THE INTERNATIONAL CONGRESS OF PLANT SCIENCES

THE Ithaca meeting of the International Congress of Plant Sciences, the fourth International Botanical Congress, formally typified the re-establishment of full cooperation among the botanists of all nations. That the participation from overseas was substantial and not merely symbolic was testified by the presence of about a hundred European and Asiatic visitors among a total attendance of about a thousand, as well as by the fact that approximately one half the papers presented were by foreign guests. Thirty-five of the nations invited to send delegates responded with letters of formal thanks to the committee, and of these twenty-five were represented by one or more botanists in attendance at the congress.

The choice of the Cornell University campus at Ithaca, N. Y., as the place of meeting was an especially happy one. Easy of access for delegates landing at New York City, Ithaca is located in one of the most interesting regions on the continent from the standpoint of ecological and systematic botany; while the existence on the campus of one of the greatest of American agricultural experiment stations, together with the near proximity of some of the most highly developed orchard and agricultural lands, was of great advantage to those interested in the applications of plant science. The prevailing rainy weather during the week interfered to a slight extent with the various field trips, but in matters which were under their control, the committees on program and local arrangements left little to be desired. The printed programs were ready on time and contained all necessary information, and mimeographed abstracts of the papers were available when the section meetings got under way. The machinery of registration ran smoothly, and all visitors were comfortably housed in the university dormitories promptly on arrival. The ample spaces of Willard Straight Hall afforded abundant opportunity for the "visiting around" that is after all the best part of such a gathering as this. The various auditoriums were made easy to find, and were so well chosen that only in a few instances did any overcrowding occur.

Quite in keeping with all other local arrangements were the brevity and comfortable informality of the opening exercises on the evening of Monday, August 16. Dr. Liberty Hyde Bailey, as chairman, introduced President Livingston Farrand, of Cornell University, who bade the members of the Congress welcome. On behalf of the foreign visitors, A. B. Rendle, of the British Museum, responded. He told of the genesis of the meeting: how the Fourth International Botanical Congress was originally planned for England in 1915, and how, as a result of the war, it was first postponed and then yielded to the United States. Mr. Rendle also extended an invitation to a fifth congress, to meet in England in 1930; this invitation was unanimously accepted at a later business meeting.

A full statement of the events of the congress, or even a comprehensive summary, is obviously impossible within limited space; a very brief outline must suffice, pending the publication of the official proceedings, plans for which will be announced at a later date.

AGRONOMY

The programs of Tuesday and Wednesday were given over to invitation papers, mainly by visitors from abroad. Of especial interest to American agronomists, for comparative purposes, was the initial paper, "Nature and agriculture in dry regions of the U. S. S. R.," by N. M. Tulaikov, of the Saratov Agricultural Experiment Station, and the initial paper on Wednesday, "The introduction of seeds and plants into Russia," by D. N. Borodin, of the Russian Agricultural Agency in America. Other papers on these programs were by Alessandro Marcello, of Venice, D. N. Prianishnikov, of Moscow, J. Stoklasa, of Prague, and A. T. Kirssanoff, of Leningrad.

On Thursday the section met with the section for genetics in a joint session devoted to the discussion of breeding for resistance to plant diseases, and on Friday it held a joint session with the sections for physiology and horticulture.

BACTERIOLOGY

The first independent meeting of this section was held on Thursday, when four papers on variability in bacteria were read. Hilding Bergstrand, of Stockholm, was of the opinion that many bacteria now regarded as separate species, *e.g.*, certain of the streptococci, are simply variants of one species. Observed changes in the form of *B. diphtheriae* in hanging drop cultures he likened to changes that are familiar as ecological variations in the higher plants. He felt that evidence is not yet sufficient to support a theory of sexual processes among bacteria.

Ralph R. Mellon, of Rochester, N. Y., regards form changes heretofore dismissed as involution forms, as possibly incipient new species, and disagreed with Professor Bergstrand on the question of sexuality. Arthur T. Henrici, of the University of Minnesota, stated that he had found a correlation between the size and stainability of bacteria and the stage of growth of the culture in which they were found. The general impression left by this session was that even such specific lines as have been drawn among bacteria may be wiped out, leaving the whole phylum in a state of constant evolutional flux.

CYTOLOGY

The sessions of the section for cytology were devoted almost entirely to chromosomes and their bearing on genetics and taxonomy. B. Nemeč, of Prague, gave a detailed account of the mechanism of mitosis. He was followed by William Seifriz, of the University of Pennsylvania, who discussed recent results of his work on the structure of protoplasm. His microphysical experiments on the elasticity of protoplasm lend support to a fibrillar theory of structure, as against a picture based on an emulsoid. Kathleen B. Blackburn, of Armstrong College, Newcastle-on-Tyne, reviewed the question of sex-chromosomes in dioecious plants and presented valuable new data. The question of chromosome numbers and arrangement in relation to various phases of taxonomy was discussed by Otto Heilburn, of Stockholm, and a communication on a similar topic from M. Nawaschin, of Moscow, was read. Nils Svedelius, of Upsala, and M. Ishikawa, of Tokyo, discussed the cytology of certain algae.

MORPHOLOGY, HISTOLOGY AND PALEOBOTANY

The most outstanding papers in this section were those on the evolution of plants. The lead was ably taken by Robert Chodat, of Geneva, the section chairman, who developed particularly the structure of the early land plants of the Devonian, and also outlined a theory of vascular development at variance with the most commonly accepted ideas of stellar structure. Rudolph Florin, of Stockholm, advanced evidence for a high antiquity of the Abietineae, frequently stated to be more recent than the Araucarineae. Carl Mez explained his method of determining plant relationships by means of serum diagnosis, and presented a phylogenetic tree based on his results. In a paper read by A. W. Hill, J. Hutchinson, of Kew, presented the reasons why he has departed from the Engler system. An especially stimulating session was the Thursday symposium on the structural evidences for genetic relationship, participated in by Nils Svedelius, of Upsala; C. J. Chamberlain, of Chicago; R. B. Thomson, of Toronto, and summed up by J. M. Coulter.

ECOLOGY

The congress presented the ecologists of England, the Continent and America with a chance to exchange views and iron out differences. The succession idea, at first slow to take hold on the Continent, seems to have achieved orthodoxy there, while Continental methods of exact survey are gaining respect on this side. Section Chairman Eduard Rübel outlined the comprehensive plant geography survey that has been made in Switzerland and displayed some fine vegetation maps that have resulted from it. The vexed questions of vegetational units and of factors affecting succession were thrashed out by H. C. Cowles, of Chicago; A. G. Tansley, of Cambridge; G. E. du Rietz, of Upsala; W. H. Pearsall, of Leeds; G. E. Nichols, of Yale, and W. S. Cooper, of Minnesota. W. Szafer told of the discovery of a series of interglacial peat beds in Poland that show a succession from an Arctic phase to a *Tilia-Acer* climax and a recession to the Arctic again.

FORESTRY

The section for forestry spent one day in joint session with the ecologists, and the remaining three in comparing methods. A comprehensive program for the rehabilitation of Italian forests was outlined in a paper from Arrigo Serpieri and Aldo Pavari, of Florence, Italy. The importance of forests as climatic factors, usually minimized, was stressed by Rafael Zon, of the U. S. Forest Service. The work of the Indian Forest Service was discussed in a paper submitted by A. Roger.

GENETICS

It is characteristic of genetics more than of any other division of biology, that a good paper in this subject can not be summarized. Within the narrow limits prescribed by available space, it will therefore be possible merely to mention as especially interesting the papers of Ernst Lehmann, of Tübingen; Alfred Ernst, of Zürich; Erich von Tschermak, of Vienna; M. J. Sirks, of Wageningen; Georg Tischler, of Kiel; E. Malinowski, of Skierniewice, Poland, and G. Savastano, of Acireale, Italy.

HORTICULTURE

The enterprise of horticulturists of these latter days in calling to their aid the resources of ecology, physiology, genetics and indeed all branches of biology, making theirs one of the most catholic of plant sciences, was well evidenced. The newest results of the length-of-day phenomena worked out by Garner and Allard were reviewed, the physiological significance of various types of reserve food storage was discussed in several papers, and the influences of shading, temperature and other factors on both plants in the field and on fruits in storage were considered by a number of speakers.

PHYSIOLOGY

Perhaps in no other section of the congress were so many provocative papers presented as in the section for physiology. One of the most outstanding was read in the absence of its author, A. Ursprung, of Freiburg, by his American associate, William A. Beck. Professor Ursprung's paper did much to

clarify the discussion of the osmotic properties of the cell, and his researches have revealed suction powers hitherto unsuspected on the part of plants. A gradient in suction power ranging from 0.5 atmosphere in the root-hairs to 32.6 atmospheres in certain leaves and petals, with almost as startling contrasts between two sides of the same cell, were among the discoveries claimed.

V. Lubimenko, of Leningrad, traced the evolution of photosynthesis from its beginnings in the simpler chemosynthesis in the autotrophic bacteria. He also showed aqueous solutions of chlorophyll and colorimetric apparatus for its quantitative study.

The physiological basis of drought resistance is not to be sought in devices for the reduction of transpiration, according to N. A. Maximow, of Leningrad; as a matter of fact, transpiration from most xerophytes is high. The real defensive mechanism lies in the high concentration of sap solutes and the small size of the individual cells, enabling the plants to recover after wiltings that would be fatal in mesophytes.

Movement in plants, though not attracting the attention it once did, is by no means an exhausted subject. F. A. F. C. Went, of Utrecht, held an evening audience spellbound with his account of the evidence he and his son have uncovered that photo-responsive movements are due to a photo-reactive substance. Dr. Went initiated a cooperative movement among botanists interested in tropical plant science, to act with a similar movement in Europe.

Other interesting physiological papers were submitted by W. W. Lepeschkin and L. Stoklasa, of Prague; L. Michaelis, of Berlin, and T. V. Vouk, of Zagreb, Jugoslavia.

Pathology

Persons rather than papers dominated the section for pathology; for so far as American Pathology at least was concerned the meeting was almost a celebration by the friends and former students of L. R. Jones, of Wisconsin. And the last important paper of the congress was given Saturday night: "Fifty years of pathology," by Erwin F. Smith, of the U. S. Department of Agriculture. Papers were submitted by the following foreign botanists: H. Morstatt, of Berlin; M. Hollrung, of Halle; H. Klebahn, of Hamburg; E. Küster, of Giessen; D. Atanasoff, of Sophia; O. Appel, of Berlin; E. von Slogteren, of Lisse; Marie Löhnis, of Scheveningen; Z. Zweigbaumowna, of Skierniewice; E. J. Butler, of Kew, and E. Foëx, of Paris.

Pharmacognosy and Pharmaceutical Botany

The two most outstanding sessions of this section were those devoted to individual drugs: a round table on digitalis on Wednesday afternoon and a symposium on cascara sagrada on Thursday morning. Among the botanists from abroad who presented papers was Carl Mez, of Königsberg.

Taxonomy

Nomenclatorial legislation, though recognized as one of the most crying needs of present-day botany, was by consent postponed until the 1930 congress. Numerous beneficial preliminary discussions, however, were made possible at this meeting. Problems of plant distribution were also discussed, notably those relating to North America, by M. L. Fernald, of Harvard; to Antarctica, by A. W. Hill, of Kew; to Greenland, by C. H. Ostenfeld, of Copenhagen.

Mycology

The mycologists were in much the same position as their colleagues who study vascular plants, so far as the vexed questions of nomenclature were concerned. With them, however, the question was still further complicated by the difficulty of deciding on the basis of nomenclature, whether it should be strictly morphological or whether physiological behavior is also entitled to consideration.

Of special interest were papers by E. J. Butler, of Kew; H. W. Wollenweber, of Berlin; J. Ramsbottom, of the British Museum; K. Wise, of Posen; H. Klebahn, of Hamburg; Miss E. M. Wakefield, of Kew; Carleton Rea, of Worcester, and A. Jaczewski, of Leningrad.

Exhibits

A large laboratory room on the upper floor of Baker Laboratory was set aside for exhibits, and was liberally frequented by the members of the congress between sessions. Among the exhibits that attracted most attention were those on mosaic disease from the Boyce Thompson Institute for Plant Research, a gas scrubber for use in physiological work by L. M. Hutchins; seedlings showing albinism in maize, by M. Demerec; a fine set of photographs of shepherd's purse, by G. H. Shull, and a most unusual set of teaching charts and demonstration mountings, by Hilary S. Jurica.

The sections for cytology and morphology reserved portions of two days for the examination and informal discussion of materials and microscopic preparations brought to the congress by various members. These sessions were highly profitable.

The Association of Official Seed Analysts of North America met with the congress in Ithaca. Its sessions were devoted mainly to discussions of analytical methods and seed germination.

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