

PRESIDENT'S ADDRESS: THE WORK OF THE INDIANA
ACADEMY OF SCIENCE

DONALDSON BODINE.

Not the least among the agencies that make for the betterment of a state are such organizations as the Indiana Conservation Association and the Indiana Academy of Science. Their officers and members receive no salary, they attend the meetings at their own expense and there formally and informally discuss together problems which have to do with the development of the commonwealth. Doubtless the greatest immediate gain comes to the individual who takes advantage of the opportunity for fellowship and the mutual interchange of thought and opinion, but through the individual the state also reaps its reward. It is as true in science as in morals that the level of the state is determined by the level of the individuals who compose the larger body. The primitive law of life is competition—a competitive struggle for existence and advancement. The work of Darwin, and more especially that of his followers, has given sufficient emphasis to the importance and universal application of this law; but even in the lower realms of life, we find the beginnings of a higher law, cooperation—a mutual aid in the struggle. Kessler, Kropotkin, and others have shown the equal if not greater importance of this later principle and have called attention to the fact that in all groups of animals those who have developed this mutual aid in the largest degree have shown the greatest progress. In social evolution also the greatest advances have come since competition has given way to, or at least has been modified by, cooperation, and the greatest teacher the world has known founded his plan for the salvation of the individual and the race upon the principle of mutual service. This mutual service should be the watchword of the members of the Academy.

The constitution of the Academy provides that the President shall deliver an address on the morning of one of the days of the meeting at the expiration of his term of office, and in obedience to that provision and in conformity with the idea of true conservation, which means the best,

most intelligent and therefore the most efficient use of resources, I beg to bring to your attention some questions which I believe to be of vital importance to the Academy and to its greatest efficiency as a state organization. This is an age of organization, and associations of various sorts are rapidly multiplying. Everyone must feel the burden of the demands of societies, local, state and national, upon his time, attention and means; and to secure and maintain the loyalty and devotion of its members, any society must prove its value in substantial returns. It has been my privilege to belong to the Academy since my advent into Hoosierdom, and nearly two decades of membership have given me a high appreciation of its value. I offer no excuse, therefore, for bringing to your attention some features of the work of the Academy and in asking your consideration of some suggestions which may be of service in making it of still greater usefulness to its members.

Societies, like individuals, must be undergoing a continuous development, unless indeed they are moribund. They must be adapted to the needs and demands of the times and from time to time readjustments are imperative if a vigorous life is to be maintained. Not too infrequently, then, should we pause to take stock of our present condition and consider ways and means by which greater effectiveness can be secured. A few years ago one of our distinguished past presidents, Dr. Jordan, said that the fight for the recognition of science in the educational field and in the world at large was a potent factor in binding together the members of the Academy in a common cause. Times have changed. No longer is it necessary for the man of science to assert his rights. The theoretic chemistry of yesterday is at the foundation of modern industry; the "plaything" of the physicist of yesterday, today lights the world and puts distant peoples into instant communication: the marvels of the biologist's microscope and culture tubes have become the dependence of the modern world for the maintenance of its life and health, and the public has become well-nigh too credulous of the powers of science. The old field of battle has been won, but there are other and greater promised lands of usefulness which must be entered and possessed, and the new conquests require new adjustments and new weapons.

Section 2 of Article I of the constitution sets forth the purposes of the Academy as follows: "The objects of this Academy shall be scientific research and the diffusion of knowledge concerning the various departments of science, to promote intercourse between men engaged in scientific

work, especially in Indiana: to assist by investigation and discussion in developing and making known the material, educational and other resources and riches of the State: to arrange and prepare for publication such reports of investigations and discussions as may further the aims and objects of the Academy as set forth in these articles."

The first provision for the encouragement of research and the diffusion of knowledge concerning the various departments of science is an important one. Examination of the printed volumes of the Proceedings will disclose a long list of original contributions and reports of investigations of the natural resources of our state and of the development of various phases of scientific progress. The record is one of which we may well be proud. Many of the papers have been an inspiration to those who heard their presentation, and they remain an invaluable, permanent record of current problems or of conditions long since passed away. Still it is worth while to raise the question whether it may not be possible to increase the value and interest of the papers presented at our regular meetings by making them part of well considered and carefully prepared programs.

In connection with this problem there appears a serious defect in the practice which obtains in the organization of the committees upon which the Academy must depend for the direction of its work. The constitution provides that "The President shall at each annual meeting appoint two members to be a committee which shall prepare the programs and have charge of the arrangements for the meetings for one year." Current practice so interprets this provision that the retiring president chooses this and other committees which must work with the newly elected officers. This I consider a seriously unfortunate usage. Under such conditions there is no reason to anticipate the same sense of common interest and responsibility for the work of officers and committees as would obtain if the acting president had the appointment of his own committees. As an illustration I may cite the fact that one year within the writer's knowledge the chairman of the program committee, which so far as the immediate interests of the Academy are concerned is the most important committee, was not even informed of his appointment till so late as to make arrangements for the spring meeting altogether impracticable. Had the acting president selected his own committees there certainly would have been a closer cooperation and a fuller sense of responsibility and therefore more efficient service. This statement is made not in adverse criticism of either officers or committees, but of the unwise practice of the Academy. Cou-

mittees are the organs of a society, and without their efficient action even an enthusiastic membership can avail but little. In the interest of a closer cooperation and better service I would commend to the Academy a change in its practice to the end that the incoming president may choose and appoint the committees with which he is to work and for whose action he is in large measure responsible.

May I also add a word here to emphasize the fact that it is a matter of vital importance to the Academy that each committee should organize promptly and carry on its work with some energy. Except during its regular meetings the Academy is a discrete body and must therefore delegate the performance of its necessary work to special or standing committees and must rely upon them for its proper and timely accomplishment. In the case of the standing committees, some of the members are carried over from year to year and are therefore somewhat familiar with the work they are expected to do. On the other hand the president is elected for one year and comes to the office with no special knowledge of the organization of the Academy or of the immediate duties of his office. In addition to this, the membership being state-wide in its distribution, there are few opportunities for personal conference in planning or carrying on the work. It is practically necessary, then, for the chairmen to take the initiative and to assume the responsibility to the president and the Academy for the efficient performance of the work devolving upon their several committees.

If the work of the committees be neglected or indifferently performed, the Academy suffers and has little opportunity to repair the failure. Fortunately, members are loyal and try to render excellent service. The chief difficulty comes from a failure to realize the time-consuming nature of the accomplishment of work through correspondence and the delays incident to widely separated residence of different members of committees. Every committee, therefore, should organize at once and make early preparation for their work.

The committee of most immediate importance to the Academy is the program committee and it is so fundamental that I may be pardoned a comment or two regarding its work. Personally I do not believe it is sufficient that this committee simply issue a call for contributions. Plans for a definite program should be made at once, and by personal invitation and correspondence the cooperation of members should be secured in carrying it out. This year's program affords an illustration of this plan, and I be-

lieve will prove its value. A definite idea should be developed as to the principal feature of the program, and the participation of individual members should be secured to treat of its various phases lying within the range of their several fields of work. This involves much labor, but the results will justify the effort, and I am sure the committee will be willing to give the necessary time and energy to the accomplishment of the plan. The writer does not believe that the papers form the most important part of the work of the Academy, but it goes without saying that a well-planned, attractive program is of first importance in gaining attendance and interest at the meetings, and without these all other ends will suffer defeat.

One result of the specialization of today is the narrowing of the interests of workers to smaller and smaller limits within the fields of their special activities. I quote in part from the address of Dr. John M. Coulter to the Academy on the occasion of the celebration of its twenty-fifth anniversary. There is "a tendency to become narrow in our vision and lose our perspective of the whole field not only of science but also of education. You will find that as scientific men become less and less interested in other fields of work, as they grind their own grooves deeper and deeper, they become less and less effective as teachers and less and less influential with their students. You will find men with broad outlook, clear and wide vision, men with sympathy—men can only get these things by coming in contact with larger fields than their own—are the men who win with students." So spoke one of Indiana's most effective teachers, and we must all be quite in accord with his opinion. Since we recognize this tendency, I would point out that a program which by its general interest and excellence will provoke thought and discussion in other than immediate individual fields of activity would be of inestimable value in the work of the Academy for its members. To this end may we not expect and demand the hearty cooperation of officers and committees and a ready and enthusiastic support from the whole membership?

One other consideration in connection with the regular programs is worth a passing mention. Modern photography and improved projection apparatus afford an important addition to the means of clear and interesting presentation of results of work, and in connection with this visual method I venture to suggest that more attention be given to the exhibition of specimens, apparatus, or preparations. The greater part of our members are teachers or are in some way closely identified with educational work, and the display of apparatus or preparations that have proven help-

ful in actual use would be of great practical value. Such displays have become one of the most acceptable features of the meetings of the sections of the American Association and of its affiliated societies and with our smaller and more intimate membership they might well prove of equal or greater value. Reference is not made here to the elaborate display of a single worker so much as to the exhibition of a number of less pretentious bits of apparatus or ingenious devices or illustrative specimens. For example, one scarcely ever visits a laboratory for the first time without seeing some ingenious device that has been worked out to meet a real need. Usually the same need is found elsewhere, and the display of the device at such a meeting as ours would command an appreciative welcome and be both suggestive and helpful.

The most important function of the Academy lies outside of the regular program, though in a large measure the latter conditions its success. I refer to the social side of the meetings—the intercourse of members for personal association and inspiration. The testimony of all older members agrees upon this as the pleasantest and most profitable feature of the Academy. During the business or teaching year we are largely isolated from each other. Sometimes a want of sympathy with or even distrust of the work of others arises from a lack of personal acquaintance and a knowledge of what they are doing. President Wilson has said that “Unless the hearts of men are bound together, the policies of men will fail; because the only thing that makes classes in a great nation is that they do not understand that their interests are identical.” Personal acquaintance will do more than any other one thing to bring about a common good fellowship and mutual appreciation which will insure that the other objects of the Academy will flourish through stimulus to thought and work and wider usefulness. The political boundaries of a state may not serve best as limits to a scientific organization, but at least they do serve to bind together into a practical working unit for the purpose of acquaintance, friendship, and cordial relations the scientific workers of a limited geographical community. This alone is an all-sufficient justification for the existence of our state organization.

Man is a social being, and nothing else is so potent in his development as personal contact with his fellows. Wagner has made much of isolation as a factor in evolution. Jordan insists upon its necessity if animals are to maintain themselves and develop into a species. This

isolation, however, is not that of the individual, but of a society. Isolation of the individual kills; of the society, vivifies. Segregation, with its consequent freedom from intimate contact with distracting forces and especially with its consequent interaction of varying kinds and degrees of like tendencies and interests, is of paramount importance in the development of the individual. This kind of segregation is just what our organization can and should accomplish. As members we are each interested in some particular field of work and too many of us find it difficult to keep in touch with the broad fields of which ours is but a part. No other agency can do so much to help us here as the personal contact which our meetings make possible. During the last two decades the pendulum has swung too far in the direction of intense specialization to the exclusion of the broader training, and already clearer minds are calling us back to the fact that science is one great field, and that to succeed in any part, one must have a broad view and a fair knowledge of the whole. The distinguished president of the British Association laid emphasis upon this in his address upon "Continuity" at the Birmingham meeting last month. President Van Hise says that for the training of a geologist there must be intimate knowledge of at least two basal sciences with a broad knowledge in other fields. "No man," says he, "may hope for the highest success who does not continue special studies and broadening studies to the end of his career. Besides the broad training in language which is essential in every field, there must be an intensive training in chemistry, physics, mineralogy, and biology." In other words the study of geology alone cannot make a competent geologist. Professor Bessey, whose word always commands the thoughtful attention of all teachers and students in America, contends that the fundamental training of a botanist may well be limited in the special botanical field to three years of university work, so that time and energy may be spared to the acquisition of the broader foundation necessary for subsequent specialization. With such a wide training the student is able to take up his special work with an intelligence and understanding that is impossible to one trained in a narrower fashion. In his presidential address to the Academy three years ago Dr. Evans said: "He is a poor chemist, who is only a chemist." Further testimony from experts in the scientific and educational fields could be cited, but I believe we all agree as to the value of broad training and the maintenance of broad inter-

ests along with any degree of specialization that may be attained. In view of this belief may I repeat that the personal interchange of ideas and the comradeship that our meetings afford can do much to nourish and keep alive this wider interest in different fields that all too readily becomes deadened by the isolation of the individual in his own work. In this service the Academy has a peculiar advantage over associations organized to promote some particular purpose. Its interests are broad, its members are recruited from widely varying fields, and yet all are bound together by their common interest in scientific work. In this respect no other organization has quite so much to offer to its members. The working out of the problem involves grave difficulties, but I believe there should be some way of putting larger emphasis upon the social side of the meetings. If possible the program committee should make some provision for greater opportunity for social intercourse. Short recesses in the regular sessions might be of service. The examination and discussion of exhibits such as previously suggested would be admirable for the purpose and would be not less effective than more elaborately planned occasions which are likely to become more or less formal and thus miss their real object. A greater cordiality on the part of the older members toward the younger, especially those who have recently joined the ranks of the Academy, would count for much. We should be of one large family and not stand too much upon formality.

In this connection let me remark that the Academy is not living up to its privileges. It should have a much larger membership. Indiana has many scientists engaged in industrial work. Pure and applied science, if we may use as still tenable that distinction of Huxley's, go hand in hand and we should do well if we could enlist in the service of the Academy many of the workers in the fields of the practical application of science. There should be some systematic effort by the membership committee to seek out these men and to show them the advantages of a connection with the Academy. In this work the committee must have the hearty cooperation of every member. It should be possible to enlist in our service the members of the various state departments of science who are doing valiant service in promoting the welfare of the people through work in agriculture, entomology, forestry, geology, health, hygiene, and sanitation. They would greatly help the Academy and in turn would unquestionably be well repaid by the advantages of membership.

In connection with the social side of the work of the Academy, one

other feature needs special mention. Conversation with the various members has shown that too little is known of the regular spring meetings. Comparatively few attend, but of those who do it is the common testimony that they are both most enjoyable and profitable. May I urge their claim upon your attendance? They are held in a different place each year and are in the nature of field excursions. This plan offers two great advantages. It gives occasion for members to visit different parts of the state and in association with others, some of whom are familiar with the territory, to become acquainted with the characteristic features of the locality. Through a series of years opportunity is given to acquire a personal knowledge of the more interesting and representative parts of the state which one scarcely would or could attain by individual travel or excursions. Field trips of this sort also afford the very best opportunities for gaining mutual acquaintance and for interchange of ideas and discussion. As one who has rarely missed a spring meeting and then only with regret and by reason of necessity, let me urge upon all the pleasure and advantages of attendance. That many other demands upon time and attention, especially at that time of the year, are pressing is recognized, but the value of such meetings will well repay the sacrifice of trouble and expense, and it is hoped that many who have not as yet attended these excursions into the field will in the near future find it possible to take part in them. I have endeavored to outline some ways in which immediate work may be done in the interests of enlarging the usefulness of the Academy. I am convinced that such work should be undertaken and have therefore turned from a more attractive theme as the subject of my address because it seemed to me a proper time and occasion to call attention to the necessity of some changes if we are to maintain and increase our membership and to serve it efficiently and well. With opportunity comes responsibility; and responsibility well discharged, brings yet larger opportunity. With an increased and united membership we could take an important part in the educational work of our state which, on its scientific side, needs direction and encouragement.

In closing allow me to propose one definite undertaking which I believe the Academy should give careful consideration. The end to be gained we would all welcome, and the effort toward its attainment would in itself be of value and incidentally bring other happy results. It seems to me that the Academy of Science is the proper body to urge a movement toward the establishment as part of our educational system of an adequate organi-

zation of a state museum for the collection, exhibition and preservation of our fauna and flora, our geological and archaeological history, and our natural resources. Such a museum would become the center of the scientific work of the state and the depository of the materials brought together by the state surveys. I do not mean to advocate a museum in the old sense of the word, to be a mere custodian of rare or curious specimens and records, but an organized department which shall exhibit our natural resources and point out the possibilities of their development in the interests of the people. Such a museum would fill a large place in the educational system of the state.

The rise of the museum in the city, state, and nation is the latest phase in the educational evolution of our day. It is only necessary to point to the work of such institutions as The National Museum at Washington, The New York State Museum at Albany, The Museum of Natural History at New York, The Carnegie Museum at Pittsburgh, and The Field Museum at Chicago, to prove its value in modern life. Its method of teaching is direct and impressive and it is the only method that is able to reach many of the people of a community. "The truest measure of civilization and of intelligence in the government of a state," I quote from an address of Professor Henry Fairfield Osborn, "is the support of its institutions of science, for the science of our time in its truest sense is not the opinion or prejudices, the strength or weakness of its votaries; it is the sum of our knowledge of nature with its infinite applications to state welfare, to state progress, and to the distribution of human happiness." In the development of this side of our educational system Indiana—we must admit it with regret—is far behind other and neighboring states. New York State is the leader and has evolved an ideal organization. Beginning in 1836 with the establishment of an official Natural History Survey, she has made successive and progressive changes until in 1894 a consolidation under the State Department of Education placed the museum at the head of all the scientific interests of the state. It directs all surveys, archeological, botanical, entomological, geological, paleontological, topographical, and zoological, and with the consolidation has come a great gain. It has succeeded not only in building up a museum worthy of a great state, but it has also taken a place in the educational work which no other organization could fill equally well. By means of instructive exhibits it has become a great teaching force, and through its traveling collections and the furnishing of materials and specimens to schools and societies it has widened its

sphere of usefulness till it reaches every part of the state and has the sympathy and active support of a wide constituency.

Our own state in 1869 organized a Department of Geology and Natural History and much good work has been accomplished. The energies of the department have been largely confined to investigations in the geological field, however, and its official title has been changed to The Department of Geology and Natural Resources. Little has been done in other fields and practically nothing in an educational way to gain the interest and support of the people of the state as a whole. It has been unable, therefore, to obtain adequate financial support from the state or to enlist the cooperation of other departments and organizations which should assist in building up an institution of which we might be proud and which would take a large place in the educational system of the state. Indiana now has a number of state departments or boards for the control or prosecution of work in various fields of pure or applied science, but for the most part they are independent in organization and work and there is lacking that cooperation and solidarity we should expect and without which the highest effectiveness cannot be attained. Let me say again that this statement of fact is not made in the spirit of criticism of the officers or personnel of any department; the purpose is simply to call attention to the situation as it exists and to point out the desirability of a change in the organization to bring about a condition more fitting to present conditions and therefore more advantageous to all departments and to their work for the state. I believe it would be wise and proper for the Academy, together with the different scientific departments and boards of the state, to consider some plan for the consolidation of the scientific agencies of the state which would render their work more effective and more extensive and thus gain the sympathy of the people and the necessary increased financial and other material support from the legislature. What is everybody's business is nobody's business, but some body or some organization should make it its business at least to consider some method of encouraging and forwarding the organized scientific activities of the state, and by reason of its character and standing the Academy of Science might well lead the way. For such action the third purpose of the organization as laid down in the constitution provides abundant warrant, and it is the belief of the speaker that through such action the Academy would render large and lasting service to the state.

