

MISTAKES, MISAPPREHENSIONS, AND FALLACIES, CONCERNING MANUAL TRAINING.

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NOTE.—Not the least important part of Physical Education is the work of Manual Training, and we are glad to have the opportunity of presenting the following refutation of the mistakes, misapprehensions, and fallacies concerning it from the pen of so able and competent an authority as Dr. Calvin M. Woodward.

It should not be forgotten that Manual Training is a physical exercise which combines, as no sport or pastime can do, the elements of intellectual interest and muscular development,—a combination which, it will be observed, nearly all the authorities contributing to this volume claim to be the highest desideratum in Physical Culture.—[C. W.]

A MOTHER recently said to a friend who had advised her to send her son to the Manual Training School: "Yes, if I wish my boy to seek the companionship of carpenters and blacksmiths, I suppose I ought to follow your advice. But I hope and expect my son to become a cultivated man, and to seek the companionship of cultivated men."

Similarly, an educational writer prophesied when the Manual Training High School of Philadelphia was opened, that its "graduates would probably form a degraded mass of operatives."

In like manner many people have taken it for granted that no one who had brains or ambition enough to do something else, would concern himself with the arts of a mechanic; hence, if they see a boy in a shop with tools in his hands, the inference is natural that he is either dull or low-minded.

I am not surprised at such mistaken ideas and inferences, for all the literature and philosophy of the ages has taught the same thing. Plato and Aristotle taught that contact with the practical arts was degrading, and that tool work of all kinds belonged to slaves.

This prejudice, ancient and modern, was founded on ignorance and caste. To-day the wall of prejudice whether founded on ignorance, or built by artificial caste distinctions, is being torn down and removed. Skill and culture go hand in hand, and there is no divorce between science and arts. Let me speak of the more common fallacies and mistakes of both parents and teachers in regard to Manual Training.

1. Manual Training is not the same thing as manual labor. If a boy works in a shop or on a farm, it is assumed that he gets manual training—he may have a taste of manual training, sometimes he has considerable, but generally he gets very little. I was a farmer's boy, and worked on a large Massachusetts farm till I went to college. I learned to plough, to chop wood, to hoe, to mow, to use a shovel and a

fork. I could yoke oxen, harness horses, and milk cows, but the scythe and axe were the only edged tools I could use, and I did not learn to use properly either bench or machine tools upon woods and metals. So a boy in a shop learns a few motions, perhaps a few tools, but nine-tenths of his time—perhaps more than that—is given to mere labor, to doing things he knows how to do, and which yield, not education, but wages. No farmer's boy learns how to draw—neither does the shop laborer learn the relation that drafting bears to construction. Manual labor means hard work, with the large muscles, for eight or ten hours per day, while the mind is absent or dormant. So long as the work in hand is interesting, and one is trying to master it, there is education and a measure of mental growth; but when sharp attention ceases, education stops, and only manual labor continues. I am reminded of a remark made to me recently by a gentleman in middle life, a very excellent carpenter, when I was watching my boys, twenty-four of them, at work making their first weld in the forging shop. He seemed intensely interested as he watched the young students at their work. I said: "You seem to like to see the boys work. Do you understand what they are doing?"

"Yes," said he; "I worked a year once in a blacksmith shop."

"Well," said I, "then I suppose this operation of welding is a very simple matter to you."

"Not at all," said he. "I never made a weld in my life. I never got a chance; I worked hard at all sorts of labor. I kindled the fire, pumped the bellows, and I did some 'striking' for other men, but they never let me try to make a weld." Then he added, with a good deal of feeling, "These boys learn more in one week about the really essential art of forging than I learned in half a year. And the secret of it is, they have a thoroughly skilled workman who is competent to teach and to use practically every principle involved, and who does nothing but teach; and he gives every boy a chance to actually learn every step in the business, and they spend no time in just doing things they know how to do fairly well."

2. It is assumed that in learning how to use tools, one must immediately make something—a toy, a piece of furniture, or a machine. The assumption is unscientific. One does not begin arithmetic with bank discount, or mensuration. The *fundamental rules* must first be mastered. The soldier learns how to use his rifle without once shooting at an enemy. The piano pupil learns scales, intervals, and fingering, before once venturing upon Beethoven or Rubenstein. So a manual training pupil learns the simple alphabetical steps of every tool, and the elements of every process before he attempts to combine them. A synthesis may follow a mastery of the analytical steps involved in a construction, but it comes at the end, not at the beginning, of the lesson series.

Much less is a pupil at the beginning prepared to select his tools, or to choose or design his exercise. The Latin pupil might as well

select his author or write his own grammar. The manual arts should be taught logically, and learned systematically.

3. It is a mistake to suppose that every boy can learn how to use tools correctly by himself without a teacher, and that he must not be "shown." Modern tools are the product of many generations of careful study on the part of skilful men. The more elaborate the tool, the more brains have been mixed with it. There is one best way with every tool and every step in its use, and the chances are a thousand to one that the boy when left to himself will not find that best way. As well let him guess at the meaning of words without a dictionary; or learn by himself how to hold his knife and fork; or how to manage an automobile.

Self-taught people—while better than untaught people as a rule—often suffer keenly from wrong habits, and they are always handicapped as compared with the pupils of a good teacher. We all know how much it means in art, in literature, and in science, to be under the careful personal direction of a master. It is equally valuable to the pupil in manual training. The theory of every tool, and its correct use, and the analysis of every process should be shown, and made perfectly clear by a master mechanic and a skilful teacher.

4. It is a mistake to suppose that the most valuable thing in manual training is its availability as an introduction to the fine arts. Undoubtedly, it is of service in leading to art study, as an abundant experience has shown, but I think its economic or industrial value is far greater. Manual training directly opens the way to industrial efficiency and to technical colleges. While it unfits no one for any occupation, it clearly leads up on the one hand to the doors of industrial establishments; on the other hand, it leads straight into our technical schools.

Some of our graduates are artists, quite a number are architects, but far more are engineers and manufacturers. Of course, many begin as mechanics, but they soon rise to positions where they direct other mechanics or draftsmen.

5. I regret to say that some people think, or fear, that manual training lowers the moral and intellectual tone of a school; that where manual training goes in something fine and refining must go out. That is a sad mistake. No school was ever on a higher moral plane than a good manual training school, and I doubt if any was more strenuously intellectual. The manual training boy learns to insist upon accuracy, precision, fitness, strength—in other words, concrete truthfulness. Again he puts theories to actual test; he challenges authority—and demands a trial. He asks the what, and how, and wherefore; and wants the latest reports in science, and the last invention in the arts. Psychologists tell us that manual training is essential to the full development of the brain, and therefore indispensable to intellectual culture.

6. Finally, it is a mistake to suppose that success in the shops of

a manual training school does not consist with success in academic studies; and that a dunce in mathematics and grammar must be good in the shop. The best all-round scholar is always a good workman; and the good all-round workman is always a good scholar. But not every boy is capable of high scholarship, and on the other hand, not every boy has capacity for mechanical skill. This, however, is true: every boy with a healthy normal brain has capacity for good scholarship and for good workmanship. There are dunces in all departments, but real dunces, like loafers and shirks, have a hard time in a manual training school, and their sojourn therein is not long. It takes brains to make and read a good figured drawing; and it takes a clear head and a high degree of intelligence to use and not abuse a Universal milling machine.

Doubtless there are other incorrect and inadequate conceptions of manual training which only an actual trial of it under good conditions can remedy. The manual features occupy less than one-third of the time devoted to study, recitation, and laboratory work. Science, mathematics, and language work still occupy the chief parts of the daily programme. The all-round effect of the combination is fine. Professor William James of Harvard University says: "The most colossal improvement which recent years have seen in secondary education lies in the introduction of manual training." And Dr. Stanley Hall says: "No kind of education so demonstrably develops brain as hand training."

THE IMPORTANCE OF ELEMENTARY INSTRUCTION IN PHYSIOLOGY.

BY

PROF. T. H. HUXLEY.

THE chief ground upon which I venture to recommend that the teaching of elementary physiology should form an essential part of an organized course of instruction in matters pertaining to domestic economy, is, that a knowledge of even the elements of this subject supplies those conceptions of the constitution, and mode of action of the living body, and of the nature of health and disease, which prepare the mind to receive instruction from sanitary science.

It is, I think, eminently desirable that the hygienist and the physician should find something in the public mind to which they can appeal; some little stock of universally acknowledged truths, which may serve as a foundation for their warnings, and predispose towards an intelligent obedience to their recommendations.

Listening to ordinary talk about health, disease, and death, one is often led to entertain a doubt whether the speakers believe that the