

PART III

Papers and Addresses Presented at the Second
Meeting, November 29-30, 1912

Science and Progress in the South

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Introduction.

On first coming to Tennessee some years ago I took occasion to investigate the status of organized science in the State. Investigation showed the following results: No Geological Survey, nor had the State given support to one for forty years. Up to that time the sum total of appropriations for geological survey work probably totalled not to exceed the amount now appropriated biennially. No Academy of Science or other organization having like aims. In the State University there were two departmental organizations, but no general scientific society, and if any such organization existed elsewhere in the State it did not come to my notice. Five years have passed and the progress made is cause for congratulation. A Geological Survey has been in operation for two years with results comparable with the best surveys of the country. We are now celebrating the second meeting of the State Academy of Science, and by the vitalizing influence inspired by these efforts, the Joseph LeConte Society which expired many years ago has been recently revived at the State University; and no doubt investigation would reveal corresponding advances in other centers. I am convinced, therefore, that we stand in the dawn of a great scientific advance in Tennessee and the South, a progress in which I trust this society is to have a conspicuous part.

Progress of Science in Recent Years.

Until recent years no review of the progress of science was considered adequate which failed to give, as the crowning achievement, the triumph of steam and its application to navigation, railroading, etc.; the triumph of electricity as represented in the telegraph; the use of waterpower, etc. So familiar are these now in

our everyday affairs that we scarcely recognize in them a modern achievement. It is scarcely conceivable that the first effective use of the railway locomotive was in 1830, and that the first passage of the Atlantic by a boat propelled by its own steam power was made in 1838 by the *Sirius* of London, the trip requiring nineteen days. Four days after the departure of the *Sirius* from Cork, the *Great Western* left Bristol making the passage to New York in thirteen days and five hours. It is interesting to note that, not long before, Sir Joseph Banks, in a lecture before the Royal Society, had said, "That the application of steam to navigation was a pretty plan, but there is just one point overlooked: that the steam engine requires a firm basis on which to work." And in 1838, the same year in which successful trips were made by the *Sirius* and *Great Western*, in an address before the Royal Institute Dr. Lardner "proved" to the satisfaction of himself (and his audience presumably) "that steamers could never cross the Atlantic because they could not carry sufficient coal to raise steam enough during the voyage."

The achievements of those early days which had been so discounted were but stepping stones to the still greater achievements of these latter times, which, in the application of electricity in industrial lines, wireless telegraphy, the navigation of the air and other accomplishments in the field of science has witnessed a progress that makes one to pause before making declaration that any proposed achievement is beyond the bounds of possibility.

Part Played by Societies in the Progress of Science.

While the study of the progress of science shows that the mountain peaks of achievement in every generation are a direct outgrowth of the labors of certain individuals, nevertheless contributory thereto were scores of lesser lights and influences without which success would have been impossible. Prof. Osborne, in an address on a like occasion, has well said: "Science is essentially mutualistic, and the success of one individual or of one organization is the gratification of all—the triumphs and discoveries of one are shared with the many, and the feeling of pride in the progress of one may be shared without loss with others."

Coincident with the great advance in science has been the establishment of associations of scientific workers whose activities have

tended greatly to promote the scientific work of their age. And much of the progress along social and economic lines is to be attributed directly to the great advances made by science. England's progress is coincident with the establishment and growth of the Royal Society. It has been said that "in olden times this country (England) possessed the materials for great things as well as the men fitted to develop them into great results." But the nation was slow to awake and take advantage of its opportunities. There was no enterprise, no commerce, no "go" in the people. The roads were frightfully bad, and there was little communication between one part of the country and another. If anything important had to be done, foreigners were called in to teach the people. An English writer says: "We sent for them to drain our fens, to build our piers and harbors, and even to pump our water at London Bridge. Though a seafaring population lived around our coasts, we did not fish our own seas, but left it to the industrious Dutchman to catch the fish and supply our markets." (Samuel Smiles, *Invention and Industry*, p. 45.)

Even to the casual observer, the analogy between the condition thus depicted in old England and those of the South must come with telling force.

Without entering at present upon a discussion of the tardy progress heretofore made by the South in education and social welfare, the causes of which are not far to seek, it may be pointed out that there has been a like absence both of notable achievements in science and of organizations which might serve as a stimulus for such work.

Among the first and most notable organizations of this character in this country are the American Philosophical Society and the Academy of Natural Sciences of Philadelphia, The Brooklyn Academy of Arts and Sciences, The American Academy and the Boston Society of Natural History of Boston, and the St. Louis Academy of Science. Inspired by the success of these organizations, sprang up such as the Chicago Academy of Science, the Philosophical Society of Washington, etc., which, though possibly of lesser prominence, have in their way rendered most important service in promoting the cause of science in their respective communities. State Academies of Science like this of ours are of relatively recent origin, and have flourished particularly in

the central and western States. Among those deserving special mention are the Academies of Iowa, Michigan, Wisconsin, Illinois, Indiana, Minnesota, Nebraska, California, Ohio, Kansas, Colorado, Utah, Maryland and last of all, Tennessee.

One of the particular functions of a State Academy is that of serving as scientific adviser to the State in which it exists. It has been well said that this function alone constitutes a sufficient basis for the organization of such societies in every State.

In an address before the Iowa Academy of Science, Prof. H. Osborne has called attention to the fact that in many instances geological surveys, biological surveys, topographical surveys and other enterprises dependent upon State support have had their origin in or have received their support and encouragement from the State Academies.

As may be seen from the enumeration given of State Academies of Science, Tennessee is the only State in the South that has such an organization. With the awakening of this giant in the Southland, must come that organization of all the forces of science and the arts which is necessary to the right utilization and conservation of the great resources, material and human, of this part of our country. In this work the Academies of Science in the various States are destined to play a prominent part. And in this great work we trust that our own Academy shall serve as a stimulus and an example pointing the way of progress and high achievements.

Suggested Lines of Activity of the Academy.

What has been said, however, is merely preliminary to some suggestions I desire to make touching the future work of the Academy. The organization must find its justification in what it does for its members and for the State. If it shall serve no other purpose than as a stimulus for scientific work among its members, it will amply justify its existence. But above and beyond all, let us see to it that it shall be felt in the promotion of every enterprise tending to conserve the material and human resources of our State.

In this connection, permit me to outline a little more specifically some views as to the lines along which the efforts of the Academy may well be directed.

1. As already suggested, a fundamental feature of a Society like this is to correlate and to stimulate the efforts of those interested in Science. By the interchange of views through papers and discussions and by the inspiration that comes through personal contact and association, enthusiasm will be aroused which goes far to overcome the inertia of dull routine and to ward off the insidious approach of indifference to the weal or woe of the other man.

2. The influence of the Academy should be exerted (1) in the support of the present Geological Survey, both by encouragement to its achievements and by urging upon the authorities the importance of ample financial support. And (2) of urging the establishment, as opportunity offers, of other enterprises, such as a Biological Survey of the State, a State Conservation Commission, whose functions shall be to provide for the conservation of the material and human resources of the State, including the waterpowers, forests, minerals, and other resources and conditions affecting the material and social welfare of the people; and other like enterprises.

3. Another and equally important phase of Academy work should be the promotion of education, and especially of science teaching in the public schools. The great awakening to the importance of education in these last years brings with it profound responsibilities as to the character of the work done in the schools and the provisions made to meet the demands for the best results. In view of previous conditions, it will not be strange if the authorities fail to recognize the paramount importance of providing not only a sufficient number of thoroughly educated teachers of science, but the equipment necessary for the proper handling of the work. About the last thing that the ordinary school officer realizes is that in order to give the proper kind of instruction, fewer pupils and classes should be assigned to the teacher of science than to the teacher of almost any other branch.

It should be the privilege of the Academy to stand for better equipment and for the best teaching of science in the schools. To this end, I would suggest that there be joint meetings of the Academy and the high school teachers of science for the consideration of the best methods of science instruction and the stimulation of a zeal for the best results?

Recommendations.

In closing, I desire to make some recommendations concerning the work of the Academy.

1. By-law 1 provides that any special department of work may be assigned to a curator, whose duty it shall be, with the assistance of other members, to promote the work of that department. I would therefore recommend that a Department of Science Teaching in the Public Schools be created and a Curator placed in charge.

2. It is a well known fact that owing to neglect, the advantages of our State in material resources and physical conditions are little known outside its borders and to relatively few within. During the next three years, three Expositions are to be held, each of which will offer unparalleled opportunities for publishing to the world the nature of our resources and the progress we are making along industrial and educational lines. These are the National Conservation Exposition in Knoxville, in 1913; the Exposition at San Diego, 1914, and the Panama Exposition at San Francisco, in 1915. The importance of providing for exhibits at each of these Expositions should be urged upon the coming legislature. A bill providing for an appropriation to prepare suitable exhibits for each of these Expositions is to be presented, and I would recommend that the Academy endorse such a bill and urge upon the members of the legislature its passage.

3. If time permitted, I would like to discuss at greater length the great importance of the museum as an educational factor. The Europeans are far ahead of us in their appreciation of this means of instruction. Few indeed are the places there without their museums and collections, to visit which constitutes one of the chief ends of the American traveler. Take for example the British Museum, which is the Mecca of the investigator in every line of study, as well as a school of instruction for the ordinary visitor. In America, coincident with the awakening of civic consciousness, has come the recognition of museums as one of the important elements of the social and intellectual progress. Thus, New York, on putting her swaddling clothes aside, began the upbuilding of that great institution, the New York Museum of Natural History. The growth of the Museum idea as pointed out by H. F. Osborne is due to the fact "that this institution is not

a conservative, but a progressive educational force; that it has a teaching quality or value peculiar to itself; that the museum succeeds if it teaches, fails partially if it merely amuses or interests people, and fails entirely if it simply mystifies."

The State museum is a natural outgrowth in the promotion of State Geological Surveys. The value of the museum as a means of becoming acquainted at first hand with the varied productions of the State is everywhere conceded. An example of one of the most noted institutions is the New York State Museum, the outgrowth of a Survey which "gave to American geology a nomenclature largely its own and demonstrated above everything else the value of fossils for purposes of correlation and incidentally brought into prominence one man, James Hall, who was destined to become America's greatest paleontologist."*

As a result of its first real effort to maintain an adequate geological survey, Tennessee is emerging from geological obscurity and the need begins to make itself felt for the building up of a State Museum. One of the functions of the Geological Survey is to develop such an institution, but its efforts in that direction are handicapped by the lack of suitable quarters for housing the collections. As a result of this, valuable material that should remain to interest and instruct our people goes elsewhere. It should be one of the first duties of the State to provide a suitable building for a good museum and sufficient funds for its maintenance and growth. I would, therefore, suggest that the Academy seek to promote the establishment of a State Museum and to that end recommend the appointment of a standing committee whose duty it shall be to take this matter in charge.

4. There are in Tennessee two other societies which aim to do for their respective branches what the Academy seeks to do for the allied interests of Science in the State; these are the Tennessee Philological Society and the Tennessee Historical Society. I believe that the amalgamation of all three organizations would be greatly conducive to the interests of the causes represented by each. Inasmuch as the scope of the Academy of Science is sufficiently broad to include these as well as other allied lines of work, it has been suggested that each be incorporated and made

* Merrill, Geo. P., Report U. S. Nat. Mus., 1904, p. 344.

a section of the Academy. I would recommend, therefore, that a committee of three members of the Academy be appointed to confer with representatives of the other societies with reference to such amalgamation and report at our next meeting.

The present is the second session of the first year's existence. The growth of its membership, the character of its programs, and the interest manifested augur well for the future of the organization. It can render a high service for the State and for the South. The better to perform this mission we need and should have a large membership. The members are urged, therefore, to invite others to join the Society and assist in all the various ways that suggest themselves of extending its work and influence.