

*Treasurer* : R. S. Woodward.

*Vice-Presidents* :

Section A. Alexander MacFarlane.

Section B. Elihu Thomson.

Section C. F. P. Venable.

Section D. Storm Bull.

Section E. J. F. Whiteaves.

Section F. Simon H. Gage.

Section G. Charles R. Barnes.

Section H. Thomas Wilson.

Section I. Marcus Benjamin.

*Secretaries of Sections* :

Section A. John F. Hayford.

Section B. William Hallock.

Section C. H. A. Weber.

Section D. James M. Porter.

Section E. Arthur Hollick.

Section F. Frederick W. True.

Section G. W. A. Hellerman.

Section H. George A. Dorsey.

Section I. Calvin M. Woodward.

JAMES MCMAHON,  
*General Secretary.*

---

A GREETING TO THE AMERICAN ASSOCIATION  
FOR THE ADVANCEMENT OF  
SCIENCE.\*

To the greetings which have been so cordially offered to you in behalf of the State and of the City it is my privilege to add a few words of welcome from the Institute, which is honored by your visit to-day.

You have not often favored us with your company, for you waited until the 29th year of the foundation of the Association before you held your first Boston meeting. Now twenty-one more years have elapsed before you visit us again, and we are pleased that it should be for the purpose of holding your semi-centennial anniversary in this city.

If your visits, like those of angels, are rare they are all the more highly prized,

\*By President J. M. Crafts, Massachusetts Institute of Technology, at the opening session, August 22, 1898.

and many of us feel that we must make the most of this one, because we may not, in the course of nature, hope to live to see you with us again, if your orbit is fixed by the intervals of your past appearances. While saying that you waited twenty-nine years before making your first call upon us, it should be added that long ago, in 1849, the second meeting of the Association was held in Cambridge, and that the Bostonians had the advantage of participating in that meeting in the same way that now our good neighbors of Cambridge and of other near places join in welcoming you to this one.

At the date of the Cambridge meeting Harvard College was 213 years old, and the institutions of Boston and of the neighborhood which now have the honor of greeting you were unborn and unthought of. Since that time Tufts College, Boston College, the Massachusetts Institute of Technology, Boston University and Wellesley, naming them in the order of their foundation, have grown up like young plants, and, notwithstanding the rapid increase of Harvard University, they surpass it at present in the number of their students. The total adds up to nearly 8,000 students and more than 800 teachers, about the same number as at the University of Paris.

It would be a poor greeting to deluge you with statistics, but I trust you will pardon these few, which are meant to show that since you have visited us we have been diligently occupied in preparing a fitting audience to meet your second, or rather your third coming, for the teachers and students in these colleges have come in larger part from New England, and particularly from this neighborhood, and, their education finished, they have remained in their New England homes, and whatever has clung to them of their college life is potent in shaping the modes of thought of their community. This center of education, then, is one of the largest in the world, and it is eager to give

you the kind of reception which you will most prize, those tokens of sympathy, of respect and of appreciation which spring from knowledge; for educated men know that men of science are discovering those truths which form the newest and truest part of their education. Sometimes the surroundings of a scientific man impress upon him a sense of isolation. He is asked: What good are such things? when he has discovered a new formula or a new exhibition of energy or a new substance, or has dissected the nervous system of a worm. He has no leisure to answer such questions, but he works on contented if he is not disturbed, and expects little applause unless he turns out a salable product. Let him, however, come in contact with those whom modern methods have trained to some knowledge of science, and he immediately finds ready support and sympathy and some share of the enthusiasm which he feels himself.

It is now as much a part of a good education to know something of scientific facts as it is to know the causes which led to the fall of the Roman Empire. I do not mean that we make scientific men of the great body of our students any more than the study of history transforms scholars to statesmen. When freshmen enter our laboratories we have small hope that they will make original discoveries, but we are well content if, while fitting themselves for some practical occupations, they learn the great lesson that new truths can only be found out by observation and experiment, and if they learn habits of honesty of thought by dealings with nature, which never lies. These men form the great public who have come forward so willingly and so generously to lend a helping hand to science. Perhaps in their college life their unskillful experiments have taught them to admire the skill which has made yours successful, their attempts at observation have

given them some idea of the acuteness of powers which can be acquired by long years of faithful training.

Those who have pleasure in scientific occupations are ready sympathizers, and know something of the joy which a discovery brings with it even if there is no money in it. As to those among us—and there are many who have devoted their lives to scientific work—I have no need to assure you of their hearty welcome, of their desire to meet you in this congress, and to listen to the news of your latest achievements and perhaps to tell you some of theirs. Your connection with our colleges is very direct, for many of the members of this Association have taken a leading part in this work of education, and in this neighborhood we have been fortunate in our teachers. Scholars who have walked the fields with Gray and Agassiz, who have learnt their mathematics from Peirce, their anatomy from Wyman, or their chemistry from your retiring president, might look the world over without finding leaders better fitted to guide them to the innermost chambers of scientific knowledge. In this place it is most fitting to mention the chairman of the first meeting of this Association, William B. Rogers, who was a born educator. He loved science for its own sake, and he had a patriotic desire to see his country call upon science to aid in its material progress. His efforts began so far back as 1828, when he thought it useful to lecture to the American people in Baltimore upon the advantages which he hoped would be derived from building railroads in this country. He demonstrated the known principles of railroad building, and showed that traction upon smooth iron rails was possible. Afterwards, when he came to Boston, his thoughts were full of a project for interesting the community in providing means for the education of men to direct our growing industries. This Institute was

founded, and this building erected because Rogers knew how to make science popular; his contagious enthusiasm inspired many co-workers who have not yet ceased in their task. With great simplicity of character he united an ardent imagination which gave a singular fascination to his public exposition of scientific truths. You perhaps know him best through his earliest endeavors for the foundation of the Geological Society, and you know that, later, just 50 years ago, he contributed with all his heart to the formation of this Association. His later years were devoted to the Institute which he built up, and which now, largely grown from small beginnings, has the honor of welcoming you this day; and it was on this stage that he fell, an unfinished sentence on his lips, giving his life to the cause which overtaxed his strength.

The memories which attach themselves to this place have led me to speak thus at length on this fiftieth anniversary of one who was a principal founder of one Association, and yet other memories crowd into this hall.

The Lowell lectures have been held here for many years, and to your Association belong many of the eminent men who have stood upon this platform, and who have done much to make the Boston public no stranger to scientific assemblies. Some sixty-five years ago the strongest interest in lectures was excited in New England by the qualities of certain lecturers. The eloquence of Edward Everett, the character, the new doctrines and the fascinating delivery of Emerson made men feel that book knowledge was of little worth, and that the living voice was the true means of communication with man. It seems like the difference between reading testimony or hearing a witness. Under these impressions John Lowell, Jr., a young man of 34, after the misfortune of losing wife and children, made a will by which he devoted half his

fortune to founding courses of free lectures. His death happened soon after in a foreign land, and the fund came into the hands of his cousin, John Amory Lowell, who made its care and administration the chief occupation of his life and has been succeeded in the charge by his son. In these hands the Lowell lectures have grown to be the largest enterprise of the kind in the world. The fund suffices to maintain 500-600 free lectures yearly, and to offer inducements to the most distinguished men in all English-speaking lands to come to speak to Boston audiences. We owe to this enterprise the visit of many a man of science to this country, and, in one notable case, a permanent settlement. You all know that Louis Agassiz was called to the United States to deliver a course of Lowell lectures, and that he became as good a citizen as he was a savant.

As you will see by the guide-book prepared for the use of the Association, great libraries and museums have kept pace with the intellectual and material growth of the community, and the needs of science are represented in them as well as those of art and literature. Our museums depend more than other institutions upon popular appreciation for their support, and calls upon public liberality must be seconded by a presentation in some striking and evident way of the aims and scope of the work which the collections illustrate. I cannot help thinking that your presence and your discussions, and the effort which you make to come each year, often from great distances, contribute notably to keep the cause of science before us, and that you aid in its task each community you visit.

As you watch the motions of the stars, or make experiments in laboratories, or observations in the fields, or build bridges, as you seek to cure disease and alleviate pain, or reduce the actions of mankind to fixed laws, you doubtless have sometimes in view

your summer meeting, and look forward to talking over with each other your discoveries and your difficulties, and as you are willing to do this in public, the whole community as your place of meeting comes to a better knowledge of the beautiful, earnest, skilful effort which makes up the life of a man of science. It is not a congress to adjust conflicting interests or for displays of oratory which lead to no conclusions. We get to know the man himself, and I think he would be even more popular than he is at present if we could invent some suitable name for him. Scientist is a most ill-sounding word. The French term *savant*—a knowing one—might provoke a smile, when contrasted with the simplicity of character of many men of science, but perhaps after all this is your best title to fame. Your discussions do not often degenerate into disputes, because for the first time in the history of the world methods of work have been found so sure that the results can be accepted almost without discussion. Even the geologists come to an eventual agreement about their theories, and the account which Bret Harte has given about their meetings must not be taken too literally. You are good witnesses and generally agree upon your facts, and when facts lead to differences of interpretation the single-minded desire to reach the truth brings you into accord at last.

We have good reason for welcoming you among us, and although you do not come as missionaries we shall find ourselves the better for your coming.

---

*DESTRUCTIVE AND CONSTRUCTIVE ENERGIES  
OF OUR GOVERNMENT COMPARED.\**

WE have been witnessing during the past five months an extraordinary exhibition of

\* Abstract of an address given by President Eliot, of Harvard University, before the American Association for the Advancement of Science, in Saunders Theater, on August 26, 1898.

energy on the part of the government of the United States in making sudden preparation for the war with Spain and in prosecuting that war to a successful issue. As men of science, or teachers or promoters of science, we have a special interest in the lessons of the war, because the instruments and means used in modern warfare are comparatively recent results of scientific investigation and of science applied in the useful arts. Moreover, the serviceable soldier or sailor is himself a result, not only of moral inheritance and instruction, but of training in the scientific processes of exact observation, sure inference and accurate manipulation. It is not the linguistic side of school training which makes the effective soldier or sailor; it is the scientific side. His vocabulary may be limited, though expressive, and his grammar false; but his eye must be true, his judgment sound and prompt, and his hand capable of using instruments of precision. The first-relief package, which every soldier carries, is crammed with surgical knowledge which the world waited for till the last quarter of the nineteenth century. Physiological science has really arrived at valuable conclusions with regard to the soldier's diet—the indispensable foundation of his effectiveness. Financial science is also a contributor of prime importance, since success in war depends more and more on the command of money and credit. To this war with Spain we owe the most effective revenue bill, or rather the only comprehensive revenue bill, the country has had within a whole generation.

It cannot be doubted, then, that the energy put forth by our government for the immediate purpose of capturing or destroying Spanish vessels, forts, towns and war material, and incidentally killing, wounding and starving Spaniards has been a great exhibition of power in applied science, and as such must commend itself especially to