SPECIAL ISSUE CONTAINING REPORTS OF THE THIRD PITTSBURGH MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND ASSOCIATED SOCIETIES

SCIENCE

VOL. 81 FRIDAY, FEBRUARY 1, 1935 No. 2092

SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. MCKEEN CATTELL and published every Friday by

THE SCIENCE PRESS

New York City: Grand Central Terminal

Lancaster, Pa. Garrison, N. Y.

Annual Subscription, $6.00 Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary, in the Smithsonian Institution Building, Washington, D. C.

THE PITTSBURGH MEETING OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND ASSOCIATED SOCIETIES

Edited by Dr. HENRY B. WARD

PERMANENT SECRETARY

GENERAL FEATURES

THE third Pittsburgh meeting closed on New Year's day with a record of events which made the occasion worthy of rank alongside of the earlier meetings in that city as marked dates in the history of the association. The first meeting in Pittsburgh was held in June, 1902. From 1848 to that date the association had held fifty meetings in summer. But the vision of larger opportunities for the advancement of science brought leaders in the organization to undertake a radical change. The period in midwinter designated Convocation Week was fixed upon as better adapted to bring together all college workers in science and those in outside activities. That Pittsburgh meeting voted to start the new plan by convening again in Washington in December, the first time also that two meetings had been held in the same twelve months. Then began also the movement to associate with the meetings technical societies in the various fields of science (of which two were accepted for that first Pittsburgh meeting) with opportunities for joint programs, discussions and stimulating personal contacts. The second Pittsburgh meeting in December, 1918, was a conference of leaders in science with a planned program definitely related to preparedness that placed science at the service of the nation.

The meeting just held demonstrated in a striking manner the effect of the plan adopted at Pittsburgh in 1902. Then the entire registration was recorded as 437[1] in ten sections and two affiliated societies; most

[1] "which placed the meeting far up toward the head of the list so far as this feature is to be taken into account." L. O. Howard, Proc. 51 (1902: 547).

recently from four to five thousand society members, visitors and citizens took part in the meetings of fifteen sections and forty-two associated organizations, while several times that number had at the exhibition a glimpse of apparatus, literature and research in science. The evidence of growth and advance in commerce and industry in Pittsburgh itself were not more impressive than those in the power and influence of the association when one compared 1934 with 1902.

Pittsburgh provided ample and attractive facilities for the meeting in the unusual group of buildings centering around the Carnegie Institute and the University of Pittsburgh. Rarely can such accommodations be secured within easy access of each other. The beautiful Carnegie Music Hall, provided for general sessions by the courtesy of the trustees of the Carnegie Institute through Colonel Samuel Harden Church, the Carnegie Museum and Library, the well-equipped lecture rooms and laboratories of Carnegie Tech and the remarkable even though still unfinished Cathedral of Learning of the University of Pittsburgh, together with auditoriums in the nearby buildings of the Bureau of Mines, the Board of Education, the Y. M. H. A., the Western Penn Historical Society, the other cooperating educational institutions and prominently the Mellon Institute of Industrial Research all together gave a wealth of meeting places such as the association and affiliated societies rarely enjoy.

To the local committee must be assigned all credit for providing arrangements so perfect in detail that the large series of meetings was run off without friction or delay. The chairman, President Thomas S. Baker, of the Carnegie Institute of Technology, at an early date laid careful plans that insured the ultimate success of the affair and his enforced absence later owing to ill health was deeply regretted by all. Coming into the work at a late date the vice-chairman, Dr. Davenport Hooker, of the University of Pittsburgh, did yeoman service in completing the arrangements. In this he was ably assisted by E. K. Collins, secretary of the local committee, and others. Especial mention should be made of Lawrence H. Miller, whose extremely efficient work in making room assignments and providing all the apparatus and helpers demanded by many societies and speakers in a hundred separate places relieved the permanent secretary's staff of a trying task. W. N. James, who took charge of local publicity, did fine work both for the meetings and for the local press. But the general satisfaction voiced on every hand showed that many others than those mentioned above were actively participating in making the occasion successful in all its aspects.

The registration at Pittsburgh reached 2,823, which was the largest total attained in several years. It was also widely distributed. Pittsburgh contributed 381 of the number and other points in Pennsylvania added 387. From New York 390 were registered, from the District of Columbia 139, from New Jersey 107, from Maryland 87 and Delaware 9. New England furnished 131 from Massachusetts, 61 from Connecticut, 16 from Rhode Island, 13 from New Hampshire, 9 from Maine and 2 from Vermont. Among the Central States Ohio registered 235, Illinois 160, Michigan 126, Wisconsin 62, Indiana 56, Iowa 42, Minnesota 40, Missouri 37. From the Southern States West Virginia sent 52, Virginia 47, Tennessee 21, North Carolina 19, Kentucky 15, Louisiana 11, Georgia 10, Alabama and Mississippi 5 each, South Carolina and Florida 4 each. Out of the plains and mountains Kansas, Colorado and Texas brought 9 each, Nebraska 7, Arkansas 6, Oklahoma and Utah 5 each, Montana 3, Wyoming and North Dakota 2 each, South Dakota, Arizona and New Mexico 1 each. The Pacific Coast was represented by California 20 and Washington 4. Only the states of Idaho, Oregon and Nevada were unrepresented. From Canada 29 were registered, from Hawaii 4, from Mexico 3, from Puerto Rico 2, and from other foreign countries 17, namely, 2 each from England, Germany, Italy and Scotland, and one each from Belgium, Brazil, China, France, Greece, Holland, Japan, Switzerland and Syria. This record shows clearly the range of interest in the meeting and of participants in its program.

Only two delegates from abroad registered at Pittsburgh, Professor H. B. Fantham and Mrs. Fantham (Dr. Annie Porter), now of the department of zoology at McGill University, were present as delegates from the Royal Society of South Africa and the South African Association for the Advancement of Science.

The General Program, which as usual was compiled and edited by Sam Woodley, executive assistant, with the aid of the local committee, has been effectively reorganized in order to decrease its size without loss of value. The amount of material this year was in fact large, as all sections of the association were active, the three conferences held sessions and forty-two societies contributed strong programs. These items, together with general sessions, special lectures and much other material, are well presented in the printed program. The most important features are referred to specifically later in this report. The Pittsburgh edition of the program was generally commended. Members may receive copies of the book by addressing the office of the permanent secretary, Smithsonian Institution Building, Washington, D. C.

Professor Edward L. Thorndike, of Columbia University, was president for the Pittsburgh meeting and contributed notably to its program. He presided at the opening general session, which was held on Thurs-

day evening in the Carnegie Music Hall. Other officers of the association and representatives of the local committee and cooperating educational institutions were seated on the stage. To the large audience assembled President Thorndike introduced first Dr. Samuel Black Linhart, secretary of the University of Pittsburgh, and then Colonel Samuel Harden Church, president of the Carnegie Institute, both of whom graciously welcomed the association and affiliated societies in behalf of the city and its educational institutions. President Thorndike responded happily to the addresses of welcome and then brought before the meeting the amendment to Article 2 of the constitution passed by the council as shown in the record below. The amendment was unanimously approved.

Dr. Wm. Alanson White, the speaker of the evening, was then introduced by President Thorndike. The address on "Man, the Great Integrator" was illustrated by examples from the field of psychiatry showing the reciprocal relation of the world within and the world without; it demonstrated how psychiatry, like general science, has discarded many of the older traditional ways of thinking and as a result has discovered a new world of thought and knowledge of great significance to the understanding of man and to culture in general.

The Sigma Xi address at the general session on Friday evening in Carnegie Music Hall was delivered by Professor E. A. Hooton, of Harvard University; his subject was "Homo Sapiens, Whence and Whither." On Monday evening the address of the retiring president of the association was given by Professor Henry Norris Russell, of Princeton University, on "The Atmospheres of the Planets." The addresses of the retiring vice-presidents which attracted appreciative audiences are all recorded in the accounts of the sections of which they were presiding officers.

A series of special invited lectures was listed for late afternoon hours. On Thursday Professor Wm. H. Hobbs, of Michigan, spoke on "The Career of Admiral Peary, the Discoverer of the North Pole," an appropriate event to mark the quarter-centennial of the discovery. On Friday, an illustrated lecture on the subject "Twins Reared Apart and the Nature-Nurture Problem" was delivered by Professor H. H. Newman, of the University of Chicago. The same day Professor Albert Einstein gave the Josiah Willard Gibbs lecture before the American Mathematical Society and guests. His subject was "An Elementary Proof of the Theorem Concerning the Equivalence of Mass and Energy." The lecture attracted wide-spread attention.

Other important events included an illustrated lecture on Friday afternoon by W. R. Chapline, of the U. S. Forest Service, on "Forestry Fosters New Approach to Watershed Conservation," and a demonstration lecture on Saturday afternoon by Dr. Mark H. Liddell, emeritus of Purdue University, on "The Acoustics of the Auditory Spectrum," with experiments by Dr. C. T. Knipp, of the University of Illinois, with the Knipp singing tubes. On Sunday afternoon Dr. Phillips Thomas, of the Research Department of the Westinghouse Company, gave a demonstration lecture on "Ramblings in Research." It was truly a remarkable and vivid series of physical experiments, which included recent discoveries not previously presented publicly, but unfortunately the audience was small though highly appreciative.

Among the special courtesies extended locally to the association and associated societies first mention must be made of the complimentary concert on Sunday evening. It was an organ recital by Dr. Marshall Bidwell in Carnegie Music Hall and was a treat to all lovers of music. He was assisted in the program by the symphony orchestra of the Carnegie Institute of Technology, directed by Professor J. Vick O'Brien, head of the department of music. About eighty musicians compose this orchestra, which is a non-professional ensemble of high repute. The general reception tendered the officers and members of the association and guests was held in the foyer of the Music Hall on Thursday evening after the general session and was greatly enjoyed. Numerous other social events, some planned especially for visiting ladies, were carried out with a spirit of generous hospitality that won the fullest appreciation of those in attendance, but space is lacking to give specific mention to all that was done for visitors during the meetings in Pittsburgh.

NEWLY ELECTED OFFICERS OF THE ASSOCIATION

At Pittsburgh the council elected the officers, whose names are listed below, for the year 1935 or such other term as is indicated in the particular case. This list has already been published in SCIENCE for January 4, 1935.

President, Karl T. Compton, Massachusetts Institute of Technology.

General Secretary, Otis W. Caldwell, Teachers College, Columbia University.

Vice-presidents and chairmen of sections:

Mathematics (A), T. H. Hildebrandt, University of Michigan.

Physics (B), John T. Tate, University of Minnesota.

Chemistry (C), Moses Gomberg, University of Michigan.

Astronomy (D), H. R. Morgan, U. S. Naval Observatory.

Geology and Geography (E), Walter E. McCourt, Washington University.

Zoological Sciences (F), Oscar Riddle, Station for Experimental Evolution, Cold Spring Harbor, N. Y.

Botanical Sciences (*G*), E. W. Sinnott, Columbia University.
Anthropology (*H*), N. C. Nelson, American Museum of Natural History, New York, N. Y.
Psychology (*I*), Joseph Peterson, George Peabody College for Teachers, Nashville, Tenn.
Social and Economic Sciences (*K*), Shelby Harrison, Russell Sage Foundation, New York, N. Y.
Historical and Philological Sciences (*L*), George Sarton, Harvard University Library.
Engineering (*M*), H. N. Davis, Stevens Institute of Technology, Hoboken, N. J.
Medical Sciences (*N*), Stanhope Bayne-Jones, Yale University Medical School.
Agriculture (*O*), H. K. Hayes, University of Minnesota.
Education (*Q*), F. B. Knight, University of Iowa.

Elected members of the council (for term ending 1938):
Louis B. Wilson, Mayo Foundation, Rochester, Minn.
W. F. Ogburn, University of Chicago.

Members of the executive committee:
J. McKeen Cattell, Garrison, N. Y. (for term ending 1938).
Burton E. Livingston, Johns Hopkins University (for term ending 1938).
E. B. McKinley, George Washington University Medical School (for term ending 1937).

Trustee of Science Service (for term ending April, 1938):
Henry B. Ward, Washington, D. C.

Members of the Committee on Grants (for term ending 1938):
Roger Adams, University of Illinois.
McKeen Cattell, Cornell University Medical College.

Member of Finance Committee (for term ending 1938):
Herbert Gill, Washington, D. C.

Member of the Division of Foreign Relations of the National Research Council:
W. A. Noyes, University of Illinois (for term ending 1937).

KARL TAYLOR COMPTON—PRESIDENT-ELECT OF THE ASSOCIATION

(*By Professor Edwin B. Wilson*)

KARL TAYLOR COMPTON, elected president of the American Association for the Advancement of Science, is a member of a notable family. His father, Elias Compton, was professor of philosophy at Wooster College and dean of the college, throughout the formative period of the son. One brother, Arthur, is Nobel laureate in physics, and another, Wilson, is a leader of the National Lumber Manufacturers Association. Genetic and environmental influences alike conspired to bring our new president early into prominence and effectiveness in science, in academic administration and in public affairs.

Dr. Compton received his doctorate at Princeton in 1912 and, after teaching for three years at Reed College in Oregon, went to Princeton as assistant professor of physics, where he was advanced to a professorship, and later to a research professorship and chairmanship of the department of physics. He left Princeton in 1930 to become president of the Massachusetts Institute of Technology, where he has already markedly developed the research activities and in particular has rapidly built up an excellent department of physics. Despite his administrative problems he has had the energy and has found the time to cooperate and even to lead extra-mural activities of public importance to science. He was one of the organizers of the American Institute of Physics, he served as a member of the Massachusetts commission for the stabilization of employment. He has long been a valued member of the executive committee of this association and recently has been chairman of the Science Advisory Board, appointed by President Roosevelt to bring the advice of some of our scientific leaders to bear upon problems of great importance to the government in its scientific work.

It is, however, of Dr. Compton as a scientist that we wish particularly to speak at this time. His early work was in the photoelectric effect; in the early days of the rapid development of this subject, he wrote pioneering contributions which led up to the determination of Planck's constant h by this means and to a check of Einstein's photoelectric law. Later he concentrated on the theory of ionization by collision and with his brother Arthur developed a famous new instrument of research, the Compton electrometer.

The years following the war saw a tremendous growth in interest in the determination of the critical potentials of atoms and molecules, and one of the most prominent schools at work in this field was that of Compton at Princeton. He not only worked in his own name, even more he gave generously of his time and advice in the work of others. No list of his papers appearing at that time or subsequently would give an adequate idea of his influence upon the subject; he knew how to work through others, and they liked to work with him.

Out of these studies of critical potentials came a series of papers on electric discharge in gases and on dielectric constants. Interested in everything which pertained to the electron and its ways with atoms, Dr. Compton in 1926 embarked on a program of researches in vacuum spectroscopy. His principal contributions to spectroscopy, in addition to his design and contribution with J. C. Boyce of the first vacuum spectrograph of sufficiently broad range to cover the whole extreme ultra-violet at a single setting and with relatively high dispersion, were his analyses of the lines Ne II and Ne I. The second of these was particularly timely, as it gave a quantitative basis to the explanation of "active" nitrogen.

A scientist may make great contributions by the discovery of new facts, by the invention of new instruments, by the theoretical or mathematic treatment of phenomena, by helpful suggestiveness to his students and colleagues, or by administrative vision in setting up constellations of personnel and problems. The key to an appreciation of Compton's importance in American science to-day is in the even balance at a high level that he has maintained among all these types of contribution, and in the range of his interest and understanding beyond his chosen field of physics. Elected president at an exceptionally early age, he will bring to the office a full maturity for service in these troubled times.

THE ASSOCIATION PRIZE

A generous friend has provided one thousand dollars annually for the last dozen years to be awarded each year to the author of a noteworthy paper on the program of the winter meeting. It is the desire of the donor, who wishes to remain unknown, that the award might serve to strengthen the program and stimulate younger men to contribute their best work to it rather than to bestow added honors upon older workers. The committtee on prize award is not charged to do more than to select *an outstanding paper*. Its work was done this year with great thoroughness and met with general approval.

VERN OLIVER KNUDSEN—TWELFTH ASSOCIATION PRIZEMAN

The association prize of this year was awarded to Dr. V. O. Knudsen, associate professor of physics, University of California at Los Angeles, for his contribution on "The Absorption of Sound in Gases." This paper was delivered on Saturday afternoon, December 29, at a joint session of The American Physical Society and The Acoustical Society of America, meeting under the Section on Physics of the American Association. In his opening sentence Dr. Knudsen said, "The measurement of the velocity and absorption of sound in gases provides a new technique for investigating molecular collisions." He presented experimental and theoretical arguments supporting this statement and recounted new and immediately practical discoveries on the influence of humidity, gas mixture and air temperature on the absorption of high frequency sound waves. The paper won wide recognition as an outstanding contribution both in pure and applied physics.

The science of sound is not a new or transitory interest with Dr. Knudsen, for in this general field he has worked with distinction during nearly fifteen years. Tuning forks, organ pipes and vibrating string constituted essential equipment in the older sound-physics but gave place rather recently to the vacuum tube oscillator. As a graduate student in physics, Knudsen arrived on the scientific scene synchronously with this new development in sound-producing and measuring apparatus. His doctor's dissertation, worked out in the Ryerson Physical Laboratory, University of Chicago, in 1922, was entitled, "The Sensibility of the Ear to Small Differences of Intensity and Frequency." As a source of sound in this study he used a telephone receiver actuated by energy from a vacuum tube oscillator, capable of producing any desired frequency between 30 d. v. and 20,000 d. v. with intensity variable and measurable from extreme (painful) loudness to that which was below audibility. With this new, flexible method improved solutions were found for some of the problems which had interested physicists, physiologists, psychologists and musicians for a half century. But this was only the beginning! His researches on sound have spread almost as sound itself propagates, that is, in all directions. He has studied reverberation and the interfering effects of tones and noises upon speech reception, the problems of the hard-of-hearing, the relationships between hearing and the sense of touch, the nature of speech and many related topics.

The work which has introduced Dr. Knudsen most widely to the scientific, engineering and general public is his substantial text on *"Architectural Acoustics,"* published in 1932. In this volume he has brought together comprehensive statements for many of his own research results and has reviewed the fundamental principles and data on reverberation of sound, absorption, sound insulation and acoustics. Here he applies his research results to the problems presented by many types of buildings, including radio broadcast and sound-recording studios. He has made material scientific advance in solving many of the difficult problems which have arisen in connection with the building of "sound stages" necessary for the success of the modern motion picture.

Dr. Knudsen was born in Provo, Utah, in 1893. After graduating from college in 1915 he worked in the research laboratories of the Western Electric Company, New York City, during 1918 and 1919. He was assistant in physics at the University of Chicago from 1920 to 1922. After receiving the doctorate in physics in 1922, he was appointed assistant professor at the University of California at Los Angeles, was promoted to the rank of associate professor in 1927 and became chairman of the department in 1932. During the current year he has held the high honor of being the president of the Acoustical Society of America.

SPECIAL COUNCIL ACTION

A report on the organization of local branches, which had been presented by the executive committee and discussed in the Academy Conference, was ap-

proved unanimously. The request for such a branch at Lancaster, Pa., was on recommendation of the executive committee granted.

By vote of the council and confirmatory action by the general session, Article 2, line 4, of the constitution was amended by omitting the words, "The admission fee for members is five dollars; the annual dues are five dollars" and adding in this place "The council shall fix the admission fees and dues."

Later the council voted that "The annual dues shall be $5.00 and the admission fee shall also be $5.00, but no admission fee shall be required from members of affiliated societies and affiliated academies. The admission fee may also be waived under such other special circumstances as may be approved by the council."

Under the terms of the Jane M. Smith Fund the following were elected emeritus life members: Charles Sumner Tainter (F81), Francis H. Williams (F90) and Karl Langenbeck (F96).

From the income of the Luella Owen Fund the following were elected emeritus annual members: Beverly T. Galloway (M88F90), Clarence P. Gillette (M01F01) and John Lane Van Ornum (M01F04).

The resignation of Dr. Burton E. Livington as general secretary was accepted with deep regret and the council expressed its appreciation of his long and able services as permanent secretary and later as general secretary.

The following minute regarding the Pittsburgh meetings was ordered spread on the records and transmitted to the persons concerned:

The council of the A. A. A. S., reviewing the records of this the third Pittsburgh meeting of the association which is just drawing to a close, is impressed by the results which have been achieved. Members representing all sections of the association and more than fifty of its associated organizations in special fields, coming from all parts of our country and requiring diverse conditions for successful presentation of research work in technical lines, have been well provided for in every respect. For generous hospitality and thoughtful provision in many ways the association is deeply indebted and desires in this minute to record its thanks to the city of Pittsburgh, to the Carnegie Institute of Technology, the University of Pittsburgh, the Pennsylvania College for Women, Duquesne University and the Carnegie Institute and to the other agencies which have so graciously contributed to make the meetings a success. Especial thanks are due to the officers and members of the local committee, to Dr. Thomas S. Baker, president of the Carnegie Institute of Technology, as chairman, and Dr. Davenport Hooker, of the University of Pittsburgh, as vice-chairman, and others who gave such valuable personal service in planning and carrying out the work connected with the preparation and handling of the meeting.

To the director of the Mellon Institute of Industrial Research and his associates we owe much of the success of the largest and best scientific exhibition which the association has yet held and which was possible only because of the space in the splendid new building of the Mellon Institute surrendered for this purpose and of the work of Dr. L. O. Grondahl and his special local committee. Members of the association enjoyed greatly the complimentary concert tendered to them by Dr. Marshall Bidwell, director of the Carnegie Music Hall, and Professor T. Vick O'Brien and the symphony orchestra of the department of music.

FINANCIAL REPORTS

The financial reports and budgets of the treasurer and permanent secretary as audited were presented, discussed and approved. They are printed below.

OFFICE OF THE TREASURER
BALANCE SHEET
September 30, 1934

Assets

Investments			
Securities			$237,475.01
Cash			
Income account		$8,206.36	
Reserve for current needs		13,000.69	21,207.05
			$258,682.06

Liabilities

Endowment and Other Funds			
	Research	General	
W. Hudson Stephens		$4,381.21	
Richard T. Colburn	$85,586.45		
Michael P. Rich		10,000.00	
Hector E. Maiben		31,448.17	
Friends of the Association		3,559.00	
Fees of Sustaining Members			
Living		1,000.00	
Deceased	6,000.00		
Fees of Life Members			
Living		39,850.00	
Deceased	13,750.00		
	$105,336.45	$90,238.38	$195,574.83
Jane M. Smith:			
Original amount		$5,000.00	
Fees of Deceased Emeritus Life Members		3,100.00	8,100.00
Luella A. Owen			500.00
Reserve Fund			25,149.19
Emergency Reserve Fund			16,357.35
Prize Fund			4,000.00
			$249,681.37
Accumulated Income Unappropriated			
Endowment and other funds			
Research	$4,629.11		
General	3,965.52	$8,594.63	
Jane M. Smith		383.16	
Luella A. Owen		22.90	9,000.69
			$258,682.06

CASH STATEMENT
October 1, 1933, to September 30, 1934

Receipts

Balance from last report (September 30, 1933)			$19,887.56
Prize fund		$2,000.00	
Life-membership fees		800.00	
Curtailment on mortgages:			
Ben Maiben	$2,500.00		
H. L. Scattergood	750.00	3,250.00	
Interest on investments		10,710.71	
Purchased interest on bonds		168.61	16,929.32
			$36,816.88

Disbursements

Investments:			
$5,000 U. S. Treasury 4s, 1954		$5,184.38	
$5,000 Consolidated Gas Co. of N. Y. 5s, 1957		4,802.80	
		$9,987.18	
Interest purchased		168.61	$10,155.79

Grants allotted by Council:		
Union of American Biological Societies	$400.00	
Mt. Desert Laboratory	100.00	
Concilium Bibliographicum	100.00	
American Mathematical Society	100.00	
F. C. Brackett	500.00	
B. M. Duggar	420.00	
J. C. Stearns	250.00	1,870.00
Prize fund, R. L. Kahn		1,000.00
Jane M. Smith, three Emeritus Life Memberships		300.00
Hector E. Maiben lectures		703.68
Life-membership subscriptions for SCIENCE		1,536.00
Safe deposit box, collection charge and U. S. tax on checks		29.36
Luella A. Owen, three Emeritus Annual Memberships		15.00
		$15,609.83
Cash on hand		21,207.05
		$36,816.88

OFFICE OF THE PERMANENT SECRETARY

RECEIPTS AND DISBURSEMENTS FOR THE FISCAL YEAR 1933-34
(October 1, 1933, to September 30, 1934)

Receipts

To balance from last account:		
Publication fund	$4,280.88	
Available for general purposes	5,726.09	
Emergency fund	5,000.00	
Special fund for Committee on Place of Science in Education	1,903.03	
Special fund for Committee on Popular Science Reading Lists	2,131.76	$19,041.76
Membership dues and fees:		
Annual dues, previous to 1933	$80.00	
Annual dues for 1933	1,541.00	
Annual dues for 1934	79,274.79	
Advance payments for dues, etc.	951.50	
Entrance fees	145.00	
Life-membership fees	800.00	82,792.29
From Treasurer for Maiben lectures		703.68
Other general receipts:		
Life-membership journal subscriptions (from Treasurer)	$1,536.00	
Interest on bank accounts	1,114.68	
Sales of Proceedings volumes	7,269.50	
Sales of Booklists	7.50	
Sales of Marburg lecture (American Society for Testing Materials)	64.50	
Sales of Stabilization of Employment	15.00	
Overpayments	39.15	
Miscellaneous receipts	85.30	10,131.63
Special journal subscriptions:		
SCIENCE and *Scientific Monthly*	$2,043.00	
Science News Letter	399.00	2,442.00
Boston Meeting:		
Registration fees	$2,254.75	
Exhibition-Receipts from exhibitors	2,844.74	
From local committee (unexpended balance of local funds)	171.57	5,271.06
Berkeley Meeting:		
Registration fees		1,142.00
Pittsburgh Meeting:		
Exhibition receipts from exhibitors		825.00
Receipts from other meetings:		
Atlantic City exhibition		40.00
		$122,389.42

Disbursements

Subscriptions to official journals, including foreign postage		$50,115.88
Division and Academy allowances:		
Divisions	$2,133.00	
Affiliated academies	1,482.50	3,615.50
Expenses of Washington Office:		
Salaries	$15,789.85	
Office and addressograph supplies	431.50	
Printing and stationery	1,097.75	
Telephone and telegraph	192.62	
Postage	1,596.99	
Exchange	31.65	
Express, freight, and drayage	29.08	
Office furniture and equipment	217.50	
Miscellaneous expense	265.07	19,652.01
Expenses of General Secretary's office		27.92
Expenses of Treasurer's office		200.00
Circularization, inviting new members		2,923.02
Miscellaneous expenditures:		
Life-membership fees to Treasurer	$800.00	
Refunds of overpayments	39.15	
Boston Meeting:		
General expenses	$2,631.08	
Maiben lecture	403.68	
Travel expenses, Executive Committee	506.96	
Travel expenses, Section Secretaries	914.04	
Miscellaneous expenses, Section Secretaries	725.45	
Exhibition	1,671.45	
Press Service	496.15	7,348.81
Berkeley Meeting:		
General expenses	$2,112.16	
Maiben lecture	300.00	
Travel expenses, Executive Committee	536.76	
Travel expenses, Section Secretaries	414.10	
Miscellaneous expenses, Section Secretaries	210.32	
Press Service	372.08	3,945.42
Pittsburgh Meeting:		
General expenses	$140.68	
Exhibition	1,362.86	1,503.54
Atlantic City Meeting		7.33
Chicago Meeting		30.00	13,674.25
Miscellaneous travel expenses			1,111.23
Preliminary expenses on Proceedings Volume			4,027.62
Expenses of Committee on Place of Science in Education			206.48
Expenses of Committee on Popular Science Reading Lists			413.19
Special journal subscriptions:			
SCIENCE and *Scientific Monthly*		$2,064.00	
Science News Letter		399.00	2,463.00
American Society for Testing Materials (Sales of Marburg lecture)			64.50
			$98,494.60
By new cash balances:			
Publication fund		$7,522.76	
Available for general purposes		7,949.44	
Emergency fund		5,000.00	
Special fund for Committee on Place of Science in Education		1,696.55	
Special fund for Committee on Popular Science Reading Lists		1,726.07	23,894.82
			$122,389.42

Cash in banks:	
American Security and Trust Co. (Checking)	$ 1,024.72
American Security and Trust Co. (Savings)	3,440.89
Riggs National Bank (Savings)	3,071.86
Reserve held by Treasurer	16,357.35
	$ 23,894.82

The accounts of the treasurer and permanent secretary were audited under the direction of Dr. W. J. Humphreys, official auditor of the association. Complete financial reports and accompanying papers are on file and copies are available if desired.

MEMBERSHIP

The following table shows the status of membership on September 30 of 1933 and 1934:

	Sept. 30, 1933	Sept. 30, 1934
Sustaining members	1	1
Life members	511	501
Annual members, paid-up	15,216	15,927
Total in good standing	15,728	16,429
Members in arrears for one year	1,644	932
Members in arrears for two years	1,177	1,192
Total enrolment	18,549	18,553

During the fiscal year 1934, 2,029 members were added to the membership list, while 2,025 were removed on account of resignations and deaths.

Since October 1, 1934, 717 names have been added to the roll, while 1,438 have been removed, making the total enrolment on January 10, 1935, 17,832.

THE THREE CONFERENCES

The Academy Conference, following the plan of past years, met at 11:00 o'clock on Thursday, continued through luncheon and thereafter. Discussions took up problems of financial support from the association, high-school science clubs and the junior academy movement, greater activity in the development of projects of mutual interest, and the proper relations to academies for local branches of the association.

The Secretaries' Conference was held on Sunday morning. While the attendance was somewhat smaller than last year, the interest was unabated. The advisability of establishing a membership group of research fellows was vigorously discussed and laid over until next year for further consideration. A committee report on organization, the association prize award and several minor matters were also considered. This conference is a valuable influence in enabling the association to render more effective services to its members.

The Conference of Science Teachers promoted by the Committee on the Place of Science in Education held two sessions and a luncheon meeting on Saturday. The programs were attended by large and enthusiastic audiences. At the afternoon meeting it was voted to form an American Science Teachers' Association. A steering committee was instructed to perfect the organization and arrange a program for the St. Louis meeting of the association next December. The committee consisted of: Harry A. Carpenter, Rochester, N. Y., *chairman;* Florence Billig, Wayne University, Detroit, Mich.; Otis W. Caldwell, New York, N. Y.; W. L. Eikenberry, State Teachers College, Trenton, N. J.; John A. Hollinger, Pittsburgh Public Schools, Pittsburgh, Pa.; Wilhelm Segerblom, Phillips Exeter Academy, Exeter, N. H.; Homer W. LeSourd, Milton Academy, Milton, Mass., and Ralph K. Watkins, Columbia, Mo. These members were instructed to add others to the managing committee as needed.

RESOLUTIONS ADOPTED AT PITTSBURGH

Numerous requests for action on scientific problems were presented by sections and affiliated societies. After careful study by the executive committee and discussion in the council, the following resolutions were approved for publication and dissemination:

Relation of the American Association to Human Welfare

WHEREAS, the objective of science is knowledge of man and of the world in which he lives; and

WHEREAS, upon this knowledge is based man's opportunity to live more intelligently, to work more effectively and to experience greater comfort and satisfaction; and

WHEREAS, the justification of the work and purpose of the American Association for the Advancement of Science is found in the contributions of this work to human welfare; and

WHEREAS, the American Association for the Advancement of Science, founded in 1848 and incorporated in 1874, with its 18,000 members and 141 affiliated societies covering the entire field of pure and applied science, including sociology, economics and education, and with its administrative offices in the Smithsonian Institution of Washington, has been and is well and permanently organized to administer funds for the advancement of science; therefore be it

Resolved, that the American Association for the Advancement of Science is prepared to accept and administer additional funds for the advancement of science and the promotion of national welfare.

Federal Support for Scientific Work

WHEREAS, development and application of science have been basic to the economic and social progress of nations, making possible such movements as universal education, abolition of child labor and slavery, emancipation of women, insurance and pensions, moderate hours of labor and great improvement in the standards of health, comfort and satisfaction in living; and

WHEREAS, scientific developments have not only conferred general social benefits, but in particular have been largely effective in leading to recovery from previous depressions,—as the railroad industry following the depression of 1870, the electric industry following that of 1896 and the automobile industry following that of 1907; and

WHEREAS, scientific research is a productive investment proven by experience to yield a high rate of return, as illustrated by the saving of $2,000,000,000 per year from the Bessemer Steel process and of over $1,000,000 per day from the modern incandescent lamp, and as illustrated also by the entire chemical, electrical, communication, transportation and metallurgical industries and by the enormous employment in such industries; and

WHEREAS, progressive foreign nations have recognized the importance of maintaining their scientific strength at a high productive level and have provided for this maintenance by allocation of funds to support scientific work on a national scale; and

WHEREAS, there now exists in America a situation demanding as never before an intelligent use of our national resources; and

WHEREAS, there are manifold problems in health, safety, agriculture, better use of resources, development of new products and processes whose social value and urgent need are unquestioned but whose solution is being seriously hampered by lack of funds for research, which have been greatly curtailed at this time when properly directed scientific work is more than ever needed; and

WHEREAS, the great national planning program, which is now under consideration for the use of our *physical* resources of soil, minerals and crops, will be seriously

deficient unless it includes provisions for utilizing the *scientific* resources of the country for creative work; therefore be it

Resolved, that aggressive governmental support of scientific work is essential to any sound program of building for the future national welfare, and is essential if this country is to do its full part in the further advance of civilization and if it is to enjoy its proper share in the benefits of this advance; and be it further

Resolved, that copies of this resolution be sent to the President of the United States, to the members of his Cabinet and to the members of the Congress.

A Pure Food and Drug Act

Resolved, that the American Association for the Advancement of Science, with more than 18,000 members and 141 associated societies and academies representing a total membership of more than 725,000, feels that there is a real need for a careful and sane revision of the Pure Food and Drug Act, which has served so effectively over a long period of time.

It seems reasonable and desirable that cosmetics should be included in any new bill which is presented and that in order to safeguard more adequately public health and public welfare, manufacturers, their salesmen or other agents, should be allowed to use in their advertising, printed, broadcasted or otherwise, only such statements as are not misleading and are essentially in accordance with fact.

Status of Land Utilization Agencies

Resolved, by the American Association for the Advancement of Science, that any reorganization of the United States Government agencies should provide for the continuance in the Department of Agriculture of the land utilization agencies now there, including the Bureau of Chemistry and Soils, Forest Service, Biological Survey, and the addition of such other agencies as have to do with the agricultural, forest or range use of the public domain or the protection thereof from erosion.

Animal Experimentation for Scientific and Medical Purposes

The American Association for the Advancement of Science, which has repeatedly recorded its protest against the enactment of legislation prohibiting animal experimentation for scientific and medical purposes, hereby reaffirms its vigorous opposition to the adoption of legislation in Congress or by state or local authorities prohibiting the use of dogs or other animals for medical experimentation.

This association is in accord with the practically unanimous and often expressed authoritative voice of science and medicine that animal experimentation has conferred inestimable benefits upon mankind, as well as upon animals themselves, and is essential to the progress of the biological and medical sciences.

The history of medical discovery affords countless examples of the necessity for the use of dogs and other animals in certain kinds of experiment, as may be illustrated by the experiments leading to the recent discoveries of insulin in the treatment of diabetes and of liver extract in the treatment of pernicious anemia.

The conditions under which animal experimentation is conducted in government and medical laboratories and in other laboratories of chartered institutions devoted to scientific research, afford every safeguard against the infliction of unnecessary suffering upon the animals.

This association, with a membership of over 18,000, with affiliated technical societies and academies representing a total membership list of more than 250,000 persons including representatives of all the sciences of nature and of man, is confident that if legislators become fully informed of the injury which would be inflicted upon the progress of curative and preventive medicine by such legislation any such bills will not receive their favorable consideration.

Pollution of Public Waters

WHEREAS, the degree of control of pollution of coastal and inland waters by domestic and industrial wastes which is essential for public health and national welfare has not yet been achieved and can not be without further development and coordination of federal, state and local authority,

Therefore, be it resolved that the American Association for the Advancement of Science, meeting at Pittsburgh, urgently recommends the adoption of legislation adequate to control pollution of public waters.

Science Advisory Board

Resolved, that the Council of the American Association for the Advancement of Science, with more than 18,000 members and 141 associated societies and academies representing a total membership of more than 725,000, appreciates the judgment of the President of the United States in appointing a Science Advisory Board and hopes that all problems of the Government involving scientific problems may be referred to this Board for its recommendations before action is taken.

Proposed Transfer of Forest Service

Resolved, by the American Association for the Advancement of Science, that any governmental reorganization planned should provide that the United States Forest Service remain, as at present, a part of the United States Department of Agriculture.

Concerning a U. S. Botanical Garden

Resolved, by the Council of the American Association for the Advancement of Science, that the efforts now being made to establish at Washington, D. C., an adequate United States Botanical Garden under effective scientific control be heartily approved.

THE ANNUAL SCIENCE EXHIBITION

(*By F. C. Brown, director of exhibits*)

The arrangements for this year's exhibition were an improvement over any held in the past. This was due in part because Pittsburgh is a great technical center and was readily accessible to the exhibitors and to the members of the association. Special credit, however, should be given to the local committee on exhibits. Dr. E. R. Weidlein, director of the Mellon Institute of Industrial Research, made a distinctive and generous contribution by preparing adequate quarters. Dr. H. S. Coleman, associate director, gave

a large part of his time to the preparations. Dr. L. O. Grondahl as chairman carried the burden of the work in Pittsburgh both before and during the meetings. This committee worked most efficiently. Through planned cooperation with the numerous technical groups in and about Pittsburgh we had, in the opinion of one prominent exhibitor, "the most distinguished body of visitors ever seen at any exhibition held in that city." The value of the effort expended by many people, including the officers of the societies, was very great. The opinion prevailed that the association brought an unusually interesting exhibition to Pittsburgh.

The success of the exhibition can be attributed to a great extent to the care and expense undertaken by those who prepared the displays and demonstrations. The industrial firms set a new standard. This cooperation is recognized as vital. Many well-known associations and research institutions were represented. The association especially appreciated the contribution of the many eminent scientific men who personally devoted their time to exhibits and demonstrations. That these exhibits were well prepared may be indicated by quoting from a radio broadcast by Dr. Grondahl given at the close of the exhibition:

> During the meeting a cablegram was received from Europe describing certain results that had just been obtained in nuclear physics. It was immediately recognized that the results could be checked by the demonstration set-up in the exhibition. Moreover some important conclusions from the facts reported could be checked. The apparatus that was used in Europe was not of such a nature that this could be done. Upon receipt of the announcement of the new results, the scientists in charge of the corresponding exhibit at the Mellon Institute went to work after the crowds left the exhibition hall and spent the night making tests which yielded interesting new facts of scientific value before the next morning. This is a good illustration of the fact that the exhibition that has just closed was not a showing of museum apparatus or of material that had already passed into history but constituted a living and functioning demonstration of the way scientific progress is being made.

The attendance was more than 20,000 and some thousands were turned away, owing to the overcrowding of the exhibition hall. The publicity given to the exhibition was larger than ever before and the accuracy of the reports was a credit to the members of the National Association of Science Writers.

SCIENTIFIC SESSIONS

SECTION ON MATHEMATICS (A)

(Reports from E. R. Hedrick and Edwin W. Schreiber)

The meetings of the Section on Mathematics (A) were held in conjunction with those of the American Mathematical Society, the Mathematical Association of America and the National Council of Teachers of Mathematics. The American Mathematical Society held scientific sessions at the Carnegie Institute of Technology from Thursday to Saturday, at which 73 short papers were presented by their authors, in addition to the longer papers presented by invitation, which are described below. Abstracts of these will be printed in the January issue of the *Bulletin* of the society, and a general account of the meeting will appear in the March issue.

On Friday afternoon, President A. B. Coble delivered his retiring address as president of the society, on the topic, "The Geometry of the Weddle Manifold W_p," and Professor Albert Einstein delivered the Josiah Willard Gibbs Lecture of the society on the topic, "An Elementary Proof of the Theorem Concerning the Equivalence of Mass and Energy," before large and enthusiastic audiences. Both of these addresses will appear in the *Bulletin* of the society.

At the annual business meeting of the society on the same afternoon, the following officers were elected: *President,* Professor Solomon Lefschetz; *vice-president,* Professor Harry Bateman; *associate secretary,* Professor J. R. Kline; *member editorial committee of the Bulletin,* Professor W. R. Longley; *member editorial committee of the Transactions,* Professor J. D. Tamarkin; *member of editorial committee of the Colloquium Publications,* Professor R. L. Moore; *trustees,* Professors W. B. Fite, W. R. Longley, G. W. Mullins, Dr. Robert Henderson and Dean R. G. D. Richardson; *council,* Professors A. A. Albert, Harold Hotelling, R. E. Langer, D. V. Widder and R. L. Wilder.

On Friday evening there was a joint session of the Section on Mathematics (A) and the Section on Social and Economic Sciences (K), the American Mathematical Society, the Mathematical Association of America and the Econometric Society, on the general topic, "The Nature and Limitations of Statistical Proof." The following papers were read by invitation: "What is a Proof?" by Professor E. B. Wilson; "What Do Time-Series Correlation Coefficients Show?" by Professor C. F. Roos; "Statistical Proofs of Periodicity in Economic Series," by Professor H. T. Davis, and "Practical Difficulties in Proving Statistical Relationships," by Mr. Max Sasuly.

On Saturday afternoon there was a joint meeting of the American Mathematical Society and the American Physical Society, on the general topic, "Group Theory and Quantum Mechanics." The following papers were read by invitation: "Symmetry Relations in Various Physical Problems," by Professor E. P. Wigner; "Some Applications of Group Theory to Non-Relativistic Problems," by Professor J. H. Van Vleck;

"Some Applications of Group Theory to Dirac's Relativistic Theory," by Professor Gregory Breit.

The meetings of the Mathematical Association of America began with the joint session on Friday evening and extended through Saturday, Monday and Tuesday. On Saturday afternoon there was held a joint session of the Mathematical Association and the National Council of Teachers of Mathematics.

On Monday morning there was a joint session of the section with the American Mathematical Society and the Mathematical Association, at which Professor Arnold Dresden delivered his retiring address as president of the association on the topic "A Program for Mathematics," and Professor C. N. Moore delivered his retiring address as vice-president of the American Association and chairman of the Section on Mathematics, on the topic "Mathematics and Science." Reports of these meetings and of the sessions of the association on Monday afternoon and Tuesday morning will appear in the *American Mathematical Monthly.*

At the business meeting of the Mathematical Association on Monday afternoon, the following officers were elected: *President,* Professor D. R. Curtiss; *vice-presidents,* Professors L. L. Dines and A. J. Kempner; *members of the board of trustees* (to January, 1938), Professors H. E. Buchanan, Arnold Dresden, E. R. Hedrick, F. D. Murnaghan and (to January, 1937, *vice* D. R. Curtiss) J. O. Hassler.

For the Section on Mathematics (A) the following officers were elected: *Vice-president of the American Association and chairman of the section,* Professor T. H. Hildebrandt; *members of the committee of the section,* Professors E. B. Stouffer (elective, retiring in December, 1938), M. H. Ingraham and C. N. Moore (representing the Mathematical Society), C. S. Atchison and W. D. Cairns (representing the Mathematical Association). Professor Marston Morse was reelected by the section committee as a member of the executive committee of the section.

The National Council of Teachers of Mathematics met with the American Mathematical Society, the Mathematical Association of America and the Section on Mathematics for the first time. Approximately 135 were registered. At the opening session on Friday evening after an address of welcome by Professor Edwin G. Olds (Carnegie Institute of Technology), the response was made by Professor W. D. Reeve (Columbia University), who spoke at some length on certain topics on curricular revision. An interesting feature of the evening was a symposium on "Methods of Making Mathematics Interesting," by a group of teachers from the Pittsburgh high schools and directed by Dr. Elizabeth B. Cowley. The Saturday morning session was devoted to the general topic, "Mathematical Concepts of Value to High School Teachers." Professor H. W. Brinkman (Swarthmore College) presented an interesting paper on "Certain Concepts in Trigonometry." Professor C. C. MacDuffee (Ohio State University) read a logical paper on the "Different Kinds of Equality." At the morning session Professor W. D. Cairns displayed English text-books and examination papers collected while visiting English schools on a recent trip abroad. The exhibit, which included various charts of typical problems used for examination purposes in England, together with the standard text-books used in Britain, was available all day. The Saturday afternoon session was a joint meeting with the Mathematical Association of America on the topic "The Need for a Reorientation of Mathematics in the Secondary Schools." The first paper, entitled "From the Viewpoint of Modern Educational Theory," was presented by Professor P. W. Hutson (University of Pittsburgh). Professor W. L. Hart (University of Minnesota) read a paper entitled "From the Viewpoint of the University Professor of Mathematics." Dr. M. L. Hartung (University High School, Madison, Wis.) spoke on "From the Viewpoint of the High School Teacher."

The general dinner of the mathematical organizations was held on Saturday evening at the Hotel Webster Hall. Nearly 300 persons were in attendance. The dinner was presided over by Professor Dunham Jackson, who introduced Professor Albert Einstein as the distinguished guest of the occasion. Informal talks were made by Professors S. Lefschetz (incoming president of the society), G. D. Birkhoff and L. L. Dines.

SECTION ON PHYSICS (B)

(Reports from Henry A. Barton, F. R. Watson, Robert G. Stone, Charles F. Brooks)

An unusually large and well-attended meeting of the Section on Physics (B) and its affiliated societies was held at the Pittsburgh meeting. More societies met with the section than ever before, *viz.,* the American Physical Society, the American Meteorological Society, the American Association of Physics Teachers and the Acoustical Society of America.

The section followed its usual custom of holding no separate meeting but rather joint sessions with the American Physical Society. The program of the official session of the section, which was held on Thursday afternoon, consisted of an address on "Some Unusual Optical Problems," by R. W. Wood, vice-president and president-elect of the American Physical Society, and the address of C. J. Davisson, retiring vice-president of the Section on Physics, on "Electron Optics" (read by K. K. Darrow in the absence of Dr. Davisson). Henry G. Gale, vice-president of the section, presided.

The American Physical Society held sessions on Thursday, Friday and Saturday, approximately 95 papers being presented. Four simultaneous sessions on Thursday morning were: (1) On nuclear structure, radioactivity, neutrons, counters and cosmic rays, Henry A. Erikson presiding; (2) on miscellaneous interesting and important applications of physics, L. G. Hector presiding; (3) on films, light filters, fluorescence, luminescence, Stark effect and spectra, R. W. Wood and W. E. Forsythe presiding; and (4) on crystals, solids, diffraction of electrons and mass-spectroscopy, L. W. McKeehan and J. A. Becker presiding.

At the business meeting held on Thursday afternoon officers elected were announced as follows: *President,* R. W. Wood; *vice-president,* F. K. Richtmyer; *secretary,* W. L. Severinghaus; *treasurer,* G. B. Pegram; *managing editor* (1935–1937), John T. Tate; *members of the council* (1935–1938), G. Breit and K. K. Darrow; *members of the board of editors of The Physical Review* (1935–1937), W. V. Houston, R. S. Mulliken and I. I. Rabi. Further business included satisfactory reports by the treasurer and the managing editor.

On Thursday evening the society inspected, by invitation, the laboratories of the Gulf Research and Development Corporation.

Friday was devoted mainly to a symposium on "Heavy Hydrogen and Its Compounds," this being a joint symposium of the section with the Section on Chemistry and the American Association of Physics Teachers. The morning program was devoted to invited papers on the physical aspects of the subject, K. K. Darrow presiding. The papers were: "Interferometric Studies of Alpha Lines of Hydrogen and Deuterium," R. C. Gibbs; "The Use of Deuterium in Spectroscopic Investigations of Molecules," G. H. Dieke; "Magnetic Moment of the Deuton," Otto Stern; "Nuclear Reactions Produced by High-speed Deutons," M. A. Tuve. In the course of discussion a vote was taken in approval of the term "deuteron" instead of "deuton" or "diplon" for the deuterium nucleus.

The afternoon session was devoted to invited papers on the chemical aspects of the subject and is reported by the Section on Chemistry. Late in the afternoon a joint meeting with the American Mathematical Society was held to hear the Josiah Willard Gibbs Lecture.

In the evening a joint dinner was held with the American Association of Physics Teachers in the Webster Hall Hotel. Approximately 325 persons attended and heard addresses by R. W. Wood, toastmaster, K. T. Compton, K. K. Darrow, Henry G. Gale, L. O. Grondahl, R. A. Millikan, Frederick Palmer, Jr., W. F. G. Swann and A. G. Worthing.

On Saturday morning four simultaneous sessions were held: (1) On x-rays, crystal and liquid structure and fatigue of metals, J. Valasek presiding; (2) on wave mechanics, ether drift, nuclear magnetic moments and spins, Alpheus W. Smith and P. W. Bridgman presiding; (3) on sound, magnetism and miscellaneous topics, Herbert G. Dorsey presiding; (4) on high-speed rotating devices, photoelectric, photovoltaic and photoconductivity effects and miscellaneous topics, J. W. Beams and Jay W. Woodrow presiding.

Two sessions were held on Saturday afternoon, one a joint session with the Acoustical Society of America, D. C. Miller presiding. The other was a joint session with the American Mathematical Society devoted to "Group Theory and Quantum Mechanics," H. P. Robertson presiding (reported by the Section on Mathematics).

Some 400 physicists in all attended the sessions. One very agreeable and valuable feature of the meeting was the holding of joint symposia bringing different groups together and stimulating borderline subjects. The A. A. A. S. convention offers the best opportunity for such cooperative gatherings.

For the first time in its history, the Acoustical Society of America met in affiliation with the A. A. A. S. A joint meeting was arranged between the Acoustical Society, the Section on Physics and the American Physical Society. The program included a symposium on "Noise" and two invited papers. One of the invited papers was by B. G. Churcher, of the Metropolitan-Vickers Company, Manchester, England, on "A Loudness Scale for Industrial Noise Measurements." He showed that any loudness scale must be decided subjectively by hearing observations but should be expressed in energy units. Other speakers discussing this subject were Dr. E. J. Abbott, Dr. L. B. Ham and V. L. Chrisler. An important paper was delivered by Dr. V. O. Knudsen on "The Absorption of Sound in Gases," which described how methods employed in acoustics were cleverly adapted to give important and surprising results in the domain of molecular interactions.

The second invited paper was given by Dr. Hallowell Davis (Harvard University) on "The Electrical Phenomena of the Cochlea and the Auditory Nerve." His experiments indicated that the cochlea always responds to mechanical sound impulses, but that the auditory nerve is intermittent in its action while discharging electrical impulses along the nerves.

An ingenious demonstration by W. C. Dodd (Miami University) made visible three simple harmonic motions mutually at right angles. Dr. E. C. Wente, of the Bell Telephone Laboratories, described the various types of instruments available for measuring sound.

Attendance at the meetings varied from fifty to two hundred. C. R. Hanna, of the Westinghouse Com-

pany, was chairman of arrangements and program. A banquet on Friday evening was attended by some fifty enthusiastic participants.

The American Meteorological Society held four sessions on December 28 and 29, with 29 papers. In a symposium on the hydro-meteorology of the Ohio River, Montrose W. Hayes reviewed the Weather Bureau's recent improvements in gauging and river-stage forecasting; Colonel C. L. Hall (U. S. Engineers) showed how important weather prediction, especially of sub-zero temperatures and local downpours, was in the operation of the Ohio River movable dams; W. C. Devereaux described the efforts of the Weather Bureau to improve its river forecasts by use of slope-discharge-stage metering; W. S. Brotzman described the hydrology of the Monongahela and Allegheny Rivers, which join at Pittsburgh to form the Ohio, and J. H. Stewart showed a chart indicating a general parallel trend between Niagara River discharge and precipitation in the Ohio Basin, with an apparent lag of a few years in the lake levels.

Aerology and aeronautical meteorology were discussed in seven papers: W. R. Gregg (Chief, U. S. Weather Bureau) described the bureau's collection and use of upper air data in daily forecasting. The daily soundings by airplane are analyzed with the aid of tephigram, Rossby diagram and vertical cross-sections of the atmosphere along certain lines across the United States. Dr. K. O. Lange (Massachusetts Institute of Technology) demonstrated a new super-sensitive airplane micro-meteorograph made on the principle of the Jaumotte balloon meteorograph. Not only is it so sensitive that it will give accurate results at maximum rates of airplane climb, but also the nature of the record obtained, with temperature and humidity plotted directly against pressure (height), permits a very quick reduction of the results. Thus the new instrument is economical of time and permits the airplane ascent to be made nearer the synoptic hour and usually by daylight. Lieutenant P. G. Hale (U. S. Navy) described meteorology in the Navy, especially the development of new apparatus for measurement of gustiness, and a sensitive aerometeorograph, with a lag of only 7½ seconds. Though not so responsive as the new Lange meteorograph it is about eight times as sensitive as those generally in use in the United States and three times more sensitive than the European standard.

In two papers on visibility W. E. K. Middleton (Canadian Meteorological Office) indicated how Rayleigh's extinction coefficient depends chiefly on wavelength and how, therefore, as a basic unit it may be used to equate visibility measurements made with photometers of special design under all observing conditions. Eric R. Miller, discussing some wind velocity correlations, showed how the wind velocity at the Weather Bureau station in Madison had decreased with the growth of trees. F. R. Garver, after summarizing the wind velocities of the free air, envisioned a tower 1,000 feet or more high to harness at reasonable cost the great potential horsepower of the winds where essentially free of surface friction.

Climatology was the major theme of several papers which reflected particular interest in correlation studies. Dr. H. H. Kimball, Dr. C. F. Brooks and R. G. Stone (Blue Hill Observatory, Harvard University) presented, respectively, the latitudinal, altitudinal, seasonal and diurnal variations in the intensity and quality of solar radiation, twenty-eight new climatic maps of the whole North American continent for the Köppen-Geiger, *Handbuch der Klimatologie,* and types of fog régimes of the United States. J. K. Rose, from many simple and multiple correlations of various climatic elements with corn yields calculated separately for selected counties of the corn belt, concluded that on the margins of the corn belt, where yields show a correlation coefficient with selected weather elements from 0.90 to 0.99, the weather may have good forecasting value for corn yields. C. D. Reed presented evidence of an 11-month period in Iowa temperatures indicating that next May would be moderately warm, and Professor C. J. Bollinger reported an intricate, apparent chain of correlations between solar constant values, Caribbean Sea and Gulf of Mexico surface temperatures, and seasonal weather and crop yields in the southwestern states. The drought in the northern plains area was described by Professor J. C. Jensen, who thought that if run-off were held back the greater evaporation would make such thunderstorms as occurred a little wetter and thus mitigate to some extent the heat and dryness of droughts. J. B. Kincer indicated that man's responsibility for the drought could be considered as nil, since it was obvious that major processes of the weather were responsible and that corresponding dryness had occurred in the past before appreciable settlement. The papers by Messrs. Reed, Bollinger and Jensen drew much discussion.

Short-term forecasting on empirical bases was discussed by I. R. Tannehill (pressure differences between stations), Dr. H. J. Franklin (cranberry frost forecasts) and W. R. Stevens (movements of isobars). Other papers concerned meteorological physics and instruments. Dr. E. W. Woolard reviewed the problem of the supporting power of a surface ice sheet. Dr. H. Landsberg presented observations showing the relatively large number of condensation nuclei found over lowlands, especially in the vicinity of cities. A. H. Mears showed how aneroid barometers could be used for accurate determinations of pressures.

Dr. I. M. Cline delivered the presidential address, entitled "A Century of Progress in the Study of Cyclones." With eminent fairness, in a sweeping comprehensive survey, he called attention to the long roll of investigators who have contributed in any notable way to our knowledge of the nature of cyclones. He devoted especial attention to the tropical cyclone, on which he is an authority.

At the annual meeting the society celebrated its fifteenth anniversary, and viewed with pleasure the rapidly increasing membership, reflecting revived interest in meteorology. Charles F. Brooks and Willis R. Gregg were reelected secretary and treasurer, and M. W. Hayes, H. C. Willett, A. H. Thiessen, F. W. Reichelderfer and G. F. McEwen were elected councilors for 1935–1937. Dr. I. M. Cline and E. L. Wells continue as president and vice-president. The society, by mail ballot, voted 229 to 22 to reduce the membership to one class, eliminating fellows.

SECTION ON CHEMISTRY (C)

(Report from J. H. Simons)

This section opened its meeting on Thursday afternoon with a symposium on "The Rôle of Chemistry in Education," planned to bridge the gap between the sections on chemistry and education. It was held jointly by these sections with the cooperation of the Division of Chemical Education of the American Chemical Society. Victor H. Noll presented a paper on "The Extent of Chemical Education," which gave a statistical account of chemical education in the various educational levels. "The Cultural Value of Chemistry in General Education" was presented by B. S. Hopkins, who stressed the cultural and esthetic side of the subject. "The Training Value of Chemistry in General Education" was treated by J. H. Simons. Alexander Silverman gave a scholarly address on "The Prerequisite and Collateral Value of Chemistry," and Webster N. Jones discussed in masterly fashion "The Profession of Chemistry."

On Friday both morning and afternoon sessions were devoted to a symposium on "Heavy Hydrogen and Its Compounds." This was held jointly with the Section on Physics and the American Physical Society. The account of the morning session is reported by the Section on Physics. In the afternoon H. L. Johnson reported on "The Chemical Separation of the Isotopes of Hydrogen," in which he gave data on the separation that results in reaction in which hydrogen is evolved; this was considered theoretically. "The Value of Deuterium in Reaction Kinetics" was treated by H. S. Taylor in a paper which contained much interesting material. John R. Bates presented "A Study of the Deuterium Exchange Reaction Involving Acetone," the material for which was obtained by himself and colleagues at the University of Michigan. F. G. Brickwedde discussed the properties of ortho- and para-deuterium and contrasted them with those of ortho- and para-hydrogen.

On Friday evening a well-attended dinner was held jointly with the Pittsburgh Section of the American Chemical Society. This was followed by the address of the retiring vice-president, Arthur B. Lamb, on the subject "Crystallogenetic Adsorbents." He discussed the adsorbent properties of certain crystalline hydrated silicates, which lose water but retain the original crystalline form. The high adsorbent properties and the selective action of these materials is remarkable.

On Saturday morning was held a session devoted to contributed papers. Raymond E. Birch presented a paper on "The Development and Properties of a Forsterite Refractory." He described the preparation and properties of this interesting material, which is a magnesium silicate with a melting point of 1,910 degrees C. and considerable resistance to the action of silica at high temperature. The interesting properties of tantalum carbide were discussed by Philip M. McKenna. This material of great potential use has a melting point above 4,000 degrees C. and is completely resistant to the action of acids. Its great hardness makes it of use in cutting tools. William A. Noyes gave an interesting address on "Electronic Theories," in which he outlined the historical development of these theories in an excellent fashion. The paper by Hazel C. Cameron on "The Effect of Vitamin A Intake upon the Incidence and Duration of Colds among Student Volunteers" was read in abstract. A. A. Horvath presented a paper on "The Phosphatides of the Soybean," and Arno Viehoever gave two papers on "The Hydrolytic Products of Amygdaline," and "Effective Antidotes."

SECTION ON ASTRONOMY (D)

(Report from Harlan T. Stetson)

The meetings of this section, held on Monday and Tuesday, were well attended, especially by those from the central section of the United States. At the Monday morning session, held at the Carnegie Institute of Technology, contributed papers were presented. The activities of the Allegheny Observatory were presented by Zaccheus Daniel on "The Parallax Program," by N. E. Wagman, who reported on the observations of Eros at the last opposition, and by papers on light curves of variable stars by Director F. C. Jordan and by Charles Hetzler, who demonstrated interesting results from infra-red plates taken with the Thaw refractor, using a color filter which, combined with the characteristics of the plate, gave sharp definition in the infra-red. The lag of the time

of maximum as compared with the visual observations was markedly indicated in several of the long-period variables. The extraordinarily interesting eclipsing star Zeta Aurigae was represented by two papers from the Mount Wilson Observatory; one dealing with the spectrographic investigations, by W. H. Christie and O. C. Wilson, and the other by P. Th. Oosterhoff presenting the results of photographic investigations.

Dr. Keivin Burns reported on the progress of his measurement of the cobalt spectrum in the sun and arc. His contribution in the measurement and analysis of some 1,500 lines discussed the similarity of partially resolved patterns in cobalt and lanthanum. The relationship involved makes possible a study of a considerable part of the hyperfine structure of cobalt through observation of the more easily resolved lanthanum lines.

A paper of unusual historical interest by Dr. Heber D. Curtis and Frank E. Robbins (University of Michigan) was entitled "A Nautical Almanac of 467 A. D." Three small fragments of papyrus, in the University of Michigan's extensive collection, contained astronomical data such as to warrant a painstaking search for the date of the document. From fragments containing the positions of the sun and moon and five planets it was possible to date the tables for the period from September 19 to October 31, 467 A. D. The ephemeris proves of historical interest, not only in exemplifying the method given by Theon of Alexandria in the fifth century, but also as showing the state of astronomical science at that early date.

On Monday afternoon a joint session was held with the Section on Geology and Geography, the first venture in bringing together scientists in these fields. The papers represented varied but often common interests, as in that of "A Proposal for an Institution for Meteoritic Research," by H. H. Nininger, and one on "Astronomical and Geological Ages," by Dr. William D. Urey (Massachusetts Institute of Technology). While a considerable variation in the age of the earth results from study of the uranium content of different specimens analyzed, Dr. Urey's researches on the uranium content of various specimens gave values for the age of the earth consistent with 2×10^a years.

A paper by Dr. John A. Fleming (Carnegie Institution) summarized important researches in the earth's magnetism in correlations with the solar and atmospheric factors, a subject of increasing importance either from an astronomical or a geological view-point.

At 3:30 P. M. the address of the retiring vice-president of the section, Dr. V. M. Slipher (Lowell Observatory), was read, on the subject "The Atmospheres of the Planets as Inferred from Their Spectra." The address was illustrated by spectrograms and photographs taken by light of different wave-lengths by means of appropriate filters. These revealed the surprising importance of methane as responsible for most of the conspicuous features in the telescopic appearance of the major planets. The results of recent searches for water vapor and oxygen on Mars and Venus gave little encouragement to those who speculate on the possibilities of life on the two terrestrial planets Mars and Venus.

Many of those in attendance on the section enjoyed the address of the retiring president of the American Association in Music Hall on Monday evening, when Professor Henry Norris Russell spoke on "The Atmospheres of the Planets."

The Tuesday morning session was held by invitation of Director F. C. Jordan at the Allegheny Observatory. Papers were presented varying in interest from "Optical Tests of the 20-inch Refractor of the Van Vleck Observatory" to a discussion of the variability in the transmission time of transatlantic time signals. After a full program the section adjourned at noon and inspected the work and equipment of Allegheny Observatory, the outstanding center of astronomical interest in the vicinity of Pittsburgh.

SECTION ON GEOLOGY AND GEOGRAPHY (E)

(Report from Kirtley F. Mather)

Many of the fellows of the Geological Society of America, which had been in session in Rochester, New York, from December 27 to 29, joined with the members of the Section on Geology and Geography in four sessions which were held on Monday and Tuesday, under the chairmanship of Professor James B. Macelwane (St. Louis University), vice-president of the section. The Monday afternoon meeting was a joint session with the Section on Astronomy. Abstracts of all papers presented will be published in February in the *Proceedings* of the Geological Society of America. On Monday evening a well-attended dinner was held in Webster Hall, at which Dr. George H. Ashley (state geologist of Pennsylvania) delivered an address concerning "Evolution and the Moral Order."

The address of the retiring vice-president, Professor Rollin T. Chamberlin (University of Chicago), dealt with certain aspects of geologic classification and correlation, stressing especially the problems of demarcation of the limits of the several eras of earth history. Several of the papers delivered on Monday morning were devoted to seismology. Those by N. H. Heck and H. E. McComb (U. S. Coast and Geodetic Survey) described the major earthquakes and the equipment of the seismograph stations in the Appalachian

Region. These papers and the extended discussion which followed them showed that the recently renewed interest in seismology in this region has already resulted in vast improvement in the equipment available for observations.

The majority of the papers presented on Tuesday were devoted to the consideration of stratigraphic and structural problems of the Appalachian region. Charles R. Fettke (Carnegie Institute of Technology) reported the results of the correlation of data secured in deep wells drilled in Pennsylvania and New York; B. L. Miller (Lehigh University) called attention to numerous unsolved problems in the geology of eastern Pennsylvania; H. M. Fridley (West Virginia University) and R. E. Sherrill (University of Pittsburgh) described the relation between the slope of peneplains and the regional dip of the Allegheny plateau.

Considerable interest was manifested in the discussion of a paper by W. H. Hobbs (University of Michigan) in which stress was placed upon the efficiency of the sand blast as an agent of erosion in the zone peripheral to the retreating ice sheets of each stage of the Glacial Period. Sidman P. Poole (Syracuse University) presented a study of Merida, Venezuela, from the point of view of the geographer, and I. W. Jones (Quebec Bureau of Mines) described the geology of north central Gaspé.

SECTION ON ZOOLOGICAL SCIENCES (F)

(Reports from George R. LaRue, H. B. Goodrich, H. B. Hungerford, A. I. Bourne, H. W. Stunkard, Lawrence E. Hicks)

The Section on Zoological Sciences held joint sessions with the American Society of Zoologists and affiliated societies from Thursday to Saturday. The annual dinner of the zoologists, held on Friday night at the University Club, drew a large attendance. Dr. George L. Streeter, Carnegie Institution, gave the after-dinner address on the subject, "The Education of an Anatomist." He discussed the education of four great anatomists, Aristotle, Vesalius, John Hunter and Franklin P. Mall. In their training he found no common denominator and concluded that great anatomists are born, not made. The complete address will be published in SCIENCE.

The American Society of Zoologists held its thirty-second annual meeting from December 27 to 29. The special features of the program were: (1) A symposium on "Mitosis," in which the following invitational papers were given: "The Morphology of the Mitotic Spindle," by Franz Schrader; "Modifications on Mitosis in Merogony and Gynogenesis," by Gerhard Fankhauser; "Differential Behavior of the Mitotic Figure in the Cleaving Insect Egg," by Alfred F. Huettner; and "Factors Influencing Chromosome Movements in Mitosis," by Charles W. Metz. About 300 were in attendance at the symposium. (2) There were two special sessions of invited papers, one a joint meeting with the American Society of Parasitologists on the "Immunological Relations between Host and Parasite." The second session was arranged by Dr. Robert Chambers, on "Cellular Physiology." The discussion was led by Dr. L. V. Heilbrunn. The regular sessions on "Embryology" and on "Endocrinology" attracted especial attention. The demonstration program on Friday afternoon, although not extensive, showed an advance over preceding programs in the attention given by the exhibitors to methods of display.

The zoologists held a joint dinner with the Wilson Ornithological Club, with an attendance of about 275. The address of the evening was given by Dr. George L. Streeter, vice-president of the Section on Zoological Sciences, on "The Education of an Anatomist." This was followed by the Biologists' Smoker, with probably over five hundred in attendance. The following were elected officers of the American Society of Zoologists for 1935: *President,* R. W. Hegner; *vice-president,* Sewall Wright.

The Entomological Society of America held its twenty-ninth annual meeting on Thursday, Friday and Saturday mornings. During the regular two days session there were presented twenty-five papers dealing with entomological research and a symposium entitled "Improved Technique in the Study of Insects." Nearly an entire day was devoted to the symposium, which proved to be the most interesting and profitable one the society has ever held. Each of ten major divisions of the subject was presented by a well-known specialist, who reported the recent worthwhile methods developed in his field and illustrated technique and equipment by drawings and displays. There was an unusual number of interesting papers on insect physiology.

The Saturday morning session was a joint meeting with the Ecological Society of America, during which twelve papers dealing with insect ecology were read. The annual address was given by Dr. C. H. Kennedy (Ohio State University), who spoke on "The Family and the Society." Taking for his purpose the thesis that the family represents the flow of energy from parent to offspring, Dr. Kennedy compared man and the insect in this regard and not to the discredit of certain insects. His discourse was a remarkable analysis of the relationship of parent to offspring in various groups. This annual address, as well as the general sessions of the society, was unusually well attended. The presiding officer at the Pittsburgh meeting was President C. L. Metcalf. Officers for 1935 are: *President,* C. H. Kennedy; *first vice-presi-*

dent, Leonard Haseman; *second vice-president,* W. T. M. Forbes; *secretary-treasurer,* H. B. Hungerford.

The program of the American Association of Economic Entomologists extended from Thursday through Saturday. The opening day was devoted chiefly to the programs of the three sections of Plant Quarantine, Extension and Apiculture, but was featured by the presentation of the annual address of the president in a general session. Brief reports were made of the three branch meetings during the year and also the Entomological Society of Ontario, Northern Central States Entomologists and Texas Entomology Society.

Friday afternoon was devoted to a program of invitation papers, summarizing the outstanding entomological features of the year.

The closing session on Saturday was devoted to a symposium on "International Entomological Problems," with addresses by Dr. A. W. Gibson (dominion entomologist of Canada), Dr. A. Dampf (government entomologist of Mexico) and Dr. L. A. Strong (chief of the U. S. Bureau of Entomology and Plant Quarantine).

Approximately 90 papers were submitted to be read in the general session. The financial condition of the association showed a gain over the previous year. Fifty-nine new members entered the association as associate members. The attendance proved very steady throughout the entire program and was approximately 300, including members and visitors. L. A. Strong, chief of the U. S. Bureau of Entomology and Plant Quarantine, Washington, D. C., was elected president.

The American Society of Parasitologists held its tenth annual meeting on Thursday, Friday and Saturday, under the presidency of Professor E. E. Tyzzer. The program contained 54 titles, 32 of which were presented either orally or by demonstration. The Thursday program consisted of papers on helminthology and protozoology, reporting researches on the morphology, life history, physiology and control of the parasites concerned. On Friday morning the society met in a joint session with the American Society of Zoologists; the program consisted of six invited papers dealing with various aspects of susceptibility and resistance to infection by animal parasites. Each of the speakers reported results of his own research and their bearing on the problem of immunity to parasitic infections. The discussion after the papers was led by Dr. W. W. Cort. Following the joint program the presidential address was given by Professor Tyzzer, who spoke on "Viewpoints and Orientation in Parasitology." This address will be published in the February, 1935, number of the *Journal of Parasitology.* At noon the society met for the annual luncheon and business meeting. Friday afternoon was reserved for the annual demonstration program, an outstanding feature of the meeting, and one that has received increasing attention in recent years. The demonstrations presented studies on the morphology, developmental cycles, taxonomy and pathology of various Protozoa, flatworms, nematodes and Acanthocephala. The Saturday morning program was devoted to papers of medical importance and diseases caused or transmitted by arthropods. In a special invited paper, Dr. Cornelius B. Philip, Rocky Mountain Laboratory, U. S. Public Health Service, reported on the 1934 epidemic of tick-borne tularemia in Montana sheep.

At the annual business meeting the following officers were elected for 1935: *President,* Colonel Chas. F. Craig; *vice-president,* H. J. Van Cleave; *council members for four years,* J. E. Ackert and W. W. Cort. The *secretary,* H. W. Stunkard, and *treasurer,* Justin Andrews, were reelected for two-year terms.

The Wilson Ornithological Club held its twentieth annual meeting in the Carnegie Museum on December 28 and 29; some 39 papers were presented covering nearly every phase of ornithological activity. The problems involved in explaining the distribution of breeding birds received special attention: a paper by W. E. Clyde Todd (Carnegie Museum) included maps of the breeding birds of Pennsylvania, one by Dr. Lawrence E. Hicks (Ohio State University) maps of the breeding birds of Ohio, and Maurice Brooks (University of West Virginia) discussed the Canadian component of the breeding birds of West Virginia. Another theme developed was the conservation of raptorial birds—hawks and owls. Warren F. Eaton (National Association of Audubon Societies) and Mrs. Charles N. Edge (Emergency Conservation Committee) reported on the securing as a refuge of Hawk Mountain in Pennsylvania, a lonely mountain ridge where for decades hunters have yearly slaughtered many thousands of the most valuable raptorial birds.

Exploration trips were reported upon with the aid of lantern slides or motion pictures. Dr. George M. Sutton (Cornell University) told of expeditions to British Columbia, Southampton Island and Churchill on Hudson Bay, and Margaret M. Nice of ornithological discoveries made in Europe. William C. Baker spoke of rare birds in Northern Michigan and Bayard H. Christy reviewed the bird life of Lake Superior. Robert A. Johnson and A. A. Myrus reviewed discoveries made in Labrador and along the Atlantic Coast. Albert F. Ganier presented a map of the nesting of the Bald Eagle in the Mississippi Valley and Edward A. McIlhenny excellent motion pictures of the countless thousands of blue geese, southern egrets and other waterfowl inhabiting the Louisiana

marshes. Dr. T. Gilbert Pearson stressed the appalling shortage of waterfowl as revealed in a survey of the Atlantic Coastal Waters.

Methods of bird study were again emphasized. Dr. S. Charles Kendeigh, of Western Reserve University, explained the best known methods of recording the abundance of birds. Ruth Trimble reported on the scientific bird study collections and Reinhold L. Fricke on the bird cases loaned for school use by the Carnegie Museum. John W. Handlin told of a remarkable experiment in bird study in West Virginia, which included an attendance of more than 50,000 persons on weekly bird hikes during the last eight years. E. L. Dakan, of Ohio State University, led a discussion of the problems involved in supervising university courses in ornithology. Charles J. Spiker reviewed the ornithological program in the United States national parks.

Dr. Gordon Wilson and Bayard H. Christy reviewed the life of Alexander Wilson, the father of American ornithology, and exhibited a fine collection of Wilsoniana assembled at the museum. Dr. Lawrence E. Hicks and Charles A. Dambach reported on the extent the European starlings captured in their studies compete with native bird life. More technical studies presented were of bird parasites by Edward S. Thomas, of the Ohio State Museum, observations on the blood of birds by Dr. Leonard B. Nice, of Ohio State University, and experiments on the resistance of pheasants and quail to cold and starvation by Paul L. Errington, of Iowa State College.

The meeting included also business sessions, exhibits, special entertainments, the annual dinner on Friday evening, an open house and reception at the Carnegie Museum on Saturday evening and a field trip on Sunday.

SECTION ON BOTANICAL SCIENCES (G)

(Reports from S. F. Trelease, L. C. Petry, E. F. Hopkins, F. C. Meier, A. E. Murneek, H. M. Fitzpatrick, Edgar T. Wherry)

The Section on Botanical Sciences met in joint session with associated societies on Friday afternoon. More than three hundred botanists attended this unusually interesting session. Dr. K. M. Wiegand delivered the retiring vice-presidential address for the section, his subject being "A Taxonomist's Experience with Hybrids in the Wild." This address was followed by a program of invitation papers. Dr. John T. Buchholz spoke on the relation of pollen-tube growth to the genetics of Datura. Dr. F. W. Went discussed experimental evidence on the rôle of hormones in plant growth. K. A. Ryerson gave an interesting illustrated talk on plant trails in North Africa.

The Botanical Society of America held its twenty-ninth annual meeting on Thursday, Friday and Saturday. The reading of papers before the sessions of the three sections occupied the forenoons.

The Thursday morning program of the general section consisted principally of papers dealing with plant anatomy. On Thursday afternoon the general and systematic sections met in a joint session with the Ecological Society of America and the physiological section met with the American Society of Plant Physiologists. On Thursday evening an informal and unscheduled round table discussion of "The Origin of the Angiosperms," led by Dr. H. Hamshaw Thomas (Cambridge University), was held, in which Dr. Thomas developed a theory of the origin of floral parts based upon his studies of plants of the lower Mesozoic age. The Friday morning program consisted of papers on cytology and flower morphology, together with two papers on other subjects. On Friday afternoon the society met jointly with the section and on Saturday afternoon with the American Society of Naturalists, the American Society of Zoologists and the Genetics Society of America, the program consisting of a symposium in "Cytogenetic Evolutionary Processes and Their Bearing on Evolution Theory." At the Saturday morning session papers on morphology, paleobotany and plant geography were presented.

The sessions of the physiological section for the presentation of papers were well attended. Abstracts of these papers are published in the December number of the *American Journal of Botany*. In addition to the sessions for contributed papers a joint meeting was held with the American Society of Plant Physiologists on Thursday afternoon: the program was a symposium on "Plant Hormones." This symposium was well attended and much interest was shown in the program, as indicated by the animated discussion which followed. The four invited speakers presented various sides of the hormone problem. Officers of the physiological section elected for 1935 are: *Chairman,* Sophia H. Eckerson; *vice-chairman,* Arthur J. Heinicke; *secretary-treasurer,* Edwin F. Hopkins.

The program of the systematic section on Thursday morning was a symposium on "The Status of Systematic Botany in American Colleges and Universities." The meeting was well attended and the reading of the papers was followed by extended discussion. The program on Friday morning consisted of contributed papers. At the Saturday morning session, two papers were presented; the section then adjourned to the Carnegie Museum, where the herbarium and plant habitat groups in the Hall of Botany were inspected, under the leadership of O. E. Jennings, curator. The following officers of the systematic section for 1935 were elected: *Chairman,* J. M. Greenman; *secretary,* R. E. Woodson, Jr.

The annual dinner for all botanists was held on

Friday evening with an attendance of 272. Dr. O. E. Jennings, local representative of the society and chairman of the systematic section, presided and introduced the retiring president, Dr. E. D. Merrill, of the New York Botanical Garden, who spoke on "Mental Excursions." The excursions referred to were into the fields of related sciences, and the speaker demonstrated by pertinent examples the value of such excursions in checking and correcting conclusions otherwise apparently acceptable.

The American Phytopathological Society held its twenty-sixth annual meeting from Thursday through Saturday with exceptionally good attendance from all parts of the country. Forty-three new members were elected, bringing the membership to 798. The following officers were elected: *President,* H. T. Gussow; *vice-president,* F. C. Meier; *secretary,* H. P. Barss; *treasurer* of the society and *business manager* of *Phytopathology,* H. A. Edson; *editor in chief* of *Phytopathology,* H. B. Humphrey; *councilor,* J. C. Walker. One hundred and ten papers were presented at the meeting. Two joint sessions were held, one with the Mycological Society of America, the other with the Section on Botanical Sciences. A special session on extension work in plant pathology called attention to responsibilities of plant pathologists in the present agricultural program. The annual dinner was attended by 243 persons.

The eleventh annual meeting of the American Society of Plant Physiologists, under the presidency of Dr. Burton E. Livingston, held four regular sessions, a joint session with the American Society for Horticultural Science and a symposium on "Plant Hormones" in cooperation with the physiological section of the Botanical Society of America. Forty-four papers were presented at the regular sessions and six at the joint session.

At the Plant Physiologists' dinner on Thursday evening Dr. F. M. Andrews read a memorial address prepared by Dr. Francis E. Lloyd on "Karl Ritter von Goebel." Dr. C. O. Appleman announced the election of Dr. F. F. Blackman to Charles Reid Barnes life membership and C. F. Hottes presented to Dr. C. A. Shull the Stephen Hales Prize Award of the society.

At the first regular session for the reading of scientific papers C. G. Barr and W. E. Loomis reported that the soluble reserve carbohydrates in vegetative corn plants are of dextrin-like nature. J. F. Trost found that soft and hard corn endosperms differ in the type of starch they contain. J. D. Sayre and V. H. Morris emphasized that in analyzing corn plants careful sampling and replications must be used to minimize differences due to inherent variability and the effects of environmental factors. In a second paper the same authors discussed a method of measuring the extent of corn root systems by the use of lithium salts placed in the soil between rows of plants. A third paper by these authors dealt with the accumulation and concentration of mineral elements in corn as affected by fertilizer treatment. C. E. Hartt presented evidence supporting the view that reducing sugars are the primary sugars in photosynthesis in sugar cane and that with maximum radiation they are produced in excess of the amount used for the formation of sucrose and starch. Invertase synthesizes sucrose in sugar cane, and the formation of this enzyme is favored by light of moderate intensity. M. G. Groner found that the more chlorophyll a corn plant contains the lower the amino nitrogen content in water extract of the leaves. J. C. Ireland reported on use of the photronic colorimeter in determination of chlorophyll content in sorghum. D. S. Francis and P. S. Hanshaw noted changes in radio-sensitivity of wheat seedlings as the interval from soaking to irradiation increased. L. C. Chesley stated that wheat and oat seedlings sprouted in light are less sensitive to x-rays than dark-sprouted seedlings.

The joint session with the American Society for Horticultural Science was devoted primarily to reading of physiological papers of horticultural interest. E. M. Emmert reported on the value of tests for nutrients in conducting tissues as indicators of the nutritional status in horticultural crops. L. R. Carolus showed illustrative evidence of symptoms of magnesium deficiency in horticultural plants and presented data on the value of magnesium fertilizers for the improvement of quality and increase of yield of certain vegetable crops. Further studies of little leaf or rosette of fruit trees were discussed by W. H. Chandler, D. R. Hoagland and P. L. Hibbard. W. F. Loehwing outlined methods of inducing sex-reversal in certain dioecious species, along with modifications of nitrogen, carbohydrates and mineral metabolism accompanying sex-reversal. P. J. Kramer presented results of experiments which indicate that the rate of growth and the beginning and ending of dormancy of seedlings of several species of forest trees may be affected by the length of day. And H. O. Werner described the effects of temperature, photoperiod and nitrogen level upon tuberization in the potato, emphasizing the inter-relation of these three environmental factors.

At the Saturday morning session E. S. Johnston reported on the sensitivity and double maximum phototropic response curve of the coleoptile of *Avena sativa.* R. B. Withrow described the effects of intensity and wave-length of artificial supplemental radiation on flowering of several horticultural plants, while R. Wenger stated that maximum and earliest flowering of *Aster* occurred when a supplementary illumination (Mazda lamps) of an intensity of 0.3 candle

power was given the plants. J. C. Carroll found that the concentration of inorganic nitrogen in Kentucky blue grass was affected by application of different carriers of nitrogen and that cold resistance of lawn grasses was increased by heavy applications of nitrogen fertilizers. C. P. Sideris, B. Krauss and H. Y. Young presented their studies on the distribution of nitrates in different tissues of the leaves and stems of pineapple plants, which seem to indicate that nitrates disappear more readily as they enter the chlorophyllous tissues of the leaves than those of the stem. N. W. Stuart discussed certain sources of error in the determination of amino nitrogen in plant extracts by the Van Slyke method. In a preliminary report E. V. Miller and Charles Brooks stated that reductase activity, expressed as rate of reduction of potassium permanganate by aqueous extracts of the peel, was lowest in lemons stored at 40° and highest at 50° F. S. V. Eaton noted that the main symptoms of sulfur deficiency in the soybean are yellow-green color and smaller size of the leaves and thinner stems. The probable effects of lack of sulfur in the nutrient medium on metabolism of this plant were discussed. W. H. Horr found that when *Aspergillus niger* and *Penicillium glaucum* were cultured on a mineral nutrient containing 1 per cent. dextrose, 1 per cent. levulose or 1 per cent. manose with 1 per cent. galactose there was a decided acceleration in development as compared to growth on media containing 2 per cent. of any one of these sugars.

The Saturday afternoon and evening sessions were devoted to continuation of reading of papers. J. T. Sullivan described a new method of estimation of starch in woody plants, which is based upon its extraction from finely ground plant material by means of boiling calcium chloride solution. D. R. Goddard dealt with certain phases of activation and correlated respiratory changes in the ascospores of *Neurospora tetrasperma*. H. A. Runnels presented data on the effects of Bordeaux mixture and other spray materials on transpiration of a great variety of plants, with detailed discussion on the nature of the response. M. A. Raines found that the elongation of young radicles of many plants is subject to a large variety of gross and minor environmental factors. J. S. Cooley reported that the percentage of infectibility of apple roots with *Xylaria mali* is influenced by the season of the year when inoculation is made, with a maximum in April and May. W. E. Loomis and L. M. Ewan emphasized that in soil the direction of root growth is determined more by gravity than by moisture supply. D. E. H. Frear described a photoelectric apparatus for measuring leaf area and F. M. Andrews stated that living nuclei of plant cells may be stained with the coloring water-soluble substances that are present in other plant cells. G. A. Greathouse and N. W. Stuart discussed the biochemical differences between hardy and non-hardy clover plants and the influence of sub-zero temperature on the freezable-unfreezable water equilibrium in plant tissues. F. H. Steinmetz analyzed the nature of winter injury to apple trees in Maine. J. P. Bennett found that the lower the temperature at which potato tubers were stored the more rapid was the loss of both electrolytes and non-electrolytes when the tissue was placed in water. Z. I. Kertesz and B. R. Nebel proposed a physico-hydrostatic theory of cracking of cherries and M. B. Linford discussed the relationship between number and weight of fruitlets, flesh translucence and quality of pineapples. The thermo-electric method of measuring osmotic potentials in plant tissues was emphasized by B. S. Meyer and E. M. Herrick, and W. E. Tottingham and R. Nagy suggested that the peculiar blackening of cooked potatoes apparently is due to oxidation of tyrosine and tryptophane to melanin pigments. G. M. Shear and N. A. Pettinger showed the effects of soil reaction on growth of ornamental plants but could not find a relationship between available calcium and frenching of tobacco. W. E. Loomis and N. L. Noecker reported that dandelions in lawns can be eradicated by spraying the lawns with petroleum distillates or distillate furfural emulsions. The program was concluded by a humorous and entertaining address by P. A. Young on microscopic observations on forming and breaking creosoap emulsions of petroleum oils.

The Mycological Society of America held its third annual meeting from December 27 to 29, with President Herbert S. Jackson of Toronto University in the chair. At the business meeting reports presented by the secretary-treasurer and managing editor of *Mycologia* showed the society and its journal to be in sound financial condition. The membership is growing slowly. New officers elected for 1935 are: B. O. Dodge, *president;* John Dearness, *vice-president;* and C. L. Shear, *councilor*. The council reelected J. A. Stevenson to serve an additional five-year term as associate editor of *Mycologia*. A report was read by the president calling attention to the outstanding success of the summer foray held at Seventh Lake, N. Y., in the Adirondacks in August and expressing appreciation of the hospitality of Professor F. C. Stewart and Mrs. Stewart on that occasion. A committee was named to draft an expression of regret at the loss by death during the year of Thomas H. Macbride, Frank L. Stevens, Mrs. Esther Lewis and Charles E. Fairman. Joint sessions were held with the Section on Botanical Sciences and the American Phytopathological Society. Saturday afternoon was set aside for the display of exhibits and the explanation of demonstrations of research materials. The papers read at the regular sessions dealt with many groups of fungi and

displayed a wide and diverse interest. Outstanding contributions were made by S. M. Pady on intracellular mycelium in the rusts, H. S. Jackson and J. W. Sinden on Heterobasidiomycetes, W. R. Hatch on Allomyces, John E. Sass on the presence of a Golgi apparatus in the basidium, Alex. H. Smith on the genus Mycena, and P. L. Rusden on the development of certain Gasteromycetes. Several students read papers in the field of medical mycology.

The American Fern Society met on Saturday afternoon. Four papers were presented, three on the distribution of ferns in Pennsylvania, and one on the climbing fern and its discovery by John Bartram.

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

(*Reports from E. W. Lindstrom, A. G. Vestal, P. W. Whiting, J. E. Ackert, J. G. Needham*)

The Biologists' Smoker, sponsored by the American Society of Naturalists, was held on Friday evening at the University Club. An unusual number of participants, estimated at 650, necessitated the use of two large halls.

On Saturday afternoon the annual Naturalists' symposium drew together an audience of over 300. Vice-President E. B. Babcock presided, the subject being "Cytogenetic Evolutionary Processes and Their Bearing on Evolution Theory." Dr. R. A. Brink, speaking on the botanical phases of the problem, showed how amphidiploidy, changes in chromosome number not involving the whole genom and structural changes of the chromosomes, all were capable of causing evolutionary changes in plants. Dr. M. Demerec spoke on "The Rôle of Genes in Evolution," a critical analysis of gene behavior which was shown to be consistent with modern interpretations of evolutionary methods. The third paper, by Dr. C. L. Fenton, on "Factors of Evolution in Fossil Series," was read by the secretary. Paleontological discoveries, particularly involving brachiopod series of fossils, were interpreted in terms of modern genetics. Stability of the genotype, evolutionary change with relaxation of natural selection pressure, polyploidy and even gene mutations of shell ornament and physiology were suggestively illustrated with fossil series.

The annual Naturalists' dinner, held on Saturday evening, was one of the most successful in recent years, with an attendance of 142. Dr. C. E. McClung gave a short paper on "Evolution of the Chromosome Concept," a historical analysis of the part played by the earlier workers in cytology as they bore on the modern developments. The retiring president of the Naturalists, Dr. A. Franklin Shull, followed with a brilliant critique of evolutionary concepts under the title of "Weismann and Haeckel; One Hundred Years." Using modern genetic concepts as a base, Dr. Shull subjected old and new hypotheses of evolutionary change to a critical scrutiny, in which certain theories of variation and especially of adaptation were attributed to wishful thinking.

The twentieth annual meeting of the Ecological Society of America began on Thursday morning with an account of water-content of leaves of the California buckeye by Dr. Delzie Demaree. He found no simple correlations with fluctuations of external conditions. Dr. M. T. Townsend gave methods for following migrations and the wandering tendency of small mammals from sex ratios of individuals trapped. Dr. A. G. Vestal emphasized the value of vegetation-components in addition to the usual units (plant associations) for analyzing mixed or compound vegetation. Dr. Ada Hayden showed the great plasticity of two Iowa species of Polygonum, and described their economic rôles. Dr. S. Charles Kendeigh gave results of a long-continued study of biological and environmental factors affecting yearly abundance of the eastern house wren.

The Thursday afternoon joint program of ecologists and botanists included data from Dr. Demaree and from Dr. Edith A. Purer, showing that many plants, particularly in regions with a long dry season, do absorb water in usable amounts by means of their above-ground parts, contrary to long-maintained belief of botanists. Dr. A. P. Dachnowski-Stokes described peat lands as effective reservoirs of rainfall and water supplies, regulating stream-flow and preventing too great lowering of ground-water levels. Preservation of these areas and their native vegetation is urged. Homer A. Jack showed that mats of the reindeer lichen intercept all moisture from rains not exceeding 0.12 inches. Miss Miriam Bomhard showed that Louisiana palmettos of both trunked and stemless types represent a single polymorphic species. Professor Herbert C. Hanson presented a study of resistance to erosion by native plant cover types in the badlands of western North Dakota. Two studies of gypsum vegetation in New Mexico were offered by Professor Fred W. Emerson, who described the White Sands of the Alamogordo desert east of the San Andreas Mountains, and by Dr. R. S. Campbell, in the Jornada experimental range west of the San Andreas. At the ecologists' dinner at the University Club on Thursday evening, announcement was made of a Festschrift number of *Ecology* in honor of Professor Henry C. Cowles.

Friday morning was devoted to a session of three long papers. Dr. George D. Fuller gave the first, his address as president of the Ecological Society, on "Post-glacial Vegetation of the Lake Michigan Region," based on recent pollen-analysis studies. Dr. C. Skottsberg, of Göteborg, Sweden, next described the northernmost rain forest of Chile, occupying part of

a mountain range in chaparral or semi-desert surroundings. Dr. William S. Cooper showed pictures, many from the air, of sand dunes of the Pacific coast and their vegetation, from the Coos Bay district to Sonora.

On Friday afternoon a joint session with the Society of American Foresters began with a motion-picture account of the Forest Research Institute, Dehra Dun, United Provinces, India, by Dr. R. Maclagan Gorrie. Dr. Robert B. Gordon presented an ecological survey of the Allegany State Park, for which comparison with early records was possible. Dr. Lewis M. Turner emphasized the influence of topographic and soil factors on growth of pines in Southern Arkansas. Professor George E. Nichols showed that white pine is a normal constituent of climax forests in the Huron Mountains of northern Michigan. Individual pines come up in openings, grow well and persist for hundreds of years. Dr. C. F. Korstian gave results of trenched-plot experiments in the North Carolina forests, which confirm the idea that soil moisture may be of greater moment than light in forest competition. A. L. McComb showed that white pine stands in northwestern Pennsylvania usually originated on open sites. Professor A. H. Wright spoke of nature preserves for special purposes which too greatly subordinate other purposes, and made a plea for custody of ecological preserves by universities or science organizations.

At the business session, Dr. Walter Penn Taylor (U. S. Biological Survey) was elected president for 1935, and Dr. E. Lucy Braun (University of Cincinnati), vice-president. Among the resolutions adopted was one for preservation of peat areas for water conservation and as part of the nation's economic program of keeping submarginal lands out of cultivation.

On Saturday morning a joint session with the Entomological Society of America included papers on inorganic salts as influencing growth of experimental insect populations, by Ralph J. Bushnell; effect of nutrition on development of a cockroach, by R. M. Melampy; and the ecological antagonism exerted by bots of the horse toward worm parasites, by Robert D. Glasgow. Dr. Walter Carter described the microscopic internal symbionts of a scale insect of the pineapple, and showed a relation between different stages of the symbiont and degrees of injury worked upon the host plant in spots surrounding punctures made by the insect. D. M. DeLong discussed ecological factors affecting distribution of Empoasca. F. Martin Brown showed attempts to correlate insect distribution in Mexico and Central America with climatic zones. A. E. Emerson showed how two closely similar species of British Guiana termites were first distinguished by their having different beetle associates. Gordon W. Haug discussed ant populations in Mississippi. A. A. Granovsky demonstrated means of combating the white grub menace to new tree plantings in Minnesota. Orlando Park described apparatus for recording activity of nocturnal insects and determining whether rhythm in activity is environmental or inherent. Such studies upon a fungus-feeding beetle, Megalodachne, by Park and Otto Sejba, were also reported. Saturday afternoon an ecologists' field trip went to Crouse's Run, north of Pittsburgh, under the guidance of Dr. Otto E. Jennings, of the Carnegie Museum.

The Genetics Society of America held its third winter meeting at the Pennsylvania College for Women with regular sessions for the reading of papers on Thursday, Friday and Saturday mornings. Demonstrations were held on Friday afternoon at the University of Pittsburgh. Interest centered about cytogenetics, with especial emphasis on salivary gland chromosomes showing localization of genes by means of breaks and rearrangements and especially by minute deletions.

The American Microscopical Society held its fifty-third annual meeting on Saturday. The following officers were elected for 1935: *President,* Professor J. E. Guberlet; *first vice-president,* Professor F. D. Heald; *second vice-president,* Dr. R. L. King; *treasurer* (3 years), Professor A. M. Chickering; *elective member of executive committee* (3 years), Professor H. W. Stunkard. J. E. Guberlet and J. E. Ackert were named to represent the society in the council of the American Association. The society is continuing its cooperation with *Biological Abstracts* in furnishing authors' abstracts of the papers published in the *Transactions of the American Microscopical Society.*

The special program on hydrobiology and aquiculture listed seventeen papers discussing algae, lake plankton, insect emergence, propagation of Daphnia and of midge larvae, bottom faunas, and other subjects of interest to students of inland waters, and concluded with a very interesting movie illustrating the biology of the blue crab. There was much interest shown by the large audience that stayed throughout a rather lengthy session.

SECTION ON ANTHROPOLOGY (H)

(Report from Wilton Marion Krogman)

The section held joint sessions with the American Anthropological Association and the American Folk-Lore Society, from December 27 to 29. An outstanding event of the sessions was the opportunity to discuss with Commissioner John Collier, of the Bureau of Indian Affairs, problems of rehabilitation of the Indians of the United States as contained or implied in the Wheeler-Howard Act. The commissioner voiced the necessity of a more complete knowledge of

Indian culture as a prerequisite to wise and just administration, and stressed the fact that readjustment must be in accord with Indian tradition and culture. The several organizations went on record as approving in principle the legislative policies outlined and pledging their cooperation in the adjudication of detailed problems.

Professor Griffith Taylor presented his "Zones and Strata" theory of human migration, applying ecological principles to the evolution of racial types of man and the spread of his culture. It was pointed out that, if Asia be accepted as a point of origin, there are three principal avenues of cultural spread: Eur-Africa, Oceania (Malaya-Australia) and the Americas. These avenues were utilized in order with the result that, stratigraphically speaking, the Negroids and their variants are basic and earliest, with the round-headed populations—Alpine and Mongoloid —superimposed and latest. Professor Taylor's hypotheses, while not accepted in detail, were recognized as a contribution in methodology which may lead to a better understanding of racial movements.

In a round-table discussion of stone hatchets and their variants Professor Warren K. Moorehead announced the results of his study of distribution-areas of stone implements of the American Indian. He recognized two Mound Culture areas—northern and southern—the former dominated by Hopewell and Fort Ancient culture complexes, the latter by Caddoan and Etowahan. Mr. Frederick Johnson elaborated upon the general theme by presenting a detailed method of classifying stone cutting-tools under two main divisions—chopping and planing.

The session of the American Folk-Lore Society centered upon the theme of the rôle of folk-lore in the interpretation of cultural contact, and in the elucidation of native elements still resident in an otherwise sophisticated community. Mrs. Elsie Clews Parsons, in a discussion of Indian elements among Zapotecan folk-tales, made the pertinent observation that the more stylized, the more ceremonialized, a given culture, the less likelihood that generalized folk-elements will persist as traditional tales. In an analysis of Southwestern folksongs Dr. A. L. Campa demonstrated the possibility of analyzing Indian, Spanish and cowboy songs as evidence of differing cultural backgrounds.

At a symposium of problems of chronology in North America several papers were offered which throw light upon time and sequence of physical type and culture. Professor A. E. Jenks announced the recovery of fragmentary human remains associated with flint implements of the Yuma-Folsom type, at Brown's Valley, Minnesota. The time was assigned to the early Tintah stage of the outlet of the glacial Lake Agassiz—an indicated 8,000 to 12,000 years ago. The type, definitely American Indian, was assigned to the Algonkin Munsee. Miss Florence Hawley reported upon her study of dendrochronology in the Mississippi Valley, cooperating with the University of Chicago and the TVA. In the Norris Basin dating has been carried back to 1315 A.D.; in Kentucky back to 1638 A.D.

In a study of prehistoric relationships in the northern Mississippi Valley Thorne Deuel recognized the Woodland basic culture as being subdivided into Red Ochre, Central Basin and Tampico phases; the Mississippi basic culture was similarly subdivided into Upper (Fort Ancient), Middle (Cahokia and Aztalan) and Lower (Etowah and Moundsville). The sequence was as given, but relative time was not stated. Dr. W. A. Ritchie then presented his study of culture sequence and chronology in the New York area. The Archaic Algonkin, *ca.* 1000 B.C., were a long-headed people possessing a nomadic hunting and fishing culture. At about the beginning of the Christian era the Second Algonkin Period supervened, with a broader-headed semi-nomadic people, who introduced agriculture. At the beginning of this period an Eskimoid influence was felt; at its end Mound influence could be traced. About 1000 A.D. the Third Algonkin Period opened, soon to fall under the influence of the Iroquois (*ca.* 1300 A.D.), and ultimately that of the Whites (*ca.* 1600 A.D.).

The Saturday morning session of the section was devoted to physical anthropology. In a discussion of human hair Miss Madeline Kneberg demonstrated that hair form in microscopic cross-section is not dependent upon hair shape, *i.e.*, straightness, waviness, curliness or frizzled. Hair from the same head and sections from the same hair shaft revealed no correlations in cross-section. The necessity of a more critical technique was emphasized. K. B. M. Crooks reported upon a height-weight comparison of White and Negro male college students. Mr. Crooks presented evidence to show that despite a possibly less favorable economic environment which gets him off to a slower start, the Negro grows for a longer period so that ultimately his height-weight ratio compares very favorably with that of the White.

On Friday evening, Dr. T. Wingate Todd gave the address of the retiring vice-president on "Anthropology and Growth." The address will be published in SCIENCE. At the business session of the section Dr. N. C. Nelson was named as chairman for 1935.

SECTION ON PSYCHOLOGY (I)

(Report from John A. McGeoch)

The sessions of the section were held from Thursday to Saturday. The first session was devoted to papers on the measurement of personality traits and of intelligence. N. L. Hoopingarner described a

method of personality analysis which yields significant predictions of vocational success. H. H. Remmers reported that a number of experiments with generalized social attitude scales had yielded relatively high coefficients of validity and reliability and had shown these scales to be useful measuring instruments. Irving Lorge subjected the Bernreuter Personality Inventory to a critical analysis and concluded that certain of the supposedly fundamental inter-trait correlations were spurious. After a critical examination of procedure in aptitude testing, H. M. Johnson described a new and logically sound method. This method requires the formulation of all the concurrent demands which a worker must satisfy and the interchangeable skills by which they may be met. Only two classifications, success or failure, are possible. S. L. Pressey reported two studies of changes in interests and attitudes in large samplings over periods of 10 to 12 years. One notable change was in the direction of a liberalization of attitude toward certain moral and social problems. H. C. Lehman reviewed the methodological errors involved in equating fraternity and non-fraternity students. H. F. Dickenson found that secondary discriminative responses on intelligence tests were superior to primary ones.

There were two parallel sessions on Thursday afternoon, one on experimental and physiological psychology, the other on social and political psychology. In the session on experimental and physiological problems Gregory J. Schramm attempted to generalize the results of experimental work on emotions in a periodic table of emotional phases. Herbert Woodrow reported that in the discrimination of time intervals the effective standard is the resultant of the influence of two remote standards, *viz.*, the absolute indifference interval and an interval equal to the average length of the preceding series of intervals, upon the actually given first interval. Certain important relations between practise and the influence of remote standards were discovered. A report of the onset and development, during fetal life, of responses released by specific stimuli which are important in post-natal life because they are then concerned in the effective functioning of receptors was made by Leonard Carmichael. A total of 178 guinea-pig fetuses comprised the material. T. N. Salmon and A. F. Blakeslee found that individuals differ in taste sensitivity to phenylthio-carbamide from one time to another. The changes may occur within intervals as short as 15 minutes; they have not been correlated with environment or routine. A. F. Blakeslee and T. N. Salmon obtained wide individual differences in the taste thresholds of 47 subjects for 10 bitter substances. The discovery of high intercorrelations between different methods of scoring the galvanic skin response led W. A. Hunt to recommend that research should concentrate on an analysis of the response itself. W. H. Gantt and J. S. Light reported, in a paper of major theoretical importance, that, after exclusion of the efferent peripheral nerve and effector, these mechanisms are not essential for conditioned reflex formation. This points toward learning as a central phenomenon. In two series of experiments on the adaptation of cold and warmth to punctiform stimulation K. M. Dallenbach obtained the significant result that adaptation occurs in the temperature senses as well as in other modalities.

In the session on social and political psychology J. B. Maller gave an analysis of the psychological and social characteristics of political districts in New York City during the last presidential election and the last election of mayor. The districts carried by the Fusion party candidate were superior, by nearly all measures, to those carried by the Tammany candidate. Margaret Mead described the conditioning as social attitudes in a primitive Papuan-speaking tribe, the Arapesh of New Guinea, and the influence of early training upon adult behavior. From a study of the reaction of representative citizens to political party names and of response to party platforms, G. W. Hartmann concluded that there is a sharp discrepancy between what American citizens want and the political channels through which they seek to attain it. H. J. P. Schubert reviewed the vocational work program at the Transient Center at Buffalo and the characteristics of the men involved. A survey of the data on individual differences led David Wechsler to infer that the democratic assumption that, in so far as participation in government is concerned, all men may be considered practically equal is essentially correct. C. A. S. Dwight presented data from anthropology and social psychology upon the social and psychobiological significance of ceremony.

The Friday morning session was devoted to experimental and theoretical papers. A. L. Windsor and E. I. Strongin reported an antagonistic action of coffee and tobacco on psychological and physiological processes. T. L. McCulloch found that the learned response of discrimination of an intermediate weight by white rats is partly a function of the absolute magnitudes of the stimuli and partly of the relation of intermediateness, even though the relation was not sensorially present on any one trial. Results obtained by C. F. Scofield showed that the non-dominant eye in binocular vision has the greater neuromuscular efficiency. H. M. Johnson and G. E. Weigand found that, when subjects practised code substitution before retiring and soon after waking, the greater gains occur in the evening and are largely lost during sleep. These results led to new hypotheses concerning the nature of physiological impairment and its recovery during sleep. According to A. R. Lauer, a profile of

characteristics will give a better estimate of automobile-driving performance than will any one performance score or general index. James P. Porter, Ruth Schisler and C. E. Fiddler obtained average reliability coefficients of 0.487 for the right ear and 0.560 for the left in audiometer tests of school children. O. R. Reiser traced the sources of non-Aristotelian logic, stated the thesis of Korzybski and criticized certain of his conceptions.

The program of Friday afternoon was a joint symposium with the Section on Education, on theories of learning. (Report given by Section Q.)

On Friday evening, at a joint dinner with the Section on Education, the retiring vice-presidents of the two sections read their vice-presidential addresses. In his address on "Training, Practise and Mental Longevity," W. R. Miles brought together and interpreted in systematic fashion some of the significant results of work on later maturity. W. F. Dearborn, in his address on "The Mental and Physical Growth of School Children," summarized in an organized picture some of the results of the Harvard growth study.

The papers in the Saturday morning session were on child and educational psychology. P. H. Furfey reported that urban boys were consistently superior to rural boys on a developmental-age scale. John E. Anderson found, in an evaluation of four indices of linguistic development, that the indices were of small value for measuring individual performance but were valuable for measuring group differences. In a study of 16 cases of extreme linguistic disability in adults Grace M. Fernald was able to remove the disability completely by application of kinesthetic methods. Comparison of the judgments of two observers is a necessary check on the experimental use of the clinical method, according to the results of T. W. Richards and O. C. Irwin. V. H. Noll described a test for measuring scientific attitude and M. E. Wagner reviewed the methods and results of a how-to-study course for high-school juniors. T. G. Hegge reported positive results from individual training of seemingly untrainable mentally deficient reading cases.

SECTION ON SOCIAL AND ECONOMIC SCIENCES (K)

(Reports from James Ford, Wm. F. C. Nelson, Howard Richards)

The program for this section was planned largely for a popular audience, inasmuch as economists, statisticians and sociologists were holding their meetings at about the same time in another city. The first session, a joint meeting with the Section on Medical Sciences, was devoted to economic and sociological phases of medicine. The doctor's point of view on the problem of the cost of medical care was presented by Dr. A. H. Colwell (president-elect, Medical Society of Pennsylvania), and the economist's point of view was presented by Dr. Michael M. Davis (Julius Rosenwald Fund). Miss Dorothy G. Wiehl (Milbank Memorial Fund) presented an analysis of recent mortality statistics. The concluding paper dealt with the results of a statistical study on the effect of climate on pulmonary tuberculosis, by Alfred Cowles, 3rd (Cowles Commission for Research in Economics) and Dr. Edward N. Chapman (formerly secretary of the Colorado Foundation for Research in Tuberculosis).

On Saturday, the luncheon session was given over to the statistical record on the progress of world recovery. Five speakers discussed the record for, respectively, the United States, England and the British Commonwealth, Germany, the gold bloc nations and the Far East. Dr. Albert Einstein and the Honorable Henry A. Wallace were guests at the meeting. Secretary Wallace spoke briefly.

Under the general heading, "Contemporary Economic and Social Problems under the New Deal," five sessions were held on Monday and Tuesday. These sessions dealt with the housing problem, problems of economic control, the problem of economic security, problem of the consumer and economic planning. At the last-named session, Professor Wesley C. Mitchell, retiring vice-president of Section K, gave his vice-presidential address on "The Social Sciences and National Planning." Professor Mitchell urged the establishment of a permanent national planning board organized for a systematic consideration of social problems and how they may best be solved. Carl Snyder gave an illustrated talk on "The Invisible Hand of Adam Smith," in which he presented the results of his long-term measures of economic growth, pointing out the implications of this record in terms of attempts at planning. The socialist critique of planning in a capitalistic state was presented by Dr. Harry W. Laidler, executive secretary of the League for Industrial Democracy.

Considerable interest was manifested in the discussions of economic control. Assistant Secretary of State Francis B. Sayre presented a plea for the restoration of international trade and for the adoption of an American policy in accord with the realities of our position as a creditor nation. Assistant Secretary of Agriculture M. L. Wilson defended the policy of the Agricultural Adjustment Administration, showing how this policy was necessary to restore American agriculture to a position of parity with American industry. Professor Edward S. Mason (Harvard University) presented a vigorous attack on the administration of the National Industrial Recovery Act, observing that, since the Administration had no program of planning, industry through its trade organizations had been allowed to adopt restrictive measures under the guise of planning. His opinion was that it

would be exceedingly difficult to rid the country of this restrictive philosophy because of the vested interest created under NRA. Oswald Garrison Villard (contributing editor of *The Nation*) criticized the Administration's program on social security as nebulous and baffling in its constantly announced changes and made a plea for the adoption of a broad program of social insurance, pointing out the urgency of the problem.

The Econometric Society began its meetings at Pittsburgh with a joint session with the American Mathematical Society, the Mathematical Association of America and the Sections on Mathematics and on Social and Economic Sciences. At this session, which was held on Friday evening, the nature and limitations of statistical proof were considered. (Reported by the Section on Mathematics.)

In a session on Saturday morning, Professor Henry H. Pixley presented a study which showed how rents varied by size of town and by geographical regions. Other papers were presented by Max Sasuly and Dr. L. J. Paradiso.

On Saturday afternoon a joint session with the Section on Engineering was held on the subject, "Cost and Cost Theory." H. J. Titus (the Franklin Railway Supply Company) presented the first econometric study of railway data. He measured the importance of the various factors—mileage between stoppings, horse power, load, etc.—which determine depreciation rates for locomotives. Professor Dexter S. Kimball (Cornell University) presented a paper showing how the industrial engineer could be taught the significance of decreasing cost, diminishing return, etc. He said that many of the engineering failures of the present day might have been avoided if engineers had properly understood cost. Professor Roos gave the concluding paper, which was a study of labor and machine costs. He exhibited statistical studies showing difficulties arising from mandatory shorter work weeks. At the final session of the society, which was held on Saturday afternoon, Walter Keim (National Recovery Administration) presented a series of statistical studies which showed the flexibilities of various prices, magnitude of their responses to monetary developments and the sequence of changes or timing. Discussion of Mr. Keim's interesting paper lasted nearly two hours.

The annual meeting of the Metric Association was held at the Carnegie Institute of Technology on December 27. The program was completed with special emphasis on the following features: (1) *Commercial Standards.* C. E. Johanssen, the eminent authority on gages, and Wm. H. Scheer showed how the various nations had come to agree on a temperature of 20 degrees C. (68 degrees F.) for taking measurements and to accept the international meter as the basis for all linear measures. It was clearly brought out that the measures in customary use in this country are legally and practically based on the metric standards. The services of the International Bureau of Weights and Measures in maintaining the fundamental standards for all nations were highly commended. The change to the practical use of millimeters on the part of the Waltham Watch Company, the DeLaval Separator Company and other American manufacturers was heartily approved. (2) *Chemistry.* Professor J. H. Simons represented the American Chemical Society. He told how the chemists were not only using metric weights and measures but were spreading their use. (3) *Food Values, Calories, Prescriptions, etc.* Men and women interested in food values, dietetics, hospital and medical work discussed the problems involved in a complete change to the metric system. It was generally agreed by the members present that as accurate food calculations are now made in metric terms, labeling and merchandising should correspond to this procedure. This will do away with the confusion caused by the British and United States quarts, which differ from each other by more than 20 per cent., while the liter is the same throughout the world. Professor T. K. Kruse and Dr. Ira Hogg discussed the education of doctors, nurses and pharmacists with reference to the correct use of metric weights and measures. The use of the metric system was shown to be required in modern medicine. (4) *Calculations and Design.* W. R. Work (Carnegie Institute of Technology) spoke on "The Metric Basis for Electrical and Magnetic Units." He pointed out that one reason for the rapid progress of things electrical is their basis on international metric standards. (5) *Engineering.* Professor Stegeman (University of Pittsburgh) pointed out that the present is the best time to arrange for the change to the general use of metric weights and measures. Every year sees standardization more firmly effected by the various metric countries of the world. He heartily approved of American cooperation in such world-wide standardization, as this is good for American business and facilitates friendly relations with other countries.

The following officers were elected for 1935: *President,* W. R. Work; *vice-president,* Theodore H. Miller; *secretary,* Howard Richards; *treasurer,* James F. Martin. It was decided to resume the publication of *Measurement,* magazine of the Metric Association.

SECTION ON HISTORICAL AND PHILOLOGICAL SCIENCES (L)

(*Reports from Joseph Mayer and Charlotte Feazel*)

With the History of Science Society and the Linguistic Associations meeting elsewhere than in Pittsburgh this year, the sessions of the Section on Historical and Philological Sciences (L) were somewhat

restricted, although the papers submitted were unusually interesting and the number of members present highly gratifying, one session having an attendance of more than sixty.

The first session, held on Monday morning, dealt with historical topics having to do with scientific development in Colonial America, with the development of the Copernican system of planetary motion and with bibliographical material bearing upon the development of trigonometry. These subjects were presented in three papers; the first by Theodore Hornberger (University of Michigan). He challenged two prevalent notions about Colonial America with respect to scientific achievement; first, that the so-called New Science of the seventeenth century did not reach many Americans until well along in the eighteenth, and, second, that the reason for this retardation was the dominance in New England of Puritanism, amounting to a "virtual repudiation of science." Professor Hornberger based his refutation of these notions upon an examination of some 640 books written in the Colonial period by 33 New England clergymen, selecting four outstanding men as representative of the scientific thought of the period. The first of these was John Cotton (1585–1652), the author of "A Briefe Exposition upon Ecclesiastes" and other books which give evidence that the bourgeois spirit of Puritanism took account of the utilitarian possibilities of technological improvements instead of being antagonistic to the advance of natural knowledge. Next was Charles Morton (1626–1698), whose manuscript "Physics" showed that the Puritan faith in education favored the spread of science. Third, Cotton Mather (1663–1728), through his writings, "Brontologia Sacra," "The Christian Philosopher" and "Manductio ad Ministerium," showed that the Puritan idea of the pulpit as an instrument of edification was an important factor in the dissemination of scientific (as well as pseudo-scientific) information. The fourth writer, Jonathan Edwards, was presented by contrasting his "Dissertation Concerning the End for which God Created the World" with the "Exposition upon Ecclesiastes" of John Cotton, which had already been discussed. The comparison illustrated how the advance of science forced the most logical of the clergy to build a new metaphysical basis for their religion. From a study of these writings of American Puritans, Professor Hornberger concluded that science came early to America, influencing thought in New England from a very early period.

Professor Benjamin Ginzburg, in speaking of the scientific value of the Copernican induction, stated that the difference of approach between modern and ancient science was entirely a matter of a shift in an existing system of thought. To appreciate this, it is important to understand the method of Copernicus in arriving at his theory, because no new facts were involved in the passage from the Ptolemaic to the Copernican system. It has generally been thought that Copernicus adopted his theory because of its mathematical simplicity and that the physical proof for the heliocentric structure of the planetary system was established after his death. Dr. Ginzburg maintained that there was here no gain in mathematical simplicity, that the real difference was that Copernicus applied mathematical analysis to the astronomical facts in order to arrive at a physical theory of planetary motion, while Ptolemy borrowed extra-scientific considerations which did actual violence to the facts. Copernicus and Ptolemy both concerned themselves with the question of physical order, but the former answered it in modern fashion by separating the approach of science from that of religion, morals and other such disciplines.

Professor L. C. Karpinski pointed out that after the invention of the printing press the progress of science may be followed quite satisfactorily through the works which appeared in print. In arithmetic, Eugene Smith's "Rara Arithmetica" gives a remarkably complete list of arithmetical works to 1600; in the geometry of the seventeenth century, Dr. F. F. Kokomoor in *Isis* gives a list somewhat less complete; in general mathematics, the German topical history by Tropfke contains a notable list, but one which it is difficult to use for bibliographical purposes. In the early twentieth century, Avon Braunmühl contributed two volumes in the field of trigonometry which contain a substantial bibliography. Professor Karpinski, in concluding, presented a list of text-books on trigonometry, based primarily on the large collection of early mathematical works in the University of Michigan Library.

The Monday afternoon session was held jointly with the Engineering Section and pertained to the development of science and technology in Western Pennsylvania. Professor John W. Oliver, of the University of Pittsburgh, presented a general survey bearing upon this subject. He stated that aside from the strategic technographic and technonomic position occupied by Pittsburgh, which made it the focus of a seven years' war between France and England two centuries ago, the region possesses an abundance of natural resources in coal, iron ore, oil and a special grade of sand suitable for glass manufacture. Early in American history, industries were developed there, and by 1800 iron, glass, nails and leather goods were being fabricated on an extensive scale. Along with these industries came other scientific and technological developments. In 1812 companies were organized to manufacture chemicals, and one year later a society was formed in the interest of advancing the chemical and physical sciences. In fast succession came the

establishment of rolling mills, the manufacture of bromine, the improvement of the electric motor, clock and locomotive and advances in the science of spectroscopy. All these, the district of Western Pennsylvania developed before the Civil War. Since that time it has progressed even more remarkably along technological lines.

F. C. Hanker (Westinghouse Electric and Manufacturing Company) followed Professor Oliver by presenting developments in the electrical industry in Western Pennsylvania. This district, he pointed out, has contributed much to our social, industrial and economic life; power-supply networks through the introduction of the polyphase alternating current system, long-distance transmission through the development of the transformer, industrial induction motors and the steam turbine generating unit.

The final paper of this section, by Professor Harry S. Hower (Carnegie Institute of Technology), presented an interesting survey of the rise of the glass industry in the Pittsburgh district, describing the history, methods and improvements in glassmaking in that region. Special mention was made of astronomical telescopes, searchlight mirrors, lighthouse lenses, special colored glasses and the white diffusing glasses which are of importance in illuminating engineering.

SECTION ON ENGINEERING (M)

(Report from Vannevar Bush)

The activity of the Engineering Section is always severely limited by reason of the fact that the great engineering societies do not hold their annual conventions at the time and place of the association meeting. For this reason the principal benefit to be derived from the Section on Engineering meetings is a closer contact between scientists and those engineers who are present. The program is always adapted as far as possible to be of wide interest among engineering groups in the hope that many of the engineers who are resident will feel called upon to participate.

The principal feature this year was the evening address of the retiring vice-president, Dr. C. F. Kettering, before a large audience in Carnegie Music Hall. Dr. Kettering's address on "Some Future Problems of Science and Engineering" was full of suggestions, as is always the case when he speaks before a group of this sort.

The Engineering Smoker was held at the University Club at the conclusion of Dr. Kettering's address. Although not as largely attended as had been hoped, nevertheless as the first affair of the type ever held for these groups at an association meeting, the results were worth while. Patterned after the smokers which have been so valuable in the biological sections, it brought together scientists and engineers in an informal manner, and resulted in animated discussions in small groups. The physicists, mathematicians and chemists were invited, and it is much to be hoped that when the affair is repeated they will more fully grasp this opportunity to discuss interesting matters with engineers in the field. Dr. C. E. Skinner, chairman of the section, made all the arrangements for these events and presided.

The section had also a program on problems of stress distribution and plastic deformation in metals, held on Saturday morning. That afternoon the section joined with that on Social and Economic Sciences in a program on "Cost and Cost Theory." It also joined with the Section on Historical and Philological Sciences in a program on Monday devoted to the history of interesting technological developments. Joint sessions of this sort have proved well worth while, as they carry out excellently one of the fundamental objectives of the association.

SECTION ON MEDICAL SCIENCES (N)

(Reports from Earl B. McKinley, Albert L. Midgley)

The program of the section consisted of three symposia and one morning and one afternoon general session. Symposia were held on the mornings of December 27, 28 and 29 on "Poliomyelitis" and "The Chemistry and Metabolism of Sulfur-Containing Compounds of the Body." Papers dealing with general subjects were presented during the morning and afternoon sessions held on December 31.

At the symposium dealing with the poliomyelitis problem on Thursday morning Dr. Maurice Brodie (Department of Health of New York City) described the newer developments in connection with the production of active immunity against this disease. This group of investigators, during the past year, has prepared a vaccine which, when administered to experimental animals or to man, leads to the production of active immunity against the virus of this disease. This vaccine consists of the virus of poliomyelitis obtained from the infected spinal cord tissue of monkeys and treated with 0.1 per cent. formalin. Ten per cent. virus emulsion treated with 0.1 per cent. formalin seems to be the best. Of this vaccine five cubic centimeters are employed as an immunizing dose. Monkeys susceptible to this virus can be successfully immunized with this formalized tissue-virus suspension, and Dr. Brodie described recent experiments in which the vaccine had been administered to a series of 35 children and it was found that protective anti-bodies were produced within one week and reached their height within four weeks.

Similar studies on vaccination against the virus of poliomyelitis were described by Dr. John A. Kolmer (Philadelphia). His method is an elaboration and adaptation of a method originally described in 1927 by McKinley and Larson, who first treated poliomyelitis infected spinal cord tissue of monkeys with sodium ricinoleate, and with virus treated in this

manner these authors were able to successfully immunize completely three monkeys and one partially following intraperitoneal injections of the vaccine. Dr. Kolmer and Miss Rule described their more detailed experiments with this method and presented convincing evidence of the authenticity of their results. This vaccine has been employed in monkeys and also in a group of twenty-five children without ill effects, and Dr. Kolmer stated that protective antibodies were produced successfully. Contrary to the work reported by Brodie, in so far as dosage is concerned, Dr. Kolmer states that small doses of the vaccine as prepared by him, such as one half to two cubic centimeters, are sufficient for immunization. One to three of such doses are administered.

In addition to these two interesting papers on vaccination against poliomyelitis Dr. W. Lloyd Aycock (Harvard University) presented a paper on "The Application of Hereditary Factors in Poliomyelitis to the Study of Autarkiologic Susceptibility." This paper was followed by a presentation on "Experiments on the Specificity of the Neutralization Reaction in Poliomyelitis" by Dr. N. Paul Hudson (University of Chicago). By studying adsorptive properties of the neutralizing factor of "normal" and convalescent human serum to alumina-gel Hudson states that adsorption was effected at pH 6.5 and elution at pH 7.4.

The last paper in this symposium was presented by Randall L. Thompson and Dr. Earl B. McKinley (George Washington University), who reported the successful immunization of monkeys to poliomyelitis with *very minute* doses of live, unattenuated, poliomyelitis virus when mixed with the active virus of vaccinia and injected intracutaneously.

An unusually interesting symposium was held on Friday and Saturday mornings on "The Chemistry and Metabolism of Sulfur-containing Compounds of the Body" and their relationship to various medical problems, such as cancer, arthritis, muscular dystrophy and cystinuria. The symposium was opened with an introductory discussion by Professor H. B. Lewis (University of Michigan), who reviewed the chemistry of the sulfur compounds to be discussed during the symposium. Professor Lewis then noted recent developments in knowledge of the intermediary metabolism of cystine, cysteine, methionine and homocystine and the interrelationship of these compounds. Dr. Erwin Brand (New York State Psychiatric Institute) presented various experiments with cystinurics; he brought out the fact that methionine, homocysteine and cysteine yielded cystine in cystinurics, whereas homocystine and cystine did not. The central rôle that glutathione may possibly play in the various detoxication reactions of the body was also discussed. The fate of methionine in cystinurics was treated by Professor J. C. Andrews (University of Pennsylvania). He presented, in addition, some interesting studies on the adsorption of cystine and various of its derivatives from intestinal loops of dogs. Then came a very stimulating paper by Dr. Ben H. Nicolet (Department of Agriculture), in which he presented a novel mechanism for the synthesis of methionine by plants, based on the addition of methyl mercaptan to methylene pyruvic acid.

The first two papers on the second day program emphasized the rôle that sulfur compounds may play in cancer, although both papers were also of much significance from the standpoint of normal growth of tissues. In the first, Dr. Frederick S. Hammett (Lankenau Hospital) discussed the influence of sulfhydryl on cell proliferation and its possible significance in the cancer problem. The effect of the equilibrium between sulfide and sulfhydryl on protein synthesis and degradation was discussed by Dr. Carl Voegtlin (National Institute of Health). Anaerobic conditions were observed to favor proteolysis in tissue extracts, whereas under high oxygen tension proteolysis was inhibited. A greater sulfhydryl concentration was found in the anaerobic digests. This and other experiments indicated that the enzyme contains a reversibly oxidizable group, which in its oxidized state favors degradation and in its reduced state synthesis. After the presentation of these papers relating to cancer, Dr. M. X. Sullivan (Georgetown University) presented his findings with respect to the change in cystine content of the finger nails in arthritis. The cultural requirements of bacteria, particularly from the standpoint of methionine and cystine, were reported by Dr. J. Howard Mueller (Harvard University). Both amino-acids seem to be necessary for normal growth of bacteria in contrast to that of animals where it appears that either cystine or methionine will suffice. The symposium was closed by a discussion of the significance of sulfur to the chemistry of insulin and the post-pituitary hormones by Dr. du Vigneaud (George Washington University).

On Friday afternoon a joint session was held with the Section on Social and Economic Sciences on "Economic and Sociological Phases of Medicine." (Reported by Section K.)

On Monday, many papers on a wide range of subjects were presented. Dr. Andrew Wallhauser (University of Pittsburgh) discussed fungous organisms in medical diagnosis and pointed out the necessity of an intimate correlation of the clinical picture and mycological study of this group of organisms. Dr. R. C. Grauer and Dr. G. H. Robinson (Singer Research Laboratory) described two spontaneous mammary adenomas in white rats which were transplanted through eight generations and over a period of five years. Two papers dealing with different phases of the leprosy problem were presented, the first by Dr.

Frederick P. Gay (Columbia University), who spoke on "Unsolved Problems of Leprosy." He discussed the question of segregation of lepers, the infection of children with this disease, segregation of children from leprous parents at birth, the present status of the etiology of the disease and the question of specific therapy in the disease. The second paper was on "The Relationship of Human Leprosy and Rat Leprosy, a Study of Wild Rats Captured in the Culion Leper Colony," by Malcolm H. Soule (University of Michigan). Soule presented convincing evidence that, under natural conditions on the Island of Culion where thousands of lepers live, the wild rats do not develop the disease. Leland W. Parr (George Washington University) spoke on "The Succession of Colon-Aerogenes Forms in Stored Feces and its Significance for Sanitation and Pathology" and concluded that the variation in forms met with in his study is from the deficiency imposed by the conditions of storage and would not appear to be the arising *de novo* of a new form. Ruth R. Puffer (Tennessee State Department of Health) discussed the subject of "The Effect of the Distribution of Medical Service on Vital Statistics Data as Shown in Tennessee" and observed that the cleavage in the vital statistics data in urban and rural areas is great and is directly dependent on the distribution of the medical service. Dr. George L. Waldbott (Detroit) described a study on "So-called Thymic Death in the Light of Recent Investigations on Allergic Shock" and concluded that the so-called thymic constitution is identical with the allergic make-up. A paper on "The More Newly Recognized Causes of Sudden Heart Attacks" was presented by Dr. Louis F. Bishop (New York City). Dr. F. C. Messer and Dr. R. H. McClellan (St. Margaret Memorial Hospital, Pittsburgh) presented two papers dealing with their recent studies on the use of blow-fly maggots in the treatment of osteomyelitis wounds. Dean Charles B. Lipman (University of California) presented an important paper on his more recent studies concerning the longevity of bacteria. His studies would indicate that living bacterial forms are to be found in old soils stored in sealed containers from 25 to 65 years; that similar forms are to be isolated from adobe bricks removed from the interior of the walls of the California missions which are 112 to 150 years old; that bricks or consolidated mud from the Pueblos in Arizona (about 600 years old), bricks from the pyramids of Lima, Peru (about 1,400 years old), and from the pyramids in Mexico (1,000 years old) all contain similar bacterial forms which may be isolated on suitable laboratory media.

Monday afternoon several other papers were presented. Matilda M. Brooks (University of California) spoke on "The Mechanism of Methylene Blue Action in CO and CN Poisoning." John H. Hanks (George Washington University) presented a paper on "The Mechanism of Tuberculin Hypersensitiveness" and concluded that definite bacterial factors other than the sensitizing proteins are responsible for the production of the tuberculin type of hypersensitiveness. This was followed by a paper entitled "Demonstration of New Toxic Substances in Tuberculosis" by Dr. Gregory Shwartzman (Mount Sinai Hospital, New York City) who described new substances in tuberculin O.T. and B. *tuberculosis* culture filtrates which were capable of eliciting the hemorrhagic necrosis of the phenomenon of local skin reactivity, provided heterologous bacterial filtrates of high potency are used either for the intradermal or intravenous injection. Dr. Louis A. Julianelle (Washington University, St. Louis) presented a paper on "Studies on the Infectivity of Trachoma." He stated that the constitution and faulty or defective diet may be eliminated as causes or accessories in this disease; that trachoma is a local disease; that trachoma is infectious for monkeys; that it is not possible to transmit the disease to normal monkeys with organisms cultivated from lesions of the disease; that the infectious agent does not pass through Berkefeld filters in sufficient quantities at least to cause infection and that attempts to correlate infectivity of a given material with the presence or absence of the epithelial cell "inclusions" have been fruitless. A paper on "Recent Studies on Endemic Typhus" was presented by Dr. R. E. Dyer (National Institute of Health, Washington, D. C.), who stated that a reservoir of endemic typhus exists in nature in wild rats; that the disease is transmitted from rat to rat and rat to man by ectoparasites of the rat; that the rat flea, *Xenopsylla cheopis,* is probably the vector from rats to most of the human cases; that this flea is readily infectible experimentally and multiplication of the virus takes place in the flea, increasing several thousand fold in a few days. Dr. Dyer further stated that the disease is readily transmitted by the flea under experimental conditions. Further studies in immunity were reported by Dr. Reuben L. Kahn (University of Michigan), who stated the theory that the capacity for defensive responses to microorganisms has been developed by animals in their struggle for survival against these microorganisms through evolutionary ages.

At this point the section expressed its deep regret at the recent death of Dr. Allan Winter Rowe (Evans Memorial Hospital, Boston), who was to have presented a paper in this program.

Alden F. Roe (George Washington University) presented a paper on "Preserving Anaerobes by Desiccation" and showed that by his method of drying cultures all the aerobes in his experiments remained viable and most (98 per cent.) of the anaerobes remained viable after storing in a dry state for one year. Dr. R. H. McClellan and Dr. F. C. Messer

(St. Margaret Memorial Hospital, Pittsburgh) spoke on "Investigative Difficulties with Experimental Animals with Special Reference to Histo-Pathological Changes in the Liver." The final paper at this session was presented by Dr. Seth T. Walton (Health Department, Charlotte, N. C.), who spoke on "Studies on the Specific Characteristics of Syphilitic Blood Proteins."

For the third successive year the dental profession was represented actively in the affairs of the American Association through a program offered under the auspices of the American College of Dentists. The meeting opened with a very satisfactory attendance which was in excess of previous meetings.

At the morning session Dr. James L. Zemsky (New York City) with the use of lantern slides discussed "Further Study of Roentgenographically Negative Submerged Roots." Dr. J. Oppie McCall (Guggenheim Dental Clinic, New York City) delivered a paper entitled "The Modern Search for the Philosopher's Stone," which was illustrated by lantern slides. Dr. John S. Oartel (Pittsburgh) spoke on "Morphological Changes of Bacteria Induced by Ultra-Short Wave Radiation." A discussion entitled "Changes in the Dental Pulp and Surrounding Calcified Tissues," illustrated by lantern slides, was offered by Dr. Warren Willman (Chicago). "The Tripping Action of Bar Clasps—A Comparative Physical Analysis of Retentive and Stabilizing Functions of Clasps," amplified by the use of a lantern, was presented by Dr. Eugene R. Stone (Washington, D. C.). A presentation, "Rootless Teeth," by Drs. E. G. Meisel, J. C. Eselman and W. F. Swanson (University of Pittsburgh Dental Faculty) then engaged the attention of the audience.

In the afternoon a paper on "Motion Picture Studies of the Eruption of Teeth and Developmental Growth of the Face," illustrated by lantern slides, was presented by Dr. B. Holly Broadbent (Cleveland). Dr. L. E. Blauch (American Association of Dental Schools, Chicago) discussed "The Changing Dental Curriculum." Because of the present status of the dental curriculum Dr. Blauch's presentation was received with much interest and proved quite instructive. Dr. Raymond J. Nagle (Boston) offered a treatise of timely concern to the modern dental practitioner. He spoke on "Galvanism in the Mouth." "A Precise Quantitative Roentgeno-Densitometric Study of the Changes in Teeth Due to Attrition" was presented by Dr. Grant van Huysen (Rochester, N. Y.). Dr. Basil G. Bibby (Rochester, N. Y.) spoke on, and illustrated with the use of a lantern, "Variations in the Nature of the Enamel Surface." Dr. H. E. Friesell then read a paper prepared by Dr. John L. Boots (Seoul, Korea) on "A Chinese Skull of the Second Century." A delightful informal dinner was held at 6:30 P. M. at the University Club.

It is heartening to all actively interested in the new relationship to find a growing sense of responsibility on the part of our dental schools, educators and scientists in the solution of dentistry's problems, especially those pertaining to its biological phases—so closely related to good health. The program presented brought a realization that dentistry is no longer solely concerned in developing the mechanical aspects of its procedures. That older idea has been displaced by the newer effort to discover the nature of conditions, factors and influences that maintain health, that induce deficiency, or that afford the most effectual means to prevent, control or to cure disease.

SECTION ON AGRICULTURE (O)

(Reports from P. E. Brown, R. P. Thomas, H. B. Tukey, Wm. H. Martin)

The program arranged by the section consisted of a symposium on "Agricultural Planning," held in conjunction with the American Society of Agronomy and other affiliated societies on Friday, with an attendance of about eighty. The subject was opened by Dr. A. R. Mann, retiring chairman of the section, who discussed the agricultural significance of state and national planning in all its broad economic and social aspects. A paper by Dr. C. F. Marbut pointed out the necessity for land inventories and land classification as a basis for a planned agriculture, and H. H. Bennett emphasized the importance of erosion control in any plan for the future. Director V. R. Gardner called attention to the very specific problems which are involved in a consideration of a planned production as applied to tree fruits, and F. A. Silcox (Forest Service) presented a picture of the place which forestry must fill in future planning. Assistant Secretary of Agriculture M. L. Wilson discussed the administration views and plans for a balanced agriculture, in so far as these plans have been developed. E. N. Wentworth (Armour's Livestock Bureau) called attention to the difficulties of the packers and their views of the planning program. Gerald B. Thorne (Agricultural Adjustment Administration) discussed the livestock problems which must be met and solved for a safe and sound plan. C. D. Jackson (Bureau of Agricultural Economics) and P. A. Herbert (Michigan State College) presented the problems of taxation changes in relation to farm lands and forest lands, as affecting the development of a sound agricultural plan. The discussion by Secretary Wilson and others indicated that there is a general recognition of the fact that planning agriculture for the future must be most wisely and carefully done, with full consideration of the many variable factors involved.

The Northeastern Section of the American Society of Agronomy and the Potato Association of America held a joint session on Saturday morning. Dr. J. G. Lipman discussed the social and economic factors

relating to land use planning in the northeastern United States. The changes in population produced different types and kinds of farming than developed by the early settlers. It is doubtful if the use of machinery has reached its maximum for the greatest efficiency. If properly managed the commercial or corporation type of farming should be profitable in this section.

B. E. Brown reported the results of cooperative fertilizer tests with white potatoes. The average of three years' results in Virginia, New Jersey, New York, Ohio, Michigan and Maine showed that fertilizer placed in a band at the side of the potato seed was superior to be usual manner of fertilization. Professor J. S. Owens described the development of agronomic extension work from the experiment station research and teaching. Now the extension work is handled by a specialist who is too busy to keep up with the research and teaching problems. Dr. C. H. Myers discussed the coordination necessary between the research and extension agronomists. By necessity the work of the research worker precedes. But the number of people engaged in extension work and the money expended is greater than for research. As a result, new work is oftentimes passed out to the farmer before it has been sufficiently tested by the research man. On the other hand, the research worker is apt to submerge his findings or be very slow in passing them on for practical use. This could be best overcome by having the two classes of workers closely associated. Dr. E. Van Alstine discussed the many problems which the extension specialist, particularly the county agent, has to meet. Owing to the demands made upon these workers they can not make detailed tests or supply detailed information; they have to depend upon the extension service and experiment station for this information.

Saturday afternoon a symposium was held on the use and application of rapid soil tests. Professor S. D. Conner reported that lime, phosphorus and potassium tests were made upon the Indiana soils. Instructions for making these tests are given to any county agent or vocational agriculture teacher who desires such. The county agent is not encouraged to make the tests himself. The agronomy department at the university tests all soil samples received. Dr. F. G. Merkle discussed the use of rapid chemical tests on Pennsylvania soils. He reported results with a pH 5 sodium acetate solution. On the extracts of the soil with this solution calcium, potassium, aluminum, phosphorus, magnesium and manganese estimations are made. These tests are not recommended for county agents or similar workers. Dr. J. B. Hester reported the results of rapid soil tests on vegetable and truck soils of Virginia. He is using a pH 5 sodium acetate solution for extracting the soils. These tests are made at the experiment station and have saved the farmer many thousands of dollars. Dr. R. P. Thomas pointed out that the rapid chemical tests used on Maryland soils were a modification of Morgan's method. It is recommended that the samples be sent to the university for testing. These tests do not take the place of the fundamental soil research, though their use gives valuable information for making fertilizer recommendations.

The thirty-first annual meeting of the American Society for Horticultural Science was held in four sections, including a joint session with the American Society of Plant Physiologists and a joint session with the Potato Association of America. There were 186 papers presented, representing the largest number in the history of the organization. The general trend of research in horticultural problems continues largely along the lines of physiology. Among the topics of major interest were those of photosynthesis as affected by various field factors, the effect of external stimuli upon sex reversal in plants, soil moisture relations, the movement of water in the soil and throughout the growing plant, physiological problems of nut trees, developmental morphology of fruits and vegetables, limiting elements as factors in physiological disease, fruit-tree rootstocks, photoperiodism as affecting floricultural crops, ripening processes in fruits and vegetables and breeding of horticultural crops.

The address of the retiring president, Dr. J. R. Magness (U. S. Department of Agriculture), reviewed the relation of fruit trees to soil moisture. Director H. H. Zimmerley (Virginia Truck Crops Experiment Station) was elected president for the year 1935.

The twenty-first annual meeting of the Potato Association of America included a joint session, on Friday afternoon, with the American Society for Horticultural Science and one on Saturday morning with the Section on Agriculture and the Northeastern Section of the American Society of Agronomy.

Reporting on the effort being made in Canada to stabilize the potato industry, J. R. Tucker stated that very wide powers are included in the Natural Products Marketing Act of 1934, with a view to improving the methods and practises of marketing of natural products in Canada. Under this act, local boards may be set up; these boards do not actually market the product, but may regulate the marketing through channels already in operation, or otherwise, and may license dealers, register the growers, collect tolls, etc. It is intended that the scheme shall be entirely self-supporting. H. B. Tabb and H. G. Zuckerman discussed possible means of regulating the potato industry in the United States. Kris P. Bemis reported on the potato marketing agreements now being considered by certain of the southern states. A committee was appointed to work with other agencies in an attempt

to formulate a plan for the regulation of the potato industry.

The following officers were elected: *President,* J. B. R. Dickey (State College, Pennsylvania); *vice-president,* F. J. Stevenson (U. S. Department of Agriculture); *secretary-treasurer,* Wm. H. Martin (New Jersey Agricultural Experiment Station.)

SECTION ON EDUCATION (Q)

(Report from William S. Gray)

The opening session of the program was held jointly with the Section on Chemistry and the Division of Chemical Education of the American Chemical Society. The central theme was "The Rôle of Chemistry in Education." It is reported by the Section on Chemistry.

The second session was devoted to reports of various investigations relating to reading. A paper by G. A. Yoakam (University of Pittsburgh) showed that distinct progress has been made during recent years through research concerning the nature of study, the procedures adopted by pupils at different levels of advancement, and to some extent the relative effectiveness of these procedures. The possibility of improving the reading habits of children and adults was clearly demonstrated in the case of poor readers in public schools by Joseph Zubin (College of the City of New York) and in the case of college students by A. R. Lauer (Iowa State College). The rapid progress which is being made in the development of scientific techniques for use in diagnosing reading disabilities was emphasized by E. A. Betts (State Normal School, Oswego, New York), who described various visual tests which may be given through the use of telebinoculars, an adaptation of the stereoscope. Some of the factors which make for difficulty in reading materials for adults of limited education were discussed by William S. Gray (University of Chicago).

The joint session with the Section on Psychology was of peculiar interest to the members of both sections, being a symposium on psychological theories of learning. In discussing cortical dominance and learning, Mandel Sherman (University of Chicago) presented evidence showing that sub-cortical dominance prevails in the case of very young children. Gradually, however, cortical dominance is attained. Fundamental distinctions between the Gestalt and other theories of learning were discussed by Robert M. Ogden (Cornell University), who emphasized particularly the fact that the Gestalt psychology is concerned with behavior patterns which are fully integrated units. J. F. Dashiell (University of North Carolina) described three general types of learning, namely, the trial and error method, the conditioned response type and the Gestalt doctrine. He then presented ten common principles involved in experiments in these three fields, thus attempting to synthesize the learning theories involved. The final paper by Clark L. Hull (Yale University) made a plea for a more careful checking of hypotheses as a desirable means of extricating psychology from the conflicting theories which it now faces.

In harmony with the practise of other years, the program following the joint dinner with the Section on Psychology was limited to addresses presented by the retiring vice-presidents of the two sections. This program is reported by the Section on Psychology. The last two sessions were devoted to brief reports of scientific studies from members of the Section on Education. The studies varied from the survey of type of investigation to carefully controlled laboratory experiments. The wide variety of problems presented was impressive, indicating that practically every important phase of education is being studied to-day, critically and objectively.

ORGANIZATIONS RELATED TO THE ASSOCIATION AS A WHOLE

(Reports by Jennie Hall, Edward Ellery, H. R. Nelson, Agnes Z. Hill)

The American Nature Study Society opened its program on Thursday morning with a paper by Philip J. Hickey, showing how federal aid might serve to develop adult education. Nature and science education for the young of all levels was discussed in six different round tables. Dennis Cooper illustrated the work being done in the field of living things in the Detroit schools. Junior and senior high school were separately discussed under the leadership of Gordon Gillen and J. C. Amon (Pittsburgh), while discussions of "Outdoor Activities" and of "Teaching of Science Method" were guided by Wm. G. Vinal and E. V. Morrison, and discussion of "Research and Curriculum Construction" was led by George Green, at which meeting a report of progress of the research committee was given by Florence Billig. The program on Friday consisted of six addresses given by outstanding men in fields of science, who illustrated cycles of change in life and physical conditions. They were J. LeRoy Kay, J. H. Bradley, Jr., Henry Leighton, George D. Fuller, Wm. S. Cooper and Samuel H. Williams.

On Thursday evening a large group attended a dinner and an illustrated lecture by H. C. Bryant on the scenery of the Florida Everglades. An excellent exhibit illustrating the work of the public schools of Pittsburgh was arranged and displayed in a room adjoining the meeting rooms by John A. Hollinger and his staff.

Sigma Xi held its thirty-fifth annual convention on Friday afternoon. Delegates were present from forty-six of the sixty-four chapters, this being the largest representation of chapters at a convention of the society since 1928. Important items of busi-

ness were transacted as follows: The alumni committee reported contributions to the amount of $1,500 for grant-in-aid of research for 1935–36. The semi-centennial committee reported that the semi-centennial of the society would be celebrated in Ithaca in June, 1936, and that the program would consist of a history of the society during the last fifty years, an address on the accomplishments and future of the physical sciences, an address on the accomplishments and the future of the biological sciences and an address on the relation of science to the progress of human society; that the Cornell Chapter will entertain all the delegates and guests at a complimentary dinner; and that the society will publish a half-century record and history similar to the quarter-century record and history published in 1911. Charters for chapters were granted to Smith College in Northampton and Wesleyan University in Middletown, Conn.

Professor Dayton C. Miller (Case School of Applied Science) was elected a member of the executive committee for the ensuing five years, and C. E. Davies (secretary of the American Society of Mechanical Engineers) was elected a member of the alumni committee for the same period.

The Gamma Alpha Graduate Scientific Fraternity held its annual council meeting and convention on Friday and Saturday. Discussion of matters of policy centered around the report of a committee which has been investigating ways and means of increasing the usefulness of the fraternity to its members and to science in general. The report stressed the opinion of university presidents, deans of graduate schools and well-known scientists that the organization occupies a unique position among scientific societies and plays a valuable rôle in the various universities which have chapters. H. R. Nelson (Battelle Memorial Institute, Columbus, Ohio) was elected president and Professor Scott Mackay (University of Wisconsin) secretary.

Sigma Delta Epsilon, graduate women's scientific fraternity, held its annual business meeting on Thursday at which the following officers were elected: *President,* Helen Jean Brown (Ohio State University); *vice-presidents,* M. Helen Taylor (University of Illinois), Mrs. Zonya Wallen-Lawrence (University of Chicago); *secretary,* Margery C. Carlson (Northwestern); *treasurer,* Marion L. Dawson (Cornell). At the breakfast for women in science given on Saturday at the College Club, Miss Lucy Boyd spoke on "Women in Science in Scotland." Mrs. Leon H. Hetherington (Pittsburgh) made local arrangements and contributed much to the success of the meetings.

REPORT OF THE COMMITTEE ON GRANTS

Of forty-one applications considered, nineteen were approved by the committee. The following table gives the names of the applicants, their addresses and the sum determined upon in each case by the committee.

H. W. Anderson, University of Illinois	$ 425.00
Wallace R. Brode, Ohio State University (Provided, that the balance needed to purchase the spectrograph be raised by June 1, 1935)	200.00
Mrs. Betty Watt Brooks, Carnegie Museum, Pittsburgh	75.00
Laurence M. Dickerson, Lebanon, Tenn.	100.00
Carroll L. Fenton and Mildred A. Fenton, West Liberty, Iowa	100.00
Frank G. Hall, Duke University	200.00
Roy Hertz, Howard University Medical School	75.00
LaDema Mary Langdon, Goucher College, Baltimore, Md. (for supplies only)	50.00
Charles J. Lyon, Dartmouth College	50.00
Arthur H. Steinhaus, George Williams College, Chicago, Ill.	250.00
Arnold A. Zimmermann, University of Illinois, College of Medicine	200.00
Elizabeth Dyer, Women's College, University of Delaware	110.00
Ernest A. Spiegel, School of Medicine, Temple University	200.00
Allan C. G. Mitchell, New York University	100.00
George S. Avery, Jr., P. R. Burkholder and H. B. Creighton, Connecticut College (Provided, the glass filters are secured on or before June 1, 1935)	265.00
Reginald D. Manwell, Syracuse University	100.00
Herman D. Jones, Alabama Polytechnic Institute (Provided, this sum be used only for supplies, and not for salaries)	200.00
Ronald F. MacLennan, State College of Washington	200.00
David I. Abramson, Long Island College of Medicine	100.00
Total amount allotted to 19 applicants	$3,000.00

The report, signed by Carl E. Guthe, acting chairman, Committee on Grants, was on recommendation of the executive committee approved by the council.

FUTURE MEETINGS

Dates and places for future meetings have been arranged and announced as follows:

Minneapolis, Minnesota, Monday, June 24, 1935, to Saturday, June 29, 1935.

St. Louis, Missouri, Monday, December 30, 1935, to Saturday, January 4, 1936.

Rochester, New York, summer, 1936, with Semi-Centennial of Sigma Xi at Ithaca, N. Y., on one day.

Washington, D. C., Monday, December 28, 1936, to Saturday, January 2, 1937.

Denver, Colorado, summer, 1937. Joint meeting with Southwestern and Pacific Coast Divisions.

Indianapolis, Indiana, Monday, December 27, 1937, to Saturday, January 1, 1938.