exercises as was necessary to pass the examination for graduation from the Swedish common school. The instruction given in the seminary was partly theoretical, and partly practical. The theoretical instruction occupied eighteen hours weekly, and included arithmetic, geometry, physics, mechanics, mechanical drawing, and pedagogics. The practical instruction occupied eighteen hours a week, and was intended to teach the use of the various implements of the joiner, the turner, the modeller, and the smith, to impart familiarity in the use of these tools, and to enable the pupils to make the furniture and implements that are found in every household. For practice, the students gave instruction, under the supervision of a trained teacher, in the schools for boys and girls above mentioned. On graduating, the student had to pass an examination in the theoretical subjects, and demonstrate his practical ability and his fitness to teach. On meeting these requirements satisfactorily, a diploma was awarded.

In 1880 this plan of instruction was essentially altered. The scientific subjects were dropped, and the entire time devoted to instruction in manual training. The length of the course was reduced to six weeks, and the training was arranged to meet the needs of certificated teachers who wished to fit themselves in these other subjects. Several, usually four or six, of these six-weeks' courses are given each year, and so popular have they become that many applicants have to be turned away. An account of one of these courses is interesting. That given in 1885 from July 8 to Aug. 18 was attended by 42 students, of whom 28 were Swedes, 3 Norwegians, 1 a Dane, 1 a German, 1 a Swiss, and 8 were female teachers from Sweden, Norway, and Finland. Six hours daily were spent in the workshop, under the supervision of Herr Salomon. The same gentleman, who is the director of the seminary, lectured seven hours each week on the historical development and the methods of manual training, and also presided twice weekly at assemblies of the students, held for the purpose of discussing the Nääs system in general and in its details. The results of these discussions were registered in a book kept for the purpose, and they accomplished diverse improvements in the details of the course.

Throughout the course a religious service was held daily, which was opened and closed with prayer and sacred song. No one was compelled, however, to attend this service.

The programme of instruction included a daily lecture from seven to eight o'clock in the morning, slöjd exercise from 9.30 to 1.30 and from 2 to 6 P.M., excepting Saturdays, when the slöjd ended at noon, and the remainder of the day was devoted to school-work and trial lessons. Two evenings weekly were given over to the discussions, and two more to lectures by Director Salomon. Herr Abrahamson was often seen in the work-rooms, and for every student he had a cheering word or a suggestion, and his personal influence was strongly felt among them.

In his lectures, Director Salomon developed the ends which manual training is to subserve, with great ability and perspicuity. He distinguished these ends as formal and material. The formal ends, he showed, were, (1) to arouse a desire for work and a pleasure in it; (2) to accustom pupils to independence, and to fit them for it; (3) to instil the virtues of exactness, order, and accuracy; (4) to train the attention; and (5) to train pupils in habits of industry and perseverance.

The material ends of manual training, Herr Salomon explained to be as follows: (1) to win the interest of the children, and therefore (2) to give them something useful to work at; (3) to require and promote orderliness and exactness; (4) to develop cleanliness and neatness; (5) to provide an opportunity to exercise and develop the sense of form; (6) to appeal to both the mental and physical powers of the child; (7) to strengthen the muscles; (8) to afford a relief from long-continued sitting at school; (9) to train the pupil to methodical and accurate expression; and (10) to promote a general ability to do hand-work. NICHOLAS MURRAY BUTLER.

## A PLEA FOR THE STUDY OF LOGIC.

MOST intelligent persons are very lavish in their expressions of admiration for the many important aids to the science of education, and consequently to the armamentarium of the teacher, which have been developed during the last fifty years. And yet, notwithstanding our progress in the methods and appliances which aid the teacher so much, many of our best educators are not satisfied with much of the work at present accomplished, and remedies are suggested from various quarters. It seems to me that most persons fail to appreciate the direct cause of the trouble, and in consequence their proposals are not such as will cure the ills of our great school system.

The object of an education should be to so train the faculties which nature has given the student, and to impart to him such knowledge, that he will be the better prepared to fill that particular station in life for which he seems destined, and which will enable him to grow in knowledge with his years, if he will continue the same methods of study after his graduation.

The school and college course should be regarded only as a beginning; and by reason of this education, if it has been as successful as we have a right to expect, the further acquisition of knowledge will be much easier. It is a source of great satisfaction to perceive that the old idea of a higher education, which consisted in turning out a polished man or woman upon society, who was almost wholly ignorant of the laws of nature, and especially so in all that pertained to their own organization, is no longer defended in the institutions of learning in this country. It is so at least in those worthy of any consideration as educational centres, and yet much remains to be accomplished under the new *régime*.

One of the desirable objects at present is to educate a man so that he may be able to overlook intelligently the whole field of knowledge, and to know how and where to obtain what he needs. The departments of human learning are already so numerous, that a general education can give but an insight and acquaintance with the many; while, if excellence in any one is desired, one must become a specialist.

Up to the present time, our greatest achievements in knowledge have been effected by our adherence to a certain form of reasoning known as the 'scientific method,' which combines the inductive and deductive processes. Until the full recognition and definition of this combination, progress was painfully slow, and was often retarded by the timely discovery that what had previously been regarded as truth, was, by reason of the imperfect methods made use of, only partly true, or altogether false. Certainly we had a right to expect that when the new method had been worked out, and had achieved grand results, every educator would be enthusiastic in its praise, and never cease to urge its study upon those who are seeking the knowledge in possession of the race at the present time, and especially upon those who hope that they themselves may be able to make some additions to the common fund of knowledge. But instead of this, it seems to have been forgotten, at least as anything of importance with which young students should become acquainted; and when it is taught, it is reserved until they have nearly completed their school-education.

The very principles that would be of incalculable advantage to the student, if inculcated early, are reserved until he has, perhaps, formed vicious habits of statement and reasoning, and which are not then so easily described. Perhaps the greatest defect of our educational system at present is the almost universal manner in which logic as a study has been ignored by our educators.

It may be urged that the logical principles are contained in some of the other branches taught; and as, in this way, knowledge is gradually increased, the pupil naturally appreciates the laws of reasoning involved in these studies, and therefore does not need the separate study of logic. But I do not believe this ground is well taken; for, although it is true that we are all to some extent logicians, too many are very imperfect ones, and they are unfortunately in the majority.

When a boy is placed at a trade involving the use of tools, the first step usually taken is to acquaint him with their construction, use, and care. But such delicate and intricate instruments as those which make up the human mind, seem to call for no special knowledge or training as to their use or care. Would it not be fully as wise to teach the younger scholars in the beginning of their education, soon after learning to read cleverly, — say, between the age of ten and twelve, — the fundamental principles of correct reasoning? The study of logic would be likely to cultivate the faculty of observation, which is so necessary in a true education.

Professor Farlow of Cambridge gave utterance, in the *Popular Science Monthly* about a year ago, to these sentiments in the following language: "I have said enough to show that unless my experience is an exceptional one, in spite of all the talk on the subject, boys at school are not taught to observe as they should be, and that even those teachers who use good text-books, frequently use them as means of imparting facts easily and quickly by the old method, rather than as an aid in the scientific training of the faculties which must form the basis of any serious study of biology." And again he says, "It seems a great pity that students should come to college so ill fitted, as are the majority, to undertake biological work. But we must accept things as they are; and there is no use in attempting to take the second step before the first has been taken. If the school can not or will not teach observation, then it must be taught in college, no matter if it does seem to be child's work. In colleges, however, it is absolutely impossible to find the time or the means for training every one to become an observer, and we are obliged to distinguish between two different classes of persons in arranging courses in biology."

These are the words of a professor in one of our best universities, as to the condition of the students sent there from the best schools in our land. In his sphere as an educator he has discovered this logical deficiency in the students who are anxious for a higher education. In a different sphere of life, no part of which has been spent in teaching, I have observed this great deficiency among the people who have received their education in our public schools, as well as in some of our colleges. There must be a cause for such a general condition as that referred to, and the one to which I attribute it may not be the only one, or a correct one. Be that as it may, it will perhaps occasion no surprise when the position is taken that the most important factor tending to perpetuate this imperfect development of our perceptive faculties is that logical methods have not been taught in our schools.

I believe nothing of greater importance can be taught children in the earlier periods of their education than this; but it should not be attempted by simply placing text-books in their hands. The teachers should first be familiar with the elementary principles of logic themselves, and spend a portion of each day, or several days each week, in an endeavor to teach the pupils the art of observation, together with the proper use of words, and how to draw correct conclusions from an observation. It is of vast importance that words should be correctly used in the formation of terms and propositions; and the study of reading and grammar alone is not likely to secure this.

If you do not teach children these principles of logic in early life, when they grow up, they are too prone to accept all that has been taught them as true, because the source from whence they received it was so eminently respectable. Thus they will lose or suppress their critical impulses, which are so necessary to mental growth: they will, in fact, be smothered by authority, and the result will be just what Professor Farlow has described as the deficiencies of his students.

Logic will continually incite the pupil to question things; and to do that, they must be observed and their characters noted, whether they be objects in the animal world about them, or some arrangement of words by which an endeavor is made to express a definite idea. The assertion made by some, that we are naturally logical, only tends to confirm the importance of these principles in any system of education. We can hardly have too many persons in this world who understand logical methods of reasoning, no matter how many there may be to whom reasoning according to these principles comes without education.

We know too well that most persons use exclusively the *post hoc, ergo propter hoc* method of reasoning; and they make up the impressionable portion of humanity. The views generally entertained about the nature of evidence are also exceedingly varied and fanciful. One has only to listen to a group of men of ordinary education and a fair endowment of common sense, discussing any subject of interest, to become convinced that this defect of early education is a glaring fact.

Even among laborers and mechanics, we can see the disastrous effect of this deficiency in early training. Could they have had these principles drilled into them by teachers who really understood and practised them, they would be more inquisitive in their work, in order to see whether it was the best that could be effected for the end in view.

It is useless to cite examples, for they are familiar to all. Much has very justly been said, in derision of the differences of opinion among professional men, upon topics which should not, from their nature, give rise to such varied conclusions; and especially has this been enlarged upon in its application to the medical profession. "Is there any sufficient reason for such a state of things?" has often been asked. This is probably not to be attributed to one cause alone, where so many different individuals have to be taken into account, although I believe it is to be explained in large part by their deficiencies in the science of logic; otherwise the uniformity of their conclusions based upon the same facts would be greater.

The records of medical literature are filled with rubbish, that no man, with any knowledge of the elementary principles of logic, would think for a moment worthy of preservation. A medical man has, for example, a peculiar and protracted case of disease: he employs a number of different remedies, and after weeks, or perhaps months, the patient recovers. The delighted physician at once rushes into print with an account of the wonderful virtues of the remedy last administered to his patient, and no suggestion as to the insufficiency of the evidence adduced in order to establish a new truth seems to intrude itself upon his consciousness. And it s in this way, and for this reason more than any other, it seems to me, that medicine continues to deserve the designation of an art rather than that of a science.

But it may be asked, is there no danger that the uniformity that might result from such a general study of logic would become so great as to hinder the development of new ideas and methods? I think not. For although the methods of logic to which we owe our greatest triumphs — and consisting of the four following steps: (1) preliminary observation, (2) construction of hypotheses, (3) deductive reasoning, (4) the process of verification — are the nearest possible approach to perfection in reasoning, and may not be at present susceptible of improvement, it would not prevent some genius from unfolding a new and better system, should such be within the bounds of possibility. I think we need have no fear, even though we were all accomplished logicians, that there would be too much uniformity in our conclusions.

Thinking is no doubt the most important function or attribute of man; and, as the brain will continue to think, let us do what we can to encourage its very best performance.

In an examination of such reports as I could obtain from the Bureau of Education at Washington, with the view of ascertaining whether any of our schools were teaching logic, I was unable to find it in the curriculum of any State, though it is true that only a few were given. The sole reference to it in connection with the schools of the United States was in a list of books considered suitable for teachers' libraries, and prepared by the librarian of the Bureau of Education, which recommended Professor Jevons's 'Elementary Lessons in Logic,' and a work by John Stuart Mill.

In a programme of the studies in a mixed school in a certain department in France, I found the upper class, from eleven to thirteen years of age, devoting thirty-five minutes in the afternoon to a recitation of which logical analysis was a part; and this is the only reference to it as an object of study I have been able to find.

Professor Agassiz, in speaking of the study of natural history being of great value to all scholars in urging its importance, goes on to say, "The difficult art of thinking can be acquired by this method in a more rapid way than any other. When we study logic or mental philosophy in text-books which we commit to memory, it is not the mind we cultivate, it is the memory alone. The mind may come in, but if it does in that method, it is only in an accessory way. But if we learn to think by unfolding thoughts ourselves from the examination of objects brought before us, then we acquire them for ourselves, and we acquire the ability of applying our thoughts in life. *It is only by the ability of observing for ourselves that we can free ourselves from the burden of authority.* So long as we have not learned how to settle a question for ourselves, we go for authority, or we take the opinion of our neighbor; that is, we remain tools in his hands, if he choose to use us in that

way, or we declare our inability of having an opinion of our own. How shall we form opinions of our own otherwise than by examining the facts in the case? and how can we learn these facts which are unchangeable, those facts over which man, with all his pride, can have no control?"

I have no hesitation in thus quoting Professor Agassiz, although he seems to be against me, judging from his reference to logic alone, because his remarks seem so applicable to what I am urging, in that they so strongly inculcate the necessity for logical training (and which the study of natural science gives) in what is certainly a convincing manner. Still, I am fully persuaded that he would not have spoken in this way about logic, if it had been understood that it was to be taught in the way he urged with natural history; viz., to take the objects or words and propositions in use every day, and apply these principles to them. It then becomes something very much higher than a mere feat of memory, and I fail to see why instruction in logic would be any waste of time, even when natural history was being studied, and where the kind of work to which Professor Agassiz refers is out of the question; and for the present this seems to be the case in all our grammar-schools. The great desideratum is the proper presentation and teaching of logic by those who really understand it themselves.

In conclusion I would say that it is very difficult for me to understand why, if logic is ever worthy of study, it is not more necessary in the beginning of an education than at its close. I will therefore hope that all who are engaged in the profession of teaching will give this subject their serious consideration, and perhaps trial. Let us not forget that logic teaches us to reason correctly; that good reasoning will give us more knowledge, and this will give us power; which, if combined with good character, cannot help making its possessor more valuable to himself and to his fellows.

S. J. BUMSTEAD.

## THE AMERICAN PUBLIC HEALTH ASSOCIATION.

THE American Public Health Association held its fifteenth annual meeting at Memphis, Tenn., on Nov. 8, 9, 10, and 11. The attendance was good, among those present being many of the prominent sanitarians of the United States and Canada. At the first session ninety-four new members were elected. The annual address was delivered by the president, Dr. George M. Sternberg, U.S.A. The following is an abstract of the address:—

"It was due to the yellow-fever epidemic of 1878, in which Memphis was the chief sufferer, that steps were taken at our meeting of that year, in the city of Richmond, to urge upon Congress the importance of a national board of health. Recognizing the fact that epidemics do not respect State boundary-lines, and that an efficient sanitary service in times of emergency requires a liberal expenditure of money, and unity of action on the part of sanitary officials, we urged the formation of a central health board, and for a time it seemed as if our well-meant plans would be crowned with success. Indeed, they were crowned with partial success, for all must recognize that in the early days of its existence the National Board of Health accomplished much good. It is unnecessary for me to refer to the various circumstances which conspired to paralyze the effective energy of this board. Unhappily it is a thing of the past, and the hopes which we had founded upon this our bantling are but a memory of the past. But we should not be discouraged that our first effort has failed. A careful consideration of the circumstances which led to this failure may enable us to mature a better plan. Such a plan, indorsed by the judgment of the experienced sanitarians here assembled, and properly presented to our national legislators, could not fail to receive respectful attention.

"One thing appears to me to be thoroughly demonstrated by the experience of the past; namely, that a central health board, to be efficient, must be attached to one of the departments of the government now in existence, so that it may be under the protection of a cabinet officer. It would be useless to ask at the present time that the sanitary interests of the country may be represented by an additional cabinet officer, a minister of public health, although there can be no doubt that the interests involved are sufficiently important to justify such an innovation. But we may at least demand that the sanitary interests of the people of the United States shall receive the same consideration from the national government that is accorded to the educational interests, the agricultural interests, etc. We may at least ask for a bureau of public health, with a commissioner at its head, and with the necessary secretaries and clerical force to make it efficient; and attached to such a bureau should be a well-equipped laboratory, in which expert bacteriologists, chemists, and sanitary engineers should be employed in the experimental investigation of unsettled sanitary problems, such as the natural history of disease-germs, the best methods of destroying them, protective inoculations against infectious diseases, problems in sanitary engineering (such as the disposal of sewage, domestic sanitation, etc.), food-adulterations, and a variety of other questions of equal importance, which will readily occur to you. I do not approve of the plan of having a central board of health, composed of members located in various parts of the country. Such an organization is cumbersome, and it cannot be expected that a board which is only assembled at long intervals, and of which the members are occupied by various pursuits, which claim their time and best thought, will render the most efficient service. On the other hand, by diversity of opinions they may greatly embarrass their executive officer, who must necessarily be located in Washington. Nor, in my opinion, would a board composed of officials at the head of various departments in Washington, such as the surgeon-general of the army, the navy, and the marine-hospital service, as has been suggested, be much better. These officials are fully occupied with the duties pertaining to their office, or at least have not sufficient leisure to undertake the executive work of a central health bureau. I would therefore expect better results from the untrammelled action of a single commissioner, who would be responsible directly to the cabinet officer to whose department his bureau was attached, and who would necessarily be controlled by the law defining the nature of his duties. In this case it is evident that the good accomplished would depend largely upon the fitness of the man selected for the special duties intrusted to him, and that a political appointment in the first instance, or the removal of a suitable man for political reasons, would entirely defeat our object.

"We may, however, ignore this possibility, and trust to the good judgment of the chief executive and the growing public sentiment in favor of retaining efficient bureau officers, without regard to party changes.

"In connection with a bureau of public health, it would certainly be desirable to have an advisory board of health, to which the commissioner could refer questions for consideration, or which could advise him of new measures, or desirable changes in his regulations, which, after full discussion, commended themselves to the judgment of the board. Such a board should have no executive power, and the members should receive no pay beyond their actual expenses in attending the appointed meetings. I would suggest that such a board should consist of the surgeons-general of the army, the navy, and the marine-hospital service, and of the presidents of State boards of health. One annual meeting in Washington would probably answer the purpose for which a board would be constituted, except in case of an actual or threatened epidemic, when it might be convened, at the suggestion of its president or of the commissioner of health.

"I request your careful consideration of the plan here suggested, and, if it meets your approval, would urge the importance of taking such action at the present meeting as will insure its being properly brought before the Congress of the United States."

Dr. Sternberg referred to the epidemic of yellow-fever at Memphis in 1878, and the sanitary improvements made in the city since that time, and then gave its inhabitants the following advice:—

"Do not allow yourselves to fall into a state of inaction and false security because for several years our foe has been kept at bay. Although it is now evident that yellow-fever is not epidemic in any portion of our land, and we have learned by recent experience that by proper measures it is possible to exclude it for a series of years, even from the city of New Orleans, yet there are so many possibilities of its introduction, in spite of the vigilance of those who have charge of the gateway of the Mississippi valley, that it would be folly to neglect those local measures of sanitation which remove the vulnerability of cities in the presence of the germs of pestilential diseases. Shutting the door is of prime importance, and while the keys are in the hands of our energetic and able colleague, Dr. Holt,