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THE THIRD MINNEAPOLIS MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Edited by Dr. HENRY B. WARD

PERMANENT SECRETARY

INTRODUCTION

THE North Central section of the country has welcomed the association for six of its ninety-six meetings thus far held. The twenty-first meeting was held at Dubuque in August, 1872, and was the first in this territory. The next was held at Minneapolis in August, 1883; this was the thirty-second meeting of the association. Just a decade later the forty-second meeting was held at Madison, Wisconsin, in August, 1893. In December, 1910, the sixty-second meeting was held in Minneapolis, and in December, 1929, the eighty-sixth meeting was held at Des Moines, Iowa. The meeting just closed was the ninety-sixth of the association and the third to be held in Minneapolis. It will be noted that three of these six were summer meetings held under the old schedule according to which summer meetings were the rule. Then came the change to winter meetings and two such have fallen in this territory. Under the most recent plan by which two meetings are held each year the association went to Minneapolis this summer and has found the experiment in all ways successful.

On this occasion, as at previous Minneapolis meetings, the University of Minnesota placed all its facilities at the disposal of the association and its associated societies. All the sessions were held in buildings on the university campus or the university farm campus, with the exception of a single day,

Thursday, when the members of the Section on Medical Sciences and guests went down to Rochester to enjoy the hospitality of the Mayo Foundation, as recounted later in this report in the records of that section.

The association was fortunate in enjoying splendid weather throughout the period of meetings. The twin cities, Minneapolis and Saint Paul, looked their handsomest, the surrounding country was in its most attractive garb, and the splendid accommodations, joined with the cordial and hospitable reception accorded members and visitors, made the occasion one which will long be remembered.

The attendance at meetings was good and the totals of members present amounted to a considerable figure, but the registrations formally made at the registration office of the association were not as large as expected, although they were highly representative both in the personnel of those who registered and in the range of territory from which they had gathered. Perhaps it was the good weather or the attractions out of doors or the widely scattered meeting rooms and the intense interest manifested in meetings and group discussions in buildings and offices around them; but officers of sections and societies were at a loss to account for the low figures of official registration records in view of the number of members known to be in attendance at various places. The chairman of the local committee secured accurate data on the number of members present and not registered, which he reported as 269 from the Twin Cities and 619 from the outside, or 888 in all, mostly in organizations meeting on the farm campus. One may safely say that at least four or five times as many members actually participated in the activities of the meetings as appear in the official record of registrations. The total registration was 417, and the following data indicate the distribution of this group.

REGISTRATION AT THE MINNEAPOLIS MEETING

From the United States: Minnesota, 209; Wisconsin, 24; Illinois, 23; Iowa, 22; New York, 17; North Dakota, 14; District of Columbia, 13; Michigan, 11; Pennsylvania, 7; Kansas and Missouri, 6 each; Maryland, Nebraska and South Dakota, 5 each; California, Colorado, Idaho and New Jersey, 3 each; Kentucky and Texas, 2 each, and Arkansas, Connecticut, Georgia, Indiana, Maine, Montana, Oklahoma and Tennessee, one each.

Canada sent four from Manitoba, and one each from British Columbia, Ontario and Saskatchewan.

Other countries contributed three from Hawaii, and one each from the Philippine Islands, Holland and India.

MINNESOTA STATE MEDICAL ASSOCIATION

In making preliminary arrangements for the meeting that had been set for Minneapolis it was found that the Minnesota State Medical Association would be in session in that city at the same time. Accordingly, through conferences with Dr. E. A. Meyerding, secretary of that organization, contacts were established with the officers and provisions made for joint sessions. The outstanding feature which concerned both associations and their guests as well as the public was the provision of a speaker for the Monday evening joint session with the American Association. Dr. William P. Murphy, of Harvard University Medical School, Boston, was secured by the Minnesota State Medical Association. Dr. Murphy is well known for his work on anemia and in 1934 was Nobel prize winner in physiology and medicine. The subject of his address was "Diseases of the Blood."

Dr. W. A. Coventry, of Duluth, president of the Minnesota State Medical Association, presided at the joint session and Dr. Karl T. Compton, president of the association, by invitation functioned with him as joint presiding officer. The address was given in the Northrop Memorial Auditorium and attracted an audience from both associations and their guests that comfortably filled that fine assembly room.

Joint sessions of the Minnesota State Medical Association with the Section on Medical Sciences (N) of the association were also held on Tuesday. In the morning the joint session was a symposium on "Diseases of the Blood," with papers by Drs. H. L. Squier, of Milwaukee; Walter A. Bloedorn, of Washington, and William P. Murphy, of Boston.

Following these papers were scientific demonstrations and exhibits, provided through the agency of the Minnesota State Medical Association and installed in the Minneapolis Municipal Auditorium. These were varied in character and too numerous to be even summarized here. Full details are given in the report of the Section on Medical Sciences printed later in this account. Following the scientific demonstrations the joint session listened to a paper and discussion on "The Prevention of Whooping Cough with *Bacillus pertussis* Vaccine," by Dr. Louis W. Sauer, of Northwestern University Medical School.

The exhibits and demonstrations of the Minnesota State Medical Association were open freely to members of the American Association during the meeting. In addition to the usual commercial exhibits the display contained a large number of scientific exhibits sponsored by the University of Minnesota, the American Medical Association, the Mayo Foundation for Medical Research and the Council on Physical Ther-

apy. The cooperative arrangement was appreciated by many and the hope was expressed that similar joint sessions might be provided at future meetings. One of the Minneapolis daily papers in a prominent editorial commenting on the situation wrote, "We like to believe, and that not without justification, that among men of medicine and of science we see self-effacement reaching its pinnacle."

SPECIAL FEATURES

The program of the Minneapolis meeting was characterized by emphasis on certain features that had been developed to some extent in previous summer meetings but were even more largely emphasized at this time. The various sections provided for numerous symposia and joint meetings involving several sections and affiliated societies in the discussion of general topics of mutual interest. These undertakings were strikingly successful. They included short programs of invited papers definitely related to the particular subject in which authors were allowed sufficient time for effective development of the topic and opportunity was also given for discussion which is often impossible when programs are filled with the numerous contributions offered under other conditions.

The field trips which are of especial interest in the field of biology found in this region larger opportunity than frequently is possible and the Sections in Agriculture, Botany, Zoology and their affiliated societies carried students in these subjects into actual contact with the characteristic features of the region and of the enterprises that have been so highly developed in it by virtue of favorable conditions. These special offerings and the success they achieved are referred to in the reports of the particular sections and societies. The fitness of the summer season and the evident desire of students in many phases of biology to find such opportunities justify laying additional stress upon this feature in future summer meetings. Attention should also be directed to the organization of a new scientific society, the North Central Branch of the Society of American Bacteriologists, as a significant factor in the advancement of science growing out of the Minneapolis meeting. The record of the society and its meeting is given later in this report.

The influence of the meeting was extended through generous press notices in local and regional papers and more widely by reports sent out by various press services and freely used throughout the country. Prominent members of the association on invitation made addresses over the radio during the meetings and thus served to spread even more widely the influence of the association. In the programs of various sections and societies about 340 papers were listed and a number of others were added during the sessions. The all too brief review of these proceedings given by society secretaries forms the second section of this report. In many cases these records were made by temporary officers, mostly from the staff of the University of Minnesota, whose contribution to the work deserves public recognition.

GENERAL SESSIONS

The series of addresses secured for the evening general sessions were related to special problems in science to-day and to the region in which the meeting was held. President Karl T. Compton, who was present throughout the sessions in Minneapolis, presided, except on Tuesday evening, when the permanent secretary was asked to introduce the speaker. Both the topics chosen for the evening addresses and the speakers themselves must have appealed strongly to the community as well as to the visiting scientists, as the audiences were large and paid close attention to the scientific discussions presented by the speakers.

On Monday evening the address by Dr. W. P. Murphy was given before the joint session of the two associations, as already noted. On Tuesday evening Dr. Richard P. Strong, of the Harvard University Medical School, spoke on the "Importance of Ecology in Tropical Diseases," analyzing the factors involved in the limitation, extension and modification of originally local diseases by virtue of natural conditions and the changes affected by human agencies, both directly and indirectly. This was the annual Hector Maiben Lecture. It was illustrated by lantern slides and films, including some obtained on Dr. Strong's recent expedition into central Africa.

On Wednesday evening, Dr. Isaiah Bowman, recently elected president of the Johns Hopkins University, spoke on "The Land of Your Possession." He discussed the disturbing factors of the present and emphasized the true value for permanent reconstruction of certain neglected scientific data.

On Thursday evening the subject of "The Nature of Cosmic Rays" was discussed by Dr. William F. G. Swann, director of the Bartol Research Foundation. By virtue of the brilliant presentation given this subject the speaker commanded the close attention and constant interest of his large audience.

On Friday evening, Dr. Philip Fox, director of the Adler Planetarium and Astronomical Museum, spoke on "The Scale of the Universe." Step by step he led his audience from the measures of the earth and solar system to the magnitude of light years and the limits of the known universe. This closing general session was well attended and the audience was expressive of its appreciation to the lecturer.

Two other general sessions were held during the Minneapolis meeting. The first, on "The Dissemination of Science," came on Wednesday morning and the

second, a symposium on "Conservation," was placed on Thursday morning.

Dissemination of Science

(Record by Frank Thone)

A look into the possible future of scientific publication and bibliography was afforded by the session on the "Dissemination of Science," at which Watson Davis, director of Science Service, Washington, D. C., presented suggestions for a centralized cooperative effort toward: (a) Publication of papers that can not now secure prompt and complete publication; (b) means for making available "out-of-print" journal articles; (c) bibliographical service that would classify and index all past and current scientific literature so as to make it available to all scientific workers; and (d) development of microphotographic and other mechanisms to be used in the above services.

Dr. J. McKeen Cattell, editor of Science, who presided, explained that in many cases scientific journals are unable to publish papers until a year after they are submitted. Whereas it has been estimated that publication costs about 5 per cent. of the cost of the research, the economic loss due to a year's delay in publication might be considered to consist of a year's interest and depreciation on the value of the results of the research, a matter of some 15 per cent., which is an argument for prompt publication.

Mr. Davis outlined a project for scientific publication and bibliography which might be organized under non-profit, centralized and cooperative national auspices as the Scientific Information Institute (abbreviated SII). Covering all branches of science, it could be operated with the cooperation of existing interscience national organizations.

Immediately capable of materialization is the function of making possible the publication of scientific papers that can not now secure prompt or complete publication. The bibliographic function is a much larger project, which will require much further planning, investigation and development of mechanisms before its realization. Details in mimeoscript (August 19, 1933) are obtainable from Science Service, Washington, D. C.

The publication function contemplates that editors of journals submit to SII manuscripts they can not publish promptly or completely. The sponsoring journal would publish an abstract, informing readers the complete paper could be had from SII in the form of slightly reduced size photographic prints of typescript, illustrations, etc., or, when reading machines are available, as microphotographs on 35 mm film. Optical and photographic mechanisms necessary to SII are under development, and Mr. Davis expressed the hope that it would be possible through securing financial support to provide for their early production.

From the discussion that followed the paper it was revealed that the mechanisms and procedures suggested would find use outside the fields of physical and natural science, as those interested in history, statistics and planning expressed hope that the projected methods and apparatus could be utilized in solving some of their pressing publication problems.

Symposium on Conservation

(Report from D. E. Minnich)

The general session on Thursday morning, a symposium on conservation, was attended by about 1,500 people. This symposium was jointly sponsored by the University of Minnesota and the association. The program was planned by a special local committee, consisting of Dr. W. S. Cooper, Dr. W. A. Riley, Dr. Henry Schmitz and Dr. D. E. Minnich, chairman.

Dr. Lotus D. Coffman, president of the university, presided. He opened the program with a brief address of welcome, in which he stressed the fundamental importance of scientific work in the solution of current problems. Dr. Karl T. Compton, president of the association, replied, emphasizing briefly the importance of conservation in all its aspects. These introductory remarks were followed by the principal addresses by Dr. C. K. Leith, chairman of the Department of Geology at the University of Wisconsin and vice-chairman of the Planning Committee for Mineral Policy of the National Resources Board, and by Dr. Charles E. Merriam, chairman of the Department of Political Science at the University of Chicago and member of the National Resources Board.

Dr. Leith spoke on "Mineral Conservation." He reviewed the state of the mineral resources of the country and pointed out that while tremendous technological advances in mining had taken place, the present social and political conditions were effectively preventing the use of this knowledge in the interests of conservation, with the result that disastrously wasteful methods were rapidly exhausting our prime resources.

Dr. Merriam spoke on "National Planning." He stressed the importance of coordinating national and local effort, the need of careful advance consideration and, finally, the necessity of authentic factual bases for plans. In concluding, he said: "If the devices of social invention are able to keep pace with the scientific organization of nature, the new world may be a fairyland of human achievement. The burdens of hunger, disease, toil, fear, may be lifted, the book of leisure may be opened and the treasures of human

appreciation and enjoyment made available to the mass of mankind."

EXHIBITS AND DEMONSTRATIONS

The remarkable series of exhibits and demonstrations organized by the Minnesota State Medical Association and shown in the Municipal Auditorium has already been described. In addition, special showings were made by departments of the university in their own laboratories and museums. Some twenty departments kept open house during all or part of the week to welcome visitors. Numerous comments on these features evidenced the interest aroused thereby; this was widely distributed but especially noted for the material shown by the library and departments of anthropology and zoology. However, the greatest center of enthusiasm was apparently at the University Farm, where the largest groups were assembled.

ENTERTAINMENT

Officers and members of the association were tendered a general informal reception by Dr. Lotus Delta Coffman, president of the University of Minnesota, and Mrs. Coffman. This was held in the lobby of the Northrop Auditorium on Tuesday evening, June 25, immediately following the Maiben Lecture. The president and deans of the university with their ladies as well as the officers of the association were in the receiving line and greeted the members and guests who assembled to the number of several hundred. The foyer and corridors of the auditorium were decorated with plants from university greenhouses and afforded an attractive and spacious meeting ground for exchange of greetings and social contacts. Group dinners were given during the week by various sections and societies, and many courtesies were extended to visitors by the Campus Club and city organizations as well as by members of the faculty and other residents of the city.

Special recognition should be given to the effectiveness of local arrangements. The ample and beautiful grounds of the university afforded an attractive and inspiring setting for a meeting. The new buildings and their equipment furnish all the desired conveniences for the sessions of sections and societies. The splendid Northrop Auditorium, which was used for general sessions and certain large meetings, is not only beautiful and comfortable but possesses such excellent acoustic properties that, despite the size of the room, the addresses and discussions were carried without loss to each listener in the audience. The Division of Visual Instruction of the University of Minnesota was highly complimented by many for its perfect service in providing for all needs of speakers not only in the auditorium but in widely scattered meeting places, even though the different demands included all varieties of transparent and opaque projection. The local press service, which was directed by T. E. Steward, head of the University Press Bureau, was particularly effective in securing the attention of the local newspapers. The amount and quality of the material utilized enlisted comment from many visitors.

BUSINESS SESSIONS

At Minneapolis the council held sessions on Monday afternoon, June 24, and Friday morning, June 28. In addition to matters of immediate importance for the conduct of the meeting the following items of general business were handled.

The American Academy of Tropical Medicine was accepted as an affiliated society and the American Dietetic Association as an associated society.

The report of a subcommittee on the Eli Lilly and Company award on the recommendation of the executive committee was unanimously approved in the following form:

THE THEOBALD SMITH AWARD IN MEDICAL SCIENCES

Established by Eli Lilly and Company

Purpose: To recognize demonstrated research in the field of medical sciences, taking into consideration independence of thought and originality.

Eligibility: Any investigator in an appropriate field of work who is less than 35 years of age on January 1 of the year in which the award is made.

Nominations: Any fellow of the association, except members of the award committee, may submit to the permanent secretary's office in Washington, D. C., the name of a proposed recipient of the award with full data regarding the personality, training and research work of the person suggested.

Only nominations can be considered in any year when received with data suggested on or before May 1 of that year.

Committee of Award: The president of the association shall serve as chairman and shall name four fellows of the association to serve with him as members of the committee which shall take charge of the selection of the winner of the award and decide all matters arising at any time in connection with the matter. The four members named shall be assigned by lot terms of service of one to four years. Thereafter, the president of the association shall name annually one fellow to replace the member whose term expires at that time.

Announcement: The name of the winner of the award shall be announced at the summer meeting of the association and printed in the official account of that meeting. The award shall be presented at the winter meeting of the association, at which time the winner may be invited to present a paper on the subject of his work.

If the committee shall decide that no outstanding work has been presented for their consideration, the award shall

not be made, and the money retained for use as a later award.

Award: The award will be $1,000 and a bronze medal. In addition, the sum of $150.00 or so much thereof as may be necessary is to be provided for traveling expenses if the recipient of the award is present in person at the winter meeting.

Two resolutions which had been adopted by the Southwestern Division of the association were presented to the council for approval. These resolutions dealt with the relations of the Federal Government to local conservation projects and local scientific investigators. The council adopted the following general resolution applying equally in similar cases to all sections of the country:

Having received from the Southwestern Division of the Association two resolutions concerning the planning and execution of Federal projects in the southwest involving the application of many branches of science toward the solution of conservation problems in that region, the council of the American Association for the Advancement of Science wishes to emphasize the need for close cooperation between national and local leaders in attacking the strikingly divergent problems that are peculiar to the many widely separated regions of our country.

The permanent secretary presented the following communication from the Department of State:

The Government of the United States has been invited to take part officially in the Seventh American Scientific Congress which is to be held in Mexico City from the 8th to the 17th of September of this year. It is expected that this invitation will be accepted and that an official delegation will shortly be appointed.

In addition, however, to inviting this Government to appoint official delegates to the Congress, the Mexican Government has requested that information concerning the Congress be brought to the attention of the universities, learned societies and scientific organizations in the United States in the hope that a large number of American scientists will wish to attend the Congress and take part in its proceedings. A copy of the program of the Congress is enclosed.

The Department would, therefore, appreciate anything that you may be able to do to bring notice of the forthcoming Congress to those to whom it would be of interest.

The council voted to cooperate to the fullest extent in promoting the congress. The president of the association was authorized to appoint two delegates to the congress. It was further voted that all affiliated societies and academies be requested to inform their membership of the event and also to appoint delegates and further encourage participation in the congress as far as may be feasible.

SCIENTIFIC SESSIONS

SECTION ON MATHEMATICS (A)

(Report from Dunham Jackson)

The section met on Tuesday morning in conjunction with the Section on Physics (B). The chair was occupied successively by Professors W. L. Hart, W. E. Brooke and J. T. Tate. About sixty members and guests were present. The program consisted of three invited addresses on the general theme of properties of differential equations important in quantum mechanics. The titles of the papers and their authors were as follows: "Oscillation Theorems Associated with Boundary Value Problems," by Professor R. W. Brink, of the University of Minnesota; "The Stokes Phenomenon," by Professor R. E. Langer, of the University of Wisconsin; "Applications of Approximation Methods to Physical Problems with Particular Reference to Molecular Spectra," by Professor D. M. Dennison, of the University of Michigan.

A joint luncheon of Mathematics (A), Physics (B) and Astronomy (D) in the Minnesota Union on Tuesday at noon was attended by forty persons. The company was addressed briefly by President Compton of the association, who was introduced by the chairman of Section B, Professor J. T. Tate.

SECTION ON PHYSICS (B) AND ASSOCIATED SOCIETIES

(Report from J. T. Tate and Eric R. Miller)

The Section on Physics (B) met on Tuesday morning in conjunction with the Section on Mathematics (A) to hear three invited addresses on the general subject of the properties of differential equation important in quantum mechanics. The speakers and their subjects are given in the report of the Section on Mathematics.

On Tuesday afternoon the section met jointly with the Section on Astronomy (D) to hear an invited address by Dr. Otto Struve, of the Yerkes Observatory, on the subject, "Some New Trends in Stellar Spectroscopy." Dr. H. R. Morgan, of the U. S. Naval Observatory, presided. About seventy members and guests were in attendance.

The American Meteorological Society held five sessions from June 27 to 29 with 28 invited papers, mostly on the problems of the Upper Mississippi Valley and the Great Plains.

Progressive or cyclic change of climate was illustrated in papers by A. F. Meyer, L. R. Wilson, N. G. Anderson, T. G. Shipman and E. R. Miller. The idea of doing something about the climate came up in Meyer's paper on rainfall changes and in C. G. Bates's paper on the shelter belt, which was read in the absence of Mr. Bates by R. H. Blythe. Meyer discussed the

possibility of reducing runoff and bringing about a larger percentage of recirculation of moisture on the continent. Mr. Bates was more concerned with the limitations set by climate on the propagation of trees than with the influence of the shelter belt after it comes into being.

The interrelations of climate and plant life figured in several papers. Paul H. Kirk estimated the relative weight of temperature, rain and humidity on the outturn of Minnesota crops. H. L. Shirley gave some idea of the heat budget of a growing forest, and showed the influence of various species of forest trees on the undergrowth. A. O. Dahl, who has been collecting pollen with the cooperation of Weather Bureau stations, reported on his findings, showing that the various species of the same genus are responsible for successive peaks of high frequency of air-borne pollen. He also showed that these peaks recur almost to the day in successive years.

Prediction did not figure largely at this meeting. Seasonal foreshadowing of temperatures in the Missouri and the upper Mississippi valleys on the basis of deviations of the barometer from normal in far-distant parts of the globe was reported by T. A. Blair and A. G. Topil. H. J. Henney showed the results of correlation analysis of the wheat crops of Kansas in terms of the rainfall of one or two years before. G. R. Parkinson applied air-mass analysis to the special problem of forecasting dust-raising winds on the Great Plains. A novel illustration of air masses in motion in both plan and elevation was afforded by the Walt Disney film showing the way the torrential rains at Los Angeles, December 30, 1933, to January 2, 1934, were brought about by the ingress of a tropical Pacific mass of warm moist air, overrunning cold air (and mountains) on the southern California coast, and terminated by the arrival of a cold polar air mass from the North Pacific. This film, the property of the California Institute of Technology, was provided for the meeting through the courtesy of Dr. Irving Krick.

The most elaborate feature on the program was the exhibition of the office practice of the U. S. Engineers Office in dealing with a flood. W. J. Parsons and G. O. Guesmer and assistants from that office first showed the result of correlation of many downpours with the subsequent run-off in the theorem that the floods of successive days' rainfall are superimposed. The methods of applying these ancillary data were illustrated by mapping a hypothetical rainfall, calculating the resulting run-off, and issuing orders for the operation of each dam to send the flood harmlessly down the river and to retain sufficient depth in the pools after the flood, for navigation. Of somewhat similar tenor was the account of the use of weather data in the operation of a public utility plant by A. C. Braun.

The session devoted to air navigation brought forth the liveliest discussion of any. G. W. Vest pointed out that the increasing supply of fresh weather information over the nets of teletypewriter circuits and radio beams along airways has reduced unforeseen weather as a cause of accidents to very small proportions in the statistics of airplane accidents. He called attention to the failure of improvements in landing fields to keep up with the demands of high-speed planes. O. T. Larson pointed out that along routes frequently traversed by airplanes the exchange of weather reports from planes in flight is of mutual advantage. He cited an instance of such reports enabling avoidance of a sheet of cloud in which icing conditions prevailed. The local influence of Lake Michigan on temperature, wind and fog was reported by F. H. Coleman, and H. L. Kirby described an airplane flight on June 19, 1935, when such conditions were encountered.

A remarkably sensitive pyrheliometer and automatic registrations from it were exhibited by L. F. Miller, who has constructed three such instruments for research on solar radiation and the influence of the atmosphere thereon. A novel display of meteorological instruments and climatic graphs and models that he has installed in the Oshkosh Museum was illustrated by R. N. Buckstaff.

One session was arranged for the cooperative observers of the Weather Bureau in Minnesota and adjacent states, but only a few were able to leave their work to attend the meeting. Three interesting accounts of the various phases of the work in the section centers where the cooperative observers' reports are collated and published were given by C. D. Reed, M. R. Hovde and F. H. Coleman. The diplomacy required in obtaining the services of suitable observers and securing uniformly reliable results over a whole state and year after year was expressed in pithy maxims by Mr. Reed. Mr. Hovde gave an account of the editing and publishing of the various reports of a section center and illustrated his improvements in the legibility and usefulness of such publications by exhibiting examples. Mr. Coleman illustrated the varied service demanded of a section director by giving instances of the demands for data for use in agriculture, industry and commerce.

The meeting ended with the exhibition of the motion pictures, "Clouds" and "Back of the Weather Forecast," from the Office of Motion Pictures of the Department of Agriculture.

SECTION ON CHEMISTRY (C)

(Report from S. C. Lind)

Three sessions of Section C were held. The first, on Monday, June 24, was a joint session with Section N (Medicine) under the chairmanship of Dr. du Vigneaud and is recorded in the report of Section N.

The second and third sessions on Tuesday and Wednesday, June 25 and 26, were devoted to twenty-one miscellaneous papers in the fields of physical chemistry, biochemistry, analytical chemistry and industrial chemistry. In the absence of the chairman, Professor M. Gomberg, Professor F. H. MacDougall presided at the Tuesday session and Professor R. A. Gortner at the Wednesday session.

Papers in physical chemistry included one by George Glockler and L. B. Thomas on "The Sensitized Decomposition of Hydrogen with Electrons of Controlled Energy," in which it was found that no decomposition results from electrons of 4.9 volts corresponding to the dissociation energy of H_2. Voltage of 7.7 had to be attained, which corresponds to a metastable state of mercury atoms. It is believed that at higher pressures where energy transfer would be quicker, decomposition at 4.9 volts might be attained. Robert Livingston and C. E. Nurnberger presented a paper on "A Simple Kinetic Interpretation of the Rate of Coloring of Glass by X-Rays." Weldon N. Baker and Victor K. LaMer reported on "The Conductance of Potassium Chloride and Hydrochloric-Deuterochloric Acid in H_2O-D_2O Mixtures," in which they showed that the lower conductivity in heavy water is almost entirely due to the greater viscosity of the solution. H. N. Stephens reviewed "Auto-Oxidation of Saturated Hydrocarbons." I. M. Kolthoff and Charles Rosenblum reported on "The Mechanism of Aging of Fresh Precipitates of Lead Sulfate" by the radioactive indicator method.

Among the industrial papers were a review by Professor C. A. Mann of his exhaustive investigation of the "Organic Inhibitors of Corrosion" and a study of the "Metathesis between Solid and Solution: Calcium Phosphate and Sodium Carbonate," by K. A. Kobe and Thomas F. Doumani.

Organic chemistry was represented by two papers, one by L. I. Smith and L. I. Hansen on "The Action of Methyl Magnesium Iodide on Benzalpropiolphenone" and the other by W. M. Lauer and William Filbert on "The Rearrangement of Some Phenyl Allyl Ethers."

Analytical papers comprised "Attempts to Estimate Cystine in Plant Leaf Material," by R. A. Gortner and Henry Reitz; "Detection of Halides in the Presence of Thiocyanates," by G. B. Heisig and L. M. Heisig; "Difficulties in Estimation of HCN from Plants," by Charles F. Rogers; "The Uronic Acid Content of Feeding Stuffs," by W. M. Sandstrom and G. A. Guanzon, and "The Estimation of Nucleic Acid in the Presence of Other Nitrogeneous Compounds," by W. M. Sandstrom and Floyd C. Olson.

In inorganic chemistry, M. C. Sneed, in his paper on "A Study of Hypophosphoric Acid and some of Its Salts," showed that the probable formula for hypophosphoric acid is $H_4P_2O_6$.

In the field of biochemistry, several very interesting papers were presented, especially those on the variable toxic properties of certain plant foods. The papers were as follows: "Variations of Cyanophoric Powers within Sudan Grass from Seed Commercially Available in Minnesota," by Charles F. Rogers, A. L. Larson and M. L. Spracher; "Variation of Cyanophoric Powers among Individuals of *Trifolium repens* on the University (of Minnesota) Farm Campus," by Charles F. Rogers; "The Copper, Iron, Calcium and Magnesium Content of Northwest Wheats," by C. H. Bailey and W. S. Hutchinson; "The Influence of the Diet on the Composition and Biological Properties of Eggs," by A. R. Patton and L. S. Palmer, and "Inheritance of Diastatic Activity in Wheat," by M. C. Markley.

SECTION ON ASTRONOMY (D) AND ASSOCIATED SOCIETIES

(Report from W. J. Luyten and H. H. Nininger)

As is usual with the summer meetings, the number of astronomers attending was very small; since, moreover, no titles of papers to be read had been received by the secretary, it was decided to hold no regular session for papers but only an informal discussion on topics of individual interest.

The principal feature of the meeting was the well-attended joint session of the sections on Physics (B) and Astronomy (D), at which Dr. Otto Struve, director of the Yerkes Observatory, gave an extremely interesting address on "Some Recent Trends in Stellar Spectroscopy." Starting from the observed difference in the width of absorption lines in stellar spectra, Dr. Struve discussed the several possible interpretations, such as turbulence, pressure and Stark effects, and showed how stellar rotations could be determined by measuring the contours of the absorption lines.

A joint luncheon with Sections A and B constituted the chief social event of the meeting for Section D.

The Society for Research on Meteorites held its sessions on Wednesday and Thursday, June 26 and 27. Six papers were presented and lively discussion was participated in by those present. Especial interest was manifest in a paper presented by H. H. Nininger on the surface features of meteorites as related to the findings of engineers in their study of

streamlined designs. Professor Behnlein, of the Department of Aerodynamics of the University of Minnesota, contributed a valued discussion in this connection.

In the absence of Dr. C. C. Wylie, Dr. E. S. Haynes, of the University of Missouri, discussed the fall of meteorites near Archie, Missouri, on August 10, 1932, and furnished convincing evidence that this meteorite did not belong to the Perseid stream, despite the fact that its fall occurred at the time of maximum intensity for this shower.

The fall of meteorites near Purna, Purbhani District, Hyderabad, India, was described in a paper submitted by Mohd. A. R. Khan, principal of Osmania University College, Hyderabad, India. Other papers were submitted by O. E. Monnig, of Fort Worth, Texas, Bemrose Boyd, of the University of Iowa, and John Buddhue, of Pasadena, California. Of especial interest were two new meteorites of unusual composition described by the Department of Mineralogy of the U. S. National Museum at Washington. Dr. W. F. Foshag described the fall of March 24, 1933, near Pasamonte, New Mexico, as a Howardite. E. P. Henderson and Harry T. Davis described the stone which fell April 21, 1913, in Moore County, North Carolina, as an eukrite with very interesting flight markings.

SECTION ON ZOOLOGICAL SCIENCES (F)

(Report from W. A. Riley)

The Section on Zoological Sciences met on Wednesday. The special feature of the morning session was a symposium of invited papers on "Hormone Activity." Dr. E. J. Kepler presented a review of the function of the suprarenals. He emphasized the rôle that clinicians played in opening up such fields of investigation and illustrated his paper by a number of human cases of the effects of suprarenal tumors and of hyperfunctioning of the suprarenals. Drs. W. D. Allers and E. C. Kendall reported their studies on the influence of diet and mineral metabolism on dogs after suprarenalectomy. The addition of sodium bicarbonate or sodium citrate to sufficient sodium chloride to maintain a positive balance maintained two operated dogs in excellent condition with marked increase in weight, normal blood volume and normal values for the blood constituents for a total of 84 days for one dog and 115 days for the other. These results, like those recently reported by Harrop, show that at least for this interval cortical hormone is not necessary.

Dr. R. A. Waggener reported experiments showing the effects of hyperthyroidism and hypothyroidism upon tissue oxidase. Cretin pups showed a reduction in the oxidases compared with tissues of normal animals, while thyroid feeding produced a slight increase above the normal. Guinea pigs fed the equivalent of two grains of desiccated thyroid until severe symptoms of hyperthyroidism were produced showed an average increase in oxidases of 54 per cent. for liver and of 22.7 per cent. for kidney cortex.

Dr. Emil Witschi discussed "Seasonal Sex Characters of Birds and Their Hormonal Control." Experiments indicate that the reproductive cycle of wild birds is under hypophyseal control. Even castration does not offset the seasonal cycles of hypophyseal activity. Of secondary sex characters, the gonoducts and the bill color are controlled by sex hormones, liberated by the gonads during the breeding season. Sex differences in the plumage are either controlled directly by the genetic constitution of the feather-forming cells (English sparrow) or by hypophyseal hormones circulating in the blood (African weaver finches or the indigo buntings). Female sex hormones and thyroxin eventually shift the plumage character to the female type.

The morning session was attended by upwards of a hundred persons. Wednesday afternoon a small group of zoologists jointly with members of the Ecological Society of America visited the Bunker Prairie sand dunes of Anoka County. The group was conducted by Dr. Samuel Eddy and Dr. C. E. Mickel. In the evening members of the section met with the Botanical Society of America and the Ecological Society of America in a joint dinner and smoker.

The joint session of the American Society of Parasitologists and of the Section on Medical Sciences (N) was held on Friday morning. A program of invited papers dealing largely with problems of medical entomology was enjoyed by an audience of over one hundred.

Dr. R. R. Parker discussed the distribution and host relationships of various species of ticks of the United States which are known to be concerned in the transmission of human disease. Dr. R. G. Green presented the results of his recent studies on the rôle of fleas and ticks in the spread of tularemia in man and animals. The cottontail rabbit is highly susceptible to this disease, and it appears that fleas are a factor in its maintenance in the late winter when ticks are rarely present. Tick infestation of rabbits reaches its maximum in August or September in Minnesota and is subject to marked variations from year to year.

Dr. R. P. Strong discussed "Problems of Onchocerciasis in Africa." Numerous lantern slides were shown, illustrating the skin lesions and the eye symptoms produced by the worms. The conditions favoring development of the *Simulium* vector and the problem of animal reservoirs were considered.

Dr. R. A. Wardle directed attention to the fact that

recent reports on the distribution of the broad tapeworm, *Diphyllobothrium latum,* in Canada might be based on incorrect determinations. His studies led him to believe that the *Diphyllobothrium* commonly found in dogs but very rarely in man in Manitoba was in reality *D. cordatum.*

The demonstration program of the American Society of Parasitologists in the afternoon attracted much favorable attention. On the whole the program of the day drew an unexpectedly large group and demonstrated that there is a wide-spread interest in problems in animal parasitology.

SECTION ON BOTANICAL SCIENCES (G) AND ASSOCIATED SOCIETIES

(Reports from W. S. Cooper, A. E. Murneek and Howard P. Barss)

The Section on Botanical Sciences (G) and the Botanical Society of America did not have independent programs but met jointly with associated societies. The records of the meetings are contained in the reports of the associated societies, as presented by their officers.

The Ecological Society of America held a successful meeting in Minneapolis from June 24 to 28. Registration took place at the Botany Building, on Monday, June 28. In the forenoon of Tuesday, a joint session with the Botanical Society of America was held in the auditorium of the Botany Building, with an attendance of 112. Dr. K. M. Wiegand, vice-president of the Botanical Society of America, presided. Four papers were presented, all dealing with the biological features of the region surrounding the place of meeting.

Dr. Norman C. Fassett, of the University of Wisconsin, described "The Vegetation of the Driftless Area" with special reference to the postglacial history of the region. The other three papers were introductory to the field trips that had been arranged for the following days. Dr. W. S. Cooper, of the University of Minnesota, presented "The Origin and Vegetation of the Anoka Sand Plain," an extensive area of outwash and ancient dunes just north of the Twin Cities. Dr. F. K. Butters, of the University of Minnesota, described the "Vegetation of Northeastern Minnesota," the part of the state dominated by conifers—where certain areas appear not to have been covered by the Wisconsin glaciation. Dr. Samuel Eddy, of the University of Minnesota, described the "Animal Communities of Central Minnesota," giving special attention to the aquatic communities.

A resolution, presented by Dr. W. S. Cooper, endorsing the program of the Quetico-Superior Council in its efforts toward the establishment of an international wilderness area covering the lands bordering the boundary between Minnesota and Ontario, was approved by the two societies jointly and transmitted to the council.

On Tuesday afternoon the botanists and plant ecologists joined in a field trip to the bottoms of the Minnesota River. The animal ecologists visited Lake Elmo for the study of aquatic communities. About 40 attended the two excursions. On Wednesday the two societies joined in an all-day excursion to the Anoka Sand Plain, visiting acid plat meadows, tamarack and cedar bogs, and Pleistocene sand dunes. About 65 were in attendance upon this field trip.

On Wednesday evening members of the Ecological Society, the Botanical Society, sections on Zoology and Botany and guests, numbering 78 in all, joined in an informal dinner.

Thursday and Friday were occupied by a longer trip to the region around Duluth. Included in the itinerary were the Dalles of the St. Croix River at Taylor's Falls, Manitou Falls, Wisconsin, the State Forest Experiment Station at Cloquet, Minnesota, where the party enjoyed the hospitality of the station staff, Jay Cooke Park, near Carlton, Minnesota, and the north shore of Lake Superior as far as Two Harbors; 35 took part in this excursion. A smaller number, under the leadership of Dr. F. K. Butters, went further along the shore and visited the border lakes, extending the trip by two or three days.

The American Phytopathological Society held its first summer meeting in several years with at least fifty-five members and many visitors present. The local committee, under the chairmanship of E. C. Stakman, arranged a most interesting and successful three-day program.

Tuesday morning was devoted to the joint symposium with the Section on Agriculture (O) and affiliated societies on "Improving the Germ Plasm of Domestic Plants and Animals," led by H. K. Hayes, in which recent scientific developments in the application of the principles of genetics to plant and animal breeding were outlined by W. C. Coffey, J. L. Lush and O. S. Aamodt. The afternoon was devoted to a symposium on "The Past, Present and Future of Plant Pathology," in which H. L. Bolley entertainingly presented highlights from nearly fifty years of experience in this field of science, and E. M. Freeman effectively urged the necessity of coordination of plant pathological research with related sciences, emphasizing the importance of team work in attacking complex problems and insisting on the necessity of maintaining the autonomous guild or scientific group organization in state and federal institutions for the most effective public service in research and regulatory work. The lively discussions which followed were continued at the evening round-table meeting and resulted in the

establishment of two committees, one to work toward the development of more comprehensive coordinated national program of potato improvement, the other to work toward coordinated testing of seed treatment methods.

The second day was devoted to inspection of the extensive field laboratory and greenhouse investigations at the Minnesota Experiment Station, followed by a banquet at which a loving cup was presented to the pioneer plant pathologist, Dr. H. L. Bolley.

The last day was devoted to a series of excursions in the region about the Twin Cities, including vegetable, fruit and ornamental plant producing areas, experimental plots and the Fruit Breeding Farm, where plant disease conditions were observed and discussed. One of the most appreciated features of the program was the abundant opportunity afforded for personal and informal conferences among the members on problems of mutual interest.

The summer meeting of the American Society of Plant Physiologists was held at the University of Minnesota Farm on June 25 to 27 under the presidency of Dr. Burton E. Livingston.

The first day was spent largely in the inspection of laboratories and demonstration of research work in progress in the physiological laboratory of the Department of Botany (Minneapolis campus) and the Section of Plant Physiology (University Farm), as well as in laboratories of the Shelter Belt project of the Lake States Forest Experiment Station at the University Farm. On the evening of June 25 a picnic supper was arranged by Dr. and Mrs. R. B. Harvey which was enjoyed by a large group of members of the society.

The first regular session for the reading of scientific papers was devoted to a symposium on "Dormancy, After Ripening and Germination of Seeds"; also the various physiological problems associated with dormancy and the ripening of seeds were reviewed and the results of recent studies in this field presented in a number of papers.

The afternoon program of June 26 consisted of the presentation of papers on a variety of subjects with particular emphasis on plant nutrition, nitrogen, metabolism and various effects of light on plants.

On Thursday, June 27, there was a joint trip with plant pathologists and horticulturists to the Coon Creek peat experimental fields and the market garden area at Brooklyn center. The field trip was continued to the Minnesota Fruit Breeding Farm at Zumbrota Heights.

SECTION ON ANTHROPOLOGY (H)

(Report from W. M. Krogman)

The section held its meetings from Thursday to Saturday, June 27 to 29. The Thursday morning session centered about the prehistory and archeology of the Upper Mississippi area. A. E. Jenks presented a summary of his conclusions concerning the age and type of "Minnesota Pleistocene Homo," which was stated to be approximately 20,000 years old and probably primitively pre-Eskimoid. The geological evidence of age was briefly considered and morphological features generally stated. Dr. Jenks also reported on evidences of cultural antiquity in Minnesota as represented by fossil mammoth ivory found in deep subsurface burials beneath sterile mounds. L. A. Wilford discussed aboriginal Minnesota pottery, recognizing cultural affinities between southern Minnesota and Iowa and Wisconsin and between central and northern Minnesota and "Lake Michigan ware." J. B. Griffin extended this theme in a general analysis of pottery types of the north-central United States. On the basis of archeological evidence, A. W. Bowers summarized the time sequence of Missouri River cultures in the Dakotas covering the period of 1200 to 1850 A. D.

At the Friday morning session, F. L. Goodenough discussed the measurement of mental function in primitive groups upon the basis of the measurement of specific performance and the measurement of general mental traits. M. F. Ashley-Montagu, in an analysis of the problem of differential fertility in primitive societies, pointed out the hiatus of four years between the onset of the menarche and the ability to conceive as the basic factor in the disparity in the fertility of married and unmarried females. Frances Densmore outlined regional peculiarities of Indian songs in terms of eight variants in the complex of melody and rhythm. Specific Indian groups were cited as examples. W. M. Krogman reported on skeletal material from Anatolia, Asia Minor, dating from 4000 B. C. to 1500 A. D. A basic long-headed Mediterranean type was recognized, intruded upon in 2500 B. C. by a round-headed Alpine type.

The Saturday morning session was devoted to problems of human growth. W. D. Wallis discussed anatomic lag in terms of the tendency of a given dimension to be retarded with reference to another with which it is positively correlated. Numerous examples illustrated the thesis. C. H. McCloy explained the analysis of growth components at different age levels by the method of factor analysis. Three components were demonstrated—linear, cross-section and measurements of cutaneous and subcutaneous soft parts. Dr. Edith Boyd, in a discussion of early human growth and development, outlined the pattern of length-age ratios in the prenatal period and infancy. Dr. T. H. Evans offered a demonstration of the comparative growth stages in the mandible.

The members of the section were the guests of the Department of Anthropology and availed themselves

of the generous hospitality of Professor Jenks and his associates.

SECTION ON PSYCHOLOGY (I)

(Report from John E. Anderson)

Sessions of the section were held on Thursday, Friday and Saturday. On Thursday evening, at a joint dinner session with the Section on Education (Q), John E. Anderson presented a paper on the "Limits of Learning" in which he reviewed a number of the experiments on maturation and learning done on young children, and after pointing out inconsistencies in the results suggested the importance of analysis in terms of the complexity of tasks set. H. L. Sorenson in a paper on "Adult Learning" presented the results of a series of investigations that indicated much more preservation of ability in maturity than is commonly supposed.

On Friday morning was held a joint session with the Section on Education (Q). In the first paper Josephine M. Smith, who reported on the responses of newborn infants to colored lights, found evidence of differential reactivity, which was explained, however, in terms of intensity differences. M. A. Wenger, in a critical analysis of the Pavlovian concept of internal inhibition, presented evidence to show that internal inhibition is an artifact to be explained in terms of general tonicity. Ethlyn V. Hurd described a modification of the Ishihara test for color blindness adapted for use with young children. She found the proportions of color blindness very similar to those found on older children and similar sex differences. Jean Marquis in a study of the development of logical processes in school children found increases in causal reasoning with age and school grade, but not with socio-economic status. Little evidence was obtained in support of Plaget's classification and a new classification was presented.

On Saturday morning in the symposium on "Attitude Measurement" E. A. Rundquist, after presenting the results of a study on the attitudes of unemployed persons, demonstrated the significance of the form of the statement in personality scale constructions. Items stated in the negative form give substantially different results from those stated in the positive form. R. F. Sletto in an analysis of the same data showed the inadequacy of internal consistency as a criterion in scale construction and recommended that items be retained only after their critical differentiating value has been demonstrated on two very different samples.

SECTION ON SOCIAL AND ECONOMIC SCIENCES (K)

(Report from Malcolm M. Willey)

Six papers were scheduled in three meetings. On Tuesday morning Dr. Bushrod W. Allin, of the Brookings Institution, reported on studies made by the Committee on Population Distribution and discussed "Internal Migration in Prosperity and Depression." Using annual school census data for selected states—1920 to 1934—he showed that rural areas lost population during the twenties and gained after 1930. The largest losses and gains were in poorest subsistence farming areas. If there is continued economic recovery the rural areas will lose again and the expectation is that the poorest areas will lose most. It was concluded that in the long run attempts at permanent rehabilitation of back-to-the-land-migrants in poor-land areas are most likely to fail. There is, furthermore, no hope that, in any process of decentralizing of industry, industry will follow migrants to the poor-land areas. Decentralization of industry has been, rather, to suburbs of old industrial areas and not to poor-land areas, where economic casualties have tended to migrate.

At the same session Dr. Samuel Stouffer, of the University of Wisconsin, reported on "Differential Fertility of Catholics and Non-Catholics." The birth rate in Catholic families has declined steadily for the past fifteen years and at a faster rate than the non-Catholic rate, although Catholic families on the average are still larger than others. The direct evidence was based on 40,766 families in all Wisconsin cities of more than 20,000 population. Indirect evidence to the same general point was presented in data that showed that birth rates throughout the United States have dropped most rapidly in those cities with a large percentage of Catholics and least rapidly in cities with a small percentage of Catholics. Professor Stouffer was interested only in the trends and not in the causes underlying them.

At the second meeting of the section, Professor William Jaffe, of Northwestern University, gave "An Appreciation of León Walras' 'Eléments d'Economie Politique Pure,'" which work, he indicated, is to be regarded as a pioneer study in the pure science of economics. Though couched in abstruse mathematical language and based on a foundation of ideal concepts, Walras' theory was clearly designed as an instrument to aid in the comprehension of concrete reality. Only with such framework as his can we comprehend our complex economic universe.

Dr. Clara M. Liepmann, of the Recreation Department of the Russell Sage Foundation, also reported on "The Use of Music as a Means of Treatment in Public Welfare Institutions." A brief historical section on institutional use of music was followed by a discussion of music in therapeutic and socially educative uses.

The third meeting of the section was cancelled, since R. I. Nowell, of the AAA, was unable to be pres-

ent. His paper, "Land Use and Its Effect on Population Trends," was read by title only and the section adjourned to attend the general session of the association on conservation.

SECTION OF MEDICAL SCIENCES (N) AND ASSOCIATED SOCIETIES

(Report from Vincent du Vigneaud and John C. Krantz, Jr.)

The program of the section consisted of a session on general subjects and several joint sessions with other sections and groups. Joint sessions were held in conjunction with sections on Chemistry (C) and on Zoology (F), with the Minnesota State Medical Association and with the Mayo Foundation.

On Monday morning was held the joint session with the section on Chemistry (C), and a number of papers of review nature were given. Dr. W. D. Armstrong, of the University of Minnesota Medical School, reviewed the outstanding points in the biochemistry of fluorine compounds and the methods that were available for the analysis of fluorine in biological material. In concluding his excellent review, he added the caution that fluorine might possibly be necessary in very small amounts for the proper development of bony structures. Dr. R. A. Gortner, of the University of Minnesota, then discussed the very interesting question of "bound water." After reviewing the methods which all point unmistakably to the fact that part of the water in biological systems is bound by hydrophyllic colloids, Dr. Gortner called attention to the many physiological phenomena that can be admirably explained by the conception of "bound water." In addition to a review of recent studies of the male sex hormone, Dr. F. C. Koch, of the University of Chicago, presented further conclusive evidence confirming his earlier contentions that the male sex hormone isolated from urine is not identical with that obtained from the testes. Evidence of the presence of still further male sex hormones in both urine and in the testes was also presented. The program was concluded by Dr. E. C. Kendall, of the Mayo Foundation, with a paper on the chemical nature of the hormone of the adrenal cortex, reporting further progress on the elucidation of the chemical structure of this and related compounds.

The joint session with the Minnesota State Medical Association on Tuesday consisted of a symposium on diseases of the blood and a paper by Dr. L. W. Sauer, Northwestern University Medical School, on the prevention of whooping cough with *Bacillus pertussis* vaccine. Various scientific demonstrations and exhibits were also included in the joint program. The symposium was contributed to by Dr. T. L. Squier, of Milwaukee, Dr. W. A. Bloedorn, of George Washington University, and Dr. W. P. Murphy, of Harvard University Medical School. The rôle of drug allergy in the etiology of primary granulocytopenia was discussed by Dr. Squier. He emphasized that the effect of amidopyrine and certain other drugs in producing this condition was not due apparently to ordinary toxic properties of the drugs but rather to an allergic type of response on the part of certain individuals to these drugs. The rôle of iron in the treatment of anemia was then discussed by Dr. Bloedorn. The use of iron medicinally was traced from the earliest times to the present and it was pointed out that it was used as a curative agent as far back as 2000 B. C., the oldest preparations being iron rust dissolved in wine. The significance of iron in the body economy was then reviewed and finally the use of iron in the various anemias was described in detail. The symposium was concluded by Dr. Murphy, who presented to the group the conclusions which he has arrived at as a result of ten years' experience in treating pernicious anemia by means of liver therapy. The need of early diagnosis and of definite diagnosis was stressed. It was pointed out that early diagnosis is important to prevent the onset of secondary effects of pernicious anemia and that definite diagnosis is essential, since once treatment is instituted it is very difficult to make a positive diagnosis. Dr. Murphy concluded his interesting discussion with the statement that, with the better understanding of adequate treatment which is now available, one may expect to maintain the patient with pernicious anemia whose condition is not complicated by other serious illness in a state of economic efficiency and further that the patient should not die from pernicious anemia. In other words, the life expectancy of a patient with pernicious anemia under adequate treatment should be that of the average member of the age group in which he belongs.

The Wednesday morning session was devoted to a series of very interesting papers of varied nature. The program was opened by Dr. R. A. Woodbury, of the University of Georgia, who described the hypodermic manometer devised by Dr. W. F. Hamilton and presented some of the findings obtained with this instrument in association with the latter. One of the remarkable findings was the marked effect that coughing has on the blood pressure. Dr. N. A. Michels, of Jefferson Medical College, reported work on the susceptibility of the omentum in rabbits to Roentgen rays. The results of his study provided confirmative evidence that each variety of cell in the body has a specific and selective sensitiveness to irradiation. The lymphocytes of the omentum were found to be the most sensitive, while the mesothelium and mast cells were the most resistant. He also observed that small doses

of Roentgen rays stimulate the lymphoid tissue to a heightened proliferative activity. The next paper by Dr. W. G. Maddock, of the University of Michigan, was of much interest in connection with the renewed attention that is being paid to the water balance of the body. Dr. Maddock found in a quantitative study of dehydration that 5.7 per cent. of the body weight was lost during four days' dehydration. The blood became concentrated and temporary damage of the kidneys occurred. Upon ingestion of water the tissues took up what they needed first, and then what remained was left for the kidneys. He stressed the fact that the insensible loss of water was greater in his subjects than the urine volume and pointed out that this is not given sufficient attention in surgical cases. The influence of dinitrophenol on human metabolism was then discussed by Dr. M. L. Tainter, of Stanford University. That dinitrophenol was a toxic and dangerous drug to be used only as the drug of last resort in reducing obesity was emphatically stated by Dr. Tainter. In considering some of the metabolic effects he presented a number of experiments in which the fat metabolism was almost doubled, whereas the protein and carbohydrate metabolism was not noticeably affected. Dr. H. A. Reimann, of the University of Minnesota, then discussed the interesting question of the relation of microbic dissociation to infectious disease and reported some experiments of a very striking nature on the dissociation of *Micrococcus tetragenus*. He also demonstrated that the various dissociant forms manifest wide difference in ability to grow or survive in unfavorable environments. Some appeared to be adaptable to growth *in vivo*, while others were not. He concluded that microbic dissociation is important in regard to infection to the extent that only certain of the variant forms are virulent and that there was no conclusive evidence that a change from virulence to avirulence occurred when a person or an animal recovers from infection, as has been claimed by some. Many experiments show that no change occurs in virulence, before, during or after certain infections. The morning's program was concluded by Dr. I. McQuarrie, of the University of Minnesota, with a presentation of some recent clinical studies in lipid metabolism which brought out the importance particularly of the unsaturated fatty acids of the blood.

A most interesting session was held at the Mayo Foundation at Rochester, Minnesota, on Thursday morning, which was very well attended. Dr. W. J. Mayo opened the program with a few remarks of welcome to the Section on Medical Sciences (N) and other visitors and then sketched briefly the outstanding developments in the past few decades in surgery, stressing particularly the changes in the attitude of the surgeon towards the problem before him. This talk was followed by a number of papers by members of the foundation on various fields of research in which they have been engaged. Dr. E. C. Kendall discussed some of his recent results on the suprarenal cortex and announced the very striking conclusion that the hormone of the suprarenal cortex is not essential to life, that suprarenalectomized animals can be kept alive with the addition of fairly large amounts of sodium chloride and sodium citrate to an otherwise adequate diet. Various problems of coronary disease were then discussed by Dr. A. R. Barnes, and the marked advances that have been made in the surgery of the thyroid gland were treated by Dr. J. deJ. Pemberton. Dr. F. C. Mann reported the results of some recent studies on blood flow. The two speakers invited from elsewhere for this special program were Dr. L. W. Newburgh, of the University of Michigan, and Dr. E. L. Sevringhaus, of the University of Wisconsin. The former presented his studies on the quantitative aspects of the insensible loss of weight, while the latter discussed the use of an extract of the anterior pituitary in patients with hypogonadism. The afternoon was devoted to visiting the Institute of Experimental Medicine, where various demonstrations were given and to the Mayo Foundation Museum of Hygiene and Medicine.

On Friday morning the section met again in Minneapolis in a joint session with the American Society of Parasitologists, as reported by the section on Zoological Sciences.

The section on pharmacy was called to order by Dean Wulling, of the School of Pharmacy, University of Minnesota, at 10:00 A. M. on Thursday, June 27, in the Medical Sciences Building. Dr. Wulling outlined in a general way the scope and purpose of the section and introduced the chairman, John C. Krantz, Jr., councillor to the association from the American Pharmaceutical Association.

One of the most interesting studies presented was the "Penetration of Antiseptics in Living Tissues," by Arthur D. Hirschfelder. He showed by methods of vital staining that many of the commonly employed antiseptics do not penetrate living tissue without producing injury during the course of absorption. Of special interest was the paper presented by Harold N. Wright on the colloidal properties of the arsphenamines. In general it was shown that the colloidal nature of the arsphenamine compounds increased their toxicity and diminished their therapeutic efficiency. Earl B. Fischer presented interesting studies on the deterioration of tincture of digitalis and showed how the modern methods of micro-sugar determinations might be used to study the deterioration of the tincture of digitalis as evidenced by the hydrolysis of the glucosides. Heber W. Youngken presented a most thor-

ough microscopical study of the methods of staining and identification of the endocrine powders used in the treatment of disease. In addition, there were interesting papers presented by A. H. Uhl on "Craca Virginiana," by Gustav Bachman on "Boric Acid," by Joseph B. Burt on "Mercuriated Derivatives of Thymol and Carvacrol," and by John C. Krantz, Jr., on the fate of the sugar alcohols in the animal body. The meeting was well attended by local pharmacists and members of the staffs of pharmacy, pharmacology and chemistry of the University of Minnesota. Most of the papers presented were discussed at length by those present.

SECTION ON AGRICULTURE (O) AND ASSOCIATED SOCIETIES

(Reports from H. K. Hayes, W. H. Alderman, F. S. Holmes, Clarence P. Oliver)

The program of the section was planned in cooperation with the Dairy Science Association, the American Society of Horticultural Science, Great Plains Section, the Corn Belt Section of the American Society of Agronomy, the American Phytopathological Society, the Genetics Society of America, the Minnesota Academy of Science and the American Society of Plant Physiologists.

On Tuesday morning a symposium on "Improving the Germ Plasm of Domestic Plants and Animals" was presented, with an attendance of about 600. The subject was introduced by Dean W. C. Coffey, of the Department of Agriculture of the University of Minnesota, who emphasized some of the accomplishments of plant and animal breeders since the rediscovery of Mendel's laws of heredity. Dean Coffey pointed out the extent to which a fundamental knowledge of genetics was being used by trained breeders, especially by government and station men in the breeding of crop plants, and emphasized the need of more extensive genetic studies with animals.

Dr. J. L. Lush, of Iowa State College, presented a summary of some accomplishments with animals. He emphasized the difficulty of differentiating between the advances due to germ-plasm improvement and those due to better methods of handling and improvements in nutrition. Dr. O. S. Aamodt, of the University of Wisconsin, discussed analysis and synthesis as tools in the hands of the trained plant breeder. He emphasized the extent to which it is possible to create new forms as a result of combining the desirable characters of two or more varieties used as parents. The importance of controlled environment in relation to breeding cold- and drought-resistant cereals was brought out with particular reference to cold resistance with winter wheat and drought resistance in spring wheat. A message from Secretary H. A. Wallace, regarding the importance of improved germ-plasm, was read by Dean Coffey.

On Tuesday afternoon field trips were made by the Corn Belt Section of the American Society of Agronomy to observe pasture research at Lake Elmo and in outlying stations.

The Third Alfalfa Improvement Conference, under the auspices of the American Society of Agronomy, was held on Tuesday evening under the chairmanship of Professor H. L. Westover, of the Bureau of Plant Industry. Short reports were given by cooperators in several states. Similar conferences on malting barley and corn improvement were held on June 26 and June 27, respectively.

On Wednesday afternoon the Corn Belt Section of the American Society of Agronomy, the American Phytopathological Society and the Genetics Society of America made a field trip to observe the work of the Minnesota Experiment Station with particular reference to the breeding of disease-resistant varieties.

The meeting of the Great Plains Section of the American Society for Horticultural Science was attended by about 35 members, representing the states of Missouri, Iowa, Wisconsin, Wyoming, North Dakota, Minnesota and the Province of Manitoba. Many of the members were accompanied by members of their families, bringing the total attendance up to nearly fifty.

The first meeting of the week was held in conjunction with the Section on Agriculture. The report of this meeting, which consisted of a symposium on "Improving the Germ-Plasm of Domestic Plants and Animals," is reported elsewhere.

On Tuesday afternoon the Great Plains horticulturists were joined by others in attendance at the meetings on an automobile tour of the Minneapolis Park System. This is one of the noteworthy park systems of America and has been developed under the able direction of Superintendent of Parks Theodore Wirth. The three-hour trip covered a large part of the extensive boulevard system connecting various parks, lakes and floral display gardens. The tour closed with a visit to the Minnesota Peony Show being held in the Northwestern Bank Building in Minneapolis. In the evening the horticulturists met for dinner at the University Farm and followed this with an annual business meeting.

Early in the morning of June 26 the experimental greenhouses and vegetable field plots at University Farm were inspected. At nine o'clock the party began a tour through Como Park and the residential section of St. Paul. This was followed by a visit to the mushroom caves in the bluffs along the Mississippi River in St. Paul. Mushroom-growing is a well-developed industry in this section. From the mushroom caves the

tour extended to the Gerten Truck Farm. The Gerten Brothers operating this farm are leaders in the rhubarb-forcing industry in Minnesota. Continuing to Faribault, the A. M. Brand Peony Farm was visited. A single block of more than 30 acres of peonies at the height of bloom presented a most unusual display of colors. The dark-colored and light-colored varieties were laid out in alternate strips so that the general effect was that of a gigantic flag spread over the ground. Mr. Brand, who is one of the leading peony breeders of America, had a display room filled with his numerous productions. Leaving Mr. Brand's the tour proceeded to the Andrews Nursery and Fruit Farm. The Andrews Brothers operating this farm not only produce nursery stock on a large scale but are the largest fruit-growers in Minnesota. In red raspberries alone their planting amounted to 362 acres. At the time of the visit 18 acres of strawberries were being harvested.

On Thursday, June 27, a tour of the fruit, vegetable and greenhouse industries in Hennepin County was made. This tour demonstrated the varied character and at the same time the extensive development of horticultural industries in the Twin City district. The afternoon was spent at the University of Minnesota Fruit Breeding Station near Excelsior. Here 227 acres of land are devoted to fruit-breeding work. At the time of this visit several thousand strawberry seedlings were in fruit and afforded an excellent demonstration of the methods used in fruit-breeding. In the evening a banquet was held at Old Orchard Inn on Lake Minnetonka, with visiting horticulturists and their families as guests of the local group.

On Friday, June 28, an extensive tour into the northern part of the state was made. The first stop was at the Cloquet Forest Experimental Station, where forest experiments involving over 3,000 acres of land are under way. The tour continued through Duluth by way of the famous skyline drive to the Northeast Experiment Station, where Superintendent Thompson explained the horticultural work in progress. This included, among other things, potato breeding, turnip and rutabaga standardization trials and a large variety and experimental orchard which is this year carrying a heavy crop of fruit. This orchard is interesting, not only because it is the largest in northern Minnesota, but because it is a demonstration of successful apple culture under northern conditions. The tour continued by the way of the iron range to the North Central Experiment Station at Grand Rapids. A stop was made at the Arrowhead Peony Show at Virginia, Minnesota, where the party was entertained at dinner by the local garden club. At the North Central Station extensive potato, vegetable and small fruit experiments are under way, and an opportunity was given visitors to inspect the experimental grounds and to examine the varied collection of ornamental plants on the campus and in the arboretum of the institution.

The Great Plains Horticulturists will hold their next annual meeting at the University of Saskatchewan, Saskatoon, Saskatchewan. Officers for the ensuing year are: *President,* Dr. A. C. Hildreth, Federal Horticultural Field Station, Cheyenne, Wyoming; *Vice-President,* Dr. E. S. Haber, Iowa Agricultural Experiment Station, Ames, Iowa; *Secretary,* Dr. C. F. Patterson, University of Saskatchewan, Saskatoon, Canada.

Judged by the number of persons attending the sessions and the number of papers presented, the meeting of Official Seed Analysts was the best ever held. Representatives of the United States Department of Agriculture, all Canadian laboratories and eighteen state laboratories were present. The states represented were as widely separated as California and Maine. Many commercial analysts were in attendance and took part in the discussions. A majority of those in attendance were present on the morning of June 26 for the Plant Physiologists' symposium on "Dormancy, After-Ripening and Germination of Seeds."

Of the six sessions held, one was given over to a field trip, two were occupied with business matters and three were reserved for the presentation of committee reports and papers. More than thirty papers were read and many of these dealt with germination problems. Several papers were concerned with seed-borne parasites which have been given increasing attention on the part of seed analysts in recent years. A paper by W. A. Davidson, of the U. S. Department of Agriculture, on "Misbranded Seed in Interstate Commerce and Seed Analysis" was of unusual interest because of the presentation of problems that have grown out of the enforcement of the interstate shipment clause of the Federal Seed Act. Another paper by the same author on "Seedling Identification" dealt with a phase of seed-testing that will undoubtedly become of greater importance. Mathematical problems involved in variations among purity analyses and among germination tests were dealt with in a very lucid way in a paper entitled "Germination and Purity Tolerances Fundamentally the Same Problem," by C. W. Leggatt, of Toronto, Canada. Methods employed at the New York State Agricultural Experiment Station, Geneva, in the control of seeds used in that state were dealt with in a series of papers by M. T. Munn. A paper on "Some Variations in Seeds and Plants of Sudan Grass and their Hydrocyanic Acid Content," by A. H. Larson, C. F. Rogers and Macy L. Spracher, of Minnesota, called attention to the danger to live stock when allowed to eat sudan

grass and sorghum hybrids. C. E. Buchanan, of Topeka, Kansas, read a paper on "The Uniform Seed Label," which was followed by a lively discussion of the various problems involved in the labeling of seeds to comply with the requirements of seed laws of the various states.

The Genetics Society of America had no special program of its own. The society met in joint session with the Section on Agriculture in a symposium on the improvement of the germ-plasm of domestic plants and animals and cooperated with the American Society of Agronomy in a field trip to observe the work of the Division of Agronomy and Plant Genetics.

The association welcomed as a guest society in the agricultural group the American Dairy Science Association, of which C. L. Roadhouse, of the University of California, Davis, is president and R. R. Graves, of the U. S. Bureau of Dairy Industry, Washington, is secretary. This organization held meetings from June 24 to 27 and had the most extensive program of any society meeting in Minneapolis with the association. There was a registration of 325 members. The program was arranged in four sections with papers on manufacturing, the chief interest being in the manufacture of dairy products; papers on production, covering the health, nutrition, breeding and management of dairy cattle; papers on extension, which presented ways and means of presenting educational projects to farmers and the dairy industry, and papers on problems and methods of instruction in which interest is confined to the subject-matter and methods of teaching dairy subjects.

The opening session was held on Monday evening, when Dr. L. D. Coffman, president of the University of Minnesota, and Dean W. C. Coffey were introduced and gave welcoming addresses. After a brief business session, there was held an informal social "get-together" for members. On Tuesday morning, the society met in joint session with the Section on Agronomy and other organizations when a symposium was held on "Improving the Germ Plasm of Domestic Plants and Animals." A report of this symposium is given at the beginning of this section. On Tuesday evening the members of the society were the guests of the Land-O-Lakes Creameries, Inc., for a dinner and inspection of their large plant. The honor guest on this occasion was Dr. Theophilus L. Haecker, now past 90 years of age. Dr. Haecker was one of the early professors of dairy husbandry of the University of Minnesota and a pioneer in the cooperative creamery movement in Minnesota. His early investigations of the nutritional requirements of farm animals resulted in the Haecker feeding standards which were long in use. On Wednesday noon the members were guests of the staff of the University Dairy Department at luncheon and on Wednesday evening was held the annual banquet. The remainder of the program, which listed 99 papers, was given under the separate sections of the society.

SECTION ON EDUCATION (Q)

(Report from William S. Gray)

The summer meeting of the Section on Education (Q) was held on June 27 and 28. The program of the Thursday morning session included five papers relating to different aspects of higher education. Professor Edgar B. Wesley, of the University of Minnesota, as a result of extended research in Washington, D. C., presented an illuminating account of the movement to establish a national university which had its origin in the days of George Washington. Dan D. Feder, of the University of Iowa, presented the results of a controlled experiment to determine the value of individualized instruction in the Department of French at the University of Iowa. The specialized form of instruction provided was designed to provide the greatest opportunity possible for growth and the attainment of high standards of scholarship. Professor Charles W. Boardman, of the University of Minnesota, presented a series of studies of admission to Colleges of Engineering and to the General College of the University of Minnesota. One very striking finding was the fact that students who entered the General College with deficiencies did slightly better on the comprehensive examinations based on course work than did those who entered without deficiencies. Professor Alvin C. Eurich, of the University of Minnesota, discussed the use and values of comprehensive examinations in the General College and described the procedures adopted in their development and scoring. Fred Hovde, of the University of Minnesota, discussed the theory underlying the courses in the General College with special reference to the combined course in physics and chemistry.

The papers presented at the afternoon session related more or less directly to the general theme, "The Improvement of Learning." Dean T. R. McConnell presented the results of a controlled experiment among primary-grade children to determine the relative merits of mechanical or non-insightful methods and of thoughtful or insightful methods in learning arithmetic. The results favored the use of the latter plan. Professor Paul A. Witty, of Northwestern University, presented the results of an elaborate study of good and poor readers, which showed that mixed hand and eye dominance is not significantly related to reversals in reading and that eye deficiencies occur about as frequently among good as poor readers. A study by Claude E. Nemzek, of the University of Minnesota, showed that of seven general factors

studied, only one-participation in extra-curricular activities was significantly related to achievement in the secondary school.

On Thursday evening a joint dinner for the Section on Psychology (I) and the Section on Education (Q) was held under the direction of Phi Delta Kappa and Pi Lambda Theta, two associated organizations. Two very interesting papers relating to learning were presented: "The Limits of Learning," by Professor John E. Anderson, of the University of Minnesota, and "Adult Learning," by Professor Herbert Sorenson, of the University of Minnesota. The meeting closed with a joint session of the Sections on Psychology and Education on Friday morning, at which a series of very illuminating studies relating to child nature and development were presented.

A NEW SOCIETY

(Report from C. E. Skinner)

The North Central Branch of the Society of American Bacteriologists had its first organization and scientific meeting in the Medical Science Building of the University of Minnesota on June 26. The local branch includes members of the parent society and others located in Minnesota, Wisconsin and Iowa. Semi-annual meetings are to be held rotating among Minneapolis, Madison and Ames. Dean R. E. Buchanan, of Iowa State College, was elected president, Dr. A. T. Henrici, of the Minnesota Medical School, vice-president, and Dr. R. H. Walker, of Iowa, secretary-treasurer. Dean E. B. Fred, of Wisconsin, was chosen representative to the National Council.

The following program was given after a short business and organization meeting:

"Problems in Nomenclature and Classification Now Before the International Committee on Bacteriological Nomenclature": ROBERT S. BREED, New York State Agricultural Experiment Station.

"The Effect of Chance on the Mortality of Experimentally Infected Animals": H. O. HALVORSON, University of Minnesota.

"On the Nature of Filterable Viruses": R. G. GREEN, University of Minnesota.

"A New Medium for the Detection of Hydrogen-Sulfide" (read by title): CHARLES H. HUNTER and MAX FELDMAN, State Health Laboratory, University of South Dakota.

"A Comparison of Liquid Media for the Quantitative Enumeration of *Bacterium coli* by the Dilution Method": C. E. SKINNER, University of Minnesota.

"Utilization of Carbon Dioxide by the Propionic Acid Bacteria": H. G. WOOD and C. H. WERKMAN, Iowa State College.

"Alleged Fixation of Nitrogen by Germinating Peas: Certain Errors in Nitrogen Fixation Experiments": ELIZABETH M. SMYTHE and P. W. WILSON, University of Wisconsin.

"A Growth Factor for Rhizobia": D. WYNNE THORNE and R. H. WALKER, Iowa State College.

"Preliminary Investigation of the Occurrence and Distribution of Azotobacter in the Soils of Iowa": WM. P. MARTIN and R. H. WALKER, Iowa State College.

"Numbers of Nitrosomonas in Some Variously Treated Iowa Soils": R. H. WALKER and P. E. BROWN, Iowa State College.

"Studies on Experimental Encephalitis and Poliomyelitis": E. C. ROSENOW, The Mayo Foundation.

"A Rapid Method of Preparing a Very High Titered Antigen for the Wassermann Reaction" (read by title): CHARLES A. HUNTER and MAX FELDMAN, State Health Laboratory, University of South Dakota.

"A Study of Certain Methods for the Isolation of *Brucella abortus* from Milk": C. P. FITCH and LUCILLE BISHOP, University of Minnesota.

"Insects as Carriers of *Clostridium botulinum*": M. F. GUNDERSON, University of Minnesota.

Abstracts of these papers will be published in the *Journal of Bacteriology.*

It would be difficult to single out any particular paper as being especially worthy of note. Dr. Breed's taxonomic discussion was highly instructive to those interested in that field and was the subject of considerable debate. Dr. Green and Dr. Rosenow both spoke on filterable viruses and, although their conclusions would seem to be as divergent as is possible, both papers were of more than passing interest; Dr. Green's paper, theoretical though it was, was based on many years of investigation. He viewed viruses as living entities, resulting from retrograde evolution from protozoa and other parasites. Thus their peculiar intracellular activities can be explained as well as the absolute lack of free-living or cultivable viruses. Dr. Rosenow presented an immense amount of data which would indicate that viruses may be derived experimentally from streptococci and *vice versa.* Of the greatest possible practical and theoretical interest, this work, if confirmed, must rank as an outstanding contribution of the decade.

Miss Smythe's paper on alleged fixation of nitrogen by germinating peas was most illuminating. She showed that the alleged fixation could be accounted for in the faults of the Kjeldahl method. Her conclusions that this much misused chemical determination is not applicable to accurate nitrogen fixation experimental work should be pondered upon by many people now actively engaged in such experiments.

The ecological work of the Iowa group on factors influencing the distribution of certain soil bacteria and Dr. Gunderson's work on the very interesting ecological aspect of the western duck sickness problem were also well received.