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THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

THE OUTLOOK OF THE SECTION FOR EDUCATION[1]

IT is not expected of the presiding officer of this new section that he will make any extended address at this time. In fact those good friends who have had longer experience than I in the American Association and who proposed that I say a few words by way of introducing Section L to the association, very thoughtfully added the intimation that brevity in this speech would be altogether appropriate. Each presiding officer of a section may speak his mind at length in the regular vice-presidential address, delivered at the meeting following that at which he has presided. That address is in the nature of a valedictory oration. The first in the line of vice-presidents of any section has the sole opportunity of serving also as salutatorian for his section. It is an advantage over his successors which he is bound in honor not to abuse.

One thing, however, ought not to be left unsaid. The new section is glad that it is, and I should not fairly represent it if I did not express to the parent society its appreciation of the high purpose that called it into being. Its satisfaction in this regard is shared, I am sure, by the great body of school men throughout the land.

We see in this act of the American Association a sign that the alliance of science with education, more or less clearly dis-

[1] Address of the vice-president at the Chicago meeting.

cerned for generations past, is now an accomplished fact in these United States. That alliance would seem to many so much a matter of course that they will find it difficult to see any new significance in this step of the association. But there are those who, whether they approve or disapprove, will see in it a notable and characteristic stage in the movement of our civilization.

The conception of the unity of education was with us preliminary to this alliance. So long as there were in the minds of men two distinct forms of education, an elementary education altogether traditional and conservative in character, and a higher education liberal in spirit and concerned with the continuous renewal of knowledge, so long, in a word, as the higher and the lower education served diverse ends, running counter to each other, just so long that alliance could not be consummated. The higher education was already represented in such societies as this through the members of its several scientific departments; and popular education might be left to go its unscientific way, serving the purpose of a more refined system of police, as Daniel Webster described it.

Our national instinct, even more than our national convictions, has been working for generations against any such rift in our national education. We have made straight the way from every country school and every kindergarten to the highest universities. This fact is clear and has been widely noted. The related fact has been less often remarked, that in making a plain way for our pupils from the lowest schools to the highest, we have made a plain way for all learning from the highest schools to the lowest. The distinction between school sciences and real sciences is altogether repugnant to our civilization. We are not willing that any good knowledge shall be the guarded secret of an intellectual class. With regard only for such metes and bounds as are natural and inevitable, we are determined that all learning shall be for all the people. It is hard enough at best to bring science home to the unlearned without taking from it its scientific character. But we are committed to the removal of all artificial hindrances to its free course. We are devoted to the effort to bring real and uncorrupted knowledge home to all; and this new educational organization is a new declaration of that purpose and a new agency for carrying it into effect.

The alliance of science and education is more than an alliance. In our national life these two are one and can not be put asunder. It is sometimes said that scientific research is a thing apart from education; that those engaged in such research, in order to do their best, must keep themselves as free as possible from the temptation to give instruction. The eminent director of the Carnegie Institution has declared that it is not an educational institution over which he presides. The better agricultural experiment stations of the country, newly endowed under the Adams act of 1906, are seeking by all legitimate means to secure for members of their several staffs sufficient freedom from lecture engagements to enable them to carry on investigations that require long patience and the severest concentration. Each new foundation providing for research apart from any requirement of regular hours of teaching is welcomed as a new factor in our real scientific development. No one of these things is incompatible with that intimate and inevitable connection of science with education. Such provision for free-handed research is indeed requisite, if science is to do its full part in the great alliance. It is not that each individual investigator shall be expected to give some formal instruction. That is a subordinate

question with which we are not now concerned. The connection of our science with our education goes deeper; for he who contributes to our science contributes, *ipso facto,* to our education. In this larger sense the Carnegie Institution and all other agencies of scientific research are educational institutions, and could not, if they would, abstain from educational service. In such an educational system as ours, no spring of new knowledge can be opened of which the streams will not find their way down through the different grades of education, as far as they may have proper use and application. The great significance of a fully coherent system of schools lies in this fact, that it not only enables individual pupils to rise according to their several capacities, but that it also gives to every scientific discovery free course among our people, according to the degree of its usefulness and of its human interest.

But in this free circulation of knowledge we are not yet perfect. If the connection were already free and open in every direction, a large part of the work of this section would be already done. We have, in fact, only as yet brought part and part of our educational system together, established the first of their more intimate connections, given first assurance that our democratic dream is passing over into reality. The task yet before us is greater than that which has been finished, and to those who plan most largely for the future, that which we now see is only a faint promise of that which may be foreseen.

It goes without saying that the mere spread of scientific information, the popular science of a generation ago, is but the smallest part of what the scientific alliance will mean to education. Scientific method, the scientific spirit, appreciation of scientific achievement, the abiding expectation that the processes of life and labor will be brought more and more under the guidance of positive knowledge; these are some of the things that education has gained and is to gain in larger measure from this relationship. In every walk in life men are to learn to observe more accurately, to pay more respect to objective evidence, to care more and more for truth, until they welcome it even against their dearest prejudice. The moral gain is greatest of all. And that is reinforced by the closely knit successive stages of developing thought and method which science has to offer, luring the learner on and on to larger reaches of organized knowledge and up into full-rounded and majestic sciences.

I do not forget that education has other alliances. Its relations with art in all its forms of beauty and use, its relations with philosophy, its relations with religion and with democracy, are not to be ignored. But all of these relations are to be tempered and steadied by scientific knowledge; and for this age, beyond any preceding age, the union with science is of commanding and immeasurable significance.

There are three ways in which this section, reinforced by the great organization of which it forms a part, can render the scientific alliance of increasing value to our education.

In the first place, it can provide for the discussion and investigation of questions relative to the teaching of the sciences. The internal method of any science depends upon the materials with which it deals. That method is in most instances well established before the use of the science in instruction comes under serious consideration. The method of instruction, with which the educator is concerned, is conditioned, on the one hand, by the method of the finished science, and, on the other hand, by the relative ignorance and immaturity of the learner. To strike the right

compromise between these two sides at any stage of instruction, and then to advance from the learner's first standpoint toward the pure method of the science, by stages that shall keep the learner's effort at the safest and steadiest tension, this is a problem which presents endless variations and calls for the closest pedagogic scrutiny.

In the second place, there is the scientific treatment of the whole range of educational procedure. The same science which is to be present and influential in the teaching of our pupils is to have a large part in the training of their teachers and in the effort of teachers and of educational theorists to give new shaping and definition to the whole work of education. Our educational doctrine is quick to respond in these days to promptings from the scientific side. But here as elsewhere the severe standards of scientific method are maintained only with the greatest difficulty. In every borderland between pure science and the things that are keenly felt and valued in human life, this difficulty rises to its highest pitch. Education is a field in which the sense of human values is intense, and it is accordingly a field in which especial care must be exercised to discriminate between science and the shadow image of science. No other educational organization, I think, is so favorably placed as this education section, to exercise that fine and severe discrimination. It owes, accordingly, a sacred duty to the educational interests of the land as well as to the great association of which it is a part, to hold its standard of scientific work up to the highest level. This duty and this opportunity, more than any other single thing, is its reason for existing.

The relations of the section to the council of the association, under the well-framed plan of this organization, must be of the greatest significance from the point of view of scientific standards. So, too, its relations to other sections and to the affiliated societies. For a century, more or less, education has walked hand in hand with psychology. This close companionship is undoubtedly to be strengthened and elevated by these new opportunities of intercourse. We may hope that both sides may be gainers in this relationship. But there is no one of the sections and societies in which education has not a direct and vital interest, and from all of them this youngest section confidently expects to receive help and stimulus.

Moreover, while concerning itself with scientific standards, this section will be reminded that the whole question of scientific and pedagogic standards in our institutions of learning is pressing for solution. It can not be doubted that in many directions our educational standards are too low. They are also in a large part indeterminate. To have its part in raising and defining these standards is a high purpose which this section may rightly cherish. It can hardly be doubted that this is to be one of the greatest tasks in our field within the next decade. Our sense of its urgency is quickened by the fact that we not only need new standards at home, but we can not be content to be in an attitude of mere deference and acceptance as regards the educational standards of the whole world. We must have our part in the main current of world education and do our part in the making of world standards.

In the third place, there is the problem of the organization of science and education in their relations to government and public policy. Year by year governments concern themselves more with the affairs of peace and industry and the culture of human character. Year by year, in both peace and war, they put larger dependence upon the knowledge of the scientist; and education, with science and the arts, is its main dependence in exalting peace above

war, and in promoting the vital concerns of a peaceful society. In legislation, in administration, in the making of new provision for the betterment of life, there are larger responsibilities falling every year upon those agencies of human culture which this section and this association represent. It will devolve upon us here to consider changes such as these, and devise and recommend ways in which the larger duties and opportunities may be met.

There is not time to enlarge upon these considerations. But they are laid before you in the briefest possible compass, with the conviction that here is real work to be done, which will count for positive gains to our national life.

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SECTION L, EDUCATION[1]

THE first meeting of the new section for education of the American Association for the Advancement of Science was held on Tuesday, December 31, at 10 A.M. The meeting was called to order by the vice-president, Commissioner E. E. Brown, who, in a brief address, welcomed the members present and urged that the section always maintain the high ideals of education as a science for whose advancement the section had been formed. Three independent sessions of the section, and two joint sessions with other organizations were held. One of these joint sessions was with the American Psychological Association, and the other with the American Society of Naturalists. An open address was delivered before a large audience composed of members from all sections by Vice-president Brown on the topic "The Outlook of the Section for Education." This address is printed in full in the current number of SCIENCE. The officers chosen for the coming year are:

Vice-president—Professor John Dewey, Columbia University.

Secretary—Professor C. R. Mann, the University of Chicago.

Member of the Council—President C. S. Howe, Case School of Applied Science.

Member of the General Committee—Professor D. P. MacMillan, Chicago.

Members of the Sectional Committee—C. H. Judd, C. S. Howe, T. M. Balliet, E. L. Thorndike, C. M. Woodward.

At the sessions of the section the following papers were presented:

The Ethical Judgments of School Children: Professor H. A. AIKENS, Western Reserve University, Cleveland, Ohio.

The Practise Curve as an Educational Method: Professor J. MCKEEN CATTELL, Columbia University.

Practise curves were exhibited showing the improvement which occurred in learning to use the typewriter and in memorizing German words. The practise was continued as long as 365 consecutive days by two observers. Curves were also shown measuring the extent to which practise in one direction causes improvement in other directions. In such experiments the learner works as hard as possible for a short time each day and knows exactly what he accomplishes, and the plan seems to have some advantages as an educational method. The greatest possible concentration and exertion for a short time is probably the best way to learn, and the child is led to this by his efforts to improve his record. The experiment can be so arranged that all the elementary subjects—reading, writing, spelling and arithmetic—are required in the experiment and are in definite relation to a task in which the child becomes interested. There is a fair competition with other students which may be emphasized as far as is desirable, but the main com-

[1] Chicago, December 31, 1907–January 2, 1908.