school-keeper' that belittles the school. The true, high-minded, hard-working, untiring, conscientious, progressive, enthusiastic, God-fearing teacher never belittles the school, society, or himself, but raises the standard of each.

Perhaps before closing we should explain one of those adjectives, viz., 'enthusiastic.'

We certainly think the professional teacher should be enthusiastic; because those who accomplish the most good are those who have energy and enthusiasm, and show by their work that they are in earnest, and believe what they do to be worth doing well. There is a difference, however, between a demonstrative and an enthusiastic manner. To be *noisy, flighty,* or *fussy* is not to be animated. Animation or enthusiasm is earnestness without undue excitement.

WILLIAM M. GIFFIN.

INDUSTRIAL TRAINING IN THE PUBLIC SCHOOLS OF GERMANY.

MY observations on the industrial training of the public schools of Germany are chiefly confined to the city of Darmstadt, the capital of the grand-duchy of Hesse-Darmstadt.

For many years the court of this grand-duchy of Hesse has drawn to the capital the representatives of the best education and culture; and its school system is undoubtedly the fairest model in central Germany.

Besides its common public schools, the city contains a polytechnic school, a gymnasium, a realschule, a school for the higher education of girls, several private schools, and a number of kindergartens.

To the noble efforts of the much-lamented Princess Alice may be largely attributed the interest that, since her death, has been taken throughout Germany in industrial training for girls. As soon as Princess Alice came to Darmstadt, she made her influence felt. The Alicen-Verein was organized with the princess as president, and Fräulein Louise Büchner as vice-president. This Verein is an association of women, whose object is to impart instruction in the various duties of housekeeping to mothers and their daughters, and to encourage them to better morals and habits of life, and inspire them with a higher ideal of w. Tomanhoodhis association started an entirely new and popular interest in girls' hand-work, — that kind of industrial training for girls which is now one of the regular branches taught in all the public schools of Germany.

In a country like Germany, with a dense population and with a sharp competition in all the departments of labor, with enfeebled natural resources, the only temporal salvation for the masses is work, — patient, continuous, and remunerative manual labor. Now, when this work is performed by an educated and skilful hand, it is plain that its effectiveness is enormously increased. The boy who has received industrial training is more apt to learn a trade; he is better prepared, as the masses must be in all countries, to make a living with his hands; he will be a happier man, more contented, and less willing to leave his fatherland and emigrate to foreign lands. These are undoubtedly some of the strongest reasons why the German government shows such a solicitude for the industrial training of its youth. At Darmstadt, a few years ago, several private citizens made an experiment in giving industrial instruction to boys after school-hours. The results of the experiment were such convincing proofs of the needs of such instruction in every city, that the institution was incorporated, and became a branch of the public-school system, although no special provision had been made in the school law, such as had been made for the industrial training of girls.

The manual-training schools are intended for that class of boys — and a very large class it is in every city — that idle away their time before and after school on the street, where they learn more readily the vices of the depraved than the virtues of the good, and so counteract whatever of honesty, patience, perseverance, kindness, and obedience the teacher at school may attempt to inculcate. This is the reason why the boys in our country, as well as in Germany, who have to work before and after school, make the best progress in their studies, and are the most obedient, and give least trouble to the teacher at school.

In Germany the schools close the daily session at about 2.30. After this time, the boys who, either through poverty or the indifference of parents, are not properly and healthfully employed, must attend the industrial school for the rest of the day. In the industrial school at Darmstadt, in the summer-time, the boys are put to work in the different gardens belonging to the institution. They are divided into classes or companies, each under the supervision of a teacher. One day I saw a company of boys, about twenty in number, between the ages of nine and ten, engaged at transplanting cabbage-plants, and for the first time in my life did I discover that there is an intelligent way of doing work even as trifling as this seems to be. In another part of the garden a company of older boys was preparing the ground for a new crop: the work was likewise systematically and even scientifically performed. In other

parts some were weeding, some were watering plants; others gathered fruit and vegetables, and prepared them for the market. The flower-garden is the most interesting part to the stranger. Here I saw a company of boys laying out ornamental flower-beds. Beauty, taste, and skill, coming from such young hands, fill the stranger with admiration.

At other seasons of the year the boys are engaged at various light crafts in work-rooms, such as the making of baskets, brushes, brooms, etc.; light and plain carpentry, where the use of tools is taught. The hammer and saw are the principal tools for the younger class: with these they are taught to drive nails and saw boards at various angles. Type-setting and book-binding are taught to the advanced and older classes.

Each boy receives a small remuneration for his work when it is faithfully and obediently performed. The money, however, is not directly paid to him, but is put into a savings bank for him; and from time to time he receives his certificates of deposits, which the boy, with a face all aglow with inexpressible delight, carries home to his parents for safe keeping.

As the industrial training of boys requires grounds, extra buildings, tools and appliances, and in many cases extra teachers, it can only be indirectly connected with the public schools. And although the government encourages manual training for boys, there are great difficulties in the way of making it universally obligatory. For this reason it is not mentioned in the school law as one of the regular branches to be taught in the public schools, but must be left entirely to private and municipal efforts, with indirect aid from the government. But girls' manual training, or, as it is called in Germany, 'female hand-work,' presents none of these difficulties; so that it finds a place in the school law. The following is a translation of article 12, p. 6, of the school law of the grand-duchy of Hesse: "The following are the branches to be taught in the common public schools: religion, reading and writing, composition and grammar of the German language, arithmetic, mensuration, history, geography, natural history, vocal music, drawing, gymnastics for the boys, and for the girls instruction in female hand-work."

Female hand-work, however, is no new thing in the public schools. From the very earliest times of school history, girls have been known to take their knitting and sewing to school; and in our country, in the early part of this century, not only the girls, but the boys also, used to knit their own stockings at school. But the work then performed had no educational end in view. The industries were yet undeveloped, and every family was obliged to manufacture its own clothing. Each member of the family had to lend a helping hand, so that the work done at school seems to have been performed through necessity.

This is not the case with the hand-work performed in the schools in Germany now. Its purpose is purely an educational one, — to train the hand, and develop its cunning. And to guard against selfish and calculating tendencies, the pupil is not permitted to make any thing to be worn by any one; for nothing is more mischievous, and more directly opposed to the harmonious development of a child's mental powers, than a calculating motive, — the motive whose chief outlook is material gain. This manual training is pursued for its own sake, as a mental and ethical discipline, and by no means for its economic value.

The parent furnishes the child with the needed material, which, when the child has finished its course, may be as useless as the paper upon which it has written its language-exercises. And yet, for all this, no one complains that it does not pay. The benefits of industrial training are best understood by the authors of school law. From another page of the school law I make the following translation: "Female hand-work is not only to have a practical purpose, bearing upon the proper management of a home, but it must also tend to train girls early to habits of usefulness, and to develop the virtues of endurance, patience, industry, economy, and benevolence, and to refine the taste for order and for becomingness in dress."

The instruction is based upon philosophic principles, and is imparted in a systematic manner. None others but teachers who have taken a thorough course in the industrial-training schools for female teachers are permitted to teach at all; and when you enter a room, no matter whether it be the lowest primary or the highest grammar, you will find a teacher there who understands her business thoroughly.

Two to three hours each week are given to industrial training, generally on Tuesday and Thursday afternoons.

Knitting is the first exercise, and the ordinary forms of meshes are continued throughout the seventh year. Sewing is next introduced.

Among the first lessons in sewing are the use of the thimble and scissors, threading the needle, and the ways of holding the cloth while sewing and cutting; a lesson is also given upon the different kinds of thread. The stitch-lesson is first performed on paper: after a while, a cheap kind of muslin is substituted. Every lesson is made a class drill. The children work by dictation: all

in the room do the same work at the same time. Every new mesh or stitch that is introduced is first illustrated by the teacher before the class, on a frame which is high enough for all to see. It is rectangular, two feet by eighteen inches. Heavy threads or cords are drawn through its sides, crossing each other at right angles. After the seventh year, crocheting of loose, open, and close meshes, with one-colored yarn, is introduced. Next party-colored yarn is used, from which various beautiful figures are made, which gradually leads them to crochet articles of many beautiful patterns.

From the twelfth to the fourteenth year (the last year in the public schools), sewing is the chief branch. The patching and mending of torn garments is most thoroughly taught. In the last school-year the cutting and making of underwear is taught.

The specimens of work that come from those young hands are simply wonderful in points of neatness, skill, and taste. Any generous-minded person will be at once convinced that the capacity for happiness in those young girls is far superior to that of the class who have never been taught any thing else than mere book-knowledge.

SEBASTIAN THOMAS.

THE TEACHING OF ALGEBRA.

AMONG the papers lately presented to the Education society of London, is one on the teaching of algebra, by W. H. H. Hudson. It contains a great many passages of universal application, and such deserve to be reproduced in this country for the benefit of our teachers of mathematics. Mr. Hudson first answers the question, Why teach algebra at all? and, while fully recognizing the utility of algebra, he maintains that algebra is not to be taught on account of its utility, nor to be learnt on account of any benefit which may be supposed to be got from it, but because it is a part of mathematical truth, and no one ought to be wholly alien from that important department of human knowledge.

The next question is, When should algebra be taught? The answer is, At an early period of intellectual development. The reason for this is that algebra is a certain science, it proceeds from unimpeachable axioms, and its conclusions are logically developed from them: it has its own special difficulties, but they are not those of weighing in the balance conflicting probable evidence which requires the stronger powers of a maturer mind. It is possible for the student to plant each step firmly before proceeding to the next; nothing is left hazy or in doubt: thus it strengthens the mind, and enables it better to master studies of a different nature that are presented to it later. Mathematics give power, vigor, strength, to the mind. This is commonly given as the reason for studying them. This is also the reason for studying algebra early, that is to say, for beginning to study it early. It is not necessary, it is not even possible, to finish the study of algebra before commencing another. On the other hand, it is not necessary to be always teaching algebra: what elementary teachers have to do is to guide pupils to learn enough to leave the door open for further progress; to take them over the threshold, but not into the innermost sanctuary.

Children younger than nine will rarely be fitted to take up algebra; and, on the other hand, it is seldom advisable to defer its commencement until after twelve years of age. Certain preliminary acquisitions are essential for this study. The first of these, in Mr. Hudson's opinion, is the power of listening.

"By this I mean the habit of attaching an idea to what is said. Some pupils — I hope no teachers — consider it sufficient if the pupil can reproduce the words that have been used, without attaching any idea to them. Such pupils will not learn algebra. A pupil who has the habit of listening will not allow a teacher to use unintelligible language, and will be of great use in a class by stopping the teacher and asking for things to be repeated and strange words explained. It is difficult for a teacher to realize that sometimes he is using a vocabulary beyond his pupils. Interruptions of this kind, which show that the pupils are listening, are of great help to the teacher.

"This leads to the next essential preliminary: the student should be able to speak. I do not mean that a deaf-and-dumb person cannot learn algebra, but he can only be taught under great disadvantages. Thinking of the ordinary run of boys and girls, I say that they cannot learn algebra until they have learnt to speak. By speak, I mean can ask questions and can answer questions, can say what they know, and can point out what to them is obscure. It has been well said that a pupil who cannot ask a question in his natural voice is unteachable: my own experience confirms this. Some pupils put on a lecture voice, in which they answer questions put to them. I do not call this speaking. It is unnatural and artificial, and is a serious bar to progress. It arises from timidity, fear of the teacher, or fear of the rest of the class; and the latter is far more difficult to be got rid of than the former.

"Moreover, a pupil must have a sufficient command of language to be able to frame a complete sentence. I have heard of teachers who are satis-