

CENTENARY OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

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Administrative Secretary

FROM September 13 until September 17 the American Association for the Advancement of Science will hold in Washington, D.C., the centennial celebration of its founding. It was born in Philadelphia, Pennsylvania, on September 20, 1848.

The A.A.A.S. (to use the customary abbreviation of the present time) owes much, particularly in its earlier years, to the pattern set by the British Association for the Advancement of Science, which was organised in 1831. There were still earlier scientific societies in Great Britain and also in the United States, but they were somewhat different in character. The American Philosophical Society of Philadelphia was formally organised by Benjamin Franklin in 1743, and the American Academy of Arts and Sciences was granted a charter in Boston in 1780. The first attempt at establishing a truly national scientific society in America was the launching in 1816, under political sponsorship, of the Columbian Institute for the Promotion of Arts and Sciences. It flashed like a meteor and soon disappeared. Some years later, in 1840, the National Institution for the Promotion of Science was established by an Act of Congress. In 1844 it held a meeting at which John Tyler, then president of the United States, delivered the opening address. Government officials of high rank served as chairmen of the scientific sessions, at which forty-three papers were presented. The Institution never held another meeting.

A few years earlier, in 1837, Dr. John Collins Warren, of Boston, had attended a meeting of the British Association. It impressed him so favourably that upon his return to America he actively began to promote the establishment of a similar society in the United States. The failures of grandiose plans on one hand, and the limitations and weaknesses of small special societies on the other, directed the attention of American men of science to the founding of a scientific society national in scope and embracing all the sciences. This culminated on September 20, 1848, in establishing the American Association for the Advancement of Science, with an initial membership of 461. At the first meeting about thirty papers and oral communications were presented before the "Section of Natural History, etc.", and about as many before the "Section of Physics, etc.", the two subdivisions of the Association at that time.

The first period in the existence of the A.A.A.S. extended from its founding in 1848 until the outbreak of the Civil War between the northern States and the southern States, in 1861. In this interval of fourteen years thirteen meetings were held in different cities in the eastern part of the United States, and one was held in Montreal, Canada. The two original Sections of the Association were gradually divided into more specialized fields. The membership varied from the initial 461 in 1848 to a maximum of 1,004 in 1854.

In 1861 the Civil War broke out, and for five years the A.A.A.S. held no meetings, it elected no presidents

or other officers, it issued no publications, and memories of its earlier meetings were dimmed. However, a meeting was held in 1866; but it was not such a meeting as earlier ones had been. The attendance was small, the papers presented were few, and the membership of the Association had declined below that with which it started. The conditions prevailed, generally, for about a decade, or until 1878.

In 1878 the membership of the Association was 962; in 1888 it had increased to 1,964, and it remained at about that level until 1900. Members of the A.A.A.S. were at its beginning and always have been on an annual basis, their dues being paid but once a year. Initially the dues were 1 dollar a year, but increased to 2 dollars in 1851, to 3 dollars in 1874, and finally to 5 dollars in 1920. Beginning with 1900 each member received with his membership a subscription for the weekly journal *Science*, and since 1915 a subscription for either *Science* or *The Scientific Monthly*. At the beginning of this calendar year (1948) the annual membership dues, including a subscription for either of the two journals, became 6.50 dollars a year.

An evolution in the structure and functions of the A.A.A.S. began in the closing decades of the nineteenth century and has continued until the present time. With the progressive specialization in science, the number of sections of the A.A.A.S. steadily increased. As their memberships grew they gave rise to the organisation of special societies—in mathematics, physics, geology, botany, etc. Many of these societies grew rapidly, and their memberships increased to such an extent that it became desirable for them to meet separately in order to obtain adequate accommodations in any American city. In a sense these developments appear to be the reverse of the integrations of science that were achieved when the Association was founded. But integrations of the sciences consist of something more than simultaneous meetings. The interrelations among them have been preserved by maintaining fifteen sections of the A.A.A.S., covering broadly all the principal sciences, the joint programmes of which with one another at the Association's meetings provide the cross-fertilization of ideas so important for vigorous scientific progress.

The outcome of this evolution in the organisation of American science has been a federation of co-operating scientific societies—the A.A.A.S. and its 207 affiliated and associated societies, the combined membership of which now totals several hundred thousands. Each of the 120 affiliated societies has either one or two representatives on the Council of the Association, who together constitute a large majority of the Council; the 87 associated societies are not represented on the Council. The affiliated and associated societies pay no membership fees or dues to the Association or fees for participating in its meetings. The harmony and co-operation of these many scientific societies in advancing science and human welfare present an inspiring example in a contentious and disordered world. It is the purpose of the A.A.A.S. to co-operate much more widely in the future with similar scientific societies in other countries and continents.

Now turning from a brief sketch of the evolution of the plans and ideals of the Association, the statistical story will be resumed, for it is the combination of both the principles and the practices of an organisation that measures its success. Membership statistics of the Association during its first half-

century have been sketched. In 1900 the total membership of the Association was 1,925. In that year the weekly journal *Science*, owned and edited by Dr. J. McKeen Cattell, became the official publication of the Association. By 1908 the membership had become approximately 8,000, and it remained about the same until the close of the First World War, after which it increased rapidly for a decade. It exceeded 15,000 in 1928 and 18,000 in 1938. Now it exceeds 40,000.

There has been a geographical expansion of science, as well as a great increase in the number of men of science, in the United States. In 1916 the Pacific Division of the Association was organised by members of the A.A.A.S. who lived in the great and now populous States on the Pacific coast, about three thousand miles from the large cities in the East and two thousand miles from those in the Middle West, the regions in which meetings were generally held. In 1920 the South-western Division was similarly organised for the convenience of members who live in the south-western States. These Divisions of the Association are wholly autonomous in the election of their officers, the organisation of their annual meetings, and their relations with other scientific societies in their respective areas. The Pacific Division now has more than 4,600 A.A.A.S. members and the South-western Division nearly 800.

Perhaps the most effective way of describing the current policies and activities of the A.A.A.S. is to present a few statistics of the meeting that it held in Chicago during December 26–31, 1947. Although registration at the meetings of the Association has not been generally required, there were 4,940 registrants at the Chicago meeting, each of whom received a general programme. There were, in addition, several thousand persons for whom programmes were not available. As an illustration of the number of men of science at the meeting from a limited field, the official tabulated attendance at the annual "Biologists' Smoker" was 5,575—substantially greater than the total registration from all fields.

There were registrants at the Chicago meeting from every one of the forty-eight States, and also from Alaska and Hawaii. There were seventy-three registrants from Canada, twenty-eight from India and fourteen from China. There were 105 registrants from California, about 2,000 miles westward from Chicago, and 102 from Massachusetts, about 1,000 miles in the opposite direction.

A total of 2,019 papers were on the programme, of which 1,809 were presented orally, 46 consisted of demonstration and informal discussions, and 164 were read by title only. They were distributed among 340 sessions, the maximum number held simultaneously being 41.

It should not be assumed from the large number of men of science attending the "Biologists' Smoker" that the meeting was dominated by biologists or by scientific workers from any other particular field. Nor should it be assumed that the number of men of science was small from the fields in which there are large special scientific societies (the American Chemical Society, for example, or the American Medical Association), which hold their own large meetings quite independently of other scientific societies. At the Chicago meeting of the Association 4,288 registrants recorded their fields of specialisation, in part, as follows: fields in which the special societies meet with the A.A.A.S.—zoology (822), biology (498), botany (903); fields in which the

special societies hold independent meetings—chemistry (678), physics (296), medical sciences (354), agriculture (176), education (100).

As a consequence of the large attendance at the Association's meetings of specialists from every field of science, it is possible to organise and hold joint symposium programmes on subjects that are not limited by the usual boundaries of the various sciences.

An important feature of the Chicago meeting of the A.A.A.S. last December was the address of Dr. James B. Conant, retiring president of the Association and the president of Harvard University, entitled "The Role of Science in Our Unique Society". There were also ten scholarly addresses by retiring vice-presidents of the Association which in general were surveys or summaries of the fields of science of the Association's sections of which they were the respective chairmen.

In addition to these official programmes, there were seven sessions for special lectures or discussions of various aspects of the role of science in human affairs. Finally, there were fifty symposia on broad sectors of science of high current interest and importance.

As the present officers of the Association look back over the century of progress in organised American science made by their predecessors they have only feelings of gratitude and admiration for the high ideals which moved them and the success which crowned their efforts. As the present officers look with anxiety toward the future they can only say (to paraphrase the closing words of Milton's "Paradise Lost") that all the world is before them and Providence their guide. To paraphrase the opening invocation to "Paradise Lost", they can only say, to the Heavenly Muse, what in us is dark, illumine, what is low, raise and support, that we may rise to the height of the great opportunities before us and justify our confidence in the powers of science to improve the lot of man.

ANTIBIOTIC ACTIVITY OF GROWTH-FACTOR ANALOGUES*

THE most striking reactions associated with the growth of micro-organisms are synthetic ones, particularly those concerned with protein synthesis. The synthesis of each compound is a stepwise process, each step being catalysed by an enzyme; if the necessary enzyme is in some way inhibited or has been lost during evolution of the organism, then growth will be slowed down or stopped unless the product of the reaction in which that enzyme was involved is now provided in the external environment. When the synthesis of a compound essential for growth is impossible through natural loss of an enzyme system, then that compound becomes for the organism a 'growth-factor'. By this term it is not meant to imply that the compound in question is not essential for those organisms which do not require it to be present in the external environment; all growth-factors investigated have been shown to be synthesized by a wide variety of organisms which do

* Based on a discussion held at the Royal Society on June 17. There took part in the discussion, which was opened by Sir Paul Flides, F.R.S., Dr. D. D. Woods, Dr. H. McIlwain, Dr. T. S. Work, Dr. H. N. Rydon and Dr. F. L. Rose; Dr. J. Walker, Dr. A. Albert and Prof. M. Stacey also contributed.