

The presidential address was then delivered by Stephen A. Forbes as follows:

RELATIONS OF THE ILLINOIS ACADEMY OF SCIENCE TO THE STATE.

The Illinois Academy is meeting this year at what we may now truly call a great state university, with its thoroughly organized and well-equipped departments of instruction and investigation in science both pure and applied; the home also of other organized public agencies for scientific work not immediately connected with instruction,—the Geological Survey, the Agricultural Experiment Station, the State Water Survey, the Engineering Experiment Station, the State Entomologist's office, the State Laboratory of Natural History, and the Soil Survey of the State; and we know that there are other active organizations elsewhere in Illinois of equal interest to us with those about us here,—the State Museum, the Field Museum, the Chicago Academy of Sciences, the great universities in and about Chicago, and the active scientific departments of the several colleges of the state, and of our five state normal schools.

Under these conditions we may reasonably ask ourselves the question: What is the place and proper work of this Academy in the midst of all this great array of established agencies for the scientific work of the State? What elements of scientific activity still remain in Illinois unorganized, or imperfectly organized, which can be brought together in a state society for their improvement in efficiency? What service may we possibly do to institutions and movements already in existence, by establishing useful bonds of affiliation and practicable systems of cooperation among them? What may we do to strengthen them? to supplement their work at any point by our own undertakings? to make them more immediately and more widely useful to the people of the state?

The earlier state scientific societies, in other states, had, in their beginning, a comparatively open field. They originated many movements and nourished the germs of many institutions which we now find permanently organized and in full operation here. We can not imitate them, consequently, even if we would, but must adjust ourselves independently to our own environment. Now, after two years of active operation, and with a membership list which insures us opportunity and promises us power, this seems a suitable time to start some fundamental inquiries as to our ends and purposes, and to begin the earnest discussion of practical answers to them.

Although I hold today a place of temporary advantage, and might assume to speak to some extent at least in the name of the society itself which has chosen me as its president for the year, I wish to disclaim any such privilege, and shall merely undertake to express my personal views from my own standpoint.

Our most immediate duty, as it seems to me, is to our otherwise unattached, active membership—to the private student, the isolated investigator, the occasional scientific worker in an unscientific environment, to whom we may, through our organization and our meetings, bring helpful acquaintanceship, appreciation, stimulus, and aid. Next we especially owe opportunity and elementary inspiration to the young—to the beginner, who may find in our meetings and in his own first paper on our program a not too difficult first step in a career which may lead him no one knows how far or how high. And then we owe to all of us, young and old, beginner and veteran, attached and unattached, an opportunity to know each other, and to learn something of each other's interests and accomplishments, and a look, at least, now and then, over some easy place in the wall of division between specialties and departments,—a chance to hear and to see the best and the latest thing in some other field than the one which we know best. And out of all this will come good fellowship and a broader knowledge, and not infrequently a reflected light on some problem of our own, involved in darkness hitherto, which no direct

light could penetrate; and best of all, there will sometimes come a chance and a disposition to get together, ignoring division lines, on some joint cooperative enterprise too large and too complex to lie wholly within the field of any one or any class of us, and likely otherwise to be ignored or imperfectly provided for.

The State Academy of Science may, like any other state society, do its part towards making the state interesting to its own people, and especially to those who are newcomers within its borders. In each of our great universities, and in many of our colleges and scientific institutions, there is an almost continuous stream of newcomers, some to take new places, others to replace those who are going away. Most of these, as a rule, come to us from other states, and some from foreign countries. They are often well prepared to make important contributions to our civic and our public life—to our scientific and industrial progress—but are sometimes little disposed on their arrival to go outside their special spheres of interest. They may even live among us, and yet not be of us, for years, concerning themselves but little with the state or its people except as their duties bring them into necessary contact with us,—a situation unfortunate for us and doubly so for them. Often their training and learning, their special abilities, their different standards, their tastes acquired elsewhere, make them precisely fitted to do some needed thing for us which we are not likely to do ourselves, and which does not get done because nothing is done to effect a real transfer of their allegiance. The very loyalty of their tempers, which would make them invaluable to Illinois if they were really to become identified with its interests, leaves them cold to us and makes them useless here for any general purpose, because it holds them still to other interests and places which they have left behind. Their own lives are more barren and lonely than they might be, and their stay with us perhaps is short, because they take no sufficient root in our soil. An acclimatization society is needed to adjust them fully to their new environment; and such a society the State Academy should actually be.

The Academy may do a great service also to our own people, by helping to increase their interest in their native state by increasing their knowledge of it, and by giving them new opportunities to contribute to its welfare. Loyalty is an emotion based on personal knowledge, on personal experience, and especially on personal service. The more we know of this great, rich, powerful, prosperous, and progressive commonwealth; the more definitely we can realize the conditions out of which, and the processes by which, it has come to its present high estate: the more justly we can estimate the energies working in its bosom for the future welfare of its people; and especially the more confidently we can be permitted to feel that we have personally contributed something, however little, but still our best, to its progress and its happiness,—the more devoted will be our attachment to it, and the greater, consequently, will be our future service. It is the one greatest and best function of this State Academy to make the State of Illinois known to itself.

Loyalty and state pride are, however, by-products of a scientific society, to which many other societies of various kind and aim may contribute equally. Our own *special* mission is the aid and advancement of scientific research and the popularization and propagation of its results. For both these aims we need to bring the scientific men and the people of the state into closer and more frequent contact, in ways and under conditions to increase the popular respect for scientific work and the popular appreciation of its outcome, and also to interest our scientific men more strongly in problems affecting the general welfare. Especially we must remind the absorbed investigator that it is the part of science to understand its own environment, and to adapt itself thereto; that science is not, and perhaps can never be, wholly self-sustaining, especially in a democracy; and that without the broadest possible basis in popular gratitude and regard, the progress of science will be needlessly retarded and its development delayed. The happy thought of an annual symposium on some subject of primary importance and strong human interest is, I think, a great help

to these ends; and the discussion of the relations of the pure and applied sciences which our representatives for the year are to hold tomorrow forenoon is an excellent example of what I now have in mind. I hope that we may make even more than we have done of the symposium idea; and that we may select and assign our topics for discussion with great care and early in the year, that those chosen for this service may have ample time for the careful preparation which its importance demands.

I have spoken of the Academy on the one hand, and the people of the state as its constituents on the other; but from another point of view we are the representatives of the people and the immediate constituents of the scientific institutions of the state. We have in our membership not only the managers and the workers of these institutions, but a select group of citizens also, especially concerned in their work and especially intelligent with respect to it. Our geologists and geographers and certain of our biologists follow the operations and study the reports of the Geological Survey with an interest at least as great as that of the miners and quarrymen, the clay men and the oil promoters, for whose benefit its work is primarily done. The Soil Survey concerns not only the farmer, but the botanist and the zoological ecologist as well, and so of most of these departments of state activity. Although not established, as a rule, for our purposes, but with some economic end in view, each of them is of great interest and importance to one or the other group of us, and virtually all of them contribute materials highly valuable to those of us responsible for scientific teaching of whatever grade. Our interest in the work of these institutions is mainly scientific, while that of their other constituents is merely economic, and it goes almost without saying that we may have, and ought to have, a strong and helpful influence over it. There is nothing that is more needed by any active department of economic work than an intelligent, watchful, and appreciative scientific constituency. Its more immediate beneficiaries and supporters are commonly in a position to criticise only its more practical results, and can usually know but little of the scientific wisdom

and validity of the methods by which these results are reached. They may even embarrass, discourage, and delay a correctly managed undertaking, by an impatient demand for a practical outcome before any such outcome is fairly attainable. They may overvalue and overpraise the empiric at the expense of the scientist, and may greatly overestimate a relatively easy and simple piece of work, which yields an immediate and important economic product, as compared with a difficult and complicated one whose progress is necessarily slow. A sufficient body of intelligent, conscientious, and disinterested critics of the scientific work of the state, such as I hope this Academy may always be able and ready to supply, would help greatly to correct the distorted perspective in which an economic science is commonly seen by the economic citizen. Furthermore, the membership of this Academy is the natural and immediate constituency and support of such *purely scientific* work as the state, or any other public agency, may choose to foster or initiate. With its general outlook over the whole field of human welfare and scientific activity, it ought to be in a position to suggest or to set on foot new work in lines neglected hitherto. This view of the legitimate and possible relations of the Academy to public scientific work seems to have been foreshadowed, whether consciously or unconsciously I do not know, by the description and resume of that work contributed by our last year's symposium, and contained in our Transactions for 1909. I commend this review to your attention as worthy of careful study. I would like to see, and am indeed ready to advise, the appointment of annual committees of this Academy on scientific progress within the state, to present reports which, published in our Transactions, will form a continuous and, in course of time, an invaluable record of the history of scientific enterprise in Illinois.

These are delicate and important functions which I am proposing to you, and all this implies, as you will see at once, that the State Academy is really to succeed and to continue to succeed; that it is to attract and to hold in its membership the best, the most experienced, and the most public-spirited scien-

tific men of the state; and that they are to enter into its work with interest and energy as worthy of their time and serious attention. I would, indeed, *make* this work worthy of the best thought and service of the best men among us. If we do that, their thought and service, I am sure, will be forthcoming; and if we do not, we shall shortly find that those whose presence and assistance we most need are conspicuous by their absence from our meetings. I must make, also, this assumption of continued success and of high-grade, disinterested service, in what I shall have next to say of the relations of the Academy to the State. If I shall seem to make this topic too prominent at this meeting, paying too little attention to other allied interests, I trust that you will accept my apologies in advance. There are many others far better qualified than I to deal with other aspects and relations of our work and influence, but if there is any such topic on which I may be thought somewhat competent to speak it is this of our relations to the State, in whose scientific service I have really spent, I suppose, a longer time than most of us have lived.

In all that we may do or propose with respect to general state work, we should of course be sure that we are assisting and strengthening existing active agencies, and not weakening them or supplanting them. We should, in other words, hold and develop what we have, and add to it what and where we can. For this reason any general plan for state-wide work which may be presented to the Academy should be carefully scrutinized and reported upon by a special, disinterested committee, which should act conjointly with any state agency operating in the same field. This is essentially the course taken by us with respect to a proposition for an ecological survey of the state made to the Academy by some of our ecological members at its Decatur meeting in 1908. As the survey proposed came within the field of operations of the State Laboratory of Natural History, charged by law with a natural history survey of the state, the forces of the Academy were united with those of the State Laboratory by means of a committee report approved by the Laboratory management and accepted by the

Academy; and a standing committee was appointed, with the Director of the Laboratory at its head, to organize and conduct this work. The principal, actual outcome of this experiment—for an experiment, of course, it is—has thus far been a review and endorsement, by this committee, of the State Laboratory plans and operations, and a common understanding among the active investigators in this field as to their respective subjects, fields of operation, and interrelations, arrived at with a view to the coordination of all parts of this work and a fairly uniform and symmetrical final product. The publication of several papers on the ecology of the state by members of the committee has been provided for by the State Laboratory, and these papers are appearing as articles in its Bulletin. Both state and individual work have thus been stimulated and somewhat expanded, so far without increase of expense, and with notable addition to the scientific and educational value of their product.

Possibly other plans of cooperative aid to other state agencies might be profitably set on foot by committees of conference appointed for the purpose. Others of our members may be so situated, so educated, so interested, and so experienced, that by coming together and by allying themselves with the Water Survey, the Geological Survey, the Soil Survey, or the State Museum of Natural History, they could at once give greater system, definiteness, and value to their own work, aid to each other, and important assistance to these organizations, either by the contribution of useful observations and material, by supplementary studies made along allied lines, by intensive local work and other continuation studies, beginning where the state work leaves off, or by adapting the products of special work to educational uses.

In order to insure the success of such cooperative plans, it is, of course, a prime necessity that thoroughly disinterested motives should prevail, and that the advancement of science in the interest of the state should be the touchstone by which all plans and persons shall be judged. I fully believe that we can trust each other confidently in these matters, and that the way

is open on all sides to various forms of helpful organized activity, which ought in a few years, if properly directed, to give a new aspect to the status of science in Illinois.

There are, however, certain limiting and controlling conditions to joint enterprises of this description, which must not be overlooked or ignored. Agents of the state, placed in charge of work provided for at public expense because of its importance to the state at large, can neither divide their duties with others nor share their responsibilities except as required or permitted by law. A considerable administrative discretion is commonly vested in them, however, within which any such adjustments as I have had in mind might readily be made. They can thus often assist materially an independent society or even a private citizen, and can receive material assistance from such sources with real profit to their enterprises, and an enlargement of their usefulness. Most of them are, in fact, really eager for such mutually profitable connections, and often take great pains to establish them, and it is, of course, good public policy to secure for any public enterprise all the really competent volunteer aid possible, in order that its results may be most quickly reached at a minimum cost to the public as a whole.

On the other hand, an academy of science is not a compact organization capable of carrying forward long, complicated, laborious, and expensive undertakings, requiring for their accomplishment the continuous cooperation of a group of men working, each in his place, to a common end. Such undertakings belong to established institutions and not to volunteer societies. Consequently we should not seek to do the work which the State has undertaken, or is likely to undertake, on its own account and at public expense. *Per contra*, the State should not tax its people for what any of them are willing to do for their own purposes, and which they can do well enough and quickly enough to serve also the public interests concerned. It may, however, provide agencies of coordination, may supplement private work, especially where extensive, complicated, and expensive operations are required, and may give such assistance to that work as is warranted by its general

value as an aid to education, as a foundation for more immediately productive operations, and as helping to create a background of appreciation for the work of the state agencies themselves. It is in this sense that it seems perfectly proper that the State of Illinois should provide at its own expense, as so many other states have done, for the publication of the Transactions of its State Academy of Science. Whatever tends to stimulate a general activity in scientific work throughout the state and to increase the public interest in it; whatever makes available for the general public the product of valuable unpaid services of private citizens; whatever helps to familiarize our people with the true objects and methods and the outcome of scientific investigation, will have consequences, immediate and remote, so important to the public welfare, material, intellectual, and social, that the petty sums needed for the publication of our papers will certainly, as it seems to me, be invested at an enormous rate of final profit.

It is especially in this period of an emotional reaction against science and the scientific method, when whole sections and sects of our people seem fairly rushing down a steep place into the sea of fantastical speculation and conjecture, that we need in every community the sane, cool, impartial spirit of science, at work along all lines of intellectual activity. It is not an empty reproach which Professor John Dewey, of Columbia University, brings against those of us who are science teachers, in his recent address as chairman of the educational section of the American Association for the Advancement of Science, when he speaks of the slight extent to which the teaching of science has hitherto protected the so-called educated public against the recrudescence of all sorts of occultism, superstition, and silliness. "The future of our civilization," he continues, "depends upon the widening spread and deepening hold of the scientific habit of mind; and the problem of problems in our education is, therefore, to discover how to mature and make effective this scientific habit. Scientific method is not just a method which it has been found profitable to pursue in this or that abstruse subject for purely technical reasons. It represents the only method of

thinking that has proved fruitful in any subject—that is what we mean when we call it scientific. It is not a peculiar development of thinking for highly specialized ends; it *is* thinking, so far as thought has become conscious of its proper ends and of the equipment indispensable for success in their pursuit.”

Our relations to the progress of scientific investigation within the state, important as they may be, are really overshadowed, as it seems to me, by those which we bear, or ought to bear, to the progress and improvement of scientific education. Topics of this description are most commonly dealt with by bodies too narrowly limited in their membership to see the subject equally well in all its bearings, and their conclusions are hence likely to be partial and tentative only. The Academy has, however, within its active membership, scientific investigators of various sorts, university and college professors, normal and high school teachers of the several sciences, and a considerable body of picked, but fairly representative patrons and supporters of all kinds of schools; and I can think of no organization better constituted to discuss our special educational problems in a broad, intelligent, and effective way. We shall have tomorrow, I hope, a favorable example of such a discussion in the contributions of our symposium; and to the participants in that discussion I am pleased to be able to leave the illustration and development of some of the ideas which I have here tried to present. If the outcome shall be the appointment of a carefully selected, composite committee on scientific education in Illinois, and if that committee shall do its best to present to the Academy next year a well-grounded, well-rounded discussion of the subject, with recommendations for our procedure, I think that we shall all have reason to congratulate ourselves that this Academy exists; and if, in addition, the Academy shall be able to exert continuously upon scientific investigation, upon education, and upon the life of the people, something of the unifying, organizing, rationalizing, and corrective but generally stimulating and educative influence which I have here described as its reasonable function, I am sure that it will presently come

to be regarded as one of the most powerful of agencies for the advancement of science and the promotion of human welfare in this State of Illinois.
