SPECIAL ISSUE CONTAINING GENERAL REPORTS OF THE FIFTH NEW YORK MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND ASSOCIATED SOCIETIES. EDITED BY BURTON E. LIVINGSTON, PERMANENT SECRETARY

SCIENCE

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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

GENERAL REPORTS OF THE FIFTH NEW YORK MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND ASSOCIATED SOCIETIES

GENERAL FEATURES

CONVOCATION week of 1928–29 will long be remembered for the great New York meeting of the American Association and associated organizations. This was the eighty-fifth meeting of the association and the fifth meeting held in New York. The preliminary announcement of this meeting appeared in SCIENCE for November 30, 1928. It contains much interesting information about the New York arrangements, which were carried out as there announced, with but very few minor changes. The sessions of the association and the associated societies were very satisfactorily accommodated in the buildings of Columbia University, the American Museum of Natural History, the Metropolitan Museum of Art, the United Engineering Societies and the American Geographical Society.

The president for this meeting was Professor Henry Fairfield Osborn, president of the American Museum of Natural History. Professor Osborn's name is well known to all who are interested in science both in America and abroad. His many years of scientific work have been devoted to research and interpretation in the fields of zoology and paleontology. His indefatigable work as an educator and organizer is represented by the great American Museum of Natural History as it stands to-day, an example of the finest and most progressive of public museums. Many of the generally attractive features of the eighty-fifth meeting were due to President Osborn's enthusiastic interest and to his loyal service to the association.

The retiring president for the fifth New York meeting was Dr. Arthur A. Noyes, director of the Gates Chemical Laboratory of the California Institute of Technology, eminent leader in chemical research and chemical teaching and in the organization of American scientific research in general. Dr. Noyes's retiring presidential address, on "The Story of the Chemical Elements," was one of the most

valuable of the many valuable reviews of present knowledge that were presented at this meeting.

Every four years the annual meeting of the American Association is exceptionally large and comprehensive and the meeting here reported was one of these larger meetings, which are held in rotation at New York, Chicago and Washington. Twelve years intervened between the fourth New York meeting and the fifth New York meeting and it will be twelve years before the association will again meet in the American metropolis. This eighty-fifth meeting was the greatest and most successful meeting in the history of the association. The fifteen sections were all represented on the program and forty-five independent organizations of science workers in all lines joined with the association on this occasion. The names of these organizations have been given in the preliminary announcement referred to above, and they will appear in the reports on the New York sessions of sections and societies, in the issue of SCIENCE for February 1.

ATTENDANCE, SESSIONS AND PAPERS

Thirty-nine hundred and thirty-five persons were actually registered at the association's registration offices as in attendance at the fifth New York meeting. Records of registration from several of the societies that failed to cooperate with the general organization in regard to registration make it clear that, with full cooperation of all the organizations that met with the association at this meeting, the official registration would have exceeded 4,800. It is certain that between five and six thousand individuals attended one or more of the numerous sessions. It is unfortunate that we have not yet hit upon any uniformly feasible plan for securing an accurate record of all who receive benefit from these great annual meetings.

The residence distribution of those who registered at the association offices is shown by the following list.

Altogether, about two hundred and fifty scientific sessions were held at this meeting and about 2,200 papers and addresses were delivered, by about 1,900 different individuals.

As usual, there were a large number of luncheons, dinners and smokers, all exceptionally well attended.

MEETING PLACES AND FACILITIES

The New York meeting was exceptionally well accommodated in respect to session rooms and facilities. Most of the sessions of the sections and societies were held in the buildings of Columbia University, the excellent allotment of rooms being due to great personal sacrifice of time and thought on the part of Dean George B. Pegram, of the university, general chairman of the association's New York committees

Registration at New York by States and Provinces

Alabama	15	Mississippi	5
Alaska	1	Missouri	47
Arizona	10	Montana	5
Arkansas	6	Nebraska	10
Bermuda	1	Nevada	3
California	35	New Hampshire	44
Chile	1	New Jersey	229
China	3	New Mexico	4
Colorado	15	New York	546
Connecticut	132	N. Y. City	547
Delaware	25	North Carolina	44
District of Columbia	255	North Dakota	1
England	7	Nova Scotia	2
Florida	9	Ohio	190
France	2	Oklahoma	14
Georgia	18	Ontario	44
Germany	5	Oregon	8
Haiti	1	Pennsylvania	330
Hawaii	3	Philippines	1
Idaho	2	Porto Rico	2
Illinois	144	Quebec	18
India	1	Rhode Island	35
Indiana	45	Russia	3
Iowa	34	South Carolina	19
Italy	1	South Dakota	4
Jamaica	1	Switzerland	2
Japan	1	Tennessee	22
Kansas	29	Texas	17
Kentucky	12	Utah	4
Louisiana	8	Vermont	24
Maine	50	Virginia	66
Manitoba	4	Washington	5
Maryland	124	West Virginia	29
Massachusetts	343	Wisconsin	63
Mexico	2	Wyoming	3
Michigan	127	Miscellaneous	8
Minnesota	65	Total	3,935

and chairman of the special committee on meeting places, who was ably and heartily aided in this very important feature of the preparations by the other members of the special committee. In accordance with a general plan followed whenever possible, practically all the biological sessions were housed together, in Teachers College, and the biological messenger service was in successful operation, by which those attending any session were kept informed as to the progress of other simultaneous programs. To Professor Maurice A. Bigelow, of Teachers College, the biologists were greatly indebted for many excellent features of the smoothly running arrangements by which such a large number of organizations were enabled to hold their sessions so conveniently to one another. The association and the organizations that met at Columbia are very grateful to the university and to many of its members.

The geological societies met at the American Museum of Natural History, which furnished facilities

of unparalleled excellence and convenience. To President Henry Fairfield Osborn and the museum staff, as well as to the board of trustees of the museum, the association and those who met in the museum halls are greatly indebted. The general sessions were mostly held there, each of the five evening general sessions being followed by a very valuable and enjoyable reception, with unusually attractive arrangements for refreshments.

The trustees of the Metropolitan Museum of Art showed a wonderful hospitality to the association and the philological, archeological and art groups that held sessions in the halls of that museum. On Sunday evening a very enjoyable general reception was held at the Metropolitan Museum, to which all in attendance at the fifth New York meeting were invited.

The American Geographical Society and the United Engineering Societies cordially placed the facilities of their buildings at the disposal of the geographical and engineering groups for their sessions, which were unusually successful in every way. Many other institutions and organizations of the metropolis joined with those here mentioned, in many ways, to make this meeting a landmark in the history of the association.

Many lanterns and microscopes were again kindly loaned by the Bausch and Lomb Optical Co., of Rochester, New York, to whom the thanks of the association are here cordially expressed. Ordinary wall screens were generally employed for the lanterns, for the small "daylight" screens tried in some cases at recent annual meetings have proved unsatisfactory for most sessions.

The hotel accommodations at New York were exceptionally satisfactory in all ways, as might be expected in such a city. The Lincoln Hotel was general headquarters for the meeting, and many of the association officers lived there. The same hotel was headquarters for several of the associated societies and many of the societies had hotel headquarters at other hotels. To the managements of all these hotels the association is very grateful for many detailed arrangements and for much cordial hospitality. The hearty thanks of the permanent secretary are here expressed especially to Mr. James T. Clyde, managing director, and to Mr. John J. Jennings, office manager, of the Lincoln Hotel, at which nine complimentary rooms were kindly placed at the disposal of the association. These gentlemen were very accommodating hosts, who interested themselves heartily in caring for the hotel needs of the association throughout the meeting.

THE LOCAL COMMITTEE

To each and all of the many people who gave so lavishly of their time and energy as members of the New York committees on arrangements, through whose patient and indefatigable interest and enthusiasm this meeting was brought to such remarkable success, the permanent secretary wishes here to express the very cordial and highly appreciative thanks of the American Association. The personnel of the committees is shown below.

The General Local Committee

Henry Fairfield Osborn, *president of the association;* American Museum of Natural History.
Michael I. Pupin, *honorary chairman;* Columbia University.
George B. Pegram, *general chairman* and *chairman* of the special committee on meeting places; Columbia University.
Sam F. Trelease, *secretary;* Columbia University.
James McKeen Cattell, *chairman* of the association executive committee; Science Press.
Fred H. Smyth, *local treasurer;* American Museum of Natural History.
Mrs. Helen Warren Brown, *assistant secretary;* American Museum of Natural History.
Walter H. Eddy, *chairman* of the special committee on luncheons.
Harold A. Fales, *chairman* of the special committee on exhibitions.
James T. Grady, *chairman* of the special committee on news service.
Donald E. Lancefield, *chairman* of the special committee on local transportation.
A. Cressy Morrison, *chairman* of the special committee on finance.
Willard L. Severinghaus, *chairman* of the special committee on hotels.
George H. Sherwood, *chairman* of the special committee on entertainment.

The Special Committee on Finance

A. Cressy Morrison, *chairman;* 30 East 42nd St.
Fred H. Smyth, *treasurer;* American Museum.
L. H. Baekeland, The Bakelite Corporation.
Charles H. Herty, 85 Beaver St.
George F. Kunz, 405 Fifth Ave.
August Merz, 1 Madison Ave.
W. H. Nichols, General Chemical Company.
Henry Fairfield Osborn, American Museum.
Michael I. Pupin, Columbia University.

The Special Committee on Meeting Places

George B. Pegram, *chairman;* Columbia University.
Maurice A. Bigelow, Teachers College, Columbia University.
Robert H. Bowen, Columbia University.
C. E. Davies, United Engineering Societies Building.
Hermon W. Farwell, Columbia University.
Wayne M. Faunce, American Museum.
Edward J. Grant, Columbia University.
Clarence Linton, Teachers College, Columbia University.
George H. Sherwood, American Museum.
David M. Updike, Columbia University.

The Special Committee on Hotels

Willard L. Severinghaus, *chairman;* Columbia University.
Robert H. Bowen, Columbia University.
Henry E. Garrett, Columbia University.
Tracy E. Hazen, Barnard College, Columbia University.
C. E. Davies, United Engineering Societies Building.

The Special Committee on Exhibitions

(Cooperating with the Manager of the General Exhibition, Major H. S. Kimberly, of the Washington office of the association.)
Harold A. Fales, *chairman;* Columbia University.
Leslie C. Dunn, Columbia University.
Clyde Fisher, American Museum.
Shirley L. Quimby, Columbia University.
Chester A. Reeds, American Museum.
Edmund W. Sinnott, Barnard College, Columbia University.
David M. Updike, Columbia University.
Raymond H. Wallace, Columbia University.
Carl J. Warden, Columbia University.
Clark Wissler, American Museum.
C. B. Wright, Columbia University.

The Special Committee on General Sessions and Public Lectures

Henry Fairfield Osborn, *chairman;* American Museum.

The Special Committee on Entertainment

George H. Sherwood, *chairman;* American Museum.
Nathaniel L. Britton, New York Botanical Garden.
Barnum Brown, American Museum.
Fay Cluff Brown, Museums of the Peaceful Arts.
William Crocker, Boyce-Thompson Institute.
Frank D. Fackenthal, Columbia University.
Reginald G. Harris, Long Island Biological Association.
Clarence L. Hay, American Museum.
Samuel R. Powers, Teachers College, Columbia University.
J. Enrique Zanetti, Columbia University.

The Special Committee on Luncheons

Walter H. Eddy, *chairman;* Teachers College, Columbia University.
Wayne M. Faunce, American Museum.
Philip M. Hayden, Columbia University.
George W. Mullins, Barnard College, Columbia University.
Elizabeth Reed, Teachers College, Columbia University.
Mabel G. Reed, Columbia University.

The Special Committee on Local Transportation

Donald E. Lancefield, *chairman;* Columbia University.
Forman T. McLean, New York Botanical Garden.
George N. Pindar, American Museum.
P. W. Zimmerman, Boyce-Thompson Institute.

The Special Committee on News Service

(Cooperating with the association news manager, Mr. Austin H. Clark, of the U. S. National Museum.)
James T. Grady, *chairman;* Columbia University.
George N. Pindar, American Museum.

The Honorary General Reception Committee

Henry Fairfield Osborn, *honorary chairman.*
Michael I. Pupin, *chairman.*
Hon. James J. Walker, mayor of the city of New York.
Edward Deane Adams.
Elmer Ellsworth Brown.
Mrs. Nicholas Murray Butler.
Mrs. Andrew Carnegie.
John J. Carty.
Harvey Nathaniel Davis.
Mrs. Marshall Field.
Mrs. John H. Finley.
Mrs. E. H. Harriman.
Mrs. Frederic S. Lee.
Clarence Mackay.
Frederick B. Robinson.
Owen D. Young.

The Local Representatives for Sections

Section A (Mathematics), W. Benjamin Fite, Columbia University.
Section B (Physics), Harold W. Webb, Columbia University.
Section C (Chemistry), R. R. Renshaw, New York University.
Section D (Astronomy), Clyde Fisher, American Museum.
Section E (Geology and Geography), Charles P. Berkey, Columbia University.
Section F (Zoological Sciences), G. K. Noble, American Museum.
Section G (Botanical Sciences), Tracy E. Hazen, Barnard College, Columbia University.
Section H (Anthropology), Franz Boas, Columbia University.
Section I (Psychology), Henry E. Garrett, Columbia University.
Section K (Social and Economic Sciences), Robert M. MacIver, Barnard College, Columbia University.
Section L (Historical and Philological Sciences), Franz Boas, Columbia University.
Section M (Engineering), Calvin W. Rice, American Society of Mechanical Engineers.
Section N (Medical Sciences), Charles R. Stockard, Cornell University Medical College.
Section O (Agriculture), O. S. Morgan, Columbia University.
Section Q (Education), Goodwin B. Watson, Teachers College, Columbia University.
For organizations not related to any particular section, Sam F. Trelease, Columbia University.

THE GENERAL PROGRAM

The General Program of the fifth New York meeting is similar in style and format to those for recent years. It is a book of nearly three hundred pages. Any member of the association in good standing may receive a free copy on request addressed to the permanent secretary's Washington office, as long as the supply lasts. It was edited for the Washington office of the association by the program editor, Dr. Sam F. Trelease, of Columbia University, and was published on December 26, at the registration offices for the meeting, 5,500 copies being printed. In the very

strenuous work of editing and proofreading, most of which had necessarily to be accomplished in the last ten days before publication, the program editor was efficiently aided by Mrs. Helen M. Trelease, as in recent years. The association is fortunate in having the long experience and enthusiastic efficiency of Dr. and Mrs. Trelease for this very important feature of the preparations for its annual meetings. The botany department of Columbia University is once more to be thanked for the arrangement by which Dr. Trelease devoted most of his time to this task in the weeks immediately preceding the meeting. The press work was very efficiently done by the Federal Printing Co., of New York City, which gave it special attention.

The material for the section and society programs, which make up the bulk of the book, was of course supplied by the secretaries of the several organizations, and that material was this year practically all in hand in time for printing in the regular form. No program supplements were issued for this meeting. The appreciative thanks of the association and of all who used the general program are due to the section and society secretaries, whose efficient cooperation is so essential to the preparation of the book.

Following recent practice, Dr. Trelease prepared at the eleventh hour and placed in the general program on tinted pages a very useful summary of events by days, in which every session of the meeting receives mention in its proper place, with numerous cross references. The index of the names of those reading papers or delivering addresses is another specially valuable feature of this general program. This feature was first introduced in the Nashville program a year ago and it met with general approval. Dr. Trelease and a group of Columbia students who spent a night on the preparation of the index after the book was in page proof are to be congratulated and heartily thanked.

The advertising pages of the general program present an excellent list of apparatus makers, supply houses and scientific publishers, and the association is appreciative of the cooperation of the advertisers. The income received from the sale of advertising space is applied to help meet the cost of the publication. Purchasers of apparatus can help the association in a concrete way by mentioning, when occasion occurs, the program advertisements as well as the advertisements in the official journal SCIENCE and the exhibits at the annual science exhibition. With the conscious cooperation of scientific supply houses and publishers and of purchasers of publications, scientific apparatus and supplies, the advertising facilities of the association—in connection with its journal, its annual program book and its annual science exhibition—should be increasingly utilized for the advancement of science, with corresponding increasing financial benefit to the organization; for the funds received on account of these business activities act to free other funds for appropriation by the council.

A list of the names of firms that contributed to the success of the New York meeting by purchasing advertising space in the general program is shown below. An E denotes that the firm so designated also had space in the general exhibition and contributed in that way also.

Bausch and Lomb Optical Co. (E), Rochester, N. Y.
Brooklyn Botanic Garden, Brooklyn, N. Y.
Cambridge Instrument Co., Inc. (E), New York, N. Y.
Commercial Solvents Corporation, Terre Haute, Ind.
H. Eisenstein & Co., Inc. (E), New York, N. Y.
Empire Laboratory Supply Co., Inc. (E), New York, N. Y.
General Biological Supply House (E), Chicago, Ill.
Henry Holt and Company (E), New York, N. Y.
Kny-Scheerer Corporation of America (E), New York, N. Y.
E. Leitz, Inc. (E), New York, N. Y.
B. Login and Son, Inc., New York, N. Y.
McGraw-Hill Book Co., Inc. (E), New York, N. Y.
Merck and Co., Rahway, N. J.
The Open Court Publishing Company, Chicago, Ill.
The Park Central Hotel, New York, N. Y.
The Thermal Syndicate, Ltd. (E), Brooklyn, N. Y.
Triarch Botanical Products (E), Philadelphia, Pa.
University of Chicago Press (E), Chicago, Ill.
Victor Talking Machine Company (E), Camden, N. J.
W. M. Welch Scientific Company (E), Chicago, Ill.
Williams and Wilkins Company, Baltimore, Md.
Carl Zeiss, Inc. (E), New York, N. Y.

THE ANNUAL SCIENCE EXHIBITIONS

The general exhibition of scientific apparatus, materials and books, including both commercial and pure-science exhibits, has developed rapidly in recent years and is now an important feature of the annual meetings of the association. A number of the societies that meet with the association have special exhibitions of their own, some of these being very efficiently used in connection with the presentation of research contributions, and these special exhibitions should not be overlooked in an inventory of the features of our meetings. Means have not yet been worked out, however, by which reports on the society exhibitions can be presented in these general reports of the meetings. That they receive here only this cursory mention is due solely to lack of adequate information. Some of them receive mention in the reports of the sessions of sections and societies, to appear in SCIENCE for February 1.

The general exhibition was this year held in University Hall, Columbia University, the facilities of which were exceptionally fine. Major H. S. Kimberly, exhibition manager, was ably helped by the

members of the local committee on exhibitions, of which Professor Harold A. Fales, of Columbia University, was chairman. Dr. Raymond H. Wallace, of Columbia University, was specially helpful in arranging for the installation of some of the exhibits. As to the commercial exhibits, this was the largest and most successful exhibition ever held by the association, being limited only by the extent of the available space. All the space was taken up early in the fall and many more exhibits might have been secured had it been possible to accommodate them. A very instructive and valuable exhibit in the realm of pure science was shown under the auspices of the American Society of Parasitologists, arranged by Dr. Benjamin Schwartz, of the United States Bureau of Animal Industry. Many recent and important developments in parasitology were clearly set forth and these exhibits attracted much attention. A new form of automatically irrigated pot, for plant-physiological and horticultural investigations, was shown by Dr. J. D. Wilson, of the Ohio Agricultural Experiment Station at Wooster, and the laboratory of plant physiology of the Johns Hopkins University showed improved technique for the demonstration of the classical Askenasy experiment on the transmission of traction through liquid "wires."

A list of the commercial exhibitors, to whom the great success of the New York exhibition was due, is given below. Their very helpful cooperation is greatly appreciated. An A denotes that the exhibitor thus designated also had advertising space in the general program.

Bausch and Lomb Optical Co. (A), Rochester, N. Y.
Christian Becker, Inc., New York, N. Y.
James G. Biddle, Philadelphia, Pa.
P. Blakiston's Son and Co., Philadelphia, Pa.
Cambridge Instrument Co., Inc. (A), New York, N. Y.
Central Scientific Co., Chicago, Ill.
Chemical Catalog Co., Inc., New York, N. Y.
Clay-Adams Co., Inc., New York, N. Y.
Denoyer-Geppert Co., Chicago, Ill.
Eimer and Amend, New York, N. Y.
H. Eisenstein & Co., Inc. (A), New York, N. Y.
Empire Laboratory Supply Co., Inc. (A), New York, N. Y.
Fiala Outfits, Inc., New York, N. Y.
General Biological Supply House (A), Chicago, Ill.
General Radio Co., Cambridge, Mass.
Hoke, Inc., New York, N. Y.
Henry Holt and Company (A), New York, N. Y.
Kny-Scheerer Corporation of America (A), New York, N. Y.
LaMotte Chemical Products Co., Baltimore, Md.
Leeds and Northrup Company, Philadelphia, Pa.
E. Leitz, Inc. (A), New York, N. Y.
McGraw-Hill Book Co., Inc. (A), New York, N. Y.
The Matheson Co., North Bergen, N. J.
New York Biological Supply Co., New York, N. Y.
Oxford University Press, New York, N. Y.
Spencer Lens Co., Buffalo, N. Y.
The Thermal Syndicate, Ltd. (A), Brooklyn, N. Y.
Thermo-Electric Co., Irvington, N. J.
Triarch Botanical Products (A), Philadelphia, Pa.
University of Chicago Press (A), Chicago, Ill.
D. Van Nostrand Co., New York, N. Y.
Victor Talking Machine Co. (A), Camden, N. J.
W. M. Welch Scientific Company (A), Chicago, Ill.
Weston Electrical Instrument Corporation, Newark, N. J.
Carl Zeiss, Inc. (A), New York, N. Y.

REDUCED RAILWAY RATES AND REGISTRATION FEES

Reduced railway rates, on the certificate plan, were available for all who attended this meeting, whether members of the association or not, as has been true in recent years, the reduced round-trip fare being one and one half times the regular one-way fare. The arrangement for reduced fares was applicable on practically all railways of the United States and Canada and it resulted in a very great saving to the individuals who took advantage of it. This constitutes a very tangible service accomplished each year by the association for its members and for the members of the many organizations meeting with it. Each person who registered received the official badge and a free copy of the general program and had the privilege of having a railway certificate validated.

A registration fee of two dollars was assessed for this meeting, reduced to one dollar, however, for registrants who presented cards of enrolment in the association for 1929. These contributions from those who registered were added to the fund from which the association's share of the expenses were to be met, with the result that the actual financial deficit for this meeting promises to be much less than ever before. This was the first meeting at which association members in good standing were asked to contribute toward the extra expenses, although non-members have paid registration fees at several recent meetings. Reports from the registration clerks indicate that there were among those who registered some who apparently felt that this contribution of one or two dollars was too much for an individual to give toward the costs of the meeting at which he was in attendance, but that feeling may have been only a momentary reaction in many instances, and we are sure that some members in good standing were glad to contribute the full registration fee, not asking for the reduction. The collection of registration fees seems to be the only feasible way by which our annual meetings may approach being self-supporting and such fees are now the general rule for conventions such as those with which we are dealing. By this means a considerable part of the extra costs of the meeting is equally apportioned among those who are benefited, the registration fee being considered as a form of contribution or

tax to support this work of the association, which seems to be a fair and just arrangement.

From the financial standpoint the plan adopted for the fifth New York meeting proved very satisfactory, as has been said, and a similar plan will be required for future meetings unless the general work of the association is to be greatly curtailed or unless some better way may be devised by which association funds for the annual meeting may be secured. The permanent secretary will be glad to receive suggestions on this very important question. It should be noted that the fund raised locally by subscription is applicable to cover only a part of the expense of the meeting and that practically all the meeting expense contracted for by the association's Washington office has to be met from the association's own current funds. These consist annually of: (1) two dollars of each payment of annual dues; (2) about one dollar from the income of each of the life-membership endowments of living life members; (3) five dollars from each of the few entrance fees collected from new members who are not members of affiliated organizations; (4) a few much appreciated gifts for current expenses made by members from time to time, and (5) the income from the annual meeting. This last item includes the five-dollar associate fees paid for the meeting (of which there are never many), the net income from the sale of advertising space in the general program and the registration fees. There may sometimes be a small additional net income from the exhibition, but that has not thus far been realized and it can never be very significant, for the income from the exhibition should generally be spent on the exhibition itself. It seems probable that the New York exhibition may show some net income when all accounts have been met; of that we are not yet certain, however.

THE SIXTH AWARD OF THE AMERICAN ASSOCIATION PRIZE

The American Association prize of $1,000 is awarded annually to the author of a notable contribution to the advancement of science given at the annual meeting. The funds for the prize are generously supplied by a member who does not wish his name made public. The rules for the prize award were published in SCIENCE for November 25, 1928, and in the general program of the fifth New York meeting. Nominations for the New York prize were received from the secretaries of the sections and societies, as in previous years, and the award was made by the committee on prize award. It was announced through the association news service on Wednesday, the last day of the meeting.

The winner of the prize this year is Dr. Oliver Kamm, of the research laboratories of Parke, Davis and Company, Detroit, Michigan, for his paper on "Hormones from the Pituitary Gland," presented in the symposium on "Recent Developments in the Chemistry of Naturally Occurring Remedial Agents," at a joint session of Section C (Chemistry) and Section N (Medical Sciences) held at Columbia University on the afternoon of Thursday, December 27. The following abstract of Dr. Kamm's paper has been contributed by him. It represents a continuation and a successful outcome of studies upon which he has been engaged for some time. Other papers on this subject by Dr. Kamm have been published as follows: SCIENCE, 67: 199 (1928); *Jour.* Amer. Chem. Soc., 50: 573 (1928). His name has been in the literature of organic chemistry since 1912 and he has been very productive in research. He is the author of a well-known text-book on "Qualitative Organic Analyses" (John Wiley and Sons, 1923, 1925, 1928).

"Hormones from the Pituitary Gland"
(*Abstract*)

Our bodies contain at least twelve recognized endocrine (internally secreting) glands, which elaborate specific active principles or hormones. These hormones are catalysts that control the intricate chemical reactions of the living body. It has been supposed that each of these endocrine glands was so highly specialized that it could produce one and only one hormone, but the work here reported demonstrates the presence of two hormones from the pituitary gland.

The extract of the posterior lobe of this gland has been in use by physicians for about twenty years and it has been known for some time that such an extract has three dictinct actions: (a) It raises the blood pressure. (b) It contracts the pregnant uterus. (c) It controls excessive output of water by the kidneys. Medical scientists have speculated as to whether these different actions were all produced by one single substance or whether, on the other hand, several substances were present, each accounting for one form of activity.

Although very little was known about the chemical nature of the active principles involved, a series of specially devised dialysis experiments made it possible for the author to predict in a fairly accurate manner what the molecular weight of the as yet unknown substance would be when discovered. This provided a good working basis for a long series of fractionation experiments and led finally to the actual separation and isolation of the two hormones, alpha hypophamine and beta hypophamine.

The alpha hormone was found to be the substance useful in childbirth, while the beta hormone was found to possess the property of raising the blood pressure. The paper here abstracted shows conclusively that the beta hormone, in addition to its pressor action, also has the power of controlling excessive output of

water. It is also shown that it has been a mistake to refer to the so-called renal activity of pituitrin; the beta hormone does not act primarily upon the kidney, but it controls the utilization of water by the tissues of the body.

Some individuals (the "physiological wets") are extremely sensitive to the action of the beta hormone, while others (the "physiological drys") readily return to normal after administration of this hormone. It has just been observed that the fleshy type of individual is almost invariably of the "wet" type, whereas the slender, scrawny individual is usually a "dry." The suggestion is therefore made that we possibly have here an important feature of the explanation as to why the former type is fleshy and why the latter type fails to put on weight readily in spite of an excessive intake of food and water.

Although we now know that the same endocrine gland may produce more than one hormone it seems logical to suppose that such multiple hormones are formed from similar intermediates, and this is true of these two post-pituitary hormones, which have been designated as "chemical twins." They are closely related in composition and exhibit similar chemical behavior when subjected to various reagents. In the future it will be possible for the physician to employ one of these hormones without fearing side-reactions brought on by the other. Even in cases where both hormones are indicated they may not be needed at the same time. The beta hormone is now being studied clinically, with reference to its usefulness in diseases characterized by excessive loss of water, such as diabetes insipidus, burns, certain infectious diseases and surgical shock.

The committee on award was this year composed of the members named below:

Roger Adams, *chairman*, University of Illinois, Urbana, Ill.

C. E. Allen, University of Wisconsin, Madison, Wis.

Frank Leverett, University of Michigan, Ann Arbor, Mich.

C. A. Mooers, University of Tennessee, Knoxville, Tenn.

Howard C. Warren, Princeton University, Princeton, N. J.

To these gentlemen is here expressed the gratitude of the association for their efficient service in this important and delicate part of the association's work.

The complete list of winners of the American Association prize is as follows:

(1) The Cincinnati award, January, 1924. L. E. Dickson, for contributions to the theory of numbers.

(2) The Washington award, January, 1925. Divided equally between Dr. Edwin P. Hubble, for contributions on spiral nebulae, and Dr. L. R. Cleveland, for contributions on the physiology of termites and their intestinal protozoa.

(3) The Kansas City award, January, 1926. Dr. Dayton C. Miller, for contributions on the ether-drift experiment.

(4) The Philadelphia award, January, 1927. Dr. George D. Birkhoff, for mathematical criticism of some physical theories.

(5) The Nashville award, January, 1928. H. J. Muller, for contributions on the influence of X-rays on genes and chromosomes.

(6) The New York award, January, 1929. Oliver Kamm, for contributions on the hormones of the pituitary gland.

THE NEWS SERVICE AT NEW YORK

(Notes by Austin H. Clark, news manager)

Material Supplied to the Press

Greatly increased interest in the news service on the part of the members of the association was an outstanding feature of the New York meeting. This increased interest, evidenced especially by helpful and cordial cooperation with the news manager in the weeks preceding the meeting, resulted in much more extensive and diversified notice in the press than it has been possible to secure heretofore. Abstracts and manuscripts were more carefully prepared than previously, while the bulk of the material arrived well in advance of the meeting. The number of papers arriving too late for use by the news service was surprisingly small—less than one sixth of last year's number. As a result of the prompt response on the part of the members of the association to the letter sent out by the news manager, it was possible to place release dates on the papers and to turn them over to the representatives of the press much earlier than heretofore.

The secretaries of some of the affiliated societies applied to the news manager for suggestions long in advance of the meeting, and took it upon themselves to see that the abstracts passing through their hands were prepared in good form and also that they reached the news manager before December 1. The first paragraph of an abstract should introduce the subject-matter in such a way as to indicate its relation to something within the knowledge of the average person. When not furnished by the author, such introductory information is supplied by the news manager whenever possible, but the mass of material passing through his hands is so great that he can make additions only for papers received before the bulk of the material begins to arrive. Abstracts should not be too short, lest they be too inflexible to admit of any rewording. They should be about five hundred words in length, but may be as long as a thousand words. Abstracts longer than a thousand words seldom receive much attention from the press representatives at such large scientific conventions as the New York meeting of the association.

The amount of newspaper notice given to a news item generally depends upon the time available for the preparation of a story from the material submitted, as well as upon the timeliness, comprehensibility and clarity of the material. If abstracts and papers are in the hands of the news manager by December 1, the press representatives can study them at leisure, work them over carefully, get additional information regarding more or less obscure points and prepare accounts to be sent out by mail. If, however, the original material is not received until the week before the meeting only short notices can be prepared, of the most striking contributions, and these have to be used only for the telegraphic service. Also, it frequently occurs that several papers presented at a meeting may deal with different phases or aspects of the same subject, and these may be assembled in a single story, if time is available, which mentions the several contributions and their authors. This method was employed very effectively this year in dealing with a large group of highly technical abstracts that came in before December 1. A single address presented at New York was given far more newspaper space than any other, because its manuscript was received long in advance of any of the other comparable addresses—more than three weeks before the meeting—and ample time was consequently available for the preparation of extended accounts and full-page feature articles. Under different circumstances this address would have been forced to share much of its newspaper space with others.

Secretaries should send their programs to the permanent secretary's office as early as possible, so that abstracts can be worked over and stories can be prepared for the mail service, properly dated for release. One of the societies that took prominent part in this meeting arranged to have all its abstracts in the hands of the news manager before December 1, and the abstracts had all been carefully gone over by a committee and made readily intelligible to any one with even a rudimentary knowledge of the subject. The unprecedented newspaper notice received by the members of this society amply justified the time and energy thus expended.

Little attention is generally paid by representatives of the press to printed abstracts, which of course can not be supplied to the press representatives with the regulation blue covers, graded and distributed with the others according to their released dates. The graded and distributed material is in itself sufficient for the preparation of day-by-day accounts of the meeting and printed abstracts are therefore largely ignored. Members of organizations that print abstracts in advance should be sure that duplicate copies of their manuscripts are sent the news manager in typewritten form, either before the abstracts are printed or as soon as their manuscripts are returned to them from the printer.

At this meeting it was conclusively proved that the news service must operate through a single office. A branch office is simply ignored by the press representatives, for they find enough to keep them busy at the main office and they fear to waste time in visiting a branch office, more especially when by so doing they may miss something of importance that may be sent in to the main office. Press material given out at a branch office may receive some local notice, but it is not used by the press associations and therefore receives only very limited publicity.

As in the case of the last two meetings, all the press representatives in attendance were men of the highest grade. Many of them were special science editors, while others had been selected to report the meeting on account of their interest in and respect for science and because of their proven accuracy. With the newspapers and the press associations assigning men of this type to the meetings, and the members of the association showing rapidly increasing confidence in the press, the prestige of science among the public as a whole is rapidly increasing. From this increased prestige both the scientific workers and the press must benefit.

It is a pleasure to express here, for the news service and the association, our appreciation of the assistance rendered by Science Service before and during the meeting. The staff of that organization was in constant touch with the news service throughout the meeting and placed the news manager under deep obligations by providing copies of important addresses and other material of the greatest value.

The press representatives in attendance at the meeting were:

Howard W. Blakeslee, Associated Press; William Chambliss, New York *Daily Mirror;* J. H. Connor, City News Association; Watson Davis, Science Service; David Dietz, Scripps-Howard papers; Don Glassman, Washington *Star;* C. E. Gratke, *Christian Science Monitor;* Blakely Hall, Boston *Post;* Thomas R. Henry, Washington *Star;* Ethel C. Ince, *Christian Science Monitor;* James L. Kilgallen, International News Service; Walter C. Kiplinger, Indianapolis; Alva Johnston, New York *Herald Tribune;* Coleman B. Jones, Associated Press; Richard Law, New York *Herald-Tribune;* Sam Love, United Press; Robert Orbin Litchfield, Washington; Maurice Mermey, New York; James N. Miller, Washington; Dudley Nichols, New York *World;* John J. O'Neill, Brooklyn *Daily Eagle;* G. Prosnitz, New York *Sun;* Joel Sayre, New York *Telegram;* H. H. Sheldon, New York *Herald Tribune;* Allen Shoenfield, Detroit *News;* E. E. Slosson, Science Service; Earl Sparling, New York *Telegram;* Elizabeth Spence, New York *Journal;* L. Stark, New York *Times;* Frank Parker Stockbridge, New York; James Stokley, Science Service; Frank Thone, Science Service; Francis J. Tietsort, New

York *American;* Uthai V. Wilcox, Washington; Percy Winner, New York *Evening Post;* S. R. Winters, Washington.

Advance publicity in connection with the meeting was most effectively handled by Mr. James T. Grady, of Columbia University, who was assisted by Mr. George N. Pindar, of the American Museum of Natural History. These gentlemen also kept in constant touch with the news manager throughout the meeting and rendered conspicuous service.

Radio Talks

Jointly with Science Service, the American Association news service presented a series of fifteen radio talks, covering a wide range of subjects. These talks were broadcast from a total of thirty-three stations scattered over an area extending from Boston, Providence, New York, Baltimore and Washington westward to Chicago, Council Bluffs, Kansas City and St. Louis. Nine stations in New York state and adjacent portions of New Jersey, six in Ohio, three each in Pennsylvania and Illinois, two each in Massachusetts, Michigan, Missouri and Maryland, and one each in Rhode Island, Indiana, Iowa and the District of Columbia participated in making this feature of the New York meeting a success. For their cordial cooperation in this important work the association is under great obligations to the Columbia Broadcasting System (operating Stations WABC, WFBL, WMAK, WEAN, WNAC, WJAS, WLBW, WCAO, WMAL, WKRC, WADC, WPSD, WHK, WOWO, WGHP, WMAQ, KOIL and KMOX), to the National Broadcasting Co. (operating Stations WJZ, WBZ, WBZA, KDKA, WTAM, WLW, WJR, KYW, KFKX, WREN and WBAL), to the Experimenter Publishing Co. (Stations WRNY and W2XAL), to Gimbel Bros. (Station WGBS) and to Paulist Fathers (Station WLWL). It is a pleasure to express our appreciation of the uniform courtesy and consideration shown by the program managers and announcers.

There is no way of estimating the number of listeners who heard these radio talks, but it was undoubtedly very large. Because of the large number and wide geographical distribution of the stations cooperating and because of the very great range of some of them, parts of our program could be easily heard in all sections of North America, and also on the opposite sides of both adjacent oceans. It is worthy of note that immediately after the meeting a member in Ravenna, Nebraska, wrote to the Washington office of the association to say that he regretted his inability to attend the New York meeting but was glad to have listened to one of the radio talks. A list of the radio talks given in connection with this meeting follows:

Wednesday, December 26.—"The Coming Science Meeting." Dean George B. Pegram, Columbia University. Stations WRNY (New York) and W2XAL (New York).

Thursday, December 27.—"American Wild Horses." Dr. James W. Gidley, U. S. National Museum. Stations WRNY (New York) and W2XAL (New York); "Indian Life in the Northern Woods." Rev. Dr. John M. Cooper, Catholic University of America, Washington, D. C. Station WLWL (New York).

Friday, December 28.—"Some Popular Misconceptions Concerning the American Indians." Matthew W. Stirling, Bureau of American Ethnology, Washington, D. C. Station WGBS (New York); "All Sorts of Stars." Dr. Annie J. Cannon, Harvard College Observatory. Stations WRNY (New York) and W2XAL (New York).

Saturday, December 29.—"Lessons from the Past as Guides to the Future." Dr. John C. Merriam, Carnegie Institution of Washington. Stations WJZ (New York), WBZ (Springfield, Mass.), WBZA (Boston), KDKA (Pittsburgh), WTAM (Cleveland), WLW (Cincinnati), WJR (Detroit), KYW (Chicago), KFKX (Chicago), WREN (Kansas City), and WBAL (Baltimore); "What is Psychology?" Dr. L. T. Troland, Harvard University. Stations WRNY (New York) and W2XAL (New York).

Sunday, December 30.—"What Science may Bring in 1929." Watson Davis, Science Service. Station WGBS (New York); "From the Pipes of Pan to the Modern Flute." Dr. Dayton C. Miller, Case School of Applied Science. Stations WRNY (New York) and W2XAL (New York); "Plumbing the Depths of Space." Dr. Seth B. Nicholson, Mt. Wilson Observatory, Carnegie Institution of Washington. Stations WABC (New York), WFBL (Syracuse), WMAK (Buffalo), WEAN (Providence, R. I.), WNAC (Boston), WJAS (Pittsburgh), WLBW (Oil City, Pa.), WCAO (Baltimore), WMAL (Washington), WKRC (Cincinnati), WADC (Akron, Ohio), WPSD (Toledo), WHK (Cleveland), WOWO (Fort Wayne), WGHP (Detroit), WMAQ (Chicago), KOIL (Council Bluffs) and KMOX (St. Louis).

Monday, December 31.—"History in Trees." Dr. A. E. Douglass, University of Arizona. Station WGBS (New York); "Sugar from Wood." Dr. Edwin E. Slosson, Science Service. Station WABC (New York); "Earthquakes in Northeastern United States." Commander N. H. Heck, U. S. Coast and Geodetic Survey. Stations WRNY (New York) and W2XAL (New York).

Tuesday, January 1.—"Winter's Music." Dr. W. J. Humphreys, U. S. Weather Bureau. Stations WRNY (New York) and W2XAL (New York).

Wednesday, January 2.—"Whales." A. Brazier Howell, Johns Hopkins Medical School. Stations WRNY (New York) and W2XAL (New York). (Read in Mr. Howell's absence by the announcer, Mr. French.)

Movietones

For the first time in the history of our meetings the news service was requested to select members of the association for appearance in the "talkies" through

the Fox Movietone Company. Several of the designated members responded, and their pictures are already being shown in different cities. Arrangements of this kind may well become an important feature of the work of the association news service in future.

THE GENERAL SESSIONS AT NEW YORK

The association was unusually fortunate this year in the arrangement of its general sessions, a very important task to which President Osborn had given much personal attention for many months. Each of the evening general sessions was planned to represent some particular field of science, but the addresses were so presented, all by men of the highest eminence, as to be of great interest and value to workers in other fields and to educated people generally. The general sessions constitute a very important part of the program of the annual meeting, for they offer excellent opportunities by which those engaged in any branch of science work may become better acquainted with important phases of the progress that is being made in other branches. The general sessions aid the spread of knowledge and appreciation across the marks and boundaries that tend so strongly, in these days of increasingly pronounced specialization, to discourage the cultivation of the broader aspects of scientific thought and to retard a much-needed interchange of ideas between the several groups of men and women of science. The general sessions at New York were freely open to all who wished to attend, to the general public as well as to specialists in science work, and without regard to membership in the association. The following brief reports of these sessions are based on the General Program and on material kindly furnished by Mr. Watson Davis, of Science Service.

On Thursday afternoon occurred a symposium on "The Centenary of the Glacial Theory," given in the auditorium of the American Museum of Natural History, under the joint auspices of Section E—Geology and Geography—and the Geological Society of America. Arrangements for this important symposium had been made by President Osborn and Dr. Chester A. Reeds, local representative of the Geological Society of America. The papers dealt with the development of the glacial theory since it was first advanced by Charpentier and Agassiz a century ago. Important new glaciation maps were displayed and discussed. Other new world maps, on the Lambert and tilted Mollweide projections, were described. Five twenty-minute papers were presented, with an interim of ten minutes for discussion following each paper, by H. F. Osborn, C. A. Reeds, E. Antevs, R. A. Daly and W. H. Hobbs. The symposium closed with an address on "Glaciation in the Northern Hemisphere," by Professor Frank Leverett, of the University of Michigan, chairman of Section E.

Another general session on Thursday afternoon was devoted to an illustrated lecture by Dr. C. E. Kenneth Mees, of the Eastman Kodak Company, on "The Kodacolor Process of Color Photography." This very interesting session was held at the McMillin Theater, 116th Street and Broadway. Dr. Mees is an eminent research leader in the chemistry and physics of photography. Educated at University College, London, under Sir William Ramsay, his doctor's thesis was on the theory of the photographic process, and he soon became a specialist in the theory and manufacture of panchromatic plates and light filters for the photography of colored objects and color photography. Since 1912 he has been engaged in directing research in the Eastman Kodak Company. The process of color photography known as "Kodacolor" is one of the latest developments in amateur cinematography. This is an additive process depending upon the use of three color filters in the objective and of a film on which microscopic lenses are embossed, these lenses forming images of the three filters upon the color-sensitive emulsion. Natural objects are reproduced on the film cut into small sections, each section corresponding to one of the three primary colors. When the film is projected in an apparatus equipped in the same way, with filter on the lens, the light passing through the individual sections is recombined on the screen to generate a picture in color. The process is characterized by convenience and simplicity and is capable of giving excellent results. The lecture was illustrated by lantern slides and the projection of "Kodacolor" pictures.

On Thursday evening, at the American Museum of Natural History, was held the general session marking the official opening of the fifth New York meeting of the association. The session was opened by Dean George B. Pegram, of Columbia University, general chairman of the New York committees on arrangements, who was followed by the Honorable Arthur J. W. Hilly, acting corporation counsel of the City of New York. Mr. Hilly, representing Mayor James J. Walker, spoke on behalf of the city in extending a cordial welcome to the American Association and all men and women of science. President Henry Fairfield Osborn responded for the association, thanking the city and its people for the fine spirit of hospitality shown toward this meeting. The president then introduced the main speaker of the evening, Dr. Charles P. Berkey, professor of geology in Columbia University, president of the New York Academy of Science and secretary of the American Geological Society. Dr. Berkey is chief geologist of the Central Asiatic Expeditions, sponsored by the American Museum of Natural History, and his lecture dealt with some of the results of those expeditions. His title was "Recent Discoveries in the Ancient History of Mongolia."

He showed the classification of the geologic formations and structures for several thousand miles of new country and discussed the interpretation of these in terms of a relatively comprehensive geologic history of Central Asia. The history leads through several very ancient systems affected by intense metamorphism and deformation, and further complicated by long-continued batholithic invasion on a magnificent scale. These events were followed by renewed sedimentation, repeated folding, and at least two great erosion intervals, the last of which reduced the then mountainous region to a peneplain. The subsequent geologic record is preserved in thin patches of continental sediments lodged within the downwarped portions of the great interior depression now forming the Gobi basin. Buried in the sediments are found a great variety of vertebrate fossils that have made the Gobi region one of the finest collecting grounds known. The very last chapter has to do with prehistoric man. Abundant traces of successive human cultures have been found imbedded in the uppermost strata, which were deposited under a changing climatic environment of great significance in correlation. Bronze and stone age men lived in Asia, and their drawings, tools and weapons, estimated to be 40,000 to 200,000 years old, have been found. But "man had been man for ages and had a fairly advanced civilization when the oldest human traces so far found were made in Mongolia." Dr. Berkey's address was a remarkable example of clear and interesting presentation.

The general reception, given by the trustees of the American Museum to the members of the association and the associated societies, followed Dr. Berkey's lecture. The receiving line was in the Hall of the Age of Man, and the reception halls also included the Hall of the Age of Mammals, the Hall of Jewels, Geology Hall and Dinosaur Hall. There was music by the Eddie Davis Orchestra and refreshments were served.

There were four general sessions on Friday afternoon. Professor Herbert Hall Turner, Savilian professor of astronomy at Oxford University, official representative of the British Association for the Advancement of Science at this fifth New York meeting of the American Association, spoke on "The Scientific Retrospect," at the American Museum of Natural History. The lecturer gave an interesting series of sidelights on men of science from Kepler to Einstein, illustrated with lantern slides showing instructive old apparatus. Professor Turner is the dean of British astronomers and he is one of the most distinguished of the astronomers who specialize in precise measurement. Of his many notable contributions to science the most far-reaching is his procedure for the rapid and accurate reduction of astronomical photographs without the use of complicated formulae. Indeed, the Turner methods of reduction have been the principal factor in giving to photographic measurement the important position that it now holds in astronomy. Professor Turner has also made important investigations on variable stars, on the periodicity of earthquakes, and in other lines, all of which show his unusual skill in the application of sound mathematics to obtain requisite results with a minimum of labor.

At 2 o'clock on Friday afternoon was held a symposium of invited papers on "The Economic Status of Scientific Men and Women," under the auspices of the Committee of One Hundred on Scientific Research, of which Dr. Rodney H. True, of the University of Pennsylvania, is secretary. The symposium dealt with *getting* and *spending* by college and university men and women, with special regard to the relation of income to research effectiveness. The following questions suggest some phases of this important problem: What relation does salary adequacy bear to the enlistment of the best young men and women in college and university work? Are the potential leaders drafted for other work commanding higher incomes? What do college and university people receive in comparison with other groups of trained men and women? How do academic families spend their incomes and do the incomes cover the needs? Are present salaries sufficient to purchase free time and freedom needed for research effectiveness? Is research stimulated by prompt and adequate publication? If so, are the present facilities equal to this demand? If not, should additional facilities be provided, or must publications be further condensed or discouraged? This session was opened by President Osborn, who presided. Besides the remarks of Professor Osborn there were papers on: "Budgets of Academic Families," by Professor Benjamin R. Andrews, of Teachers College, Columbia University; "Salaries and Supplementary Earnings of College Teachers," by Frank P. Bachman, director of the General Education Board, and "The Salary Scale of Trained Men," by Dr. Rodney H. True, of the University of Pennsylvania. An interesting and profitable discussion followed. It is expected that the papers presented at this general session will be published later.

At four o'clock on Friday afternoon, at the Horace Mann School, Dr. C. A. Kofoid, of the University of California, showed the famous Canti motion pictures of cell division and other cytological phenomena, including some aspects of the action of radium on living tissue. These motion pictures were prepared under the direction of Dr. Reginald Canti, of the British Imperial Cancer Institute, and Professor Strangeways, of Cambridge University. They deal mainly

with the periosteum of the chick and with Jensen's rat sarcoma. The process of mitosis is dramatically depicted, including the emergence and division of the chromosomes and the formation of the daughter cells. The action of radium emanation upon both normal and malignant cells is well illustrated, as are also ameboid movement, the behavior of phagocytes and the movements of mitochondria.

The showing of the Canti films was followed by a showing of a new and very valuable series of motion pictures depicting the early stages of the development of the rabbit's egg, prepared by the department of embryology of the Carnegie Institution of Washington. Both of these showings aroused much favorable comment.

In the Casa Italiana, Columbia University, on Friday afternoon at four o'clock, was given the sixth annual Josiah Willard Gibbs Lecture, under the joint auspices of the American Mathematical Society and the American Association. This important address was presented by Professor G. H. Hardy, Savilian professor of geometry at Oxford University, on "An Introduction to the Theory of Numbers." Professor Hardy is one of the greatest of mathematicians and his lecture was very important in its field. It was well attended.

The Friday evening general session was devoted to the presentation of the seventh annual Sigma Xi lecture, under the joint auspices of the Society of the Sigma Xi and the American Association, the lecturer being Dr. Arthur H. Compton, of the University of Chicago, who received the Nobel Prize in physics for 1927. Dr. Compton's subject was "What is Light?" After demonstrations of various types of electromagnetic radiation, including radio waves, heat rays, light, ultra-violet x-rays and gamma rays, he described the experiments (mainly those involving interference) that show the wave characteristics of light. He then proceeded to a discussion of the experiments that have shown the corpuscular character of x-rays. Finally, attention was turned to the fact that this duality, by which light has both wave and corpuscular aspects, is also applicable to electrons. The corpuscular character of electrons has long been known, but their wave characteristics are only now being made evident. "It is only to satisfy our sense of continuity that we assume that an electron or proton has a real existence between the occasions at which it acts on other particles." While moving from one place to another light appears to spread out as waves, but when producing any physical effect it would materialize into discrete particles.

Following this general session a reception was held in Education Hall of the American Museum of Natural History. The exhibition halls of the museum were open for inspection by members of the association and refreshments were served.

On Saturday afternoon there was a general session at 4:30, in the duplex assembly room of the American Museum of Natural History, at which Professor Franz Boas, eminent anthropologist, of Columbia University, delivered a fascinating lecture on "Migrations of Asiatic Races and Cultures to North America." Dr. Boas is the most competent person in the world to discuss the peopling of America from Asia. He concluded that the Mongoloid races very early migrated in a number of waves into the American continent and were gradually driven southward by the inclemency of the Arctic climate. Later on, when the climate became more temperate, man settled again in the more northern districts of both continents and there was migration in both directions. The outposts of the eastern wave may have been the Eskimo, while the western wave moved across Bering Strait and back into Siberia, where its peoples subsequently amalgamated with the Old World tribes, which also migrated northward when Siberia became again habitable.

The general session of Saturday evening was devoted to an important lecture on "New Tendencies in Biologic Theory," by Dr. William Morton Wheeler, dean of the Bussey Institution, Harvard University. This session was held at the American Museum of Natural History and was followed by a reception, with refreshments, in the Darwin Hall, the Reptile Hall and the new Hall of Fishes. Professor Wheeler said that the meeting ground for the two opposing schools of thought in biology (the mechanists and the historists, as he termed them) seems to lie in "holism," "emergent evolution," "organicism" and "organismalism." From this intermediate point of view a plant or animal is seen not as a mere mechanism, nor yet as something driven by a pseudo-supernatural force from within, but as something in itself, developing its qualities from the combination of the elements that make it up—qualities that these elements do not appear to possess in the separated state.

The general session on Monday evening, also held at the American Museum of Natural History, was devoted to the address of the retiring president of the association, Dr. Arthur A. Noyes, director of the Gates Chemical Laboratory of the California Institute of Technology. Dr. Noyes has been called the father of American physical chemistry and the most successful American teacher of chemistry. His great influence on teaching methods is felt in every American chemical classroom. He described the development of our knowledge of the chemical elements, passing briefly over its earlier stages but discussing more fully the remarkable recent advances that have re-

sulted from the discoveries of modern physics. He showed, with the aid of lantern illustrations, some of the recent discoveries relating to the structure of the atom, contrasting the view-point of thirty years ago (when the atom was considered to be a rigid sphere) with the present highly developed knowledge of various kinds of radiations, which have shown the atom to be a type of solar system with a central (sun-like) nucleus built up out of hydrogen-nuclei and electrons with other (planetary) electrons circulating around it. He dwelt on the chemical aspects of the subject, since these have received less attention than the physical ones, showing what the new knowledge of the structure of atoms has contributed to chemical science and indicating what this new knowledge may mean for the future development of chemistry. Dr. Noyes's stimulating and informative address has been published in SCIENCE for January 11.

Another very enjoyable and profitable reception, with refreshments, followed the Monday evening general session, in Education Hall, the Morgan Memorial Hall and other halls of the American Museum of Natural History.

The final and closing general session of the fifth New York meeting was held at the American Museum of Natural History on Tuesday evening, followed by the last of the series of receptions for which the association is so greatly indebted to the American Museum. President Osborn made some happily chosen remarks on the successful accomplishment of this, the greatest of the association meetings, and he was followed by Dean George B. Pegram, Dr. J. McKeen Cattell and Dr. Burton E. Livingston, who also spoke briefly on the fine outcome of this meeting. The address of the evening was given by Dr. Harlow Shapley, director of the Harvard College Observatory and Paine professor of astronomy in Harvard University, who was introduced by Professor H. H. Turner, official representative of the British Association at this meeting.

Dr. Shapley's address was on "The Galaxy of Galaxies—New Developments in the Study of the Super-Organizations Outside the Milky Way." He is a leader in American astronomical investigation. His principal researches have dealt with photometry and spectroscopy, especially in connection with investigations of the so-called spiral nebulae, which are now known to be extra-galactic universes. He has greatly advanced our knowledge of these extra-galactic systems and has recently done outstanding work in locating the center of our own Milky Way system. The address dealt with our rapidly increasing knowledge of the external galaxies, those very remote systems that seem to resemble our own galaxy in many ways, being considered now as each made up of millions of stars. Among the external galaxies are included the typical spiral nebulae. Others are like the two Magellanic clouds, which are visible from southern countries to the unaided eye, being more irregular. Dr. Shapley himself has demonstrated that the Magellanic clouds are definitely outside our own universe. Our own galaxy appears to have a diameter from ten to twenty times as great as that of any of the others with which we are acquainted, with the exception of the Andromeda nebula, which may be a fifth as large as our system. In the oceans of space, our galaxy is like a continent, whereas the hundreds of thousands of extra-galactic nebulae may be called "island universes," as Herschel and others termed them a hundred years ago. But these "islands" are not isolated. They are organized into higher systems, into galaxies of galaxies, which are enormously larger than our own galaxy. Analysis has shown that the Coma-Virgo group of galaxies is itself composed of between two hundred and three hundred galaxies. Lying in the same general direction, though much more remote, are at least three other clouds of galaxies, indicating a scattering of such systems through space as far as we can fathom.

"In analyzing the Coma-Virgo region we hit upon the major discovery of all our work—the apparent proof that intergalactic space is effectively transparent. This gives us the assurance that the distances we are measuring are correct and that veils of meteoric dust and of electrons can not obscure the light of remote systems and lead us to false conclusions concerning their distances. This permits us to say that the remotest galaxies we study are more than a hundred million light years distant; that the great Coma-Virgo galaxy of galaxies is ten million light years away and extends throughout two million light years of space; and that the individual systems in this organization have diameters of from five thousand to twenty thousand light years. Our own galaxy probably much exceeds two hundred thousand light years in diameter. It is possible that an enormous galaxy such as ours may have resulted from the condensation or amalgamation of many smaller galaxies, as from the concentration into one system of a hundred or so of the members of a super-system such as that in Coma-Virgo."

ENTERTAINMENT AND SUNDAY FEATURES

This New York meeting was exceptional in its entertainment features. Afternoon tea was served daily in the Philosophy Hall of Columbia University, at the general science exhibition in University Hall, Columbia University, and in the Grace Dodge Room of Teachers College. Tea was served Saturday afternoon at the Museums of the Peaceful Arts. As has been mentioned, a reception followed each of the five

evening general sessions at the American Museum of Natural History. These teas and receptions were all very enjoyable indeed and very useful in furnishing welcome opportunities for relaxation and for general intercourse among those who were in attendance at the meeting. The association and the societies are very grateful for the fine courtesies thus shown.

On Sunday morning many of those attending the meeting visited points of interest in and about New York, especially the New York Botanical Garden, the New York Zoological Park, the Brooklyn Botanic Garden, the Metropolitan Museum of Art and the Boyce Thompson Institute for Plant Research, at Yonkers. The trip to Yonkers was by means of autobuses, arrangements for which had been very efficiently made by Dr. Tracy Hazen, of Barnard College, Columbia University. About 150 persons accepted the cordial invitation extended by Dr. William Crocker, director of the Boyce Thompson Institute, and were given a rare opportunity to inspect the facilities and work of the institute. A buffet luncheon was served and the staff of the institute very obligingly demonstrated many interesting and important lines of research. This feature of the meeting was highly appreciated by all who took part.

About fifteen pastors of New York churches of many denominations expressly invited members of the association and the associated societies to attend religious services on Sunday and large numbers took advantage of these kind invitations. The New York Philharmonic-Symphony Society gave a complimentary concert on Sunday afternoon in Carnegie Hall, especially for the visiting men and women of science, which was arranged through the generosity of a friend of the American Association. The concert was under the direction of Dr. Willem Mengelberg. It was attended by about twenty-five hundred persons, who were greatly appreciative of this unusually fine entertainment feature, for which this meeting will long be remembered.

On Sunday evening a remarkably enjoyable and profitable reception, with music, was given to the members and friends of the American Association by the president and trustees of the Metropolitan Museum of Art, which very suitably brought the Sunday features of this meeting to a close. Many of the galleries and rare collections of the museum were open for inspection and the large number who attended were very grateful for this unusual opportunity.

THE COUNCIL AT NEW YORK

The following list, compiled by Dr. Sam F. Trelease, secretary of the council, shows the names of those who attended New York council sessions, together with each member's official status in the council.

Alexander, William H., *Rep. Ohio Acad. Science.*
Allee, Warder Clyde, *Rep. Amer. Soc. Zoologists.*
Allen, Charles E., *Vice-President for Section G.*
Anderson, Esther S., *Rep. Nebraska Acad. Science.* (Substitute for W. C. Brenke.)
Ball, C. R., *Rep. Honor Soc. Phi Kappa Phi.*
Bingham, W. V., *Rep. Amer. Psychological Assoc.*
Breed, Robert S., *Rep. Soc. Amer. Bacteriologists.*
Bridgman, P. W., *Vice-President for Section B.*
Brown, William M., *Rep. Virginia Acad. Science.*
Budington, Robert A., *Rep. Amer. Soc. Naturalists.*
Cairns, W. D., *Rep. Mathematical Assoc. Amer.*
Caldwell, Otis W., *Rep. National Education Assoc.*
Calver, Homer N., *Rep. Amer. Public Health Assoc.*
Cattell, J. McKeen, *Exec. Comm. Member and Past President (1924).*
Clark, Austin H., *Elected Member.*
Cole, Fay-Cooper, *Vice-President for Section H.*
Cole, Leon J., *Rep. Amer. Genetic Assoc.*
Craver, Harrison Warwick, *Rep. Amer. Library Assoc.*
Cunningham, Bert, *Rep. North Carolina Acad. Science.*
Danforth, Charles H., *Secretary of Section H.*
Dean, George A., *Rep. Amer. Assn. Economic Entomologists.*
Dietrichson, Gerhard, *Secretary of Section C.*
Drushel, J. Andrew, *Rep. Amer. Nature-Study Soc.*
Enders, Howard E., *Rep. Indiana Acad. Science.*
Estabrook, Arthur H., *Rep. Eugenics Research Assoc.*
Fenneman, N. M., *Rep. Assoc. Amer. Geographers.*
Fort, Tomlinson, *Rep. Amer. Mathematical Soc.*
Fox, Philip, *Secretary of Section D.*
Freeman, Frank N., *Secretary of Section I.*
Gardner, Wright A., *Rep. Alabama Acad. Science.*
Gibbs, George, *Rep. Amer. Soc. Civil Engineers.*
Giltner, Ward, *Rep. Amer. Veterinary Med. Assoc.*
Goldforb, A. J., *Vice-President for Section N and Rep. Soc. Experimental Biology and Medicine.*
Grindley, Fred H., *Rep. Canadian Soc. Technical Agriculturists.*
Guthe, C. E., *Rep. Amer. Anthropological Assoc.*
Hargitt, Geo. T., *Secretary of Section F.*
Heck, N. H., *Secretary of Section M.*
Hendren, L. L., *Rep. Georgia Acad. Science.* (Substitute for T. H. McHatton.)
Herrick, Glenn W., *Rep. Amer. Assoc. Economic Entomologists.*
Howard, L. O., *Elected Member and Past President (1920).*
Hughes, A. L., *Secretary of Section B.*
Humphreys, W. J., *General Secretary of the Association and Rep. Amer. Meteorological Soc.*
Ives, Herbert E., *Rep. Optical Soc. Amer.*
Juday, Chancey, *Rep. Ecological Soc. Amer. and Wisconsin Acad. Sciences.*
Koch, Julius A., *Rep. Amer. Pharmaceutical Assoc.*
Koos, Leonard V., *Rep. Nat. Soc. Study Education.*
Livingston, Burton E., *Permanent Secretary of the Association.*
Lutz, Frank Eugene, *Rep. Amer. Soc. Zoologists.*
Lynch, J. Joseph, *Rep. Seismological Soc. Amer.*
Lyon, Marcus Ward, Jr., *Rep. Amer. Soc. Mammalogists.*
McGill, John T., *Rep. Tennessee Acad. Science.*
Mance, Grover C., *Rep. South Carolina Acad. Science.*
Mansfield, G. R., *Secretary of Section E.*
Mayer, Joseph, *Rep. History Science Soc.*
Mees, C. E. Kenneth, *Vice-President for Section C.*
Merrill, M. C., *Rep. Honor Soc. Phi Kappa Phi.*
Middletown, Austin R., *Rep. Kentucky Acad. Science.*
Mitchell, S. A., *Rep. Amer. Assoc. Univ. Professors.*
Mooers, Charles Ansel, *Vice-President for Section O.*
Moore, Charles N., *Secretary of Section A.*
Morehouse, D. W., *Rep. Iowa Acad. Science.*
Murnaghan, Francis D., *Rep. Mathematical Assoc. Amer.*
Ogden, Robert Morris, *Rep. Amer. Psychological Assoc.*
Okkelberg, Peter, *Rep. Michigan Acad. Science.*
Reddick, Donald, *Rep. Amer. Phytopathological Soc.*

Renshaw, R. R., *Rep. Amer. Chemical Soc.*
Sackett, Robert Lemuel, *Vice-President for Section M.*
Senior, H. D., *Rep. Amer. Assoc. Anatomists.*
Shull, A. Franklin, *Rep. Botanical Soc. Amer. and Amer. Soc. Naturalists.* (Substitute for H. H. Bartlett.)
Shull, Charles Albert, *Rep. Amer. Soc. Plant Physiologists.*
Spinden, Herbert J., *Rep. Amer. Anthropological Assoc.*
Stetson, H. T., *Rep. Astronomical Soc. Pacific.* (Substitute for Walter S. Adams.)
Tilton, John L., *Rep. West Virginia Acad. Science.*
Torrey, John Cutler, *Rep. Soc. Amer. Bacteriologists.*
Trelease, Sam F., *Secretary of Section G.*
True, Rodney H., *Elected Member.*
Turner, H. H., *Rep. British Association for the Advancement of Science.*
Van Horn, Frank R., *Rep. Mineralogical Soc. Amer.*
Ward, Henry B., *Exec. Comm. Member, Rep. Amer. Soc. Parasitologists and Illinois Acad. Science.*
Warren, Howard C., *Vice-President for Section I.*
Whipple, Guy M., *Rep. Nat. Soc. Study Education.*

BUSINESS PROCEEDINGS OF THE COUNCIL AND EXECUTIVE COMMITTEE AT NEW YORK

The council held its first New York session in the Lincoln Hotel on Thursday afternoon, December 27, and additional sessions were held at Columbia University, at nine on Friday, Saturday and Monday mornings. A list of the council members who were in attendance at one or more of these New York sessions is given elsewhere in this issue of SCIENCE. The following is a summary of the business transacted.

(1) The minutes of the council session of December 29, 1927, at Nashville were read and approved, and also the minutes of all the New York sessions of the council, excepting the last.

(2) Professor Herbert Hall Turner, Savilian professor of astronomy in Oxford University, was introduced to the council as the official representative of the British Association for the Advancement of Science at this meeting of the American Association. He had been invited to attend the council sessions and to take part in the discussions. He presented a letter of greeting from the British Association, which the secretary read to the council. The letter follows:

> The Council of the British Association for the Advancement of Science through its representative, Professor Herbert Hall Turner, F. R. S. (lately a general secretary of the association) desires to convey to the American Association for the Advancement of Science an expression of its cordial good will and every hope for a most successful meeting.—W. H. Bragg, *president.*

The chairman expressed to Professor Turner the pleasure of the council in having him in attendance at this meeting, saying that the American Association was very greatly honored by having as special delegate from its sister association a research worker of Professor Turner's eminence and a past general secretary of the British Association. Professor Turner responded by expressing his gratification at being the official representative of the British Association on this occasion, and added an interesting and valuable account of some features of the manner in which preparations are made for British Association meetings. He remarked on the excellent results obtained by bringing the section secretaries together early in the year for a day or two devoted to discussions of plans for the approaching meeting. Professor Turner emphasized the fact that these preliminary conferences of section secretaries had resulted in specially valuable joint sessions of two or more sections, in which science workers in different but related fields are brought together.

(3) The permanent secretary's financial report and the report of the association treasurer for the fiscal year 1927–28 were presented to the council by distributing mimeographed copies, and the council followed the recommendation of its executive committee and accepted the reports, instructing the permanent secretary to publish them. These reports are published elsewhere in this issue of SCIENCE.

(4) Thirty-seven members were elected to fellowship in the association, distributed among the sections as follows: Section A, 17; Section C, 1; Section D, 2; Section E, 1; Section F, 1; Section G, 1; Section M, 4; Section N, 9; Section Q, 1.

(5) The council cordially invited the organization of Phi Beta Kappa to become affiliated with the American Association. The invitation has now been accepted and the Phi Beta Kappa Fraternity is affiliated with the association.

(6) On recommendation by the executive committee three emeritus life members were elected as follows:

George Bird Grinnell, 238 East Fifteenth Street, New York City. Dr. Grinnell joined the association in 1876 and was elected to fellowship in 1885.

Frederic W. Simonds, geological department, University of Texas, Austin, Texas. Dr. Simonds joined the association in 1876 and was elected to fellowship in 1886.

Edward H. Williams, Jr., Westerdale, Woodstock, Vermont. Dr. Williams joined the association in 1876 and was elected to fellowship in 1894.

(7) In connection with the election of emeritus life members, Professor Turner described briefly a method by which the British Association has arranged in some instances for the encouragement of young workers in science to attend the association meetings, thus bringing them into early contact with the older members. A brief discussion followed and attention was called to the fact that some of the special American scientific societies have junior or associate memberships, by which students may have the benefit of the meetings without paying all the regular dues. The question as to whether the American Association might undertake any arrangement by which beginners in scientific work might be encouraged to attend our meetings was referred by the council to the executive committee for further consideration.

(8) Professor H. H. Turner presented a cablegram received from Mr. O. J. R. Howarth, secretary of the British Association, in which attention was called to the exceedingly high prices charged by some European publishers of scientific periodicals and the suggestion was made that the American Association might take this under consideration. After considerable discussion this matter was referred to the executive committee.

(9) On recommendation of the executive committee the council accepted a report of the Committee of One Hun-

dred on Scientific Research, which was presented by Dr. Rodney H. True, the secretary of the committee of one hundred.

(10) On recommendation by the executive committee the council appropriated for the expenses of the committee of one hundred for the fiscal year 1928–29 the sum of $1,200 from the treasurer's available funds, or such portion of that sum as may be required.

(11) The council accepted a report on *Biological Abstracts*, presented by Dr. Herbert Osborn, representative of the American Association on the Board of Directors of *Biological Abstracts*, and the permanent secretary was requested to arrange for the publication of this report. It will appear in a later issue of SCIENCE.

(12) On recommendation by the executive committee the council voted that the News Service be known hereafter as the Press Service of the American Association for the Advancement of Science and that its work of bringing science before the public be continued throughout the year. The press service is to have the cooperation of the permanent secretary's office as far as possible. The director of the press service (hitherto known as news manager) is to receive from the permanent secretary's funds an allowance of $500 per year in lieu of salary.

(13) After the matter had been considered by the executive committee, the council named the chairmen of three special committees to prepare suitable memorials, for publication in SCIENCE, for the three recently deceased past presidents of the association: Dr. Theodore W. Richards, Dr. Thomas Chrowder Chamberlin and Dr. John Merle Coulter. The chairmen of these three committees are as follows: for the Richards committee, Roger Adams; for the Chamberlin committee, F. R. Moulton; for the Coulter committee, Otis W. Caldwell. Each chairman was requested to name additional members for his committee, thus forming a committee of three or five to prepare the memorial.

(14) The council considered memoranda from George Eastman and C. F. Marvin suggesting that the association might adopt a resolution regarding calendar simplification, and it was voted that the council approved the simplification of the calendar, requesting the executive committee to name a committee of five to draft a suitable resolution in this connection. The executive committee reported the appointment of the following members of the special committee just referred to: A. E. Kennelly (*chairman*), C. F. Marvin, A. R. Crook, W. W. Campbell, Gano Dunn.

(15) The council adopted a resolution on standard mathematical symbols, suggested by Dr. J. Franklin Meyer, chairman of the Sectional Committee on Mathematical and Engineering Symbols, of the American Engineering Standards Committee. The resolution appears below.

Resolution on Standard Mathematical Symbols
Adopted by the council, December 31, 1928

WHEREAS, Under the procedure of the American Standards Association, representing forty or more national scientific and technical associations and societies, and with the cooperation of this association as a sponsor, there has been formally approved as National Standard a carefully prepared list of Mathematical Symbols (approved as American Standard by the American Standards Association, January, 1928);

Therefore, be it Resolved, That the American Association for the Advancement of Science urges all technical journals and publishers of scientific and technical books to conform to this standard at as early a date as pending printing will permit.

(16) On recommendation by the executive committee the council requested the permanent secretary to communicate with the British Association with regard to the desirability of forming a joint committee to consider the interrelations of these two organizations and their relations to other scientific associations. The president and the permanent secretary were named to represent the association in the proposed committee.

(17) On recommendation by the executive committee the council appointed a special committee to cooperate with the American Association of University Professors with respect to the evolution controversy, the committee consisting of E. G. Conklin (*chairman*), S. J. Holmes, H. F. Osborn, J. C. Merriam and R. A. Millikan.

(18) On recommendation by the executive committee the council expressed a cordial welcome to the approaching international congresses for physiology and psychology, which are to be held in the United States, stating that the association will be glad to cooperate in every feasible manner with those in charge of the preparations for these congresses, to the end that the congresses may be successful in every way.

(19) The council voted that the permanent secretary's office shall regularly secure and have on file information about approaching international congresses to be held in the United States or elsewhere, with the aim of facilitating preparations for such congresses whenever the American Association can be of service.

(20) On suggestion by a preliminary committee of members of Section G (Botanical Sciences) and Section O (Agriculture) the council constituted a committee of the American Association, consisting of A. S. Hitchcock (*secretary*), A. G. McCall, F. H. Grindley, C. O. Appleman and G. H. Coons, to facilitate arrangements for the attendance of American men and women of science at the International Botanical Congress and the International Soils Congress, which are to be held in England and in Russia, respectively, in 1930.

(21) The council asked the executive committee to make arrangements by which expenses incurred by members of the executive committee attending the annual and special meetings of the committee shall be cared for by the association.

(22) Under instruction by the council, the executive committee adopted the following rules to care for the expenses of members of the executive committee attending the annual meeting and special meetings of the committee: (1) Executive committee members are to receive, in lieu of their traveling expenses, a mileage allowance of four cents per mile for the round trip in connection with attendance at the annual meeting of the association. (2) They are to receive a mileage allowance of five cents per mile for the round trip in connection with attendance at special meetings of the committee. (3) Members of the executive committee attending its special meetings are

to receive a *per diem* allowance of $6.00 when the trip is wholly chargeable to the association, it being understood that when the trip involves other than association business the association is to pay only the proper *pro rata* share of the *per diem* allowance. (4) In connection with the attendance of executive committee members at the annual meeting of the association the allowance is to be $3.00 per day and the permanent secretary is to arrange for rooms for committee members at the general headquarters hotel, without expense to them.

(23) On recommendation by the executive committee the council voted that the permanent secretary shall make arrangements by which section secretaries attending the annual meeting of the association shall be furnished with rooms at the general headquarters hotel without expense to the secretaries.

(24) On recommendation by the executive committee the council voted that section secretaries attending the annual meeting shall receive an allowance of $3.00 per day in addition to their mileage allowance of four cents per mile.

(25) On recommendation by the executive committee the council voted that the section secretaries be asked to give special attention early in the year to the desirability of having the programs of the annual meeting especially suited to the region in which the meeting occurs.

(26) On recommendation by the executive committee the council appointed a special regional committee for the Des Moines meeting, consisting of D. W. Morehouse, Austin H. Clark and Henry B. Ward, with additional members to be named by these if desirable. The duty of this committee is to arrange for the Des Moines meeting with reference to the regional suitability of the scientific programs.

(27) The council definitely decided upon the city of Cleveland as the meeting place for the annual meeting for the association year 1930–31.

(28) As instructed by the council, the executive committee considered the question of the most suitable time for the first session of the council at the annual meeting and voted that the first council session at Des Moines shall be called at ten o'clock in the morning, December 27, 1929.

(29) The executive committee voted that its first session at the Des Moines meeting shall be held on the evening of Thursday, December 26, and that its second session shall be held at two o'clock on the following day.

(30) The permanent secretary reported that nominations for president of the association had this year been secured from the membership by means of nominating ballots sent out with the annual statements of dues on October first. The results of this canvass were presented to the council on Saturday morning when the election of the president occurred.

(31) The permanent secretary reported that a new method had been used this year for the first time, by which nominations for section officers had been secured from the fellows of the several sections, these nominations being afterwards referred by mail ballots to the section committees. The resulting nominations from the section committees were presented to the council Saturday morning when the council took up the election of section chairmen for 1929 and of section secretaries for the four-year period 1929–32.

(32) The nominating committee, consisting of E. G. Conklin (*chairman*), David White, R. G. D. Richardson, J. G. Lipman and E. L. Thorndike, presented to the council on Saturday morning nominations for the following offices, which were filled by election at that council session: general secretary, permanent secretary, treasurer, auditor, two elected members of the council, two members of the committee on grants for research, two elected members of the executive committee and one member of the finance committee (for the ensuing four-year term), an additional member of the executive committee for the official term to expire at the end of 1929 and one member to be nominated to the board of trustees of Science Service as an official representative of the American Association on that board for the ensuing three years. (The names of the newly elected officers are shown in the list of association officers for 1929, elsewhere in this issue of SCIENCE.)

(33) At the council session on Saturday morning, December 29, Dr. Robert A. Millikan, director of the Norman Bridge Physical Laboratory of the California Institute of Technology, was unanimously elected president of the American Association for the Advancement of Science for 1929. At the same session other officers of the association were elected, as indicated in the list of association officers for 1929, which appears elsewhere in this issue of SCIENCE.

(34) The council approved the election of Howard E. Enders as chairman and D. W. Morehouse as secretary of the academy conference for 1929.

(35) On recommendation of the executive committee the council voted that the nominations for association officers made this year by the nominating committees shall in future be secured by mail. Preliminary nominations are to be obtained by a canvass of the council membership, the lists obtained being then reviewed by the council by means of one or more subsequent ballots, and the final results are to be referred to the council when the business of elections is taken up.

(36) The council expressed to the British Association for the Advancement of Science its hearty appreciation of the courtesy of that association in sending to this New York meeting a special official representative, in the person of Professor Herbert Hall Turner, F.R.S., Savilian professor of astronomy in Oxford University, and thanked Professor Turner for taking part in the deliberations of the council at New York and for delivering an address at one of the general sessions of this meeting.

(37) The council expressed its gratification at the great success of the fifth New York meeting and its hearty appreciation of the financial and other invaluable cooperation given by the American Museum of Natural History, the Metropolitan Museum of Art, Columbia University, the United Engineering Societies and the American Geographical Society, which generously placed their facilities at the disposal of the association for this meeting.

(38) The council expressed the hearty thanks of the association to the many other scientific institutions and

organizations that cooperated so cordially with the local committees on arrangements for this meeting.

(39) The council expressed its great appreciation of the interest shown by the people of New York and of the very generous manner in which New York citizens contributed to the fund to care for the local expenses of this meeting.

(40) The council expressed its great appreciation of the cooperation and exceptionally fine service given in connection with this meeting by the newspapers of New York and the other newspapers and press organizations that were represented.

(41) The council thanked the Hon. Arthur J. W. Hilly, acting corporation counsel of the City of New York, who so ably represented the mayor of the city in extending a cordial welcome to the men and women of science.

(42) The council thanked the members who contributed so largely to the success of this meeting by giving addresses at the general sessions.

(43) The council placed specially on record its great appreciation of the valuable services given to the association by its president, Henry Fairfield Osborn, president of the American Museum of Natural History, to whom was due the organization of the local committees on preparations for the meeting, and also the very fine and elaborate arrangements for the general sessions held at the American Museum of Natural History.

(44) The council recorded its grateful appreciation of the invaluable services rendered to the association and associated societies by Dean George B. Pegram, general chairman of the local committees on arrangements for the meeting, by Mr. A. Cressy Morrison, chairman of the local committee on finance, by Dr. Sam F. Trelease, secretary of the general local committee, and by all the other members of the local committees on arrangements.

REPORT OF THE ASSOCIATION TREASURER FOR THE FISCAL YEAR 1927–28

In compliance with provisions of Article 15 of the constitution, the treasurer has the honor to submit the following report for the fiscal year ending September 30, 1928, with suggested budget for the year 1929.

Details of receipts, disbursements and disposition of funds and securities of the association are shown in the following itemized statements: Balance sheet for September 30, 1928; receipts and disbursements for the fiscal year from October 1, 1927, to September 30, 1928; schedule of securities; suggested budget for 1929.

The total of cash receipts during the year is $20,046.73. Included in the amount are items of $1,500 (for fifteen life-membership fees), $1,000 (contribution to the Prize fund) and $10,500 (redemption of U. S. A. Second Liberty Loan Bonds, including a profit of $327.64), which has been added to the capital fund designated as "Gifts and Accumulations." Also the treasurer's reserve fund has been increased by $1,427.28, undisbursed income for the fiscal years 1927 and 1928.

Disbursements made in accordance with direction of the association council amount in the aggregate to $41,638.99, including the prize award for 1927–28 ($1,000), grants for research for 1928, allotted by the Committee on Grants ($2,975.35), other allotments ordered by the council or the executive committee ($1,357.64), three emeritus life memberships ($300), and fixed charges, including journal subscriptions for life members ($1,274).

Bonds were purchased, upon recommendation by the finance committee, amounting to $34,278.75.

The available funds for appropriation for 1929 amount to $6,493.48, from which the following fixed charges are to be deducted: Journal subscriptions for life members ($1,269), rent on safe-deposit box ($20), and three emeritus life memberships ($300). The remaining available funds amount to $4,904.48.

Respectfully submitted,

(*Signed*) J. L. WIRT,
Treasurer.

DECEMBER 20, 1928

TREASURER'S BALANCE SHEET
September 30, 1928

Assets

Investments: Endowment and reserve funds	$145,430.33	
Cash awaiting investment	4,665.33	$150,095.66
Current assets (cash):		
Income account	6,493.48	
Prize fund	5,000.00	11,493.48
		$161,589.14

Liabilities

Endowment and reserve funds:		
W. Hudson Stephens fund	$ 4,381.21	
Richard T. Colburn fund	85,586.45	
Gifts and accumulations	3,886.64	
Sustaining membership fees	6,000.00	
Life membership fees	39,450.00	
Jane M. Smith fund for emeritus life memberships	5,000.00	
Reserve fund	5,791.36	150,095.66
Current liabilities:		
Prize fund		5,000.00
Accumulated income unappropriated		6,493.48
		$161,589.14

TREASURER'S CASH STATEMENT
October 1, 1927–September 30, 1928

Receipts

1927			
Oct. 1	Balance from last report		$37,751.07
	Redemption U. S. A. 2nd L. L. Bonds	$10.172.36	
	Profit on redemption	327.64	10,500.00
	Prize fund		1,000.00
	Contribution for Committee of One Hundred, from Southwestern Division		100.00

Revertment (accumulated interest purchased)		453.25
Fifteen Life-membership fees		1,500.00
Interest on securities	$ 6,120.37	
Interest on bank balance	373.11	6,493.48
		$57,797.80

Investments:	*Disbursements*	
$5,000 Chi. R. I. & P. Ry. Co. 4½s 1925	$ 4,793.75	
$5,000 Erie R. R. 5s 1967	4,868.75	
$5,000 Southern Calif. Edison 5s 1951	5,078.75	
$5,000 N. Y. Power & Light 4½s 1967	4,800.00	
$5,000 Georgia Power 1st 5s 1967	4,900.00	
$5,000 Tex. P. & L. 1st Ref. 5s 1956	4,931.25	
$5,000 Ark. P. & L. 1st Ref. 5s 1956	4,906.25	
	34,278.75	
Purchased interest	453.25	$34,732.00

Grants, allotted by Committee on Grants, for 1928:		
Ferdinand Cann	$150.00	
W. R. Maxon	300.00	
Herbert D. Curtis	300.00	
Phineas W. Whiting	150.00	
Elery R. Curtis	300.00	
James W. Broxon	350.00	
Winterton C. Curtis	300.00	
Roy L. Moody	100.00	
Seismological Society	200.00	
Joyce Hedrick	200.00	
Henry C. Collins, Jr.	300.00	
A. L. Hughes	125.35	
H. H. Collins	200.00	2,975.35
Allotments by Council or Executive Committee:		
For National Conference on Outdoor Recreation	$100.00	
For Annual Tables of Physical and Chemical Constants	200.00	
For Naples Zoological Station	500.00	
For Committee of One Hundred	557.64	1,357.64
Other Appropriations by Council or Executive Committee:		
Prize, to H. J. Muller		$ 1,000.00
Three emeritus life memberships		300.00
Journal subscriptions for life members		1,254.00
Rent, safe-deposit box for securities		20.00
		41,638.99
Cash in bank		16,158.81
		$57,797.80

TREASURER'S SCHEDULE OF INVESTMENTS

	Par Value	Cost or Value at date acquired
Chi. & N. W. gen. 4s 1987	$10,000	$ 9,425.00
A. T. & S. Fe gen. 4s 1995	10,000	9,287.50
Gt. N. 1st ref. 4¼s 1961	10,000	10,050.00
Pa. R. R. Co. con. 4½s 1960	10,000	10,487.50
C. B. Q. gen. 4s 1958	10,000	9,350.00
U. Pac. 1st ref. 4s 2008	10,000	9,012.50
Nor. Pac. pr. lien 4s 1997	10,000	9,187.50
N. Y. Cent. & H. R. 3½s 1997.	10,000	8,237.50
Am. Tel. & Tel. Coll. 5s 1946	5,000	5,107.50
B. & O. R. R. ref. & gen. mtg. 5s 2000	5,000	4,766.67
Pac. Gas. & Elec. 1st ref. 5½s 1952	5,000	5,175.00
U. S. First L. L.	100	91.25
U. S. Third L. L.	2,000	2,000.00
U. S. Fourth L. L.	2,000	2,000.00
U. S. Treas. B. 4¼ 1952	6,500	6,373.66
Chi. R. I. & P. Ry. 4½s 1952.	5,000	4,793.75
Erie R. R. 5s 1967	5,000	4,868.75
So. Calif. Edison 5s 1951	5,000	5,078.75
N. Y. Power & L. 4½s 1967	5,000	4,800.00
Georgia Power 1st 5s 1967	5,000	4,900.00
Tex. P. & L. Co. 1st ref. 5s 1956	5,000	4,931.25
Ark. P. & L. Co. 1st ref. 5s 1956	5,000	4,906.25
*Park & Tilford Co.	8,000	6,400.00
*Pitts. Shaw & No. R. R. 4s 1952	42,000	4,200.00
	$190,600	$145,430.33

* All securities are registered excepting those marked with an asterisk (received from the Colburn Estate and appraised as by the court at date acquired).

(*Signed*) J. L. WIRT,
Treasurer

FINANCIAL REPORT OF THE PERMANENT SECRETARY FOR THE FISCAL YEAR 1928

(*October 1, 1927, to September 30, 1928*)

Dr.

To balance from last account:		
Checking account	$ 21.14	
Available for general purposes	3,394.88	
Emergency fund	5,000.00	
Publication fund	2,000.00	
Special fund for Committee on Place of Science in Education	882.89	
Special fund for Joint Committee on Promotion of Research in Colleges	230.16	$ 11,529.07
To receipts from membership dues:		
Annual dues previous to 1927	$ 115.00	
Annual dues for 1927	710.00	
Annual dues for 1928	74,631.00	
Annual dues for 1929 and 1930	370.00	
Entrance fees	545.00	
Associate fees	10.00	
Life-membership fees	1,500.00	77,881.00
To other general receipts:		
Life-membership journal subscriptions	$ 1,254.00	
Interest on bank accounts	768.49	
Contributions	553.00	
Sales of Proceedings	50.00	
Miscellaneous receipts	357.43	
Overpayments, etc.	120.96	
Miscellaneous advance payments	132.38	3,236.26
To special extra journal subscriptions:		
SCIENCE and *Scientific Monthly*	$ 3,357.62	
Science News-Letter	7,118.50	10,476.12
To receipts from Agassiz bust fund		17.73
To receipts from treasurer for Committee of One Hundred		557.64

To receipts for Joint Committee on Research in Colleges:		
From American Association of University Professors	$ 100.00	
From American Council of Learned Societies	100.00	
From Social Science Research Council	100.00	300.00
To receipts from Nashville meeting:		
Fund raised by local committee	$ 2,400.00	
Registration fees (net)	491.00	
Sale of programs	33.50	
Sale of advertising space	722.00	
Exhibition (receipts from exhibitors)	2,126.03	5,772.53
New York exhibition (receipts from exhibitors)		$ 1,386.67
Contribution to fund for fifth New York meeting		5.00
		$111,162.02

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By subscriptions to official journal		$ 47,163.50
By Division and academy allowances:		
Divisions	$ 2,090.00	
Affiliated academies	1,313.50	3,403.50
By expenses, general secretary's office		5.50
By expenses, Washington office:		
Salaries	$12,477.96	
Office and addressograph supplies	366.58	
Printing and stationery	1,233.75	
Telephone and telegraph	190.48	
Postage, correspondence and billing	1,818.53	
Exchange	25.16	
Express, freight and drayage	262.80	
Notary fees	2.00	
Miscellaneous expenses	384.12	
Office furniture and equipment	150.90	16,912.28
By circularizations for new members		4,033.41
By miscellaneous expenditures:		
Life-membership fees, to treasurer	$ 1,500.00	
Refunds of overpayments, etc.	120.96	
Bad check	5.00	
Contribution to American Library Asso. (for Braille printing for the blind)	100.00	
Contribution to National Conference on Outdoor Education	50.00	
Travel expenses:		
Permanent secretary's office:	$ 80.64	
Executive committee members	272.97	
Section secretaries	762.29	1,115.90
Section expenses	$ 566.12	
Annual meeting, Philadelphia	125.00	
Annual meeting, Nashville:		
Preliminary announcement	$ 364.78	
Program (printing)	1,390.28	
Popular lectures	240.32	
Exhibition	2,104.07	
General expenses:		
At Washington	$1,776.83	
At Nashville	2,117.59	7,993.87
Annual meeting, New York:		
Exhibition	$ 786.81	
General expenses (Washington office)	20.90	807.71 12,384.56
By disbursements for Committee of One Hundred on Research		$ 557.64
By disbursements for Committee on the Place of Science in Education		455.89
By disbursements for Joint Committee on Promotion of Research in Colleges		439.58
By delayed collections for Agassiz bust fund		17.73
By special extra journal subscriptions:		
SCIENCE and *Scientific Monthly*	$3,360.50	
Science News-Letter	7,006.00	10,366.50
		$ 95,740.09
By new balance:		
Checking account (American Security & Trust Co.)	$1,203.64	
Publication fund	3,000.00	
*Special fund for Committee on the Place of Science in Education	427.00	
*Special fund for Joint Committee for Promotion of Research in Colleges	90.58	
*Emergency fund	5,000.00	
*Available for general purposes	5,700.71	15,421.93
		$111,162.02

(*Signed*) BURTON E. LIVINGSTON,
Permanent Secretary

* All these funds are in Savings Department of Federal-American National Bank.

GRANTS FOR RESEARCH FOR 1929

Allotted by the Committee on Grants for Research

An appropriation of $3,000 from the treasurer's available funds was made by the council at New York for individual grants in aid of scientific research, to be allotted to applicants by the Committee on Grants for Research. Applications for grants are made on special blanks, supplied by the permanent secretary's office, and they may be sent in at any time. Allotments are made at the time of the annual meeting and the funds become available immediately. In recent years the amounts of single grants have not exceeded $500 and most of the grants have been for smaller sums.

Dr. L. G. Hoxton, chairman of the Committee on Grants, reported the following allotments for 1929. The list is arranged according to the several fields of science represented.

Chemistry

Nao Uyei, 3800 E. Colfax Ave., Denver, Colo. For studying the active principle in potato for the

growth of bacteria, especially for tubercle bacilli $500

Isidor Greenwald, Harriman Research Laboratory, the Roosevelt Hospital, New York, N. Y. For continuation of work on reaction of alkaline picrate solutions with creatinine and other organic substances 300

Astronomy

Frank Schlesinger, Yale University, New Haven, Conn. For making determinations of the trigonometric parallaxes of southern stars 500

Zoology

Phineas W. Whiting, University of Pittsburgh, Pittsburgh, Pa. For studying effects of X-radiation on the germ-plasm of Habrobracon... 200

David D. Whitney, University of Nebraska, Lincoln, Nebr. For studying the rate of metabolism in male-producing and female-producing rotifers..... 250

Botany

Joyce Hedrick, Miami University, Oxford, Ohio. For continuation of research and publication of Dr. Bruce Fink's "Lichen Flora of the United States" 350

Anthropology

Lawrence T. Royster, University, Va. For comparing the size of the sella turcica as studied by X-ray, of white males and females, and colored males and females, between eight and nine years of age 200

Physiology

J. P. Baumberger, Stanford University, Calif. For construction of special apparatus for studying apparent oxidation-reduction potential of respiratory substances 100

W. H. Cole, Rutgers University, New Brunswick, N. J. For quantitative study of effects of varying the concentrations of the gases in inspired air in animals 150

J. F. McClendon and George Burr, University of Minnesota, Minneapolis, Minn. For quantitative study of the effect of large assayed injections of the ovarian hormone on physiology, especially metabolism 450

THE ANNUAL SESSION OF THE SECRETARIES' CONFERENCE

The secretaries' conference serves as a special committee of the American Association, to facilitate the interchange of ideas and suggestions among its members for the mutual advantage of the associated societies and the association. Its membership consists of the secretaries of the associated societies, the secretaries of the sections of the association and the members of the executive committee of the association council. It thus forms a useful instrument of liaison between the associated societies and the broader organization. Its work is carried on by the conference secretary, through correspondence extending throughout the year and by means of a special session at the annual meeting. All members of the conference who are in official attendance at the annual meeting are invited to the complimentary secretaries' dinner, provided by the American Association.

This rather informal organization has an elected secretary, who automatically becomes chairman when his successor is elected at the annual session. The newly elected secretary prepares minutes of the session, at the opening of which he is elected, and these are subsequently distributed to the members by mail. He conducts correspondence with the members by means of circular letters and prepares a program for oral discussions at the next annual session, at which he acts as chairman.

The New York session of the secretaries' conference was held Sunday evening, December 30, in the El Patio rooms of the McAlpin Hotel, beginning with a social gathering before the secretaries' dinner, which was a dinner conference. Dr. George T. Hargitt, who had served as secretary of the conference throughout 1928, became chairman and presided at the session, his successor having been elected, as the first order of business, on nominations secured from the members by a mail ballot sent out from the permanent secretary's office. The newly elected secretary of the conference is Dr. Philip Fox, secretary of Section D.

An excellent program for discussion, which had been prepared by Dr. Hargitt, based on his correspondence with the members, was carried through very effectively, with speakers prearranged to lead discussion on the several topics. The following notes of suggestions that developed in these discussions are based on the minutes of the New York session, received from Dr. Fox. It was pointed out that serious conflicts between society programs and the general sessions of the association might be largely avoided if the section and society secretaries might arrange the dates of their joint sessions and dinner meetings as early in the year as possible, keeping the permanent secretary's office informed on such matters. Then the general sessions of the association might be arranged so as to fit in with the society and section plans. The lectures and addresses presented at the general sessions are planned to be of interest to all workers in science but each of these sessions naturally represents one field of science more than others and it is highly desirable that workers in the field represented by one of these main speakers should be as free as possible to attend his address before the association as a whole. There was a little confusion in this respect at New York, due partly to the selection of dates for the great evening general sessions by the president of the association without much study of the society plans that

were available, and partly to the fact that the general plans of some societies were not in the hands of the permanent secretary till about the time the General Program had to go to press. It should be emphasized that the proverbial early bird remains an excellent exemplar for secretaries who are planning meeting programs, and that September and October, or even earlier months of the year, are the best period for correspondence with the permanent secretary about general plans and the setting aside of special days for special groups. Through November and December the correspondence of the permanent secretary rapidly increases, until many matters that deserve more prolonged attention have to be handled in a rather perfunctory manner in the last hectic weeks before the opening of our great annual meeting.

The sense of confusion that pervades these great meetings, where all branches of science are represented, results of course from the difficulty experienced by an individual in choosing among the great wealth of interesting and valuable material offered. At its worst, this sense of confusion leads to the thought that the special societies might better meet separately or in small groups, but when this occurs their members miss valuable opportunities to become better acquainted with the work going on in other fields—opportunities that constitute the greatest value of the great association meetings. The inevitable antagonism between scientific specialization and the broad intellectual attitude is at the bottom of this difficulty. Dr. Humphreys remarked, however, that "It is birds of one feather that flock by themselves," and one solution of our problem appears to be for the societies to hold some of their more specialized meetings independently or in small groups, coming with the association as frequently as possible, however, in order to secure the undoubted benefits of the complex meetings. It is also suggested that the holding of additional spring or summer meetings by the societies, a plan already adopted by many of them, cares for some of the more specialized sessions without distraction and renders the meetings held with the association less crowded and freer for intercourse with workers in other fields.

The problem of securing new members and retaining those who are already enrolled in an organization was discussed at length. For some societies the securing of new members is a work of promotion; for others it is a problem of selection. In either case, lists of those who might be interested to join the organization are needed. If resignations are numerous it would be well to analyze the reasons given, to ascertain whether much resignation might not be avoided. It was emphasized that it is generally desirable for societies to be able to receive new members at all times throughout the year. Comments by several secretaries brought out the great diversity in the annual dues of the various organizations; the dues of our societies range from $1.00 to $25. Mr. Woodley reviewed the recent experience of the association in its campaigns for new members. Between October 1, 1927, and December 15, 1928, more than 2,700 new names were added to the association roll.

An animated discussion was concerned with the manner of presentation of scientific material at our sessions. Some speakers felt that the arts of presentation need to be given more attention. Some mechanical features of presentation received attention, such as the suitable preparation of lantern slides, charts, etc. The consensus of the session seemed to be that, while presentation is surely an important feature, the scientific results presented constitute the real reason for scientific meetings. It was suggested that our universities might perhaps devote somewhat more serious attention to the presentation of the results of research, as by "coaching" advance students in preparation for their first appearance as speakers at society meetings.

The discussion emphasized the great value of the science exhibition as an important feature of the association meetings. It was stated that the commercial part of our exhibition is now well established and assured of continued success, but that the exhibitions are still not what they should be in regard to exhibits of a purely scientific nature. It was suggested that societies might undertake to organize research or teaching exhibits by their members, but such exhibits require the attention of some person or group of persons to arrange for them in advance and to see that they are well installed and supplied with suitable attendants during the period of the exhibition. All individuals who have apparatus, methods, etc., to exhibit at the annual exhibition should inform the permanent secretary early in the year. Because exhibits have to be installed rapidly and "under high pressure," it is advisable that all exhibitors should bring to the exhibition hall all of the accessories essential to efficient work in installation, including even "string and thumb-tacks." It was urged that the general exhibition should be provided with a suitable space and the requisite projectors for the showing of motion pictures presenting scientific research.

The suggestion, which has been made by members from time to time, that it might be well for the association to consider reorganization so as to have only about three sections, with as many subsections as might be needed (the affiliated societies taking the places of subsections when fields are cared for by the societies), was briefly presented, but time did not permit a thorough discussion. The feeling of the conference session appeared to be that our present association organization functions fairly well, and that

suggestions for basic alterations should be supported by well-thought-out proposals and should be subjected to prolonged and public discussion, as in the pages of the official journal. Until great interest and able leadership become evident in favor of a change, the conference felt that our organization should be left without fundamental alteration.

The minutes of the New York session of the secretaries' conference are to be mailed to the conference members in the near future, and members will be asked to make and to consider suggestions for the work of the conference during 1929 and for the program of its Des Moines session next December.

THE NEW YORK SESSION OF THE ACADEMY CONFERENCE

THE academy conference acts as a special committee of the American Association, on the relations between the affiliated academies of science and between them and the association. The association is anxious to aid the academies in every way and especially to facilitate their representing the aims and purposes of the association in their respective regions. The facilities of the permanent secretary's office are at the disposal of the academy conference in the carrying on of its work. The conference consists of the representatives of the affiliated academies in the association council and three members named by the executive committee to represent the association as a whole in the deliberations of the conference. The conference has a secretary, elected at its annual session at the time of the annual meeting of the association. He conducts correspondence with the members throughout the year and formulates therefrom a program for discussion at the next conference session. The work of the organization was well started in 1928, by William H. Alexander and Howard E. Enders, conference chairman and secretary for that year, and an interesting session, at which great enthusiasm was shown, was held at New York, following the first council session on Thursday afternoon, December 27. The session was followed by the annual complimentary academy dinner, to which conference members were invited by the association, and that dinner proved to be a very profitable and enjoyable feature of the New York meeting.

Dr. D. W. Morehouse, representing the Iowa Academy of Science, was elected secretary of the academy conference for 1929, and Dr. Howard E. Enders, representing the Indiana Academy of Science, who had been conference secretary for 1928, is chairman of the conference for 1929. These elections were subsequently approved by the council of the association.

Since the business of the academy conference deals with matters specially interesting to the academy representatives and since this conference is but newly organized, it will not be necessary in this place to report in detail on its work, and the permanent secretary wishes only to record the fact that the conference is now actively functioning and that it appears to have before it a very useful future. This report of progress may be added to at a later time, as the work of the conference takes definite form. It is expected that its work will shortly become of great interest not only to all academy members but to the general membership of the association as well.

THE PRESIDENT ELECT

ROBERT ANDREWS MILLIKAN, distinguished president of the American Association for the Advancement of Science for 1929, is of New England stock, of Scotch and English descent. His father, Rev. Silas Franklin Millikan, who was a graduate of Oberlin College, preached for forty years in Congregational churches of Illinois, Iowa and Kansas. His mother, Mary Jane Andrews, was also a graduate of Oberlin College and she had been dean of women in Olivet College, Michigan. President Millikan received the A.B. degree from Oberlin College in 1891 and taught elementary physics there during the following two years. He received the Ph.D. degree in physics at Columbia University in 1895 and spent the next year studying physics in the universities of Berlin and Göttingen. Assistant in physics at the University of Chicago in 1896–97, he passed rapidly forward and attained a professorship in 1910, a position which he held for eleven years. Since 1921 he has been director of the Norman Bridge Laboratory of Physics, of the California Institute of Technology, at Pasadena.

It is interesting to note that Millikan's special interest in physics, the science that owes so much to his many brilliant and successful research contributions as well as to his eminently clear and inspirational teaching and writing, does not appear to have dated from his college days. In his undergraduate period at Oberlin College he was most absorbed in Greek and mathematics and he limited himself to a single one-semester course in physics. His deep and lasting interest in his chosen science developed in connection with his teaching of the subject after his graduation. As an undergraduate he took prominent part in many student activities; he was an athlete of some local success, he was president of his class in the sophomore year, editor-in-chief of the college annual in his junior year, acted as student gymnasium director during his junior and senior years and made the speech on behalf of his class at the time of his graduation. He is still an enthusiastic tennis player.

For a third of a century Dr. Millikan has been actively and indefatigably engaged in physical research, chiefly in the fields of electricity, optics and molecular physics. The following brief summary of some of our new president's best-known investigations,

as reported from time to time in the scientific literature, may serve to indicate, in a confessedly inadequate manner, the sort of intellectual achievement for which the American Association has honored both him and itself by his election to its presidency.

(1) The isolation and measurement of the electron, resulting in direct demonstration of the atomic structure of electricity and making it possible to ascertain with a high degree of precision the number of molecules in a given weight of any simple substance.

(2) The direct photoelectric evaluation of the fundamental radiation constant known as Planck's h, which furnished the first direct, experimental establishment of the validity of the Einstein equation of 1905. The subsequent general establishment of the validity of that equation, by means of an extensive series of researches that began with the work of Millikan, constitutes one of the most far-reaching advances of modern physics and the Einstein equation has now become scarcely second in importance, in the electromagnetic theory, to the equations of Maxwell in that field.

(3) The study of Brownian movements in gases, resulting in one of the strongest links in the chain of evidence that finally silenced all opposition to the atomic and kinetic theory of matter.

(4) The great extension of the known ultra-violet spectrum, reported in 1920–23, by which the range of the explored ultra-violet frequencies was extended downward by two octaves. These studies completed the work begun by Moseley, establishing the order of progression of the chemical elements, or of their evolution, on the basis of the character of the radiations emitted by the constituent electrons within the atom.

(5) The discovery, reported in 1923, of the "law of motion of a particle falling toward the earth after it enters the earth's atmosphere," by which was definitely settled both theoretically and experimentally a problem of the kinetic theory that had been in controversy for seventy-five years.

(6) The experimental study, with Dr. I. S. Bowen, of the properties of light atoms when completely or partially "stripped" of their valence electrons, together with the new spectroscopic laws based on the results of these studies, from which, in part, was subsequently developed the exceedingly fundamental concept of the "spinning electron."

(7) The discovery of the conditions controlling the extraction of electrons from metals by fields alone, which furnished the first direct experimental proof that electrons in metals do not at ordinary temperatures appreciably take part in the motion of thermal agitation but do begin to take part in that motion at sufficiently high temperatures. This discovery appears to be beginning to clear up the problem of the nature of metallic conduction.

(8) The study of the nature and properties of cosmic rays, very high-frequency radiation of cosmic origin, which appears to penetrate space uniformly in all directions.

Millikan's strong influence on contemporary scientific thinking and on many of the prevalent trends of scientific philosophy is evident everywhere where carefully thoughtful people converse and write. Alone and in collaboration with others he has exerted great influence on elementary and advanced physical teaching through a number of standard and much-used text-books, which have been kept abreast of our rapid advance by needed revisions. That he is still deeply interested in elementary students of physics is shown by the recent publication of "A First Course in Physics for Colleges," by Millikan, Gale and Edwards (1928). On the more philosophical side, many general readers have been helped by his broad and tolerant attitude of mind as shown in "Science and Life" (1923) and in "Evolution in Science and Religion" (1927).

Dr. Millikan's outstanding leadership in science is well attested by many honors conferred upon him. He is a member of the Phi Beta Kappa society and of the Society of the Sigma Xi. He is a member of the National Academy of Sciences, of the American Philosophical Society and of the American Academy of Arts and Sciences. He is an honorary member of the Royal Institution of Great Britain, of the Academies of Amsterdam and Rotterdam, of the Royal Irish Academy and of the Academies of Sciences of Holland, Russia and France. He is also a member of the Gesellschaft der Wissenschaften of Göttingen. Among honorary degrees that have been conferred upon him by institutions of learning are: *Doctor of Science,* by Oberlin College, Amherst College, Northwestern University, University of Pennsylvania, Columbia University, University of Dublin and Leeds University; *Doctor of Laws,* by Yale University, University of California and University of Colorado; *Doctor of Philosophy,* by King John Casimir University, of Poland, and University of Ghent. He has been recipient of the Comstock prize of the National Academy of Sciences, of the Edison medal of the American Institute of Electrical Engineers, of the Hughes medal of the Royal Society of Great Britain, of the Nobel prize in physics awarded by the Swedish Academy of Sciences, of the Faraday medal of the London Chemical Society, of the Matteucci medal of the Italian Academy of Sciences, of the gold medal of the American Society of Mechanical Engineers and of the gold medal of the Society of Chemical Industry of England.

Dr. Millikan has always had great interest in the broader aspects of education and the welfare of humanity, in connection with which he has been con-

tinually active in many ways. He was for many years one of the directors of the University of Chicago Settlement, he is a trustee of Oberlin College and is the American member of the Committee on Intellectual Cooperation of the League of Nations. He belongs to the Congregational Church. His friendliness and reliable helpfulness to his students and colleagues have always been of rare quality, inspiring unusual confidence, affection and loyalty, as one gathers from conversation with those who know him well.

Millikan has a brilliant record of scientific activities in the war period. He devoted himself wholly to them from March, 1917, to January, 1919, serving first on several committees of the Council of National Defense, notably with the General Munitions Board and the Optical Glass Committee. Throughout the war he served on the Anti-Submarine Board of the U. S. Navy, which consisted of four naval officers and three civilians, its main responsibility being the direction of the work of the anti-submarine research station at New London, Connecticut. He received a commission in the U. S. Army in July, 1917, and served throughout the remainder of the war as lieutenant-colonel in charge of the science and research division of the Bureau of Military Aeronautics. He is at present a lieutenant-colonel in the Officers' Reserve Signal Corps.

Our new president has taken active part in American scientific organizations, especially in the National Research Council (of which he is now vice-chairman), in the American Physical Society (of which he is a past president) and in the American Association for the Advancement of Science, to the presidency of which he now comes with an exceptionally extensive experience and sympathetic interest. The records of the American Association show that he has been a member since 1907 and a fellow since 1910. He was vice-president for Section B (Physics) in 1911. No other member of the American Association approached him in the number of votes cast in the nomination canvass of the membership regularly conducted last fall, and the unanimous vote of the council on December 29, by which he became president for 1929, is thoroughly and heartily approved by the membership at large. He now becomes an *ex-officio* member of the council and of its executive committee, in which are vested the control of association affairs. The American Association, and American science in general, are to be congratulated on the addition of Dr. Millikan's name to the long list of distinguished names that constitute the presidential roll.—B. E. L.

GENERAL OFFICERS OF THE ASSOCIATION FOR 1929

President

Robert A. Millikan, California Institute of Technology, Pasadena, Calif. (*Elected at the fifth New York meeting.*)

Retiring President

Henry Fairfield Osborn, American Museum of Natural History, New York, N. Y.

Vice-Presidents, Retiring Vice-Presidents and Secretaries of the Sections

Section A (Mathematics):

Vice-president, E. T. Bell, California Institute of Technology, Pasadena, Calif. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, Raymond C. Archibald, Brown University, Providence, R. I.

Secretary, Charles N. Moore, University of Cincinnati, Cincinnati, Ohio. (*Elected at the fifth New York meeting, to succeed himself.*)

Section B (Physics):

Vice-president, Charles E. Mendenhall, University of Wisconsin, Madison, Wis. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, P. W. Bridgman, Harvard University, Cambridge, Mass.

Secretary, A. L. Hughes, Washington University, St. Louis, Mo. (*Elected at the fifth New York meeting, to succeed himself.*)

Section C (Chemistry):

Vice-president, Samuel Colville Lind, University of Minnesota, Minneapolis, Minn. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, C. E. Kenneth Mees, Eastman Kodak Co., Rochester, N. Y.

Secretary, R. R. Renshaw, New York University, New York, N. Y. (*Elected at the fifth New York meeting, to succeed Gerhard Dietrichson.*)

Section D (Astronomy):

Vice-president, Harlow Shapley, Harvard University, Cambridge, Mass. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, J. S. Plaskett, Dominion Astrophysical Observatory, Victoria, B. C., Canada.

Secretary, Philip Fox, Northwestern University, Evanston, Ill. (*Elected at the fifth New York meeting, to succeed himself.*)

Section E (Geology and Geography):

Vice-president, George Frederick Kay, University of Iowa, Iowa City, Iowa. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, Frank Leverett, University of Michigan, Ann Arbor, Mich.

Secretary, Kirtley F. Mather, Harvard University, Cambridge, Mass. (*Elected at the fifth New York meeting, to succeed G. R. Mansfield.*)

Section F (Zoological Sciences):

Vice-president, Charles Manning Child, University of Chicago, Chicago, Ill. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, Michael F. Guyer, University of Wisconsin, Madison, Wis.

Secretary, Geo. T. Hargitt, Syracuse University, Syracuse, N. Y. (*Elected at the fifth New York meeting, to succeed himself.*)

Section G (Botanical Sciences):

Vice-president, J. Arthur Harris, University of Minnesota, Minneapolis, Minn. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, C. E. Allen, University of Wisconsin, Madison, Wis.

Secretary, Sam F. Trelease, Columbia University, New York, N. Y. (*Elected at the fifth New York meeting, to succeed himself.*)

Section H (Anthropology):

Vice-president, A. V. Kidder, Phillips Academy, Andover, Mass. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, Fay-Cooper Cole, University of Chicago, Chicago, Ill.

Secretary, Charles H. Danforth, Stanford University, Calif. (*Elected at the fifth New York meeting, to succeed himself.*)

Section I (Psychology):

Vice-president, Madison Bentley, Cornell University, Ithaca, N. Y. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, Howard C. Warren, Princeton University, Princeton, N. J.

Secretary, Edward S. Robinson, Yale University, New Haven, Conn. (*Elected at the fifth New York meeting, to succeed Frank N. Freeman.*)

Section K (Social and Economic Sciences):

Vice-president, Henry Lewis Rietz, University of Iowa, Iowa City, Iowa. (*Elected at the fifth New York meeting.*)

Secretary, Charles F. Roos, Cornell University, Ithaca, N. Y. (*Elected at the fifth New York meeting, to succeed himself.*)

Section L (Historical and Philological Sciences):

Vice-president, Henry Osborn Taylor, 135 East 66th St., New York, N. Y. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, G. M. Bolling, 777 Franklin Ave., Columbus, Ohio.

Secretary of the Subsection on Linguistics, Leonard Bloomfield, University of Chicago, Chicago, Ill. (*Elected at the fifth New York meeting.*)

Secretary of the Subsection on Historical Sciences, Joseph Mayer, Tufts College, Mass. (*Elected at the fifth New York meeting.*)

Section M (Engineering):

Vice-president, H. F. Moore, University of Illinois, Urbana, Ill. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, Robert Lemuel Sackett, Pennsylvania State College, State College, Pa.

Secretary, N. H. Heck, U. S. Coast and Geodetic Survey, Washington, D. C. (*Elected at the fifth New York meeting, to succeed himself.*)

Section N (Medical Sciences):

Vice-president, Ludvig Hektoen, University of Chicago, Chicago, Ill. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, A. J. Goldforb, College of the City of New York, New York, N. Y.

Secretary, Edmund Vincent Cowdry, Medical School, Washington University, St. Louis, Mo. (*Elected at the fifth New York meeting, to succeed E. G. Hoskins.*)

Section O (Agriculture):

Vice-president, Merritt F. Miller, University of Missouri, Columbia, Mo. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, C. A. Mooers, University of Tennessee, Knoxville, Tenn.

Secretary, P. E. Brown, Iowa State College, Ames, Iowa. (*Elected at the fifth New York meeting, to succeed himself.*)

Section Q (Education):

Vice-president, Frank N. Freeman, University of Chicago, Chicago, Ill. (*Elected at the fifth New York meeting.*)

Retiring Vice-president, Truman L. Kelley, Stanford University, Calif.

Secretary, Willis L. Uhl, University of Washington, Seattle, Wash. (*Elected at the fifth New York meeting, to succeed A. S. Barr.*)

Permanent Secretary

Burton E. Livingston, Johns Hopkins University, Baltimore, Md. (Association mail address: Smithsonian Institution Building, Washington, D. C.) (*Elected at the fifth New York meeting, to succeed himself.*)

General Secretary

Frank R. Lillie, University of Chicago, Chicago, Ill. (*Elected at the fifth New York meeting, to succeed W. J. Humphreys.*)

Treasurer

John L. Wirt, Carnegie Institution of Washington, Washington, D. C. (*Elected at the fifth New York meeting, to succeed himself.*)

Executive Assistant

Sam Woodley, Smithsonian Institution Building, Washington, D. C.

Auditor

Lyman J. Briggs, U. S. Bureau of Standards, Washington, D. C. (*Elected at the fifth New York meeting, to succeed R. B. Sosman.*)

News Manager

Austin H. Clark, U. S. National Museum, Washington, D. C.

Exhibition Manager

H. S. Kimberly, Smithsonian Institution Building, Washington, D. C.

The Council

The council for 1929 consists of the newly elected president (who is *ex-officio* chairman of the council), the general secretary, the permanent secretary, the treasurer, the vice-presidents, the section secretaries, all members of the executive committee not otherwise members of the council, the representatives of the affiliated organizations and the eight elected council members named below.[1]

[1] The number in parentheses denotes the year at the end of which the member's term of office is to expire.

L. O. Howard (1932), U. S. Department of Agriculture, Washington, D. C. (*Elected at the fifth New York meeting, to succeed himself.*)

D. T. MacDougal (1932), Desert Laboratory, Tucson, Ariz. (*Elected at the fifth New York meeting, to succeed himself.*)

Austin H. Clark (1931), U. S. National Museum, Washington, D. C.

Arthur H. Compton (1931), University of Chicago, Chicago, Ill.

L. E. Dickson (1930), University of Chicago, Chicago, Ill.

David White (1930), U. S. Geological Survey, Washington, D. C.

John C. Merriam (1929), Carnegie Institution of Washington, Washington, D. C.

Rodney H. True (1929), University of Pennsylvania, Philadelphia, Pa.

The Executive Committee

The executive committee consists of the newly elected president, the general secretary, the permanent secretary and the eight elected members named below.[2]

Vernon Kellogg (1932), National Research Council, Washington, D. C. (*Elected at the fifth New York meeting, to succeed himself.*)

Edwin B. Wilson (1932), Harvard School of Public Health, Boston, Mass. (*Elected at the fifth New York meeting, to succeed himself.*)

David R. Curtiss (1931), Northwestern University, Evanston, Ill.

John Johnston (1931), U. S. Steel Corporation, New York, N. Y.

J. McKeen Cattell, *Chairman of the Committee* (1930), Garrison-on-Hudson, N. Y.

Henry B. Ward (1930), University of Illinois, Urbana, Ill.

Karl T. Compton (1929), Princeton University, Princeton, N. J. (*Elected at the fifth New York meeting, to succeed M. I. Pupin.*)

F. R. Moulton (1929), 327 S. LaSalle St., Chicago, Ill.

The Committee on Grants for Research[2]

Charles P. Berkey (1932), for Geology; Columbia University, New York, N. Y. (*Elected at the fifth New York meeting, to succeed Nevin M. Fenneman.*)

William Charles White (1932), for Medicine; Hygienic Laboratory, U. S. Public Health Service, Washington, D. C. (*Elected at the fifth New York meeting, to succeed Joseph Erlanger.*)

Walter S. Adams (1931), for Astronomy; Mt. Wilson Observatory, Pasadena, Calif.

Karl F. Kellerman (1931), for Botany; Bureau of Plant Industry, Washington, D. C.

W. Lash Miller (1930), for Chemistry; 8 Hawthorne Ave., Toronto, Ont., Canada.

Oswald Veblen (1930), for Mathematics; Princeton University, Princeton, N. J.

L. G. Hoxton, *Chairman of the Committee* (1929), for Physics; University of Virginia, Charlottesville, Va.

Vernon Kellogg (1929), for Zoology; National Research Council, Washington, D. C.

[2] The number in parentheses denotes the year at the end of which the member's term of office is to expire.

The Finance Committee[2]

George K. Burgess, *Chairman of the Committee* (1932), U. S. Bureau of Standards. (*Elected at the fifth New York meeting to succeed himself.*)

Arthur L. Day (1931), Geophysical Laboratory, Carnegie Institution of Washington.

A. F. Frissell (1929), 530 Fifth Ave., New York City.

Herbert Gill (1930), Bethesda, Md.

John L. Wirt, Treasurer of the American Association (1932), Carnegie Institution of Washington.

FUTURE ANNUAL MEETINGS OF THE ASSOCIATION

The American Association meets annually in convocation week, at the time of the Christmas holidays, the dates for the meetings being determined by a rule adopted by the council. When New Year's day falls on Thursday, Friday or Saturday, the meeting period is the week (Monday to Saturday, inclusive) in which New Year's day occurs. When New Year's day falls on Sunday, the meeting period is the preceding week. And when New Year's day falls on Monday, Tuesday or Wednesday, the meeting opens on December 27 and continues through January 2. Plans of individuals and societies may thus be made years in advance. The dates and meeting places of some future annual meetings are shown below.

1929–30 (Des Moines): Friday, December 27, 1929, to Tuesday, January 2, 1930.

1930–31 (Cleveland): Monday, December 29, 1930, to Saturday, January 3, 1931.

1931–32 (probably New Orleans): Monday, December 28, 1931, to Saturday, January 2, 1932.

1932–33 (Chicago): Monday, December 26, to Saturday, December 31, 1932.

1933–34 (undecided): Wednesday, December 27, 1933, to Tuesday, January 2, 1934.

1934–35 (probably Rochester): Thursday, December 27, 1934, to Wednesday, January 2, 1935.

SPECIAL NOTES

(1) This issue of SCIENCE contains only the general reports of the fifth New York meeting. Reports on the sessions of sections and societies are to appear in the next following issue, for February 1.

(2) The journal subscriptions of members for 1928 who have not yet enrolled for 1929 are to be continued to include the issue of SCIENCE for February 1. Dues for 1929 that have not been paid earlier should be paid now; otherwise the journal subscriptions can not be continued longer.

(3) All who are interested in the advancement of science and education should belong to the American Association. New members are received at any time. Information about the association and its work and about the privileges and responsibilities of association membership may be had at any time from the permanent secretary's Washington office, in the Smithsonian Institution Building.