. With such a spirit of correlated effort science marches on."

On Thursday afternoon, at the beginning of the session, the Theobald Smith Award in Medicine, consisting of an appropriate bronze medal and a check for a thousand dollars, was presented by Dr. Walter B. Cannon, president of the association, to Albert B. Sabin, formerly of the Rockefeller Institute for Medical Research. In an address which followed Dr. Sabin presented his findings on constitutional barriers to involvement of the nervous system by certain viruses.

The Subsection on Dentistry (Paul C. Kitchin, *secretary*) held two sessions before which 18 important papers were presented. The first session was devoted mainly to a series of papers dealing with the relation between fluorine, tooth decay and the acid-producing bacteria inhabiting the mouth. Experiments both at the University of Rochester School of Medicine and Dentistry and at the Zoller Memorial Dental Clinic, in Chicago, indicated beneficial effects of fluorine in the diet of rats. The reports, however, were on investigations into the fundamental role played by fluorine and still lack much of providing a basis for clinical procedure. At the same session a paper was presented on the use of alkyl dimethyl benzyl ammonium chloride as an inhibitor of acid formation by mouth bacteria. The second session was a symposium on "Definite Oral Manifestations of Systemic Disease." The first paper was a review of the literature by Edward H. Hatton. Three papers were illustrated by motion pictures depicting mouth conditions in a number of systemic diseases, including pemphigus, acromegalia, fat and skin tumors. Another group of papers was on the effects of dietary deficiencies. Still others were on aspects of syphilis in the mouth, giant cell tumors of the mouth, disturbances in the membrane lining of the mouth accompanying the menstrual cycle and treatment with estrogenic hormones, and the mouths of diabetic children in Vienna. Registration, 61. Officers of the subsection were elected as follows: *Chairman,* J. L. T. Appleton; *secretary,* Paul C. Kitchin.

The Subsection on Pharmacy (B. V. Christensen and Glenn L. Jenkins, reporting) held two sessions before which 10 papers were presented. Justin L. Powers reported on the chemistry of the Viburnums and James C. Munch on their uterine sedative action. Glenn L. Jenkins discussed the preparation, toxicity

and antiseptic value of methenamine mandelate, and B. V. Christensen and J. W. Nelson the bioassay of aconite, concluding that aconitine is the principal analgesic constituent of aconite. Leonard J. Piccoli discussed the use of oral vaccine for preventing the common cold. Other papers were read by R. L. Murray, Carl J. Klemme and Lee F. Worrell, C. M. Brown, Leroy D. Edwards and Richard A. Deno.

SECTION ON AGRICULTURE (O) AND ASSOCIATED SOCIETIES

(From reports by M. F. Morgan, Henry E. Clepper, H. B. Tukey and William H. Martin)

The section (M. F. Morgan, *secretary*) held a joint session with the Society of American Foresters and the American Society for Horticultural Science at which R. M. Salter, retiring vice-president for the section, delivered an address on "Some Soil Factors Affecting Tree Growth." At the same session papers were presented on related subjects by A. E. Murneek, Hardy Shirley, Damon Boynton and Ralph Lorenz. Attendance, about 100.

The Society of American Foresters (Henry E. Clepper, *executive secretary*) held two sessions, at which 14 papers were presented, in addition to a joint session with the American Phytopathological Society, at which 9 papers were presented, and a joint session with Section O. The society held a dinner, with C. F. Korstian presiding, which was attended by 80 members and guests. After the dinner Walter Lowdermilk delivered an illustrated address on soil conservation practices, ancient and modern, in Asia Minor and northern Africa.

The meetings of the American Society for Horticultural Science (H. B. Tukey, *secretary*) were held in 23 sessions, in addition to an evening devoted to a banquet and the presidential address. The program of the society contained a total of 310 papers, 5 of which constituted a symposium on "The Effect of Temperature on Absorption, Growth and Reproduction of Plants." Attendance, about 375, exclusive of visitors from other societies at joint sessions.

Some conception of the trend of research in horticulture may be gathered from the subject-matter groups into which the program was divided, indicating a gradual broadening interest and away from the trend toward specialization on physiological problems which seemed in progress a few years ago. There were sessions on nutrition and physiology of fruit trees, breeding horticultural plants, methods of horticultural research, rootstocks and propagation, small fruits, storage, processing and utilization of horticultural products, culture of the tomato, soils and fertilizers for vegetable crops, culture of the potato and soils and fertilizers for ornamental plants. In addition there were round table discussions on present-day research as applied to the economics of the fruit industry, educational methods, nomenclature and varieties, vegetable varieties and extension problems. The trend is towards treatment of new horticultural crops, such as the papaya, the macedemia, coffee, pecans, almonds, the tung tree, the pineapple and various flowers and ornamentals. There is also a new emphasis on research in processing, handling and storing horticultural plant products.

The broad interest of horticultural research and the position it holds in reaching into various allied fields is shown by the several joint sessions, namely, one with the Potato Association of America, one with the American Phytopathological Society, one with the Botanical Society of America and the American Society of Plant Physiology, and one with the Society of American Foresters.

Outstanding contributions dealt with preventing the pre-harvest drop of apples, the effect of synthetic growth substances upon rooting and development of various horticultural plants, adaptability of fruit trees to soils of various moisture levels through the use of different rootstocks, the place of carbon dioxide in lengthening the storage life of fruits, the use of wax in preventing drying out of fruits and vegetables, potash deficiency studies of fruit trees, starters for transplanting tomato plants and materials to aid in the shipment of transplanted southern plants, photosynthesis as effected by temperature spraying and soil moisture, quality in potatoes and other horticultural products, and fertilizers, artificial light and irrigation practices in the greenhouse.

The new officers of the society are: *President,* L. H. MacDaniels; *vice-president,* F. C. Bradford; *secretary-treasurer,* H. B. Tukey; *sectional chairmen,* E. S. Haber, W. W. Aldrich and G. H. Poesch. The society has voted to join in the summer meeting of the A. A. A. S. at Seattle in June.

The Potato Association of America (William H. Martin, *secretary-treasurer*) held its 26th annual meeting in four sessions, before which 42 papers were presented. There were joint sessions, one with the American Society for Horticultural Science and another with the American Phytopathological Society. The feature of the latter session was the presentation and discussion of a report by the committee to coordinate research on new and unusual potato diseases which brought out the rapid spread and economic importance of bacterial ring rot.

Officers were elected as follows: *President,* C. H. Metzger; *vice-president,* F. M. Blodgett; *secretary-treasurer,* William H. Martin; *executive committee,* Ora Smith, L. M. Ware, R. A. Jehle and A. H. Eddins.

The annual meeting of the Board of Governors of the Crop Protection Institute (Paul Moore, *secretary*) was held in Columbus under the chairmanship of W.

C. O'Kane, who reported that the institute had an income from gifts during the year of over $35,000 and expenditures of a little more than $33,000. During the past year the institute gave much attention to explorations of new organic insecticides, fungicides and fumigants, while carrying on its studies of insecticidal properties of various nitro compounds, the fungicidal activities of cuprous oxide and research in organic stomach poisons and repellants. A very thorough survey was made of the present status of soilless culture of plants.

SECTION ON EDUCATION (Q) AND AMERICAN FEDERATION OF TEACHERS

The Section on Education (no report received) held seven sessions for the presentation of papers and a joint dinner with the Section on Psychology. The program included 43 papers in addition to a round table discussion of problems in conservation education.

On the first morning the program consisted of 2 sessions, the first under the chairmanship of M. R. Trabue and the second under the chairmanship of A. S. Barr. In the afternoon the section met for the presentation of 7 papers, mostly on student guidance. At the joint dinner with the Section on Psychology J. F. Dashiell, retiring vice-president for the Section on Psychology, delivered an address on "A Neglected Fourth Dimension to Psychological Research." This address was followed by a discussion by G. D. Stoddard of the address of Dr. Dashiell. The next session of the section met under the chairmanship of T. R. McConnell for the presentation of papers, partly on abilities of students and partly on methods of instruction in special subjects. Simultaneously, another section met under the chairmanship of H. L. Smith for the presentation of papers referring mainly to teacher problems.

On the afternoon of the second day the entire section met, with H. H. Remmers as chairman, for the presentation of a series of papers referring mainly to testing of students. The final program of the section was held under the chairmanship of O. E. Fink and consisted of a round table discussion by O. E. Fink, F. B. Knight, H. H. Remmers and Paul Sears.

The American Federation of Teachers held a breakfast followed by a panel discussion on subjects of interest to teachers of science.

VARIOUS SCIENTIFIC ORGANIZATIONS

(From reports by Edward Ellery, Deborah M. Russell, Lawrence R. Guild, R. H. Davidson, Leroy Allen, Anselm M. Keefe and Paul Moore)

The Society of the Sigma Xi (Edward Ellery, *secretary*) chose as its speaker for its annual program at the meeting of the association Kirtley F. Mather, who delivered an address on "The Future of Man as an Inhabitant of the Earth," preceded by a dinner at which officers of the association were guests. The following officers of the society were elected: *President,* Edward Ellery; *secretary,* George A. Baitsell; *treasurer,* George B. Pegram; *member of executive committee,* Harvey E. Jordan; *members of alumni committee,* John C. Parker (5 years), C. E. Davies (1 year).

United Chapters of Phi Beta Kappa (no report received) chose as its speaker for the fifth of the annual lectures it sponsors at meetings of the association Dean Marjorie Hope Nicolson, professor of English in Smith College. Dr. Nicolson delivered a brilliant address on "Science and Literature" at a general session of the association at which Royall H. Snow, president of The Ohio State University Chapter, presided.

The American Nature Study Society (Nellie F. Matlock, *secretary*) met in two joint sessions with the American Science Teachers Association, and followed with its own program of 4 sessions at which 21 papers were presented. The program included not only discussions of the value of nature study in the classroom, in writing, in children's museums and as a leisure-time activity, but also demonstrations by students. One of the society's scholarship students presented an interesting paper on his summer experiences and proposed a research problem. A transcription of children's imitations of bird songs was an interesting feature.

The American Science Teachers Association (Deborah M. Russell, *secretary*) held two sessions, at which six papers were presented, and a luncheon, under the chairmanship of W. L. Eikenberry, at which Walter B. Cannon, president of the association, delivered an address on "The Role of Chance in Discovery." Members of the executive committee of the association were guests of the society at its luncheon.

The Honor Society of Phi Kappa Phi (Lawrence R. Guild, *secretary*) has held biennial business meetings at times of the annual meetings of the association. At Columbus it launched a new undertaking by providing as a general program an address by President Isaiah Bowman on "Who is Responsible for Peace?" This lecture was appreciatively received by the 400 persons who attended it.

The eleventh annual session of the Catholic Round Table of Science (Anselm M. Keefe, *secretary*) was held, as usual, in conjunction with the meetings of the association. There were 85 persons in attendance, representing 43 Catholic universities, colleges and research institutions. The three-hour discussion which followed the luncheon centered around the announced topic, "Building a Research Program." Hugh S. Taylor, professor of chemistry at Princeton University and Pontifical Academician, presided. The Catholic University of Fribourg in Switzerland was represented by Gilbert A. Raum, O.S.B., who brought word of an approaching census of Catholic scientists throughout the world under Vatican auspices with a view to more extensive inter-cooperation on a world-wide basis.

Gamma Alpha Scientific Fraternity, Sigma Delta Epsilon, graduate women's scientific fraternity, and Pi Gamma Mu, national social science society, held business meetings and luncheons at which officers of the association were guests. At the luncheon of Pi Gamma Mu (Leroy Allen, *secretary*), welcome was extended to visitors by S. S. Wyer, of Columbus, a few remarks were made by Charles J. Bushnell, an explanation of social science ideals was given by S. Howard Patterson, president of the society, and a principal address was delivered by Wesley C. Mitchell, retiring president of the association. Dr. Mitchell was awarded the honor key of the society "for distinguished service in social science."

THE ANNUAL SCIENCE EXHIBITION

The Annual Science Exhibition at Columbus was, from the point of view of the exhibitors, one of the most successful ever held in connection with association meetings. Not only were the commercial exhibitors on the whole pleased by the numerous contacts provided, but the science exhibitors also were gratified for the opportunities offered to explain and discuss their research projects on display. The space in the Columbus Civic Auditorium occupied by the exhibits, the science library, the registration desks and the lounge were in every way satisfactory. A room adjacent to the lounge was used for a program of scientific motion pictures. This program, with pictures being exhibited almost continually, was one of the important attractions of the exhibition.

There were 50 exhibits, organized under the direction of Mr. Owen Cattell, of which 2 were by individuals, 21 by scientific institutions and organizations, 9 by publishers, and 18 by manufacturers of scientific materials and equipments. The scientists who exhibited research subjects were: Dr. Charles T. Knipp, University of Illinois; Professor B. J. Luyet, St. Louis University. The scientific institutions and organizations which presented exhibits were: *Biological Abstracts;* Boyce Thompson Institute for Plant Research; Carnegie Institution of Washington, Department of Genetics; Duquesne University Biological Laboratories; Institutum Divi Thomae, Cincinnati; Guthrie Clinic of the Robert Packer Hospital, Sayre, Pa.; National Geographic Society; The Ohio State University, including the Industrial Research Foundation, the Departments of Physics and Electrical Engineering and the Engineering Experiment Station; Society for Research on Meteorites; Vassar College, Department of Botany; U. S. Bureau of Plant Industry; U. S. Geological Survey; Virginia Agricultural Experiment Station, cooperating with Duke University and the North Carolina Department of Agriculture; special exhibits on Astronomy (a) on the Pacific Coast, (b) in Ohio and (c) in the eastern United States; an exhibit on experimental phonetics in the same booth with *Chemical Abstracts*; an exhibit on plant pathology (Drs. F. A. Wolf, E. C. Stakman and C. W. Ellett); American Association for the Advancement of Science. The publishers having exhibits were: Blakiston Company, Philadelphia; McGraw-Hill Book Company, New York; Macmillan Company, New York; Prentice-Hall, Inc., New York; W. B. Saunders Company, Philadelphia; Science Press Printing Company, Lancaster, Pa.; University Presses (a cooperative exhibit by the following university presses: California, Chicago, Collegiate of Iowa State College, Columbia, Cornell, Duke, Harvard, Minnesota, North Carolina, Oklahoma, Oxford, Princeton, Stanford and Yale); John Wiley and Sons, Inc., New York; and Williams and Wilkins Company, Baltimore. The commercial exhibitors were: Bakelite Corporation; Bausch and Lomb Optical Company; Fred S. Carver; Central Scientific Company; Chicago Apparatus Company; Clay-Adams Company; Coleman and Bell Company; Commercial Solvents Corporation; Denoyer-Geppert Company; Eastman Kodak Company; Ford Motor Company; Gradwohl Laboratories; Graf-Apsco Company; Leeds and Northrup Company; Merck and Company, Inc.; Spencer Lens Company; W. M. Welch Scientific Company; and Wilkens-Anderson Company.

REPORT OF THE COMMITTEE ON GRANTS

Upon recommendation of the Committee on Grants, consisting of Drs. A. F. Woods, *chairman,* Vincent du Vigneaud, T. R. Hogness, Dayton C. Miller, G. H. Parker, A. T. Poffenberger, Joel Stebbins and Sam F. Trelease, the council of the association awarded grants-in-aid amounting to $2,191.09 as follows:

Alexander A. Abramowitz, for a study on the purification of the crustacean eye-stalk hormones, $200.

Leslie Lyle Campbell, for a study on the determination of the several effects in metal crystals, $350.

T. T. Chen, for a study of the cytology of paramecium in relation to physiology and genetics, $200.

William G. Clark, for a study on the adrenal cortex as related to electrolyte balance through control of membrane function, $200.

Newell S. Gingrich, for an experimental study of the diffraction of x-rays by liquids and by gases at high pressure, $100.

Karl C. Hamner, for a study of the analysis of the interrelationships and relative effectiveness of the photoperiod and the dark period as factors in causing the photoperiodic response in plants, $500.

William A. Hunt, for a study of the nature of judgment, particularly the value judgment, $100.

Daniel Luzon Morris, for the continuation of an investigation of the specific effects of tissue extracts on the crystallization patterns of cupric chloride, $110.82.

Felix Saunders, for a study of the isolation of an investigation of the enzyme systems of the dysentery bacillus, $130.27.

Edwin C. White, for a study of the anti-bacterial activity of filtrates from cultures of certain micro-organisms, $300.