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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE JOINT MEETING AT ROCHESTER AND ITHACA

Edited by Dr. HENRY B. WARD
PERMANENT SECRETARY

INTRODUCTION

THE ninety-eighth meeting of the association, which opened at Rochester, N. Y., on June 16, was the second to be held in that city. In 1892 this city was host to the forty-first meeting. For that year Professor Joseph LeConte was president of the association and presided at the public sessions. Among the vice-presidents, who also served as chairmen of the eight then established sections, were in geology Professor H. S. Williams, of Cornell, the leader among the founders of Sigma Xi, and in biology Professor S. H. Gage, under whose chairmanship at that meeting the section was divided into the present sections on botany and zoology. The local secretary of that first Rochester meeting was Professor H. L. Fairchild, of the University of Rochester, who served for many years as a member of the executive committee and was always active in the work of the association. For the recent meeting he was honored with the appointment as honorary chairman of the local committee.

This recent second Rochester meeting was the eighteenth to be held in cities of the Empire State. The association held its sixth meeting in Albany in 1851 and also its tenth in 1856 in the same city. Buffalo sponsored the fifteenth meeting in 1866, the twenty-fifth in 1876, the thirty-fifth in 1886 and the forty-fifth in 1896. The nineteenth meeting was held in Troy in 1870, the twenty-eighth in Saratoga in

1879, the forty-third in Brooklyn in 1894, the fifty-sixth in Ithaca in 1906 and the ninetieth in Syracuse in 1932. The first meeting in New York City was the thirty-sixth, held in 1887; the association returned there for the forty-ninth meeting in 1900, for the fifty-seventh in 1907, for the sixty-ninth in 1916, and for the eighty-fifth in 1929.

At the first Rochester meeting the University of Rochester was host to the visiting scientists and the association found the atmosphere and facilities primarily responsible for a meeting which was reported as "notably successful." On this recent occasion the association was equally fortunate. Most of the meetings were held on the new River Campus of the university. This beautiful site on the bank of the Genesee River, readily accessible from hotel headquarters in the center of the city, furnished ample facilities for all sessions in a fine series of modern, well-equipped buildings admirably adapted for scientific meetings. The sessions in medicine, dentistry, pharmacy and associated societies were held in similar modern buildings of the School of Medicine and Dentistry only a short distance from the academic quadrangle. Members were grateful for the attractive environment, the ease of movement from session to session, the frequent personal contacts with colleagues in all lines of work and the facilities so conveniently provided for all functions.

REGISTRATION AT THE ROCHESTER MEETING

The total number of persons who signed registration cards was 514. This gives an inadequate picture of the number that participated in the work of sections and cooperating societies. A rough estimate, made from data derived from various sources, indicated that at least a thousand all told attended the sessions on the two campuses and the total number may have been considerably larger than that figure. Those who signed registration cards reported residences as follows:

From the United States: New York, 298 (of whom 115 were from Rochester); District of Columbia, 38; Pennsylvania, 31; Massachusetts, 21; Ohio, 15; Illinois, 14; Maryland, 13; New Jersey, 12; Michigan, 8; Connecticut, 6; New Hampshire and Virginia, 5 each; California and Missouri, 4 each; Minnesota, 3; Indiana, Louisiana, South Carolina and Texas, 2 each; Iowa, Maine, Nebraska, North Carolina, North and South Dakota, Vermont, West Virginia and Wisconsin one each, as also Puerto Rico and the Philippine Islands.

Canada was well represented, with 14 from Ontario, 2 from Quebec and one each from Alberta and British Columbia.

It is interesting to compare in general the programs of the first Rochester meeting with those which were given this time. The report of the first Rochester meeting was printed as a volume of the then annually issued *Transactions*. Including the vice-presidential addresses, which at that period were given at the summer meeting, the series made a volume of some 400 pages and included a total of 208 papers as listed, but most of these were printed by title or in abstract.

The program of the present meeting lists a few more papers, but the number, about 230, is not relatively as large, since the number of sections is greater and the associated societies contributed this year, whereas this feature was not found in the record of 1892. The most striking difference in the plans of the two meetings consists in the emphasis laid at this meeting on demonstrations and field work. All the interests included in the broad field of natural history devoted half of the time or more to trips that were definitely programmed for the study of specific natural features. Further, it was evident that most organizations had reduced their programs to fewer items, giving opportunity for discussion, and many had limited the programs to definite topics or to invited papers. For some time the suggestion has been made that some such modifications in the program of the summer meeting were likely to increase the value of the occasion and give members desirable opportunities not available at winter meetings. The plan was tried out this summer on a larger scale than at any previous meeting. Such comments as were heard were favorable to continuation and further development of the plan.

The different sessions were well attended and the programs aroused much interest even where the numbers present were not large. The majority of the sections were manned by temporary secretaries, most of whom were members of the faculty of the University of Rochester. The success of the programs was due to the good work done by these officers, whose activities were the subject of frequent favorable comment. Many visitors spoke of the convenience of arrangements made for the meetings and the perfection of details evidenced by freedom from confusion, readiness with which meeting places were found and fitness of rooms and equipment for the purposes designated.

GENERAL SESSIONS

The evening general sessions were held in the Eastman Theater, a most attractive audience room and splendidly equipped for the purpose of both speaker and audience. At the first session on Tuesday evening Dr. Edwin G. Conklin, president of the association, presided. In his opening address he paid a high tribute to the honorary chairman of the local committee, Professor H. L. Fairchild, who was prevented by illness from attending the session in person. He spoke of Professor Fairchild's distinguished career at the University of Rochester, of his scientific work and

his connection with various scientific organizations, and dwelt at length on his services for the American Association and the recognition accorded him by the association. Dr. Conklin also referred to the contributions of the late George Eastman to the advancement of science and education.

As the speaker of the evening, President Conklin introduced Dr. C. E. K. Mees, research director of the Eastman Kodak Company, who spoke on the subject of "Color Photography." He followed step by step the efforts of investigators to develop methods for securing pictures of objects in natural colors from the earliest work of Clerk Maxwell in 1861 to the most recent of the present year. The various stages in the record were demonstrated vividly with diagrams, slides, dyes and moving pictures. The large audience appreciated highly this complete and lucid presentation of an interesting but complex technical subject.

The Wednesday evening general session was devoted to the Hector Maiben Lecture, which was established some years ago from the bequest given the association by one of its friends and donors. Charles Camsell, Deputy Minister of Mines of the Dominion of Canada, who had accepted the invitation to deliver the address for 1936, is well known as president and founder of the Canadian Geographical Society and past president of the Royal Society of Canada. The president of the association, Dr. Conklin, presided and introduced Dr. Camsell. The title of the address was "A Four-Thousand Mile Flight over Northwestern Canada in August, 1935." It was illustrated by an extensive series of photographs illustrating a region previously entirely unknown. The survey of the territory was made exclusively by airplane and demonstrated the definite termination of the Rocky Mountain system at the Laird River and also the origin of the McKenzie Mountains, starting west of the river and extending northward for some 600 miles. This region, which is the most difficult of access in the entire Dominion of Canada, is the seat of trappers' legends involving the so-called "tropical valley." These explorations show the existence in that area of hot springs but completely disprove the legends associated therewith. Because of its inaccessibility this will be probably the last portion of the continent to be mapped.

At the close of the Maiben Lecture the officers and members of the association and invited guests were tendered a reception in the Eastman School of Music adjoining the auditorium. President Alan Valentine and the trustees of the University of Rochester, with other distinguished citizens, welcomed the guests. The spacious hall was attractively decorated and refreshments were provided. Members of the association enjoyed greatly the privilege accorded them of personal contact with the members of the university and the citizens of Rochester.

The Thursday evening general session was provided by the Section on Social and Economic Sciences. Dr. Edwin B. Wilson, of Harvard University, was the presiding officer. The speaker was Dr. Carl Snyder, who has been for many years statistician of the Federal Reserve Bank of New York and is past president of the American Statistical Association. Last year Dr. Snyder was retiring vice-president of the Section on Social and Economic Sciences of the association. Because of illness he was unable to attend the St. Louis meeting and was invited to present the vice-presidential address at this time. He spoke on the same subject, namely, "The Rôle of Capitalism in Civilization," a topic of great public interest at the present time. In introducing Dr. Snyder the presiding officer outlined some of the relations of the present world situation to those existing in this country and some of the problems that face scientific investigators in the economic field. The audience followed Dr. Snyder's presentation with close attention and evident interest.

SPECIAL EVENTS

Several items on the Rochester program were of such significance as to deserve special mention because of their general interest and historic importance. On Wednesday the Section on Geology arranged to commemorate the one hundredth anniversary of the establishment of the New York State Geological Survey. This event is unquestionably of particular interest to the association for two reasons. In the first place, the origin of the association is directly traceable to the activity and interest of the earlier Association of American Geologists, and in the second place the organization of that association was due to the efforts of Dr. Ebenezer Emmons and other leaders in the city of Albany among the New York State geologists. This relation is commemorated by a tablet placed upon the old Emmons house in Albany, and the occasion which led to its dedication is more fully described in the *Transactions* of the association (Vol. 50, pp. 392–394).

The second affair of especial historical importance in connection with the Rochester meeting was the Theobald Smith memorial session. This tribute to an outstanding American investigator of the transmission and prevention of disease was sponsored by the Section on Medical Sciences, which met in joint session with the Central New York State Branch of American Bacteriologists. The occasion was on Thursday morning, with Dr. Edwin G. Conklin, president of the association, in the chair. The meeting was held in the School of Medicine and Dentistry, and attention was called to the fact that ten years ago the coming fall Dr. Smith participated in the conference which

marked the dedication of that school and spoke in the same room in which the meeting was held on the topic, "Immunity, Natural and Acquired as Illustrated by Experiment with *B. coli* and its Mutants." After brief introductory remarks, Dr. Conklin introduced Dr. Simon Henry Gage, of Cornell University, who gave the memorial address on "Theobald Smith: Investigator and Man." Dr. Conklin called attention to the fact that Dr. Smith worked as a student and teacher and published his first paper under the direction of Dr. Gage. The address by Dr. Gage was enriched with personal anecdotes of the work and character of Theobald Smith. It will be published soon in full and constitutes an important contribution to the story of the life of a great American scientific investigator.

The presentation of the 250,000th Bausch and Lomb microscope, which took place at a complimentary luncheon tendered to the association on Thursday noon, was the outstanding event of the Rochester meeting. At the St. Louis meeting the Bausch and Lomb Optical Company communicated to the executive committee and council of the association its desire to recognize in significant fashion the record of its extended work in the production of optical instruments for scientific purposes. It proposed to present this microscope to some scientific investigator to be selected by a committee appointed by the association in recognition of his outstanding contributions to the welfare of mankind through research of fundamental significance in which the microscope was an essential tool. After due consideration the council of the association approved the appointment of such committee and the selecting of an appropriate person to be the recipient of this award. The committee selected Dr. Frederick George Novy, of the University of Michigan, recognized for his important researches on the chemistry of bacteria, on filterable viruses, on the isolation of the bacteria causing gas gangrene and on American relapsing fever.

The luncheon was attended by some 600 visiting members of the association. At the speakers' table sat the officers of the association and of the Bausch and Lomb Optical Company, together with the president of the university, the chairman of the local committee and representive business leaders of Rochester. The presentation was made by Mr. Edward Bausch. In accepting the honor Dr. Novy reviewed the history of science with particular regard to the workers who contributed to the development of the microscope and its use in fields of especial service to human welfare.

Another event of general character was the annual symposium, sponsored by the Ecological Society of America, and rapidly coming to be an item of major importance at the summer meeting as is the symposium at the winter meeting which has been for many years arranged by the American Society of Naturalists. For the symposium at Rochester was selected the topic of "The Scientific Aspects of Flood Control," a subject of great natural significance on which attention had been focussed by disasters of unusual magnitude that earlier in the year had visited certain regions in the country. Dr. W. S. Cooper, president of the Ecological Society, was responsible for the plan of the symposium and for the considerable work involved in securing speakers of national reputation to present different aspects of the problem. Unfortunately a violent storm, which broke before the hour of the session and lasted for some hours, interfered seriously with the assembling of an audience. Despite this difficulty, a fair audience heard the speakers present the phases of the subject outlined by Dr. Cooper in the report given later in this article. Arrangements have been made to publish together the addresses given at the symposium as one of the *Occasional Papers* issued for the association by The Science Press.

INDUSTRIAL TRIPS AND EXHIBITS

For many years Rochester has been the seat of manufacturing interests of marked importance in scientific teaching and research. These same establishments opened their plants to the visits of those taking part in the first Rochester meeting and furnished then as now an outstanding feature of interest. Special visits to various plants were arranged by sections and societies in connection with particular programs and demonstrations or exhibits provided to illustrate improvements in method or new lines of research in different fields. These served to enrich many programs and were highly appreciated by participants. General inspection trips were also organized and guide service provided for all interested in the plants or in particular phases of their work. These privileges were highly appreciated by the large number of members and friends who took the opportunity to become familiar at first hand with what had been known to them previously by repute only. It is safe to say that no equal opportunities have been extended to the association at any recent meeting. Among the firms which extended these courtesies were the Bausch and Lomb Optical Company, the Delco Appliance Corporation, the Eastman Kodak Company, the Gleason Works, the Taylor Instrument Companies, Ward's Natural Science Establishment and the Will Corporation.

RADIO PROGRAMS

Two types of broadcasts composed the radio program of the Rochester meetings. Immediately preceding the opening dates, the local stations of both the National Broadcasting Company and the Columbia Broadcasting Company gave the Rochester local committee time on the air for announcements of the

various activities. Then during the meetings, station WHAM provided time assignments for four broadcasts. These were the opening address on "Sensational Science," by President E. G. Conklin, of Princeton University; the address on "Microscopes and Medicine," by Dr. E. B. McKinley, of the George Washington University Medical School; a group discussion on "How Science Teaching is Aided by Radio Lessons," by Otis W. Caldwell, general secretary of the association, H. A. Carpenter, specialist in sciences in the Rochester schools, three pupils from the Rochester schools and one from the schools of Washington, D. C.; and the final broadcast on "Some Significant Features of the Week's Program," by Otis W. Caldwell and Watson Davis, director of Science Service.

BUSINESS SESSIONS

The executive committee met in Rochester on Monday afternoon and evening in advance of the opening of the meeting and also several times later in the week. Various matters of immediate importance for the handling of the sessions were considered. The following represent items of general business which were acted upon. Only one session of the council was held during the three days of the meeting. At that time matters referred by the executive committee were discussed and acted upon or entered for record.

As noted in the last published minutes of the executive committee the question of future meetings of the association was made a special item of business and evidence on the questions under consideration was submitted and action taken at Rochester. The council approved the recommendation to hold the winter meeting of December, 1938, in Richmond, Virginia, and reaffirmed action previously taken to the effect that the summer meeting of 1940 be held on the Pacific Coast jointly with the Pacific Division and at a place to be selected by that division. In accordance with the general plan of action decided upon some years ago the council approved the plan for holding the meeting of December, 1940, in New York City and the meeting of December, 1944, in Chicago. In connection with the general program of future meetings the council approved a proposal to discuss with the divisions and the various affiliated societies the feasibility of a proposal to hold a meeting in Mexico City.

Proposals previously favorably mentioned as desirable places for meetings were further considered and the council approved the acceptance tentatively, subject to the completion of suitable arrangements, of invitations for meetings at the following points:

1939	Summer meeting	Milwaukee, Wisconsin
1939	Winter meeting	Columbus, Ohio
1941	Winter meeting	Washington, D. C.
1942	Winter meeting	Dallas, Texas
1943	Winter meeting	Philadelphia, Pennsylvania

This announcement of the tentative program was made at the suggestion of various affiliated societies in order to facilitate the work of such societies in providing for joining with the association at certain times and places.

At the Minneapolis meeting in June, 1935, the council approved the recommendations of the executive committee establishing the Theobald Smith award in medical sciences and setting the conditions under which such award might be granted. Dr. Karl T. Compton, retiring president of the association and chairman of the committee on the award, reported the unanimous verdict of the committee that in view of the few nominations made for the current year the committee recommended that no award be made and further that steps be taken to give more extended notice concerning the matter so that the first award may be made in accordance with the rules at the Denver meeting in June, 1937.

Attention had been called to the fact that the change in the constitution made at the Pittsburgh meeting contradicted a section in the by-laws; consequently the council voted to strike out the last sentence from Article X, Section 1 of the by-laws.

On recommendation of the executive committee the council unanimously voted to elect Dr. A. V. Hill, of the University of London, as a fellow of the association.

The council voted that in the election of members of foreign scientific societies which are in the same class as the association and its affiliated societies the admission fee be remitted in accordance with the plan followed in the case of similar American organizations.

The president of the association made an informal report to the council on the participation of Philadelphia in the Atlantic City meeting next December. It is expected that one day of the meeting will be devoted to Philadelphia and that special provision will be made for the entertainment of delegates on that occasion. The detailed program of events will be announced in the early fall.

A proposal from the American Society of Naturalists was presented by the executive committee and after discussion a resolution put on record in the following form:

INASMUCH AS the Pan-American Institute of Geography and History has undertaken to study and promote the protection of those natural areas in the Americas which represent unique present and future scientific, economic, intellectual or spiritual values and

INASMUCH AS a committee has been appointed by the Pan-American Institute to establish and maintain contacts with the various governments in the Americas which through their representatives have approved the resolution, be it

Resolved, that the American Association for the Advancement of Science hereby records its approval of this plan and pledges its support in all feasible ways to the achievement of this purpose.

Before the adjournment of the Rochester meeting the permanent secretary was instructed to enter on the records of the association the following resolution and to communicate its contents to those concerned.

RESOLUTION OF THANKS

The American Association for the Advancement of Science desires to put on record its deep appreciation of the many courtesies extended and services rendered in connection with the Rochester meeting. To these effective aids was due the success of the meeting so clearly recognized by all who participated in the event.

First of all it is appropriate to record the indebtedness of the association to the University of Rochester, which not only placed at our disposal a most attractive and well-equipped series of buildings and meeting rooms for the various sections and societies, but also provided for the manifold needs and the comfort of visiting scientists. To the Trustees of the University and to President Alan Valentine the Association owes particular thanks for the reception tendered the officers and members after the Maiben lecture.

The especial privileges which were extended to the association by scientific and industrial interests in Rochester were highly appreciated. To the Bausch and Lomb Optical Company, the Eastman Kodak Company, Ward's Natural Science Establishment, the Taylor Instrument Companies, and other industrial organizations which opened their research plants, arranged for special exhibits, and otherwise contributed to the interest and value of the meetings, the association wishes to express formally its appreciation for these courtesies.

Finally it is fitting to give expression of the indebtedness to the membership of the local committee, which under the chairmanship of Professor J. Edward Hoffmeister worked long and laboriously to perfect the detailed arrangements that contributed in essential fashion to the conduct of the meetings. To the services of this committee the officers and members of the association wish to extend grateful and appreciative recognition.

SIGMA XI SEMI-CENTENNIAL

The celebration of the completion of fifty years of the history of Sigma Xi, the society for the promotion of research in science, had been arranged as the closing section of the joint summer meeting of 1936. Relations between the two organizations had always been intimate and in a real sense the younger was a natural outgrowth of the movement which some fifty years earlier had led the scientific workers of the country to engage in a united and organized effort for the advancement of science. The leader in the new movement was one of the prominent workers in the association and so were the large majority of those who have served as the officers and builders of Sigma Xi during the first fifty years. It is significant that the names on the roster of those who were guiding the destinies of Sigma Xi locally and nationally were also listed prominently among the workers in the association.

The sessions in Rochester closed informally with the general session on Thursday evening, and on Friday morning members and visitors were registering in groups for the Sigma Xi celebration at Ithaca. At the first formal session the greetings and congratulations of the association were extended to Sigma Xi in a felicitous address by President Conklin. This, together with some other addresses given on that occasion, has already been printed in SCIENCE (June 26, 1936). From the start to finish the Semi-centennial program was impressive and inspiring. The beautiful setting given by the campus and buildings of Cornell University, the perfect arrangements provided by the membership of the Alpha Chapter, the delightful opportunities for personal contact afforded delegates and visitors and the large attendance which enjoyed these privileges made the occasion one long to be remembered and a worthy recognition of a half century marked by significant growth of Sigma Xi in size and influence. The exhibit of research demonstrations showing work in 25 different lines by graduate students at Ithaca during the past year furnished striking evidence of the activity of the Alpha Chapter at Cornell and of its devotion to the purpose of the organization. As the closing event on the program was dedicated an artistic monument on the Cornell campus in front of Sibley Hall, prominently associated with the founders of Sigma Xi and their work. It bears a tablet with this inscription:

THE SOCIETY OF THE SIGMA XI
DEVOTED TO RESEARCH IN SCIENCE
HAS PLACED THIS TABLET HERE
ON ITS FIFTIETH ANNIVERSARY
TO COMMEMORATE THE FOUNDING
AT CORNELL UNIVERSITY
1886 1936

SCIENTIFIC SESSIONS

SECTION ON MATHEMATICS (A)

(*Report from A. S. Gale*)

The Section on Mathematics held two meetings. On Thursday morning two addresses of wide interest were presented by invitation. C. J. Keyser spoke on "The Rôle of Infinity in the Cosmology of Epicurus," and W. A. Hurwitz considered the topic "Mathematics —a Science and a Fine Art." Sixty-five members of the association and guests were present and C. W. Watkeys presided. On Thursday afternoon the session was devoted to more specific questions. By

invitation T. R. Hollcroft spoke on "Curves on Algebraic Surfaces," and R. B. Agnew on "Convergence in Mean." H. M. Gehman presided; the attendance was thirty-five.

SECTION ON PHYSICS (B)

(Reports from T. R. Wilkins and C. F. Brooks)

The program arranged for the Section on Physics included three symposia of invited papers on problems of current interest to physicists and geologists, recent developments in weather forecasting, and the biological effects of radiation. The first of these was a joint meeting with the Section on Geology and Geography, in which, after a general survey of current problems in radioactivity and geology by R. D. Evans, specialized reviews of recent advances in particular fields and techniques were given. L. B. Slichter presented a survey of problems associated with the earth's internal heat, pointing out that there seems to be ample energy in radioactive disintegration to cause such major disturbances as volcanoes, earthquakes and continental drifts. W. H. Bradley showed how it was possible to use the study of non-glacial varves in the measurement of geologic time. John P. Marble reviewed recent progress in the lead method of measuring geologic time, reporting on his own analyses and calling attention to the desirability of more extended work in micro-analysis and the spectrographic study of the isotopes of lead which is being made by J. L. Rose. The dating of the various divisions of geologic time by the helium method was outlined by W. D. Urry. Finally the influence of actinouranium on age determinations and its possible application to the study of the age of the solar system was discussed by T. R. Wilkins and W. M. Rayton. In these papers there was thus presented a balanced and very informative survey of the border-line fields of physics and geology, in the studying of which radioactive phenomena are bearing so interesting a part.

The symposium on recent developments in weather forecasting was a joint session with the American Meteorological Society. The basis for forecasts by the method of air mass analysis was explained by E. W. Woolard, of the U. S. Weather Bureau. This was followed by a paper on the Harvard meteorograph by K. O. Lange, who explained the use of radio-equipped balloons which send signals back to the earth of the barometric and temperature readings which the meteorograph registers during ascension. The final paper by C. G. Abbot on solar radiation and weather forecasting was accompanied by the announcement that it was hoped that a number of solar radiation stations would be set up very shortly. In addition to these ground stations Dr. Abbot referred to the possibility of solar radiation measurements by the same type of balloons as are being developed for making meteorographs. Great interest was displayed in the exhibit of balloons, meteorographs and auxiliary equipment which was arranged by L. F. Curtiss and A. V. Astin, of the Bureau of Standards. During the afternoon a large audience watched the releasing of a number of rubber and Cellophane balloons from the football stadium at the university. A special broadcast was arranged by Station WHAM in which a series of talks was given by C. F. Brooks, K. O. Lange, C. F. Curtiss, T. R. Wilkins and B. O'Brien on the purpose of such flights. The actual radio signals coming back from the balloons were also broadcast from the meteorograph developed by C. F. Curtiss. Owing to the overcast skies the balloons did not carry the new cameras developed by Dr. O'Brien for sky brightness measurements, but in addition to the radio meteorograph photographic plates were sent up for the study of cosmic rays. In the third symposium the biological effects of radiation were reviewed by S. L. Warren with special papers on the relative biological effectiveness of fast neutrons, x-rays and alpha particles by R. E. Zirkle and the seasonal and geographic variations in the biological effects of the ultra-violet solar spectrum by B. O'Brien.

The American Meteorological Society met on Tuesday and Wednesday morning and afternoon, the second day with the Section on Physics. Attendance ranged from 30 to 100. Upper air research was the dominant theme. Brian O'Brien showed that the stratosphere balloon *Explorer II* had reached well into the so-called ozone layer, which commenced more sharply than previously determined. K. O. Lange and L. F. Curtiss demonstrated Harvard and U. S. Government radio-meteorographs of two types carried aloft by sounding balloons, and T. Russell Wilkins sent up photographic plates for cosmic ray traces. These plates came down three hours later about 200 miles away after reaching a height of probably 14 miles, which was the altitude attained by the U. S. radio-meteorograph sent up by a similar balloon a few minutes before. The demonstration was broadcast for an hour over WHAM by Charles F. Brooks, L. F. Curtiss, T. Russel Wilkins and others.

A symposium on recent developments in weather forecasting included papers by E. W. Woolard on the physical interpretation of synoptic weather maps and by C. G. Abbot on solar radiation and weather forecasting. Dr. Woolard urged experimental forecasting based on dynamical interpretations, even though such might not at first be as accurate as those now made largely on empirical grounds. Dr. Abbot presented evidence of cycles in solar phenomena and apparent responses of weather, for which, however, no explanation is yet obvious. A paper by H. C.

Willett, on the application of air mass and frontal concepts to the analysis of weather maps and to weather forecasting, was read by title.

Another feature of the meeting was a demonstration of little known phenomena observed in thermometers by Bradford Noyes, Jr., followed by a luncheon at the Taylor Instrument Companies and a detailed tour through the plant. The scientific staff conducted members of the society in groups of only three or four.

Two papers on recent floods and their causes by T. E. Reed and C. F. Brooks showed that excessive rainfall precipitated from tropical air masses was responsible. Floods in the Atlantic states are favored by a strong, enduring high pressure area extending southward from Newfoundland, on the west side of which a broad and deep stream of warm moist air sweeps northward from the tropics. The floods occur near obstructing mountains, especially when these are backed by a nearly stalled mass of polar air over which, as well as over the mountains, the air is forced to great heights, thereby producing two to ten or more inches of rainfall in 24 to 48 hours.

Other subjects were: the solar climate of Madison, Wisconsin, where detailed solar observations, carried on by, or under the direction of, the speaker, Eric R. Miller, for a quarter of a century, showed a definite decrease of insolation in the colder months—ascribable to increased use of soft coal; and the present state of the theory of visibility, by W. E. K. Middleton.

SECTION ON CHEMISTRY (C)

(Report from W. R. Bloor)

This section held three sessions, all of which overran their assignment of time. The attendance was generally not large, but the audience was interested and took part enthusiastically in the discussion of papers which appealed to them.

The first session on Tuesday afternoon in the lecture room of the Chemistry Building of the University of Rochester covered a wide range of topics in the field of chemistry. Biochemistry led in numbers with five papers; organic chemistry was represented by four papers; quantitative inorganic chemistry, agricultural and physical chemistry by one each.

The second session, on Wednesday morning, was a joint session with the Society of American Bacteriologists, held in the amphitheater of the Medical School of the University of Rochester. It was given over to a symposium on chemical problems arising from the activity of bacteria, especially in their relation to their animal hosts. Immunity, immuno-chemistry and immune reactions took up most of the time. The remainder was devoted to biological fixation of nitrogen.

The Thursday morning session in the Chemistry Building again covered a wide variety of chemical topics, ranging from surface studies of ordinary solutions, specific heats of aqueous solutions, structure studies of inorganic and organic compounds to photochemical decomposition of heavy ammonia and the mechanism of anesthesia in insects.

SECTION ON ASTRONOMY (D)

(Report from Harlan T. Stetson)

The activities of astronomy at the Rochester meeting were represented by a joint meeting of this section with the Section on Physics on Thursday morning. Four astronomical papers were contributed to the program. S. L. Boothroyd, director of the Fuertes Observatory of Cornell University, presented a new design for a stellar spectrograph combining a surprising lightness in weight with high rigidity. The spectrograph has been built specifically for stellar spectroscopy in the ultra-violet, but when removed from the telescope may be readily adapted to laboratory purposes.

A paper by Robley C. Williams presented the technique of aluminizing the 37½-inch reflector of the University of Michigan Observatory. In the discussion it was revealed that the exposure time for securing spectrograms in the visible region of the stellar spectrum had been reduced 60 per cent. since the aluminum coating had replaced the conventional silver.

Frederick Slocum, director of the Van Vleck Observatory, presented a paper on the spectrohelioscope of the Van Vleck Observatory which has been recently installed in a unique arrangement utilizing the 20-inch lens of the equatorial telescope for the formation of the solar image, the image of the sun so formed being 83 mm in diameter and affording a field of view of 4″.25 by 1″.5 for the examination of prominences and flocculi in the eye-piece. Sketches of solar prominences in the light of H alpha were exhibited, showing recent activities in the vicinity of sun-spots where radial velocities ranged from −78 km to +51 km per second.

A paper by J. Allen Hynek called attention to the discrepancy between trigonometric and spectroscopic parallaxes of certain stars which had been placed on the program at the Perkins Observatory. The desirability that these stars should also be followed at other observatories was brought out in the discussion by Dr. Slocum.

The secretary acknowledges his indebtedness to S. L. Boothroyd for his courteous help in making local arrangements at the Rochester meeting and for forwarding material for this report.

SECTION ON GEOLOGY AND GEOGRAPHY (E)

(Report from Quentin D. Singewald)

The program of the section was arranged particularly to honor the one hundredth anniversary of the New York State Geological Survey. A special feature was the complimentary luncheon on Wednesday, at which Rudolf Ruedemann and Chris Hartnagel, state paleontologist and assistant state geologist, respectively, were speakers. Mr. Hartnagel told of early explorations for minerals in the state, from the time of Hendrik Hudson to the establishment of the Survey. Dr. Ruedemann told of the early work of the Survey, including many anecdotes about James Hall.

Presentation of papers began on Tuesday morning, in a joint session with the Section on Physics, with a symposium on radioactivity and the age of the earth. A paper by R. D. Evans, which gave a general survey of the field, was followed by five on specific subjects.

Wednesday morning was devoted mainly to a symposium on Paleozoic stratigraphy of central New York and surrounding areas. Representing New York State were Marshall Kay, L. W. Ploger and Tracy Gillette. Representing Pennsylvania were Bradford Willard and Frank M. Swartz. Continuing the discussion of New York State geology, there were on Thursday morning a group of papers on glacial, pre-Cambrian and structural subjects, by C. D. Holmes, N. C. Dale, E. T. Apfel, W. H. Bradley and J. S. Brown. Presiding officers were: Heinrich Ries, at the Wednesday morning session; Carl O. Dunbar, at the Thursday morning session; and Harold L. Alling, at the luncheon.

On both Tuesday and Wednesday afternoons the members had a choice of two field trips, one glacial and the other stratigraphic.

SECTION ON BOTANICAL SCIENCES (G)

The section joined with the American Society of Plant Physiologists, the Physiological Section of the Botanical Society of America and the American Society for Horticultural Science in programs arranged by them.

The American Society of Plant Physiologists held a joint meeting on June 17. The morning session under the chairmanship of A. E. Murneek, president of the American Society of Plant Physiologists, was devoted to a symposium on the physiology of reproduction. E. J. Kraus discussed the general concepts of reproduction, stressing the value of long-range studies on the plant as a whole under varying conditions, factor substitution and localization of response. H. R. Kraybill reviewed the chemical aspects of reproduction in an elaboration of the original C/N ratio concepts and analysis of its present status. H. H. McKinney described vernalization treatments of grain and forage seeds in America and compared the results with those reported by Russian workers. He emphasized the limitations of these treatments and reviewed the interrelationship of light with temperature effects as well as the necessity of knowing the genetic characteristics of the stock in evaluating the significance of results. The concluding paper on temperature and day-length in relation to reproduction was given by H. C. Thompson. The striking rejuvenation effects of repeatedly altered photoperiod was shown for several important vegetable crops, including also some evidences producing analogous results through temperature contrasts. Small temperature differences frequently produced marked formative effects. In some instances reproductive stimuli were found widely transmissible from one portion of the plant to another but sharply localized in others, the pattern varying with the species. The program was well received by the 120 members attending as evidenced by the animated discussion which followed.

The morning symposium was followed by an informal luncheon in the private dining room of the Todd Union Building. Visitors were given an opportunity to inspect the biology laboratories during the luncheon recess and following the afternoon session.

The Wednesday afternoon session was under the chairmanship of Alex Laurie, president of the American Society for Horticultural Science. Z. I. Kertesz described the determination of plant enzymes in extracts and press sap, stressing the differences between enzyme properties and behavior under these conditions as compared with *in vivo* reactions, and the need of caution as to assumptions as to the natural activity of enzymes in the cell. Rates of photosynthesis in apple trees were discussed by A. J. Heinicke, who had recently completed large-scale quantitative measurements on entire trees under controlled conditions. The accumulation of reserves in their effect on shoot and root growth, flower bud and fruit development and cold resistance were described. It was noted that maximum photosynthesis occurs in freshly expanded leaves in the early morning, when carbon dioxide and moisture were most abundant early in June at the latitude of Ithaca.

In a searching report on the respiratory changes accompanying activation of dormant spores, D. R. Goddard and P. E. Smith described the alterations in the oxidative mechanism. Evidence was produced to show that dehydrogenase systems limit the respiration of dormant spores nearly independently of the oxygen supply and other factors, whereas in activated spores respiration is controlled by the Warburg enzyme. Increase in toxicity of fluorides, iodacetates and urethane was noted as spores germinated.

The final paper by O. F. Curtis on radiation and leaf temperature demonstrated thermal fluctuations as great as 15° C. in one minute or less with ordinary variations in light intensity. The fundamental significance of direct infra-red radiations was found to be more important in control of foliar temperature than transpiration or relative atmospheric humidity.

For the American Society of Plant Physiologists, American Society for Horticultural Science and Ecological Society an All-Botanists dinner was held on Wednesday evening in the Blue Room of the Hotel Seneca. The toastmaster, Charles A. Shull, presented W. S. Cooper, president of the Ecological Society, as the speaker of the evening. He gave an informative and entertaining address on Alaska as a land of color, illustrating his lecture with 1,600 feet of moving pictures in natural color of unusual beauty photographs by the speaker during an exploratory expedition last year.

Thursday was devoted to an inspection of research at the Geneva and Cornell Agricultural Experiment Stations. Upon arrival at Geneva, the visitors were welcomed by Vice-Director P. J. Parrott, who also explained the plan of the exhibits. Drs. Nebel and Ruttle demonstrated the significance of radiation as a means of inducing polyploidy and the importance of the latter to production of desirable mutants in fruits and mints. The comprehensive displays of H. B. Tukey and K. D. Brase on embryo culture and stock-cion relations attracted general attention, due to the ingenuity and wide-spread utility of technique as well as the profound significance of the results. The predeterminative effects of early developmental conditions and the specific regulatory interaction between grafted and embryonic parts such as integuments, nucellus, placenta and embryo sac promises a means of solving many basic problems in physiology and horticulture.

Other exhibits at Geneva comprised those of A. L. Shuck on light sensitivity of seeds, of C. B. Sayre on fertilizer placements, of D. K. Tressler and W. F. Walsh on wine and fruit juices. The fruit-breeding demonstrations of G. H. Howe, Richard Wellington, G. L. Slate and Olaf Einset elicited wide-spread interest. Abundant opportunity was provided for personal contact, inspection of equipment and discussion of techniques of personal interest to individual visitors.

Following a luncheon at the Seneca Hotel, the party motored to Cornell University at Ithaca under the leadership of H. C. Thompson, chairman of the program committee, where the party inspected the departments of pomology, floriculture and vegetable crops. The construction and operation of the glass-enclosed photosynthesis cases for entire apple trees evoked general interest, along with soil management and hardiness studies. The photoperiodic, temperature, storage, nutritional and other studies of ornamentals were demonstrated with considerable care and offered much value to every visitor. Phasic development, temperature and light studies on vegetable crops drew the attention especially of physiologists along with exhibits on potato and tomato storage, asparagus respiration and physiological diseases. The tour terminated with an inspection of the striking experiment of G. B. Johnston-Wallace on clover-grass interaction in pasture plots. On Friday morning opportunity was provided for personal interviews and professional conferences. Later the visitors participated in the Sigma Xi semi-centennial festivities.

PROGRAMS RELATED TO BOTH BOTANICAL AND ZOOLOGICAL SCIENCES (F AND G)

(Report from W. S. Cooper)

The Ecological Society of America held its summer meeting in conjunction with the association from June 16 to 18. The local committee of the society in charge of arrangements consisted of W. D. Merrell and Henry C. Markus. Tuesday morning was devoted to registration. On Tuesday afternoon there was a field trip under the leadership of Drs. Merrell and Markus. Localities visited were the Highland Park Pinetum, the marshes of Irondequoit Bay, a virgin tract of beech-maple-hemlock forest on the estate of William B. Hale and the trout hatcheries of the U. S. Bureau of Fisheries in Powdermill Park. On Wednesday occurred an all-day field trip to Bergen Swamp, an extensive marl deposit thinly covered by stunted arbor vitae and tamarack, supporting an unusual population of plants and animals. Thursday morning was given to a trip to the Mendon Ponds area, a region of abrupt glacial ridges enclosing kettles which contain a variety of bog vegetation. The average attendance on each of the trips was twenty-five.

On Wednesday evening the ecologists participated in a dinner for all botanists, after which W. S. Cooper showed color movies of vegetation and glaciers in southern Alaska, made during the summer of 1935.

A special feature of the meeting was a symposium on "The Scientific Aspects of Flood Control," held in cooperation with the association on Thursday afternoon in the Strong Auditorium on the River Campus of the University of Rochester. The speakers were F. A. Silcox, chief of the U. S. Forest Service, "Forests and Flood Prevention"; W. C. Lowdermilk, associate chief of the U. S. Soil Conservation Service, "Agricultural Land Use and Floods"; Morris L. Cooke, administrator of rural electrification, "On the Relations of Engineering Science to Flood Control."

Dr. Silcox, by means of illustrations drawn from recent events, demonstrated the pronounced effect of forest and other native cover upon the rate of run-off, giving instances where removal of vegetation by fire and other agencies was directly responsible for disastrous floods. He pointed out that the forest is not merely an assemblage of trees, but that it includes the lower vegetation, animals, micro-organisms and the humus complex, all of which are essential to the maintenance of regularity in the outflow of water.

Dr. Lowdermilk emphasized the necessity of checking the process of gullying at its inception, and described various methods by which this may be done. He urged the adoption of new and scientific methods of treatment of land under cultivation, such as contour plowing and terracing.

Mr. Cooke pointed out that while downstream engineering works, such as dams, levees, revetments, are necessary, these can not bring a permanent conclusion to our difficulties. The engineer must go to the headwaters and join forces with the forester and the soil conservationist in attacking the problem at its source. Upstream engineering is absolutely essential.

The three speakers, approaching the problem from different angles, thus reached the common conclusion that flood control is not enough; that flood prevention is the necessary goal. This involves preservation and renewal of forest and other natural cover, intelligent and skilful treatment of land in agricultural use and engineering methods applied where the streams have their origin as well as along their lower courses where destructive action is felt. These addresses will shortly be published by the association.

SECTION ON ANTHROPOLOGY (H)

(*Report from Wilton Marion Krogman*)

The papers presented on June 17 and 18 were concerned principally with the archeology of the New England area. D. S. Byers reported on two sites, in Connecticut and Rhode Island, which may possibly represent two phases of a New England Archaic. In the Connecticut site, the older of the two, there was evidence of two occupation layers. Frederick Johnson then presented a critical analysis of archeological chronology in New England, stating that the present sequence was based on evidence inadequate both with respect to typology and stratification. It was observed that careful and detailed investigation might lead to a possible correlation with the McKern classification for the Mississippi Valley. W. A. Ritchie discussed Upper Great Lakes influence in New York archeology. Traces of a relatively pure Ohio Hopewell culture were sparsely represented; the "intrusive mound culture" reported by Mills at Mound City, Ohio, was definitely present at Point Peninsula, New York. J. B. Griffin stated that in his study of the Fort Ancient culture of Ohio it seemed likely that it might be identified with historic groups generally marginal to the southern and northern Woodland area. In a study of the Oneota culture of Iowa he identified it specifically with the historic Chiwere Sioux. Miss Mary Butler discussed the archeology of the Iroquois in western Pennsylvania. Three periods were outlined: early and undifferentiated; specialized, ending in 1654; late, 1654–1700. No Archaic period was reported. Arthur C. Parker presented a penetrating study of folkways of the Seneca in terms of cultural adjustment. Discrete elements were traced either as assimilated or as modified "survivals." The interesting situation has arisen that the Indian is adapting himself to the white man's concept of the Indian—the modern Indian is in very fact "playing at being Indian." The theme of culture pattern was carried on by W. M. Fenton, who discussed Seneca ceremonies at Tonawanda Longhouse. The yearly cycle of ceremonies was found to conform to the pattern of all Iroquois Longhouse rituals, with a local development of rituals and dances centering about a Bean Festival and New Year and Green Corn Festivals. Mr. Fenton in his paper reported upon a newly found letter, dated 1850, from Lewis H. Morgan to Ely S. Parker concerning the six principal festivals of the year. J. H. Bailey outlined Iroquois ceramic types, observing a prehistoric triangular decoration motif and a notched-rim type of 1600–1700. The use of the human face as design was stated to be prehistoric, while the use of the entire human figure was post-Jesuit.

Several papers in physical anthropology were presented. P. B. Candela reported that by a modification of the Boyd adsorption technique he was able to obtain blood groups A, B and AB from Egyptian skeletal material dating to ca. 1500 B.C. Mrs. P. B. Candela undertook stature calculations from the long bones of the same Egyptian material. The stature was found to be well below modern averages and presumably two racial groups were represented, both with armbones relatively short. W. M. Krogman discussed the inheritance of non-pathologic physical traits in man with respect to whether or not they were readily modifiable, temporarily or mildly influenced by conditions of life or non-adaptive and stable. The latter, only, adhere to Mendelian principles and are thus tending towards expression as unit characters. T. H. Evans presented a paper on the earbones. Specifically, it was concluded that the *stapes* of the "Lake Pelican Man" (Minn.), of possibly 20,000 years in age, was of an extremely primitive hominid type. Mrs. T. H. Evans traced an interesting survival of Ptolemaic mummy-wrapping designs in modern quilting "Log-Cabin" patterns.

The section held several informal sessions at the Rochester Public Museum, Edgerton Park, where under the direction of A. C. Parker and W. A. Ritchie important archeologic collections were studied.

SECTION ON SOCIAL AND ECONOMIC SCIENCES (K)

(Report from Donald W. Gilbert)

"Social Security" was the subject of the meeting of the economic section of the American Association for the Advancement of Science on Wednesday, in the Strong Auditorium at the University of Rochester. Strongly conflicting views were expressed by four speakers, who were introduced by Raymond N. Ball, president of the Lincoln-Alliance Bank and Trust Company, acting as chairman of the meeting. Ewan Clague, associate director of the Bureau of Research of the Social Security Board, Washington, D. C., described trends which he felt would intensify rather than reduce the social security problem. The paradox of great unemployment with strong business revival could be explained, in his judgment, not by the existence of chiselers on relief, nor by the refusal of the unemployed to accept jobs, nor in general by any cyclical factors. Unemployment, which might continue as high as four million persons in future boom years, must be explained by observing certain fundamental long-term trends which the depression had served to illuminate but which had existed for several decades.

Among these trends, the decreasing rate of population growth and the probable stabilization of the population by 1960, the increasing percentage of older persons, the movement from farm to suburban area with agricultural mechanization, all these would tend to make a more rigid, more elastic economic and social organization, an increasing dependence of the aged upon the young, greater pressure for jobs and increasing demands for government protection of the aged.

All these results were categorically denied by Warren W. Persons, formerly a professor at Harvard University, now economic consultant in New York City. Dr. Persons pointed to the almost continuous rise in the per capita production of the nation as indicating a path of rising standards of living and more jobs as long as people want such rising standards of living and will work to produce them. We can take care of the aged and other social dependents in the future if we will consciously continue the trend of the past twenty-five years toward increasing our application of objective scientific methods to materials and to human wants. If we forget the money side, our real ability to work and consume in the future depends upon the continuance of those methods which made us more productive in the past. The five million automobile output of past years will be exceeded in the near future and so with radios, electric refrigerators and many other things. If we study the consumer's wants and discover new ways of satisfying those wants, people will not have to worry about jobs, nor need we fear old age, retirement and dependence.

Like Dr. Persons, Carl Snyder denied the imminence of any serious problems. Even in the depths of depression we had nineteen million automobiles in operation and spent on them something like the national income of France each year. With less than one eighth of the population outside of a few backward territories, the United States consumes annually one half of the products coming into world commerce. Up to 1930, his studies show, the rate of per capita production increase was almost constant. No decennium from 1830 to 1930 shows a rate of growth materially different from the previous or succeeding decennium, and the same is true in later years of quinquennium rates. Our problem is to continue that rate of growth of production, and our social security problems will take care of themselves. This will be true at least if we also work to eliminate what has been erroneously called the business cycle.

Dr. Snyder denies the existence of a business cycle, seeing our recurrent booms and depressions as mere scallops in this long trend of continuous production growth. At times, he pointed out, credit expands too rapidly, prices rise, interest rates are raised and growth is stopped, and this is followed by changes the reverse of all these. We can prevent depressions if we will prevent booms as we can by the control of excessive credit expansion.

Finally, Craig Cochrane, of the Eastman Kodak Company, reviewed recent federal and state legislation respecting old age security and unemployment insurance. He indicated the danger which the federal Social Security Act creates through its failure to specifically link together resources derived from the taxes levied and the expenditures for old age relief. Contributions and benefits will not equalize for fifty years. In the meantime he feared that revenues covered into the general government funds and at first greater than benefits paid would encourage Congressional extravagance and misuse. If this situation did not arise to create deficits which would eliminate the accumulation of a large funded reserve, he believed that it would be necessary to keep the tax rates at their present levels rather than to increase them as provided by law. A contingent reserve of perhaps ten billion dollars is necessary, but the accumulation of perhaps fifty billion dollars by 1980 would create almost unsolvable problems.

Regarding unemployment insurance, Mr. Cochrane made a plea for the merit rating provision in state laws and criticized the New York legislation of 1934 for its failure to penalize the employer who does not successfully stabilize his business and reward the enterprise which does. This does not mean that pooled

funds must be abandoned wholly. Some part of the premium paid by each enterprise should be placed in such a pool to assist those industries whose unemployment is greatest. But the larger part of the payment should be held for the enterprise making the payment and should be adjusted to the amount of unemployment experienced by that enterprise. Mr. Cochrane asked his audience to keep in mind the great progress which individual concerns have already made without legislation to protect their employees against the vicissitudes of ill-health, accident, unemployment and old age.

SECTION ON ENGINEERING (M)

(Report from W. J. Conley and Charles H. Gale)

The Section on Engineering sponsored two morning meetings, at which five papers were presented. On Wednesday morning the meeting was opened by J. P. Ancona, president of the Rochester Engineering Society. Papers were read by J. R. Banks, Jr., professor of administrative engineering of the College of Engineering, Cornell University, and Professor Earl Church, of Syracuse University. Professor Bangs's paper, "The Engineer and the Social Sciences," dealt with the reasons for the introduction of administrative engineering as a separate curriculum at Cornell. He pointed out that since engineers, in spite of their purely technical training, have found their way into the managerial side of industry, a new type of education is necessary. Due to the amazing development of labor-saving machines, readjustment has become necessary which must be managed with social vision. In addition, the application of modern industry has made it necessary to engineer "through to the end," creating a demand for engineering treatment of the social effects arising from rapid technological development.

Based on questionnaires it was decided to give definite place, along with fundamental sciences, professional studies and electives, to the social sciences—economics, social history and theory, business organization, etc.— in fact all the subjects which comprise the study of human relations.

Professor Bangs stated that there are three central themes running through the course at Cornell University: the first being economics, the second, production and marketing, and the third, human relations. Professor Bangs developed and illustrated the working out of themes in an extremely interesting manner.

Professor Church read a paper on "Photogrammetry," sketching very briefly the application of this science and the various specialized apparatus which has been developed for interpreting the aerial photograph. He pointed out how the lens technique, the technique of photographic emulsion and the effort of the instrument makers had been developed to make rapid advances in recent years. The possibilities of economic mapping of large areas, not only of inaccessible terrain, but of thickly populated and thoroughly developed character, were discussed. The use of a few definitely located landmarks, such as those already in place due to the coast and geodetic surveys, were explained in relation to their aid in aerial mapping.

The meeting on Thursday morning was presided over by W. T. Morgan, metallurgist of the Taylor Instrument Companies. Papers were presented by B. L. McCarthy, metallurgist of Wickwire Spencer Steel Company of Buffalo, C. L. Shapiro, assistant metallurgist, Halcomb Steel Company, Syracuse, N. Y., and by W. J. Conley, W. E. Conley, H. J. King and L. E. Unger, of the Engineering Department of the University of Rochester.

Mr. McCarthy discussed the effect of grain size and its influence on the manufacture of steel wire. He outlined the methods of inherent grain size determination and its measurement. The paper was then developed on this information, showing how the grain size influenced the reaction rate of the formation of pearlite for the slower cooling rates. This is important for wire drawing, since the form of the pearlite influences the stress distribution across a section of rod as it is being drawn rapidly through the dies and at the same time subjected to enormous internal stresses. Photomicrographic evidence was presented to show that a fine laminated pearlite gave the best results. For this fine laminated structure to be formed, a correct reaction rate was necessary for a given rate of cooling through the critical. In turn, the reaction was influenced by the austenitic grain size. Aside from the practical value for this particular application, Mr. McCarthy made clear some fundamental points in connection with pearlite formation.

Mr. Shapiro discussed the factors influencing the alpha-gamma transformation in plain carbon tool steels. A preliminary introduction described the iron allotropic transformation and the effects on the temperature at which the changes occurred because of alloying elements. These are not only affected by the normal action of the alloy, but by segregation and variation in carbide particle size. Photomicrographic evidence was presented to show how these factors operated, giving a fundamental picture of the manner in which carbides were taken into solution and how the pearlite formed as the gamma changed to alpha. This paper gave some very valuable fundamental information on the gamma-alpha transformation through some excellent photomicrographs taken at 4,000 magnification.

The third paper on "The Microcharacter as a Research Tool" was given by W. J. Conley. The actual construction and use of the instrument was

described and photographs shown to explain the interpretation of the cut made by the special diamond point. The diamond point, in the form of the corner of a cube, ground so that it shows a sharp intersection of three planes at 2,000 diameters loaded by a 3-gram weight, is maintained on a flexible arm so that the leading edge is the intersection of two faces of a cube, with the cube diagonal, ending in the cutting point, held perpendicular to the surface being investigated. The method of interpreting the cut width in terms of micro-hardness number was explained. The paper was concluded with a few practical illustrations of the use of the instrument for determination of the hardness of micro-constituents in alloys and in turn using this factor to interpret photomicrographs containing several structures of varying hardness.

Special interest was attached to the meetings of the two newcomers to the ranks of the association—the Institute of the Aeronautical Sciences and the American Society of Photogrammetry—and to the comparatively new subject of aerial photogrammetry. This new science, which is gaining in importance in view of the vast national mapping programs which have been projected by the Federal government, has to do with making maps based on aerial photographs.

What photogrammetry can mean to this country was outlined by Lieutenant O. S. Reading, of the U. S. Coast and Geodetic Survey, in a paper entitled "Photogrammetry in 1936." He pointed out that we actually have little knowledge of our land and natural resources at the present time, and as evidence stated that the photographs of the entire 5,004 square miles of the state of Connecticut, made by Fairchild Aerial Surveys, disclosed so much unrecorded property in 14 cities that the tax rate was lowered an average of 29 per cent. in tax equalization studies while the Grand List was increased an average of 47 per cent. The cities involved were lifted out of financial difficulties by these adjustments.

One of the extensive users of aerial photogrammetry is the U. S. Soil Conservation Service, which has undertaken the mapping of large areas in various parts of the country. Aerial photographs have become absolutely essential in the government's soil conservation program, according to Charles W. Collier, of the Soil Conservation Service. He stated that aerial photogrammetry has proven to be the most rapid, the most economical and the most effective method of securing the basic information that the Service requires and that without the aerial pictures it would be impossible to secure the required data within the time limits and the funds available.

The survey work being sponsored by the Soil Conservation Service is part of the national mapping program which is expected to include eventually aerial photographs of practically the entire 3,000,000 square miles of the United States. This program, projected by the National Board of Surveys and Maps, would call for the expenditure of about $9,000,000 over a period of ten years. The types of maps to be prepared from these photographs and the methods of reproducing them for general use were described by Colonel C. H. Birdseye, chief of the Division of Engraving and Printing of the U. S. Geological Survey. Colonel Birdseye, who is a past president of the American Society of Photogrammetry, and one of the pioneers in aerial photography, presided at the sessions at Rochester.

When this huge mapping program is completed, it was pointed out by Lieutenant Reading, it will be possible for any one to sit comfortably in his office and visualize any part of the country he is interested in. This in turn will enable the layman as well as private and government engineers to move with speed and certainty in their respective fields without having to wait for slow and expensive ground surveys to be made to fit special requirements, or to muddle through on the basis of generalized half truths proved by the present maps.

"The Multiplex Aero Projector," one of the instruments used in drawing maps from aerial photographs, was described in a paper prepared by Captain Louis J. Rumaggi, of the Materials Division of the Air Corps at Wright Field, Dayton, Ohio. This machine enables the operator to view serial photographs in three dimensions, essential for drawing contours, and permits him also to view the pictures as though he were in the plant at the time the exposures were made. In other words, it makes possible a reconstruction of the conditions under which the photographs were secured. Thus all the characteristics of the terrain may be studied at leisure and an accurate map may be drawn by an engineer without his ever having to make a personal inspection of the area involved.

A great deal of the success of aerial photographs in engineering work depends, of course, upon the lenses in the cameras. The requirements in this field were discussed by W. B. Rayton, of the Bausch and Lomb Optical Company of Rochester, and the various materials used in aerial photogrammetry were discussed by Walter Clark, of the Eastman Kodak Company's research laboratory.

The American Society of Photogrammetry has about 400 members; it is affiliated with the international photogrammetry organization, which has branches in nineteen countries. The Institute of the Aeronautical Sciences has been one of the leading aviation organizations in this country since its formation a few years ago and it includes aeronautical specialists from many foreign countries as well as those engaged in

the many sciences and branches of engineering which have to do with aeronautics in this country. About 80 attended this session.

SECTION ON MEDICAL SCIENCES (N)

(Reports from Vincent du Vigneaud, Maynard K. Hine, John C. Krantz and Ralph P. Tittsler)

The meetings of the Section on Medical Sciences were held this year in joint session with the Western New York Branch of the Society of Experimental Biology and Medicine and with the Central New York State Branch of the Society of American Bacteriologists. The Subsection of Dentistry held two sessions on Thursday morning. All the sessions were well attended, and much worthwhile discussion was elicited.

The outstanding event of the Medical Sciences program was the Theobald Smith Memorial Session held in joint session with the American Bacteriologists. Edwin G. Conklin, president of the American Association for the Advancement of Science, presided at the memorial session. In opening the meeting President Conklin recounted some of his reminiscences of his contacts with his friend and associate, Theobald Smith, particularly when Theobald Smith was a guest in his laboratory while the Rockefeller Institute for Animal Pathology was being built in Princeton. President Conklin then presented Simon Henry Gage, of Cornell University, with whom Theobald Smith published his first scientific work. Dr. Gage then gave the memorial address, entitled "Theobald Smith: Investigator and Man," to be published in SCIENCE.

The memorial session was held in the lecture room at the University of Rochester Medical School where Theobald Smith took part in the inaugural exercises of the School of Medicine in 1926. At that time Theobald Smith was one of the invited lecturers in honor of the occasion and gave an address entitled "Immunity, Natural and Acquired, as Illustrated by Experiments with *Bacillus Coli* and its Mutants."

After the memorial address was held the scientific session in honor of Theobald Smith. A series of papers of bacteriological significance was presented by a group of investigators representing various fields of work. The scientific program was opened by R. J. Anderson (Yale University), who summarized the results of his extensive chemical studies on the wax fractions of the tubercle bacillus. In addition he compared the findings with those which he had obtained with other acid-fast bacteria. Some of the practical problems in the serum therapy of bacterial infection was then discussed by Augustus B. Wadsworth, Department of Public Health, Albany, N. Y. He pointed out particularly the effectiveness of serum therapy and concluded that in the case of diphtheria the residual mortality was due mainly to delayed treatment. A paper on the co-existent infection of individual cells by more than one filterable virus was next presented by Jerome T. Syverton and George Packer Berry, of the University of Rochester. It was fitting that Thomas Ordway, dean of Albany Medical College, should take part in the scientific portion of the memorial session, for it was at Albany Medical College that Theobald Smith received his doctor's degree. Dr. Ordway discussed pneumonia from various angles, particularly the early diagnosis of the disease. He stressed the need of the education of the layman, so that the early symptoms of pneumonia might be recognized, and in this way the wide-spread distribution of lobar pneumonia might be decreased. George Packer Berry and Helen M. Dedrick, of the University of Rochester, presented their further observations on the transformation of the virus of rabbit fibroma (Shope) into that of infectious myxomatosis (Sanarelli). By the addition of heat-"killed" virus of infectious myxomatosis to the virus of rabbit fibroma, the latter acquired the ability to produce infectious myxomatosis in rabbits, apparently identical to that produced by the unchanged virus of infectious myxomatosis. Furthermore, the disease produced by this combination of inactive myxomatosis virus and rabbit fibroma virus could be serially transferred through ten or more passages. The program was concluded by Charles M. Carpenter and Stafford L. Warren, of the University of Rochester, with a paper and motion pictures on the subject of gonococcal infection. The diagnosis of gonococcal infection by the culture method and the treatment of the infection by fever therapy were presented. Remarkable success with fever therapy was disclosed, the fever being produced by radiant energy.

The Wednesday morning session, held with the Western New York Branch of the Society of Experimental Biology and Medicine, was opened by a paper by Estelle Hawley, Ray Daggs and Doran Stephens, of the University of Rochester. They presented their work on the Vitamin C content of guinea pig tissue as affected by diet. These workers had observed that in both man and in the guinea pig the Vitamin C found in the urine after the administration of the vitamin was lower when the urine was distinctly alkaline. Since this might be due to destruction of the vitamin in the alkaline urines or to increased retention by the tissues, experiments were carried out on the Vitamin C content of the tissues of guinea pigs kept on alkaline and acid ash diets. The results showed a distinctly higher Vitamin C content in the tissues of the animals which had been fed on the alkaline ash diet. They pointed out that the alkaline ash of citrus fruits, coupled with their high Vitamin C content, suggested the optimum utilization of the

vitamin C from these sources. The effect of calcium on the iron assimilation of the pregnant rat was clearly demonstrated by Dr. Kletzien and Clara Kingdon, of the University of Buffalo. These workers showed that increased ingestion of calcium decreased the assimilation of iron. The significance of these results is far-reaching and points to the possible danger of the rather wide-spread tendency to prescribe large amounts of calcium salts for pregnant mothers without taking into consideration the effect that this might have on the assimilation of iron. The storage of iron in the liver of the fetus is of course recognized as being extremely important. A discussion of the methods of modifying milk for infant's digestion was contributed by I. Newton Kugelmass. John R. Murlin, R. S. Manly and E. S. Nasset, of the University of Rochester, presented the results of their studies on the effect on ketogenesis produced by high fat diets in relation to combustion in the human subject. The ketosis was produced by the ingestion of heavy cream, and sucrose and glucose were administered to study their antiketogenic effect. No apparent correlation between the rate of sugar combustion and the disappearance of ketone substances was found. The interesting fact was noted that sugar administered eight to fifteen hours after a meal of fat seemed to have a larger effect than when the sugar was given earlier. It was also observed that glucose seemed to be more antiketogenic than sucrose. A very interesting study of the comparative concentration of creatine, phosphorus and potassium in muscle was offered by Victor C. Myers, of Western Reserve University. The study revealed that in uremia with heart failure the concentration of creatine was quite low. On the other hand, in hypertrophy of the heart a high creatine was found. Other experimental studies brought out the possibility that the concentration of potassium bore some definite relationship to the amount of phosphorus and creatine in striated muscle. A very ingenious method of studying the movements of the eyes when the lids are closed was presented by W. O. Fenn and J. B. Hursh, of the University of Rochester. Gordon Ellis and L. A. Maynard, of Cornell University, discussed the effects of low levels of fluorine intake on the bones and teeth. An interesting and instructive film was shown by Everette Idris Evans, of the U. S. Bureau of Dairy Industry. Ovulation, fertilization and early development of the mammalian egg were demonstrated.

The afternoon session was devoted to another series of papers of diversified nature. A paper presented by George P. Heckel and Willard M. Allen, of the University of Rochester, threw some light on the persistence of corpora lutea in pregnancy. These workers injected oestrin into non-pregnant rabbits and found that the life of the corpora lutea could be greatly prolonged. It was inferred that a similar mechanism may obtain in pregnancy. S. A. Gutmann, R. G. Horton and D. T. Wilbur, of Cornell University, presented their studies on the enhancement of muscle contraction after tetanus. They reported the interesting observation that when a muscle is stimulated through its motor nerve at a frequency of one per second and then for a short period of more rapid stimulation of twenty per second, its contractions are markedly enhanced after return to the previous lower rate of stimulation. Their experiments indicated that the seat of this phenomenon was in the junction between the nerve and the muscle. Some doubt was thrown on the toxicity of Vitamin A by the report of Edward B. Vedder, of George Washington University. This investigator was able to give much larger doses of Vitamin A than hitherto given without the severe toxic symptoms reported by others. It was intimated that the toxicity reported by others might be due to substances other than vitamin A in the oils used. A curious phenomenon was encountered, however, in the animals fed large doses of Vitamin A for long periods of time. These animals were found to have multiple fractures of the long bones. The question of passive anaphylaxis in white mice was discussed by Kenneth L. Burdon, of Louisiana State University, and J. Bronfenbrenner, of Washington University. They reported that passively sensitized mice can be thrown into anaphylactic shock by the intravenous injection of antigen within one minute following a sensitizing dose of antiserum. Similarly, mice receiving a preliminary injection of antigen can be thrown into shock by the immediate intravenous injection of corresponding antiserum. Emmanuel M. Josephson reported his clinical studies on the action of adrenal cortex hormone. The clinical significance of the plasma proteins in tuberculosis was discussed by S. Edward King. A study on the effect of thymus removal on chickens was presented by G. H. Maughan, of Cornell University. He reported that the removal of the thymus had little to do with the development of rickets. M. B. Greene presented a film and discussion of the influence of alcohol upon phenomenon of impulse transmission in the peripheral and sympathetic nervous system. A very interesting discussion of the relation of the thyroid to the gonad-stimulating hormones was contributed by Samuel L. Leonard, of Union College. The non-renal water loss in lobar pneumonia was the subject of a paper presented by George K. Anderson, of the University of Rochester. Dr. Gutmann, of Cornell University, reported that the radiation of *Limulus* muscle produces two chemical compounds, one which stimulates the action of the heart and another that is antagonistic to the stimulat-

ing compound. A longer period of irradiation is required to produce the second compound.

The Subsection on Dentistry met in the morning and afternoon of June 17. The program was planned by a committee from the Rochester Section of the International Association for Dental Research and the Rochester Dental Study Club. Twelve papers were presented, and three others were read by title.

The morning program consisted of a symposium on dental caries, and all essayists were from the University of Rochester. Maynard K. Hine was the presiding officer. M. W. McCrea opened the program with a discussion of the histophonological changes during dental caries. He pointed out that structural form, which can be modified during tooth development by many factors, has a great influence on the rapidity of advance decay. J. Frank Hall discussed general body conditions in relation to dental caries and concluded that both clinical and laboratory investigations have proved that systemic disturbances do increase susceptibility to decay. Robert E. Brawley, in considering the relation of saliva to dental caries, listed certain properties and constituents of saliva as being causative or preventive agents in dental decay. Some of the factors discussed were rate of flow and viscosity, mucin, enzymes, bacteria and bactericidal factors.

M. K. Hine reported a study of the bacterial flora of dental caries and stated that microscopic study of carious material (41 cavities) gave no evidence to suggest dental caries in a specific bacterial disease. Rather it tends to support the idea that any species of oral bacteria which can produce acid in appreciable quantities can cause dental caries. Basil G. Bibby reported on a study of the enamel surface of teeth. It was suggested by him that changes by mouth environments formed a protective layer which lessened the susceptibility of the teeth to dental decay. Such a change was offered as an explanation for the relative resistance of adult teeth to caries.

Miss Marian LeFevre discussed the chemical constitution of carious teeth. She stated that the few available analyses show that carious tooth tissue contains more water, organic matter and magnesium and less calcium and phosphorus than sound teeth. R. S. Manley, in considering diet in relation to caries, found that although excess carbohydrates or lack of vitamins A, B, C or D or of minerals have been suggested as causes of caries, most of the work with laboratory animals denies this conclusion. The only point of agreement he could find in dietary experiments was that an adequate diet is better than a poor diet in preventing or arresting dental decay.

Harold C. Hodge discussed the physical properties of carious tissue and methods of studying them. His findings indicated that between an area of caries and a vital pulp a barrier of denser dentine may be built. This barrier is up to 30 to 40 per cent. harder than normal dentine, and has an x-ray absorption value up to 40 per cent. higher than "normal" dentine in the same tooth. Sequelae of dental caries were discussed by H. B. G. Robinson. He pointed out that the carious process affords an avenue for entrance of infection into the dental pulp, pariapical region and, potentially, the entire body. Therefore, the prevention and control of dental caries is not a therapeutic measure limited to the oral cavity, but is a prophylactic treatment against possible systemic complications. The general discussion throughout the symposium indicated a belief that dental caries is a complex problem that will probably not be solved by a study limited to any single phase of the subject.

The presiding officer of the afternoon session was Benedict S. Hert, past president of the Rochester Dental Study Club. Leslie A. Sandholzer read a paper on "Bacteriophage and Its Relation to Oral Infection," in which he gave a critical review of the field of bacteriophage therapy, especially as it involved dentistry. He questioned the reported cures of oral infection by use of this agent, and indicated that present evidence did not justify its use in dental practice. J. A. Greenhouse presented three reels of moving pictures of oral operations under various methods of general anesthesia. The films were well received by the audience.

Interest displayed by dentists attending these sessions, as well as other sections of the association, indicated that dentistry is appreciative of the opportunity of cooperating with the general organization.

The Subsection on Pharmacy held one session on Thursday morning, at which John C. Krantz, Jr., of the University of Maryland, presided. Marvin R. Thompson, of the University of Maryland, reviewed the pharmacology of the alkaloids of ergot. He pointed out the differences between the new alkaloid of ergot, which is now called ergonovine and other alkaloids of ergot of the ergotoxine-ergotamine group. He emphasized that the colorimetric reaction for the evaluation of ergot used in the British Pharmacopoeia estimates all the alkaloids, whereas the new alkaloid, ergonovine, differs quite markedly pharmacologically from the alkaloids of the argotoxine-ergotamine group. H. B. Haag, of the Medical College of Virginia, discussed the assay of digitalis, using the pigeon as the test object. The method did not employ the minimum emetic dose, as was employed by Hanzlik and others, but on the other hand showed that the toxic dose is a trustworthy guide to the potency of digitalis when the pigeon is used as a test object. Heber W. Youngken, of the Massachusetts College of Pharmacy, gave a detailed description of the pharmacognostic methods of differentiating between the anterior lobe of the pituitary body and the posterior

lobe of the pituitary body as these substances appear on the drug market to be used for medication. F. K. Riggs, of Rutgers University, discussed the assay of Vitamin B_1 and pointed out that more specific methods than rat growth were necessary. He also emphasized that an absorbate of Vitamin B_1 on international clay was not as valuable as crude yeast and other products that contain B_1 in the restoration of rats that have been placed upon a Vitamin B_1 deficiency. L. F. Tice, of the Philadelphia College of Pharmacy and Science, discussed the colloid chemistry of the two types of gelatin, the acid-treated type and the lime-treated type. He showed that their iso-electric points were different and that for all scientific work for which these gelatins were employed, particularly for the suspensions of the halides of silver, it was necessary to point out which gelatin had been employed. Ruth Musser, of the University of Maryland, reported a study of the use of cyanides on the rat sarcoma antidoting the rat against 3 lethal doses of cyanide by the Chen antidote. It was shown that the antidote of sodium nitrite and sodium thiosulfate not only antidotes the rat but also protects the viability of the tumor. C. Jelleff Carr, of the University of Maryland, reported his studies on the use of dextrose fragments as a sugar substitute in diabetes. Animal experiments indicated that this substance bids fair to be a useful substitute carbohydrate in the diabetic diet. Wm. F. Reindollar, of the Maryland State Department of Health, presented a paper explaining a new method used for the titration of iodide and iodine as they occur in common solution in many of the United States Pharmacopoeia preparations. E. I. Evans, of the University of Chicago, discussed the emetic doses of extract of ergot, ergotoxine and ergonovine. He showed that ergonovine produced no emesis clinically, as does ergotoxine. The meeting was closed by a paper by Richard A. Deno, of the Medical College of Virginia, presenting an elaborate histological study of the involution of the mouse uterus.

Papers dealing with various phases of bacteriology and immunology were presented on June 17 and 18 at well-attended sessions of the thirty-first meeting of the Central New York State Branch of the Society of American Bacteriologists. The morning of June 17 was devoted to a symposium on "Immuno-Chemistry" in conjunction with the Section on Chemistry. The meeting was opened by Sanford B. Hooker, of the Evans Memorial Hospital; he brilliantly reviewed the concepts and experiments which deal with antigen-antibody interactions. He discussed these phenomena from the point of view of the physical chemist and from the point of view of the organic chemist, calling attention to the "unusually rapid increase in the number of investigators who are applying physico-chemical concepts and methods to the problems of immunology." Emphasis was given to the importance of surfaces and to the presence of multiple binding-groups on at least one of the kinds of molecules involved in antigen-antibody reactions. Dr. Hooker discussed these reactions on the basis that "serology deals mostly with molecules and particles within the range of size that in many reactions is governed by the rules of colloidal chemistry." In conclusion he stated: "Immuno-chemistry offers tools for the clearing and cultivation of the difficult domain of protein-chemistry in general; it can contribute richly to our effective understanding of disease and of many substances that are vital to the continuity of normal bodily function." He predicted that "some of these potentialities will be more fully realized in the immediately forthcoming years." Forrest E. Kendall, of Columbia University, discussed, in detail, the methods and principles involved in the chemical preparation of the specific polysaccharide antigens of the pneumococcus. He outlined the concepts which he and Dr. Heidelberger have formulated to explain the interaction of the pneumococcus and its products with antipneumococci serum. Their hypothesis is predicted on the assumptions of the law of mass action. Kenneth Goodner and Frank L. Horsfall, of the Rockefeller Institute, then described some of their experimental work which shows that lipids play an essential rôle in the antigen-antibody interactions which they have studied with the pneumococcus and its fractions and antipneumococci serum. They indicated that lipids have a very important function in this connection *in vivo* as well as *in vitro*.

On the morning of June 18, the bacteriologists joined with the Section on Medical Sciences for the Theobald Smith Memorial Session (see report of the section).

Papers dealing with fundamental subjects were presented during the afternoon session on June 17. A portion of the session was devoted to bacterial taxonomy. David H. Bergey proposed that the genera *Staphylococcus* and *Micrococcus* should be separated on the basis of source and pathogenicity; the genus *Staphylococcus* to be composed entirely of pathogenic species. Robert S. Breed, of the New York State Agricultural Station, then reviewed the systematic relationships of the red chromogenic bacteria, advocating a reduction in the number of species to be included in the genus *Serratia* and suggesting that certain atypical cultures should be included in the genus *Proactinomyces* Jensen. H. J. Conn, of the New York Agricultural Experiment Station, advocated the grouping of many non-spore-forming soil bacteria in the genus *Bacterium*, for instance, the crown-gall organism, the legume nodule bacteria and the "radiobacter." Hubert C. Carel reported that

the intestinal flora of man and other animals was greatly reduced by the ingestion of a water-soluble form of alpha-naphthol. In fact, in certain instances, the bacteria were almost all killed according to his findings. The results of studies concerning the oxygen requirements of bacteria and the amount of oxygen available to bacteria in liquid media were reported by Otto Rahn, of Cornell University. He found that rapidly reproducing *Bacterium coli* consumed approximately 10^{-10} mg of oxygen per bacterium per hour. The presence of 2 per cent. glucose did not alter the amount of oxygen which was utilized. Emphasis was placed upon the fact that liquid cultures must be aerated to permit maximum growth. Miss Grace Kimball, of Cornell University, reported that the budding of young yeast cells is inhibited to the extent of from 20 to 30 per cent. when they are exposed to a magnetic field of 4 gauss, which is 25 times stronger than the earth's field. The preparation of bacteriophage of high purity, prepared by a modified Kligler-Olitzki technique and concentrated by the Flosdorf-Mudd method, was explained by Leslie A. Sandholzer, of the University of Rochester. The purified material contains no protein and only 22 mgm of nitrogen per gram of dry material. It was stated that 0.1 gm of the purified substance dissolved in 100 cc of fluid yielded a titer as great as 10^{14}. Some of the properties of this new material were described, and its advantages for chemical and physiological investigations were explained. A. V. Syrocki, J. E. Fuller and R. L. France, of the Massachusetts Agricultural Experiment Station, reported a method for differentiating members of the *Escherichia-Aerobacter* group on the basis of their acid production and its subsequent effect upon dissolved iron.

The afternoon of June 18 was devoted to a symposium on the microbiology and preservation of foods. Studies concerning the influence of commercial canning methods upon microorganisms and vitamins were reported. O. B. Williams, of the National Canners Association, explained how experimental methods can be applied effectively in the determination of processes necessary in the canning of foods. W. B. Esselen, Jr., of the Massachusetts State College, reported that a 20 per cent. cranberry diet materially reduced the number of fecal gas-producing and *B. coli* organisms. Furthermore, "diets of 20 per cent. apple, blueberry and cranberry materially decreased intestinal putrefaction." These diets also increased the acidity of the contents of the cecum and large intestine. The experiments were conducted on white rats. Then C. R. Fellers, Walter Stepat and G. A. Fitzgerald, of the Massachusetts Agricultural Experiment Station and Birdseye Laboratories, presented the results of determinations of the ascorbic acid (Vitamin C) content of lima beans after shipping, freezing and canning. They found that fresh immature lima beans are a good source of vitamin C, while the mature beans contain only traces of this vitamin. The vitamin content was reduced 30 per cent. during shipment in the pod in iced hampers over a two-day period; cooking fresh beans caused a loss of 60 per cent.; and cooked frozen beans contained from 20 to 40 per cent. more vitamin than canned beans. G. L. Mack, D. K. Tressler and G. C. King, of the New York State Agricultural Experiment Station and the University of Pittsburgh, presented the results of studies on the vitamin C content of string beans. Two papers dealing with the preservation of grape juice were read. First, Carl S. Pederson and D. K. Tressler, of the New York State Agricultural Experiment Station, pointed out that many factors, especially the amount of oxygen present and the quality and type of container, influence the final product. Secondly, Carl S. Pederson, E. Arthur Beavens and Harry E. Goresline, of the New York State Agricultural Experiment Station, presented an excellent report of studies on the pasteurization of juices from different varieties of grapes. They found that different minimum temperatures are required for the juice from different varieties of grapes. The session was closed by K. Pierre Dozois, of the University of Maryland School of Medicine, who described the conditions under which crab meat is produced and explained the need for improvements in sanitary methods.

On Wednesday evening, prior to the Maiben Lecture, approximately 75 bacteriologists attended a dinner given in honor of their guests.

SECTION ON AGRICULTURE (O)

(Reports from H. B. Tukey, M. T. Munn and W. A. Davidson)

The joint summer meeting of the American Society for Horticultural Science, the American Society of Plant Physiologists and the Physiological Section of the Botanical Society of America, held in conjunction with the American Association for the Advancement of Science, consisted of two sessions of invitation papers, held at the University of Rochester on Wednesday, a day of field trips to the New York State Agricultural Experiment Station at Geneva on Thursday forenoon, and to Cornell University on Thursday afternoon, there combining with the semi-centennial celebration of the founding of Sigma Xi on Friday and Saturday.

The central theme of the symposium on the physiology of reproduction in higher plants attempted to view the plants and their processes in their entirety rather than in isolated sections and details. Accord-

ingly, the contributions by those on the program, including E. J. Kraus, of the University of Chicago, H. R. Kraybill, of Purdue University, T. G. Phillips and George F. Potter, of the University of New Hampshire, H. H. McKinney, of the United States Department of Agriculture, and H. C. Thompson, of Cornell University, brought together particular lines of endeavor with particular plants, attempting to coordinate various findings in the general scheme of things.

In studies on the composition of fruit-bud formations in apple trees, it was pointed out that analyses of samples of carefully selected spurs indicate that the carbohydrate nitrogen balance is closely related to their fruitfulness. Within limits the larger spurs and those with the greater dry weight are the blossoming spurs; also the ratio between starch and insoluble nitrogen is proportional to the percentage of blossoming in spurs, whereas reducing sugars and soluble nitrogen show no such relation. General sampling of spurs from trees under orchard conditions show that other factors, comparatively few of which are known, may limit fruitfulness, since the whole range of blossoming response may be found in spurs that can not be distinguished on the bases of their carbohydrate nitrogen relationship.

Vernalization as applied to certain winter annual plants, as winter cereals, daffodils and Spanish iris, and certain biennials, such as the beet, was discussed in terms of the physiological processes involved. It was pointed out that certain species and varieties possessed different optimum environmental requirements during their several critical growth phases, that these optimum requirements must be met within certain limits, otherwise sexual reproduction will not occur or it will be delayed, and that certain of these environmental requirements during the first developmental phases in certain plants can be supplied artificially to the germinated seeds or bulbs before planting. Studies on wheat indicate that the greatest number of seeds are produced under light and temperature conditions which do not favor the earliest sexual reproduction which is characteristic of a given variety. From the practical view-point, it was considered that the problem of crop adaptation can best be solved through the development of better adapted varieties through breeding and selection, rather than through vernalization. In discussing the relation of temperature and length of day to reproduction, it was pointed out that the photoperiod of a plant can be definitely modified by temperature factors; high temperatures, for example, favor seeding in lettuce, whereas low temperatures favor seeding in beets.

Participants in the second session were Z. I. Kertesz, of the New York State Experiment Station, A. J. Heinicke and O. F. Curtis, of Cornell University, and David R. Goddard and Paul E. Smith, of the University of Rochester.

The trip to the New York State Experiment Station at Geneva included exhibits on breeding of cultivated fruits; polyploidy in deciduous fruits and chromosome structure; varietal suitability of fruits for juice purposes; fertilizer placements, germination and root distribution of vegetable crops; germination of light-sensitive seeds; artificial culture of isolated embryos of deciduous fruits; and stock and cion relations, compatibilities and unions.

Following a luncheon at Geneva, the tour continued to the Cornell University laboratories, greenhouses and orchards. Visits were made to see entire apple trees enclosed in glass cages; orchard soil management studies; photoperiod and temperature studies in relation to florist crops; relation of temperature and photoperiod to seeding in onions, beets and spinach; and other related physiological problems.

The Association of Official Seed Analysts met at the Rochester Colgate Divinity School on June 16, 17 and 18, and at the Agricultural Experiment Station at Geneva on June 19. During the meetings thirteen papers on seed-testing were presented and there were six papers that dealt with seed inspection, seed control and the relation of seed testing to the seed trade. Special consideration was given at this meeting to the application of the science of seed testing to the seed trade.

This twenty-eighth annual meeting of the Association of Official Seed Analysts of North America was the largest in attendance ever held.

Progress in the development of standard rules and equipment for seed testing was reported by E. H. Toole and M. T. Munn, of the United States, and W. H. Wright, of Canada. In a discussion of what seed analysts and control officials can do to curtail the use of untested and unadapted seed a plan was outlined to bring this matter to the attention of the seed-buying public. A committee was appointed by the association to work with a committee of the American Seed Trade Association looking forward to a solution of problems of mutual interest in seed distribution. Two important phases of seed work, namely, physiology of germination and seed sanitation, were concentrated upon.

The report of the research committee, especially with reference to its activities in the distribution of referee samples, was met with considerable interest and response in view of criticisms that there have been excessive variations in results of tests from different analysts. The association moved to establish the research committee on a more permanent basis that it may more efficiently plan an effective program.

The election of the following officers for 1937 was announced: *President,* G. A. Elliott, Department of Agriculture, Ottawa, Canada; *Vice-president,* Miss Emma Sirrine, Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C.; *Secretary-Treasurer,* W. A. Davidson, Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C.

SCIENTIFIC EVENTS

HABITAT GROUP OF EMPEROR PENGUINS AT THE FIELD MUSEUM

A HABITAT group of rare emperor penguins, composed of specimens collected by Admiral Richard E. Byrd on his last expedition to the Antarctic (1935), was opened to public view at the Field Museum of Natural History on July 7.

The specimens are a gift to the museum from the Chicago Zoological Society, which obtained them from Admiral Byrd. They were taken to Chicago alive and were for some time resident at the society's zoological gardens at Brookfield. However, they subsequently died of a respiratory disease. As the best means of preserving them in the semblance of life, the Zoological Society presented them to the museum, where they now appear, mounted in lifelike attitudes amid a reconstruction of their natural environment in "Little America."

The group was planned and prepared under the direction of Rudyerd Boulton, assistant curator of birds. John W. Moyer, staff taxidermist, mounted the birds, and the scenic background is the work of Charles A. Corwin, staff artist, and Arthur G. Rueckert.

The emperor penguins are the largest and rarest of all penguins, according to Mr. Boulton, who writes:

> They are found only at the earth's southern extremity. They stand from three and one half to four feet tall, and weigh on the average about 73 pounds, but large specimens have been known to reach as much as 94 pounds. The average temperature of the region they inhabit is 50 degrees below zero. The birds are flightless, using their small highly specialized wings principally to aid them in swimming. Usually they walk in an upright position, but when in a hurry they glide over the ice and snow on their stomachs, using both feet and wings to assist them in locomotion. Their average life span is about 34 years. They have few enemies, although they are preyed upon to some extent by whales and seals. Because of the rarity of their contacts with men, they display no fear, and have been found by explorers to be remarkably tame.
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> One of the most interesting things about the emperor penguins is their unique method of incubating their young. The eggs are laid during the long Antarctic night, only one to a female. After an egg is laid, it is rolled on top of the bird's foot, and a flap of loose skin folds over it to protect it and incubate it. When the bird is tired of carrying the egg thus, it rolls it off the foot, and immediately a number of others rush up to roll it on theirs. Both males and females participate in this transference of eggs, and when finally hatching occurs it is as likely to be while the egg is in custody of a male as a female. In the great majority of cases the egg is probably completely lost to its own parents, and the chick, when hatched, likewise probably seldom comes into the care of its own progenitors. The chicks, in their earliest stages, are, like the eggs, cared for by being folded in the skin flaps above the adults' feet. Because of the frequent transfers of both eggs and chicks from one adult to another a great many of the eggs are broken, and many of the chicks killed. The mortality among the young is estimated at 77 per cent.

THE DUST BOWL AREA

ONLY about half the land in the Southern Plains region—the area called the "Dust Bowl" because of recent spectacular wind erosion—has been seriously eroded, according to a survey by the Soil Conservation Service covering 25,000 square miles in twenty counties of Texas, Kansas, Colorado and Oklahoma.

A preliminary report, covering 15,810,885 acres, shows that approximately 7,091,000 acres, or about 43 per cent. of the surveyed area, is suffering only slightly from wind erosion, with a considerable area completely unaffected. Approximately 8,710,000 acres are affected to an extent regarded as serious. Included in the survey were 16,805 farms valued at $189,876,291.

In announcing the preliminary results of the survey, H. H. Bennett, chief of the service, pointed out that in the Southern Plains country, as elsewhere, there are certain areas unfitted by nature for cultivation. Also in this region, as in all other regions, unwise land use and ill-advised farming practices have contributed to the impoverishment of other areas of good crop land. The results of this survey indicate clearly, however, that the Southern Plains is not yet a desert by any means and that the opportunity for agriculture there is far from ended. Nevertheless, the Southern Plains farmer must quickly adapt himself to natural conditions, if wind erosion is not to spread throughout most of the region. Conservation farming, involving precautionary crop planning, contour tillage and other measures of soil and moisture conservation must be adopted.

Prior to the survey just completed, the actual extent of erosion damage in the area was not known, although in the summer of 1934 the service conducted a nation-wide erosion reconnaissance survey, which included in its broad appraisal of erosion damage the territory