Department of Public Instruction in Mysore

SPECIAL REPORT

ON

MANUAL TRAINING

IN

SCHOOLS OF GENERAL EDUCATION

BY

H. J. BHABHA, M.A.

INSPECTOR-GENERAL OF EDUCATION IN MYSORE

Based on notes of inspection taken during the period of study leave in 1906-07

BANGALORE

PRINTED AT THE GOVERNMENT PRESS

1909

THE SLOYD TRAINING CLASS OF TEACHERS IN BANGALORE AT THE DEWAN'S INSPECTION, 1908.

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PREFACE.

—o—

In June 1906 I took, for the benefit of my health, three months' privilege leave which was combined with furlough for nearly six months. The Government of His Highness the Maharaja of Mysore, during the Dewanship of Mr. V. P. Madhava Rao, C.I.E., were pleased to depute me to study, among other kinds of education, the systems of manual instruction in schools of general education both in Europe and America. Mr. Madhava Rao was a firm believer in the advantages of manual training, and had made efforts for its introduction into the schools of Travancore before he became Dewan of Mysore. The special report now published embodies the results of my study and the notes of inspection taken during the period of my deputation leave. It has been drawn up in the scanty intervals of leisure snatched from the engrossing duties of the head of an important department. The liberality and earnestness of His Highness' Government enabled me to introduce, soon after my return from leave, the methods of kindergarten instruction as well as manual training into the schools of Mysore during the last two years. The introduction of these modern subjects of teaching required much thought and careful organisation, and left me no time to write the special reports on the subjects of my study, which, if they are to be of use to those engaged or interested in education, should necessarily be, not mere reproductions of notes, but treatises on the theory and practice of educational methods illustrated by notes of inspection.

I hope I have convincingly shown the educational value of manual training in schools of general education. Its importance to Indian boys and girls cannot be overrated, from the point of view of their physical, mental and moral development. But of equal or greater importance to India

is the economic value of manual training. In the present economic condition of this country, the practical activities of kindergarten instruction in elementary schools and of manual training in both elementary and high schools are of immense importance for affording a basis and creating a taste and mental as well as physical aptitude for industrial and manufacturing pursuits. The enrichment of a poor country, in which 66 per cent of the population obtain a scanty livelihood by tilling the soil, is possible only when the present proportion of the population engaged in agricultural pursuits is reduced to not less than one-half, the other half being drafted to industrial, manufacturing or commercial occupations, chiefly by the rapid extension of industrial and technical education. It is then that the lot of the agriculturists themselves would be improved by the higher profits they would obtain from the largely increased consumption at home of the raw products, which are now sent over the distance of half the globe in return for a supply of manufactured products.

That the boys and girls of India have as great natural aptitude for manual work, if they are trained in it at the right age, as the children of any other country, I am fully convinced. Mr. Gustaf Larsson, who is the most distinguished teacher of Sloyd in the United States of America, spoke in the highest terms, when he was here to train teachers of Sloyd, of the natural aptitude of Indian children as well as of young men for manual work. He emphatically and repeatedly asserted that he had not found elsewhere a better set of teachers to train than those he trained in Bangalore. He had an equally good opinion of the earnestness, resourcefulness, and deftness of fingers of Indian children, when taught by the right methods.

I hope these pages may be of some use to those who are interested in education in India.

I must thank Mr. C. H. Yates, Superintendent of the Mysore Government Press, for the prompt care and skill which he has brought to bear on the printing and general get-up of the Report.

H. J. BHABHA.

BANGALORE,
30th December 1909.

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MANUAL TRAINING IN SCHOOLS OF GENERAL EDUCATION.

CHAPTER I.

INTRODUCTORY.

THE importance of manual training in schools of general education has been recognised universally in Europe and America by educationists during the last thirty years. Its adoption in India is a much-needed reform for the improvement of general education. Hitherto the system of education prevalent in India has followed for the most part the lines of the principles of education which were accepted in the middle ages after the invention of printing had spread all over Europe a knowledge of the ancient classical literature of Greece and Rome, and the invention of gunpowder had reduced the importance of physical culture and military exercises such as were the delight of the Greeks. The ancient system of popular education in India was almost wholly confined to reading, writing and arithmetic, the training of verbal memory, and the repetition of the text of old works and their interpretation in a stereotyped and traditional fashion, little or no chance being given to a child under the prevailing system to observe, to acquire sense impressions at first hand, and a knowledge of real objects and phenomena, or to cultivate discrimination and judgment. Eye and hand training was unknown to the ancient teachers of India, and manual work of all kinds was despised by them as beneath the dignity and notice of intellectual men. The result has been a neglect for ages in schools of all subjects that train the senses, develop the body and the brain, and through the training of the eye and hand cultivate intelligence and improve character.

CHAPTER II.

Physiological Basis of Manual Training.

Physiology of the brain and voluntary muscles.—Muscles as organs of the will.—Character a plexus of motor habits.—Muscles and certain parts of the brain grow together by exercise.—Self-activity the basis of correct methods of education during the period of growth.

Physiology of the brain and voluntary muscles.—Modern psychology and the researches of Prof. Ferrier have revolutionised the old world notions of the separation of hand-work from intellectual work and established the intimate connection and interdependence between the hand and the brain. The existence of afferent and efferent nerves in the body and sensory and motor centres in the brain, and their intimate connection and mutual interdependence were a revelation that was bound to exercise a revolutionary influence on systems of education that aimed at developing the body and brain as well as training the intellect and forming the character. Modern education aims at physical, mental and moral development at the same time, and recognises as a fundamental truth that the three modes of development should advance *pari passu* during the period of growth and education at school, which lasts roughly from the fourth or fifth year, when a child enters the Kindergarten, to the fifteenth or sixteenth year, when he is learning in a High School or a secondary Technical School. The manual work suited to different ages has to be adapted to the stages of growth and development of the motor centres of the brain. "The motor cells of the brain controlling the muscles of the joints nearest the trunk develop first, and later, in regular order, those which control the muscles of the more distant joints." The coarser adjustments of the shoulder and elbow joints which require physical training come first in the order of time, while the finer adjustments of the forearm, hand and fingers are of later growth and necessitate a system of manual training proper, such as the sloyd system provides, which should commence from the eleventh year.

Muscles as organs of the will.—President Stanley Hall says in his 'Adolescence' that "the muscles are by weight about forty-

three per cent of the average adult male human body. They expend a large fraction of all the kinetic energy of the adult body, which a recent estimate places as high as one-fifth. The cortical centres for the voluntary muscles extend over most of the lateral psychic zones of the brain, so that their culture is brain-building. In a sense they are organs of digestion, for which function they play a very important role. Muscles are in a most intimate and peculiar sense the organs of the will. If they are undeveloped or grow relaxed and flabby, the dreadful chasm between good intentions and their execution is liable to appear and widen. Character might be in a sense defined as a plexus of motor habits." The last two sentences are pregnant of meaning. Every one knows how some men see clearly the consequences of action or want of action, and have a clear judgment and the best of intentions, and yet fail to take the right action at the right moment from want of will power or quick decision. Probably the severance of action from intention is the most humiliating feature in the character of some men. On the other hand, a man of action, though he may not be clear-headed or judge the consequences correctly, often forestalls others by his activity and succeeds.

Character a plexus of motor habits.—Muscles and certain parts of the brain grow together by exercise. Experiments have clearly established that every sense organ and the voluntary muscles are inseparably connected with certain nerve centres of the brain. Impressions from the surface of the body are received by the sensory centres and conveyed by them to motor centres, which produce the necessary movements required for attaining an object. As a rule the sensory centres are in the posterior, and motor centres in the anterior part of the brain. It is a fundamental law that no part of the human organism can be exercised without strengthening it. Just as muscles grow in size and strength by exercise, so portions of the brain intimately connected with them as well as all higher intellectual centres which come into activity along with muscles grow in size and strength. The brain and the muscles react on each other, and there cannot be full growth of the brain, especially in the centres connected with voluntary action, unless the muscles employed in carrying out voluntary actions are systematically exercised. Hence the great importance of all manual instruction whether in the Kindergarten or at the work bench in the period of a child's growth from the age of five to sixteen.

Self-activity the basis of correct methods of education during the period of growth.—The wonderful self-activity which a child

manifests is the basis of all correct methods of education from the Kindergarten upwards. All Kindergarten occupations—gardening, drawing, object teaching, teaching of light science, sloyd and manual training of all kinds, are based on the child's self-activity. New education so called recognises and utilizes the natural self-activity of the child by directing it and providing channels for its exercise, which not only make work a pleasure, but also strengthen and train the muscles and organs of sense, develop the gray and white matter of the brain, train the powers of observation, discrimination and judgment, and improve the delicacy of touch and sense of form and beauty.

CHAPTER III.

Importance of Manual Training in the Development of Mind and Character.

Motor centres and the growth of the brain and character.—Opinion of Superintendent Thomas M. Balliet.—Development of mental powers and character.—Opinion of Professor William James.—Opinion of Sir James Crichton Browne.—Opinion of President G. Stanley Hall.—Opinion of Dr. Felix Adler.

Motor centres and the growth of the brain and character.—The motor centres are so intimately connected with other parts of the brain that if they are not properly developed during the period of growth, their imperfect development has a reflex action upon other parts of the brain and stunts the intellectual and moral character. Superintendent Thomas M. Balliet, who did so much for the establishment of manual training schools in America, speaks emphatically on this point.

Opinion of Superintendent Thomas M. Balliet.—"Manual training, appealing to the eye and hand, establishes a co-ordination between the sensory and motor parts of the brain, which is a most important step in the thorough organization of the brain. This proper knitting together of different centres, this opening of paths of association between the sensory and central portions of the brain on the one hand and the executive portions on the other, is most vital to its health and efficiency. It makes for perfect sanity and mental health, for well-balanced adjustment of life to environment, for good judgment, for self-control, and for firmness and poise of character. Much of our present school work divorces knowing from doing, and often exaggerates the relative value of the former as compared with that of the latter."

Development of mental powers and character.—The development of hand-power and skill has important effects upon the growth and development of the higher mental powers and of character generally.

Opinion of Prof. James.—Prof. William James of Harvard University, in his "Talks to Teachers on Psychology," speaks of

manual training schools in the following laudatory terms:—"The most colossal improvement which recent years have seen in secondary education lies in the introduction of the manual training schools, not because they will give us a people more handy and practical for domestic life and better skilled in trades, but because they will give us citizens with an entirely different intellectual fibre. Laboratory work and shop work engender a habit of observation, a knowledge of the difference between accuracy and vagueness, and an insight into nature's complexity and into the inadequacy of all verbal accounts of real phenomena, which once wrought into the mind remain there as life-long possessions. They confer precision; because, if you are *doing* a thing, you must do it definitely right or definitely wrong They give honesty; for, when you express yourself by making things, and not by using words, it becomes impossible to dissimulate your vagueness or ignorance by ambiguity. They beget a habit of self-reliance. They keep the interest and attention always cheerfully engaged, and reduce the teacher's disciplinary functions to a minimum." There is no sensation or impression received by the mind which has not its corresponding reaction or correlative expression in action. It is this inseparable connection between feeling and action that is turned to useful account in modern pedagogics by the introduction of methods of concrete object teaching from the Kindergarten upwards into the secondary stage in the best modern schools. The objective and experimental methods of teaching "occupy the pupil in a way most congruous with the spontaneous interests of his age. They absorb him and leave impressions durable and profound. Compared with the youth taught by these methods, one brought up exclusively by books carries through life a certain remoteness from reality: he stands, as it were, out of the pale, and feels that he stands so, and often suffers a kind of melancholy from which he might have been rescued by a more real education."

Opinion of Sir James Crichton Browne.—Mr. J. Struthers, C. B., Secretary of the Scotch Education Department, who has introduced manual training into Scotch schools, quotes the following weighty pronouncements from Sir James Crichton Browne's pamphlet on "Handcraft":—

"It is plain that the highest functional activity of these—the motor—centres is a thing to be aimed at with a view to *general mental power* as well as with a view to muscular expertness, and as the hand centres hold a prominent place among the motor centres, and are in relation with an organ which in prehension, in touch, and in a thousand different combinations of movement adds

enormously to our intellectual resources, besides enabling us to give almost unlimited expression to our thoughts and sentiments, it is plain that the highest possible functional activity of these hand centres is of paramount consequence, not less to mental grasp than to industrial success."

Again, "Depend upon it that much of the confusion of thought, awkwardness, bashfulness, strutterings, stupidity and irresolution which we encounter in the world, and even in highly educated men and women, is dependent on defective or misdirected muscular training, and that the thoughtful and diligent cultivation of this is conducive to breadth of mind as well as to breadth of shoulders."

Opinion of President Stanley Hall.—Stanley Hall sums up briefly the following psychological reasons for the introduction of manual training into secondary schools:—"It lessens the interval between thinking and doing; helps to give control, dexterity, and skill, an industrial trend to taste; interests many not successful in ordinary school; tends to the better appreciation of good, honest work; imparts new zest for some studies; adds somewhat to the average length of the school period; gives a sense of capacity and effectiveness, and is a useful preparation for a number of vocations. These claims are well founded, and *this work is a valuable addition to the pedagogic agencies of any country or state.* (The italics are mine.) As man excels the higher anthropoids perhaps almost as much in hand power as in mind, and since the manual areas of the brain are wide near the psychic zones and the cortical centres are thus directly developed, the hand is a potent instrument in opening the intellect as well as in training sense and will."

Opinion of Dr. Felix Adler.—Dr. Felix Adler, in his lecture on "The influence of Manual Training on Character," thus describes the importance of manual training as an element in training the will:—"Manual training fulfils the conditions I have just alluded to. It is interesting to the young, as history geography and arithmetic often are not. Precisely those pupils who take the least interest or show the least aptitude for literary study are often the most proficient in the workshop and the modelling-room. Nature has not left these neglected children without beautiful compensations. If they are deficient in intellectual power, they are all the more capable of being developed on their active side. Thus manual training fulfils the one essential condition—it is interesting. It also fulfils the second. By manual training we cultivate the intellect in close connection with action. Manual training consists of a series of actions which are

controlled by the mind, and which react on it. Let the task assigned be, for instance, the making of a wooden box. The first point to be gained is to attract the attention of the pupil to the task. A wooden box is interesting to a child. Hence this first point will be gained. Lethargy is overcome, attention is aroused. Next, it is important to keep the attention fixed on the task; thus only can tenacity of purpose be cultivated. Manual training enables us to keep the attention of the child fixed upon the object of study, because the latter is concrete. Furthermore, the variety of occupations which enter into the making of the box constantly refreshes this interest after it has once been started. The wood must be sawed to line. The boards must be carefully planed and smoothed. The joints must be accurately worked out and fitted. The lid must be attached with hinges. The box must be painted or varnished. Here is a sequence of means leading to an end, a series of operations all pointing to a final object to be gained, to be created. Again, each of these means becomes in turn and for the time being a secondary end; and the pupil thus learns, in an elementary way, the lesson of subordinating minor ends to a major end. And, when finally the task is done, when the box stands before the boy's eyes a complete whole, a serviceable thing, sightly to the eyes, well adapted to its uses, with what a glow of triumph does he contemplate his work! The pleasure of achievement now comes in to crown his labor; and this sense of achievement, in connection with the work done, leaves in his mind a pleasant after-taste, which will stimulate him to similar work in the future. The child that has once acquired, in connection with the making of the box, the habits just described, has begun to master the secret of a strong will, and will be able to apply the same habits in other directions and on other occasions."

"I have thus far attempted to show how the will can be made strong. But a strong will is not necessarily a good will. It is true, there are influences in manual training, as it has been described, which are favorable to a virtuous disposition. Squareness in things is not without relation to squareness in action and in thinking. A child that has learned to be exact—that is, truthful in his work, will be predisposed to be scrupulous and truthful in his speech, in his thought, in his acts."

There is nothing more to add to what has been so aptly said by the eminent educationists quoted above.

CHAPTER IV.

Importance of Manual Work from the point of view of Society.

Correlation of school work with home life—Professor John Dewey's views.

Correlation of school work with home life.—The chief aim of the elementary school should be to correlate the school work with home life, and with the activities common in the neighbourhood of the school, rather than to isolate the child from its surroundings and feed it on unmeaning word symbols and abstract ideas of number and space. It is as an important factor in this correlation that manual training in schools derives its value. Manual training affords a much-needed outlet for the spontaneous activity of the child, it makes them alert and active, makes them useful and helpful at home, and prepares them for the practical duties of life. There is a more important view, however, that the education and evolution of the child's mind and character should follow the evolution of the human race, and be a reflection and repetition of the past history and experience of the race. This truth should be the guiding principle of the education of children.

Professor John Dewey's views.—This fundamental principle of a child's education is defined and explained by Professor John Dewey in "The School and Society," and accepted by the best educationists of the day. Children should not only familiarise themselves with the mechanical principles of construction and the materials used by men at different stages of social evolution, but should also get an insight into the historical progress of the human race. It is with this view that in selecting suitable forms of hand-work, the choice is confined to three principal kinds of work, *viz.*, (1) carpentry, (2) cooking and (3) sewing and weaving. These are "selected as involving different kinds of skill, and demanding different types of intellectual attitude on the part of the child, and because they represent some of the most important activities in every-day outside world: the question of living under shelter, of daily food and clothing, of the home, of personal movement and exchange of goods. He gets also the training of sense organs, of touch, of

sight, and the ability to co-ordinate eye and hand. He gets healthy exercise; for the child demands a much larger amount of physical activity than the formal programme of the ordinary school permits. There is also a continual appeal to memory, to judgment, in adapting ends to means, a training in habits of order, industry, and neatness in the care of tools and utensils, and in doing things in a systematic, instead of a haphazard way. Then again these practical occupations make a background, especially in the earlier groups, for the later studies. The children get a good deal of chemistry in connection with cooking, of number work and geometrical principles in carpentry, and a good deal of geography in connection with their theoretical work in weaving and sewing. History also comes in with the origin and growth of various inventions, and their effects upon social life and political organization."

CHAPTER V.

Regeneration of Muscular Development.

Means of effecting a regeneration of muscular development.—Industrial training.—Manual training, its brief history.—Manual training in America.—Sloyd in Sweden and Norway.—Manual training in France and Germany.—Manual training in London.—In the principal towns of Great Britain.—Sloyd in the United States.—Criticisms of manual training.—Not applicable to sloyd—Further criticisms.—Gymnastics.—Sports and games.—Conclusion.

Means of effecting a regeneration of muscular development.—The best means of effecting a regeneration of proper muscular development in an age of civilization, luxury and the use of machinery are classified by Stanley Hall under four principal heads:—(1) Industrial training, (2) Manual training, (3) Gymnastics, (4) Sports and play games.

Industrial training.—Industrial training such as is imparted in monotechnic or trade schools, and especially that which is afforded by the various healthful activities of a farm are the most powerful agents in the development of muscles, will power and character. The activities of farm life have been imported with the greatest advantage into schools like Abbotsholme in England and Liancourt School in France for sons of gentlemen, and into the best institutions in America for the education of negroes and Indians at Hampton and Tuskagee. These institutions will be referred to later. "Industry," says Stanley Hall, "has determined the nature and trend of muscular development, and youth, who have pets, till the soil, build, manufacture, use tools, and master elementary processes and skills, are most truly repeating the history of the race. This too lays the best foundation for intellectual careers. The study of pure science as well as its higher technology follows rather than precedes this."

Manual training, its brief history.—Manual training came into America after the Centennial Exposition at Philadelphia in 1876, which contained a full exhibit of the method of tool instruction devised by Victor Della-Vos in 1866 for the Imperial School of

Moscow. His systematic analysis of tools and processes provided a basis for manual instruction as it was introduced into secondary schools and especially the Manual Training Schools of America.

Manual instruction in America.—Professor John D. Runkle, of the Massachusetts Institute of Technology, wrote a most illuminating report on the exhibit from the Imperial School of Moscow, which emphasised the difference between tool "instruction" of a general abstract kind and actual "construction." In connection with the Massachusetts Institute of Technology instruction workshops were opened in Boston in 1877 under the name of "School of Mechanic Arts," which were open to secondary school pupils. Since the city of Boston took over manual training into its own hands, about 1884, these workshops have been maintained and greatly developed as the "Mechanical Laboratories of the Institute. In 1877 Professor C. M. Woodward established in St. Louis similar workshops, and in June 1879 the St. Louis Manual Training School was opened. Other Manual Training Schools followed. The Manual Training Schools of America will be described later on in a separate section. About 1895 the legislature of Massachusetts made manual training compulsory in the high schools of every city containing more than twenty thousand inhabitants. Like all new movements, educational manual training met at first with great deal of opposition, but all opposition ceased in America practically by 1890.

Sloyd in Sweden and Norway.—Sloyd as a system of manual training was organised in Sweden at first in 1870 as "an effort to prevent the extinction by machinery of peasant home industry during the long winter night." In 1872 schools were established for the special purpose of teaching sloyd. In the same year a school was started at Naas to teach different branches of sloyd, *viz.*, carpentry, carving, turning, smiths' work, basket-making, saddlery, stone-cutting, fretwork, and painting. The first training class for teachers of sloyd was formed by Herr Otto Salomon in 1874. The school at Naas is to this day famous as a training institution for teachers who come from all countries of Europe. Sloyd was introduced into Norway in 1879.

Manual training in France and Germany.—In France a law was passed in 1882 making manual work an ordinary part of the school curriculum. The course was a graduated one starting in the *ecoles maternelles* with Froebelian occupations. In Germany different kinds of manual work have been taught, and in 1878 the first school for the training of teachers was opened. The Teachers'

Training College of the German Association for Manual Instruction, at Leipzic, of which Dr. Alwin Pabst is at present Director, was established under Dr. Gotze, who did eminent service to the cause of manual training by repudiating the idea that it was meant as a direct preparation for the trade which the pupils intended to learn later on, and insisting that its chief or sole importance was due to its educational aims. At present there are 937 schools in Germany in which manual training is given, of which 909 accept the exclusively educational object of manual training.

Manual training in London.—Manual work has been introduced into all the principal County Council Schools of London, and sloyd is taught in many of them especially in the Hornsey and West Ham Board Schools. There were at the end of March 1908 so many as 210 wood-work centres and 12 metal-work centres in London at which 57,980 children were in attendance. There were about 72,753 children in elementary day schools who were eligible for work at the manual work centres. Of these 87·6 per cent actually received instruction.

In the principal towns of Great Britain.—In the schools of Leeds, Bradford, Keighley, Manchester, Sheffield, Glasgow, Edinburgh and Aberdeen, manual work or sloyd forms part of the regular curriculum. Manual training owes its establishment in England largely to Sir Philip Magnus, Sir William Mather of Manchester, and Professor Ripper of Sheffield.

Sloyd in the United States.—Swedish sloyd was introduced into the United States by Gustaf Larsson, a pupil and Assistant of Herr Otto Salomon, in 1888. By the enlightened munificence of Mrs. Quincey A. Shaw, who has maintained a free Sloyd Training School in Boston for the last twenty-one years, sloyd has been adopted as a part of the school curriculum in a large number of schools in Massachusetts.

Criticisms of manual training.—It is worth while to refer to criticisms of manual training as a means of education. It is alleged that the work is essentially of the hands and gives little exercise to the legs where most of the muscular tissues of the body are centred, also that manual training gives little exercise to the back and trunk. "Consideration of proportion and bilateral symmetry are practically ignored."

Not applicable to sloyd.—It cannot be denied however that in the system of Swedish sloyd great attention is paid to the correct positions of the body of the worker, sufficient freedom of space being allowed to him before the bench. Whatever objections there

might be to other forms of manual training on the score of imperfect exercise of the large muscles, they are inapplicable to the system of sloyd. Dr. John P. Hylan, of the Harward Psychological Laboratory, asserts that among the different forms of manual training sloyd fills an unique position. He says that "sloyd meets the special demands of a time of life as, I believe, nothing else does. The muscles of the hands, arms, and shoulders are not alone used, but also those of the spine, the legs, and the whole trunk. This use, too, is not of a minute and limited nature, but employs the larger muscles in an amplitude and variety, also a strength of movement, which puts the endurance of the whole body to test. Every occasion for a good job of planing or boring or sawing serves as a challenge of strength as well as of skill, and one which even an adult may not despise if maple or oak is used." Sloyd is regarded as a system of applied gymnastics, and the correct positions required for working with particular tools and materials are shown in pictures placed prominently before the eyes of the learner. Attention is also paid in sloyd to the harmonious development of both sides of the body.

Further criticisms.—Educational manual training is also said to be too much divorced from practical arts, and to confine itself chiefly to abstract principles of the use of tools. It was to remedy this dissociation from practical arts, of which the system of sloyd is accused, that schools like the Mechanic Arts High School of Boston have been established. The opinions of educationists on this point differ, the majority of whom with great force defend the dissociation of manual training from the practical arts of life in schools of general education, whereas a few advocate the close association of manual training with mechanic arts.

It is further considered a defect that courses of manual training concern themselves chiefly with wood and metal work and ignore other materials besides wood, tin and iron. The schemes of instruction are also considered defective in being too methodical and out of touch with the scientific courses of higher technical institutions.

Gymnastics.—The place of *Gymnastics* in modern schools is recognised universally as essential to the development of that muscular strength and activity which in ancient times it was necessary to acquire for purposes of war and the public games. Modern gymnastics are admirably calculated to produce development of the muscles chiefly of the trunk, shoulders and arms, and in a partial sense, of the legs. There is, however, no close relationship in gymnastics to mental or moral development, such as there is in

manual training, except in this way that they promote the health of those who cultivate them and are often a powerful safeguard of moral purity and temperance. The ancient Greeks firmly believed that half the education of youth consisted of physical culture, and if this was secured, mental and moral development would follow. A sane mind cannot inhabit an unsound body. And this belief with certain limitations is still strong among the civilised nations of modern times and justly so.

Sports and games.—Play, sports and games form a highly important means of physical culture. They have the distinguishing merit of providing great variety as well as a strong element of gladness and outburst of joy, and of being instinctive to children and youth. The instinctive plays of children are the reproduction of the motor activities of their ancestors in remote ages, just as for adults modern hunting takes the place among the well-to-do classes of hunting for food, which necessity compelled the savage to pursue as a life-long occupation. Play of all kinds provides cheerful modes of exercise and calls forth the joyous enthusiasm of youth. "Play is at its best only a school of ethics. It gives not only strength but courage and confidence, tends to simplify life and habits, gives energy, decision and promptness to the will, brings consolation and peace of mind in evil days, is a resource in trouble and brings out individuality."

The value of organised games and outdoor sports in school life needs no emphasis. As a means of physical culture as well as of moral training their importance cannot be exaggerated. The self-control, readiness to obey orders, subordination of selfish to common interests, activity and resourcefulness evoked by school games leave life-long effects on the character of the youth.

Conclusion.—An investigation, however partial, into the nature of all the four means of physical culture, has been necessary to show that each has its distinguishing merits and advantages and that they cannot fully replace one another, but are supplementary. It is unfair and misleading to expect manual training to take the place of the other three modes of youthful activity, and then blame it for shortcomings which cannot be justly laid at its doors. It is necessary to remember that manual training is only one of the means, though it be a powerful means, of physical development, of cultivating the fine adjustments of the muscles of the hands, of promoting intellectual growth, and of forming a manly character.

CHAPTER VI.

SLOYD.

General description of sloyd.—Origin of sloyd.—Educational tests of various kinds of sloyd.—Clay-modelling as manual work.—Derivation of the word sloyd.—Definition of sloyd.—Aims of sloyd.—Methods of sloyd.—Differences between the Russian system of manual training and sloyd.—Opinion of Dr. C. Hanford Henderson.—Sloyd best taught by a trained teacher.—Sloyd does not teach a trade.—It is not carpentry, and there is no repetition of the same exercise.—Purpose of a trade.—Cost of production.—Class teaching and individual attention.—Tact of the teacher.—Temptations of the teacher.—A pupil should judge his own work.—Sloyd as an essential part of general education.—Opinion of Sir Philip Magnus.

General description.—Sloyd, which literally means skilful or deft, is a system of educational hand-work for children of eleven to fifteen years of age, which in Sweden, besides embracing wood and metal work, includes work in leather and card-board and such occupations as brush-making, coarse painting, straw-plaiting, basket-making and book-binding. In England it means a system of hand-work in wood. The purpose of sloyd is not to teach a trade but to develop the mental, moral and physical powers of children. "It gives a taste for rough labour as distinguished from clerkly accomplishments, it cultivates manual dexterity, self-reliance, accuracy, carefulness, patience, perseverance, and especially does it train the faculty of attention and develop the powers of concentration."

The origin of sloyd.—It is interesting to trace the origin of sloyd. At first sloyd was valued in the country of its origin not for its educational advantages but for economic purposes. Sweden is a poor country in which the wealth of the people depends chiefly on agriculture. It was of importance that the farmers of limited means should be able to manufacture articles for domestic use by their own hands, and thus not only save the cost of purchasing them but also acquire habits of self-help and independence. All articles for domestic use were for a long time manufactured at home in the long winter evenings. The introduction of machinery, however, by which the production of articles for domestic use was

TEACHERS' SLOYD TRAINING CLASS, BANGALORE.

cheapened, made it less costly and more convenient to purchase them than to make them at home. Thus gradually home industries died out in Sweden, and their disappearance had a deteriorating effect upon the bodily strength as well as the character and intelligence of the people. Attempts were therefore made by Government to re-establish 'home sloyd' about 1870. Various kinds of hand-work were taught, but the instruction was industrial and technical. Educational sloyd was worked out by Herr Otto Salomon, Director of the Seminarium at Naas, who was inspired by the views of Uno Cygnæus, the founder of the system of elementary education in Finland. Cygnæus in his turn had derived his views from Froebel and Pestalozzi.

Educational tests of various kinds of sloyd.—Herr Otto Salomon subjected the different kinds of sloyd to ten educational tests, with a view to discover which was the most suitable for educational purposes. The results of this examination are summarised in the tabular statement on pages 18 and 19 which gives the educational values of ten different kinds of sloyd.

Branches of sloyd	1 Does it accord with children's capability?	2 Does it excite and sustain interest?	3 Are the objects made useful?	4 Does it give a respect for rough work?
I. Simple metal-work...	Yes and No	Yes	Yes	Yes
II. Smith's work	No	Hardly	Tolerably	Yes
III. Basket-making	No	Hardly	Tolerably	Yes
IV. Straw-plaiting	Yes	Yes?	Yes	Yes and No
V. Brush-making	No?	Yes?	Yes	Yes?
VI. House-painting	No	No	Yes and No	Yes
VII. Fretwork	Yes?	No and Yes	No and Yes	No
VIII. Book-binding	No	No and Yes	Yes. Tolerably	Hardly
IX. Card-board work	Yes and No	Yes?	Yes	No
X. Sloyd carpentry	Yes	Yes	Yes	Yes?
XI. Turnery	No	Yes	Yes?	Hardly
XII. Carving in wood	Yes?	Yes and No	Yes and No	No
				Not regarded as a kind of sloyd,
Clay-modelling	Yes	Yes	No	No

5	6	7	8	9	10
Does it train in order and exactness?	Does it allow of cleanliness and neatness?	Does it cultivate sense of form?	Is it beneficial from hygienic point of view?	Does it allow of methodical arrangement?	Does it teach dexterity of hand?
Yes and No	Tolerably No	Yes	Yes?	Yes	Yes
No	No	No?	Yes and No	Perhaps	No
No	Yes?	No	No	No	No
Yes	No and Yes	No?	No	Yes	No
Tolerably	Yes	No	No	No	No
No	No	No	No	No	No
Yes	Yes	No and Yes	No	No and Yes	No
Tolerably	Yes?	No	No?	Perhaps	Tolerably
Yes. Very high	Yes	Yes	No	Yes	No?
Yes	Yes	Yes	Yes?	Yes	Yes
Partly (not quite). No. Yes	Yes? Yes	Yes Yes and No	No No	No Yes	No No

but useful for comparison.

Yes and No	No	Yes	No	Yes	No

By putting the different systems of sloyd to the above tests, he determined that wood-work was best suited for manual training in schools, and he devoted the whole of his life to the evolution of a system of wood-work based on educational principles. "Of the various systems of manual training, so far as wood-work is concerned," says Professor James, "the Swedish sloyd system, if I may have an opinion on such matters, seems to me by far the best, psychologically considered."

Clay-modelling as manual work.—It will be noticed that clay-modelling was not recognised from the Swedish point of view as sloyd, probably because the objects modelled in clay, like leaves, fruits, plants and flowers, are not useful but only ornamental, and clay-modelling is best taught long before wood-work can be commenced. While wood-work is taught to children of eleven to fifteen years of age, the importance of clay-modelling to children of six to eight years of age is now generally recognised. It is of the utmost value as an indispensable complement to drawing inasmuch as it enables children to make objects of three dimensions formed from a plastic material, and trains them in habits of exact observation so essential to the success of artisans as well as artists, machinists, architects, naturalists and scientific men of all kinds. Due importance is attached to clay-modelling in the Leipsic Seminary by Dr. Pabst, where, though beginners are taught copying from nature and the making of models of leaves, flowers, fruits, and sometimes animals, the advanced teachers draw ornamental designs from a given object of nature like a flower, first on paper, and then model the same designs in clay. In this advanced form clay-modelling has its useful purposes, besides training the powers of observation, teaching exactness, and producing deftness of fingers. It is now recognised as an important and useful branch of hand-work in Italy, Switzerland, Germany, France and England.

Derivation of the word sloyd.—Sloyd is derived from an old Swedish adjective, 'Slog,' meaning skilful or handy. It means dexterity, manual skill or artistic skill. A Slöjdare or sloyder is a person possessing a certain dexterity of hand without being in any sense an artisan.

Definition of sloyd.—Sloyd is defined by Mr. Gustaf Larsson, a pupil and assistant of Herr Otto Salomon, who has been chiefly instrumental in introducing it into the schools of the United States, as "a system of educational hand-work, so arranged and carried out as to employ and direct the vigorous self-activity of a student for a purpose which he recognises as good." A child receives no impression

which is not immediately followed by a reaction or instinctive motion. This reaction or instinctive motion is spontaneous, automatic and unconscious, and is governed by the nerve centres at the base of the brain. All acquired and voluntary actions are based or grafted upon instinctive and spontaneous actions. With the help of memory and the association of feelings of pleasure and pain with every motion and action, voluntary action for a pleasurable and beneficial end takes the place of the blind automatic action. The experimental teaching of object phenomena and manual training have for their basis the natural spontaneous activity of the child. New habits and new associations between feelings and actions for a set purpose are acquired by calling into action the nerve centres in the highest parts of the brain, by the formation of indissoluble nexuses between sensations received and the necessary or desirable actions which are both pleasurable and helpful.

Aims of sloyd.—As sloyd is instrumental in developing the mental, moral, and physical powers of the child, its *aims* are chiefly formative, and only incidentally, and in a subordinate sense, are they utilitarian. They are summarised as follow by Herr Salomon :—

(i) To instil a taste for and love of work in general.
(ii) To inspire a respect for rough, honest, bodily labor.
(iii) To train in habits of order, exactness, cleanliness and neatness.
(iv) To form habits of attention, industry and perseverance.
(v) To promote the development of the physical powers.
(vi) To afford a training of the eye in the sense of form.
(vii) To train the thinking faculties.

Methods of sloyd.—The methods of sloyd are thus summarised :—

(i) The series of models must progress from the easy to the difficult, from the simple to the complex.
(ii) There must be a refreshing variety in the exercises, tools and models.
(iii) As the training progresses, the number of tools and manipulations should be gradually increased. In the beginning the knife, which is the fundamental tool, should alone be used as far as possible.
(iv) The models must be arranged in a progressive series.
(v) The exercises should result in the making of a useful article the use of which is appreciated by the child..

It will be seen that stress is laid on providing a refreshing variety of exercises, tools and models, and avoiding too great strain

on the mind or the muscles. At the same time the æsthetic sense of the child is cultivated by combining good form and proportion with utility. The making of an article the use of which is appreciated by the child deepens its interest in the work and increases its application.

Differences between the Russian system and sloyd.—The chief differences between the Russian system of manual training and sloyd are that the former teaches the use of certain tools by making parts in place of complete articles or executing abstract exercises such as single joints, and pays little attention to the needs and capacities of the growing child. The Russian system is suitable only to technical schools. The system of sloyd, on the other hand, attaches great importance to the use of the knife as the simplest and least mechanical of tools, which develops the muscles of the hand and wrist in a way peculiar to itself. It gives great prominence to the study of form and the training of the eye, and furnishes a great variety of small but complete models which interest the pupil. It also provides more carefully for the physical development of the child than the Russian system by regulating the positions, the sequence of tools, and the difficulty of the exercises. On account of its superior merits sloyd has been rapidly displacing the indigenous system even in the schools of Russia.

Opinion of Dr. C. Hanford Henderson.—"In estimating the several forms of manual training," says Dr. C. Hanford Henderson, "I have come to believe that the Swedish form, sloyd, has some advantages over the more formal Russian manual training, in giving better gymnastics in its movements, and more human interest to its occupations. A finished article makes a stronger appeal to the childish sympathy than the abstract exercises of manual training proper. It is psychologically truer and, I believe, morally more effective. Children wholesomely occupied, children busy in trying to realise some form of usefulness and beauty, must, I think, daily grow into that unconscious goodness which I hold to be the highest morality; must illustrate Emerson's favourite doctrine, that evil, like cold, is a negative, is but the absence of good."

Sloyd best taught by a trained teacher.—Pedagogically considered, sloyd is the most suitable and advantageous system of manual work for schools of general education. It can therefore be easily understood that sloyd is best taught by a teacher who has studied the science of pedagogics, knows the nature of the child whom he teaches, and is able to guide its mental, moral and physical development. An artisan or carpenter, on the other hand, knows little or

nothing of the nature of the child and thinks only of the article to be produced as his chief aim. Such a man is entirely out of place in a school where the needs and interests of the growing child should be the supreme guide of the teacher.

Sloyd does not teach a trade.—After the above explanation of the aims and methods of sloyd, it is hardly necessary to add that sloyd does not teach a trade or trades. This mistaken notion, however, has so often prevailed both at the first introduction of the system into schools, and at all times among parents who do not understand the pedagogical value of it, that it may be well to refer to it. The aim of sloyd is purely educational and not industrial, though one who has had the training given by sloyd would be in a far better position to acquire a trade rapidly than one who has not had that advantage, and further would have his inventive faculties so much improved as to enable him to invent or suggest the construction of new machinery and appliances for use in the practice of the trade.

It is not carpentry.—Sloyd is not carpentry, because it does not aim at producing carpenters or mechanics. In teaching a trade the same exercise is repeated until the required amount of skill is acquired, and the article to be manufactured is produced almost automatically and with ease, without requiring any effort to pause or think at each step. In sloyd, on the other hand, the pupil has to pause and think at every step. If a mistake is made, it is fatal, and the whole work has to be done over again with greater care. At the same time the repetition of an exercise once learnt is carefully avoided in sloyd, although it may reappear as part of a more difficult and complex exercise later on in the system.

Purpose of a trade.—The purpose of a trade is to produce an article, that of sloyd is purely disciplinary and aims at producing a trained intellect and character. The hands of a young man trained in sloyd may be cut off, but the improvement of his faculties which has resulted from the training cannot disappear and will be of life-long use. If he has gained in physical development, if his reasoning is clearer and his character and will-power stronger than before, then the loss of his hands cannot deprive him of the permanent improvement of body and mind which has already resulted from the sloyd training, and which must be of life-long use to him.

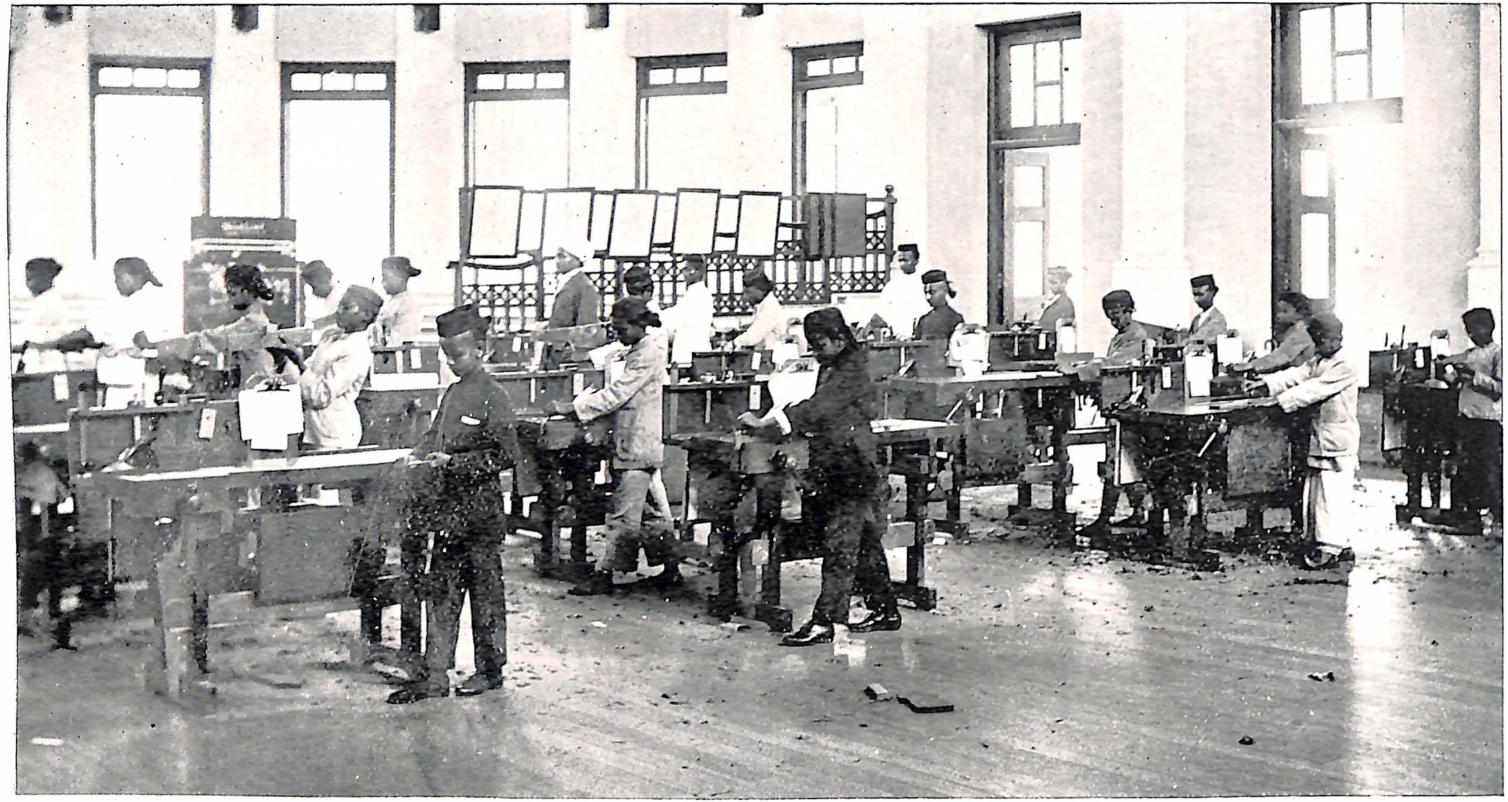
Cost of production.—In the teaching and practice of a trade it is essential to reduce the cost of a manufactured article and to increase the facility of production and lessen the time required for making it. Hence the necessity of using labour-saving machinery for sawing, planing, drilling, etc. Such machinery is entirely out

of place in a sloyd room. The use of the knife and the simplest and most common tools alone is permitted. The more a child is thrown upon his own resources and made to think out the successive steps necessary to make a finished product with the simplest of tools, the better is its training.

Class teaching and individual attention.—The maximum number of pupils that one teacher can deal with satisfactorily is twenty, and sometimes for an active teacher the number of pupils may be increased up to thirty. Sloyd is of all kinds of manual training perhaps best adapted to class teaching. The general principles, information about different kinds of wood and the use of different tools, directions about mechanical drawing, etc., can be imparted to a class collectively, and perhaps at the commencement the class can work together on the first few simple models. But disparity in intelligence, alertness and resourcefulness soon discloses itself, and the slower pupils fall behind others who have quicker grasp of difficulties and work faster. Such differences necessarily require the teacher to pay individual attention to the pupils, and it is essential to the success of the teacher that he should give appropriate attention, supervision and help to those individual pupils who require them. It is bad to hurry the slow pupils or to let the quick ones wait till they are overtaken. There should be no unnecessary rivalry or emulation. Each child should put his heart into the work and do his best at his own pace.

Tact of the teacher.—A successful teacher of sloyd requires a great deal of *tact*. He cannot have too much of it. He should study the nature of each child, arouse by an encouraging word a lethargic child, or teach an impetuous one to cultivate patience. He should never sternly repress the child's will, but only direct it with skill into desired channels. He must have a quick insight into the nature of the child and by perfect sympathy with it must be able to guide and encourage him, recognising his merits and honest effort fully, and when need arises, administering gentle reproof. It would be hopeless to expect tact in an artisan teacher, which is not superabundant in teachers who have been pedagogically trained.

Temptations of the teacher.—The teacher should not be tempted to give too much help to his pupil and leave too little for him to think out or do. It is no doubt more easy for him to show at once the correct method of work and point out the defects in the pupil's work, but such instruction would not be improving to the pupil himself though it may result in producing a good model. What is wanted is to lead the pupil on by judicious questions to find out the



CLASS OF BOYS AT SLOYD WORK, BANGALORE.

defects of his own work and the ways of correcting them. If he has difficulties he should be encouraged by judicious hints to think out the way to overcome them. A similar temptation into which an inexperienced teacher of sloyd is likely to fall is to encourage the making of showy pieces for exhibition. The teacher tempted by the prospect of making a great show of his pupil's work gives him sometimes too minute directions for accomplishing his task. This may be effective in producing a showy article, but not in training the pupil, who may from indolence created by excessive help become inclined to depend on the aid of his teacher or of others in future, and spare himself the trouble of self-exertion.

A pupil should judge his own work.—A good way of improving a pupil's judgment and skill is to make him sit in judgment upon his own work. As soon as a model is finished, he is asked to give an estimate of the quality of his own workmanship, and to state his reasons for the estimate on a prescribed form. This process of criticism of his own work which he cheerfully goes through promotes his candour, honesty and manliness, and the impression made on his mind by his own judgment is far more permanent than any remarks that his teacher can make. He tries to correct the errors and defects which he himself has found in his work, and feels stimulated to improve it when he takes up successive models. This process of self-education is not the least important part of the training given by a good teacher of sloyd. Mr. Gustaf Larsson adopts the following form for the pupil to fill in :—

SLOYD RECORD.

Pupils are requested to carefully note and fill out this blank, to hand in with each completed model.

Bench.....Name.....
Age.....Model.....
Kind of wood...
Tools used.....
Time spent in making the model.....
Standard measurement.....
Measurement obtained.....
Workmanship*.....
Give reasons for your mark.....
What are you going to do with the model ?.....
Teacher's remarks.....

* WORKMANSHIP : *Excellent, Good, Fair*.....

Sloyd as an essential part of general education.—Manual instruction, pre-eminently in the form called sloyd, which is organised carefully on sound pedagogical principles, is an essential part of general education in the primary and secondary stages. Manual instruction is as necessary to a complete education as the study of language, mathematics or science. It makes no difference whether a pupil is intended to pursue, after leaving a secondary school, an industrial or technical course or not. A physician, lawyer or clergyman would benefit quite as much from the training imparted by sloyd as an ordinary artisan or mechanic. Dr. D. Forsyth, M.A., D.Sc., Headmaster of the Central High School, Leeds, told me that he attributed not a little of the success of his own son as surgeon to the fact of his having gone through a course of manual instruction at school. At Philadelphia I was told that one condition of granting scholarships to students of dental surgery was that they should have completed a course of manual instruction at school. In all literary and scientific pursuits much of the cheerfulness, readiness and resourcefulness of the professional man depends on the manual training received by him during his school days.

Opinion of Sir Philip Magnus.—Sir Philip Magnus concludes an article on Manual Training in School Education in the following terms:—

"I have endeavoured to show that workshop instruction may be a part of a liberal education; that, as an educational discipline, it serves to train the faculties of observation, to exercise the hand and eye in the estimation of form and size, and the physical properties of common things; that the skill acquired is useful in every occupation of life, and is especially serviceable to those who are likely to become artisans, by inducing taste and aptitude for manual work, by tending to shorten the period of apprenticeship, by enabling the learner to apply to the practice of his trade, the correct methods of inquiry which he has learnt at school, and by affording the necessary basis for higher technical education."

CHAPTER VII.

The Mosley Educational Commission and Manual Training.

The Commission's Joint Report.—Opinion of the Rev. Dr. H. B. Gray, Headmaster of Bradfield College.—Report of Mr. J. R. Heape, Vice-Chairman of the Education Committee and Chairman of the Technical School Committee, Rochdale.—The general conclusions on manual training in America of Prof. H. R. Reichel, LL.D., Principal of University College of Bangor, North Wales.

The Commission's Joint Report.—The Educational Commission organised by Mr. A. Mosley in 1903 consisted of 26 eminent educationists who visited the United States and Canada during the last three months of the year. The object of the Commission was to ascertain how far education in the United States is responsible for her industrial progress. In the Joint Report signed by all the members of the Commission occurs the following paragraph on manual training:—

"The important part which manual training is beginning to assume in the schools struck them very forcibly. Such work appears to be in many ways of high value as an educational discipline, especially in developing handiness and alertness, and in familiarising the scholars with constructive processes."

Opinion of the Rev. Dr. H. B. Gray.—The Rev. Dr. H. B. Gray, Headmaster of Bradfield College, speaks of manual training in American secondary schools in the most enthusiastic terms:—

"The connection between mind and hand is recognised there to an extent which preconceived prejudices have hitherto rendered impossible in England. But instead of manual training being confined to those who are to pursue an industrial or engineering career, or to those who are relegated to "shops" merely as a *derniere ressource*, because they are incapable of the abstractions of book learning, in the United States it is regarded in many of the best-developed schools *as an integral part of a liberal education.* Its importance in this aspect varies indeed in different States, and in different cities, but everywhere it occupies an honourable place. It

is, moreover, graded on carefully thought-out systems from the card-board 'modelling' of the Kindergarten to the skilled engineering processes in the colleges and universities. Though space forbids me to enlarge on the value of this feature of American education, my report would lack a completeness satisfactory to myself if I did not pause to emphasise my profound sense of the value of manual training as scientifically carried out in the schools of the United States, leading as it does to the happiest results in promoting versatility and alertness which is so characteristic of American workers."

Report of Mr. J. R. Heape.—Mr. J. R. Heape, Vice-Chairman of the Education Committee, and Chairman of the Technical School Sub-Committee, Rochdale, speaks in glowing terms of the inclusion of manual work in the school curriculum at every stage: —

"Not only is educational hand-work of importance in the early years of school life, but it should be continued through all the grades up to and including the high school. Such at any rate is the American view. Although at present manual training is given in only about 25 per cent of the schools, it is now recognised as of such educational value that it may be broadly said that provision for its teaching is being made in all new schools. Manual training in the ordinary sense of bench-work in wood was begun in America in 1880, when, through the efforts of Dr. Calvin A. Woodward, a manual training school was opened at St. Louis in connection with the Washington University. The success of this school led to the speedy organization of similar schools in other large cities, in Chicago, Baltimore, and Toledo in 1884, in Philadelphia in 1885, and so on. In 1895 the Massachusetts Legislature, under the lead of the State Board of Education, made it obligatory upon every city in the State of 20,000 or more inhabitants to establish and maintain manual training in a high school. This has been one source from which manual training has spread; there has also been another, representing an opposite extreme of thought. It has grown from the kindergarten. The first source emphasised the utilitarian side, the other came purely as an educational idea. From the union of these two growths has resulted manual training as it is seen to-day in the States, not on the one hand entirely technical and utilitarian, nor on the other as distinctly educational as if it were wholly permeated with the spirit of the kindergarten. It is claimed for truly educational hand-work that it develops the physical, mental and moral qualities. It is not so much a subject of instruction as a method. It calls out certain creative powers, and the processes which are passed through, from the conception of a model in the

mind to its first being embodied in a working drawing, then to its assuming permanent form in clay or wood, are each healthful, real educational developments of will-power, accompanied by that keen sense of pleasure which comes from the act of construction. Manual training also develops individuality; hand-work cannot be slurred over in chorus; it must really be done, each piece and process, under the teacher's eye. We cannot do good hand-work without sticking to honesty and truth; we cannot, in manual training, hide or equivocate or slide over. The good work we do is there, plain for all to see; 'the faults we have made stand out self-revealed, no outside judgment needs to be called in, and we stand by our work, justified or condemned.' Another most valuable result achieved by educational hand-work is, that it not infrequently infuses new life into a child who is dull and who seems to be absolutely irresponsive to the usual educational stimulus of books."

Report of Prof. H. R. Reichel.—Prof. H. R. Reichel, LL.D., Principal of University College of Bangor, North Wales, and Member of the Welsh Intermediate Education Board, has made a very interesting report on manual training, from which his 'General Conclusions on Manual Training in America' will bear reproduction:—

"1. Manual training in American schools derives its strength from two independent motives:—

(*a*) The educational working up from the kindergarten.

(*b*) The professional working down from the technical colleges.

The great preponderance of opinion both among educationists and industrialists is in favour of making it in some form or other universal in the elementary and secondary schools.

2. The light work done in the four lower grades of the elementary school (6 to 10) is a development of kindergarten work.

3. The bench wood-work done in the upper grades is in the main either Swedish sloyd or based on the same general principles.

4. The manual course in the high school is largely technological, and based on the Russian trade-school work exhibited at the Philadelphia Exhibition in 1876. The system has life and vigour, and produces results of immediate vocational value, but unless carefully watched, is apt to fill up the pupil's mental horizon with the fascination of mechanical detail. For this reason, as well as economy, some educationists advocate the elimination of the machine-fitting work of the fourth year. In some high schools there is also a movement to make manual work more definitely educational by correlating it with the art department and with the teaching of mathematics.

5. This division into educational and technological has psychological justification. As an instrument of brain development the value of manual training ceases about the age of 15 or 16, or shortly after entrance on the high school course. Up to this point, therefore, it should be treated as part of the general education prescribed for all: from this point on it should form part of a specialised professional training.

6. Actual trade work is not a good form of manual training for promoting brain development, because it seeks to cultivate manipulative skill to the automatic point, and when work becomes automatic it ceases to require mental effort.

7. At the same time, trade work has a special value of its own for the formation of moral habits and the building up of character, particularly in the case of pupils of inferior intelligence and morale.

8. Such distrust of manual training as exists seems rather a survival from the traditions of all older curriculum than a living educational force. It is contended, precisely where educational investigation is most scientific and profound (*viz.*, in the education departments of such universities as Harvard, Columbia, and Chicago), that belief in its value is most absolute.

9. The movement in favour of manual training so universal in the state schools is beginning to make itself felt in the private schools in which the sons of the well-to-do are prepared for the older universities.

10. Though manual training tends to become universal in the States, there is no movement in the direction of a technical school, pure and simple, without the culture element. The manual training high school has a strong culture side, and even technical institutes like the Massachusetts Institute and the Armour Institute at Chicago, though their students have been through high schools, insist on a study of language and literature throughout the course. An unrelieved technical course, it is felt, would at best produce a mere worker, not a citizen, and not the best kind of worker either."

CHAPTER VIII.

Manual Training High Schools of America.

History of the origin and growth of manual training high schools in America.—Typical manual training schools.—Manual training in grammar and high school grades.—The Mechanic Arts High School, Boston.—Its course of study.—Instruction in the Mechanical Departments.—General aims of the school.—Attendance.—Cost of instruction per head.—Buildings and equipment.—School hours.—Instruction in the Academic Department.—Instruction in the Mechanic Arts Department.—Brooklyn Manual Training School.—Laboratories and Science Lecture rooms.—Building and workshops.—Manual work for girls.—Course of instruction.—High schools in U. S. A.—Courses of instruction in M. T. high schools at Washington.—McKinley M. T. High School.—Rindge M. T. High School.—Indianopolis M. T. High School.—Brookline High School.—The M. T. high school as a culture school.

History of the origin and growth of manual training high schools.—Before describing some of the manual training high schools in America it will be appropriate to give a brief history of the origin and growth of these schools. Since 1865 there had been various attempts to introduce manual training as an element of general education. In that year Mr. John Boynton gave $100,000 for the endowment of the Worcester Free Institute for teaching such subjects as were best adapted to train young men over sixteen years of age for practical life. Other endowments followed, and the Institute was opened in 1868, which gave tool-instruction and shop-practice to those who intended to become mechanical engineers. It was a combination of an Engineering School with an ordinary machine shop. In the same year Victor Della-Vos commenced the system of class-instruction in tools in the Imperial Technical or Engineering School at Moscow. In 1872 the Washington University in St. Louis provided a large workshop for tool-instruction and the construction of models for the illustration of mechanical principles.

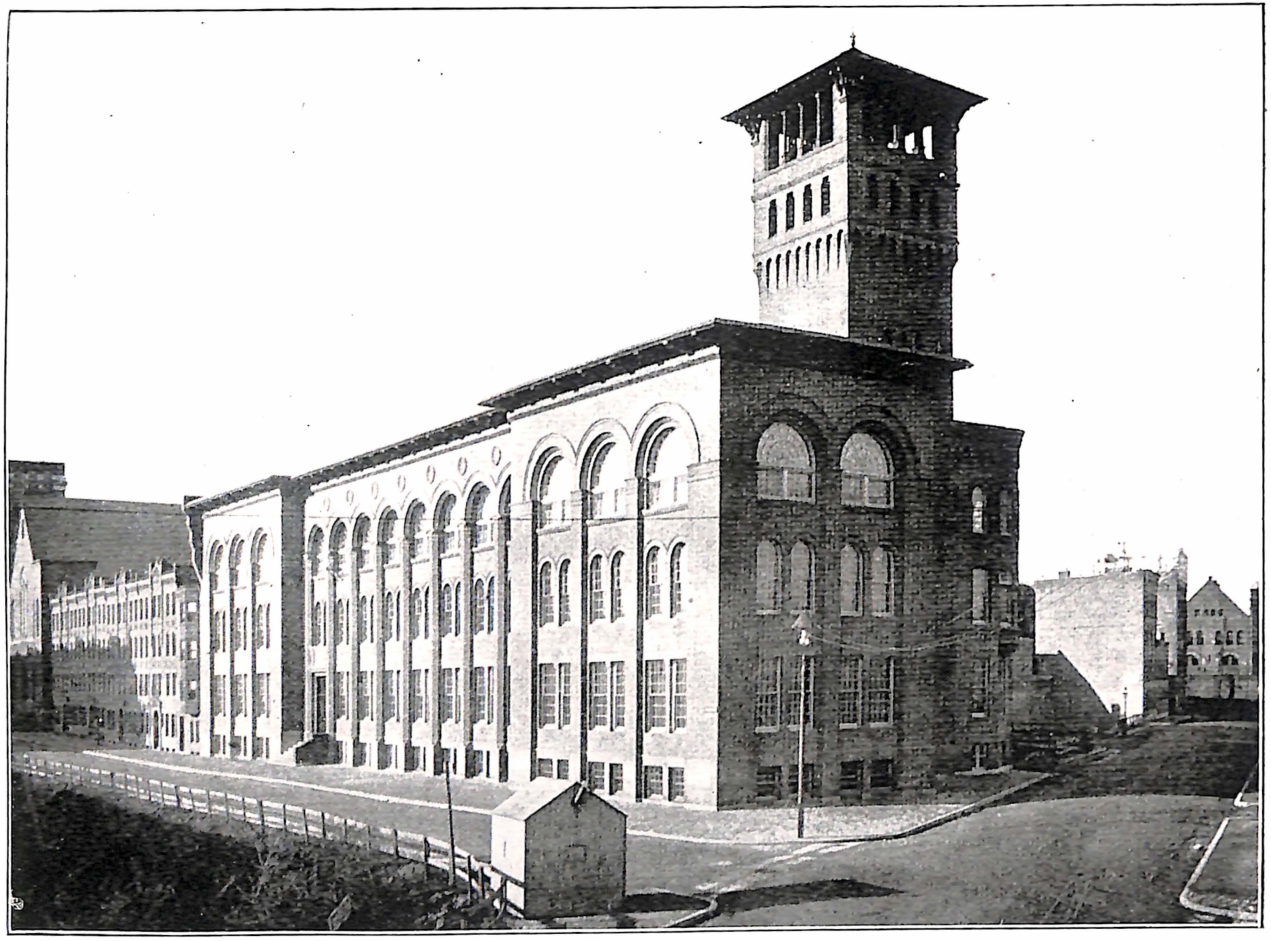
In 1876 the Philadelphia Exposition was opened. The Russian exhibit of the Moscow Imperial School in the Exposition

formed the most notable event in the movement in favour of manual training. "It showed with remarkable fulness and logical arrangement the true educational method of tool-instruction. It presented, clear-cut and definite, what before had been ill-defined or unthought of." Professor J. D. Runkle, President of the Massachusetts Institute of Technology, made a full report on the theory and practice of tool-instruction of Della-Vos as exhibited at the Philadelphia Exposition. He recommended that a series of instruction shops should at once be added to the Institute. He was the first prominent educationist who grasped the idea that this instruction, which is essential to a mechanical engineer, had elements of value in general education. The series of workshops were formed into the School of Mechanic Arts which was opened in 1877 with a two-years' course of study for boys of not less than fifteen years of age.

In the meanwhile the workshop established by the Washington University in 1872 was developed into the St. Louis Manual Training School, which was opened in 1879 with a very general three-years' course of study for boys of fourteen years and upwards. It provided instruction in mathematics, drawing, and the English branches of a high school course as well as instruction in the use of tools. The tool-instruction comprised carpentry, wood-turning, pattern-making, iron-clipping and filing, forge-work, brazing and soldering, and the use of machine tools. The students divided their working hours between mental and manual work. The school did not provide a mere workshop but trained the head more than the hand. The tool-education was general and specific trades were not taught. The school was the first real manual training high school established in America. It was opened with a single class of about 50 pupils in 1880. In 1883 with all the four classes in full working the enrolment was 201.

Typical Manual Training Schools.—Professor C. R. Richards, of the Teachers' College of Columbia University, recommended me to visit the following manual training high schools :—

1. Brooklyn Manual Training School, New York, Principal Dr. C. D. Larkins.
2. Philadelphia Manual Training School, Principal W. L. Sayre.
3. Mechanical Arts High School, Boston, Principal C. W. Parmenter.
4. Technical High School, Springfield, Mass., Principal Charles F. Warner.



MECHANIC ARTS HIGH SCHOOL, BOSTON.—MAIN BUILDING.

5. Rindge Manual Training School, Cambridge, Mass., Principal C. H. Morse.

The above schools were selected as typical institutions. Professor Richards recommended that the following schools might be visited if there was time. They were the same in organization as the first five schools, but different only in equipment:—

1. The McKinley Manual Training School, Washington, D. C., Director of Manual Training, Mr. John A. Chamberlain.
2. Boardman Manual Training High School, New Haven, Conn., Director of Manual Instruction, Mr. Charles L. Kirschner.
3. Crane Manual Training School, Chicago, Illin.
4. University High School, Chicago University, Principal Dr. H. H. Belfield.
5. Manual Training High School, Indianopolis, Supervisor of Manual Training, Mr. M. Louis A. Bacon.

The time at my disposal in America, as may be seen from the narrative of my tour, was so short that I could visit only three of the typical schools named above, besides the Mechanic Arts Branch of the Institute of Technology, Boston. Some more schools will be referred to in this chapter, of which I have collected interesting particulars.

Manual Training in Grammar and High School Grades.—The course of grammar or intermediate schools in America usually extends from the tenth to the fourteenth year and that of high schools from the fourteenth to the eighteenth year. The importance of manual training having been recognised by all in the primary and intermediate grades, the advocates of this training introduced it into the high school course also. To the end of the grammar school course the training is purely disciplinary and is completely dissociated from vocational training. But in the high school course a desire arose to correlate the training with mechanical engineering and higher scientific training without dissociating it from its disciplinary aspects. It was this desire that created the manual training high schools.

The Mechanic Arts High School, Boston.—I shall describe the Mechanic Arts High School of Boston fully. Dr. C. Hanford Henderson, to whom I had a letter of introduction, kindly accompanied me to the school. The school was opened in 1893, but the first wood-working room was not ready for use until March 1894. The Committee on Manual Training describes the character and

purpose of the school in the following terms: "It is neither a trade school nor an institution peculiarly adapted to pupils of any particular class or social condition. Its jurisdiction is the entire city of Boston, and its splendid opportunities are freely offered to the sons of all citizens. Its special function is to furnish systematic instruction in drawing and the elements of the mechanic arts, in addition to a thorough high school course in which mathematical and scientific branches predominate. The training which it gives is not less valuable to a boy who is to become a lawyer or a physician than to one who is to superintend a manufacturing establishment or work at the bench. The many-sided activities of the school tend to reveal to boys their dominant powers and aptitudes and lead them to a happy choice of occupation. It educates them not primarily to become mechanics, but to become men of intelligence and skill. It encourages industry, arouses ambition, and opens wide the avenues to success, usefulness, and happiness. In an age characterised by a marvellous development of industries based upon scientific and mechanical principles, when manual dexterity and a knowledge of mechanical processes are essential to success in numberless profitable employments, it is unnecessary to point out the great value of an institution which combines a good high school education with systematic training in the mechanic arts."

The *course of study* extends over four years. It may be useful to give it at full length.

First year.

Academic	Hours per week	Months	Mechanic Arts	Hours per week	Months
Algebra	5	10	Drawing	5	10
General History	2½	10	Carpentry	10	7
English ...	2½	10	Wood-carving	10	3
Total ...	10		Total	25	

Second year.

Algebra	2½	10	Drawing	2½	10
Plane Geometry ...	5	10			
History of the United States, Civil Government	2½	10	Wood-turning and pattern-making	10	5
English	2½	10	Forging	10	5
French	2½	10			
Total	15		Total	12½	

TEACHER'S DEMONSTRATION LESSON IN WOOD-WORK.—MECHANIC ARTS HIGH SCHOOL, BOSTON.

Third year.

Academic	Hours per week	Months	Mechanic	Hours per week	Months
Solid Geometry	5	5	Drawing ...	2½	10
Plane Trigonometry	5	5	Machinist's work with hand-tools mainly ...	5	3
Physics	2½	10	With machine-tools mainly	5	7
English	2½	10			
French	5	10			
Total	15		Total	7½	

Fourth year.

Trigonometry—Applications to physics, surveying, and navigation	2½	10	Drawing	2½	10
Physics, Laboratory work	2½	10	Machine shop practice, and projects involving the shop work of preceding years	10	10
Chemistry	5	10			
Algebra	2½	10			
Plane Geometry ...	5	10			
History of the United States	2½	10			
English	2½	10			
French	5	10			
German	5	10			
Total ...	15		Total	12½	

The subjects specified for the fourth year, with the exception of English, are optional. Candidates for diplomas are required to take fifteen hours per week in the Academic Department and twelve and a half hours per week in the Mechanic Arts Department.

"The course has been arranged with reference, primarily, to the needs of boys whose school life is to end with the high school, but fortunately this course offers excellent preparation for the higher scientific schools. The thorough training in shop work and drawing enables pupils who enter such higher institutions as the Lawrence Scientific School of Harvard University or the Massachusetts Institute of Technology to anticipate equivalent work in those institutions, and thus gain valuable time for advanced courses. Diplomas are awarded at the end of the third year, and also at the

end of the fourth year of the course. The work of the fourth year enables good students to anticipate not only courses in shop work and drawing, but also several of the courses prescribed for the first year in the higher scientific schools. All who intend to enter those schools will find it much to their advantage to complete the fourth year."

Instruction in the Mechanical Departments.—In the mechanical departments the elements of carpentry, joinery, wood-carving, wood-turning, pattern-making, forging of iron and steel, chipping, filing, fitting, and machine tool work are thoroughly taught. A carefully graded series of models has been prepared for each department. The construction of the models illustrates every fundamental principle or process. In each department there is a primary series of models to be constructed by all, and a supplementary series of models for those who are more rapid and skilful workers than boys of average ability. All the series of models are so planned as to require the utmost exercise of judgment, thought and care, and no task is repeated merely to increase facility of construction. The series of models are not irrevocably fixed, but new models are substituted when they give increased interest or better grasp of an important principle. The school, however, takes care that its teaching embodies the best practice of skilled artisans. For although the chief purpose of the school is the development of all the powers of the pupils, it is not forgotten that many boys hope to obtain lucrative appointments on completing their course, or to continue their studies in higher scientific and technical schools with a view to become ultimately architects, engineers, or superintendents, and to direct the work of other men engaged in mechanical pursuits.

The pupils after they finish a model are made to judge how far it is good or defective, and record their opinions with their reasons. "This method serves to develop the power to form correct judgments concerning the essential elements of perfect work, exposes shams, stimulates pride in worthy achievement, deepens respect for a high order of mechanical skill, and demonstrates that success is impossible without mental alertness, patience, foresight, deftness and unceasing care."

General aims of the School.—"The school aims to encourage every noble endeavour, foster every ambition, insist upon high standards of attainment in study and of perfection in mechanical work, cultivate self-control, kindness, politeness and manliness, and deepen respect for honest toil. Its rapid growth and the high

A WOOD-WORKING ROOM.—MECHANIC ARTS HIGH SCHOOL, BOSTON.

esteem in which it is held by its patrons give encouraging evidence that it has been successful in attaining its ideals."

Attendance.—The attendance rose from 160 in 1895 to 730 in 1904. At the time of my visit in December 1906 there were 824 students, of whom 63 belonged to the fourth year class. All the students belong to the city of Boston, no outsiders being allowed admission. The enrolment would have increased by at least three hundred if more accommodation had been available.

Cost of instruction per head.—The cost of instruction per head is $73 a year against $100 in the neighbouring Latin High School and $91 in the English High School of Boston.

Buildings and equipment.—The cost of site, buildings and equipment was about $320,000 till 1904.

In the basement are the boiler-room, coal-room, engine-room, engineer's store-room, the janitor's room and bicycle-room.

On the first floor are the office of the headmaster, with a lobby for visitors and a library adjoining, the chemical laboratory and the room for chemical stores, two class rooms, three recitation rooms, the machine shop and the tool room.

On the second floor are the physical laboratory, a teachers' laboratory, a storage-room for apparatus, a dark room, two class-rooms, two wood-working rooms for first year pupils, the carpentry tool-room, the room for the preparation of stock for exercises in wood-working, and the finishing room.

On the third floor are three class-rooms, two drawing rooms, a storage-room for drawing materials, a wood-turning and pattern-making room, and a modelling room.

Each of the two drawing rooms has accommodation for six classes of thirty-six pupils. Each drawing table provides a locker to hold six drawing boards, and six drawers to contain note-books, drawing materials, etc., of one student each.

The two rooms for wood-working on the second floor are equipped to accommodate daily six classes of thirty-six pupils each. Each room has eighteen double benches, 45 inches wide on the top, and varying in height from 29 to 33 inches. On each side of these benches are five drawers, one of which is assigned to each pupil.

In the wood-turning and pattern-making room there are thirty-six benches. On one side of the bench there is a Putnam 11-inch speed lathe; the other side is used for work with hand tools. The benches are fitted with quick-action vises.

In one corner of each of the three wood-working rooms is an amphitheatre in which the entire class may be seated so that each

member can see plainly the work done by the instructor at the demonstration bench.

The forge shop is a separate one-storey brick structure, 93 feet long and 41 feet wide, which is so situated that the noise incident to the work causes no disturbance to work in the class-rooms. It is equipped with B. F. Sturtevant Company's 36 new down-draft forges, two power hammers, and all necessary appliances for the instruction of three classes daily, each containing thirty-six pupils. Upon a post conveniently located with reference to each of these forges, is an Eagle anvil, weighing 130 lbs., near which is placed a tool bench supplied with tools. Each of these tool benches contains three drawers, one of which is assigned to each boy for the storage of the models which he has completed or on which he is engaged. In one corner of the room there is accommodation for giving demonstration lessons to thirty-six pupils at a time.

The machine-shop is equipped for classes of thirty pupils. The benches which are placed along the sides of the room are divided into sections, each of which is provided with a vise and eight drawers, one for each pupil. There are 36 machine lathes, and a power planing and cutting machine.

I have tried to describe the different workshops with some detail, in order to show with what completeness and careful thought each of them is equipped. The illustrations will, I trust, help in forming tolerably correct ideas of them.

School hours.—The school is in session five and three-fourths hours per day for five days in the week. Of this time ten minutes are given to opening exercises and thirty minutes to recess. The rest of the time is divided into six periods of about fifty minutes each.

Instruction in the Academic Department.—In the Academic Department the study of Algebra extends over two years. The subject of Plane Geometry is completed in the second year. The first half of the third year is devoted to principles of Solid Geometry while the remainder is given to the fundamental principles and formulæ of plane Trigonometry. The subject of Trigonometry is continued in the fourth year with special reference to its application to problems in surveying, navigation and physical science.

The course in History for the first year consists of a rapid survey of the History of Greece and Rome, followed by a study of the History of England with special reference to its influence upon the Colonial period in America. Political History is studied in the second year, and the growth of the principles of free self-govern-

WOOD-TURNING AND PATTERN-MAKING ROOM.—MECHANIC ARTS HIGH SCHOOL, BOSTON.

ment in England and their development in America are traced. Clear notions are given of the character and functions of the Colonial Government, and of the Municipal, State, and Federal Governments.

The distinguishing feature of the work in English is the emphasis placed upon practice in writing and speaking correctly. The books read are determined by the requirements for admission to New England colleges.

The course in French is intended to enable pupils to read simple French with ease and pleasure.

The course in Physics is illustrated by lecture-table experiments, explanations and recitations, and is designed to give clear ideas of the fundamental principles and laws in every department of the subject. All pupils are made to perform carefully-selected laboratory experiments. In Chemistry a comprehensive view is given of the fundamental facts of the elements of inorganic chemistry. The lecture-table demonstrations are supplemented by individual laboratory work as in Physics.

Instruction in the Mechanic Arts Department.—In the Mechanic Arts Department wood-work is taught in the first year, towards the end of which carving is taught. About six models in carving and twenty-nine models of wood-work are done in one year. The second year is given to joinery, wood-turning, and forging. In the forging shop the boys make some of their own tools. The third year is devoted to the machine shop and the fourth to instrument-making. The work of the third year chiefly consists of drilling, planing, scraping, turning cylinders, screw-cutting, etc. In the fourth year machine work is optional. Those who take it up work for two periods a day more than those who do not, that is, for eight periods in place of six. The best boys build a machine or parts of a machine themselves in the fourth year and present them to the school as proofs of their skill. Those who do not take up machine work in the fourth year learn advanced German instead.

Brooklyn Manual Training High School.—At New York I visited the Brooklyn Manual Training High School. The Principal, Dr. C. D. Larkins, began life as a telegraphist, saved money and went to College and has worked for more than thirty years in high schools. He is intimately acquainted with the practical as well as the academic side of high schools and is a firm believer in the educational value of practical teaching. Nearly all the pupils of the school take up the full manual training course, a few only choosing the general high school course, and yet they take as

high positions in the Superintendent's examination in the purely academic subjects as pupils of academic high schools.

Laboratories and Science Lecture Rooms.—Every high school pupil goes through a course of Elementary Anatomy, Botany, Zoology and Physiology in the first year. Dr. Hunt, the science lecturer, has a most admirable way of blending all the above sciences in the same lesson. There are four biological laboratories, two for botany and two for zoology. They are furnished with large flat tables seating four students on each side. Each student is provided with a cupboard and a compound microscope, two instrument drawers and a revolving chair. The teacher's table has got hot and cold water and electric connections, and a deep porcelain sink. At its back are chart racks and large blackboards. Each of the botany laboratories has a plant room adjoining, fitted with a nickel-mounted and glass-shelved plant rack, and a dark room for experiments with growing plants. Each of the Zoological laboratories has a large three-divisioned aquarium and a four-shelved aquarium rack so arranged that aquarium jars may be placed on them, and water left running over at night. There are also numerous vivaria and a supply table containing about one hundred drawers. Each of the two lecture rooms for science provides banked seats round two sides of the room for 61 pupils, the lecturer's table being across one corner of the room. This table has connections for hot and cold water, gas, and electricity, and has an air blast and exhaust. The pneumatic trough in the table has a plate glass in front, so that the manipulations of an experiment may be seen in all its parts by the class. The table is provided with a plate-glass chamber with exhaust attached for use with noxious gases. Over the table are specially designed chart racks and a lantern screen, the lantern table with electric connection being placed behind the highest row of seats for students.

Building and workshops.—The building is a large four-storeyed structure in one of the busiest parts of the town. In the basement are three laboratories, a steam engine and dynamo laboratory, an electric testing laboratory, and an assay and analytical laboratory. Every laboratory is replete with the best available machines and apparatus.

There are four joinery shops each fitted up with 30 benches, bandsaw, turning lathe, grind-stone, teacher's demonstration bench, blackboard, amphitheatre for demonstration lessons, tool room, wash room and 150 students' lockers. The pattern-making shop is fitted up like the joinery shops.

THE FORGE SHOP.—MECHANIC ARTS HIGH SCHOOL, BOSTON.

There is a mill room on the first floor for preparing stock which contains a planer, a jointer, a jigsaw, a circular saw, and a knife-grinder for the planer knives.

The sheet-metal shop is fitted with long benches for 30 pupils and provided with gas forges and tools for tin-smithing, repousse and Venetian iron work. The forges used are those of the Buffalo Forge Co., with exhaust and pressure draft, a big fan being connected with each draft. The shop is perfectly free from smoke or draft.

The printing shop is provided with a linotype presented by the manufacturers. Both the printing and binding rooms are richly fitted up.

The forging shop is on the top floor and has 20 down-draft Buffalo Co.'s forges with electric power blower and exhaust. The coal is stored in a hermetically sealed iron box with only one outlet at bottom. The anvils have under their base a thick layer of sand to deaden the noise of hammering.

The machine shop has 24 engine lathes of 12-inch swing, two of 14-inch swing, and one of 16-inch swing, four speedlathes, two vertical drills, two sensitive drills, besides saws, millers, grinders and planers. Each machine is driven by an independent motor attached to it.

The whole building is heated and ventilated scientifically and lighted by 6,500 electric lights.

Manual work for girls.—For girls there are four sewing and millinery rooms, each provided with tables for 30 girls. The suite of rooms for domestic science consists of a laundry, two kitchens, a pantry, a model dining room and a model bed-room.

Course of instruction.—The course of instruction extends over four years from 14 to 18 and is divided into 8 grades. The time-table embraces 30 periods of 50 minutes each, of which six periods are given to manual work in the first three years, and four periods in the fourth year. These periods are exclusive of the time given to drawing. Joinery is taught in the first three grades. In the IV Grade the boys take up wood-turning and sheet-metal work, which latter continues into the V Grade. Forging is commenced in the V Grade and is continued into the sixth grade. In the VII and VIII Grades machine fitting is taught. Dr. Larkins is hoping to convert the manual training of the last two years into technical work bearing upon a trade. He thinks that when a boy is 16 years old, manual training should get exhausted, and when he is beginning the third year in the high school he should turn his

attention to technical work. The third year should be considered a transition year.

The girls are taught sewing in the first year, cookery in the second year, millinery in the third year, and domestic science in the fourth year.

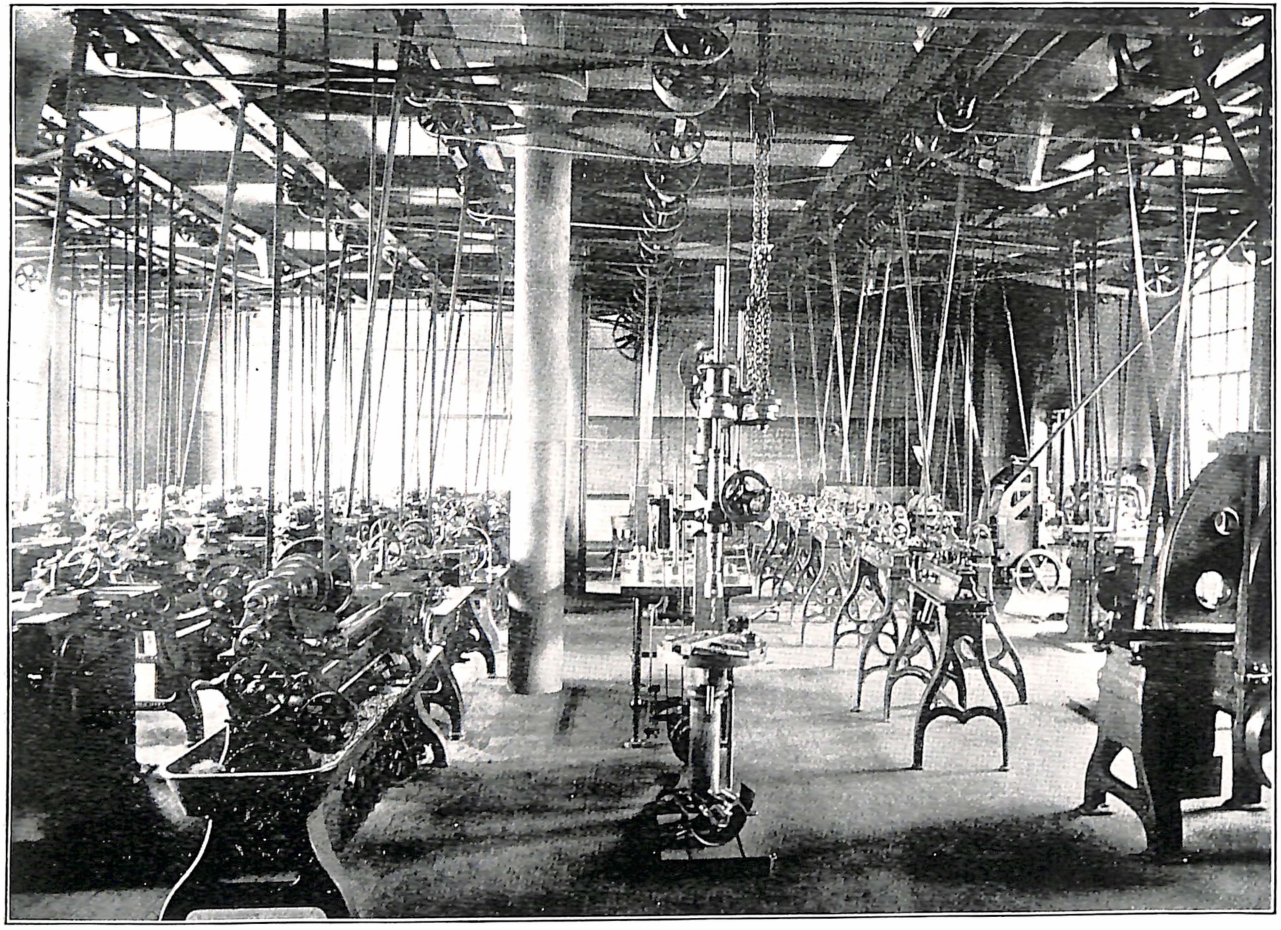
In the same building the *Evening Trade School of Brooklyn* is held from 7-30 to 9-30 P.M. In the Evening Trade School and the Manual Training High School there are more than 2,000 pupils. There are 84 teachers for the day school and 26 for the evening or night school.

High Schools in U. S. A.—At Washington there are three kinds of high schools, (1) Academical, (2) Commercial and (3) Manual Training. In Philadelphia, Classical, Commercial and Manual Training courses are combined in the same high school, a common course for all being provided during the first two years. In the high school system of Pittsburgh four courses are combined, (1) Classical, (2) General, (3) Normal and (4) Commercial. New York has three kinds of high schools, (1) Academical, (2) Commercial and (3) Manual Training. The Principal of the McKinley Manual Training High School at Washington, which I visited, maintains that though the object of all the courses is general teaching and not trade teaching, they should not be combined in the same school, but specialised high schools for the different branches are necessary.

Courses of instruction in Manual Training High Schools at Washington.—At Washington four courses are prescribed for manual training high schools. In all the courses English, Mathematics, Physics, Chemistry, Free-hand Drawing and Design are compulsory, and German, French History and Biology are optional *for both boys and girls.* Shopwork and mechanical drawing are compulsory *for boys* in each year, and practice is given in caring for the boilers, engines, dynamos, motors, etc., which constitute the heating, lighting, and power plants of the buildings. Courses in domestic science and domestic art are compulsory *for girls,* which include individual work in cooking, the preparation and serving of meals, invalid cookery, marketing, laundry methods and materials, management of the house, plain sewing by hand and machine, dress-making and millinery.

The four courses are :—

(1) *The special two-year course,* which assigns eight hours instead of four to shopwork and mechanical drawing for boys and to domestic science and domestic art for girls, and thus covers the



THE MACHINE SHOP.—MECHANIC ARTS HIGH SCHOOL, BOSTON.

same ground in these subjects as do the four-year courses, but the academic work is proportionately lessened.

(2) *The special four-year course*, which omits foreign languages and devotes the time saved to technical and scientific work.

(3) *The four-year course A*, designed to prepare for the Normal School, which provides four hours for compulsory shopwork or domestic science and art in each year, in addition to four hours for freehand and mechanical drawing.

(4) *The four-year Course B*, which prepares for scientific and technical schools of college grade.

I give the details of the first, second and fourth courses below. The optional subjects are printed in Italics.

SPECIAL TWO-YEAR COURSE.

First year		Second year	
English ...	5	English	3
Business Arithmetic	4	History	2
Physics	4	Geometry	4
Drawing—		Chemistry	4
Freehand	2	Drawing—	
Mechanical	2	Freehand	2
Shopwork	8	Mechanical	2
Joinery		Shopwork ...	8
Wood-turning		Machine-shopwork	
Pattern-making		Domestic Science	8
Foundry work		Cookery	
Forging		Laundry	
Domestic Science...	4	or	
Cooking		Domestic Art	8
Domestic Art	4	Dress-making	
Plain sewing		Millinery	
Dress-making		or	
		Domestic Science	4
		and	
		Domestic Art	4

SPECIAL FOUR-YEAR COURSE.

First year		Second year		Third year		Fourth year	
English ...	4	English...	3	English... ...	4	English...	4
History	2	History...	2	*Solid Geometry*		*Mechanics* ...	5
Algebra ...	5	Geometry	4	*Trigonometry*	5	*Applied Electricity*	4
Physics	4	Physics...	4	*Surveying*		*Advanced Chemistry*	4
Drawing—		Chemistry	4	*Elementary Steam Engineering*	4	*German or French*	4
Freehand	2	Drawing—		*Chemistry*	4	*Biology*	5
Mechanical	2	Freehand	2	*Biology*... ...	5	Drawing—	
Shopwork	4	Mechanical	2	*German or French*	4	Freehand	2
Joinery		Shopwork	4	Drawing—		Mechanical	2
Wood-turning		Foundry		Freehand	2	Shopwork	4
Pattern-making		Forging		Mechanical	2	Machine shop	
Domestic Science	2	Domestic Science	2	Shopwork	4	Domestic Science	2
Cooking		Cooking		Machine shop		Domestic Art	4
Domestic Art	2	Laundry		Domestic Science	2		
Plain sewing		Domestic Art	2	Domestic Art	4		
Dress-making		Dress-making					

NOTE.—In the third and fourth years of this course pupils are required to take two of the optional studies.

FOUR-YEAR COURSE B.

First year		Second year		Third year		Fourth year	
English ...	4	English	3	English...	4	English ...	4
History	2	History...	2	*History...* ...	2	*History* ...	2
Algebra ...	5	Geometry	4	*Solid Geometry* }		*Advanced Mathematics and Reviews* ...	5
German ...	4	German	3	*Trigonometry* }	5		
Drawing—		Physics...	4	*Surveying* }		*German or French*	4
Freehand	2	Drawing—		Chemistry ...	4	*Physics* ...	4
Mechanical	2	Freehand	2	*German or French*		*Chemistry*	4
Shopwork	4	Mechanical	2	*or Physics*	4	Drawing—	
Joinery		Shopwork	4	Drawing—		Freehand	2
Wood-turning		Forging		Freehand	2	Mechanical	2
Pattern-making		Foundry work		Mechanical	2	Shopwork	4
Domestic Science	2	Domestic Science	2	Shopwork	4	Machine shop	
Cooking		Cooking		Machine shop		Domestic Science	2
Domestic Art	2	Laundry		Domestic Science	2	Domestic Art	4
Plain sewing		Domestic Art	2	Domestic Art	4		
Dress-making		Dress-making					

NOTE.—Pupils in the third year of Course B are required to take at least one, and in the fourth year at least two, of the optional studies not including history.

McKinley Manual Training High School—In *the McKinley Manual Training High School* at Washington there were at the time of my visit 400 boys and 150 girls in attendance. The school has workshops for joinery, wood-turning and pattern-making, forging, and machine work, fitted up with every requisite on a lavish scale. For each workshop a regular series of exercises is prescribed. In the machine shop tools and cutters are made. In the fourth year some boys take up electrical engineering in place of machine work. The Chemistry and Physics laboratories are elaborately fitted up. Education is free throughout the school, and in the Elementary Department even books are supplied free of cost. In the High School Department, however, boys buy their own working cloaks and instruments. In the Art Department both boys and girls learn weaving, design-drawing, and decoration work. I saw many girls printing cloths with blocks made by themselves. Printing by blocks with the hand which is common in India has become popular in American schools through the advocacy of Prof. Arthur Dow of Columbia University. In the school museum I saw an important exhibit of exercises worked by boys of a French Boarding High School which was presented to the school after the St. Louis Exhibition was closed. The week's work in the French School amounted to 40 hours, of which 18 to 25 were given to shop practice. The manual work of the McKinley Manual Training School is much more technical than that of the Brooklyn Manual Training High School.

At Washington there is the *Armstrong Manual Training High School* for coloured pupils which is organised and equipped exactly

like the McKinley Manual Training High School. I was unable to visit it for want of time.

In Philadelphia there are four Manual Training High Schools and only one Academic High School.

I may briefly refer to some other manual training high schools. *The Rindge Manual Training High School*, Cambridge, Mass., has more than 350 boys, about half of whom proceed to the University technical school and the rest enter Engineering offices. The school is in no sense a trade school. The boys do not become mechanics but supervisors of mechanics, commencing with a salary of $7 to $12 per week and rising to $200 a year.

The *Indianopolis Manual Training High School* combines the good points of the academic and the manual training high schools. It may be described as a high school with a strong manual training department. There are over 1,200 pupils. Greek, Latin, French and German are all taught, but Greek and French only for two of the four years. The workshops are unusually large and well equipped. The lathes used in the wood-turning room were made by pupils of the school in their fourth year. Manual training occupies about one-half of the whole school time.

The *Brookline High School* is an academical high school with a manual training department. Those who join this department have no Latin or Greek to learn. The manual training consists of three hours a week of drawing and three hours of benchwork. In the first year there is woodwork, in the second wood-turning, in the third forging, and in the fourth machine-fitting. For girls there is suitable practical teaching as usual.

The Manual Training School as a Culture School.—I may conclude this chapter by a quotation from a paper on "The manual training school as a culture school," read by Mr. Frank Rollins, Principal of Stuyvesant High School, New York:—

"An old idea of culture that has obtained for five hundred years and more has laid its chief emphasis on certain intellectual accomplishments. The possessor of these accomplishments was cultured, and no other person could claim that distinction. Courses of study for schools, and choice of occupations for men and women have long been dominated by this ancient conception of culture; and even yet in schools and colleges that offer several courses of study the course of highest caste is often judged to be the course that has the smallest possible relation to modern human life and its varied activities. Within the memory of the present generation,

however, there has slowly grown the conviction that the highest culture includes something more than knowing, and that the power to do is one of the marks of the cultured man. A definition of culture that is likely to stand as a classic definition for many a year includes 'Refined and gentle manners, facility and precision in the use of the mother-tongue, the power and habit of reflection, capacity for growth and the power to do.'

"With this definition in mind let us examine the courses of study in the manual training high schools to see if such schools furnish the materials and activities for the attainment of culture. Time will not permit a detailed review of all the courses of study, but a comparative examination of the courses in fifteen of the leading manual training high schools of the United States shows that the following subjects are mainly common to all: English, at least one foreign language, history and civics, mathematics, physics and chemistry, mechanical and free-hand drawing, joinery, wood-turning and pattern-making, forge and foundry work, and machine-shop practice. The manual training exercises for the several years have been arranged with such variety as to insure sustained interest and to prevent irksome repetition or automatic and unthinking reproduction. It seems to be intended that any process shall be discontinued as soon as it ceases to compel the student to think, that is, as soon as it becomes merely mechanical; and this is justified by the consideration that a mechanical process ceases to be of educational value to a student at the very point where it begins to be of industrial value to an apprentice, since the valuable product of manual training is a disciplined mind, while the valuable product of apprentice work is some article of commerce."

CHAPTER IX.

Training Schools for Teachers of Manual Work.

Teachers' Training College of the Columbia University.—Pratt Institute, New York.—Sloyd Training School, Boston.—Teachers' Training College for Manual Instruction, Leipsic.—The Macdonald Institute, Ontario.

There are three principal training colleges for teachers of manual work in America, namely, the Teachers' College of the Columbia University, New York, the Pratt Institute, Brooklyn, and Mrs. Quincy A. Shaw's Sloyd Training School, Boston, all of which I visited.

The Teacher's Training College of the Columbia University is the highest Training College in the United States. A candidate for admission must have completed (1) an approved curriculum in a secondary school and (2) an approved curriculum of at least two years in length in a college, scientific school, normal school, training school or technical school, including at least two years' work in the modern languages, in English language and literature, in mathematics and the natural sciences, and one year's work in history. For graduation it is necessary to complete satisfactorily (1) certain fundamental courses, (2) at least one major subject, and (3) approved elective courses.

The fundamental courses include a general course in psychology with special reference to dynamic psychology and the mental processes important to intellect and character, and the psychological basis of educational theory and practice. They further include the history and principles of education and the history of education in modern times.

Those who take the Teaching of Manual Training in Elementary Schools as the major subject learn the Theory and Practice of Teaching Manual Training. This subject includes the place of manual training in education, its relation to social life, to child nature and to the curriculum, problems of subject matter and of method, practice of handwork in the different grades of the elementary school, problems of direction and maintenance of work

under supervision. Those who take the course for secondary schools study manual training in the high school, courses of work, methods of presentation and relation to industrial life. In manual training they learn (1) handwork for the primary grades which includes weaving, sewing, basketry, pottery, and construction in paper, cardboard, metal and wood, (2) wood-working for elementary schools, (3) mechanical drawing, (4) applied design, which deals with problems of design in the various lines of handwork, such as basketry, weaving, sewing, embroidery, pottery, construction in paper, cardboard, bent-iron and wood and (5) principles of design. Those who take the Teaching of Manual Training in secondary schools study, in addition to the above subjects, (1) wood-working for secondary schools, (2) constructive design, (3) turning and pattern-making, and moulding and foundry practice, *or* forging and sheet-metal work, *or* machine-shop work, and (4) an advanced course of mechanical drawing.

Manual training students are advised to take up for their elective or optional courses Domestic Art, Domestic Science, and Fine Arts.

It will be seen from the above details how complete the course of instruction is for teachers of manual training. The course for teachers of both elementary and secondary schools is one of two years. The time-table is stated by Dr. Reichel to be roughly as follows :—

First year.

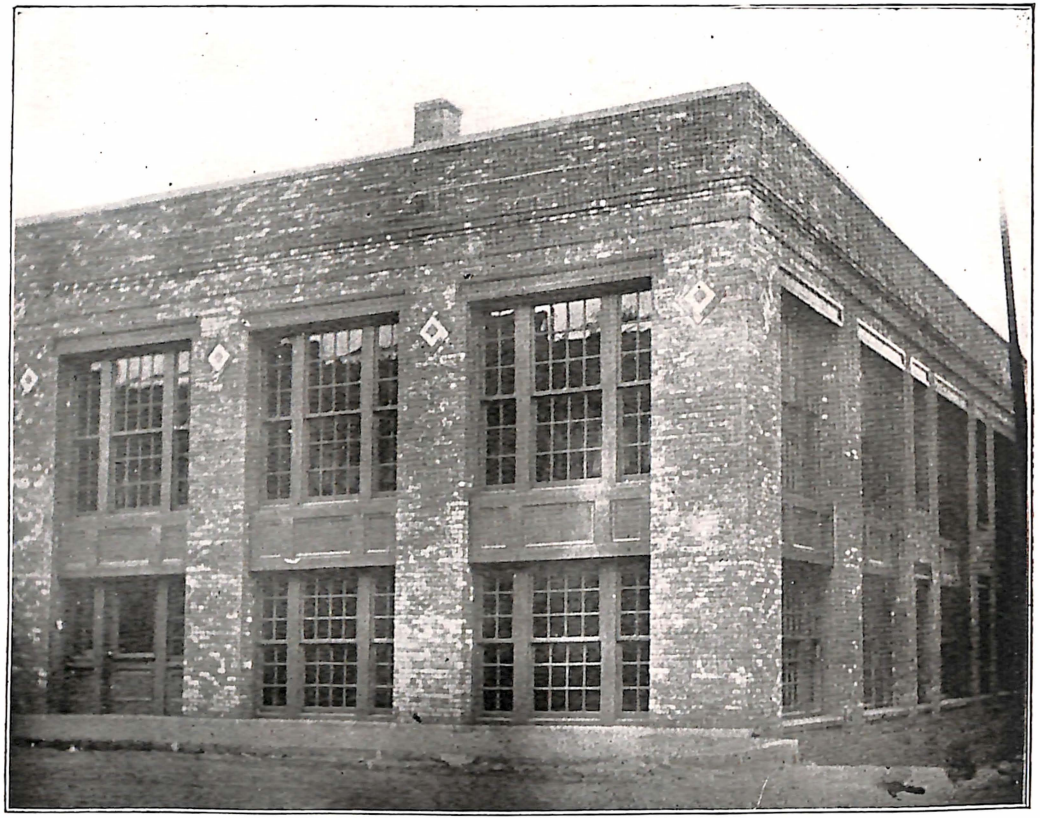
Manual work	12 hours a week.
Mechanical drawing	2 do.
Fine arts	2 do.
Educational lectures	6 do.

Second year.

Manual work	10 do.
Mechanical drawing	2 do.
Fine arts	2 to 6 do.
Educational lectures	5 do.

The *workshops* are elaborately equipped at great cost, and the practical instruction given from cloth and carpet weaving, basketry, raffia work, clay modelling, pottery, painting and decoration of pottery up to woodwork, bent-iron work, forging and machine work is of a high order.

In the *Pratt Institute* the course for Manual Training teachers lays great stress on art work and the manual work is confined to the kind usually done in elementary schools. Candidates for



SLOYD TRAINING SCHOOL, BOSTON

admission must be graduates of a high school. The first year is chiefly devoted to art. Dr. Reichel gives the following analysis of the time-table :—

First year.

The light manual work of the lower grades	2 afternoons a week.
Mechanical and architectural drawing	1 day a week.
Fine art including freehand drawing, clay-modelling, history of art, etc.	2½ days do.
Educational lectures and practice	Half a day do.

Second year.

Wood-work for upper grades	1 day a week.
Lighter work for lower grades	Half a day a week.
Designing for manual training	Do.
Wood-carving and leather-work	1 day a week.
General art	2 days do.
Theory and practice of education	Half a day a week.

The *Sloyd Training School of Boston* was established by Mrs. Quincy A. Shaw in 1888 as a free school. The Principal of the school has from the commencement been Mr. Gustaf Larsson, an alumnus of Herr Otto Salomon of the famous seminary at Naas, whose services as organizer of manual instruction in Mysore I was fortunate enough to secure for a period of about six months in 1907-08. Mr. Larsson's work of training 2 supervisors and 20 teachers of sloyd, who were mostly graduates of the University, for the Mysore Department, and organizing the teaching of sloyd in Mysore generally, is described in a separate brochure on 'Sloyd in Mysore.'

The object of the Boston school is to train teachers of sloyd. It provides instruction and practice in tool-work and teaches the educational principles involved in manual training. The school curriculum includes bench-work, educational lectures, practical knowledge of English, and practice in teaching sloyd. The regular normal course occupies one year of 34 weeks and prepares both men and women teachers to teach sloyd in all grades below the high school.

The course of studies includes the following subjects :—(1) Aims, principles and methods of sloyd, (2) History and growth of manual training, (3) Talks on wood-work, (4) Woods, their growth, structure and quality, (5) History of education, (6) Selected literature on educational subjects.

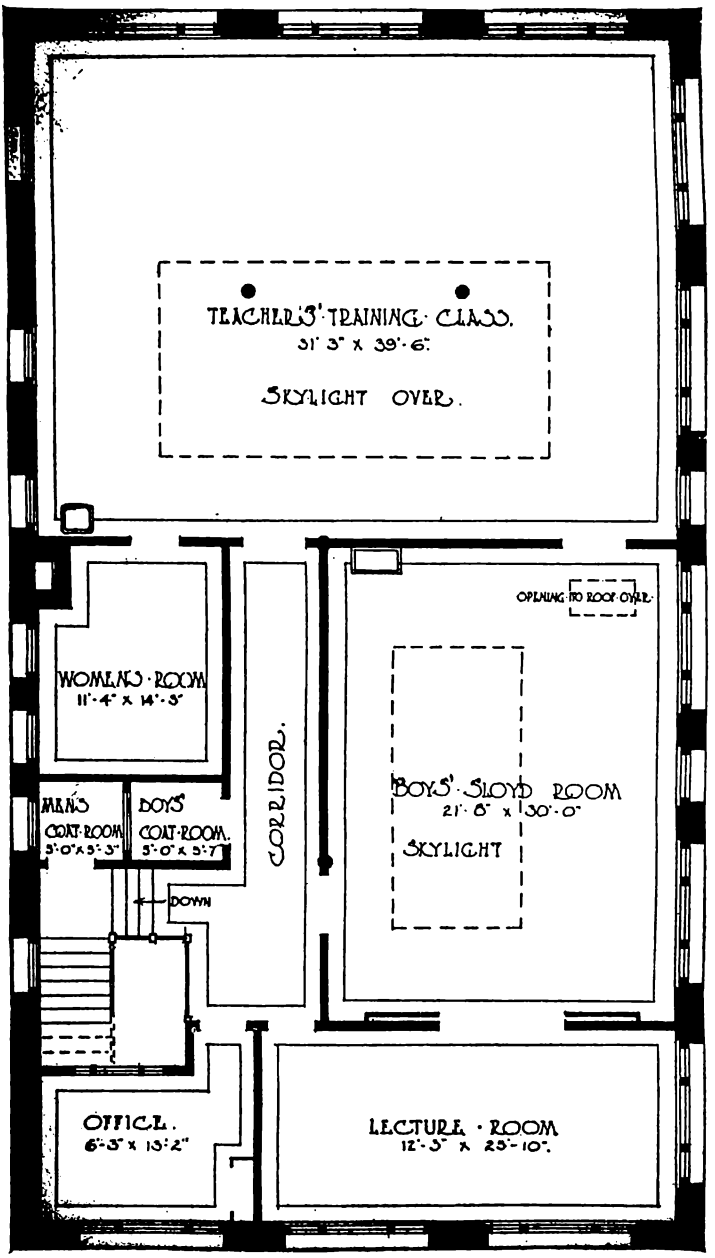
The practical course includes (1) the making of a set of models representing about seventy-four different exercises and involving the use of fifty wood-making tools, (2) the making of sketches and working drawings, full-size and scale, previous to the making of the models, and (3) practice in teaching under the guidance of an experienced teacher, and observation lessons.

The whole course is exclusively educational and has no industrial aim. Manual training occupies 25 hours a week, educational lectures about eight hours a week, the lectures being partly given by Dr. J. P. Hylan, Harvard Professor of Physiology and Psychology, and partly taken at the Massachusetts Institute of Technology.

The school has been a free institution till now, and up to 1903 turned out 200 graduates who were engaged in teaching 50,000 children. The influence of the school is felt all over the Eastern States. The school, which had somewhat dingy surroundings in 39, North Bennett Street, is now provided with an up-to-date building, by the liberality of Mrs. Shaw. A forge-shop and metal-room have been provided in the new building, and high school courses in sloyd for those who desire them have been organized. On the ground floor of the new building are the forge-shop, metal-room and wood-turning room. On the second floor are the Principal's office, a lecture room, a teachers' training class and a boys' sloyd room.

Besides visiting the three training institutions in America described above, I visited the *Teachers' Training College for Manual Instruction of Leipsic* (19, Scharnhorstrasse) under the Directorship of Dr. Alwin Pabst, on my way back to India. The school was established in 1887 by the Association of German Teachers for Manual Instruction under Dr. Woldemar Gotze, who continued as Director until his death in 1898. The great service he did to the cause of manual instruction was to insist on its educational value and repudiate the idea that manual instruction was a direct preparation for a trade or handicraft. Nearly all the schools in Germany except a few in Strasbourg (Alsace-Lorraine) follow what is known as the Leipsic method. The building for the College has been erected by the Leipsic Town Council and handed over to the Association on certain conditions.

The object of the College is the theoretical and practical training of teachers for boys' manual work. Theoretical training is given by lectures on the significance, history and methods of manual instruction. "Lectures and exercises in drawing enable the



BOSTON SLOYD TRAINING SCHOOL—SECOND FLOOR PLAN

students to see and apply the æsthetical points in manual training. Form, color and ornamentation of models are duly considered. The instruction is supplemented by object lectures in the museums. Practical instruction and exercise in the technical part of each department of work is regulated according to a fixed progressive plan. The students are initiated into the methods of manual instruction by means of probationary lessons, besides which discussions are held on matters relating to manual training."

There are nine departments of practical work:—

(*a*) Elementary work (simple wood and paper-work, clay-modelling.)
(*b*) Cardboard-work.
(*c*) Bench-work.
(*d*) Wood-work for rural boys' workshops.
(*e*) Wood-carving (chip-carving and grounding).
(*f*) Clay-modelling.
(*g*) Metal-work.
(*h*) Construction of apparatus for school purposes.
(*i*) Glass-work.

Special attention is paid to modelling in this College. Following Froebel's and Pestalozzi's principle that a child knows nothing so well as what it can construct, the Director was impressed with the inadequacy of drawing as a complete representation of an object. Modelling not only gives a complete idea of an object, but leaves an indelible impression on the mind of the child of the object modelled. In modelling, a child is compelled to take in every detail clearly and distinctly, the hand and eye working together, and the sense of sight being helped by the sense of touch and the muscular sense. Thus the idea of an object is grasped more fully and accurately by modelling it than by merely looking at it during an object lesson. Any defect in the conception of an object is readily revealed in the process of modelling. A comparison of an imperfect model with the original object at once shows the pupil the defects in his conception of the object, and here the sense of sight comes to the help of his sense of touch and muscular sense. With increased manual skill there comes increased activity of the brain, and the training of the hand and the training of the mind proceed together. The Director is convinced that in the early stages of a child's education modelling in clay and sand, cutting figures of objects out of paper, paper-folding, and at a later date cardboard-work, stick-laying and fretwork are necessary for developing its representative faculties generally. The hands and eyes are both trained and children thus educated are infinitely superior to those who have not

undergone this training. This early training naturally leads to the manual training proper which commences at the age of eleven. A systematic course of graduated hand-work from early childhood to the age of sixteen develops the mental and bodily powers, creates valuable tastes and activities for youth and renders the whole life happy and useful.

On the morning of my visit Dr. Pabst was unavoidably absent, but he sent a friend to show me everything that was interesting. All the year children of the elementary schools of the town come to the Seminary on Wednesday and Saturday afternoons from 2 to 5 P.M., for various kinds of elementary manual work, consisting chiefly of wood-work, paper-work and clay-modelling. The rest of the week is devoted to the training of teachers. I saw a class of 15 adult teachers at work. They were engaged in making colour charts, form charts and number charts of various attractive designs for class use. Pleasing designs were also practised of arranging semi-circular rings of metallic wire on cardboard for teaching numbers. Buckets, trays of various shapes, models of lanterns, etc., were made of cardboard. Some of the teachers made models of ladders, easels, gates and hat-pegs with sticks. Others were engaged in paper-plaiting, paper-folding and wire-plaiting, also in making geometrical figures and designs of coloured strips of wood, in cutting out the forms of familiar objects like a tea-kettle, a light-house, a cottage of coloured paper, and sticking them on mill-boards. Little ornamental and useful cabinets of six drawers made of match-boxes with a cardboard case to enclose them were constructed by other teachers. Cardboard, a knife, a pair of scissors, and plenty of paste, and occasionally other materials like strips of wood are supplied to the teachers.

In the modelling class the pupils are provided with modelling boards or pieces of linoleum, a sponge and a modelling knife, but all the modelling as far as possible is done by the hand, the knife being used only when a fine edge or corner cannot be reached by the fingers. After an object is modelled, the pupils are made to draw it, and to paint their drawing. Demonstration lessons are given by the teacher as may be required.

The school museum contains beautiful specimens of wood-carving, ornamental iron-work, wooden models of agricultural implements, specimens of glass-blowing, fancy wire-work, simple apparatus for science-teaching, wooden models of a steam locomotive, models of gymnastic apparatus, etc., all made by teachers.

During the summer from 1st July to 30th September, teachers

come from different parts of Germany as well as other countries including England, for a five weeks' course of elementary hand-work. For wood-work, there are two courses, one of ten weeks with 25 exercises, and the other of five weeks with 13 exercises.

I was unable to visit Herr Salomon's *Sloyd Seminary at Naas* in Sweden. The Seminary was opened in 1874. The course of training up to 1881-82 was for one year, and included mathematics, natural science, pedagogics, psychology, school methods, mechanical drawing, the Swedish language, physics and the study of mechanical laws, besides carpentry, wood-turning, wood-carving, and forging, the time-table providing for fifty-five hours of work a week. From 1882 the Seminary has adopted a new plan of training teachers in six weeks' courses. Up to the end of 1907 when Herr Salomon died, not less than one hundred and ten of these six weeks' courses are said to have been held, which were attended by 4,102 teachers representing 37 different countries. Instruction, tools and material are given free, and only a small sum is charged for board and lodging. All the students are expected to take part twice daily in gymnastic exercises arranged in accordance with the Swedish Ling system. Since 1895, in addition to the usual courses, instruction has been given at Naas in the theory and practice of out-door games, and since 1902, also in gardening, cookery, needle-work and other similar subjects. This brief account will show the many-sided activities of the institution, and I can only regret my inability to visit it for want of time. The Seminary has been endowed by Herr August Abrahamson, uncle of Herr Salomon. The total value of the endowment is six lakhs of rupees.

This chapter would be incomplete without a reference to the *Macdonald Institute* attached to the Ontario Agricultural College, which was the last educational institution I visited in America. The Institute provides a Teachers' Normal Course for one year, which affords a comprehensive study of the subject of manual training as regards the needs of both the specialist and the regular grade teacher, and deals with those forms of industrial work that are most practical and significant. The subjects of study and practice include—

Paper-folding.—Cutting and mounting.
Clay-modelling.—Geometrical forms and natural objects.
Basketry.—Weaving in yarns, raffia, and rattan.
Construction.—In paper, cardboard and metal.
Drawing.—Freehand, plane and solid geometry, working drawings.

Wood-carving.—As decorative constructive work of the course.

Principles of construction.—Properties of materials, construction of tools, their care and sharpening, analysis of the action of cutting tools.

Turning.—In soft and hard woods.

Machine shop practice.—Tools, methods of union, lining out, templets, chipping, filing, drilling, drifting.

Lathe.—Tools and tool angles, chucks and chucking, slide rest turning, boring, screw-cutting.

Sheet metal working.—Jointing, riveting, soldering, Bunsen burner, soldering iron, blow-pipe, brazing.

Forge-work.—Tools, cutting, breaking, care of fire, drawing and pointing, bending and shaping, flattening, punching, twisting, welding, upsetting, hardening and tempering.

Equipment.—Manual training rooms, plans and estimates of cost.

Methods of teaching.—Practice and criticism in the Institute and in the Macdonald Consolidated School. Theory and history of educational hand-work.

The same Institute has a *Normal Course in Domestic Science* extending over two years, which aims to lay a thorough foundation for the special work of teaching Domestic Science. The Toronto University gives a degree in Household Science. The following subjects are prescribed:—

Junior year.

Elementary chemistry	3 periods weekly.	
Physiology and hygiene	1 period	
Elementary cooking	6 periods	
Foods	1 period	
Sanitation	1	
Household economics	1 ,,	
Laundry	3 periods	2 terms.
Psychology	2	1 term.
History of education	2	1
General teaching methods	2	1
Practice work	6	
English	3	
Educational sewing	2	

Senior year.

Chemistry of foods	5 periods weekly.	
Biology	1 period	1 term.
Bacteriology	9 periods	1
Physiology and hygiene	1 period	

Senior year.

Home nursing and emergencies . .	1 period weekly	2 terms.
Advanced cookery	3 periods	2
Home ethics	Lectures.	
Domestic science	1 period weekly.	
Observation	1 ,,	
Practice teaching	3 periods	
English	2	
Elective	5	

CHAPTER X.

Manual Training in Council Schools of England.

Leeds and Bradford.—County Council Schools of Leeds.—Kirkstall Road School.—The Central High School.—The Thorsby High School.—Cockburn High School.—Council Schools of Bradford.—Belle Vue Boys' Secondary School.—Belle Vue Girls' Secondary School.—School for Defective Children, Grange Road.—Housewifery School, Grange Road.—Cartlon Street Boys' and Girls' Secondary Schools.—London County Council Schools.—Honeywell Road Manual Work Centre.—Page's Walk L. C. C. Schools.—Upper Hornsey Road L. C. C. Manual Work Centre.—Basnett Road Metal-work Centre.—Manual Training Workshop of the Hornsey C. C. Elementary Schools.—Hornsey Education Committee.—Syllabuses of wood-work and metal-work of the London County Council.

Professor Sadler recommended that I should see the manual work in the Council Schools of Leeds and Bradford. The first schools I visited in England were these. Both in Leeds and Bradford great activity has been shown by the education authorities to introduce manual training or educational hand-work into all elementary as well as secondary schools, in the words of Principal Reichel, "up to the point where brain development connected with the hand motor centres is fairly complete," this point being placed by physiologists "somewhere about the age of fifteen or sixteen, or about two-thirds of the way up the secondary school." It is at Bradford that the Educational Hand-work Association has been formed by the amalgamation of the 'Educational Hand-work Association' and the 'British Sloyd Association.' The Hand-work Association arranges in or near Bradford for summer courses for teachers in twelve different kinds of hand-work as well as for educational lectures delivered by eminent specialists like Professors Sadler, Findlay and Thistleton Mark. It also arranges to send teachers for summer courses to Naas and Leipsic.

In company with Mr. S. Bearder, Superintendent of Manual Instruction, I visited the schools in *Leeds*. In the *Kirkstall Road School*, which is a mixed school, hand and eye work, which chiefly consists of clay and paper-modelling, is prescribed for one hour a

week in standards I to IV. For standards I to III the work is the same for both boys and girls. Hand and eye work is omitted in the IV standard for girls, as they have needle-work for two hours and cookery for two hours and a half a week from the IV to the VII standards. Besides hand and eye work, both boys and girls have drawing in standards I to IV for three periods of 45 minutes each, of which one period each is set apart for plain drawing, object drawing, and design. For object drawing a graduated course is arranged by a drawing master in 8 books published by Arnold & Sons of Leeds. For design 7 books of Petty's Elementary Lessons in Design, published by the same firm, are used. In standards V to VII boys have manual work in place of hand and eye work for two hours and thirty minutes, and drawing for two hours and forty minutes a week. The manual work consists of wood-work. In the same standards girls have needle-work for two hours, cookery for two hours and thirty minutes, and drawing for one hour and fifty-five minutes a week. The time given to drawing for girls has to be reduced to make room for both needle-work and cookery. The time allotted to drawing for boys in the V standard is divided into four periods for freehand drawing, geometrical drawing, model-drawing and design. In the VI and VII standards the time for drawing is given entirely to original and coloured designs.

For wood-work a separate building has been erected which contains a spacious well-lighted and well-ventilated room. In the wood-work room, which is used as a centre by pupils of several neighbouring schools at different hours during the day, and by evening schools at night from 7 to 9 P.M., there are 40 benches. Each bench has a vice, a front cupboard with ten pigeon-holes, and two side cupboards into which three boards to hold the tools for that bench are fitted. Each pigeon-hole contains the drawings and unfinished models of one pupil. The benches, tools and pigeon-holes are all numbered. The tools of one bench cannot be mixed up with the tools of another neighbouring bench.

The *Central High School* and the *Thorsby High School*, Leeds, have the same workshops for wood and metal-work on the ground floor of the Thorsby High School. The Thorsby High School is a literary high school which prepares both boys and girls, many of whom are pupil teachers, for the Arts courses of the University or for the profession of teachers. Special attention is paid, however, to the teaching of chemical physics, for which there are two lessons of 45 minutes' duration, and practical work in the laboratory

for an hour and a half a week. The Central High School, which is a mixed school, has an elementary or preparatory section of standards V to VII, and a secondary section of three high school classes. The course for the first two years in the secondary section is general, which all pupils attend. In the third year of the secondary section the special educational requirements of individual pupils are considered, and the course for that year is shaped to suit the future careers which the pupils propose to follow. The secondary section thus provides the following courses:—

I. Classical (or professional) in which Latin, mathematics, science and drawing form the chief subjects.

II. Modern (or mercantile) in which French or German, commercial geography, mathematics, science and drawing receive most attention.

III. Scientific (or technical) in which mathematics, science and drawing form the leading subjects.

From the V standard of the elementary section upwards the following subjects are included in the time-tables of all classes: science, drawing, commercial subjects, manual instruction, Latin, French and German, some of these subjects being optional. In the secondary section art replaces drawing, and includes mechanical drawing, and drawing and shading from objects and casts. The manual instruction in the elementary section is wood-work, but a boy who has gone through a two years' course of wood-work is allowed to take up metal-work. Similarly in the secondary section the backward boys do wood-work, and the more advanced do metal-work. The Headmaster considers metal-work to be unnecessary for those who intend to proceed to the University for a classical or professional education. Three rooms are fitted up for wood-work, and one for metal-work, with several forges in which boys desiring to become mechanical or electrical engineers receive elementary training. Large laboratories are provided for elementary and advanced work in physics and chemistry.

Wood-work or metal-work is taught for an hour and a half a week. Metal-work includes soldering, moulding, casting, repousse work, turning and fitting. The teacher, Mr. McAdie, has arranged a progressive set of models which all pupils have to work out. Drawing is taught only for one period of half an hour. The time given to drawing in the secondary section is not considered too little as freehand, model and elementary geometrical drawing as well as design, linear, perspective and elementary shading have been taught in the elementary section. Altogether the total

amount of time given to drawing and manual work is two hours a week in the Central High School, which is not grudged, as woodwork, in addition to its other great advantages, imparts geometrical notions, and boys who have gone through a course of manual instruction require less time to learn trigonometry and co-ordinate geometry than others who have not. In the same way boys who have been through a manual training course do better practical work in the physical and chemical laboratories. A Bachelor of Science was employed at the time of my visit as a teacher of manual training.

The cookery and laundry classes for girls are, like the manual training classes, also held in the Thorsby High School. The cookery and laundry rooms are fitted up with all necessary apparatus. Each subject is taught for 2½ hours a week at a time. The teacher gives a lesson and a practical demonstration in cookery for an hour. Then the pupils cook the same dish themselves which was the subject of demonstration, and write out a description of how they did it in the remaining time. The cooked dishes are marked at cost price, about 2*d.* each, and are usually bought up by the pupils for their lunch.

The Central High School is one of the largest and best-equipped high schools in England, and is provided with a magnificent building which contains two chemical and two physical laboratories, all well supplied with apparatus, and also an art room, two music rooms and a museum. At the time of my visit the school had 1,486 pupils.

The *Cockburn High School, Leeds,* has an elementary department attended by one thousand children, under a separate Headmaster, Mr. W. S. Crowther. The elementary department consists of V, VI, and VII standards, in which special attention is paid to nature-study. The high school department was attended at the time of my visit by 230 pupils. It is under the Headmastership of Mr. William Wallace, and is provided with two physics laboratories, two practical chemistry laboratories, one metal-workshop, one electrical engineering workshop, and one machine workshop. All high school boys work for two hours a week at least in the workshops. Those who intend to take to mechanical and electrical engineering at once on leaving school work in the third and fourth years of the high school course from 3 to 7 hours a week according to their requirements or aptitudes in the workshops. No work is done in the workshops except from the students' own drawings. The school was opened in 1902 and is

housed in a large and model building, which with the school furniture but without the science apparatus and workshop fittings cost £50,000. It is situated by the side of the public park and is warmed and ventilated by the plenum apparatus.

At *Bradford* I visited the *Belle Vue Boys' Secondary School.* The school has a preparatory department of standards V and VI, and a secondary department which provides a four years' course of instruction which includes classical, scientific, manual and art subjects and instruction in modern languages. The complete course of the secondary department is often extended to five years. The school provides a sound general education as a basis for future specialization in higher institutions, or as an equipment for commercial, industrial or professional life. The secondary course prepares for, among other preliminary examinations, the Matriculation Examination of the London University, the Preliminary Examination of Leeds University, the Entrance and Intermediate Examinations for Pupil Teachers, or for scholarships tenable at the Royal College of Science, South Kensington, or the Leeds University.

The school is provided with a large assembly room, well-equipped chemical and physical laboratories, an art room, a clay-modelling room, a science lecture room and balance room, manual instruction rooms, both for wood and metal-work, a dining room, a gymnasium, a swimming bath and a playing field.

The school hours are from 9 A.M. to 12 noon and from 2 to 4-30 P.M. The teaching staff consists of 28 trained and certificated teachers of whom four give manual instruction. The fee is only £2 per annum.

The course of the *Preparatory School* includes Scripture and moral instruction, elementary science, nature study, freehand, geometrical, model and brush drawing, wood-work, vocal music and physical exercises including swimming.

The curriculum of the *Secondary School* for drawing and manual instruction is arranged as follows:—

First year.

Drawing.—Geometrical drawing, drawing from nature, elementary design.

Manual instruction.—Wood or metal-work.

Second year.

Drawing.—Plane and solid geometrical drawing; light and shade; drawing from nature; elementary design.

Manual Instruction.—A carefully graduated course in metal-work, involving vice-work, forging, turning, soldering, riveting and brazing.

Third year.

Drawing.—Drawing in light and shade; painting in monochrome from the cast; more advanced design; stencil-cutting.

Manual Instruction.—More advanced exercises in metal-work.

Fourth year.

Drawing.—Painting in monochrome from the cast; more advanced design; stencil-cutting.

Manual instruction.—More advanced exercises in metal-work.

Wood-work is taught in the V and VI standards of the Preparatory School for 2½ hours a week, a series of 30 models of progessive difficulty being gone through in two years. In addition to the time given to manual work, about two hours a week are given to drawing, in both departments. In the secondary stage the time allowed for manual instruction varies from 1½ hours to five or six hours a week according to the special requirements of each pupil. The boys of the V and VI standards practise ambidexterous drawing, and are made to draw original designs on the blackboard in the limited space of ten minutes at a time. Thus alertness, and quick conception and execution are encouraged. The art work of the school is excellent. For science 1½ hours a week are usually set apart for practical work in the laboratory.

The Belle Vue Girls' Secondary School is organised similarly to the boys' school, and has a staff of 17 trained and certificated teachers including specialists for chemistry, biology and art, in addition to special teachers for dress cutting and making, cookery and gymnastics. The school has a preparatory department consisting of standards V and VI and a secondary department which provides a four years' course. The school provides a sound general education as a basis for future specialization in higher institutions or as an equipment for commercial, industrial, professional or home life. The building provides an assembly room, chemical and biological laboratories, an art room, and a cookery room. Instruction in laundry work and housewifery is afforded at the Green Lane Centre. A gymnasium, a swimming bath and a playing field are provided. The fee is £2 per annum.

The course of the *Preparatory School* comprises Scripture and moral instruction, elementary science, freehand, geometrical, model and brush drawing, needle-work and cutting out, cookery, laundry,

housewifery, vocal music and physical exercises (including swimming).

In the *Secondary School*, the course for drawing is, with a few alterations, the same as in the boys' school. In place of physics, girls learn physiology and hygiene in all the classes. The course in chemistry is the same as that for boys. Botany is taught to the girls as an additional subject in the third and fourth years.

Domestic Science takes the place of manual training in the girls' school; and comprises the following subjects:—

First year.

Cookery; simple dress cutting and making.

Second year.

More advanced dress cutting and making.

Third year.

Dress cutting and making; lined dress.

Fourth year.

More advanced dress cutting; cutting out and making any garment for girls' or women's use.

Physiology, hygiene, botany and chemistry are all taught experimentally, the girls themselves performing the experiments and noting the results.

In *the School for Defective Children, Grange Road*, I saw 30 children of about 12 or 13 years under instruction. They were taught the lessons prescribed for children in the lower classes of elementary schools although at their age children of sound minds complete the elementary course or standard VI. They are taught light wood-work, basket-weaving, knitting of carpets, etc. By judicious manual work the children improve in the use of their fingers and in their powers of learning. By patient teaching and kind treatment of the Headmistress, Miss C. Harris, the children improve so much that some of them are transferred to ordinary schools at the age of 16. The great secret of her success is her inexhaustible patience and tact, and the amount of individual attention paid to each child. Conductors and conveyances are provided for such children as need them.

In the same building there is the *Housewifery School, Grange Road*. In this school a whole flat is designed, built and furnished as a complete home containing a sitting room, a dining room, a bedroom, a kitchen, a pantry, etc. Instruction is given for 5½ hours

every day, three hours in the morning of which 1½ hours are taken up by a theoretical lesson and 1½ hours by a practical lesson, and 2½ hours in the afternoon of which the first hour is taken up by a theoretical lesson which is followed by a practical lesson for 1½ hours. The girls are taught to furnish, fit up and clean a house, and to perform all household duties as in a home. The children are sent out in batches to make purchases, and to prepare a dinner for a fixed number of people at so much per head. They are taught to keep all market and household accounts. Ambulance lectures are given in the school and home nursing is also taught. Instruction in cookery and laundry work is given in special rooms set apart for such instruction.

I did not visit the Grange Road Secondary Schools for boys and girls as they are very similar to the Belle Vue Schools. All the Grange Road Schools are housed in a large and beautiful building of the newest type and equipped with the most modern fittings and apparatus. Assembly rooms for boys and girls, laboratories, art rooms and lecture theatres are provided. Attached to the schools are a fine swimming bath and a gymnasium. The whole building is warmed and ventilated by the plenum apparatus. The building has cost more than £40,000.

I paid a hurried visit to the *Carlton Street Boys' Secondary School,* which aims at preparing boys for various posts in commerce. The schemes of work are based on the conviction that the best training for commercial and business pursuits is to be found in a good, general, all-round education. French and German taught in a practical manner form an essential feature of the curriculum. As a subject of manual training, wood-work is taught. The practical part of wood-work consists in the making of models so designed as to give practice in the use of tools, and the making of joints usually found in courses of wood-work. Lessons are also given in the construction of tools, and the structure and growth of timber trees. Drawing is an essential part of the work, each pupil making a working drawing of the model to be constructed. The aim of manual instruction is to develop the inventive and constructive faculties of the pupil, to create in him a love for manual labour, to develop the powers of observation in the eye and of execution in the hand. The manual work is well calculated to foster in the boys habits of self-respect, self-reliance, accuracy, attention and industry. The premises comprise besides the usual class rooms, an assembly room, a large covered and beautifully ventilated and equipped gymnasium, lecture rooms for physics and chemistry, physical and chemical laboratories with dark room and balance room, an art

room, a room for manual instruction and a large dining room. The furniture and apparatus are of recent and approved design. Great attention is paid to drawing, painting, design and art generally. The passages, staircase hall and assembly hall have their walls covered with framed drawings and coloured designs prepared by the pupils which would do credit to any school of art. The *Girls' Secondary School* in the same building provides for a sound education on a literary basis. Besides needle-work, music, art and cookery, the scientific subjects of physics, chemistry, hygiene, physiology and botany are taught practically by experiments.

In *London*, I visited the chief manual work centres recommended to me by Mr. R. Blair, Chief Executive Officer, who kindly introduced me to the Headmasters. The first Centre I visited was the *Honeywell Road Manual Work Centre* attached to the Honeywell Road L. C. C. School (near Wandsworth Common). Both wood-work and metal-work are taught here. Six schools send their boys for instruction to this centre. Wood-work is usually commenced in the V standard at the age of twelve. The *wood-work room* is provided with twenty benches arranged in two rows. The tools are placed on both sides of a long open rack which is placed between the two lines of benches. A number of special tools for the use of the whole class are provided on a stand at one end of the room. The exercises are either taken from or based upon those given in "Wood-work" by S. Barter, Inspector of Manual Work, London C. C. Schools, (Whittaker & Co.). The morning class is held for three hours, and the afternoon class for two hours. At each bench two boys work at the same time. Two years of wood-work are usually followed by one or two years of metal-work.

The *metal-work shop* has accommodation for sixteen boys at a time. It has two forges. Metal-work was commenced in 1901. In 1906 there were no more than ten metal-work shops for all the London C. C. Schools. The boys of the VII and ex-VII standards do metal-work. The work consists of vice-work, forge-work, drilling, gauge-work, tin-work, brazing, brass and wood turning, brass-work, advanced forging exercises, welding, scraping, making of a try square, a steel screw-driver hardened and tempered and a set of steel tools. These exercises are usually spread over two years. If a boy continues for the third year, his exercises consist of riveting with joints, advanced lathe-work like screw-cutting, inscribing a block, making a micrometer, etc. Boys advanced in physics make a galvanometer, a dipping needle or ordinary compass needle, a simple electric motor, or a pair of quadrant compasses.

Great attention is paid to drawing and art in the Honeywell Road C. C. School, which is attended by many boys of good social position. At the time of my visit the Headmaster informed me that the names of seven old boys were found in the recent Mathematical Tripos list. In the VII and ex-VII standards drawing, painting and design of a high order are taught, the work of the boys having won many prizes at school exhibitions.

In the manual work centre attached to *Page's Walk L. C. C. Schools*, wood-work is taught. The workshop has accommodation for 40 pupils at a time. In the morning the classes work for three hours, in the afternoon for two hours and a half. The following time-table is adopted :—

Morning.	Afternoon.
9 to 9-40—Drawing.	2 to 2-35—Drawing.
9-40 to 10-30—Bench-work.	2-35 to 3-15—Brush-work.
10-30 to 10-45—Recess.	3-15 to 3-25—Recess.
10-45 to 11—Object lesson on tools or timber.	3-25 to 3-35—Object lesson or drill.
11 to 12—Bench-work.	3-35 to 4-30—Bench-work.

The object lessons treat of the principles of the construction of tools, the growth, properties, etc., of different kinds of timber and timber trees, nails and screws, the making of glue, etc., or give general instructions or a demonstration lesson on the model on which the boys are about to begin work. The benches are arranged in three rows of seven each, a space of three feet being left on each side of them. Each bench measures $4'\text{-}6'' \times 2'\text{-}3''$ and has two vices. Two boys work at each bench or four draw upon it. Between the lines of benches are open racks furnished with tools on each side. Boys begin wood-work at 12 in the V standard and continue it till the ex-VII is passed, that is, for four years. There are altogether 43 attendances for each boy in the year, and no grant is paid for a boy unless he has put in at least 20 attendances after reaching the age of 12. A series of 44 models has been arranged by the Chief Instructor of which 15 are worked in the first year, 8 in the second year, 12 in the third year and 9 in the fourth year. Pigeon-hole cupboards are provided for putting away the drawings and the unfinished models. The panels of the doors of the cupboards are made of different kinds of timber, on which the leaves of the respective timber trees are painted. Most of the boys are said to leave at the age of 14 to get employed in engineering works or to join a polytechnic or evening school.

In the *Upper Hornsey Road L. C. C. Manual Work Centre*,

only wood-work is taught as nearly all the boys of the County Council schools leave at the age of 14. Ten different sets of 40 boys each are taught at the centre. There are twenty benches placed in two rows, each measuring at the top 4′-6″ × 2′-3″. Each bench has two wooden vices. The instructor says that iron vices are unsuitable, as boys hurt the saw when they saw a piece of timber held in an iron vice. Between two benches is an open tool rack holding tools on either side. In the centre of each bench there is an upright rack to hold the drawing board and book, and instruments. A large collection of specimens of different kinds of wood, dry branches, leaves and flowers of timber trees is kept for object lessons. The instructor has arranged an excellent series of wood-work exercises for a four years' course. An advanced class comes to him once a week to learn solid geometry. He has devised a drawing board which folds in three parts for facility in drawing figures of solid geometry.

The best metal-work centre for L. C. C. schools is the *Basnett Road Metal-Work Centre* near Clapham Junction. There is accommodation for sixteen boys at a time. Ten different schools send their boys to this centre. The ages of boys vary from 13 to 15. The room which is an oblong one is fitted with two long work benches along the two longer walls. The benches have cupboards below and are fitted up with quick-action vices. In the centre of the room there is a long bench furnished with the finer tools for general use or marking out work. There are two lathes, one an ordinary lathe costing about £8 and the other a screw-cutting lathe of Milnes of Bradford costing about £20. At one end of the room there are two forges on iron tables with bellows worked by a handle. There is a grinding stone, a hand shearer, a gas blow-pipe used for brazing, and an ordinary drilling machine. In an adjoining room there are sixteen drawing tables.

The time-table is as follows:—

Morning.	Afternoon.
9 to 9-45—Drawing.	2 to 2-45—Drawing.
9-45 to 9-50—Interval.	2-45 to 2-50—Interval.
9-50 to 12—Object lesson and practice.	2-50 to 4-30—Object lesson and practice.

The instructor who is a capable man has arranged a course of 44 exercises for three years. In a year there are about 45 lessons of 3 or $2\frac{1}{2}$ hours each. A rough description of the exercises for each year is given below:—

First year.

1. Iron washer.
2. Set square.
3. Soldering exercise in tin.
4. Forging exercise, *viz.*, a piece of iron $\frac{3}{8}$ inch square drawn to a square point, a chisel point or a round point.
5. Round or square bar of iron bent at one or both ends into a circle, called a single or double eye.
6. Soldering exercise—a tin soap tray.
7. Inlaying brass in steel—a round piece of brass let into a square piece of iron.
8. Forging exercise—an iron staple.
9. Eye bolt iron with washer and nut.
10. Nut gauge of steel.
11. Brass picture hook to be driven into the wall.
12. Set square.
13. Another soldering exercise.
14. Pair of inside calipers.
15. Pair of outside calipers.
16. Brass matchbox holder to be fixed in the wall.
17. Brass pen rack (double).
18. Straight edge of brass.
19. Iron tripod for inkstand.
20. Pair of iron brackets of ornamental bent iron.

Second year.

1. Set square.
2. Steel paper weights, square or oblong with brass knobs.
3. Round surface plate of steel to test the smoothness or correctness of planing.
4. Hexagonal surface plate of steel to test the smoothness or correctness of planing.
5. Brass letter rack.
6. Steel centre punch hardened and tempered.
7. Flat chisel.
8. Cross cut chisel.
9. Steel drill.
10. Steel bar balance with brass cylinder at one end and a hook at the other.
11. Ornamental steel bracket.
12. Steel cramp for side of work bench.
13. Iron ring made from a round bar.
14. Centering gauge.
15. Brass sector.
16. Iron coupling.

Third year.

1. Scribing block (requires a lot of turning work).

Third year.

2. Caliper gauge.
3. Brass repousse ash tray (square).
4. Do pin tray (oblong).
5. Steel bevel for marking out angles.
6. Plumb bob (round).
7. Do (square).
8. Ornamental iron bracket (to hold a flower pot).

The most interesting manual work centre in London is that maintained by the *Hornsey Committee.* In company with Mr. J. C. Hudson, Superintendent of Manual Instruction, under the Hornsey Education Committee, I visited the *Manual Training Workshop of the Hornsey C. C. Elementary Schools.* Mr. Hudson is a very capable Instructor and Superintendent of Manual Instruction. He has made a tour in America and a careful study of American methods of education. Boys are admitted usually at the age of 11 or 12 from standard IV to the wood-work class, but often from standards II and III according to their intelligence and ability. The Hornsey Elementary Schools are mixed schools of boys and girls. No child is admitted into the workshop unless the parents agree to keep the child in the workshop for at least four years, and a small fee of 6d. a week is charged, which, however, is often remitted in the case of poor pupils. The newly admitted children commence manual work with paper-folding and cardboard-work. Cardboard modelling is correlated with art work. Whatever is modelled is decorated, and a coloured drawing of it is made. Cardboard models are correlated with geometry and science, also with history. The walls of the workshop are hung with coloured pictures showing the environments of the early Britons and illustrating the old history of the Britons. The stages of civilisation of other countries are also shown in the pictures on the walls. The boys are taught to model with clay, sticks and cardboard the dwellings of the early Britons, and the model is painted.

The workshop is fitted up with a neat set of benches made of a hard white wood. A channel or well is sunk along the length of the bench in the centre to keep tools when in use. There is also an upright rack at the back of the bench to hold the tools when they are not in use. For each bench at which two boys work at the same time the following tools are provided :—One hammer, one 1″ paring chisel, one pair spring compasses, two 4½″ try-squares, two marking gauges, two marking knives (for cardboard and wood-work), two foot-rules marked with metres and inches, two lead pencils, two 15″ jack-planes, and two 10″ buck saws. In addition

to these tools a collection of special tools is kept for general use on a separate stand.

At one end of the room desks are arranged in tiers both for drawing and demonstration lessons. I saw some boys engaged in preparing and painting a model of the Parthenon.

In the centre of the room there are several small tables with hold-fasts to hold logs, pieces of wood or things that have to be operated upon. The lumber is kept in a separate room.

Mr. Hudson has prepared an interesting series of charts of exercises and drawings of wood-work, which is published by Newmann & Co., under the name of the Pestalozzi Series of Educational Handwork.

The *Hornsey Education Committee* deserves the credit of having raised in the latter part of 1906 the question of filling up the gap with appropriate handwork between the age of seven when a child leaves the infant school and the age of twelve when the boys are sent to wood-work shops and girls to cookery, laundry and domestic science classes. There is also the question of correlating handwork with the other subjects of instruction at every stage. These questions have long since attracted discussion in America and been solved in the best schools like the Horace Mann and Ethical Culture Schools of New York, the Chicago University Elementary School, and the schools of Boston. A Committee is said to be now sitting at the Board of Education Office in London to discuss these questions, and devise solutions. A Committee appointed in 1906 to report upon the handwork of the Hornsey Borough Council schools states that handicraft instruction is of great educational and practical utility, and that in the Hornsey schools, "whether it be judged by its educational value or for the workmanship and artistic power displayed in the completed models, the work of the Hornsey centre is distinctly of a higher character than that which the Committee has seen elsewhere."

I may conclude this chapter by reproducing the syllabuses of Manual Training in wood-work and metal-work of the London County Council. The Council very kindly presented complete sets of wood-work and metal-work models taught in the London Elementary Schools, which have been mounted and placed in the Mysore Educational Museum. They were exhibited at the Mysore Educational Exhibitions of the last two years.

SYLLABUS OF A FOUR YEARS' COURSE IN MANUAL TRAINING IN WOOD-WORK.

First Year's Course.

(*a*) *Joints.*—Such as dovetail halving, angle and centre bridle, and mortice and tenon joints.

Simple models embodying above-named joints, such as newspaper rack, mirror frame, etc.

(*b*) *Modelling.*—Involving use of bow-saw and spokeshave.

Simple gouging exercises in fluting in the direction of the fibre and across the fibre of the wood.

(*c*) *Solid Geometry, etc.*—The preparation of simple geometrical solids, such as prism, cylinder and cone.

Simple scientific apparatus.

Second Year's Course.

(*a*) *Joints.*—Such as common dovetailing, lap dovetailing, and oblique bridle joints.

Models involving the inclusion of above-named joints, and the making of drawing board, T-square and set squares.

(*b*) *Modelling.*—Of a more advanced character than in the first year's work.

(*c*) *Solid Geometry, etc.* —The preparation of geometrical solids of greater difficulty than in the first year, with inclined and oblique sections.

Models to illustrate the method of finding "Centre of Gravity." Spring balance and inclined plane.

Third Year's Course.

(*a*) *Joints.*—Such as oblique housing, mitring, groove and tonguing and oblique dovetailing.

Models involving inclusion of above-named joints, such as knife tray with doubly inclined sides.

(*b*) *Modelling.*—To include use of chisel, bow-saw, gouge and spokeshave.

(*c*) *Solid Geometry, etc.*—Models to illustrate inclined and oblique planes and "dihedral angle."

The balance, monochord and models for experiments in light and sound.

The friction board and models to illustrate the principle of "triangle of forces" and "parallelogram of forces."

FOURTH YEAR'S COURSE.

(*a*) *Joints.*—Of a similar and more advanced character than in the preceding year's work.

Models, such as truncated hollow hexagonal pyramid, with sides dovetailed together.

(*b*) *Modelling.*—Exercises such as circular wooden ring, elliptical band showing inclined section of cylinder, quarter and semi-spheres, etc.

(*c*) *Solid Geometry, etc.*—Interpenetration of geometrical solids. Development of surfaces, with special reference to shape of material required for covering solids of double curvature.

Scientific apparatus to demonstrate "moment of a force." "Reactions" on a beam loaded at various points.

SYLLABUS OF INSTRUCTION IN METAL-WORK.

The following syllabus should be taken as a suggestive guide; and in all cases the instructor should select exercises of a character to suit the mental and physical capabilities of the scholars.

Vice and Bench-work.

(1) External cutting out and filing thin pieces of sheet plate, about $\frac{1}{16}$ in. thick.
   (*a*) Filing on edge only, *e.g.*, geometrical forms, set square, etc.
   (*b*) Internal cutting and filing thin sheet plate, *e.g.*, angle gauges, etc.

(2) Filing two small surfaces at right angles to each other; wrought iron or mild steel to be used.

(3) Drilling and riveting exercises, illustrating the various riveting joints in use; plate $\frac{1}{16}$ in. to $\frac{1}{8}$ in. thick, *e.g.*, try-square.

(4) Cold bending into simple forms.

(5) Chipping and filing to simple forms and given dimensions, broad surfaces up to two inches, with flat and cross-cut chisels, cast iron to be used, *e.g.*, paper weight.

(6) Drilling, tapping and filing to shape—*e.g.*, hexagonal nut. Tapping round bar iron with stock and dies to given sizes.

(7) Soldering; use of copper bit; soldering small joints in tin and brass-work.

(8) Scribing block and its various uses.

Forge-work.

(1) Hammering and drawing out bars to square and round ends, parallel and taper; bending iron to simple curves, square or circle, of given size; jumping up, upsetting, *e.g.*, spikenail, S-hook, ring, part of latch, staple, holdfast, pipe-hook, etc.

(2) Forging and tempering drills and small chipping tools.

(3) Welding; connecting pieces of iron bar.

(4) Brazing.

(5) Case-hardening.

Lathe-work.

Parallel and face turning; spherical turning, thread chasing, and boring.

Drawing.

All exercises and models executed in the workshop will be drawn to scale; freehand sketches of tools used; and working drawings by actual measurements of parts of lathe and other tools will be given.

Object Lessons.

(1) Tools, names and uses; reasons for shapes and angles of tools; grinding and keeping in order of tools.

(2) Composition of soft solders; composition and use of ordinary fluxes.

(3) Form and use of ordinary forge tools; care and management of fire; method of heating metals and precautions necessary; melting point of metals.

(4) Metals and their properties.

(5) Workshop method of treatment, etc.

CHAPTER XI.

Manual Training in American Schools.

The re-organization of elementary education on a philosophical basis in America.—The manual work of Horace Mann School in New York.—The University Elementary School, Chicago.—The Ethical Culture School, New York.—Manual training in the elementary schools of the principal cities of America.—In Washington.—In Boston.—The Speyer School, New York.—The Macdonald Consolidated School, Guelph.

A vast amount of thought has been spent by philosophical educationists in America on the best methods of developing the growth of the brain, intelligence, character and social usefulness of a growing child. With large resources at their command Universities like those of Columbia and Chicago have organised the Teachers' College in New York and the School of Education in Chicago, with faculties composed of large numbers of professors who constantly study every minute feature, theoretical and practical, of the science and art of education, discuss every debatable point among themselves, carry out experimentally the results of their deliberations in the elementary schools attached to their pedagogical college and publish the results achieved by them. Philosophers and educationists like Dr. John Dewey of Columbia, or Dr. Dopp of Chicago, have made a profound study of Child Nature, not only from the point of view of development or evolution and the acquisition of a certain body of facts or knowledge, but also from the social standpoint which regards an individual chiefly as related to the people with whom he lives. The Horace Mann School of New York, which is the model elementary school attached to the Teachers' College of Columbia University, has for its chief aim social efficiency, which consists in the capacity to do as well as to know. "Education involves the development of the natural powers of the individual and the acquisition of knowledge, so that he may become adjusted to the ideals towards which society is moving." The development of the child is effected through work that interests him. The guiding principle of elementary education adopted is that "the various activities of the school life shall be based upon the fundamental instincts and interests of the child, that all work shall be fairly

within his comprehension and adapted to the stage of his mental development, and that his studies shall be so related to the life of society about him that they will appear reasonable and vital to him." The child's social life is the centre of correlation between the various subjects of the school curriculum. In the lower primary grades the centre of correlation is a study of certain phases of the primitive life of man, and in the higher grades it is history or geography. Both these centres help the child to interpret his environment. The need of correlation for unifying the various activities of school-life is greatest in the lowest stages and becomes less and less as the pupil rises to the higher grades and accumulates a body of experience of his own. In the higher grades the teaching differentiates into the usual subjects of the school curriculum, which then become more or less independent.

The distinguishing peculiarity of the Horace Mann School is the making of primitive life as the centre of correlation in grades I and II and of history and geography in the higher grades. The reasons for making primitive life as the centre of correlation, I shall try to state below. The school also makes nature-study a centre in these grades.

Other schools like the model school attached to the State Normal School at Hyannis, Mass., make the school garden alone as the centre of correlation. It would be too long to show how all the subjects of the school curriculum can be correlated with work in the school garden. It will be appropriate to describe this correlation in my notes on nature-study and the school garden if I should be able to publish them. This correlation has been carried out in the model primary school attached to the Mysore Normal School, and the correlated teaching in the lower primary classes is doing a wonderful amount of good to the children by way of improving their intelligence and character. It is certainly a powerful means of education in any school.

But without neglecting the correlation of subjects with work in the school garden, there are greater possibilities and advantages in making the activities of a typical community the basis of instruction in the lower primary grades. The conditions of modern society are inappropriate as a basis of the practical activities of a child, because they are too complex to be clearly understood by him, and the impression made by them on him is vague and lacking in that real interest which alone helps the evolution of mental and moral qualities. The facts of modern social life are beyond the comprehension of the child. It is necessary, therefore, to resort to

a simpler state of society. The daily life of primitive man, by preference primitive man of the Aryan race, which is within his grasp, is full of interest and instruction for a child. The wants of primitive man, the ways in which he overcomes the difficulties that beset him, and the activities necessary for satisfying the wants appeal to a child. Anthropologists tell us that a child's feelings and actions resemble those of primitive man. In his instincts, attitudes and actions he is like primitive man, whose activities are reproduced in him in the early stages of growth. All the successive phases of social evolution form a series of natural developments in the growth and life of a child. A child trained to observe, to reason, and to construct through the various stages of development of human life and society, is better able to understand his position in the modern world, and to grasp the social and economic problems that beset modern life.

A period of primitive culture like the hunting or fishing stage is selected for the first grade, and the children are taught to imagine and reason out the conditions of life, and draw, paint and construct the means adopted by primitive man to overcome his difficulties. The child is not sent out to live the life of the Eskimo or the Red Indian, but he is taken rapidly in school through the various stages of the social development of a primitive race, which are well within his grasp. He would thus understand how man's advancement is brought about through his powers of observation and reason, by his inventive and constructive faculties, by experiments and discoveries. Dr. Dopp says: "The socialising power that comes from a well-directed study of the past is secured chiefly through the recognition of the principle that, in the adaptation of the materials of the past, such a condensation of the experience of ages should be telescoped into the activities of a few hours as corresponds to the parallel changes in the child's attitude with reference to their more instructive origin. To attempt to carry the child through the actual stages of racial development in a minute way would be to arrest development; the child represents something of the present as well as of the past. Although the child enters sympathetically into the problems of primitive life, he never for a moment identifies himself with the people except in a dramatic way. He is looking down from above, and he knows it. At the same time he is leading up to a fuller realization of forces in his own life, which hitherto have been unrelated." Dr. Dopp's epoch-making work on 'The Place of Industries in Elementary Education' and her admirable 'Industrial and Social History Series' (Rand McNally & Co.) have made it feasible for an intelligent teacher to adopt her philosophical method of imparting education in the lowest grades.

To render such education more definite, a particular type of primitive culture limited by climatic and geographical conditions is chosen, whether of the cave-dweller, the Red Indian of the plains, the Eskimo or the dweller in a warm climate. "The aspects of primitive culture to which most attention is given are activities underlying food-getting, provision for clothing and shelter, transportation and communication. The forms of social organization that would naturally develop out of the different conditions are also discussed." The methods of instruction include problems for investigation or "things to think about" which call for reasoning experiment and invention, narrations to stimulate the imagination, illustrations, visits to museums of natural history and outdoor excursions, and dramatization of particular situations songs and dances. At the same time the making of earthen vessels and their decoration, and the construction of baskets, primitive tools, places of shelter, etc., develop his constructive faculties.

Dr. Nicholas Murray Butler's illuminating definition of manual training as "mental training through the hand and eye" is the guiding principle of all manual training in the Horace Mann School. In the *first grade* in which the children are six years old the need of constructive activity is brought home to the child by the conditions of life in a community, and problems of work are arranged according to his physical capacity and the tools he can handle, the tools chosen being such as call the larger muscles into action before the fine adjustments and co-ordinations of the smaller muscles have become possible. The nature of the constructive work is determined by its significance in social evolution, the interest it awakens in the child, and its simplicity. The materials used are inexpensive and easily procurable, such as prepared wood, twigs, clay, cloth, grasses, rushes, raffia, leather, cord, paper, cardboard, sand and stone. The tools used are the hammer, saw, mitre-box, chisel, knife, scissors, and foot-rule. There are three periods a week of 45 minutes each set apart for manual work. But the children are free to go on with the work whenever they are unoccupied. The weaving of rough mats with flat rushes and twigs, basketry, pottery, the making of huts, bows and arrows, representations illustrating the life of the early cavemen on the sand tray, and any other activities which are correlated with the interests and thoughts arising from the other subjects of the curriculum, and the making of gifts for parents and friends suitable for the Christmas season at the end of the school year may be mentioned as examples of construction. Nature-study goes on concurrently with manual training, and it is often difficult to draw the line between the study of

primitive life and nature-study, as the problems of primitive life require the child to explore and study his natural surroundings.

In a similar way in the *second grade* the phases of primitive life are studied not for the sake of information about a remote period but as a means of understanding the social conditions of the present day. The children work out in manual training the material problems of existence that primitive people had to face. The pastoral and agricultural stages of society are studied in this grade and comparisons are constantly made between these stages and modern society. The life of the herdsman is first represented by sketches on paper or the blackboard, and subsequently on the sand table. The life of a pastoral community is represented by the construction of a village with tents, cattle pens, protecting walls, pastures, a stream or well for drinking water, and watch dogs. The children then pass on to the study of the agricultural stage, which is desired by people who wish for a more settled and prosperous life than that of shepherds, who have to roam about in search of pastures, especially when, on account of increased population, the food supply of the pastoral community becomes insufficient. Farm life and the work of the cultivator is then brought into relation with the work in the school garden. The representation of a farm is made on the sand tray with fields and houses of stone, unburnt bricks or logs. The origin of private property, and the need of a military force maintained by the community, and of laws and taxes at this stage are perceived by the children and compared with the conditions of modern life.

The *manual training* in the second grade is made to suit the advanced stage of social development. The study of the sheep and manufacture of clothing from its wool occupy the children. The washing and cleaning of wool, the making of uneven threads by twisting the fibres first with fingers, then round a pencil, and lastly spinning with a spindle are discovered and learnt by the children by their own unaided intelligence. Combing and dyeing the wool come next. The various steps in weaving are then gone through, such as the preparation of a rough loom frame in which the warp threads are fixed, and the gathering of the coloured woof in a rough shuttle to lessen the trouble of passing the woof through. After much study and many experiments string heddles or healds are invented to lessen the labour required in raising and lowering the individual warp threads. The weaving of coloured stripes in the rugs is next studied, and the experience of children is enlarged and improved by visits to museums as well as modern factories, or by a study of pictures of modern processes.

The making of pottery and decorating it with figures, basketry, and the construction of farm buildings of clay and sun-dried bricks with thatched roofs afford instructive occupations. Other manual work of the year is connected with nature-study and the storing of seeds, with the lessons in the readers, the various holidays, and the immediate needs of the children for cardboard boxes and books for preserving specimens. Other manual work consists of the making of butter and cheese, cooking rice and fruits, cooking corn meal and corn cakes, making shields, spears and clubs, making primitive ploughs, rakes, yokes for oxen, and carts with wheels. The materials used are grass, ash sprints, rushes, willow and raffia for baskets; clay for pottery, houses, animals, and people; prepared wood and twigs for houses, looms and kites; paper for boxes, books, etc.; wool for weaving; and burlap for sewing. In all the work the ingenuity of the child is exercised, and independent thought and expression is developed with as little aid as possible in the form of questions and suggestions.

In the *third grade* the usual school subjects begin to differentiate. History and geography with the beginnings of early trade and discovery take the place of the study of primitive life. After the study of the pastoral and agricultural stages the children are introduced to activities connected with trade and discovery, and to stories of adventure by sea and land. The pupils of the Horace Mann School study the topography and resources of Phœnicia, and learn how the people of Phœnicia, with the forest-clad mountains in the background and the open sea in front, developed an adventurous spirit of commerce and discovery by crossing in search of other commodities the sea, which was their natural means of communication with the outer world. The sand table is brought into requisition to make a representation of Phœnicia and other lands similar to it, and of harbours like those of New York. The study of gulfs, bays and straits, of weights and measures, of trade by caravans, and of the discoveries of early explorers like Columbus and Hudson follows. After general geographical notions are acquired home history and home geography are taken up. Home history commences with the arrival of the first traders on Manhattan Island and the settlement of the Dutch in New Amsterdam. All the incidents of the arrival of the first traders, their relations with the Manhattan Indian, the arrival of the first colonists, and the purchase of the Manhattan Island from the Indians are recounted with dramatisation and representation in clay and water-colour. The children become colonists in imagination and model a miniature New Amsterdam on the sand table. Home geography

is studied with reference to groups of homes, streets, drainage, commerce, means of transport, harbour, river, etc., and it is difficult to distinguish this subject from that aspect of nature-study which is concerned with the physical features of the immediate environment of the school.

Under *manual training* the use of metals, the sources from which they are derived, their usefulness for tools and weapons as contrasted with that of wood and stone are studied. Easily fusible metals are melted and cast, and soft metals hammered and cut. For transportation by water a large galley is made by a group of children, who individually help in making a part. For transportation by land baskets, panniers, sleds, and carts on wheels are made. A caravan crossing a desert is represented on the sand table. Standard weights and measures and a balance are studied and made. For measuring time the sun-dial and the hour glass are constructed. In connection with 'Early Trade and Discovery,' sand table representations of a Dutch settlement on Manhattan Island, and cardboard houses of the old Dutch type are made. The methods of making bricks, of drying and burning them are practically learnt. The simple parts of a house such as rafters, sills, posts, beams are studied. And lastly a group of children build a miniature house. Pottery, basketry and simple cross-stitch embroidery are other additional activities of this grade.

In the *fourth grade* the children take up for *manual training* the household occupations of the early colonial period of American history. The problems which a civilised race had to face in finding food, clothing and shelter in a strange land are considered. Unlike the aboriginal races who were content to live in caves or in bark houses, the civilised settler made log-cabins to dwell in, which were more permanent and afforded better protection than the wigwams of the Red Indians. The children make a model of a log-cabin. The need of a block-house or fort is felt, and that is also constructed somewhat like a log-cabin. For use in hunting and fishing, nets and traps are made. The needs of home-life are many, such as spinning, weaving, knitting, netting, quilting, embroidery, cooking, and soap and candle-making. But all these cannot be practically learnt in the school in a year. Weaving is therefore usually selected. The chief problem dealt with is the use of warps longer than the loom for the purpose of weaving great lengths of cloth, and of fixing the warps so as to make them continuous. The development from the hand-loom to the foot-loom is easy. The children construct a foot-loom, which completes their experience of hand-weaving.

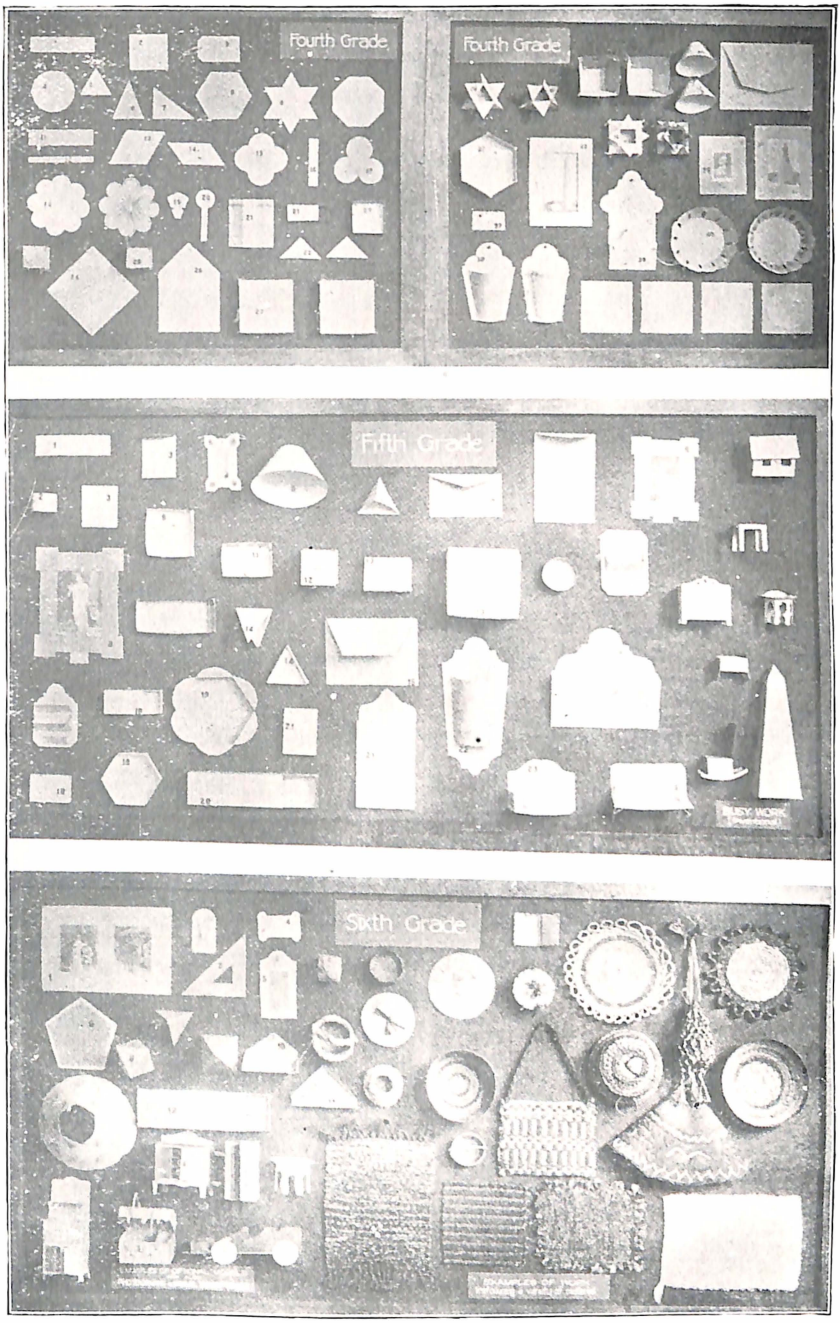
While the manual work of the fourth grade is confined to the

wants of simple households or individuals, in the *fifth grade* the children study the requirements of villages and towns, the division of labour for each industry, and the separation of the functions of the producer from those of the merchant. The children practise handicrafts like pottery and basketry, of which they have already some knowledge, but which they now greatly improve by attending to the artistic effects of form, proportion, colour and design. In pottery vaious specimens are first made by the simple processes of hand-building. They are then decorated by the application of color, glaze or incised designs. The working and uses of a kiln are next studied practically. Later on experiments are made with the potter's wheel, and the process of making plaster casts is learnt. In the latter part of the year the boys and girls are separated in their manual training, and the boys are taught wood-work and the girls sewing. They jointly build a house and furnish it. The boys do the wood-work and the girls make the curtains, draperies, rugs, cushions and table covers.

In the *sixth grade* the boys and girls continue to work separately in manual training. The sewing work begun in the fifth grade by the *girls* is done with greater skill and more systematically. "The aim throughout the course is to awaken the girl's thought and to train her judgment and taste as well as her hands; to make the work a necessary part of her life, especially in the home; to show her the easy and natural use of the needle; to cultivate habits of neatness and orderliness; and to give the feeling of independence which comes from knowing how to do things for one's self." The stitches taught are those needed in every-day life. The articles manufactured are made as attractive as possible by simplicity of design and good workmanship.

The *boys* advance from the study of handicraft in the fifth grade to that of the modern factory or mill in the sixth grade. They construct the model of a factory, make models of machines, instal them with shafts and belting in suitable places in the factory, and devise a water-wheel worked by water flowing from a water-pipe to drive the mill or factory. Along with the details of construction they also learn a good deal about the organization and division of labour in a factory, and about the nature of the manufacturing processes and the products. By making the model of a factory and fitting it up, the boys obtain a broader experience in manual work than they would by making models of a single material.

In the *seventh grade* the *girls* learn cookery. If a knowledge of cookery is not necessary for children of high social position, it is



CARDBOARD CONSTRUCTION AND WEAVING

beneficial for its educative effects. The subject of cookery deals with a large number of interesting facts that have a vital bearing on life, such as the production and manufacture of food materials, their wholesomeness and digestibility, the study of food elements and the effect of heat upon them. The truths of chemistry, bacteriology, and hygiene are incidently studied. The subject gives training in neatness, order, foresight, practical management and personal responsibility when the children work singly. When they work together, consideration for others and helpfulness are developed. The time allowed for cookery in the seventh grade is only an hour and a quarter a week.

The subject of industrial study for *boys* is the modern means of transportation. Transport by rail is studied in all its details, and the track, the wagons, the goods shed, and signals are all constructed. Boats are also constructed for transport by sea. The processes worked out are more varied than those involved in working out a set course of models, the number of materials used is greater, and there is greater scope for initiative and ingenuity.

In the eighth *grade* or the first year of the high school course the subject of communication is studied, and printing, typesetting, etching, engraving, the telephone and the telegraph form the industrial activities of boys.

I have given above at considerable length a description of the handwork adopted in one of the best elementary schools in America for children of good social position, to show how thoughtfully it has been arranged in order to prepare them for life in the complex social conditions of one of the largest modern cities in the world.

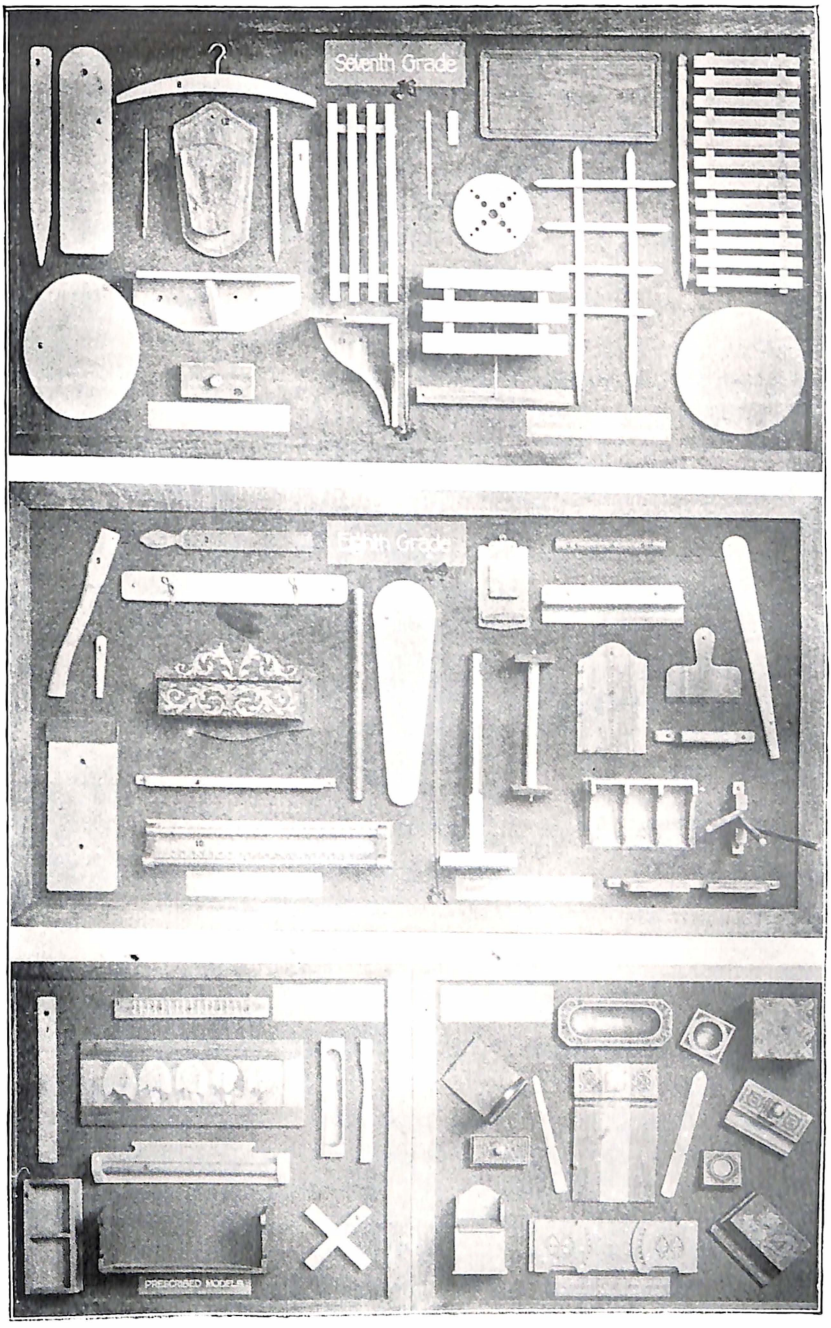
For manual training in the high school grades of the Horace Mann School wood-turning, carving, pattern-making, forging and machine-shop work are provided. The workshops are equipped on a liberal scale.

The manual training of the *University Elementary School, Chicago,* is organised in much the same way as that of the Horace Mann School, Prof. John Dewey having organised the practical work of both schools. As in the case of the latter school, the curriculum is valuable and interesting for its correlation of shop, textile and art work with social and historical studies. I was unable to visit Chicago for want of time.

The Ethical Culture School, New York, is another well-known school which has manual training throughout the grades. It was established in 1878 as a Free Kindergarten. It is interesting to note that, as the name implies, the chief purpose of the school is

the building up of character on a purely unsectarian basis. The ethical teaching takes the place of a common religious creed and the means employed are the following:—(1) The democratic spirit is inculcated. The school is open to both the rich and the poor, more than half the students being excused the fee on account of poverty. Children of all nationalities and races are taught together. (2) Serious intellectual interests and enthusiasms are awakened, the school insisting on the conscientious performance of all tasks. (3) The interest of the pupils is awakened in the work of the settlement and neighbourhood houses with which the school is in touch. (4) The idea of human progress is made the focus of the whole educational scheme and the main steps of progress in science, industry, politics, etc., are taught in outline. Direct moral instruction is given by eminent teachers like Prof. Adler and Dr. Eliot. The school environment and spirit is also relied upon for the moral improvement of the pupils, and it may be briefly said that the school combines the advantages of a modern city school with the peculiar excellences of the best type of boarding school. This school took the lead in introducing manual training as an integral and valuable part of elementry education without reference to its special industrial uses, and solely for the sake of the general educational advantage to be derived from it. "The special features are manual training and art instruction in all classes, special attention to elementary science teaching throughout the school, to universal history and literature, and regular excursions to industrial establishments and to the parks and surrounding country for observation and study. The method applied in all branches has been called by the founders of the school the *creative method*."

I went round a few of the classes to inspect the manual and art work. In this school even the children of the Kindergarten classes do some light wood-work. The children of Grade I, who are six years old, work with the plane, saw, hammer and bit, the tools being all small and light of weight. At the time of my visit they were preparing a flat piece of wood for a calendar for 1907. The flat piece of wood which formed the back was correctly shaped and planed, and a hole for hanging it on a nail was bored. The printed calendar in book form was to be attached to the wooden back below the hole. Both girls and boys do manual work together in the lower class. Cardboard construction and easy clay-modelling are taught to children from the first to the third grade in their respective classes. From the fourth grade upwards the pupils come to the special modelling or art room, which is filled with examples. In the first three grades manual work and modelling are co-ordinated



WOOD-WORKING

with the season, the class lessons of history, geography and literature, etc. For instance they weave a blanket or draw and make a wigwam or tent in connection with their reading lesson. From the fourth grade upwards the co-ordination is not necessarily required, but more art-work is insisted upon. Thus the fifth grade boys model from nature and life or copy casts. The boys of the sixth grade had made models of a bowstring bridge, and of a suspension bridge with wires. The boys of the eighth grade were making moulded wooden frames for the pictures they had themselves drawn and painted. Very great attention is paid to art in this school, which is correlated with manual training and nature-study. The paintings and drawings which Mr. Hall, the art instructor, showed me were most admirable. I saw several beautiful drawings in various tints executed with charcoal called *effusien* in French. In the higher grades no object is modelled in clay before it is first drawn. The seventh grade boys were very good in design and the eighth grade boys in drawing from nature. As a rule in every grade two periods a week are given for drawing, painting and modelling, and three periods for manual training. In the high school grades sloyd, wood-turning, carving, lathe-work and machine-work are taught to boys in workshops which are placed in the basement. Girls of the higher elementary and high school grades learn domestic science and domestic art. I saw girls of the eighth grade engaged in designing, cutting out and making a dress in the most practical manner.

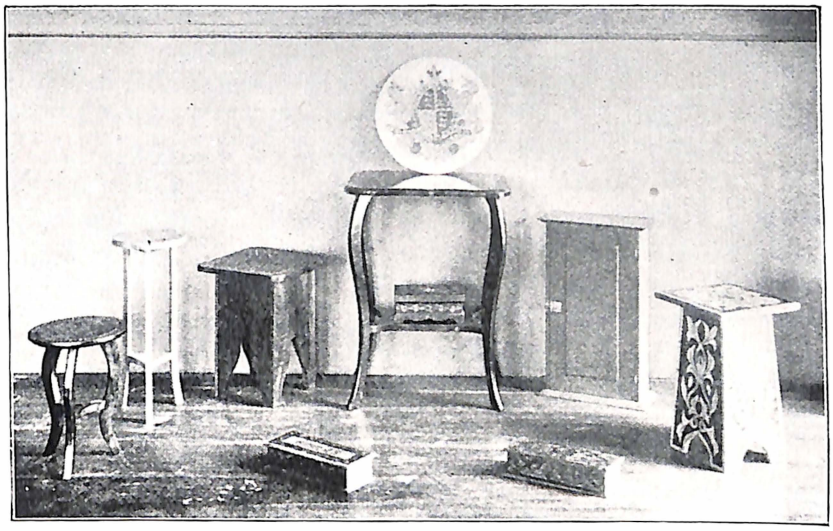
The cities of New York, Washington, Boston, Brooklyn, Minneapolis, and Dayton have all of them regular schemes for hand-work from the Kindergarten up to the regular manual training shops. The courses differ considerably, but the common feature is the continuation of the constructive work and the form and colour studies of the Kindergarten into all the elementry grades.

In *Washington*, the manual training courses for the first six school years are included under drawing. The first grade "drawing" course includes clay-modelling, which is followed by tablet and stick-laying, and paper-folding and mounting. The course is the same for the second year. In the third year object-drawing is commenced, the objects being first modelled and then drawn, and is followed by paper-cutting and folding. The course of the fourth year is the same as that of the third year. In the fifth grade solid figures are constructed, and relief modelling is commenced and continued into the sixth grade. In the sixth grade boys have two hours' work in the manual training shop and the girls two hours' work in the sewing room. In the seventh grade clay-modelling is done from

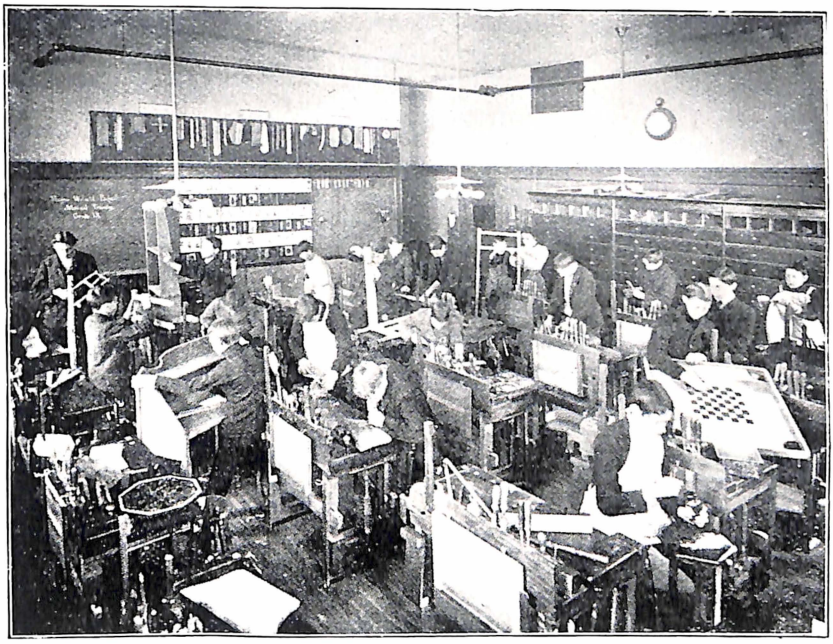
objects, and the boys design boxes, stools, etc. In the eighth grade the work of the seventh is carried out more fully. Regular bench work is done in the seventh and eighth grades. In the high school grades bench work is taught in the first year, all models being constructed from the pupils' drawings, and iron-work is commenced. The curriculum includes in the second year forging, steel-tool making hardening and tempering, and in the third and fourth years machine shop work.

In *Boston* also manual training is included as one of the nine divisions under the head of drawing, for which from one hour and forty minutes to two hours and a half a week are allowed. In the first and second grades it includes modelling, paper-folding, tablet and stick-laying, paper-cutting and pasting, and making in paper. In the third grade manual training consists of making in paper or light cardboard. In the fourth and fifth grades manual work is confined to cardboard construction, which is continued in the sixth grade. In this grade "the pupils are encouraged to make original models. They redesign common articles of household use, which are made from sheet materials, such as tin pans, cans, boxes, portfolios, book covers and card cases, or they make, in miniature, houses, furniture, automobiles and electric cars, or they follow out suggestions received from Indian life, as the wigwam or canoe, or from camp life as the tent, or from travel as the trunk, handbag or suit case. Scale models of the great pyramids or famous monuments are sometimes made. The object is to develop independence, the power of individual initiative, and the creative instinct."

"In combination with the cardboard construction, and supplementary to it, is recommended the use of raffia, reeds and yarns. From raffia, in combination with cardboard, are made needle books, picture frames, napkin rings, small boxes and trays, and from raffia alone, bags, mats and handkerchief cases. Reeds are woven into baskets in large variety of form and construction. Yarns and other materials are woven into small rugs, mats, blankets, wash cloths, bags, hoods, bed slippers and sofa pillows." Wood-working is prescribed for Grades VII, VIII and IX. For each grade a carefully arranged series of models is prescribed, with the wood to be used and the exercises required for each medal. The models are often constructed from working drawings made by the pupils from enlarged models. The complete drawing is sometimes drawn on the blackboard, step by step, at the direction of the class. Carving on suitable models is practised as extra work. With the exception of raffia reed and yarn work, the cardboard work of Anglo-Vernacular Classes I, II and III and the sloyd work of



EXTRA WORK



WOOD-WORKING ROOM

Forms II to VI in the schools of Mysore have been organised by Mr. Gustaf Larsson on the plan of similar work in Boston. They are illustrated in "*Sloyd in Mysore*" published in 1908 and described in the circulars issued by Mr. Larsson.

In the vicinity of the Horace Mann School the New York Board of Education maintains an elementary school called *the Speyer School* for children of the poorer classes who cannot afford to go to the Horace Mann School. Drawing, design, basketry, hand-loom weaving and embroidery are the chief features of art and constructive work in the elementary grades. Great deal of attention is paid to this work, but neither the organization nor the correlation is so thoughtfully carried out as in the Horace Mann School.

In Canada I visited the Guelph Macdonald Consolidated School. Sir William Macdonald, a wealthy manufacturer of Montreal, has given a large endowment fund for the improvement of rural schools. One of the principal objects of the fund is to provide a consolidated school for each of the five Eastern Provinces of Canada, Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island. Half a dozen or more small rural schools are consolidated into one central school, the children being conveyed in a large covered conveyance, a sort of omnibus, which is sometimes called a "barge," from places within a radius of four and a half or five miles to the school each morning. As the pupils are provided with the means of conveyance from home to school they are neither late nor irregular in attendance, they are better classified in school than they would be otherwise, there is no loitering or bad behaviour on the way, no wet feet or danger of catching colds. Similar consolidated schools were first started in Massachusetts so long ago as 1869, and the movement has spread to every one of the New England States. The advantages claimed for the consolidated schools are longer school terms, better teachers, better grading, better instruction, more interest in the pupils, greater physical comfort on the part of the children and better supervision. The usual cost of the rural schools is drawn from the taxes, and the extra cost of the consolidation scheme is met from the endowment fund. The distinguishing features of the consolidated school at Guelph are manual training, domestic science and nature-study. The building of the consolidated school is a model structure of two storeys beautifully lighted and ventilated on scientific principles, and equipped with up-to-date furniture. There is no Kindergarten class for infants. The school is divided into five grades, the fifth if not the fourth being of the standard of the lowest high school grade elsewhere. The children usually take six years and sometimes

seven to complete the course. Each child has a plot in the school-garden of his own. Work in the school-garden is one of the principal features of the school. As a rule, every class has drawing for an hour or an hour and a half, and manual training for half a day in the week. The first grade is divided into I-A and I-B. For manual training the children of the first and second grades have, besides the use of the usual Kindergarten gifts, paper-cutting and folding, painting and clay-modelling. From the first grade the children draw and paint flowers and plants and make models of fruits and vegetables. They also collect and preserve dried specimens of plants, fruits and nuts, and display them on a board hung in the class room. A doll's house made in the wood-work class and furnished by the older children was presented by them to the children of the first grade. In the second grade free-hand drawing with coloured crayons is practised on the blackboard. Sand-tray representations of Indian life are also practised. In the third grade the children study all about seeds and observe the growth of plants. In the fourth grade free-hand and ornamental drawing was practised. I saw neat illustrations of plants and flowers drawn in the children's note-books with pen and ink, and on the blackboard with coloured crayons. In the fifth grade light science takes the place of nature-study. The boys of this grade had made the model of a hand-pump. Wood-work is practised by the children of the third, fourth and fifth grades. One room in the school is set apart as the children's laboratory, where the advanced children are permitted to make any mechanical constructions they like with their own hands.

ABBOTSHOLME SCHOOL, DERBYSHIRE. BOYS AT GARDENING

CHAPTER XII.

Some Notable Schools.

Schools of the new type—Abbotsholme School—Two similar schools on the continent—Felsted Public School, Essex—Oundle School—Bedale School.

The conviction has been growing in the case of the education of the sons of the cultured classes that the old classical and mathematical courses that suited pupils preparing for the Universities is not a complete or desirable education, and does not enable them to gain such success in life as can otherwise be attained. Practical activity and social efficiency are neglected in schools of the old type, and the specialisation that comes long before the age of joining a university leaves little or no time for useful subjects like hygiene, economics or physical culture, nor for that "motor education" of which President Stanley Hall is the greatest advocate, nor for training in art and music which render life so happy and refined. New ideals of education have arisen of late. A reference to schools that have found it necessary to devote half the time to practical activities in the farm and workshops, to outdoor excursions, and to the refined arts in addition to the usual school subjects of the school curriculum, would be of interest. I regret that want of time and opportunity has not enabled me to visit the principal schools of the new type which had been recommended to me by educational experts. If I get a chance of another visit to Europe I hope to study the systems of these schools more carefully than I have been able to do, and perhaps to embody the results in a second edition of these furlough studies.

Abbotsholme School in Derbyshire, called the New School, has attracted much attention both in England and the United States for the principles on which it bases the education of boys from 11 to 18 belonging to the cultured classes who direct the national life. The school has initiated a new departure, and avoids all specialisation before the age of 18, and gives an all-round general education by developing the nature of boys harmoniously, bringing them into proper relations with nature and human life, enabling them to

think in their mother-tongue, fitting them to be citizens not only of the British Isles but of the British Empire. The school is distinguished, as Prof. Geddes puts it, for "the experimental working-out of a modernised curriculum, with adequate correlation and succession of studies—geographic and historic; scientific, linguistic and literary; practical and artistic; in brief, naturalistic and humanistic." The principal aim of the school is to train up young men for practical life and social usefulness. The general time-table provides five class lessons every day of 45 minutes each between 7 and 12-15 in the morning, which include four periods of chemistry and physics a week. After the first lesson comes breakfast, and after each of the next three lessons there is a break for fresh air and exercise or lunch or change of clothes. After the last lesson come bathing in the river Dove, and dinner, which is followed by music or an organ recital for twenty minutes. The afternoon from 2 to 5-45 is devoted on two days of the week to excursions to places of geographical, geological, botanical, archæological or historic interest, or to neighbouring places of interest. On the remaining four afternoons, one hour a week is devoted to modelling, two to drawing and outdoor sketching, one to painting, one to turning, one to sloyd, and two to carpentry and joinery, up to 4 o'clock. From 4 to 5-45 on two days of the week there is gardening or farm-work, and on the remaining two days games. Thus there is art, hand-work, farm-work, gardening, games, or outdoor instruction from 2 to 5-45 every day. After tea there is a language lesson of 45 minutes from 6-30 to 7-15, which is followed by singing, concerts, lectures, debates, rehearsals, boxing, wrestling, etc., and preparation on four days for 45 minutes. The day concludes with supper, chapel and bath at 9-15 P.M. The education for practical life consists of regular farm and garden-work, practical bee-keeping, forestry, and shop-work. Once in the seven years' school course there is a felling of trees, followed by replanting. In the workshops sloyd, carpentry, joinery, or turning work is correlated with drawing. Mechanical drawing is insisted upon. In connection with the building operations of the school architecture is taught practically. Open-air sketching, photography and printing are also practised. There is earnest work and no mere amateur trifling in all the practical occupations of the afternoon. All the occupations are thoroughly organised, each squad of boys being regularly under the orders or supervision of a captain. The latest and most approved principles of Stanley Hall's Motor Education are followed in the afternoon occupations. The artistic culture imparted, whether of music or art, is of a high order.

Besides the boys who proceed to the universities, many pass directly from the school to the offices of architects and land agents, or the workshops of engineers, ship-builders and the like.

Every detail of school-work is carefully thought out and thoroughly organised without any of the evils of over-legislation. In all matters governed by rules and codes the boys are acquainted with the underlying principles, and have a hand in shaping and modifying the rules as need arises. There is therefore no difficulty whatever in obtaining cheerful obedience or maintaining discipline.

I had the pleasure of meeting in the house of Mrs. Olle Bull in Harvard in December 1906 Dr. Reddie, the talented and learned Headmaster of Abbotsholme School, who was then travelling in search of health, and had a long talk with him about his school. The principles of Abbotsholme School are followed in the *Liancourt* School, about 36 miles from Calais, which is an English boarding school and of which the Director is an English public school boy, and also in Dr. Hermann Lietz's School, Schloss Bieversteine, near Frankfurt. For want of time I was unable to visit these famous schools.

I visited the *Felsted Public School*, Essex, which is one of the great English public schools and has kept up its connection with Oxford and Cambridge by numerous ties of scholarships and academic distinctions. Isaac Barrow and Oliver Cromwell's sons were educated in this school. The Headmaster is the Revd. Frank Stephenson, M.A., late of Cheltenham College. The distinguishing feature of this school is the fact that it has adjusted its courses of study to modern requirements. It prepares boys not only for the universities but for manufacturing and commercial pursuits. "It provides an education which fits boys to take their place in professional life, whether through the universities or otherwise, and in the higher branches of manufacturing and commercial life." The school is divided into classical and modern sides. History and geography, and English literature and composition are taught on both sides. On the classical side the languages taught are Latin, Greek and French, on the modern side Latin, French and German. Drawing is taught to all boys in the lower school and is an optional subject for others. For mathematics there is a special classification apart from the ordinary division into forms. Science is a compulsory subject in the lower forms, and on the modern side throughout, but it is optional in the higher forms of the classical side. Botany is taught in the Lower and Upper III, and physics and chemistry are compulsory subjects up to the Upper IV and in Modern Upper V, and optional in other classes.

In the Upper and Special VI the work is specialised, the boys devoting most of their time to classics, mathematics, history or science.

Boys are admitted to the engineering department at about 15 and are excused from certain literary subjects, and receive a thorough training in metal-work, principles of engineering and mechanical drawing. They spend from five to ten hours a week of school time in the engineering workshop according to their age or proficiency. They are also allowed to work out of school hours in the workshop. Other boys are admitted to the engineering workshop out of school hours if there is room. The engineering pupils do not necessarily pass an examination. Some pass the London Matriculation or the Oxford and Cambridge Leaving Examination.

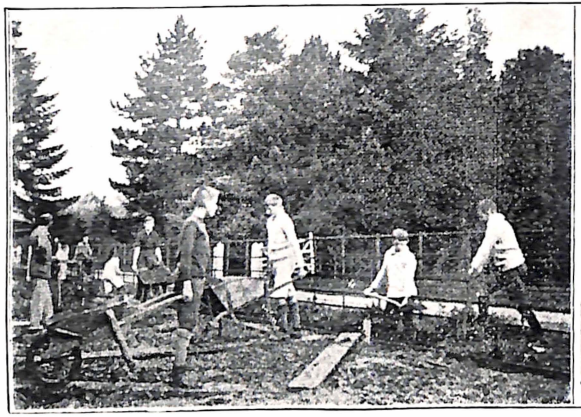
Carpentry is taken by all boys in play-time only. The instructor is always present and the boys go to the workshop when they like. Boys of every form are encouraged to work voluntarily in the carpentry shop. At the time of my visit about a hundred boys out of a total attendance of about 180 were learning carpentry. Boys prepare models according to their own taste and inclination. There is no hard and fast course of instruction. Boys of the engineering side from the IV to the VI Form did metal-work only. I saw various models prepared by the boys such as a motor boat, a model gas engine, a Bramah press, etc.

Boys are admitted to the Senior Army class at the age of 17 and are suitably taught. The Army pupils are prepared for Naval Clerkships, Naval Engineer Studentships, Indian Forest service and Indian Police as well as for Sandhurst and Woolwich.

There is also a class of medical pupils formed of those who have passed the London Matriculation or a Medical Preliminary Examination. The medical pupils prepare for the Preliminary Scientific or First Professional Examination. In the medical class twenty-one hours are devoted to science, including six or seven hours for biology.

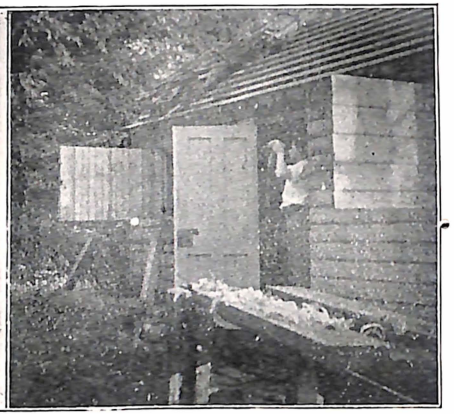
For commercial pursuits shorthand and book-keeping are taught as optional subjects.

The staff consists of the Headmaster and seventeen Assistant Masters, all graduates, and one visiting teacher for drawing. The highest salary without residence for an Assistant Master is £400 and the lowest £120. The average number of lesson hours per week during which each one of the seventeen assistants is teaching is 28·6.

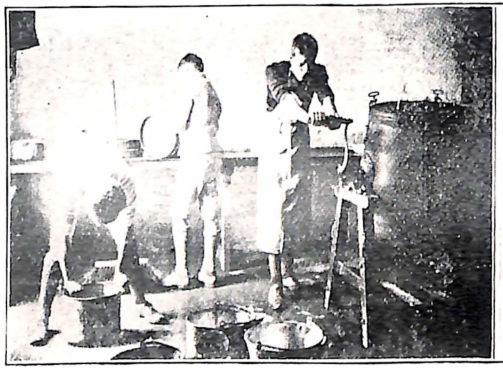


GARDENING AT BEDALES

MODELLING AT BEDALES

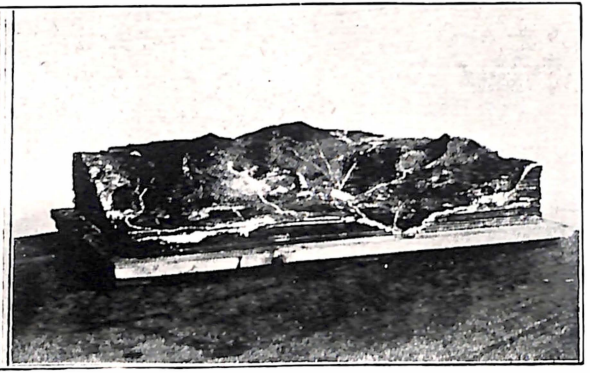


CARPENTERING AT BEDALES. THIS SHED WAS MADE BY THE BOYS AND GIRLS THEMSELVES



DAIRY-WORK AT BEDALES

BASKET-WORK AT BEDALES



A MODEL OF A LOCALITY NEAR BEDALES

Oundle School in Northamptonshire was established by the Grocers' Company with the object of providing a liberal and useful education in modern subjects as well as a high classical education for boys intended for a university career. The school has carried out on a complete and liberal scale a scheme for providing higher scientific and technical education. Two new laboratories were opened in 1900 and three others and a workshop have been equipped recently.

The Senior School is divided into four sides, classical, modern, science and engineering. The classical side prepares for the universities both in classics and mathematics. The modern side prepares for the London Matriculation, Engineering Studentships, Preliminary Law Examinations, Civil Service and other professional examinations. The subjects taught on this side are mathematics, modern languages, English subjects, Latin or science, and drawing. For business education a class is provided on this side for hand-writing, book-keeping, precis-writing, shorthand and other allied subjects. An Army division of this side prepares boys for Woolwich and Sandhurst. A Navy class has also been formed. The science side prepares boys for University scholarships in science, for the London University Science Examinations, and generally in pure science. Medical students who prepare for the Preliminary Scientific or First Professional Examination are placed on this side to learn physics, chemistry and biology. Other subjects taught on this side are mathematics, and in place of biology modern languages. Perhaps the most important department of this school is the engineering side, which prepares boys for all the three branches of civil, mechanical and electrical engineering. The subjects taught are mathematics, seven hours; mechanics and physics, eight hours; chemistry, four hours; drawing, four hours; French, German and English, seven hours; workshops, four hours. The laboratories are completely equipped with apparatus for practical courses. The workshops are fitted up with benches, lathes, forges and moulding and casting plants. An engine-house is provided with a steam engine, a gas engine, electric motors and dynamos. Boys who compete for scholarships in mathematics and science study in the higher forms of this side. Oundle School is one of the best schools in England for instruction in practical subjects.

Bedale School is distinguished for providing practical work in many directions and encouraging unathletic hobbies or pursuits which are real attractions to a city boy. These are a great comfort and means of happiness, a source of self-control and self-respect,

when one feels fatigued worried or discontented. At such a time resort to an agreeable occupation saves one from misery and makes one feel happy and at peace with the world. Engineering, especially electrical engineering, modelling, drawing, painting, photography, carpentering, basket-work, gardening and dairy work are some of the hobbies that give a certain amount of physical exercise and mental and moral relief, and at the same time provide constructive or useful work which may not seldom add to the limited resources of the worker. The encouragement of attractive and useful hobbies should be an object aimed at by educationists. Some of the attractive pursuits of the pupils at Bedale are shown in the illustrations. Not the least advantage of practical activities in a school is the opportunity they afford to a thinking earnest boy of making his choice of a future career according to his predilections and natural aptitude.

CHAPTER XIII.

The Hampton Institute and its Lessons.

Education in the Southern Provinces of North America—History and principles of Education in Virginia—Jefferson's scheme—"Freedmen's Bureau"—Pioneers of education in the South—General Armstrong, founder of the Hampton Institute—The aims of the Institute—Its growth and cost—Classes of pupils—Discipline—Courses of instruction—The Academic course—Manual training—Syllabus of the Academic course—Undergraduate course in agriculture—The Armstrong-Slater Memorial Trade School—Graduate courses—Dr. Frissell's views on the aims, methods and results of education given in the Hampton Institute—The Tuskegee Institute, and its industrial education—A day at Hampton—The lessons to be derived from the success of the Hampton and Tuskegee Institutes.

The Hampton Normal and Agricultural Institute is one of the most remarkable educational institutions of the United States, full of instructive lessons to educationists all over the world. This institute has fully proved to the world that the despised negro freedman and to a larger extent even the Red Indian can be so trained as to develop a high character for industry, truthfulness and manliness as well as for productive efficiency which enables them to become good, prosperous and useful citizens.

In the Southern provinces of British North America like Virginia, the educational arrangements were of the old feudal order. The best possible education was provided for the *elite* or the English country gentlemen who had settled on their plantations, and all else lower down in the social scale were neglected. This kind of education produced a few eminent statesmen and rulers like Washington, Jefferson and Madison. But the masses who, in the South, were partly the 'poor whites' and mostly negro slaves, were neglected. There was no middle class between the refined country gentleman and the debased slave. In New England, on the other hand, there was a well-educated and vigorous democracy, the masses being educated on a well-organised system at the State expense.

Professor Sadler, whose views on the history of education in Virginia I summarise below, states in his special report on the

Education of the Coloured Race that the educational system of Virginia was based on four principles:—(1) "that education should be deliberately planned as a discipline for society according to distinctions of class"; (2) "that mere book-work ought to form a relatively small part of any one's education"; (3) "that the State had no cause to take any particular care to develop a highly educated middle class; but on the contrary, a middle class so educated might easily prove socially restless and politically inconvenient"; (4) "that all who could afford to do so ought to pay for the education of their own children; that 'free education' for everybody would be bad policy as well as be a piece of public extravagance; that really great abilities would find their way to the top, and would be strengthened by overcoming difficulties in obtaining education; that the universal and gratuitous provision of public education for all would ultimately involve either (*a*) inferior quality in what was provided or (*b*) a prodigious burden on the finances of the State; and that it was expedient for the Central Government, though it must do something for education, to do nothing that could be done by private effort or out of charitable endowments without the assistance of the State." When education was grudged on these principles to the 'poor whites,' it was considered out of the question for the coloured race.

The narrowness of these principles did not find favour with the few high-minded statesmen who took liberal views regarding the duty of the State to educate all classes of people. They were too few, however, and were unable to stem the tide of national prejudice. After the Declaration of Independence, Jefferson prepared in 1779 a scheme of public education for Virginia which provided primary schools for white children in every district, for the selection of promising children of poor parentage for admission to grammar schools, and for a further selection of a smaller number who were to proceed as free scholars to the William and Mary College, which was to crown the edifice of public instruction as a modern university. Jefferson at the same time proposed laws for the emancipation of the children of negro slaves, who were to receive a course of practical instruction like that provided at Hampton and Tuskegee, and who were to be settled somewhere outside America as a free and independent people. This benevolent and statesmanlike scheme, however, which was good for the 'poor whites as well as negro children, met with great opposition from the planters and the slave-holding interest, and Jefferson's plans had to be abandoned. In New England, on the other hand, under Puritan influences the Common School system was rapidly

developed for the education of the masses. The moral effect of this development on the Southern States was great, and a body of public opinion was created in favour of the Common School system even in the South. The struggle, however, for the change of policy from the previously adopted false ideal of education based on the duties of graded classes of society to the liberal policy of encouraging and developing natural ability wherever it was found, was long and fierce. The reactionary influence of slave-holders was such that for a time the giving of education to "blacks, mulattoes, or other descendants of African parentage" as well as to "free persons of colour" was actually prohibited. Many well-meaning planters in the South considered the education of the negro as untimely, inappropriate and likely to give rise to revolutionary ideas in the minds of the slaves. Their ideas prevailed with the legislature, and laws were passed prohibiting the education of the slave, negro, or free person of colour by fine, whipping and imprisonment. Gradually, however, in the north more and more schools opened their doors to the children of negroes, and it came to be believed, especially by members of the Society of Friends, that the best method of elevating their moral and intellectual character and raising them in the social scale was not only to give them the benefit of a good general education but to impart to them the knowledge of some useful trade. Long before the outbreak of the Civil War fugitive slaves were encouraged to escape to the Northern States and to Canada where they received the benefit of education.

After the Civil War was over, Congress established the "Freedmen's Bureau," which within five years helped to establish 4,239 schools in the South. The emancipated slaves themselves supported 1,324 schools and owned 592 school-houses. But even before the close of the war, the American Missionary Association began at Hampton and other places its educational work among the coloured people, and received valuable pecuniary help from philanthropic men of the Northern States like George Peabody. This charitable work received its greatest support from the devotion of a large number of volunteer teachers, who made a great impression by the example they afforded of unselfish work upon both the coloured and white population. These pioneers of education in the South, however, paid little attention to industrial training and laid great stress on mental, moral and religious education. Their work would have borne infinitely better fruit if they had followed a more correct ideal of education as was proved by later experience. To establish schools for the coloured races of the old type which imparted unproductive literary instruction was a mistake. The

essential parts of education are "home life, parental discipline, services and sermons in the church, the strong tradition of the community, the practical tasks of daily duty in door and out of door." The school is only a segment of a wide circle called education, and it is a segment which should fit in with the other segments to form a complete circle. The kind of school that suits one people at a certain stage of development and with one kind of environment, cannot suit another in a different stage of development with another kind of environment. The school has properly to fill up the gaps left by deficiencies in the other elements which go to make up a complete and suitable system of education for the particular children to be educated.

The man of genius who perceived what sort of education was best suited to the conditions of life of the freedman of the South was General Samuel Chapman Armstrong. He was the son of a missionary in the Sandwich Islands, but was educated in the United States. "He had helped his father, as superintendent of public education, to work out the problem of how different races could live and work together. He came as an agent of the Freedmen's Bureau to Virginia to work for both the whites and the blacks, and to make them live useful and peaceable lives together in a state of freedom. He loved both the races. He had been an officer of the Union Army and knew the heroism of the Southern white man. He had also commanded a regiment of black soldiers and knew their capacity and bravery. He felt that if different races were to live together successfully they must be of mutual help to each other. To make the black a useful citizen was therefore the mission of his life. He had firm faith that he could make him serviceable to his neighbours not by enforced slavery, but by love and kindly treatment, and by raising his character and increasing his self-respect, and imparting to him such practical and useful education as would enable him to be of service to his neighbours.

He founded the Hampton Normal and Agricultural Institute in 1868. The aims of the Institute were defined by him to be :—

"To train selected youths who shall go out and teach and lead their people, first by example, by getting land and home ; to give them not a dollar that they can earn for themselves ; and, to these ends, to build up an industrial system for the sake not only of self-support and intelligent labour, but also for the sake of character."

General Armstrong knew both the weaknesses and the strong points of the negro youths. "He knew that they needed discipline,

THE SCHOOL BATTALION

right surroundings, an atmosphere of hard work for the sake of duty, training in the bearing of responsibility, protection against the temptations of a shallow sort of politics, a new sense of the dignity of labour, the stimulus of noble example, austere restraint of the emotions, exact training in verbal expression, the morally-uplifting sense of being able honestly to earn a good and respectable living by the practice of a useful trade; but, above all, leaders whom they could love and trust and admire, and the *esprit de corps* which comes from membership of a great institution devoted to other than self-regarding ends." The formation of habits of regular, intelligent and conscientious industry is the principal aim of the Hampton Institute, which is more an industrial village than a school. Its numerous workshops, farms and laboratories afford a training ground not only for learning one or more trades but also for the formation of habits of industry and improvement of character. The academic work done in the school rooms is of subsidiary importance. Many of the scholars earn a portion of the boarding and school fees by working in the shops. They learn habits of self-denial and self-support. The regular hours of hand-work and study, the military discipline of the school battalion which all pupils must join, and the religious instruction strengthen their character.

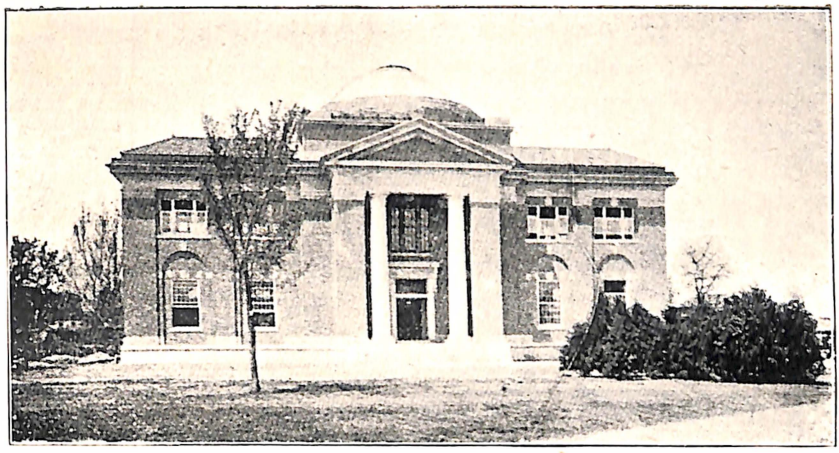
The Hampton Institute is situated on a beautiful well-wooded site, overlooking Hampton Roads, which is the site of one of the military hospitals in the Civil War and is two miles from Old Point Comfort. It is connected with Old Point Comfort by an electric tramway. When the Institute was opened in 1868, there were only two teachers and 15 students. At the time of my visit in December 1906, there were more than 1,200 negro and Indian boys and girls receiving instruction, of whom 800 were boarders and 400 day scholars. Besides these pupils, 500 student-teachers are gathered from every part of the Southern States for normal instruction in the summer school of six weeks. The Institute now employs over 120 officers and teachers. There is also an elementary day school with kindergarten attached for 400 young children, called the Whittier School, which is the Practising School for students of the Normal Department of the Institute. In 1870 the Institute was chartered by a special Act of the Assembly of Virginia. It is not a Government, State, or denominational school, but a private corporation, controlled by a body of seventeen trustees. In 1878 its doors were opened to Indians also. The United States Government pays $167 for each of the 120 Indians it sends to the school. The annual expenses amount to

$180,000, "about $100,000 of which is provided for by interest on the endowment fund, on one-third of the land scrip fund of the State of Virginia, the Slater Fund, the Morrill Act Fund, and an annual appropriation by Congress towards the support of 120 Indians." The deficit of $80,000 has to be made up from subscriptions and contributions paid by the public to whom appeal has to be made. Since General Armstrong's death in 1893 the endowment fund of the school has increased from $360,000 to $1,200,000. It needs a further endowment of $3,000,000. There are sixty buildings standing on one hundred and eighty-eight acres. Many of the buildings are large and costly like the Virginia Hall, the Cleveland Hall, the Academic Hall, the Science Building, the Stone Building, the Marshall Hall used as a museum, the Memorial Chapel to seat 1,000 people, the Armstrong-Slater Memorial Trade School with a floor space of 22,000 square feet, the Domestic Science Building with a floor space of 30,000 square feet, and the Huntingdon Memorial Library with its 30,000 volumes.

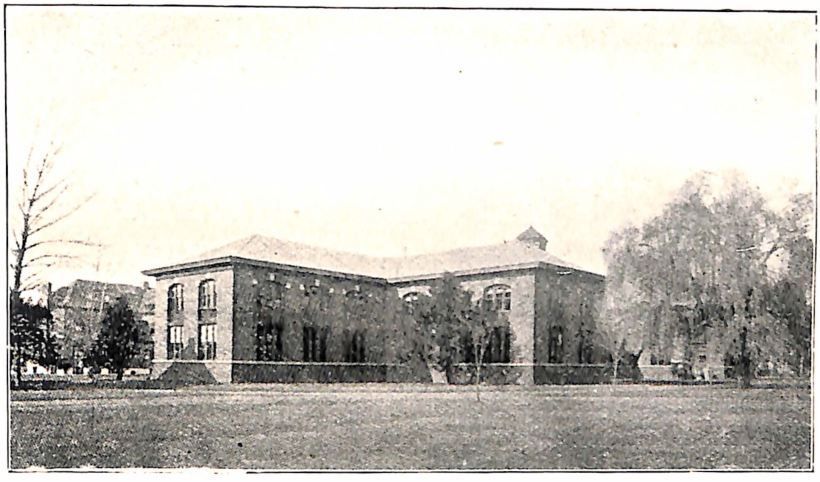
Candidates for admission to the Institute should be at least seventeen years of age and pass an easy entrance examination in arithmetic, English and geography. The admission fee is $20, the boarding fee is $10 a month, and the full tuition fee is $100 a year. But many concessions and scholarships are given to poor boys.

There are three classes of students, *viz.*, work students, day school students, and trade students. The first class of students are those who, on account of their poverty, cannot afford to join the academic department or the under-graduate classes in agriculture or the trade classes. They are given an opportunity to work for wages six days in the week for twelve months, and *attend the night school for eight months.* As the wages earned by work students amount to $15 to $20 a month, and the boarding fee is $10 a month, the work students not only pay their board for the year, but accumulate a balance which helps to pay their board in the second year, when they enter the day school and take up the academic course or the three years' course in agriculture or a trade course. This benevolent scheme for poor lads is so arranged that they need little money beyond their entrance fee of twenty dollars to enable them to join the Institute, which hardly refuses admission to any applicant of the requisite qualifications.

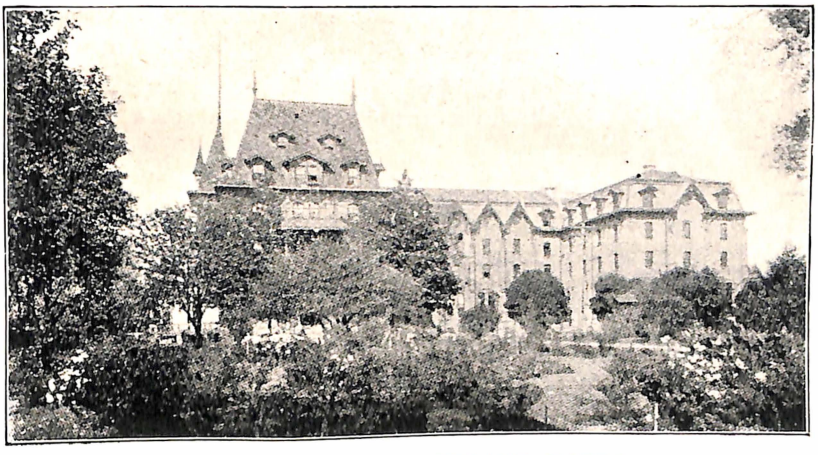
The day school students take up either academical studies without learning a trade or the three years' agricultural course. They attend school four or five days in the week, and work for wages one or two days. The wages amount to one or two dollars a month,



HUNTINGTON MEMORIAL LIBRARY



DOMESTIC SCIENCE BUILDING



VIRGINIA AND CLEVELAND HALLS

for which the students are given credit in their tuition bill. A day school student thus needs, besides his admission fee of $20, from $75 to $85 a year for tuition.

Trade students, who are all boys, receive instruction in some trade for eight hours each day, and attend the night school. A boy in the first year is allowed to earn wages for one day in the week. He would thus need in the first year, besides the admission and boarding fees, from $75 to $85 for his tuition expenses. From the second year student-labour is paid for according to its value, credit being given to the student for the amount of earnings.

Every boy wears a smart school uniform of navy blue or a cheaper working suit of the same style. Girls wear uniform dresses and aprons made in the Institute. All the girls take gymnastics. Gymnastic suits are provided at a small cost.

All young men are under military discipline. They all belong to the school battalion and are required to drill without arms, to perform guard duty and to police the grounds. The use of low or profane language is visited with fine, reprimand, confinement or other suitable punishment. Card-playing and the use of spirits and tobacco are strictly prohibited. For the first year a student is considered to be on probation and is liable to be suspended or discharged for unsatisfactory record in regard to study, conduct or industrial work.

The courses offered are :—

I. ACADEMIC COURSE.

1. Day School. | 2. Night School.

II. AGRICULTURE.

An under-graduate course of three years.

III. TRADE COURSES.

1. Blacksmithing.
2. Brick-laying and Plastering.
3. Carpentry.
4. Harness-making.
5. Machine work.
6. Painting.
7. Shoe-making.
8. Steam-fitting and Plumbing.
9. Tailoring.
10. Tinsmithing.
11. Upholstery.
12. Wheelwrighting.

IV. GRADUATE COURSES.

1. Agriculture.
2. Business.
3. Domestic Art.
4. Domestic Science.
5. Library Methods.
6. Matron's Course.
7. Public School Teaching.

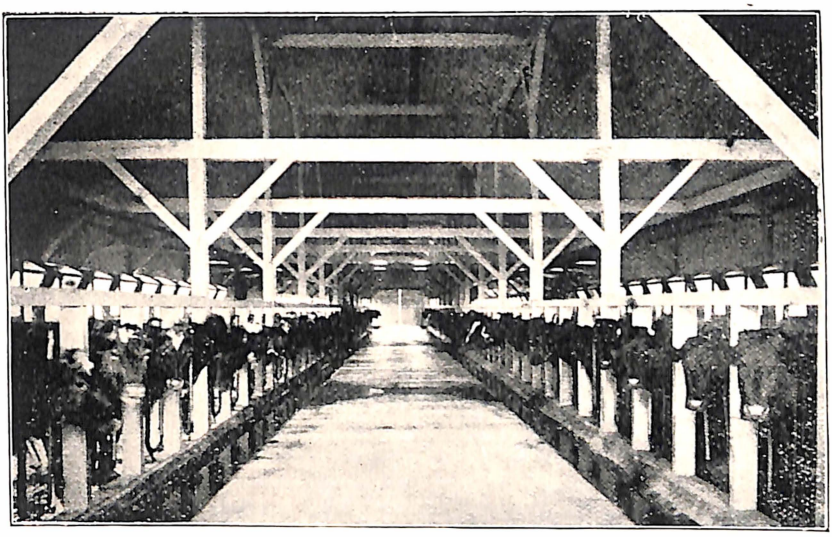
The academic course extends over four years. As the great majority of the people of Virginia are engaged in agriculture, every kind of knowledge and training useful for people engaged in agriculture is imparted in the academic course along with the usual school subjects. The course for the day classes, besides including *practical agriculture, manual training, and public school teaching* for both boys and girls, is so arranged that every boy shall acquire some skill in the building arts, such as *carpentry, brick-laying, plastering and tinsmithing*; and that every girl shall be expert in *cookery, sewing, laundering and general house-work.* Every pupil of the Institute receives regular instruction in the academic department either in the day school or the night school. Students who are learning trades or earning wages attend the night school. There is no manual work in the night school, as the handwork done during the day is considered sufficient. A student of the day school is excused manual training if he learns a trade at night. Two years of work on the usual school subjects in the night school are considered equal to one year's work in the day school.

The academic course extends over four years. *Agriculture* is taught for four periods of forty minutes each a week during the second and fourth years and for two periods in the third year. The time for agriculture is reduced in the third year to make room for physics and chemistry, for which four periods are provided.

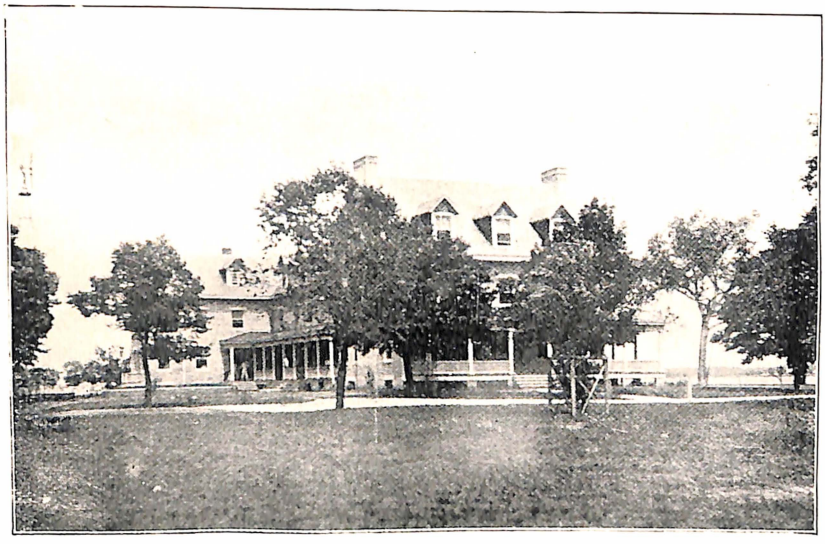
In the second year *plant life* and *soils* are studied by observation and experiment in field and class room, and by written exercises and discussions. The other subjects taught in the second year are *farm drainage, irrigation, manure and manuring, commercial fertilisers, tillage, rotation of crops and study of special crops* like cotton, corn, peanuts, etc. In the third year the following subjects are learnt:—*Plant propagation, transplanting, tillage, cover crops, pruning, insects, plant diseases, spraying, special horticultural crops,* and *harvesting and marketing fruits and vegetables.* In the fourth or senior year attention is paid to *animal husbandry. Breeding, care and management of horses, dairy cattle, sheep, swine and poultry*; *dairying, including care and testing of milk, methods of creaming, ripening, churning, etc.*, are studied. Instruction is made as practicable as possible by taking the classes into the dairy, stables and poultry houses.

It may be noted in passing that *English Literature* for the fourth year is selected from works like the following:—

Scott's Ivanhoe or the Talisman.
Shakespeare's Merchant of Venice and Julius Cæsar.



INTERIOR OF THE DAIRY BARN AT SHELLBANKS



THE SHELLBANKS FARM HOUSE

Burke's Conciliation of the American Colonies.
Macaulay's Lord Clive.
The Roger de Coverley Papers.
Longfellow's King Robert of Sicily.
Webster's Adams and Jefferson.
Etc. etc. etc.

For *manual training* two periods of eighty minutes each a week are given in each of the four classes. The first year's work for *boys* consists of *bench work*. Each exercise is first worked in free-hand or mechanical drawing from a model; the model is then set aside, and a reproduction made from the drawing. Some finished models like boxes for collars, cuffs, neckties, etc., book-shelves, inkstands, printing frames, picture frames, drawing boards, T squares are made in this year.

At the beginning of the second year boys are advised either to select a trade or to continue with the regular manual training course. The latter consists of *wood-turning* for the first half-year and *brick-laying* and *plastering* for the second half-year. In the third year *tinsmithing* is taught in the first half-year and *mechanical drawing* in the second half-year.

The principal object of the *manual training for girls* is to enable them to make good homes and to prepare them for industrial teaching. Two eighty-minute periods a week are devoted to manual training for four years. In the *first two years* the time is equally divided between *sewing and cooking*. In the second year besides cooking, duties of *house-keeping* are taught, such as sweeping and dusting, floor-scrubbing, window-cleaning, silver-polishing, care of dining, bath and bed rooms, care of lamps, table-laying and making of bread. In the second year the girls learn drafting and cutting. In the third year they learn, besides sewing and cooking, *the nutritive value of foods, soup-making, canning, preparation and serving of family dinner*. Half of the third year is spent in *household handicrafts* which include simple *carpentry, glazing, whitewashing, painting and papering*. Lessons are also given in *mattress-making, the caning of chairs, and other branches of upholstery*. In the fourth year each girl is taught to draft, cut and make her own dresses.

In the fourth year the time for manual training is spent in specialising in some particular branch of the subject with reference to teaching.

In addition to the above subjects, *basket-making* is also taught and Indian girls learn to make pillow-lace and Indian pottery.

The following is the syllabus of the academic course for four years:—

JUNIOR YEAR.

Arithmetic	4	Manual Training ...	4
English	4	Physiology (half-year)	4
Drawing ...	1	Reading	4
Elementary Science	4	Singing	1
Geography (half-year)	4	Voice culture (for distinct speech)	2

JUNIOR MIDDLE YEAR.

Arithmetic	4	Geography (half-year)	4
Agriculture	4	History ...	4
Current Events	2	Manual Training	4
Drawing ...	1	Reading (Literature)	4
English	4	Singing	1

SENIOR MIDDLE YEAR.

Agriculture	2	History	4
Book-keeping	2	Geometry	4
Civil Government	2	Literature and English	4
Current Events	2	Manual Training	4
Drawing ...	1	Physics and Chemistry	4
		Singing	1

NOTE.—Girls have physical training two periods a week throughout the first three ears.

SENIOR YEAR.

Boys.

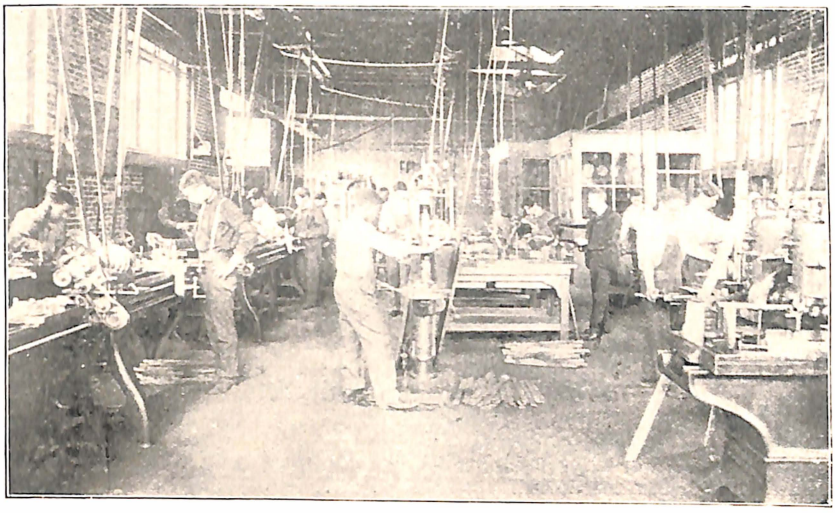
Agriculture	2	Literature ...	5
Book-keeping	2	Manual Training	4
Economics	5	Principles of teaching...	4
English	4	Singing	2
History	5		

GIRLS—(*Half-year*).

Agriculture	4	Literature ...	5
Economics	5	Manual Training	4
English	4	Principles of Teaching	4
First Aid in Illness and Injury	1	Singing	2
History	5		

HALF-YEAR.—Teaching and observation at the Whittier School all day five days in the week.

The *under-graduate course in agriculture* extends over three years. Its object is to make young men successful farmers, gardeners and stock-raisers. The course is arranged to give a practical knowledge of farming, including work in field, orchard, greenhouse, barn



THE MACHINE SHOP

CORRELATING ARITHMETIC WITH BRICKLAYING

and dairy, and of stock-raising, poultry-raising, and bee-keeping. There is laboratory work as well as field experiments. Each student devotes seven hours a day from 7 A.M. to 3 P.M. to practical agricultural work in the fields, barns or greenhouses, and one hour to a class lesson in agriculture bearing upon the out-door work. One more hour in the afternoon is given to preparation for lessons in the night school. In the night school he gets three periods of academical work, which includes theoretical instruction in agriculture. During the first two years, in addition to the regular agricultural and academic studies, two months of each year during the winter months are devoted to the learning of trades most needed by the farmer. Of the four months, one month is given to carpentry, half a month to blacksmith's work and wheelwright's work each, and two months to brick-laying and cement work, painting and glazing, tinsmithing, harness-mending, mechanical drawing, and farm mechanics. The third year is given up to animal husbandry, including work at the barn and dairy with care of stock, poultry, etc.

The Armstrong-Slater Memorial Trade School is one of the best-equipped trade schools in America. Every trade is taught by systematic steps from beginning to end in a school course of three years. Business principles and mechanical or free-hand drawing are taught in connection with each trade. Every trade student devotes eight hours a day to his trade and two hours a day to lessons in the night school. Those who are unable to pay the tuition fee accumulate enough money by working as unskilled labourers before joining the trade school, and even after joining it, if the authorities permit, they may work on wages for one day in the week. At the beginning of the second year the greater part of the student's work is termed "productive" for which he is paid. Trade students work during the summer months if called upon to do so. A trade student while confining himself principally to the trade he has chosen is allowed to learn something of other allied trades. Thus wheelwrighting and blacksmithing are combined; also harness-making and shoe-making; or carpentry, brick-laying, plastering and painting. Not only are combinations of different trades allowed, but in the teaching of a trade, some instruction which properly falls under other heads is included. Thus the carpentry course is as follows:—

First year.—Technical work based on drawings, course in mechanical drawing in the night school.

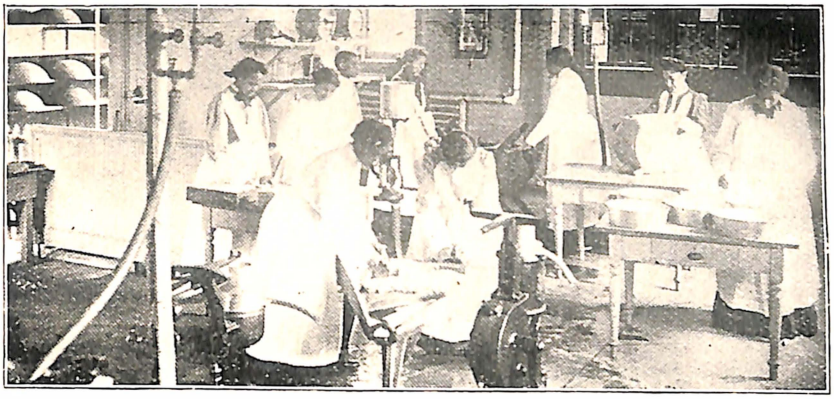
Second year.—House-building and repairs.

Third year.—Advanced principles of technical carpentry, designing and estimating cost of houses; supplemental work in tinsmithing, painting, bricklaying and plastering, and wood-turning.

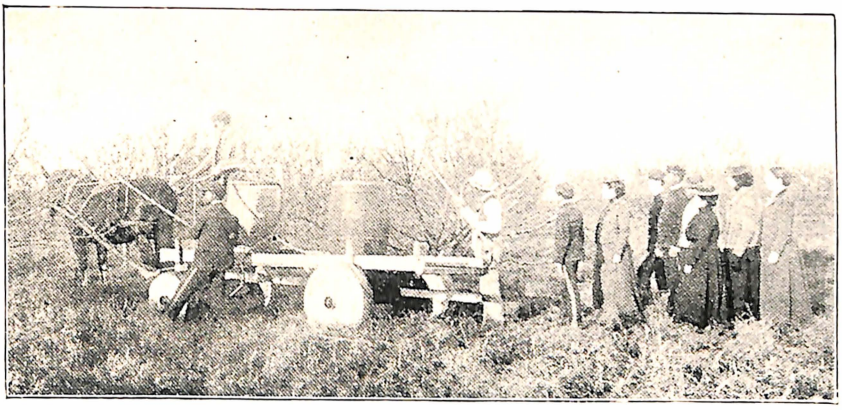
A certificate is given to those who complete the required amount of work in any of the trade classes, and also complete the first two years' academic course in the night school. All new buildings of the Institute are constructed by pupils of the trade school, and all the wants of the students are as far as possible supplied by the trade shops.

Graduate courses are also offered in agriculture, business, domestic art, domestic science, library methods, matron's course and public school teaching. The courses vary in length from one to three years. The post-graduate course in agriculture includes, besides agriculture, the subjects of animal husbandry, chemistry and horticulture. In a graduate class of agriculture of four students, I saw two Indians who were said to be making good progress in all the higher subjects.

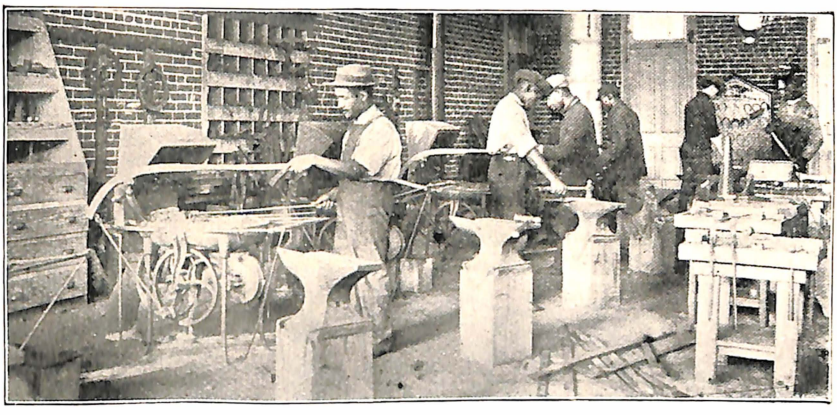
The Rev. Dr. H. B. Frissell, President of the Hampton Institute, who succeeded General Armstrong in 1893, in an address on the important question of training negro teachers, delivered by him in 1900 before the National Educational Association, emphasised "the need (1) for conquering race-prejudice as far as possible; (2) for the creation of the work habit; (3) for a deepening of the sense of responsibility; (4) for cultivation of the power of initiation and self-help; (5) for giving a predominantly practical rather than a predominantly literary education; and (6) for laying great stress on the importance of cleanliness, decency and refinement in the homes of the coloured people." In the course of his address there occurred the following interesting passage:—"The rural schools of the South, as indeed of our whole country, have been given up to the literary side of education. The results have been disastrous. Both boys and girls have left school, feeling that it was degrading to work with their hands, and yet they were unable to find work of a different sort. The word "education" has become associated in their minds with an entirely different life from that which they have been living. *Any training which makes a man or woman dissatisfied with the occupations which are open to them is of doubtful good.* (The italics are mine.) Many Southern men, seeing those results, have concluded that all education of the blacks is a failure. The mistake was not in giving them education, but in not giving them the right sort of education."



CLASS IN DAIRYING



A LESSON IN SPRAYING



CLASS IN BLACKSMITHING

In another address delivered in New York on the Aim and Methods of Hampton he describes the results of the training given at Hampton as follows:—" Now, this kind of training produces three things. First, it develops character. The struggle toward self-support, the regular hours of labour combined with study, the military drill, and the religious instruction unite to make strong characters of these men and women. In the second place this training produces economic independence. No graduate of Hampton becomes a drag on the community to which he goes. With his knowledge of agriculture and the trades he becomes a self-respecting and useful citizen. He is not only able to sustain himself, but also to help others to self-support. Sixty-five per cent of those who have learnt trades at Hampton are practising or teaching them. Eighty-seven per cent of the school's living graduates are known to be profitably employed. Many are leaders in business enterprises; thirty-five per cent are farmers, tradesmen or part-time farmers; and a very large number are teachers of industries. We have now in almost every state of the South industrial schools carried on by graduates of Hampton. At the head of Tuskegee is Mr. Washington, Hampton's most distinguished graduate. His brother, Mr. J. H. Washington, Superintendent of his industries; Mr. Logan, his treasurer, his disciplinarian, his head farmer, and a large company of other Hampton men and women have aided in building up this remarkable institution. In the third place, the Hampton training has produced young men and women of reasonable intelligence. While the great mass of our returned students have gone into the country districts, the leading colored city public schools in the State of Virginia are to-day in the hands of Hampton's sons and daughters. Sixteen per cent have entered the professions, and a number have been graduated with honour from the highest institutions in the land, demonstrating the ability of the race to meet the hardest intellectual tests." Many Hampton graduates are doctors, lawyers, artists, trained nurses, clergymen, teachers of industrial and public schools, business men, land and building agents, besides being farmers, printers, carpenters, blacksmiths and mechanics.

The influence of Hampton soon spread all over the South. In a short time there was hardly any State that did not make efforts to secure *industrial education for its white boys and girls.*

The most notable industrial school founded by a Hampton graduate is the Tuskegee Institute in Alabama, started in 1880 by Booker T. Washington, LL.D. At Tuskegee there are twice as many boarding pupils and buildings as at Hampton, and more

trades are taught at Tuskegee than at Hampton. As from Hampton so from Tuskegee many normal and industrial schools have sprung up all over the country. The institution at Tuskegee began work in 1881 in a dilapidated shanty, so leaky that, when it rained, a pupil had to hold an umbrella over the head of the teacher. The institution started with one blind horse, now it has more than 800 head of cattle. Almost all the buildings were put up by the students themselves. Booker Washington based the education of the negro entirely or chiefly on agriculture, mechanics and household arts. He carried out his methods with indefatigable industry and tenacity of purpose.

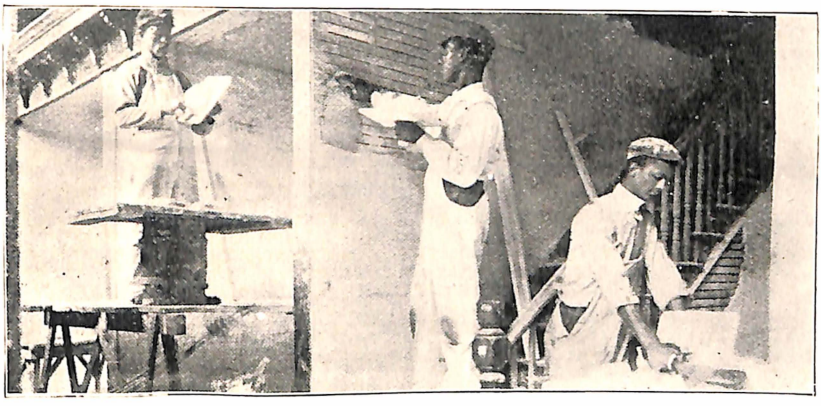
"The industrial training at Tuskegee rests on three principles: (1) that each student shall be fitted to meet actual conditions *as they now exist* in the part of the South where he lives, *i.e.*, shall be able to do what people want to have done; (2) that every student who leaves the school shall be able to make a living for himself and others, being both skillful, intelligent and trustworthy; and (3) that every student shall feel that labour is a thing to be honoured, not escaped from. And now as a result thousands of negroes educated at Hampton and Tuskegee lead the lives of respectable and useful citizens, and have created for themselves clean comfortable homes and lucrative business connections."

The prejudice against coloured children reading in the public schools has entirely broken down in the New England States, and is rapidly breaking down in the Middle States. In the South, though separate schools are maintained for coloured children, the percentage of coloured children at school was 51, while the percentage of enrolment of white children was 68 in 1900.

On the morning of my visit to the Hampton Institute, as soon as my interview with the President, Dr. Frissell, was over, I heard the bugle for parade of the school battalion. All the students from their residential rooms fell in within a few minutes without noise or confusion and took their proper places. Major Robert R. Moton commanded. He has held the position of commandant of the school cadets since 1892. He is a full-blooded negro, one of his ancestors having been an African prince who was captured with a number of his own slaves whom he had brought down to the coast to sell. His management of the cadets has always been marked by wisdom and tact. He is the principal assistant or private secretary of Dr. Frissell, to whom he renders very valuable help. A finer, smarter or more manly set of young men than the cadets who paraded I have not seen anywhere. After parade came breakfast served in a large hall. The teachers sat in groups at round tables, and the students at long tables. The table was

CLASS IN COOKING

IN THE WHITTIER GARDEN



CLASS IN PLASTERING

plentifully supplied with well-cooked dishes of the products of the school farms. After breakfast I went round in company with one or two teachers to all the various departments and from building to building. Major Moton joined me as soon as he could be free from urgent business, and he went about with me the whole day until late in the afternoon when he saw me off in the electric tram car. Dr. Frissell proposed that I might go with a party of visitors to a school farm situated at some distance where some interesting operations were going on. I excused myself and preferred to spend the day in the Institute, which was full of instruction to me in all its departments. The day was bright and mild, very like a December day in Bangalore, and the beautiful natural surroundings with the Hampton roads on the south-west front, the wooded grounds, the magnificent buildings, the well-equipped class rooms and laboratories, the spacious and richly equipped workshops, the Huntingdon Library with its marble hall, its 30,000 volumes, and its system of sending out small travelling libraries packed in special cases to all the village schools around, the arrangements for printing and publishing, the vast establishments in every department, made a deep impression on my mind. I returned to my hotel with the conviction that even the sons of well-to-do parents could hardly expect better or more wisely organised education at four times the cost than that which was imparted at Hampton to negro and Red Indian youths.

The success of Hampton and Tuskegee as educational institutions which have raised the character of the coloured race and rendered thousands of the race self-respecting, prosperous and useful citizens, is full of practical lessons for educationists in India. Education for the common people in India before the advent of the English was confined to reading, writing and arithmetic, the higher classes receiving a purely Sanskrit education of the type given in Pathasalas. After the formation of the Education Department in India under British rule to the present day, education has been almost purely literary from the primary school upwards to the college. Sufficient attention has not been paid to technical and scientific education, manual and industrial instruction in schools of general education has not even been commenced, and the methods of instruction adopted have been such that habits of observation, reasoning and research have not been cultivated. The same mistake has been made in India from the oldest times in making public education almost wholly literary as was made by the New England missionaries when they first went to the South to educate the negro. To add to the disastrous effects of a false ideal of education, the prejudice of the Virginian planters against the

education not only of the coloured children but also of the poor whites, based on the old feudal system of society, which assigned duties but gave few privileges to the different classes in the social scale, has been repeated in India. The cry has often been heard in India, though it is less frequently heard now than it was heard some years ago, that the people should pay for their own education, and that it was not the duty of the State to educate the people. What the Government spends comes from the pockets of the people, and if the people are unable to pay more, or to tax themselves specially to provide for their education, or to appreciate a more beneficial system of education even if they have the means to pay for it, which is extremely doubtful except in the case of the very few manufacturing and commercial towns of India, then no efforts need be made to retrench expenditure in other directions to provide for an increase in the cost of the people's education. In America, on the other hand, it is the deepest and most cherished conviction of the people and the State that the trained intelligence of the people is the highest asset of the State, that all moneys private and public spent on education are the best investment, that natural ability, wherever it may be found, irrespective of race or social class, should be cultivated and developed to the highest possible extent. The vast natural resources of the country and the wealth of the people enable the Americans to spend fabulous sums on educational institutions. But the development of the natural resources of the country and the wide dissemination of a highly useful and productive education have reacted as they must on each other as cause and effect in America. The conditions of India, however, are widely different from those of a rich progressive country like America. India is essentially a poor country dependent chiefly upon agriculture, 66 per cent of the population being agriculturists. In such a country advance in the spread of education of all kinds must at best be necessarily slow. And when the funds are insufficient for encouragement of all grades of education, necessarily higher education has to be made self-supporting as far as possible, the savings being devoted to primary education. Much nevertheless can be done in India by adopting a better ideal of education for the people, by combining manual and industrial instruction with the general education of the masses, or in other words by giving a practical combined with literary education, to enable the people to attain to greater competence and a higher standard of living, and also by adopting more correct methods of education from the infant class upwards in all schools.

Except in the presidency and a few other towns in India an educated middle class does not exist, and no efforts have

apparently been made to create it, from a mistaken ideal of education or indifference and want of sympathy on the part of educationists. India is a vast continent which is a meeting ground of different races who are at every stage of mental development, some being fitted to receive the highest mental culture by the pursuit for long ages of subjective studies like the studies of the ancient poetical, philosophical and religious literatures, others with descending degrees of natural endowment inherited from their ancestors being less fitted for subtle subjective studies than for manual and industrial work. The education of the former class is necessary for the help that Government requires from them in carrying out a highly complex system of administration. The education of the people of the latter class who form the masses has to be made as practical and productive as possible, while at the same time it should be such as will improve, strengthen and elevate their character.

For such education there is no better model than that adopted in the Hampton and Tuskegee Institutes. Agriculture should be practically taught by trained teachers from the village schools upwards in all primary and secondary schools according to a graduated scale of instruction. School gardens should be established in connection with all schools and nature-study encouraged. In Mysore the subject of agriculture has been introduced into the secondary course of training from 1904, and a public examination in practical agriculture has been instituted from this year. Manual training should be commenced from the lowest classes, and industrial education combined with the usual school subjects in all primary and secondary schools. What industries should be taught must depend upon the local conditions and what the people want to have done for themselves. It is quite practicable, nay it is imperative, to combine five periods of theoretical instruction say of 45 minutes each with practical work for about three hours every day. Such a combination would make the children more alert, more fond of studies as well as hand labour, more healthy and more likely to achieve success in life, than if their education was confined to only one kind of instruction. The establishment of Normal and Agricultural Institutes like that at Hampton or Tuskegee, at first one for each province or group of districts, and later one for each district, would be the salvation of the people of India. In productive efficiency, in wealth, in self-respect and character, in the hatred of shallow politics such as the idle, ignorant and thoughtless indulge in, the people would make rapid advance and thereby increase their own happiness. A contented and useful middle class would then be created such as now hardly exists in India.

CHAPTER XIV.

The place of Industries in Elementary Education.

Dr. Dopp's work on "The Place of Industries in Elementary Education."—Industry the mother of civilisation.—Classification of industries.—Instinctive attitudes of the child inherited from primitive life.—The domestic industries.—The hunting stage.—The fishing stage.—The pastoral stage.—The agricultural stage.—The use of metals.—Travel and trade.—The city states.—The feudal system.—The handicraft system.—The factory system and use of steam power.—The instinctive activities inherited by the child.—The first activities of an infant before it is two years and a half old.—Activities suited to later infancy up to the age of seven.—Activities suited to the eighth year, which is a period of transition.—Activities suited to childhood from the ninth year to the close of the elementary-school period.—The views of Dr. Otto W. Beyer of Leipzig.—Their great similarity to the views of Dr. Dopp.

In the XI Chapter, while describing the methods of manual training adopted in the Horace Mann School, a reference was made to Miss Dopp's work on "The Place of Industries in Elementary Education." The subject is a most important one for educationists, and I may be allowed to recur to it briefly in order to show the real origin and importance of all constructive training for children.

From the earliest times industry has been "the matrix that holds within itself the other interests of life, which it nourishes until they become strong enough to support themselves." Industry was absolutely necessary for individuals for the maintenance of life before social groups were formed, and it was also the chief cause later in the history of man of the formation and maintenance of such groups and of the development of the complex social relationships of modern times. It is obvious that industry should therefore have an important place in the education of the young on whom as they grow older the maintenance and advancement of industrial activities would depend.

From the earliest times to the commencement of the latter part of the middle ages industries were confined to the home and family, the *domestic industries* sufficing to supply the few wants as well as

to develop the manual skill and intelligence of the people. The domestic industries were succeeded by the *handicrafts* in townships and the system of *apprenticeship* in the latter part of the middle ages. The handicraft system was replaced after the invention of the steam engine by the *factory system*, in which the individual who guided machinery in a limited and particular way counted as scarcely more than a part of it, and the opportunity of developing manual skill generally and of obtaining the educational advantages which the domestic industries and handicrafts afforded in the two previous stages was lost. The education of the individual henceforth became defective until the importance of industrial or manual training began to be recognised as an essential part of school education for the development of the individual.

The instinctive attitudes of the child which are his inheritance from the experience of past ages have to be recognised, studied and utilised in developing his mind and character, according to the light thrown upon them by anthropology, sociology and history. The successive stages of the industrial development, chiefly of the Aryan races, have therefore to be studied to understand their significance and bearing upon the education of the child. How man's character and development depended on his natural social environment, how industries took their origin from the interaction between the environment and the character of the primitive man, and how they led to social organizations and the development of the sciences and arts, are subjects that should be studied by educationists before they can evolve a system of education suitable to children.

Primitive life has to be principally studied as it lasted through untold ages and has left indelible marks on the instinctive attitudes of the child, while modern civilisation is comparatively only a thing of yesterday. It is necessary to study primitive life both for the purpose of interpreting and understanding the instinctive attitudes of the child, and also of ascertaining such activities of primitive life as best suit and satisfy these attitudes. "How to make use of the emotional attitudes of the child * * * ; how to direct them in such a way as to afford the child, in each stage of development, an experience suited to his capacities in the fundamental processes by which society in all ages sustains itself; how to transform the dramatic and play instincts of the child into the real interests of adult life without diminution in their vigour and purity—these are most vital problems in education."

"The history of industrial activities represents a fundamental factor in the education of the child, because it furnishes a series

of typical problems that correspond to the changes in his own attitudes. Because the past still lives in the present, because its problems are simpler statements of the most fundamental problems of the present, the history of the industrial activities of the past is especially valuable as subject matter in elementary education."

The history of the industrial activities of the human race is divided into three periods, the period of *domestic economy or home industries*, the period of *town economy or handicrafts*, and the period of *national economy or the age of machinery and the factory*.

The home or domestic industries are of the greatest importance in elementary education. They form the experience of the race in industrial activities of primitive life for long ages that preceded the handicrafts. They correspond closely to the instinctive activities of early childhood which form part of the physical inheritance of children.

The stages of domestic industry are roughly classified into the hunting, fishing, pastoral and agricultural stages, the age of metals, trade and transportation, the city state, and the feudal system.

In the hunting stage man's activities were dominated by his need of food and protection and shelter. Surrounded by wild beasts of great strength and destructive power, he tried by the help of associative memory and the use of his limbs as mechanical powers to overcome or avoid them. The emotions of curiosity, fear and wonder were excited in him. It was in this stage that he conquered fire which was considered a wild beast. The conquest and use of fire led to division of labour between men, who were then free to travel far from home and engage in vigorous life, and women who stayed at home tending the fire and the children. Co-operative action for the common welfare was stimulated. The love of dress and decoration, and the beginning of the art of drawing mark this period. Man cultivated craft, foresight, endurance and speed, invented traps and weapons, carried on complicated co-operative activities, and developed the industries and arts from their rudimentary origins. "Although man of the hunting stage had not reduced his knowledge to intellectual formulas, he had made considerable progress in the sciences and the arts. He had gained this knowledge under the impulse of his need of food, protection, shelter and clothing. He was familiar with the habits of the wild animals of his locality and with most of the useful and poisonous plants. He was familiar with the topography of the various regions in which he lived and with special advantages afforded by each. He knew the signs of the weather and the relation of the changing

position of some of the heavenly bodies to coming changes in his own activities. He had learned the limitations and the possibilities of the raw materials with which he worked, how to select the best materials for his weapons, implements and utensils, and how to manufacture and manipulate the same. He had learned how to submit himself to a leader in time of danger and how to take the lead. He had learned how to live in sympathetic relations with members of his own clan and how to gain the social approval of the members of his group."

Man had less formidable enemies to contend with in the *fishing stage* owing to the destruction or disappearance of the largest and most destructive of the wild animals. He domesticated the dog, and had new problems to contend with in the arts of fowling and fishing, which required less force but more foresight and cunning than were necessary before. The desire to acquire the vast stores of food in the deep sea made him study the winds and the waves, and the changing phases of tides, calms and storms. Fishing expeditions required co-operative effort and organisation. The increased supply of food more readily acquired than before gave him leisure to manufacture fishing tackle, boats, rafts, basketry and pottery, and invent different kinds of the dance.

As population increased, it became difficult to support life by hunting and fishing, although the most terrible of the beasts of prey had been decimated. The advantages of domesticating the grass-eating animals were soon perceived, and man had to face new problems of finding pastures and water for the flocks and protecting them from wild animals, hostile tribes and the inclemencies of the cold season. But the *pastoral stage* was characterised by a plentiful supply of nourshing food which created a great deal of leisure time. The arts of music, story-telling, dancing and singing flourished. Man learnt to spin, weave and dye, and manufacture improved clothing. The accumulation of property gave rise to warfare, which led to the organisation of larger and larger political groups and the rise of political institutions.

Agriculture had its origin in the hunting stage when women staying at home resorted to it to eke out a living. In later times the domestication of animals and the cultivation of plants proceeded side by side. The difficulty, however, of protecting the domesticated animals forced men to take more earnestly to agriculture. The agricultural life was of great educational value to the race. The man that tilled the soil had to discover nature's secrets. "He had to learn how to prepare the soil in the best way with the crude tools at his disposal; he had to learn the best time to sow the seed,

and what seeds would grow rapidly enough to mature before the early frosts; he had to invent ways in which to protect the growing crop from birds and beasts. He had also to invent tools and to learn how to utilise animals as a motive power in work; he had to invent harnesses, evolve carts, measure time, and regulate consumption as well as production." The predatory instinct of warlike people at the same time united people into large social groups and created a desire for political order and subordination.

The *use of metals* revolutionised the methods of agriculture and warfare. The mechanical arts received an immense impulse from the art of metallurgy, which enabled man to grapple with difficulties he would never have overcome otherwise.

Search for food led man to *travel* at first. As communities began to enjoy a settled life, tribal gatherings of a religious and festive character induced people to travel to distant countries. Temporary fairs and markets were established for the exchange of goods, and trade of all kinds grew in volume from year to year. It became necessary to improve the motive power, the modes of conveyance and the comfort of carriers and travellers. The development of trade united distant nations, and while it strengthened their sympathies and bonds of friendship, it increased their intelligence and alertness to decide all questions of doubt or dispute.

In the fertile valleys of the south of Europe, Western Asia and Northern Africa, the city-state sprang from what was more or less a tribal town or nomadic village, and subjugated the less powerful neighbours. Gradually homogeneous empires arose which imposed the customs, laws, religions and languages of the conquerors upon the conquered peoples.

What the city-states did for the tribal town and nomadic villages of the South and East, feudalism did for the towns and villages of the West, which were in constant dread of attacks from barbarian hordes. The small landholders in outlying parts were in need of protection, and the large landholders were in need of labourers and fighting men. The feudal system was devised to meet the wants of all, and feudal castles were erected to which all from the surrounding country might flee for protection. Feudal industries developed on special lines the skill of labourers and workmen who were mostly serfs. These industries represent the transition from domestic industries to the handicraft system.

As commerce developed and free towns arose, the handicraft system came into existence in Western Europe with the emancipation

of serfs. At first the handicraftsman worked up his own raw material. Gradually the production of the raw material was differentiated from the manufacture of it into the required article for the local market. To this period belongs the application of wind and water power to industrial processes.

With the use of steam as motive power the handicraft system declined, and was relegated to a narrower sphere for the supply of the local market, while the factory system supplied the national or international market. The application of steam to locomotion enabled the manufacturer to exploit the remotest regions for raw products, and to take the manufactured goods to distant markets. The use of steam power has centralised manufactures in large towns and produced a minute division of labour which has supplanted the handicraft system in the large centres of industry.

The modern child inherits in the form of permanent instinctive attitudes those activities of primitive man which were most remote and most constant, the later activities appearing only in a less permanent form and later in life as the child grows up. The emotional activities of primitive man like the dance, singing, or festive celebrations, are reproduced in the modern child as play impulses. The difficulties of obtaining shelter and living, and the activities with which primitive man met them in his natural and social environment, suggest the guiding principles for regulating practical work at the different stages of the elementary-school period suitable to the child's instinctive attitudes and inclinations. At no time, however, should the child be taken minutely through an actual stage of racial development. The racial experience of long ages has to be condensed into activities of a few hours, during which the child identifies himself with primitive man only in a dramatic way. Before the child acquires technical skill or gains the strength to use complicated tools, it is the simple domestic industries of primitive man that are of great educative value.

The first efforts of an infant until the age of about two years and a half are confined to the exploitation of his immediate environment. He has not yet acquired the free use of his hands nor developed an erect posture. His hands are employed for the purposes of locomotion, which are set free for higher purposes only after the erect posture is attained. In later infancy up to the age of seven or eight he explores an environment which includes not only the home and its immediate surroundings, but also his school and its neighbourhood.

Later infancy is the period of play, and it is for the satisfaction of the play instincts that the child explores its surroundings. It is

of use to take advantage of this interest by directing it to *nature-study*, and by supplementing it by *stories* of people, and animals. Children reared in cities who do not easily come into contact with nature resort to the use of *toys* which are thrown aside as soon as the temporary excitement produced by them is over. Toys can never replace the actual experience gained from *natural objects*. A pile of sand, grasses and fibres, a neighbouring tree, dry-goods boxes, paper and paste, which are so easily within the reach of children, can help the natural and happy growth of the child's intelligence and experience far better than toys. At this period of life *gardening* and *agriculture* such as it was before the introduction of machinery, and the manufacture and transportation of those artificial products in which the child is interested are of great educative value. Throughout this period the study of *animals* and *plants* is of the greatest interest to a child. Even in a crowded city, "it is an easy matter to gather cocoons, and their transformation into moths or butterflies is a wonderful revelation to the little ones who are fortunate enough to see it. Canaries are always of interest to children, who well may be allowed to care for them. Fish, frogs and other animal forms may be brought into the school room if aquaria are available. An occasional visit of a *domestic animal* is welcomed by the children." Attention to the needs of the pet animal in the school room is in itself an education to the child, which broadens his sympathies, inculcates kindness to animals, and lays the foundation of all benevolent feelings. The child's interest in *plants* is associated with his interest in food. A country child knows where to look for ripe berries, nuts and acorns. He takes interest in a tree because it yields fruit, is a suitable place for putting up a swing or is otherwise interesting. *Construction*, though it be of a crude kind, is of great interest to a child at this stage, after he has begun to use his hands freely. *Sand* and *clay* are the best plastic materials for this period, the latter especially after the commencement of the sixth year. The serious activities of the Kindergarten are largely associated with the subject of food. "Children in the Kindergarten take delight in the care of plants; they are interested in cooking simple foods; and if their instinctive efforts, which are so apt to result in 'mussing about' when left uncontrolled, are directed with reference to present social conditions, habits may be grafted upon them at this time more easily than at later periods. The same is true of washing dishes, sweeping, dusting, arranging utensils in an orderly way and other similar activities." Interest in questions of *clothing* and *shelter* comes later as in the race. "The interest in *shelter* is best expressed by

the child of this period by means of *building blocks* which afford freedom of movement and quick results. The adaptation of a dry-goods box to the purpose of a doll's house is suitable for this period, and in its furnishings admits of a variety of activities." The use of *tools* at this stage is a disputed point. Perhaps the use of the *plane* and *saw* of suitable weight and size may be allowed, but the use of the *hammer and nails* at this stage would be premature, while the use of *glue* and *paste* is more appropriate, and *paper-cutting* and *cardboard construction* are suitable occupations. Interest in *clothing* is chiefly associated with the child's love of personal display. Crude attempts at *weaving* are possible at this stage, but it seems best to put off *weaving* or *sewing* until the child is at least seven years old. "It seems better to let the child's interest in clothing express itself in dressing and undressing dolls, in washing and possibly in ironing these articles of dress, in stringing beads, or in related activities that make little demand for precise co-ordinations." Up to the sixth year the child makes no distinction between *dramatic play* and *work* which is free play. Playing with dolls and making doll's houses form an intermediate link. It is after the sixth year that work becomes as natural as free play. Dramatic play is of educational value when it is kept "in close connection with the occupations observed or participated in by the children."

The eighth year is a period of transition from infancy to childhood. From play the child then progresses to serious activities, and begins to adjust means to ends. The hunting plays natural to the child of this age can be turned to good account by leading him to imagine and act out the conditions suitable to the hunting stage, to the contests of primitive people with wild animals, and the difficulties of finding food and protection. Suitable stories of the hunting stage would help the idealisation. He becomes specially interested in his environment as the one source of supply of nuts, berries and wild grasses, and also of stones of particular shapes and edges for use as cutting implements. The child is now of an age to be able to understand how the environment acted upon the character of the men of each stage of culture from the hunting stage forwards to the agricultural stage. The child can be led to realise the close relation existing between the prevailing form of industry and the form of Government as well as the form of the family. "The child's interest in metals and certain tools made of them and his intense curiosity in regard to such mysterious processes as those by which ores are reduced and metals manufactured, furnish the motive for activities by means of which he may master

the rudiments of these arts." His interest in such games as marbles and in forms of barter would naturally lead to an inquiry into the origin and development of trade. And this inquiry would lead to the allied subject of primitive travel and transportation on land and on water. The latter subject would include an inquiry into the various swimming devices, the development of the various forms of rafts, and passenger and freight boats. The eighth year is also a period of transition from the hand to the tool. The kind of tools to be placed in the child's hands depends on the stage of his mental development and corresponds to the tools used by the savage in the same stage of development. It would be a mistake to place tools of a higher technique in his hands. His first tools are the limbs and parts of his body like the arms, hands, feet, teeth, nails, fist, knee or heel. Placed under the same circumstances as primitive man, he can make hammers of stone of various shapes and sizes for distinct uses, and cutting implements of teeth, tusks and horns of animals, a sea-shell or sharp stone, to take the place of his nails and teeth. The evolution of the spear from the knife, of the dart and javelin, of the bow and arrow would naturally follow as subjects for his investigation. The invention of the bow and arrow was perhaps the greatest of all human inventions and forms an important landmark in the march of civilisation. The elaboration of the bow and arrow at the various stages of their evolution is a most interesting study through which the child can be easily led step by step. The simpler steps in the evolution of boats are also of great interest to the child at this age. A consideration of the art of swimming and the various devices for supporting the body or a load in water would lead to that of the evolution of the boat from the swimming log and dug-out, of the raft, the catamaran, the double canoe and the outrigger. The evolution of boats of bark, skin and reeds, of the oar, rudder, paddle-wheels and sails, of the art of navigation in the deep seas would naturally follow. In these and numerous other ways the subject of primitive industries of man can be utilised to connect the subjects of the elementary school with the play instincts and practical activities of children.

The period of childhood after the completion of the eighth year is one of great restlessness and activity. There is now a clearer perception of the objective world, and though work is differentiated from play, it is not felt as drudgery, but as an agreeable manifestation or result of the child's growing activity. He takes vivid interest in considering "how man secured dominion over the natural forces, substituting for the motive power of his own muscles

that of the beast, the water, the wind, fire, steam and electricity; and how in applying these forces successively to the work of society, he invented tools, discovered mechanical principles, worked out metrical apparatus, exploited his environment in search of natural forces, and invented and controlled machines for the more advantageous application of these forces." The opportunity to work out such problems by construction, illustration and experiment produces the most salutary effects on the studious habits and character of boys. Boys who have been listless and idle and are the despair of their teacher have had their interest revived and have been enabled even to excel in book learning after they are introduced to constructive work and experimentation in practical work. On the other hand, boys who have excelled in book learning have become intensely interested in practical work when they are introduced to it. Most of the industrial processes of the child correspond to the stage of domestic industries, which commenced from the earliest times and lasted to the tenth century and are still found in backward communities. Industries that require the aid of simple tools and can be carried on without the use of machinery like cooking and sewing are of the greatest importance to the child. At the same time industries that supply the needs of a clan, tribe, village community, the city-state, or the nation should not be neglected. The problems of co-operative work are of great interest to the child if the child's own share in them forms the basis of his constructive activity. The growth of civilisation affords interesting problems for the child. He can easily understand how the earliest civilisations arose in fertile river valleys, and how the development of agriculture in these valleys led to the rise of city-states and feudal castles. The study of geographical areas with a view to ascertain what kind of civilisation they would support and encourage is full of instruction to the child. Phœnicia is a typical country to study in this connection. "The more important questions that cluster about the handicraft period are those bound up with such questions as the freeing of labour, the application of the power of the wind and water to simple machinery, the consequent change in manufactures, the development of commerce, the work of the Hanseatic League, the growth of cities during the Middle Ages, the regulation of labour by means of guilds, the advance made in more accurate measurement, the artistic work of the craftsmen, and the spirit which gave rise to the cathedrals. These subjects lend themselves to various forms of expression and serve to enrich many experiences of the child." If the child is taken through a course of constructive activities like the one

sketched above, he will be prepared in the last year of the elementary school course to study the main steps of the industrial revolution of England and the United States in modern times. A child that has traced the origin of the tool from the action of his limbs, knows the value of rhythmical and automatic movements, which form the prototype of the rhythmical movements of a machine. "What this machine is, what its purpose, how constructed, how controlled, and how used for the amelioration of society, these are the problems that the school should undertake to teach him to grapple with, rather than to occupy him with activities that tend to render him as automatic, as unfeeling, as a part of the machine itself. The construction of simple machines in the workshop, and the tracing of the connections between the steps in the process from the stage of the *hand*, through the stage of the *tool*, to that of the *machine*, with its many possible modifications, is an educative work. It will train the child to control machinery rather than be controlled by it."

It is interesting to note how the most advanced educationists in different countries have come to the same conclusions with regard to a carefully thought-out system of manual instruction for the elementary school. Dr. Otto W. Beyer of Leipzig, who for many years from 1895 gave pedagogical lectures at Jena on Manual Instruction as an organic part of the school curriculum, anticipated the ideas of Dr. Dopp, which have been so successfully carried out in the Horace Mann School of New York. "To supplement the ordinary school education by a well thought-out pedagogical system of Mannual Instruction," says Dr. Beyer, "is a pressing need among all civilised nations, and a large measure of fame awaits the man who successfully solves the problem." He proceeds to discuss the principles of the relation of manual instruction to the aim of education. "It is incontestable that the purpose of education is to so equip the pupil that, when its protective influence is withdrawn, he may be able to take his share in the duties of his age, as far as social position and individual capacity admit. This demands a rudimentary insight into the social organism. The pupil can only acquire such an insight if his school instruction has enabled him, in some measure, to grasp preliminary assumptions. These lie rooted in the past, and therefore the chief task of educative instruction is to lead the pupil, by means of a consideration of history, to understand the development of human civilisation." He then refers to the same stages of human development as have been described above, namely, the hunting, fishing, pastoral and agricultural stages, and the stages of handicrafts and modern civic life, and

suggests that the manual exercises should be such as would illustrate the separate economic periods. Before the culture-epochs are discussed, he thinks "it is necessary to have a preliminary introductory course, during which the pupil in numerous instructive walks under the immediate direction of the teacher, has the opportunity of learning how to observe and comprehend." This observation course should be continued even after the discussion of the culture-epochs has begun. In the epoch of the hunter and the fisherman the chief manual occupations were those of weaving, rope-spinning, net-making, sewing and the making of vessels of clay. In school the corresponding occupations would be the weaving of threads and bands, knitting and clay-modelling. Paper-plaiting, paper-cutting and cardboard work can also be practised. In the epoch of nomad life the cardboard work should be developed and crochet work added to knitting for girls. But the chief occupation will be the rearing of domestic animals. The epoch of agriculture requires new manual tasks. The school garden affords the most important occupations suitable for this period. "Gardening includes the care and rearing of plants, the protection of animals useful for the garden and the exclusion of those that are harmful, the observation of the weather, biological observation of plants and animals, examination of the nature of the soil, care of the soil, and other related manual occupations, especially wood-work adapted to the needs of the country, employing not the carpenter's bench, but the so-called carving board and knife." Much useful, though elementary knowledge of the theory of the nourishment of plants, of physics, chemistry, mineralogy, botany, natural history and weather lore can be imparted in connection with the children's out-door work and direct intercourse with living nature. Clay-modelling and cardboard work should be continued at this stage. To illustrate the economic principles of the last two epochs, the age of crafts and guilds and that of free industry with machine power, Dr. Beyer recommends simple industries, wood and metal work, and easy experiments in physics and chemistry with simple apparatus in the school laboratory for boys, and sewing, cutting out, darning, mending and fancy work together with other duties of housekeeping for girls. He suggests that, in the last year or two of school life, attention should be paid to the future calling of the pupil and to a general course of technical instruction in wood and iron work and in the use of the most important tools. In rural schools only such industries as have relation to agricultural should be taught. "For the future craftsman the stage of the crafts and guilds should be fully treated, while the last stage would only touch on certain points

useful to the craftsman, *e.g.*, the various machines used in handicrafts."

The points which Dr. Beyer emphasises may be thus summed up:—

(1) The guiding principle in drawing up the curriculum of instruction for the school must be the development of human civilisation.

(2) To this scheme should be added exercises in manual occupations, their nature and extent being determined by the curriculum.

(3) In the upper classes of those schools in which the pupils belong to the working classes, so much attention must at least be paid to the future calling that a distinction is made between the needs of the town and the country; this distinction must also be recognised in manual instruction.

CHAPTER XV.

Suggestions for Schools in India.

Classification of schools according to three systems of manual training.—The third system most scientific but not practicable.—The first system logical but uninteresting and lifeless.—The second system most useful and easy to adopt---Adopted in the State Normal School at Hyannis.—The advantages of the school-garden.—Its importance in India as providing manual training and subjects of nature-study, as a means of teaching the elements of agriculture, and as a centre of practical activities.—Agriculture cannot be taught successfully in the first five school years.—The elements of agriculture suitable for the next three school years.—Outline course of elementary agriculture.—Suggestions for schools not provided with expensive equipments for manual training.—Course of manual training for schools in Mysore from Anglo-Vernacular Class I to Form VI.—Suggestions for manual training and practical hand-work from the Infant Class to Standard V with a tabular statement of suggested activities.—Principles to be observed in arranging the practical activities, and some subjects of instruction in the lowest classes of an elementary school.

Schools may be classified according to the systems of manual training adopted in them under three types:—(1) There are schools "where an elaborate well-defined course of study is marked out in a perfectly logical fashion, with its regular set objects to be made in paper, cardboard, clay, raffia, wood, iron, etc." In this system the child's mental growth, instincts and motives are not considered at all or only incidentally and in a subsidiary way, and an attempt is made to frame a logical course of constructive activities in which each part occupies a position in relation to what precedes and what follows. Such a definite course of models and exercises is framed by the teacher from his own point of view. (2) There are schools "where there is an orderly sequence of subject matter, but the objects to be made are suggested by the immediate needs of the class room or home." Such a course provides motives for construction, but the child is not given an insight into the origin of industries, and how they developed at each stage of civilisation, so as to enable him to understand more or less the social and industrial conditions that are his environment at the present day. (3) There

are schools "where the approach to an understanding of present civilisation is made through a study of the past." The stages of primitive culture are studied with a view to ascertain the simple conditions from which the present complex social conditions have been evolved. "The skill, inventive genius, and power of civilised man have been developed largely by his struggle with nature, especially in solving the problems of food, shelter, clothing and Government. If it were possible for a child to approach the study of his environment from the point of view that man has historically, it would seem as if the child would not only get a clear idea of his environment, but would also gain much power from the difficulties that are involved in subduing nature." The Horace Mann School of New York adopts the third system of manual training in the elementary grades, which has been described in some detail at pp. 74 to 81.

The third system of manual training is the most scientific, and is based on true pedagogical principles. To carry it out, however, highly trained teachers thoroughly conversant not only with child-nature but with the history of human civilisation are required. Such teachers can be trained only in the highest colleges for teachers or normal institutions and the model schools attached to them, and must necessarily form a small number. With the help, however, of standard books like Dopp's Place of Industries in Elementary Education, and the same author's Industrial and Social History Series (Rand, McNally & Co.), much may be done by an intelligent and able teacher to carry out this system of manual training.

Other books on the subject of primitive culture for the use of teachers are:—

Clodd's Story of Primitive Man (Appleton & Co., New York).
Dawkins' Cave-Hunting (Macmillan & Co., New York).
Sir John Evans' Ancient Stone Implements in Great Britain and Ireland (Appleton & Co., New York).
Figuier's Primitive Man do do
Archibald Geikie's Prehistoric Europe (Edward Stanford, London).
Gummere's Germanic Origins (Charles Scribner's Sons, New York).
Hutchinson's Extinct Monsters (Appleton & Co.).
Hutchinson's Prehistoric Man and Beast do
Nicholas Joly's Man before Metals do
Lubbock's Prehistoric Times do
Mason's Origins of Invention (Charles Scribner's Sons, New York).

W. G. Smith's Man the Primeval Savage (Edward Stanford, London).

F. Starr's Some First Steps in Human Progress (Chautauqua Press, Springfield, Ohio).

James Stoddard's The Seven Sagas of Prehistoric Man (Chatto and Windus, London).

Isaac Taylor's Origin of the Aryans (Charles Scribner's Sons, New York).

E. B. Tylor's Anthropology.

Stanley Waterloo's Story of Ab (Doubleday Page & Co., New York).

Sir Daniel Wilson's Prehistoric Man (Macmillan Company, New York).

G. F. Wright's Man and the Glacial Period (Appleton & Co.).

Worsae's Industrial Arts of Denmark (Chapman & Hall, London).

To carry out a system of manual training correlated with primitive culture must remain a matter of great difficulty until education and normal training have advanced much farther than at present in India, and in any country it would be always difficult to obtain, for the ordinary elementary school, teaching of a high order such as a few select schools with rich resources can provide. The ordinary elementary school, therefore, often adopts a system of manual training such as is found in schools of the first type described above. It is this system which the principal cities of New England have adopted. They have regular systems of handwork from the Kindergarten up to the manual training shops. The courses continue the constructive work and the form and colour studies of the Kindergarten up to the eighth elementary grade. They are briefly referred to in pp. 83 to 85. The minute elaboration of the course of 'drawing' so called in the Boston schools may be seen from the course which is prescribed for Grades I and II.

DRAWING.

Grades I and II.

$1\frac{2}{3}$ hours a week.

1. *Form Study.* —(*a*) Sphere, cube, cylinder; square, prism, right-angled triangular prism; ellipsoid, ovoid, equilateral triangular prism; cones, pyramid, and vase-forms. (*b*) Objects like these types.

2. *Nature Study.*—(*a*) Natural phenomena. (*b*) Plants. (*c*) Birds and other animals.
3. *Colour Study.*—(*a*) Choice and relations of colours. (*b*) Their recognition and names. (*c*) Ideal unit. (*d*) Six leading colours. (*e*) Making borders, etc., in one tone. (*f*) Tones, tints. (*g*) Six leading colours and their tints. (*h*) Borders, rosettes, etc., in two tints.
4. *Appearances.*—(*a*) Representations of type-forms and of objects like them. (*b*) Illustrations of simple stories.
5. *Arrangements.*—(*a*) Geometric figures. (*b*) Simple historic ornament. (*c*) Borders. (*d*) Original arrangements. (*e*) Space filling.
6. *Facts.*—(*a*) Study of wholes and of parts. (*b*) Terms of location, position, direction, and relation. (*c*) Patterns of surfaces.
7. *Manual Training.*—(*a*) Modelling. (*b*) Paper-folding. (*c*) Table and stick laying. (*d*) Paper cutting and pasting. (*e*) Making in paper.
8. *Correlation.*—(*a*) Language expression. (*b*) Imaginative work. (*c*) Number. (*d*) Elementary geography.
9. *Study of pictures.*

The above course is a specimen to show how minutely the course of drawing and constructive work may be elaborated by the teacher without any reference to the inherited instincts and attitudes of the child or much reference to the environment or neighbourhood of the child. However full and scientific such a course may be from the teacher's point of view, it cannot always be interesting to the child. Unless a child's motives and instincts are appealed to, he cannot enter with must zest or benefit to himself into elaborate exercises intended to promote creativeness, inventiveness or self-expression. Such a system of training is, however, highly valued in America and considered to contribute largely to the industrial efficiency and commercial prosperity of the people.

Under these circumstances the most useful and feasible manual training to be imparted in an ordinary elementary school seems to be that which is given in schools of the second type mentioned above. The training is suggested by the immediate needs of the class room or home. This is the kind of manual training given in

the State Normal School at Hyannis, where "the forms of manual training found most appropriate for the primary grades are the garden work, the care of school rooms, the care of school grounds, and domestic science. The children are encouraged to put on and take off their own wraps and rubbers, to wash their faces, comb their hair, to keep their desks in order, sharpen pencils, to sweep and dust their own school room, care for their books in their little library, to care for the room which is set off in one corner of the school room for a sitting room, a dining room or kitchen, to do similar things at home and report at school. They help to keep the corridors clean, to make little individual towels and wash and iron them. They help to plant vines and hedges about the school premises. They have home gardens in which they raise vegetables for the table or to sell. They go caddying, make hammocks, slippers, baskets, pillows, aprons, dresses for home use and to sell."

The work of the school graden is invaluable in all elementary schools as affording manual training in connection with nature-study. The practical operations of the garden are of the highest value as a kind of manual training suitable for rural schools. There is at least as good manual training in laying out a garden bed and then preparing the soil as there is in simple work with wood or iron. "As a school subject gardening possesses the double advantage that it affords exercise in the use of tools as well as being a means of nature-study. The double educational purpose should always be kept in view. Learning by seeing and doing is the best kind of learning and there is no subject in which so much can be thus learnt as in gardening."

The great advantage of a school garden is that, besides furnishing a chief means of carrying on nature-study, it can be made a centre of correlation with most other school subjects. When a child becomes a gardener, Principal Baldwin of the State Normal School at Hyannis says that "the garden activities become the real business of his life just as the activities of the farm furnish the real business of the farmer, and the house which the carpenter is to build furnishes the real business of the carpenter. The carpenter uses his knowledge of drawing, reading, writing, arithmetic, architecture, and every other subject in planning, buying material for and constructing that house; so the little gardener must use arithmetic and drawing in measuring and plotting the ground, language and writing in securing seed catalogues and seeds, reading arithmetic and common sense in using these catalogues and in deciding what to plant. When he comes to planting, he finds that he needs to know something of soils, fertilizers, ploughing, harrowing, and

very much about the weather. All these subjects crowd in upon him, not as so many different subjects, but as one subject, gardening, reaching out in many directions. As the plants begin to germinate, every normal child is interested in every step of this wonderful transformation. Of course, it is necessary to plant many extra seeds in boxes to be pulled up for study. If this work is given in the proper way, it is sure to open up a new world to the child, and to afford much pleasure. It furnishes splendid opportunities for drawing and colour work, for very simple lessons upon the effect of light heat and moisture upon plant growth, for observation of the way in which plant food is stored in the seeds, the power of young plants to lift up masses of earth or to push up through the hard soil, and the dangers from frost and insects." As an illustration of the correlation of garden work with language lessons, a lesson on weeds and weeding is followed by putting into practice in the school garden what has just been taught. The next morning an oral language lesson is based on the experience of the previous day. The children talk of the weeding and what they observed and did in the school garden or the garden at home. They also write their experiences in their garden or nature-study notebook, and this writing serves as an exercise in composition and spelling, the teacher putting on the board the words which the children find it difficult to spell for a regular spelling lesson later on. Drawing, painting and arithmetic can also be correlated with garden work. The preparation of the ground and the laying out of the garden, the making of the plan, and planting of seeds give many occasions for teaching number work. Arithmetical tables, fractions, and measuring distances with the chain are taught by concrete examples. In the highest grades arithmetic and book-keeping are necessary. The children buy seeds, receive a bill for them, enter the bill in a blank account book and preserve the original as a voucher. They sell vegetables, make out bills for what they sell, collect outstandings, deposit the collections in a bank, pay for the seeds they purchase by cheques, and in these and similar ways learn all the business forms of every-day life. The school garden also furnishes ample material for drawing and colour work all the year. There would also arise in gardening incidental questions of what is right and what is wrong, of the rights of neighbours, of the rights of property, which would afford opportunities of lessons in manners, morals and religion. In the school, the practical activities of life should be the basis of teaching, the three R's being taught incidentally and in connection with concrete instances of practice.

For elementary schools in India the school garden is invaluable as a centre of correlation for Kindergarten activities and nature-study, and for providing manual training and also a basis for commencing the study of the elements of agriculture after the child has attained the age of eleven years. For young children very small plots, a square yard or two in size, for growing a few flower plants will suffice. For boys of eleven commencing the study of agriculture, separate plots about a square rod in size measuring $30' \times 9'$ or $27' \times 10'$ is required, besides a seed plot and a fruit plot.

In the model elementary school attached to the Mysore Normal School, all Kindergarten exercises are centred round the school garden up to the III or highest primary standard, which may be continued to the V standard. Practical agriculture is taught on the school farm after the Lower Secondary Examination is passed. The subject of school gardens and nature-study will be treated at length in a separate report, should I find the time to write it in the near future. In a country where agriculturists form 66 per cent of the population, nature-study and the elements of agriculture require no advocacy for their extreme usefulness in life. For disciplinary use in cultivating accurate habits of observation and providing manual training of a suitable character their value cannot be surpassed. I regret that, before laying down the reins of office, I have not had time to institute regular school gardens for rural schools in Mysore. No improvement of primary education seems to me of such great importance as the formation of school gardens in connection with all elementary schools, especially when it is remembered that more than 95 per cent of the pupils proceed no further in their education after leaving the village or taluk school.

It is commonly asserted somewhat hastily as an obvious truth by public writers and speakers that the elements of agriculture should be taught in all village schools, even if they are what are called one-room schools and have only one teacher. These advocates of the teaching of agriculture are apparently little aware of the difficulties of carrying out their favourite idea. In the first place, the teacher must be one who has been specially trained for the teaching of the subject. Secondly, it is too early to introduce the teaching of agriculture into the elementary curriculum, which usually lasts from the sixth year of age to the eleventh, the pupil being neither fitted mentally to enter upon the scientific, though elementary, study of agriculture, nor physically able to perform the industrial work of practical agriculture. And, thirdly, no agricultural instruction can succeed which is not adapted to the local

conditions nor limited to the capacity of the pupil even at the age of eleven. The Committee appointed by the National Council of Education of Boston to report on Industrial Education in Schools for Rural Communities states in its Report of July 1905 that "the attempt to give instruction in the elements of agriculture in the rural district schools has been made at different times in this country and in other countries. Up to date, the experiment has not been successful to any considerable degree throughout any great extent of territory. Here and there individual teachers have, under somewhat unusual conditions, succeeded to a reasonably degree, but generally the experiment has resulted in failure. It has been tried in France, in Ireland, in Canada, and here and there in other foreign countries over limited areas. France, Ireland and Canada have all abandoned the experiment because of its failure to meet expectations." In the opinion of the Committee, therefore, it is a most serious mistake to require by law that every country school teacher shall teach the elements of agriculture. The Committee therefore suggests that teaching on the line of nature-study may be attempted by competent teachers on approved methods for the first five school years which correspond to the five Vernacular standards of village elementary schools in Mysore, and then the pupil may be taken through the elements of agriculture in the next two or three years, which correspond to Forms II and III of Anglo-Vernacular Taluk Schools in Mysore. The Government of India, too, in their Resolution on Indian Educational Policy of 1904 state that "the aim of the rural schools should be, not to impart definite agricultural teaching, but to give to the children a preliminary training which will make them intelligent cultivators, will train them to be observers, thinkers, and experimenters in however humble a manner." Mon. Rènè Leblanc, Inspector-General of Public Instruction in France, gives a similar opinion in his work on "Agricultural Education in Primary Schools for Boys."

This is not the place for describing at length the methods of nature-study or giving specimens of nature-study lessons. It will suffice to say that nature-study must be closely related to objects and phenomena in the immediate environment of the pupil, and that the teacher should avoid the giving of mere information. He should, however, make the child observe accurately and find out facts for himself with as little guidance as may be necessary to arouse his interest. The three main subjects of nature-study are (1) simple facts of physiography about the earth, sky and scenery or conformation of the neighbouring region, (2) animals, and (3) plants. One or two periods a week should be devoted to this study.

Nine subjects of nature-study may be taught in each standard in a year, schemes of nine subjects being prepared for the guidance of village school teachers by the highest Normal School or College of the Province.

After a course of nature-study in the first five school years or standards, when the child attains the age of eleven, the elements of agriculture may be taught in the sixth and seventh school years or in Forms II and III. The teaching should be of the kind of nature-study, and not strictly scientific instruction such as is given in an Agricultural High School preparatory to the work of an Agricultural College. The Boston Committee suggests the following outline of subjects for the sixth and seventh school years :—

SIXTH YEAR.—FIRST HALF : THE AFFAIRS OF AGRICULTURE.

The place that the farm occupies as a part of the community life. What the farmer's business is ; what he does ; what he sells ; how he spends his year.

What is the nature or kind of agriculture of the particular region.

What outside help the farmer has ; good roads ; telephones ; experiment stations ; colleges ; markets. Gather rough statistics from the farmers of the neighbourhood. Write descriptions of the farms of the district as to history, size of buildings, etc.

SIXTH YEAR.—SECOND HALF : THE SOIL.

Experiments as to the physical conditions and texture of the soil. Soils of the neighbourhood and their classification.

Let the pupil classify the soils on his own farm and make a chart as to the soil distribution.

General ways in which the soil is improved as to ploughing, tilling, rolling, covercropping, fertilising, and the like.

SEVENTH YEAR.—FARMING SCHEMES AND CROPS.

The general lay-out of the farm ; rotation schemes and mapping. Farm crops ; the products themselves to be studied, sometimes in the school room. Ears of corn, for example, may be studied and 'judged' as a part of the school exercises. The same may be done with potatoes, grains and fruits.

The crops may be studied as they are grown in the community ; let each child report on the crops and the cropping schemes of his own farm.

If the instruction is continued into the *eighth school year*, it should relate to farm animals. The following outline is suggested :—

What animals are a part of the farm enterprise and why. What relation these animals bear to rotation of crops or other farming

schemes. Relation they bear to the fertility of the land. Relative importance of different kinds of animals and why they are reared.

Some general studies of the different breeds of animals and also 'points' of specific animals and something of the judging of animals.

Some observations may be made on feeding and the like.

The details of the above scheme should be worked out in accordance with the local conditions. Along with the elements of agriculture, wood-work should be taught in Forms II and III, and drawing and the usual Kindergarten exercises should be taught along with nature-study in all the lower classes.

It may be of use to refer briefly to suggestions based on those embodied in Dr. Dopp's book for the benefit of teachers who have not been provided with expensive equipments. The want of materials ready to hand should encourage the teacher to lead the pupils into direct contact with nature so that they may explore their environment. A small beginning may be made with one period a week for such work which may be fixed at first out of school hours, and then gradually brought into the curriculum as an organic part of it in close relation to every subject taught. The children may themselves be made to choose the practical work they would like best. *Sand* is easily procurable everywhere, and a large sand tray, which can be prepared without much difficulty for use in the class room, would be an invaluable means of illustrating geographical facts and relations, and such phases of history as have close relation to geographical features. *Clay* can be easily obtained everywhere and the children can themselves prepare it for use by treading, washing and kneading it. They would also supply a barrel or jar to hold the clay, and smooth boards or pieces of oil cloth on which to model. *Stones* shaped as natural tools or weapons, for cutting, pounding and grinding can be picked up in great varieties in quarries. For practical lessons in the *textile industry*, which is so closely related to history, geography and nature-study, tough barks which can be shredded into *fibres*, *willows*, *canes*, *osiers*, *grasses*, *rushes*, *reeds*, and *strips of palm leaves*, all of which abound in India, can be easily collected. The grasses and rushes of Kadakola near Mysore have been utilised by a backward tribe for making mats and baskets of great usefulness and beauty, and can be availed of for similar work in elementary schools. The Virarajendrapet Elementary School in Coorg exhibited excellent specimens of mats, trays, boxes, baskets and ropes made of grasses, rushes and fibres at the Mysore Educational Exhibitions of the last two years. For *weaving* with Berlin wool or yarn a simple *loom* can be devised. In its simplest form the loom may be merely a rectangular piece of

cardboard with notches cut at either end in the smaller sides to carry the warp threads, or it may be formed of a strip of wood about a foot long and six inches broad, with two upright pieces of wood from four to six inches high fixed at the two ends carrying a row of brads or tacks on the top round which the warp threads may be wound. A small wooden frame with a row of brads or tacks at either end will also do. These simple looms can be made by the children themselves and placed on their laps when they are weaving. A cardboard heddle may also be made and brought into use by the children. *Cocoanut fibre* and *shells* can be utilised in numerous ways for making cheap and useful articles. The dry *leaves* of certain trees after they fall off can be washed and stitched with dry needles or sticks by children into cheap cups and trays for household use. Tags of *wool* can be easily gathered from sheep-shearing farms. *Flax* can be grown in the school garden. Roots, barks, flowers and fruits which yield *natural dyes* as well as coloured earths and minerals can be collected without much difficulty, and practically used for dyeing cloth with the help of an oil stove. The Hole-Narsipur Weaving Institute in Hassan District has familiarised the boys of the neighbouring school with natural dyes and the processes of dyeing. The same institute has introduced the weaving of tapes as a manual occupation in elementary classes. The *weaving of cloths and rugs* on looms roughly prepared from cheap materials by the children themselves can be introduced into most elementary schools. The *spinning* of wool and cotton and *weaving* of rough country blankets and cloths can be learnt by a teacher who takes interest in his work and taught to children of elementary schools. There are villages near Mandya and in Chitaldrug and other districts of Mysore where almost the whole population is composed of weavers. In connection with lessons in geography, the production, manufacture and distribution of foods suggest a great variety of industrial activities, such as field trips, excursions, gardening, visits to mills, bakeries and grocery stores. With a few cooking utensils and oil stoves *cookery* can be taught in girls' schools along with *sewing* and *knitting*. Models of various kinds of shelter such as huts, and dwelling houses of the primitive type can be made by children with the use of the simplest tools like the pocket knife, and a small hammer and saw. *Building blocks* can be procured from carpenters' shops and places where timber is worked up. Even a pile of discarded bricks can be turned to use as *building material*. Gradually the use of tools may be introduced. The Ethical Culture Schools of New York provide a work-bench and a set of tools for each class room in addition to the regularly equipped manual training rooms for the purpose of helping the

children in manual work. When children begin to search for materials, it will be surprising how many they can find from their immediate neighbourhood. "Such objects as stones, bones, horns, seeds, nuts, acorn cups, rose-hips, river and sea shells, and the shells of gourds and other hard-shelled vegetables, all can be used in a variety of ways which will unite the child by stronger ties to his natural and social environment. The neighbouring farmer, merchant, lumberman or manufacturer may easily be induced to supply the by-products of his industry to be used by the children. The *school garden* is another large source of materials. Schools in different parts of the country can also arrange to exchange materials collected from their neighbourhood. During vacation time children may be given specific directions to make collections. They may be taught to collect, preserve and mount pictures illustrative of modes of living and industrial processes wherever found. An *industrial museum and library of reference books* should be formed in each school to which all the children should be encouraged to contribute. In every province of India there are backward races like forest tribes living in remote parts, whose modes of living may be studied by teachers. Many of them produce articles for domestic use of grasses, barks, shells of gourds, which are ornamented with coloured patterns and pictures, beads and sea shells. These can be utilised for the manual occupations of children with considerable benefit.

For schools in Mysore the following programme of manual training is suggested. A tentative scheme without gardening is at present in operation in many schools:—

III, IV and V Vernacular Classes, or I, II and III Anglo-Vernacular Classes.	Cardboard work (two periods), and gardening and nature-study (two periods).
IV and V Anglo-Vernacular Classes, or II and III Forms.	Sloyd wood-work (two hours), and gardening and elements of agriculture (two hours).
IV Form (High School)	Sloyd wood-work (two hours).
V Form (High School)	Wood-turning and carving (two hours) and practical work in Science Laboratory (one period).
VI Form (High School)	Practical work in Science Laboratory (one or two periods).

The practical activities of the Kindergarten should be continued from the Infant Class or Kindergarten to Vernacular Standard V or Anglo-Vernacular Standard III according as a school teaches a vernacular only or English with a vernacular language. A tabular statement showing how the practical work of all classes up to the V Vernacular or III Anglo-Vernacular Class can be arranged is appended.

Most of the work shown in the statement is done in the model elementary school attached to the Mysore Normal School. Gardening out of doors and the cultivation of plants on the school room window or class table in boxes and glass bottles for the purposes of observation and study should be the central occupation of an elementary school. The time table should provide 45 minutes divided into three periods of 15 minutes each or two half-hour periods a week for gardening, for care of school pets, for observation of weather, etc. School-gardening on small plots affords the best means of carrying out nature-study lessons in all standards up to the V, and, what is more important, nearly all practical work in these standards can be correlated with gardening and nature-study. The elements of agriculture can take the place of nature-study lessons after the V standard is passed. In the school garden individual plots measuring about a square rod should then be provided for each pupil of the age of eleven as well as large common plots for the cultivation of crops, all manual work on the plots being carried out by the pupils.

Reading, writing and arithmetic should not be prescribed for children under six years of age. They should be wholly occupied with nature-work, Kindergarten occupations, games, stories, and free play. For children above the age of six years the reading and conversation lessons and composition should be correlated with nature-study as far as possible. Drawing and clay-modelling are most important subjects and should be continued to Vernacular Standard V. These subjects with brush-work and other practical work should, as far as possible, be correlated with nature-study, reading, geography and history. "Let number lessons be based upon the number and size of the beds and paths in the garden, upon the height of the various plants, upon the number of buds and full-blown flowers upon a stem, the quantity of seed yielded by various plants, the amount of time required to dig up the potatoes in one bed, in two or more beds of equal size, etc., and arithmetic will appeal with ever new interest to child and teacher alike." Measuring, weighing, money values may all be taken in connection with nature-work.

The occupations of the Infant Class and Standard I given in the table should not be taken up all at the same time, but those that are selected should be taught for parts of the year or term in succession or in alternate years. The time to be devoted in the week to some subjects is indicated, but the teacher's experience may suggest modifications. In the teaching of practical work, success will depend on the teacher who must be trained. As little help as possible should be given by him to the pupil. He should never do any part of the work himself. By questioning and less frequently by advice and guidance he should arouse the interest and thinking powers of the pupil and put him in the way of doing the work by his own intelligence.

Tabular statement showing practical activities from the Infant Class or Kindergarten to Standard V.

	Infant Class or Kindergarten Age 5—6	Standard I Age 6—7	Standard II Age 7—8	Vernacular Standard III or Anglo-Vernacular Standard I Age 8—9	Vernacular Standard IV or Anglo-Vernacular Standard II Age 9—10	Vernacular Standard V or Anglo-Vernacular Standard III Age 10—11
Drawing ...	(1) Mass drawing with crayon of simple objects such as the sun, the moon, eggs, etc., on wall black boards or free-arm boards. (2) Mass drawing with crayon of leaves of familiar plants. (Three half-hours.)	(1) Free-hand and free-arm line drawing with crayon of easy and familiar objects from the objects themselves. (2) Free-hand line drawing with crayon of leaves of irregular shape in connection with the nature lessons. (3) Illustrations of stories told or of stories in Reading Book. (Three half-hours.)	(1) Free-hand and free-arm line drawing with pencil or crayon of familiar objects from flat examples. (2) Drawing of bunches of leaves and fruits. (3) Illustrations of stories told or incidents in Reading Book. (Three half-hours.)	(1) Free-hand drawing with pencil of familiar objects, bunches of leaves, fruits, flowers, etc., from memory. (2) Illustrations in connection with reading, conversation lessons, geography and history. (Two periods of 45 minutes each.)	(1) Free-hand drawing of familiar objects or plants in greater detail. (2) Drawing of symmetrical figures and designs. (3) Copying of designs from the flat. (Two periods of 45 minutes each.)	(1) Drawing to scale with rulers and compasses. (2) Composition drawing ... (3) Drawing of decorative designs. (Two periods of 45 minutes each.)
Clay-modelling	Modelling of easy natural objects in connection with nature-study lessons. (Two half-hours.)	(1) Modelling of single leaves, fruits, pods, etc., in connection with nature-study lessons. (2) Modelling of pottery ... (Two half-hours.)	(1) Modelling of fruits, vegetables, stems, branches, bunches of leaves, feathers of birds, etc. (2) Modelling of small articles in common use. (Two periods of 45 minutes each.)	(1) Modelling of flowers and bunches of flowers in connection with nature-study lessons. (2) Modelling of the class room, school building, hills, villages, rivers, etc., in connection with geography. (Two periods of 45 minutes each.)	(1) Modelling of animals ... (2) Modelling of a plot of ground in the vicinity of the school showing natural configuration. (Two periods of 45 minutes.)	(1) Modelling illustration of a story. (2) Modelling a relief map of a village, town or province. (Two periods of 45 minutes each.)
Brush-work ...		(1) Blobbing, line drawing and washing. (2) Exercises in colour-mixing. (3) Painting of easy natural objects such as broad leaves of simple structure. (Two half-hours.)	(1) Painting of flowers, bunches of leaves, etc. (2) Painting of simple designs (Two half-hours.)	Painting of natural objects with light and shade.		
Stick and ring-laying, string-laying, seed-placing.	(1) Laying simple object forms. (2) Laying letters of the alphabet.	(1) Laying more difficult object forms. (2) Laying simple designs ...		.....		.....
Tablet-laying	Laying of simple object forms with squares.	(1) Laying of object forms with triangles, circles, etc. (2) Laying of flooring designs.		.....	.....	
Fraying	(1) Drawing out a given number of threads from a piece of bunting. (2) Making mats, brushes, etc., of threads so drawn out.			.....	.....	.....
Bead work	Stringing coloured beads ...	Stringing stated numbers of beads of different colours, in correlation with number work.	Making useful objects such as chains, necklaces, or representations of objects.		.....	.....
Building with bricks ...	(1) Building representations of simple objects. (2) Laying of forms of beauty, gifts III and IV.	(1) Construction of representations of objects, huts, buildings, forts, towers, etc. *(2) Laying of designs, gifts V, V B and VI.*		.....	.....	.....
Interlacing slats	Making simple object forms such as garden fence, fans, etc.	(1) Making more complex object forms. (2) Interlacing designs ...		.....	.....	.....
Spinning and weaving ...		(1) Washing, carding, dyeing wool. (2) Cleaning cotton ... (3) Spinning cotton and wool.	(1) Dyeing yarn and wool ... (2) Making a loom ... (3) Weaving plain cloth ...	(1) Making a shuttle, heddle and warp stick. (2) Weaving with coloured thread.	Weaving a rug or carpet ...	.....
Cane-working and basketry. Cord work.	.....	.....	(1) Weaving of bamboo chicks and mats. (2) Rope and net weaving ...	(1) Weaving of bamboo baskets. (2) Making of ornamental flower baskets of coloured rushes and grasses. (3) Making rattan trays ...	.....	.....
Sand tray work	(1) Forming letters with a clean finger in clean sand. (2) Illustrating land and sea, sea coast, hills, mountains, rivers, table-land, volcanoes.	(1) Illustrating more geographical terms. (2) Plans of the school house, school garden and surroundings.	(1) Representative scenes of an Indian village, of a tank and fields, of pasture lands. (2) Representation of caves, forests, huts, etc.	(1) Representative scenes of (*a*) pastoral life, (*b*) agricultural life. (2) Representation of a geographical area or province.	.....	.....
Paper-folding	Folding of simple forms of objects.	(1) Folding of more difficult forms of objects. (2) Folding of designs ...			.....	.....
Paper-cutting ...		Cutting of simple object forms. Free cutting as well as drawing and cutting to be practised.	(1) Cutting of more difficult natural forms. Free cutting as well as drawing and cutting to be practised. (2) Cutting of designs. Drawing and cutting to be practised.	.....	.....	
Cardboard work			.....	First year's course as given in Rich's book on paper sloyd. (Two half-hours.)	Second year's course as given in Rich's book. (Two half-hours.)	Third year's course as given in Rich's book. (One hour a week.)
School-gardening	Gardening ... (Three periods of 15 minutes each.)	Gardening ... (Two half-hours.)	Gardening ... (Two periods.)	Gardening ... (Two periods.)	Gardening ... (Two periods.)	Gardening (Two periods.)

APPENDIX.

The following is a brief narrative report of the work done by me during the period of my deputation or study leave in 1906-07. The Government of H. H. the Maharaja of Mysore were pleased to grant me by Order No. Fl. 8521-3—Ed. 350-05-2, dated 11th June 1906, three months' privilege leave combined with four months' furlough. During the period of my furlough, which commenced on 12th September, I was deputed " to study in Europe and if possible also in America the systems of primary education including Kindergarten instruction and the special courses for rural schools including nature-study and elements of agriculture, also the ways in which school gardens are maintained and instruction given in them especially in France." I was also to study the systems of technical instruction both in the United Kingdom and on the Continent and of manual instruction in schools of general education. I availed myself of the leave from 12th June 1906. Although the period of my privilege leave was chiefly spent in rest and recuperating my health at Matlock and Buxton, I consulted educational authorities, arranged a programme of work, read educational reports and codes, and visited several important schools during that period.

On the day of my arrival in London I was fortunate enough to meet Sir William Ramsay, K.C.B., F.R.S., with whom I had been previously acquainted. On hearing of the object of my visit to England he very kindly sent me the next morning letters of introduction to Professor M. E. Sadler, Drs. Heath and Ogilvie of the Board of Education, and Principal Laurie. I saw Dr. Heath and Professor M. E. Sadler by appointment, who gave me most valuable help in drawing up my programme of work. Mr. H. W. Orange, Director-General of Education in India, also very kindly sent me a letter of recommendation to Dr. Heath, Director of Special Inquiries and Reports of the Board of Education and Educational Correspondent to the Government of India. Sir William Lee Warner, K.C.S.I., of the India Council, too, kindly recommended me to the Board of Education. Professor M. E. Sadler was so good as to give me written notes for my guidance in reply to my inquiries about the best institutions that I should visit. Dr. Heath considered the time at my disposal too short for the work I put down for myself. He, however, and his Assistant Mr. A. E. Twentyman cordially gave me most valuable help and introductions at every step during my stay in Europe. During the period of my privilege leave for about a fortnight I attended the Board of Education Library in Cannon Row to consult various educational books and reports on the subjects of my special study.

During the period of my privilege leave I visited King Alfred Society's School, 24 Ellerdale Road, Hampstead, under the Principalship of Mr. James Russell, which is a very remarkable institution in many ways

and provides instruction for both boys and girls on the latest pedagogical principles including nature-study and manual training. On the 7th September I visited two rural schools in Staffordshire at Mayfield and Ellastone near Ashbourne, both of which have school gardens, in company with Mr. Graham Balfour, Director of Education, Staffordshire C. C. Schools, and studied the whole system of education adopted in Staffordshire on the following days. I also arranged for visits to the Leeds and Bradford Education Committees' Schools from the 18th to the 21st September.

At *Leeds* I visited in company with Mr. Bearder, Chief Manual Instructor, and other educational officers, the following schools. Mr. Graham, the Secretary, very kindly deputed his officers to help me, one of them by turn being always with me during the day and evening:—

Kirkstall Road School.
Central High School.
Thorsby High School.
Central Technical School.
An Evening Preparatory School.
A Branch Artisan School.
An Advanced Evening Technical School.
The Central School of Art.
The Cockburn High School.
Queen's Road Infant and Elementary School.
The Holbeck Institute Trade School.

Besides visiting these schools and taking copious notes of the work done in them, I studied the whole system of general and technical education which has been most admirably planned for the city. I had more than one interview with the following officers who gave me every help and information:—

Mr. James Graham, Secretary (Higher Schools Section).
Mr. W. Packer, do (Elementary Schools Section).
Messrs. Tait and Webster, Inspectors, Elementary Section.
Mr. Alexander McAdie, Manual Work Teacher.
Mr. S. Bearder, Chief Manual Instructor.
Mr. McWeeny, Inspector.
Mr. H. W. Dicken, Head Master, Armley Council School.

At *Bradford* I visited the following schools:—

Belle Vue Secondary Boys' School.
Do Secondary Girls' School.
Grange Road Elementary Mixed School.
Do Infants' School.
Do School for Defective Children.
Do Housewifery School.
Hanson Secondary School for Pupil Teachers.
Do do for Boys.
Do do for Girls.
City of Bradford School of Art.
Higher Evening Classes held in Carlton Street Secondary School.
Allerton Elementary School.
Carlton Street Secondary Day Schools for Boys and Girls.
Carlton Street School for the Blind.

Carlton Street School for the Deaf.
Bradford Technical College.
Bradford Incorporated Institution for the Blind.

I had more than one interview with the following officers:—

Mr. Thomas Garbutt, F.C.I.S., Secretary.
Mr. Robert Roberts, Chairman of the Education Committee.
Mr. Benjamin Pitts, Assistant Secretary and Superintendent.
Mr. William McWeeny, Elementary Education.
Mr. James Tipping, Superintendent of Manual Instruction and Drawing.
Mr. Abraham Barker, Superintendent of Evening Schools.

The days spent in Leeds and Bradford were full of work. I had to be out before 9 A.M., and the day's work was not finished till 10-30 P.M. The rate at which I worked was, however, very fatiguing. I cannot sufficiently thank the Secretaries and other educational officers for all the valuable help they gave. I returned to Buxton with a large number of reports, programmes, syllabuses, etc., which it took me several days to study. At each of my visits through the whole of my study leave I made it a point to take copious notes, which I copied fair into my note books afterwards at home.

The experience gained at Leeds and Bradford of the cost of travelling, hotels, cabs, etc., convinced me that the actual travelling expenses sanctioned which were limited to £1 a day, and the increase by one-sixth in my furlough allowance, were quite insufficient for the expenses that had to be incurred, and references to Government were necessary, for granting the same allowances that are given to British Educational officers on similar duty. The reply to my letters of 31st August and 3rd September and a telegram on the subject did not reach me till the middle of November. In the meanwhile much valuable time was lost, and I had, to my great regret, to abandon my journeys to Edinburgh, Glasgow, Liverpool, Manchester, Birmingham and selected schools like Bedale's School in Hampshire, Oundle School in Northamptonshire, etc., as it was impossible to continue my work without great loss on the travelling allowances that were sanctioned. I had to content myself, therefore, with visiting schools in London.

On the 25th September 1906 I visited the Department of Applied Science of Sheffield University on my way from Buxton to London. Professor W. M. Ripper, M.I.C.E., who is Principal of the Technical Department and Dean of the Faculty of Applied Science, kindly showed me over all the Engineering Departments.

In the first week of October, with the help of the officers of the London County Council, I commenced my visits to the Council Schools. I visited the Manual Work Centre attached to the Honeywell Road L. C. C. School on the 5th October, and revisited the same school on the 19th to study the methods of teaching science and mathematics in the higher classes. On the 6th I inspected the Manual Work Centre attached to Page's Walk L. C. C. Schools, and on the 8th I visited the L. C. C. Manual Work Centre in Upper Hornsey Road.

On the 9th of October I visited the famous Sesame House in 43A Acacia Road, St. John's Wood, Principal Miss Schepel, which was highly recommended to me by the Board of Education as one of the best training schools in England for Kindergarten mistresses with a model Infants'

Kindergarten attached. On the 10th October I visited the Incorporated Froebel Educational Institute, Talgarth Road, West Kensington, Principal Miss Esther Lawrence. On the 17th October I visited the Stoke Newington L. C. C. Infants' School in Church Road, Head Mistress Miss Snowdon, which had been recommended to me for its Kindergarten teaching.

On the 22nd October I visited the City and Guilds Finsbury Technical College, Principal Dr. Sylvanus Thompson. The Principal and Mr. Brophy, art instructor, showed me over the whole College. On the 24th October I visited the Basnett Road L. C. C. Metal Work Centre, Lavender Hill, and in the afternoon of the same day I visited the Shoreditch Technical Institute, Pitfield Street, N, Director Mr. Shadrach Hicks. On the 25th October I visited the Regent Street Polytechnic.

On the 26th October I visited Chelmsford in Essex to study chiefly the instruction in gardening, for which the county is famous. Mr. J. H. Nicholas, M.A., Secretary of the Essex Education Committee, took me round to the garden, class rooms and biological, chemical and physical laboratories, libraries and museums, and gave me copious information about instruction not only in horticulture and agriculture but also in natural and experimental science. He also gave me many publications on the whole system of public instruction arranged by the County Council.

I visited the Shoreditch Technical Institute again on 30th October to see more carefully the classes at work.

On the 2nd November I visited Bedford College for Women, York Place, Baker Street, W, Principal Miss Ethel Hurlbatt, M.A., which is one of the constituent colleges of the University of London.

On the 3rd November I had a long interview with Mr. E. M. Rich, who had lately been Inspector of Schools in Ireland, but was then unattached Officer of the London County Council Schools, on the subject of Manual Instruction in Ireland.

On the 12th November I visited the Centre for Domestic Economy attached to Plassey Road L. C. C. Schools, Head Master Mr. J. Gardiner, who took me over the Cookery, Laundry and Housewifery Sections.

On the 14th November I had a long interview with Mr. T. S. Dymond, Inspector of the Board of Education for nature-study and school-gardens, who gave me most useful information. I took copious notes of his views and recommendations. He recommended several schools distinguished for nature-study for me to visit. For want of time I had to abandon the idea of visiting them, with great regret, except one, *viz.*, the L. C. C. Infants' Department of the Invicta Road L. C. C. School, Blackheath, S. E., of which Miss L. R. Latter was Head Mistress. Miss Latter was then on a visit to America. I visited her school more than once on my return from America, when she too had returned.

On the 15th November 1906 I visited the Manual Training Workshops of the Hornsey C. C. Elementary School, which are under Mr. J. C. Hudson, Superintendent of Manual Instruction of the Hornsey Education Committee. Mr. Hudson, besides showing me the work done in these workshops, gave me useful information and a report about Manual Instruction in America, which he had recently visited.

On the 16th November I visited the Felsted Public Schools in Essex, Head Master the Revd. Frank Stephenson, M.A., which is distinguished for its manual work and Engineering Departments.

On the 17th November I had a long interview with Mr. Wilfred Mark Webb of Odstock, Hanwell, W., who is an authority on nature-study. He recommended some schools distinguished for nature-study for me to visit. But I could not visit them for want of time, as I had to leave for America almost immediately, so that I might have at least three weeks' time in America before the school closed for Christmas. I collected much information in England about education in the United States during the next few days before starting for America on the 27th November from Liverpool.

I arrived in New York on the afternoon of Saturday the 1st December, but was unable till the 4th December to see President Nicholas Murry Butler of the Columbia University, who was out of town for the week-end. President Butler, when he was on a visit to England at the time of the boat race between Harvard and Cambridge, had kindly promised to give me every help. He gave me a printed pamphlet recommending the best schools in America compiled for the guidance of the 500 English teachers who took advantage of Mr. Moseley's benefaction to visit America. The pamphlet was of great use to me. Dr. Butler introduced me to Professer M. A. Bigelow of the Teachers' College, Columbia, for information regarding nature-study, and to Professor C. R. Richards of the same college for information regarding manual instruction.

Professor Bigelow, who is the editor of the Nature-Study Review strongly recommended me to visit the Cornell University, which has done much for nature-study, the Hampton Institute in Virginia, and the Ontario Agricultural College at Guelph. He also advised me to see Professor Hodge of Clark University in Worcester, who has original ideas about nature-study. He recommended schools and school farms in New York, and kindly gave me introductions to Principal Bailey, Miss Mac Closkie, Mrs. Comstock and Mr. John Spencer of Cornell University, to Professor Hodge of Clark University, and Professor Macready of Guelph. Principal Bailey and Miss MacCloskie had already left Ithaca for the holidays at the time of my visit to Cornell University, but I saw Mrs. Comstock and Mr. Spencer, and the former was kind enough to go about with me on two days and give me most useful information. I could not go to Worcester, and when I reached Guelph, Professor Macready had left, but one of his Assistants gave me the necessary help. Professor Bigelow also recommended the schools I should see in New York for nature-study.

Professor Richards recommended the best Manual Training High Schools in the United States which I should try to visit within the limited time at my disposal, and also the schools in New York distinguished for their manual training and Kindergarten work.

The same morning I also saw Professor John Dewey, who gave me introductions to President Baldwin of the State Normal School at Hyannis and to the Heads of the Speyer School and the Ethical Culture School in New York.

While waiting to see President Butler, I saw on the 3rd December, Superintendent Maxwell of New York, to whom I had a letter of introduction from the Board of Education of England. He in his turn gave me a general letter of introduction to the Superintendents of all other States. In his office I met Mr. A. Moseley, with whom I had a most interesting exchange of ideas about education in India.

On the 5th December I visited the Evening Trade School of Brooklyn, Director Dr. Larkins. On the 6th December I paid my first visit to the Horace Mann Elementary School, and had a long interview with Professor Arthur Dow of the Teachers' College, Columbia University, to whom kind friends from India had given me letters of introduction. On the 7th December, in company with Professor Dow, I paid a second visit to the Elementary Department of the Horace Mann School, and also visited the Speyer School. In the afternoon Professor Dow took me to the Pratt Institute, Brooklyn, one of the best Technical Institutions in America. We also visited the magnificent Pratt Free Library.

On Monday the 10th December, I visited the Ethical Culture School of New York in the morning, and the College of Mines, Columbia University, in the afternoon.

On the 11th December I spent the whole day in the Brooklyn Manual Training High School, Principal Dr. Larkins, which is one of the foremost and best equipped Manual Training High Schools in America.

On the 12th December I visited the Baron De Hirsch Trade School and the Hebrew Technical Institute of New York, and had an interview in the afternoon with Dr. Haney, Superintendent of Manual Training to the New York Board of Education. The same evening I left for Philadelphia in company with Professor Dow.

At Philadelphia on the 13th December Professor Dow and I visited the famous School of Industrial Art of the Pennsylvania Museum, which is a vast institution and comprises various departments including the Philadelphia Technical School. On the same day we visited the Drexel Institute of Art Science and Industry, Philadelphia, another world-famous institution. The same evening Professor Dow returned to New York, and I left for Washington.

At Washington on the 14th December I had an interesting interview with the Honourable Elmer Elsworth Brown, Commissioner of Education, who kindly gave me a general letter of introduction to the heads of all schools in the United States, and deputed one of his office assistants to go with me to the principal Manual Training High Schools in Washington. I visited the McInley Manual Training High School and the Business High School, and left the same night by steamer for Hampton.

At Hampton on the 15th December I spent the whole day at the famous Normal and Agricultural Institute for the education of Negroes and Red Indians, Principal Dr. H. B. Frissell, which I have fully described in my Special Report. The same night I took steamer back to Washington, and after halting for twelve hours at Washington on the 16th took the express train to Boston at night.

I arrived at Boston on the morning of the 17th December, saw the Superintendent of Education and visited Miss Wheelock's Training School for Mistresses during the day. I spent the evening at Mrs. Olle Bull's, where I met Dr. Reddie of Abbotsholme. On the morning of the 18th, in company with Dr. C. Hanford Henderson, Lecturer on Manual Training at the University of Harvard, to whom I had letters of introduction from India, I visited the famous Sloyd Training School maintained by Mrs. Queincey Shaw, Principal Mr. Gustaf Larsson. It is the best school in America for the training of Teachers of Sloyd. In the afternoon I visited, in company with Dr. Henderson, the Mechanic

Arts High School of Boston. An account of both these schools is given in the Special Report. On the morning of the 19th December, I paid a second visit to the Sloyd Training School to study its work carefully. Before I left Mr. Larsson in the afternoon, he signified his willingness to come to Mysore for a period of six months to train teachers in Sloyd if he was asked. It was far better to bring out a first rate teacher like Mr. Larsson to India for a limited time than to send twenty Mysorean teachers to America for training. In the afternoon I visited the Mechanic Arts Branch of the Massachusetts Institute of Technology in Garrison Street, Boston, and the Electrical Engineering Branch of the Mechanics Charitable Association's Trade School. On the morning of the 20th December I visited Miss Gray's Kindergarten School in Huntingdon Avenue, and the Boston Normal School, Head Master W. C. Boyden, A.M. In the afternoon I saw Superintendent Brooks of Boston and Superintendent George Martin of Massachusetts State, and visited the rooms of the Massachusetts Horticultural Society of Boston and the Library of the Society. On the night of the 20th I left for Ithaca.

The afternoon of the 21st and morning of the 22nd December I spent in the Cornell University, where Mrs. Comstock and Mr. John Spencer, usually called "Uncle John" by the children, explained to me the system of nature-study introduced by the University, and the vast amount of correspondence carried on by Mr. Spencer with school children all over the district on nature-study subjects and on the questions sent to them and their answers. Mrs. Comstock explained how naturalists' clubs were formed among the school children, how the making of school and home gardens was encouraged, and how exhibitions of the produce of children's gardens were regularly held. I was sorry to miss Professor L. H. Bailey, Professor of Agriculture and Nature-study, who had left for the holidays. I left Ithaca on the afternoon of the 22nd for Toronto and Guelph in Canada.

I reached Guelph of the morning on the 24th December. Professor McCready, Professor of Agriculture, had already left for the holidays. His assistant Mr. J. E. Hewitt was kind enough to attend to me. Mr. John Evans, Professor of Manual Training in the Macdonald Institute, was also away. But Mr. Painter, Instructor of Manual Training in the Macdonald Consolidated Rural School, took me to this school, which I have described in the Special Report. I returned to Toronto the same evening and returned to New York on the morning of the 27th December.

I left New York on the 1st January 1907, and arrived in London on the afternoon of the 6th, and found most schools in England closed for the Christmas holidays and not likely to get into working order till the last week of January. On the 7th January 1907, with a letter of introduction from the India Office I saw Dr. J. Struthers C.B., LL.D., Secretary of the Scotch Education Department, in his office at Whitehall. He did not advise me to go to see the Scotch schools for their manual training as there was not more of it in Scotland than in London, and agriculture was not taught in the rural schools of Scotland. For the next few days, I collected information about the best schools I should see on the continent on my way back to India during the few days at my disposal before leaving Marseilles on 13th February. I visited the Royal College for the Blind in Upper Norwood, Principal Dr. Campbell, a wonderfully accomplished and active American gentleman, himself blind. I saw Miss L. R. Latter at the Lyceum Club and visited her school in

Blackheath more than once. I was glad to find Miss Latter was willing to come to Mysore for a limited time to train teachers in Kindergarten methods and organise Kindergarten instruction in Mysore. I placed her in communication with Mr. Maconochie, who was then in London. Miss Latter gave me useful letters of introduction to educationists in Paris, Berlin and Zurich. I left England on the 23rd January 1907.

On the 24th January I called on Mon. Bedorez, Director of Primary Education in the Department of the Seine, and obtained his permission to visit Kindergarten schools (Ecoles Maternelles) and the Technical Schools (Ecoles Pratique) of Paris, saw Mademoiselle Bres and Madame Kergomard, Inspectress-General of Kindergarten schools, to whom I had letters of introduction, and visited Ecole Diderot at Paris, which is one of four famous technical schools maintained by the Paris Municipality that combine general education with technical subjects. On the 26th I went to Ecole Germain Pilon and Ecole Boulle, but in both places I was not allowed to inspect the work of the schools in the absence of the Director. On Monday the 28th January I visited again Ecole Boulle and in the afternoon visited Ecole Estienne. On the 29th I paid two visits to Ecole Germain Pilon. On the 30th I left for Berlin.

On the 1st February I saw Miss Lyschinska, an expert in Kindergarten instruction and intimate friend of Miss Latter, who was once in the service of the London Board. I visited on the 2nd February in company with Miss Lyschinska the Pestalozzi Froebel House in the morning, and the Yugendheim (or Home for young people), Pestalozzi Strasse 40, in the afternoon. I visited with Miss Lyschinska Handwerker Schule No. 1, Lindenstrasse, Berlin, on the morning of the 3rd February, and left for Leipzig in the afternoon of the 4th.

On the 5th February I visited the Stadtische Gewerbeschule and Maschinenbauschule in Leipzig. On the 5th I spent the whole morning in Dr. Alwin Pabst's Training College of the German Association for Manual Instruction. At night I left for Zurich, which I reached at 4 P.M. on the 7th.

On the 8th February I visited with Mr. Fritschi, a Deputy of the Federal Parliament and member of the Cantonal Council of Education, a Kindergarten, two elementary schools, a number of technical continuation schools, also the Pestalozzianum, which is an Educational Museum, the Arts and Crafts School, and the National Museum. Mr. Fritschi was very obliging and indefatigable. On the morning of the 9th I woke up with a severe chill and bronchitis, which made me quite ill and unable to visit any more schools in Zurich. The effects of the chill lasted for a fortnight. I left Zurich on the 11th for Marseilles and sailed from Marseilles for Bombay on the 13th February 1907. I resumed charge of my duties on the 4th March 1907.

On the 23rd April 1907 I submitted proposals for improving Kindergarten Instruction and introducing Manual Training into schools of general education in Mysore during 1907-08. I proposed to engage the services of Miss L. R. Latter, Head Mistress of the Invicta Road L. C. C. School, and Mr. Gustaf Larsson of the Sloyd Training School, Boston, for limited periods to train teachers and organise Kindergarten and manual instruction. The Government of His Highness the Maharaja were pleased to sanction my proposals and the necessary grants on the 1st June 1907. From that date for over two years I was busily engaged in organising normal classes for Kindergarten instruction and manual training, providing

apparatus, equipping Sloyd rooms, etc., in addition to the usual duties of my office. What work has been done has been detailed on pp. 2 and 20-22 of the Annual Report of Public Instruction for 1907-08 and in the concluding chapter of the Report for 1908-09. The latter report has been submitted to Government but not yet published. Miss Latter's death greatly upset the arrangements made for training teachers in Kindergarten Principles and Methods. Her place was taken by Miss Williams till April 1908 and then by Miss Hart. The Special Teachers and the Mysore Normal School in its vacation classes have trained more than 150 teachers in Kindergarten Principles and Methods as well as practical work in 1907 and 1908. For Manual Instruction two Sloyd Supervisors and twenty teachers were trained by Mr. Gustaf Larsson. They have all obtained good certificates from him and are doing excellent work, especially the Sloyd Supervisors. Nine Sloyd Centres have been opened at which more than 1,200 boys are being trained. During the last year 370 teachers have been trained in cardboard work. At the winter vacation classes and in the Normal Schools a large number of teachers will, it is hoped, continue to be trained every year.

The following books and reports have been published or are under preparation :—

1. Sloyd in Mysore by Gustaf Larsson.—(Published.)
2. Kindergarten Instruction in Mysore in 1907 and 1908, Vol. I — (Published.)
3. Kindergarten Instruction in Mysore in 1907 and 1908, Vol. II.— (In the press.)
4. Kindergarten Instruction in Mysore in 1907 and 1908, Vol. III.— (Under preparation.)
5. Special Report on Manual Training in Schools of General Education by H. J. Bhabha, M.A., Inspector-General of Education in Mysore.—(In the press.)

The organisation of training classes for teachers and of Kindergarten instruction and Sloyd in a large number of schools entailed so much additional work upon me that though I worked very hard it was not possible for me to write the three Special Reports I intended to publish. The one on Manual Instruction has just been sent to the press. It has been written under adverse circumstances while carrying on the regular work of the Department without sufficient help, at great sacrifice of my health and peace of mind. The other two Special Reports on (1) Kindergarten Instruction, School Gardens and Nature-Study, and (2) Technical Education, it has been quite impossible to write. I may perhaps write them under more favourable conditions in future.

As exaggerated ideas of the remuneration given to me for the special work during the periods of study leave seem to prevail, I think it necessary to state that the usual furlough allowance was increased by one-sixth of my pay or Rs. 200 from 12th September 1906 to 3rd March 1907, and at the same time the house-rent allowed to me was stopped. The travelling allowances given to me were barely sufficient, or even fell short of actual expenses especially in America.