

SCIENCE

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AN INTERNATIONAL ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE American Association for the Advancement of Science will meet next year at Detroit, on the Canadian frontier, and will adjourn to Toronto to welcome the British Association to American territory. The British Association has acknowledged this courtesy by inviting the officers of our Association to attend the Toronto meeting as honorary members and by admitting all members and fellows of our Association as members for the meeting. The *Association française pour l'avancement des sciences* has proposed that it should meet at Boulogne in 1898 or 1899, and suggested to the British Association that it should meet at some town on the opposite coast, such as would allow an interchange of visits between the two Associations. This proposal was cordially welcomed, and the British Association will meet at Dover in 1899.

Within the past few years International Congresses for a number of the leading sciences have been organized. In nearly every case each new congress has been more successful and stimulating than the preceding, and the future growth of these congresses is assured. They are accomplishing a work, the importance of which

cannot be over estimated, not only by unifying scientific methods and contributing to the symmetrical progress of science, but also by bringing men of science from all parts of the world into personal contact. A further stage in scientific cooperation has been reached by the decision of the International Zoological and Physiological Congresses to meet together at Cambridge in 1898.

The time has now come when an International Congress for the Advancement of Science is possible. The cooperation between the British, French and American Associations; the successful international congresses in the separate sciences and for scientific bibliography; the establishment of journals, international in circulation, in contributions and even in editorship, are steps in a forward movement leading directly to a world's congress of men of science.

All the arguments that can be urged for national associations for the advancement of science, and for international congresses in the separate sciences, tell in favor of an international scientific congress. Cooperation furnishes both the means and the motive for scientific progress. As science becomes more complex the interrelation of all its parts becomes more evident. It would, indeed, be difficult to mention a scientific question that concerns one of the sciences only. Much good might come from the discussion of purely scientific problems by men approaching them from the most diverse points of view.

There are further many questions which may be regarded as external conditions of the progress of science which can only be settled by international cooperation. These

questions usually concern more than one science and often all the sciences. Such are bibliography, nomenclature, the definition of units, libraries and museums, explorations, the teaching of science and many more. Progress results from chance variations and the survival of the fittest, but in a manner wasteful of time and life in comparison with what may be accomplished by intelligent direction.

One of the great advantages of gatherings of men of science is the personal contact and acquaintance which they further. This is an important function of local and national societies and could be attained by an international association to a degree otherwise impossible. Such a meeting would be amply justified if only by bringing together the leaders in the different sciences from the different nations.

Now at the end of the nineteenth century science is the dominant factor in the world. It should be acknowledged as such if only for the more efficient performance of its work. An international congress would impress the collective weight of science on the outside world. If the money and men used in preparations for war could but for a few years be used for the advancement of science preparations for war would no longer be necessary.

The advantages of an international association for the advancement of science seem evident, and the difficulties seem slight. The first year of the twentieth century is opportune for the first meeting. Many men of science will be in Paris, and if London or Berlin should seem more eligible they could easily gather in one of these cities. The preliminary arrange-

ments could readily be made by the American and British Associations in 1797, and the final arrangements by the British and French Associations in 1899.

ADDRESS BEFORE SECTION B OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE BY THE VICE-PRESIDENT.

THE selection of a subject for presentation in an address such as I am called upon to deliver to-day, seems difficult. A large proportion of those who may listen to me to-day are workers in the same field which interests me and are familiar with the progress in the science of physics. It is, therefore, unlikely that I shall be able to present to you anything which may be new or startling; this I regret, for it seems that it requires something of this character to stimulate interest and research.

The aim of science in its most general sense, is the discovery of truths. Its progress may be expressed by a curve approaching truth asymptotically, probably never in human experience approaching to its *complete* knowledge. So long as investigators find that they are working upon the steep part of the curve where it approaches truth rapidly, there is no lack of interest; this, however, seems to die out quickly when much labor and great patience are required to extend experimentally the curve now more slowly approaching complete knowledge, or straighten out some of its irregularities. As soon as a startlingly new or curious line of investigation is suggested every one pounces upon it and older problems are left far from completion. That we in America are especially inclined to this weakness in physical investigations I believe to be the case. Though investigations have been carried out by a number of American physicists, well-nigh to completion, involving years of painstaking labor, of which we may well be proud, yet I be-

lieve the tendency exists. It is this thought which has led me to select for a brief review a line of study patiently carried on in Europe for a number of years, yet hardly touched upon by physicists in this country. In the last few years the studies in electrolysis and solution have been so fruitful that we can no longer afford to neglect them. It is also remarkable that these studies in electrolysis and molecular physics have been made almost exclusively by chemists, though of equal, if not greater, interest to the physicists; the problem should be attacked by them. To direct your attention then to some of the important work that should be undertaken by physicists is my object in reviewing, in the briefest possible manner, the progress of studies in electrolysis from their beginning to the present time.

Scarce one hundred years have passed since the first note of chemical action having been produced by electricity is to be found. About the middle of the 18th century Pater Beccari obtained metals from oxides between which electric sparks had passed. These results led to no further inquiry at the time, and were passed by almost unnoticed. Priestley, in 1778, critically studied the effect of the passage of the spark through air, noting the production of an acid gas. Cavendish continued these researches, explaining the action in the sense of the Phlogistic Theory of the day. Van Marum, extending Cavendish's investigations, decomposed ammonia, and through a careful study of the chemical changes brought about by the electric spark became converted from Stahl's Phlogiston Theory, stoutly maintained at the time, to Lavoisier's Oxygen Theory. Van Troest and Dieman, in 1739, gave the first unmistakable evidence of electrolytic action in decomposing water by means of the spark. The tendency towards an Electrical Theory of chemical action, fully developed later,