SCIENCE

VOL. LIX MAY 2, 1924 No. 1531

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

THE SCIENCE PRESS

Lancaster, Pa. Garrison, N. Y.

New York City: Grand Central Terminal.

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.

Entered as second-class matter July 18, 1923, at the Post Office at Lancaster, Pa., under the Act of March 3, 1879.

THE HISTORY OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

II

MEETINGS

The Association of American Geologists and Naturalists held its closing session in the Library Room of the Academy of Natural Sciences of Philadelphia, at 10 a. m., September 28, 1848. The chairman was William B. Rogers, acting in place of President Amos Binney, deceased. The proposed constitution for the larger society was adopted. At four o'clock, in the College Hall of the University of Pennsylvania, the president-elect of the new organization, William C. Redfield, was introduced and the American Association for the Advancement of Science was formally declared.

The Proceedings of the Association, Volume I, tells the story of that first meeting; and a good account is also given in the *American Journal of Science* (6: 393–401).

The first day of the meeting was wholly in general session, with the presentation of papers. On the second day the association divided into the two sections provided for by the new rules. Louis Agassiz presided over the natural science section, and Joseph Henry over the physical science. Agassiz is credited with 11 papers at this meeting. A total of 56 titles, covering a wide range of interest, are listed in the *American Journal* (6: 393). At the second meeting, in Cambridge, 107 papers were presented.

Evidently there was interest and enthusiasm in the new and broader association, for in 1850 two meetings were held, in March at Charleston, S. C., and at New Haven in August. Two meetings were also held in 1851, at Cincinnati in May and at Albany in August. But no meeting was held in 1852, the one planned for Cleveland being deferred on account of the prevalence of cholera (7: 273). The number of the meetings and the corresponding number of the volumes of Proceedings do not agree with the calendar years.

In 1860 the civil war had begun, and the meeting proposed for Nashville in 1861 was postponed "for one year" (14: VIII), and meetings were not resumed until the end of the war. The first two meetings following the war, in Buffalo, 1866, and Burlington, Vermont, 1867, had the smallest attendance in the history of the association, 79 at the former meeting and 73 at

the latter. One cause of the small size of these meetings was the absence of members from the southern states. Not until 1877, at the Nashville meeting, did the association again become truly national.

The record of places of meeting, dates, registration and total membership is given complete for 66 meetings, to 1914, in the volume of summarized proceedings of 1915. The volume of 1921 omits this tabulation.

As early as the third meeting, March, 1850, the association went south to Charleston, and southwest to Cincinnati, in May, 1851. Canada was visited in 1857, at Montreal, but a second Canadian meeting was not held until 1889, at Toronto. In 1872 the association ventured as far west as Dubuque. The first southern meetings following the unfortunate interruption by the civil war, not only of the meetings but of the truly national character of the society, was in 1877, at Nashville, and in 1878 at St. Louis.

Not until 1887 did the association venture to invade the arena of the bulls and bears in New York City, although an invitation had been extended by Fernando Wood, the mayor, in 1857 (11: 171, 181). Plans were laid for a meeting in San Francisco in 1872, but they failed, and the meeting that year was in Dubuque. Not until 1901 was a meeting held west of the Mississippi valley, and then in Denver. Since then two summer meetings have been held in California, at San Francisco, 1915, and Los Angeles, 1923. The organization of the Pacific and the Southwestern Divisions has now removed the necessity of frequent far-west meetings of the entire association.

It is surprising that Philadelphia, the birthplace of the association, 1848, and of its grandparent society, 1840, was not paid a visit until 1884, an interval of 36 years. An invitation was given the association for 1876, an interval of 28 years. We may not suppose that Philadelphia was ashamed of its illustrious product. Probably the city was preoccupied with its commercial affairs and its local politics, and no sufficient hint was received that it should invite its progeny to a scientific family reunion. To nearly the present time the meetings of the association were held on invitation from the cities. Rarely has it been necessary to seek such invitation. On the contrary, the invitations have sometimes been so multiplied and so urgent that the permanent secretary and the council have had to be tactful and diplomatic.

The formalities of the opening sessions have always, and properly, emphasized the addresses of welcome on behalf of the entertaining cities. Many of these are printed in full in the proceedings. A very flattering compilation of the industries, excellencies and beauties of American cities could be gathered from the welcoming addresses.

As early as 1854 we find references to favors by the transportation companies, and in 1860 the form of railway certificate was published (14: 252). In 1856 the Atlantic steamships offered liberal concessions, which have been repeated in later years.

A feature of the meetings, with both social and scientific aspects, has been the excursions, local during the sessions, and longer following adjournment. Reduced rates, and often free transportation, have been given for extended trips. Following are a few examples: 1871, from Indianapolis to Kentucky and Mammoth Cave; 1872, from Dubuque across Iowa; 1877, from Nashville to Texas; 1878, from St. Louis to Colorado; 1889, from Boston to the White Mountains.

In 1902 the city of Pittsburgh raised $9,000 for the expense of excursions. The vast territory of the United States and Canada, with the great variety of scenic and geologic features and of resources, has made the extended excursions very attractive.

The early volumes of Proceedings are deficient in the incidental matters and social events of the meetings, which would interest us to-day. Fuller accounts begin with the reports of the general secretary, following the change in organization of 1874.

The dignified proceedings do not record the spontaneous events, peculiar incidents, accidents and disputes, which must sometimes have enlivened the meetings. For example, what was the trouble at the 11th meeting, 1857, at Montreal, with James Hall's presidential address? In volume 11, page 169, occurs the following resolution: "That a committee be appointed to wait upon the retiring president of the association and invite him to deliver his address at some proper time and place and under more favorable circumstances than those which existed at the social meeting of August 13." The record states that the address was given on Tuesday p. m., August 18. The meeting began Wednesday, August 12.

In the record of the Albany meeting, 1851, is a resolution which piques our curiosity: "Res., that considering the circumstances in which they were placed, the members of this association do entirely approve of the action of the standing committee of this year" (6: 402).

We are not informed of the occasion for the appointment of Joseph Henry as a special committee of one on "scientific ethics" (4: 391). Unfortunately for our scientific morals the subject was not elucidated by any report.

In 1883 (7: 274) twelve men were named to report on special topics, and the list was carried through four volumes. The absence of any mention of such reports suggests that men were just as busy, or just as dilatory, then as now. And it is very unfortunate that such reports were not prepared and published.

Similar reports were made to the British association during the earlier years, and were of the utmost value, not only in summarizing the knowledge to that time but as suggesting lines of desirable research.

Many volumes contain the long prayers which were delivered at the opening sessions. At Buffalo, in 1886, Bishop Coxe was scientific, and gave a preliminary description of his invocation, which had been compiled from the writings of an Alexandrian Jew of two centuries B. C. (35: 363). The sentimental general secretary adds: "On pronouncing the Lord's Prayer a quite general response was heard over the room."

The description of a favorite social function is given in volume 40, page 442.

For some years the more cheerful and irrepressible members held a humorous session at the close of the meeting, which was called "Section Q" but was never recognized in the official proceedings. To-day our Section Q is Education, a very proper substitute. In later years frivolity is crowded out by the great volume and intensity of serious matter. But the British Association once had its humorous appendage. In the early years the effervescent spirits had their "Red Lion Club."

> Forbes it was who gave them a species of constitution; their chairman became the Lion king; their new members on admission became cubs; the organizers of the arrangement, jackals. On rising to speak (or otherwise to entertain the company) they must roar and flourish their coat-tails as an introductory ritual; similar manifestations were prescribed to the audience as conveying applause or dissatisfaction.[3]

Occasional reference is made to the presence at the American meetings of eminent foreign visitors. Charles Lyell participated in the meeting of 1842. At the 25th meeting, 1876, Huxley made a brief address; and at the Montreal meeting of 1882, W. B. Carpenter read a paper on "The temperature of the Deep Sea."

Down to 1903 it was the expensive custom to print a separate program for each day's scientific and social events. That has become impossible with our larger and diversified meeting, and one comprehensive program covering the entire meeting, both of the association and of the many societies in conjunction, has proved satisfactory. These programs, on file in the office of the society, give much fuller accounts of the meeting than are found in the condensed reports of the secretaries.

[3]The British Association for the Advancement of Science, a Retrospect, 1831–1921. By O. J. R. Howarth, Secretary, London, 1922. The above quotation is from page 91. Some data relating to the British association, in later pages of the present writing, are derived from this interesting book.

In the earlier years it was the custom to hold general sessions of the whole association each morning, and sometimes in the afternoon, at which papers were read in addition to the administrative business. As late as 1900 business sessions were held in the morning, and to 1909 a session for business closed the meeting. When the association was small and many items of administration were handled by the association such sessions were not only necessary, but were desirable and helpful in both a scientific and a social way. As the association became larger and the administration was thrown on the council, with more time required for the science work, the general sessions were omitted except one at the beginning and one at the close of the meeting; and even the latter has been abandoned in recent years. Quite the only item of business now left to the general session is the passing on changes in the constitution.

The most radical change in the conduct of the association relates to the dates or season for holding the annual meetings. Previous to 1902 the 51 meetings were held in the summer, and mostly in August (except four very early ones in the spring). Beginning with December, 1902, they have been held in midwinter, during the holiday time. In order to hold the many technical societies in helpful relation to the association it was necessary to so plan the meetings in time and place as to secure cooperation and frequent convocations. The first of the large winter gatherings was in Washington, D. C., December 29, 1902, to January 3, 1903. Of this meeting the secretary reports: "One may assert with reasonable confidence that the gathering was the most representative and extensive which has ever been held under the auspices of any purely scientific association in this country, and stands in favorable comparison with any similar congress in other lands. . . . One may well affirm that the experiment of changing the time of meeting has proved a distinct success, and this is evident not only in the size of the gathering but in the characteristic features of the series of meetings as well." (52: 540).

The great convocations are held in the three cities of Washington, New York and Chicago, at four-year intervals, to which all national scientific societies are urgently invited. At the intervening even-numbered years the meetings are held in other large cities, to which the affiliated and associated societies are invited; while in the odd-numbered years the association meets in smaller cities, other societies being welcome, and some always present. Designation of places is made years in advance for the information of all societies. The success of this plan, which has evident difficulties, is, nevertheless, attested by the growth of the association in its membership, finances and influence during the past 20 years.

This difficult matter of time of meetings has often been discussed (53: 587–9), and has been ably considered in a recent report by a special committee, Dr. Cattell, chairman, made to the Boston meeting, 1922. This was printed in SCIENCE, volume 56, pages 616–620.

Older members recall the summer meetings with pleasure, and regret their passing. The thought was happily and humorously expressed by President Remsen at the first convocation.

> The scientific men of this country are to-day and this week making an experiment of national significance. To those who have been in the habit of attending the meetings of the American association, these meetings suggest summer excursions, rather hot weather, pleasant experiences in the open; they certainly do not suggest mid-winter. For the first time in its history, the association, at all events, meets in the winter time and in what is known, perhaps not to all, but certainly to the scientific men and university men of the country, as "Convocation Week." It has been found that the scientific men, the university and college teachers of the country, were hard put to it to pass their time between Christmas and New Year's day. It hung heavily on their hands. They were distressed. And so some of our good brethren got together and voted that we must have something to do; and they appointed the week in which the first of January occurs as "Convocation Week," in which we are all to come together and work, stop this idling and get rid of this sad period of the holidays. As I understand it, it is impossible for us, in the future, to think of spending the holidays with our families unless we bring our families with us, and sometimes there are difficulties in the way of that. This is the experiment we are making, and this is the first evidence of the results of that experiment. How it is going to work no one is able to say at the present time. We hope, however, that the meetings will be larger than in the past and that they will be fully as helpful and pleasant as in the past; though some of the features we have always had in mind as pertaining to the meetings of the American association will necessarily be lacking. (52: 556–557).

Much may be said for the summer meetings; the more favorable weather and cheerful travel; the opportunity for out-of-doors, excursions, garden parties, etc.; with the consequent social advantage. In this connection the summer meetings of the British association are always cited; but the comparison is unfair because of the wide difference in geographic and social conditions. It must be realized that the social pleasure of the old-time meetings was largely conditioned by the small attendance. Omitting a very few exceptional meetings, the registration to 1878 was usually less than 200, and to 1902 only a few hundred. The suggestion of two regular meetings every year is impracticable, for obvious reasons. Since 1902 five summer meetings have been held, with satisfaction to the few persons attending, and others are in prospect.

Summer meetings with their excursions and opportunity for field study were especially helpful to the natural science sections, and sections E, F and G may have suffered somewhat by the shift from summer to winter. However, there are compensating advantages. The winter meetings must have favored the other sections, as evidenced by the great increase in membership and attendance. It should be remembered that any section may hold independent meetings (52: 542), and they are desirable for the reason that smaller cities and isolated institutions can be visited which are unavailable for the whole association.

The article by Goode, mentioned in our first chapter, closes with a paragraph in italics that is interesting in this connection.

> A winter meeting would render it possible for all the kindred societies of specialists and professional workers to meet in connection with the American association, occasionally, or it may be each year. It would be a glorious occasion if, when the American association in 1898 enters upon the second half of its first century, it should have actually assumed its natural functions as the central agency for all American scientific effort. (40: 47).

The "glorious occasion" arrived in 1902, only four years beyond the date in Goode's prophetic conception.

With the shift from summer to winter the character of the annual meetings has changed conspicuously, in the greatly enlarged membership and registration, and the conjunction with many large technical societies. But the most important, if less evident, change lies in the scientific work of the association as related to the affiliated societies. During the first half century of its life the association was the national representative of science. Beginning about 1880 the stronger sciences, those dealing with material resources and related to commercialism, were outgrowing the facilities and financial limitations of the association and its sections. The chemists and the geologists were the first of the strong groups to set the example of separation. An early discussion of good and bad effects of the formation of special societies was made by the permanent secretary in his report for 1888 (37: 418–419).

The following statement gives the number of meetings in different cities:

Four times

Philadelphia, 1848, 1884, 1904, 1914
Washington, 1854, 1891, 1902, 1911.
Buffalo, 1866, 1876, 1886, 1896.
Boston, 1880, 1898, 1909, 1922.
New York, 1887, 1900, 1906, 1916.

Three times

Cincinnati, 1851, 1881, 1923.

Cleveland, 1853, 1888, 1912.
Baltimore, 1858, 1908, 1918.
Chicago, 1868, 1907, 1920.
St. Louis, 1878, 1903, 1919.

Two times

Albany, 1851, 1856.
Montreal, 1857, 1882.
Springfield, Mass., 1859, 1895.
Indianapolis, 1871, 1890.
Detroit, 1875, 1897.
Minneapolis, 1883, 1910.
Toronto, 1889, 1921.
Columbus, 1899, 1915.
Pittsburgh, 1902, 1917.

Once

Cambridge, 1849. Charleston, 1850. New Haven, 1850. Providence, 1855. Newport, 1860. Burlington, Vt., 1867. Salem, 1869. Troy, 1870. Dubuque, 1872. Portland, 1873. Hartford, 1874. Nashville, 1877. Saratoga, 1879. Ann Arbor, 1885. Rochester, 1892. Madison, 1893. Brooklyn, 1894. Denver, 1901. New Orleans, 1905. Ithaca, 1906. Hanover, 1908. Atlanta, 1913. San Francisco, 1915. Los Angeles, 1923.

Many important cities of America have not been visited by the association. The Pacific and the Southwestern divisions will feel responsible for the far-west and southwestern territory. Within the area left to the general association the following cities should be considered; while invitations would be welcomed from many other smaller cities.

For Winter Meetings

Birmingham	Mexico City	St. Paul,
Jersey City	Milwaukee	Toledo
Louisville	Newark	Wilmington.
Memphis	Richmond	

For Summer Meetings

Bridgeport,	New Bedford,	Syracuse,
Camden,	Omaha,	Trenton,
Des Moines,	Paterson,	Worcester,
Fall River,	Quebec,	Winnipeg,
Grand Rapids,	Reading,	Yonkers,
Lowell,	Scranton,	Youngstown.

Attendance.—We have no record of the registration at the first four meetings, nor of the seventh, at Cleveland, 1853. Omitting the two small meetings immediately after the civil war (Buffalo, 1866, and Burlington, Vermont, 1867), the registration of the remaining 45 summer meetings, to 1901, is grouped geographically as follows:

New England states, average of	9	meetings	380
Middle Atlantic states, average of	15	"	439
Central states, average of	12	"	284
Mississippi Valley states, average of	4	"	221
Southern states, average of	1	"	173
Far west states, average of	1	"	311
Canada, average of	3	"	570

21 winter meetings, beginning 1902, have had registration as follows:

New England states, average of	2	meetings	1,739
Middle Atlantic states, average of	9	"	1,125
Central states, average of	4	"	1,294
Mississippi Valley states, average of	3	"	595
Southern states, average of	2	"	342
Far West states, average of	0	"	0
Canada, average of	1	"	1,832

The largest registration of the summer meetings was at the second Philadelphia meeting, 1884, with 1,261, including 312 foreign guests. The first Boston meeting, in 1880, had a registration of 997.

Since 1913 five winter meetings have had registration exceeding 1,000, and two of them over 2,000. Chicago, in 1920, registered 2,412; but of this number only 1,383 were members of the association, 377 being from associated societies and 652 being guests. Our later meetings compare with the meetings of the British association, where 13 meetings in Scotland averaged 2,133, and 24 in northern England 1,955. Four meetings of the British association were over 3,000: Manchester, 3,838, in 1887; 3,138, in 1861; Newcastle-on-Tyne, 3,335, in 1863, and Liverpool, 3,181, in 1896. The large meetings of the British association are more justly compared with our winter convocations, taken as a whole, when only a portion of the attendance of the affiliated societies appears on the registration lists of the association. The total attendance at our greater convocations must far exceed the largest British registration.

One point of difference between the British and the American meeting is of importance. Our association has followed the "democratic" American custom of throwing all sessions open to the public without charge. The British association has been somewhat exclusive, and from its beginning their scientific and social functions have not been freely open to the public. Visitors, as local and temporary members, pay the regular annual charges. From the sale of membership tickets from 1848 to 1920 the British association realized the equivalent of over $705,000. One half of this was expended on grants for research. It may properly be questioned if our free gatherings are as well appreciated or as well attended as if they cost the visitor something. It is a trite saying, but true, that most people appreciate things in proportion to the cost.

During the great war the British association omitted meetings in 1917 and 1918. America being so far from the scene of conflict and relatively so little af-

fected, the American association dropped no meetings, but, on the contrary, the meetings were well attended. The demands of warfare were a stimulus to chemical and physical science.

Following the Columbus meeting of 1915, a special two-day meeting was held in Washington, in conjunction with the Pan-American Congress. This meeting is not listed with the series of annual meetings.

The delicate relation of the association to the technical societies and the difficult problem of meetings and of functions have been the subject of study by council and executive committee. Without hasty or radical action, but with patience and tolerance, the matter of the mutual relationship has been allowed to develop from year to year, and the present strength and influence of the association, as the general representative of science, and the success of the many societies in their special fields, appear to justify the conciliatory and laissez-faire policy.

The association claims as its field the whole of Pan-America. But it has never held a meeting south of New Orleans. In 1889, Professor Putnam proposed a meeting in Mexico (38: 481), and Brazil was favored by the council in 1913 (65: 464). In 1919, at Chicago, a committee was appointed "to cooperate with such organization as Mexican men of science may form." The Southwestern Division has carried the work to the Mexican border, and the El Paso meeting held a session across the boundary, in Juarez. It is hoped that the political conditions will soon admit of an organization in Mexico, and of association meetings in Mexico and Central America. It would be a happy event for science and for internationalism if a meeting could be arranged for some city in South America.

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(To be continued)

THE GROWTH OF LEGEND ABOUT SIR ISAAC NEWTON

(1) *The usual explanation of Newton's delay of about twenty years in announcing the law of gravitation* involves what appears to be one of the earliest legendary statements concerning Newton. In a publication issued the year after Newton's death, H. Pemberton[1] states that when Newton in 1666 first tested the gravitational hypothesis by applying it to the earth's attraction for the moon, he used too small a value for a degree of latitude on the surface of the earth (60 English miles instead of the more accurate value of 69½ miles obtained later by J. Picard) and found that "his computation did not answer expectation. On this account he laid aside for that time any further thoughts upon this matter." W. Whiston[2] refers to Pemberton's account and adds that Newton was "in some degree disappointed, . . . however, some time afterward," using 69½ such miles, he verified the law of gravitation. These accounts of the computation of 1665 or 1666 are in direct conflict with Newton's own statement[3] found by the astronomer Adams in the Portsmouth Collection of Newtonian manuscripts: "And the same year (1665) I began to think of gravity extending to y^e orb of the Moon and . . . I compared the force requisite to keep the Moon in her Orb with the force of gravity at the surface of the earth, and *found them answer pretty nearly.*" Newton does not state what value he took for a degree of latitude, but fairly accurate values were known at that time. Measurements of the earth had been made by Eratosthenes[4] and Posidonius[5] in the third century B. C., by the astronomers of Caliph Al-Mamun[6] in the ninth century A. D., by J. Fernel in 1528, W. Snell in 1617, R. Norwood in 1635. Most of these early measurements were in excess of the modern values, some by as much as 13½ per cent. On the other hand, it is true that English seamen used 60 miles to the degree; this was thought sufficiently accurate for their purposes. It was very convenient in computation, for 60 miles per degree of latitude meant one mile per minute. Thus R. Norwood[7] used 60 miles in his "Trigonometrie" of 1631, and again in the edition of 1678, notwithstanding the fact that he himself in 1635 had found the degree to exceed 69 miles. Moreover, Edmund Gunter and William Oughtred[8] call special attention to the inaccuracy of 60 miles. Gunter[9] says in 1624, "I find that we may allow 352000 feet [66 2/3 miles] to the degree." Oughtred[10] (we suspect from what he says,

[1] H. Pemberton, "View of Sir Isaac Newton's Philosophy," London, 1728, Preface; W. W. R. Ball, Essay on Newton's "Principia," London, 1893, p. 10; Sir David Brewster, "Memoirs of . . . Sir Isaac Newton," 2 Ed., Edinburgh, 1860, Chap. II, p. 23.

[2] Memoirs of the Life of Mr. William Whiston by himself, London, 1749, I, p. 35.

[3] W. W. R. Ball, *op. cit.*, p. 7.

[4] Sir Th. Heath, "History of Greek Mathematics," Vol. 2, Oxford, 1921, p. 107; Encyklopädie d. Math. Wissensch., Vol. VI, 1, 1907, p. 223.

[5] Sir Th. Heath, *op. cit.*, p. 220; Encyklopädie, Vol. VI, 1, 1907, p. 223.

[6] Encyklopädie, Vol. VI, 1, 1907, p. 224.

[7] Richard Norwood, "Trigonometrie," 1631, p. 102; edition of 1678, p. 147.

[8] Newton as a boy studied one of Oughtred's books and later commented favorably on Oughtred's plans for the education of navigators.

[9] "Works of Edmund Gunter," 5 Ed., London, 1673, p. 280, 281.

[10] W. Oughtred, "The Circles of Proportion," trans. into English by W. Forster, "Addition," London, 1633, p. 21, 27.