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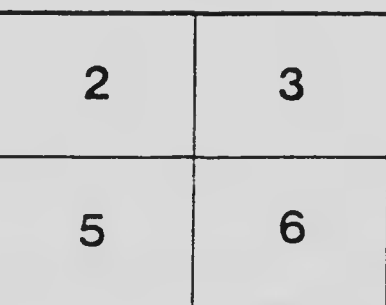
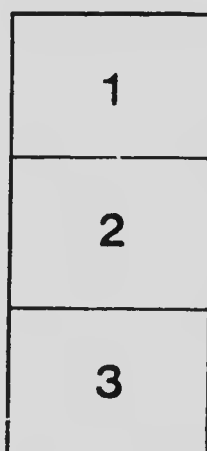
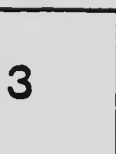
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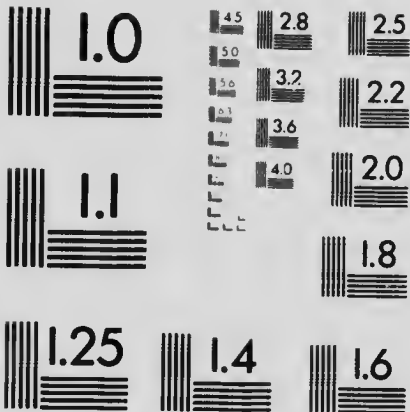
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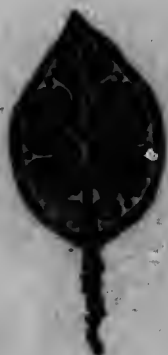




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**A Report on
Elementary Technical
Education.**



**BY W. S. ELLIS,
PRINCIPAL OF KINGSTON COLLEGIATE INSTITUTE.**



A REPORT
ON
ELEMENTARY TECHNICAL
EDUCATION

FOR
ONTARIO

BY

W. S. ELLIS,
PRINCIPAL OF KINGSTON COLLEGIATE INSTITUTE.

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A Report Regarding a Course of Study of a Technical Character for Public and High Schools.

A year ago I had occasion to spend some time studying the development and results of technical training and education in some of the primary and secondary schools of the Eastern States. By the kindness of Professor Robertson, director of the Macdonald Manual Training Schools, a reissue, in a revised form of the report, then made and distributed, is possible.

Explanatory.

Throughout this report the term **ELEMENTARY TECHNICAL COURSE** will mean a course of study that is first of all educational, but will at the same time tend to fit pupils, both by information acquired and training given, for the practical side of life's duties, whether the student is intending to adopt a professional, a mechanical or a commercial pursuit. The name is chosen, for want of a better one (though open to objection), to distinguish such a course from the merely academic studies which lead, in public schools to the Entrance, and in high schools to Departmental Matriculation and Leaving examinations.

Tendency of the Present Course of Study.

It seems scarcely open to question that the school life of the child should be a fitting for the mature life of the adult in its completeness. It follows from this that a broad and liberal school curriculum should make provision for giving students some preparation for entering the great industrial occupations of the country, so far as can be done without sacrificing educational efficiency. This does not mean the establishment of trade schools in any sense of the term, but it does mean the providing of such a course of study in the primary and secondary schools as will afford boys and girls an opportunity to fit themselves for intelligently taking part in commercial and manufacturing life, just as the present course fits them for professional callings. It is a reproach to the system

as we now have it, that its tendency is to turn the minds of pupils entirely towards the professions and away from the industrial pursuits. Probably nine-tenths of the public school teaching of Ontario has for its object the passing of pupils through the entrance examination, and certainly nine-tenths of the high school work aims only at the Departmental examinations, which are practically those for University matriculation; thus it comes about that at the end of school life the student has had the mental discipline of the course, which is entirely desirable; but the choice of studies and the methods pursued have given him very little acquaintance with the practical affairs of the world, neither has he gained mechanical facility nor useful information, even about current events. The life of the school and the life of the world outside have been two distinct existences scarcely even in contact with each other.

Some Conditions for Consideration.

We are living in a new country with great districts undeveloped and almost unexplored, acknowledged on all hands to be enormously rich in mineral resources which are just beginning to be opened up and for the development of these skilled and educated men are a necessity.

Our own province and those westward of it have agricultural possibilities, that are hardly yet realized, which with intelligent management should place the material prosperity of the country beyond question.

In a single district of northern Ontario there is power enough going to waste to drive the entire machinery of the continent, yet rivers and waterfalls still lie in the unbroken wilderness.

A considerable portion of the capital wealth of Canada has been, and is, in its forest products, yet year by year these are being used up and the resources of the country thus reduced, with no adequate steps toward the nurture and replacement of raw material. There is room and need here for a whole department staff of trained men.

Within twenty years there has been a complete revolution in the agricultural products, methods and exports of the province, and the adaptations to the new requirements are being made only after slow and costly experiments. Now reliable experiments necessitate trained

observers, and these are not a natural farm product of this land.

A similar consideration of great importance is the changed industrial and commercial conditions within the generation just past. Those of us who are yet at middle life have seen the skilled workman forced into the labourer's position, and the apprentice disappear from the trades. Formerly, by country crossroads and village street the woodworker and the blacksmith made the carriages and farm implements for the neighbourhood; now the woodworker has practically passed off the stage and only an odd blacksmith lingers to nail on the horse-shoes that are dropforged in the village mill, and to repair the carriages and farm machines that are built in the city factory. Similarly the shoemaker has been driven from his bench, the tailor from his counter, the cabinet-maker from his shop, so that except in the building trade, there are but few skilled workmen whom stress of competition has not forced to give up their business; and never again will the tradesman or the apprentice cut any figure in the economic history of the world. No longer can the energy of human muscle compete with that of the steam engine and the turbine. Invention of machinery that replaces hand labour, and improved means of transportation have produced those concentrations of effort and divisions of labour which the modern manufactory has made us familiar with.

While this drift and readjustment of industrial operations and trade centres have practically driven out the skilled artisan of former years, they have equally created a demand for a new class of workmen, the basis for whose preparation must be laid in the schools, not in the shop. The call is for men of intelligence, educated and trained, with ability to grasp the ideas of the guiding head of the department and translate them into finished products. This is not the man at the machine in the modern factory who, without early training and education and without the energy and ambition to gain these in later life, is likely to become as little intelligent, as little useful and as little human as that hypothetical personage with the hoe.

Rather, there is wanted the man who has been taught to observe accurately, to reason clearly, to think independently,—the man, in short, who has the capacity for intelligent and successful improvement,—for such the industrial conditions make constant demands.

If students have not the means of fitting themselves for such occupations as the needs of the country and the needs of industry require, they will doubtless still continue to go to school and college, and become lawyers, doctors, preachers and teachers, though they may have little mental aptitude for these professions, and though continually faced by the puzzling question of finding a location in which another of their class can earn a living; while skilled and intelligent superintendents and workmen will continue, as is now the case, to be brought from other countries with better educational facilities, to take the best industrial positions we have at our disposal, and carry off the cream of the earnings. Meantime our own people do the slave's work for the laborer's pittance, not because they lack in intelligence or capacity, but because this country with the "best educational system in the world" has turned out the children as incompetents for lack of any proper fitting for life's duties.

Some Educational Factors of the Problem.

The public school attendance is 470,000. Of these, last year, 97,700 were in the third book and 86,500 in the fourth, and less than 25,000 were in fifth classes and form I. of the high schools. This means that at an age of from 12 to 13 years 11,200 scholars out of 97,000 leave school; next year, at 14, 60,000 disappear from the records, and at 15, about 18,000 more go. Another way of stating the matter is this: At the third book stage 12 per cent. of the pupils leave, at the fourth book 75 per cent. go out, and at one year later 70 per cent. of the remainder. Out of a public school population of 470,000, allowing for a reasonable decrease on account of death rate, and taking the period of public school attendance as eight years, and that of the high schools as four years, the maximum high school attendance should be about 220,000, as a matter of fact it is 22,400, just about ten per cent. of the possible. Now it will scarcely be disputed that intelligence as a factor in civilization, in progress, in

productiveness, is a direct result of education, so that it is far from a desirable condition of affairs that, on the basis of numbers, seven tenths of all our school work should be done with pupils not yet fourteen years of age; or that there is only one scholar in the high schools for every ten that should be there.

Since there is no subject upon which the whole civilized world is so agreed as upon the benefits to be derived from schools, and no faith is so generally held as that which rests on the belief in education, it does not seem to be unreasonable to conclude that our school system, as now carried on, is not appealing to the confidence and sympathy of the people so strongly as is desirable. The result is dormant powers and undeveloped capacities in the children, to the detriment both of the individual and the community; for, on the one hand, the state and society have a right, under our modern civilization, to require the highest powers and greatest productive abilities in every individual; and on the other, every member of the community has the right to demand from the state the opportunity and means for best fitting himself for performing most effectively his duties as a member of the social order in which he has to take his place.

When looking for the reasons for the serious state of things, arising from some 70,000 children leaving school at too early an age, the enquirer is constantly met with the statement, "These boys and girls have to make their own way in life, and they cannot afford to lose a year or two in studying subjects that are of no use to them."

Without giving endorsement to the contentions of these people that schools do not fit for the battle of life, it may just be pointed out that the position they take is not altogether an unreasonable one. A pupil who does not intend to go through the high school either for matriculation or for a teacher's certificate is at a disadvantage educationally, and his time is not on the whole well employed, either in the senior classes of the public school or in the high school. This is part of the toll we pay for our foolish plan of judging school success by examination results. It is at least unfortunate that in our schools we have this constant rush for certificates, but scarcely a candidate for an education.

Under the circumstances the following enquiries seem to be pertinent :—(1) Is the study and the drill required for the Entrance Examination a proper and serviceable course for pupils who will not use the standing thus obtained, but who desire an education that will fit them best for engaging in the active and practical affairs of life? (2) Have not these scholars in the public schools, together with the forty-five per cent. of the pupils who enter the high schools and leave before finishing any course, quite as good a claim to an educational curriculum suited to the needs of their future lives as have the balance of the high school pupils who are preparing for their professions?

If such a course were available and properly taught there would be hope of a considerable rise in the educational status of the province; because of a larger number of pupils taking advantage of the altered, and for them more favorable school conditions to remain longer in attendance.

The second factor may be stated this way—That: there is a demand for a useful preparation for the common pursuits of life is shown by the fact that one correspondence school in the United States, which professes to give instruction by letter to fit students for mechanical and engineering employments, has enrolled about 200,000. Of these it is asserted by the officers of the school, and there is no reason to doubt the correctness of the statement, 20,000 are in Canada. These are generally ambitious and intelligent young men, who recognize that they must get knowledge and training to rise in their chosen pursuits. It is hardly likely that students of the class who are earning their money would be willing to pay the relatively high fee for explanation by letter, if they could have the advantage of personal teaching from competent masters, in class-rooms properly equipped with suitable apparatus. We are nominally teaching science, mathematics and mechanics now in our schools; but we have made that work entirely subservient to the demands of the junior lecturers in the universities, instead of meeting the needs of the people for whom the system exists, in theory at least.

The Home-making Element.

The great majority of the boys and girls of Ontario are, in the natural course of events, to become the country's home-makers within the next few years. If the object of education is to develop the faculties for right and complete living (not mere existence), surely the *living* requires quite as much attention as the *right* and *complete* part of the duty.

A boy or girl who passes through the public and high schools comes out at the age of 17 or 18 without either knowledge or training that is of any real value for securing domestic comfort or enjoyment. It has apparently come to be a strict law with us (unwritten it is true, but the more unbreakable on that account) that every pupil in our schools shall have a course of academic education; but under no conditions shall anything of a domestic nature be taught. Considering the circumstances of the country and of the people at large, it would seem far more reasonable to reverse the law and make it read, "Every pupil in school shall learn about the duties and requirements of home-keeping, and every girl shall go farther and become acquainted with those domestic affairs relating to the household which it is reasonable to suppose she will have to either perform or oversee in her own home at a later period." Herbert Spencer's jibe at the English schools of twenty years ago, as those of a nation of celibates applies equally to our own of to-day; with the addition that the people who had such a system and such schools were evidently cave dwellers.

To find a solution for these educational difficulties it will be well to consider the circumstances which have led to the present troubles. The fact is, a new set of conditions have come upon us for which no provision had been made and now adjustments to meet these fresh demands must be looked for. The rapid industrial and commercial developments of the last few years, and the call for intelligent and skilled workmen with a wide range of adaptability; the recent advances in knowledge regarding aims and processes of education; the discovery and exploitation of the great natural resources of the country; and the successful attempts in the neighboring United States to bring the elementary educational work into close connec-

tion with the actual daily life of the people, have all combined to force on our attention the need to look to our methods and aims in school work.

As indicating the direction in which the development to meet new conditions has taken in the United States, a reference to the last report of the superintendent of education for Massachusetts, shows two significant results: (1) That with a population differing from that of Ontario by only a few thousand, and with a public school attendance practically the same as in this province, there is a high school attendance of 40,000 as against our 22,000, and that too, with their "grammar grades," (corresponding nearly to our continuation classes, but in all public schools) counting as public school attendance. (2) Of the 40,000 high school pupils, 35,000 were taking the *non-college*, or *general* course. These students are in school to get an education, not a certificate that can be traded for dollars; to be fitted for the positions they are to occupy as citizens and social units, not to be made into matriculants or teachers. The possibility of securing such a result counts for the greater use made of the schools and for the higher educational status than would otherwise be the case, with the consequent greater powers for progress, for better living, and for good to the country.

A General Course.

Since the needs of the country demand the greatest degree of intelligence in the people, and since every individual has a right to the means for the highest mental development that his circumstances will permit of his reaching, it is requisite that every provision within reason be made (1) for inducing children to remain at school for as long a period as possible. (2) That during the period of school attendance the exercises and studies be made as educative as possible. By educative is meant the adjusting of the pupil in the immature, earlier years of life to the conditions under which it will be necessary for him to live and act when school times are past.

Such a course should aim to accomplish these things for every pupil: (1) To furnish an adequate store of useful information in regard to those affairs and conditions, both present and past, which all well informed and intel-

ligent persons must be possessed of. (2) To train to accurate observation, correct reasoning and self-reliance. To secure these results the course should begin at the kindergarten and extend unbroken throughout the public and high schools, with no diverted energies for examination records or other extraneous objects.

The reasons why the present course fails of these results seem to be these: (1) The curriculum is 'loaded up on its purely educational side with subjects that are not accompanied by either useful information or training. (2) The knowledge gained by the student is not of a character that can be applied in the callings of life, nor has it been got for that purpose at all, but rather to enable him to make marks enough on an examiner's paper to obtain a certificate; and even of that the minimum required measures the maximum of the student's efforts. (3) The training now given as a foundation for any future occupation, is trifling in amount and often worse than trifling in methods.

The subjects appropriate to such a course may be grouped in four departments: (1) English including Literature, Composition, Grammar, Geography and History. (2) Mathematics, made up of Arithmetic, Algebra, Geometry, Trigonometry. (3) Science, beginning with nature study and expanding through Botany and Physical Geography into Physics, Chemistry, Geology and Mineralogy. (4) Manual Training and Domestic Science.

Details of the Course.

ENGLISH.

Grammar and Composition, as practically applied in speaking and writing, and to such an extent that the student will habitually speak correctly, and that he may be able to write a letter or report in plain intelligible language with an effective arrangement of the parts.

Literature.—A course of reading of good English authors for the purposes of forming a taste for such literature, learning to read intelligently, gaining useful information, and obtaining a vocabulary. With this should go practice in oral reading, practice in oral expression of ideas before a class, and a course of supplementary reading in history, scientific books and current news.

History.—A study of the industrial, commercial, territorial and legislative growth of the British Empire during the present century, with a brief reference to the great events in the development of the empire during former periods such as the Elizabethan voyages, Walpole's administration, the American colonies, &c. A study of the history of the various Canadian provinces since 1300, with sketches of preceding important events. Rights and duties of citizenship.

Geography.—Study of a globe, position of continents, oceans, routes of travel, important lines. Maps; physical features of the continents, as related to mountains, watersheds, drainage areas; climatic conditions as to their cause and effect upon products and people; manufacturing and commercial centres. Exports and imports of the chief countries, inter-imperial trade. The study of the provinces of Canada in detail, productions as related to climate, rocks, soil, &c. Chief rock formations and accompanying minerals, forests, water supply. Elementary Geology and Physiography.

SCIENCE.

Nature Study.—From the earliest years of school life a systematic course of observation work on plants, insects, rocks, soils, weather changes, and any other natural objects or conditions within the child's comprehension. The main objects being to cultivate accurate seeing, and the acquiring of information that may be used as the basis for further knowledge in other subjects. This study should be an introduction to the following, more detailed sciences:

B: any.—The practical study of plants both wild and cultivated, conditions of growth and methods of propagation. Diseases and enemies of farm and garden plants, and methods of treatment.

Physics.—An acquaintance with those laws of matter that underlie the structure and use of ordinary machines. Properties of solids, liquids and gases. A brief course covering the essential practical principles of Heat and Electricity.

Additional for boys—The necessary theorems of statics, hydrostatics, mechanics, dynamics with applications. Structure and use of the turbine, steam-engine

and dynamo, Methods of transmitting and transforming energy.

Chemistry.—A study of the common elements and the simpler portions of chemical theory. Practical work with the metals and their compounds illustrating methods in chemistry.

Additional for girls—A study of common household materials and operations, such as baking powders and baking, soaps and washing, waters, disinfectants, and detection of common impurities.

Mineralogy.—A knowledge of the chief characters of the commonly occurring minerals of economic importance, with the localities and geologic formations in which they are found. Simple tests for the common minerals.

Zoology.—Study of types of the great classes of the animal kingdom, their gross anatomy, circulatory, respiratory, nervous and digestive systems. Entomology, chiefly economic.

MATHEMATICS.

Arithmetic.—Simple rules and common commercial work with quickness and accuracy.

For boys.—Calculation of quantities and materials, as required in contractors' and manufacturing work.

Algebra.—Through quadratics as used in mechanical and physical problems.

Geometry, (not Euclid.) Study of the straight line, rectilinear figures, circle, parallelopipeds, sphere, prism, cone, pyramids, with the mensuration deduced therefrom.

Trigonometry.—For boys.—Through solution of triangles as used in physical and mechanical work.

FRENCH AND GERMAN.

As optional subjects, so far as to leave the student able to read the language with facility. This especially for those who wish to engage in engineering or scientific pursuits, that they may become acquainted at first and with current literature.

Manual Training and Domestic Science.

The course in manual training and domestic science that would give the requisite education in that kind of school work would consist of the following subjects to the limits indicated, for both boys and girls:—

Boys and Girls.

BOOKS I. AND II.

- Holding pencil.
- Drawing lines.
- Stick laying.
- Use of colored tablets for simple designs and borders.
- Paper folding.
- Sewing.
- Combining lines into simple geometric figures.
- Freehand drawing, consisting of lines and simple objects.
- Cutting paper into ornamental patterns.
- Nature study; leaves, their outlines, forms and surfaces; common plants, pebbles, rocks, birds.

BOOKS III. AND IV.

For Boys.

- Freehand drawing.
- Object drawing, freehand and with rulers.
- Cardboard work, cutting, scoring, folding into geometric solids.
- Object drawing with rulers and squares.
- Coloring of patterns and drawings.
- Designs in water colors.
- Cardboard work.
- Chip carving and cutting.
- Geometric drawing.
- Nature study from objects, with drawings in pencil and crayons and water color sketches, leading to simple designs for ornamentation and use.
- Chip carving and cutting.

For Girls.

- Drawing, freehand and object.
- Nature study from objects only, accompanied by color work with crayons.
- Sewing.
- Cardboard work.
- Coloring of patterns and drawings.
- Designs in water colors.
- Sewing and making of simple articles.
- Straw and fibre plaiting.
- Freehand and object drawing.
- Making simple designs.
- Nature study from objects, with drawings in pencil and colored crayons, and water color sketches.
- Designs in water colors for ornamentation and use.
- Sewing, cutting, and making simple garments and other articles.
- Moulding in clay.
- Straw and fibre weaving.

FROM HIGH SCHOOL ENTRANCE.

For Boys.

Bench work with simple carpenters' and joiners' tools, introducing exercises in Cutting to line, truing up and joining parts, boring, planing, chiselling, dovetailing, &c., followed up by lathe work. The making of finished objects such as bookracks, stools, cabinets, boxes, &c., all from scale drawings.

Drawing, freehand, mechanical, architectural.

Machine shop exercises in metal with lathes, planer, drills, &c.

Bench work in metals, chipping, filing, fitting,

Drawing, mechanical and architectural.

Pattern making moulding, and casting of small objects.

For Girls.

Freehand drawing, wood carving, clay modelling, simple joinery, water color work for home ornamentation, bent metal work.

Sewing by hand and machine.

Cooking of simple dishes, such as crushed cereals, farinas, eggs, potatoes.

Ornamental and industrial designs in pencil, water color, and stencil work.

Cooking of vegetables, breads, meats, pastry.

Serving of foods and arrangement of dining room.

Dressmaking, measuring, drafting, cutting and making plain garments of light material, such as blouses and skirts of cotton and linen.

Simple millinery consisting of the choice of materials, and the use of them in trimming hats.

Lessons on materials, colors and texture of dress goods and trimmings.

Cooking for invalids and children.

Dressmaking from heavy materials.

Millinery, -- the making and trimming of hats and bonnets.

Home nursing, emergency treatment of illness and

For Boys.

Light forge work on small articles, both useful and ornamental, to afford practice in methods of treatment.

For Girls.

injuries, administering of food and medicine, changing of patient's clothing.

Theory and practice in household cleansing, laundry work, disinfection, ventilation, and similar domestic operations.

Marketing, in theory and practice, for a household.

To some this may read like a rather ambitious programme of work, and it is fairly complete, but not more so than is being systematically carried out in many American schools, and those not in the largest cities either.

Manual Training, Domestic Science and Nature Study as School Subjects.

As these departments of work are but little known in Ontario schools a paragraph may be devoted to them. Naturally, there are two aspects under which this matter may be viewed,—the pedagogical and the utilitarian. Taking these in order it may be pointed out (1) That children invariably gain their ideas, their notions, their images of things through the medium of the senses. All elementary educational effort, therefore, to be effective must be along the lines of enlarging the child's experience; and this consists of acquaintance with the objects that he sees and handles, and the properties that he gains knowledge of by the senses. (2) That children are naturally interested in those operations which show a tangible, concrete result. The objects of kindergarten structure, the sewing, drawing, carving, and in general, the making of things are exercises that children will follow without compulsion. Similarly they are eager for information about the objects and phenomena of nature and of art which come within their experience. Plants and animals, rocks and soils, boats and machinery, things of commerce and of actual life all appeal to the child's desire for infor-

ministering medicine, patient's practice in cleansing, work, disinfection, and plastic operation. theory and household. vicious professions not more in many of the largest cities

mation. Now it is an elementary principle of educational theory that, so far as possible, those subjects should be taken advantage of for school work which appeal to the interests of the scholars, and are therefore least wasteful of energy and of time; and waste may arise either from the effort constantly required to compel wandering thoughts to stay fixed on uncongenial work, or from the lack of educational result arising from exercises not comprehended, and performed in a perfunctory manner. All minds are not constituted in the same way, consequently are not capable of equal improvement by the same subjects and methods of teaching. So long as we have to deal with different mental attitudes and strengths we require different methods of treatment and problems of various kinds to get the best results for all. There seems to be no good reason, except conservatism and prejudice are to be ranked as such, why the concrete and practical problems of actual life should not be turned to account for mental training, as well as the theoretical and the abstract of the schools. Especially so when it is kept in view that for immature minds the mere theoretical and abstract offer conditions that are difficult to understand, hence are not educational because not clearly intelligible. It does not seem desirable therefore that all students, regardless of natural powers and aptitudes, should be compelled to take exactly the same course. This has been acknowledged in high school work by permitting some options, especially the honor courses, so that high schools are able to give some special attention, very near the end of their studies, to students who promise to distinguish themselves along some line in their university career, but nowhere is there any provision made, or any encouragement given to the student whose mind has a practical bent, or who is likely to gain distinction, either in applied science or in mechanical work. This purpose Manual Training fulfils.

The mechanical problems of the workshop, the cooking table and the drafting room, when used by a competent teacher, afford a means of mental discipline not at all inferior to that of the ordinary class-room work,—indeed to the majority of students they would be valuable because they occur in practice and have a reality

that the others lack. Since the widest discipline is sought, proper provision should be made in school to meet the needs of those who do not profit by the study of abstract mathematics or of foreign languages. With the cultivation of memory and reasoning power should go a training of hand and eye for ability to control these organs and to have them act in obedience to the will is always a desirable power, and the possession of it, both in professions and ordinary employments, often distinguishes the expert from the mediocre. Still, the only attempt made in school to give pupils this valuable acquisition is the little bit of freehand drawing in the course.

It tends to save the waste of human faculties. "There is no more familiar fact nor one which suggests more pathetic reflection than the large store of unused capacity in the world. Hundreds of men and thousands of women carry down with them to their graves great gifts which are well-nigh wasted, powers of usefulness unsuspected by the world, and hardly known to their possessors, because the right means for development have not been supplied and opportunity has been wanting." (Fitch.) Technical work by greatly increasing the opportunity for development of pupils' capacities tends in like proportion to check this human waste and to turn it into productive channels.

The Example of Other Countries.

In Great Britain, Russia, Austria, Switzerland, France, Germany, Belgium, Denmark, Sweden and the United States, schools giving a practical education, including Manual Training and Domestic Science, have had much attention from educationists within the last few years, while they have been increasing immensely in numbers. As a general thing the courses of instruction and the methods of European schools are not suited to Ontario requirements. We may learn from them, profit sometimes from their experience and mistakes, may indeed copy from them in parts, but may not imitate them. The differing conditions of the countries, and characteristics of the people would make certain failure follow such a proceeding. The American schools have learned this

lesson sometimes by costly experience, so that their work and methods are generally very largely of their own devising hence are more nearly suited to our needs. Whatever the differences may be, however, there is no country in which these schools have been established and have been afterwards abandoned; on the contrary they have in all cases steadily advanced. Mistakes have been made, enthusiasts have gone wild in their foolish efforts to turn all education in this direction, still the schools have grown in numbers and in influence.

In explanation of the scope, methods and equipment of typical American schools, devoted to elementary technical work, the following extracts are taken from a report of a visit made to a number of them, at the instance of the Kingston Board of Education, for the purpose of gaining information about them that would be of service for the establishment of such a school here.

The following were the schools visited :

The Boys' High School of New York City.

The high school of East Orange, N.Y.

The Pratt institute, of Brooklyn.

The Teachers' College,—a department of Columbia University,—in New York City.

The Boardman Manual Training School of New Haven.

The Mechanic Arts High School of Boston.

The Rindge Manual Training School of Cambridge.

Description of Schools.

THE BOYS' HIGH SCHOOL OF NEW YORK.

This may be passed here with the remark that there is no Manual Training yet introduced into the high schools of the city, although it has a place in the grammar schools. Measures are being taken, however, for the establishment of a technical high school in the near future.

HIGH SCHOOL, EAST ORANGE, NEW JERSEY.

East Orange is a New Jersey city of about 20,000 inhabitants, and is mostly a place of suburban residence for New York business people. The high school has an attendance of 350, and is therefore somewhat similar to our own in the number of scholars and in the constitu-

ency from which support is received. For these 350 scholars there are twenty-three teachers,—twenty-one on permanent staff and two special ones; of the twenty-three, twenty-one are women. The manual training in this school is made up, for boys, of mechanical drawing and wood work, nearly altogether carving, as the joinery is done in the grammar school grades, before entering the high school; for girls there is free hand drawing, leading up to decorative designing of various kinds, sewing, simple dress-making and millinery, and wood carving.

As I intend to deal with girls' work in one place at a later stage, I merely mention its character under the various schools.

The manual training is optional for all students, but not compulsory upon any. I was told by the teachers that about seventy per cent. of those entering take this work in the first year, this decreases to about twenty-five per cent. by the third year, and in the fourth year of the course it is not taken by any. The result, it seems to me, is sufficiently explained by the fact that manual training is handicapped by not counting, in any way, toward the standing or record of a student in the school; that the course is limited in extent, consequently does not permit of much new work being taken up; that the department is in charge of a lady as teacher, who gets excellent results in drawing and carving, but has not facilities for doing much in other kinds of work.

On account of previous training the boys are able to make, with neatness, such objects as a box, a wall bracket, a small cabinet, a bookcase, etc. In the high school they put in regularly two hours a week in the shop and drawing room, at such periods as they are free from other classes; and occasionally extra time after regular school hours.

The architectural drawing was, in my opinion, very good, and was an important educational subject, because it furnished many a problem for solution to the boys engaged at it, as anyone will easily understand who has attempted to work out the floor plans of a house. Several boys were engaged on plans of buildings designed by themselves. They were working out floor plans, and elevations with details of heating, drainage, stairways,

cornices, frames, etc. Others were busy making drawings of pieces of machinery, all according to conventional methods, so that a workman might take the sketch and construct the piece from it. Manual training is comparatively a new department in this school, introduced, I think, about five years ago.

PRATT INSTITUTE, BROOKLYN.

This institute was founded some thirteen years ago by Charles Pratt, of Brooklyn. The object aimed at in all its work is, according to the founder's direction, "The promotion of manual and industrial education, as well as cultivation in literature, science and art, the fostering of habits of industry and thrift and all that makes for right living and good citizenship." This sentence, it seems to me, would serve admirably as the creed for the new phase of education with which this report is dealing. The experiment has worked out in the direction of establishing a complete educational institution, with classes from the kindergarten through public school, grammar school, high school and technological work, and a training department for teachers. There is, in addition, a great deal of instruction in evening classes for those who desire special preparation for particular occupations. This form of help really is a school of trades. Classes are formed for blacksmiths' apprentices, plumbers' helpers, house painters, carpenters and joiners, and many other of the common trades, for the purpose of giving an intelligent understanding of the materials and processes employed. There is another department devoted entirely to art work; it, of course, is largely patronized by girls. One of its chief aims is to make students acquainted with the principles that underlie ornamental and artistic work as applied to industrial pursuits and home decoration.

The provision for manual training is exceptionally complete and, I think, typical of the best to be found. In the high school course manual training occupies about one-fifth of the time for four years. The purpose, with students of this grade, is entirely educational, to develop and cultivate hand and eye, as well as the purely mental faculties. For this reason the work at bench and drawing table is carefully correlated to that in the other class rooms, so that no one department

causes excessive drain either upon time or mental powers of the student. Boys and girls work together in the woodworking shops during the first year, after this they separate, the boys taking lathe work in wood and metal, vise and bench work, pattern making, moulding, forging and machine construction, and their drawing is confined to the mechanical work altogether. The workshops are equipped with complete sets of machines and tools as required for each of twenty-five students in a class. The work is done under the supervision of an instructor. In the wood-working department the exercises are somewhat remotely founded on the Sloyd of the European countries, but with great modifications, especially in two directions, viz., the omission of exercises that involve repetitions and the making of completed articles rather than of a single part.

During the first year the drawing is freehand and instrumental. The manual training is bench work in wood, using common simple tools, making easily constructed articles that permit of typical exercises valuable for hand and eye training. Wood carving.

During the second year the drawing is freehand and instrumental, designing patterns and ornaments; manual training for boys is wood turning, pattern making and moulding in foundry; for girls is sewing, drafting, cutting, making simple garments and study of materials.

Third year, for girls is drawing, color work design; for boys, mechanical drawing. Manual training for boys is forging, blacksmithing, decorative iron work; for girls is dressmaking and millinery.

Fourth year, for girls, color work, cast drawing and composition; for boys, mechanical drawing. Manual training, for boys, machine shop work and machine tools; for girls, domestic science, cooking and home nursing.

The mathematics of the course runs through the whole four years, if desired, but for those who wish a training in languages, either French, German or Latin may be substituted in third and fourth years.

The full course is:

Language, four years; English, with French, German or Latin, if desired as additional subjects replacing Mathematics for the last two years, four hours a week.

History and civil government, four years, two or four hours a week.

Music (singing and voice culture) first and second years, two hours a week.

Mathematics, two or four years, four hours a week.

Drawing, four years, four hours a week.

Gymnastics, four years, two hours a week.

Manual training, four years, six hours a week.

Whenever a department, such as mathematics, permits of a choice of subjects, that selection is made which will be serviceable in other work as in solving the problems arising in the machine shop or in the electric appliances. So in English, especially with the more advanced students, much of the composition consists of reports or descriptions about work done in the machine shop, the engine room or the science laboratory.

It must be kept in mind that this course of study is framed to give an all round development to the child, and at the same time prepare for the emergencies and difficulties of actual life. There is no intention of preparing for any special calling, or for any final test or examination. The record of the student's daily work alone determines his advancement.

TEACHERS' COLLEGE, NEW YORK.

As its name indicates this institution is for the training of teachers. It is now a department of Columbia University. Its buildings stand adjacent to those of the University, and its instructors form one of the University faculties.

I wish briefly to refer to its origin as illustrating another phase in the beginning of that movement which is now changing half the educational work and aim of the continent.

Twenty years ago an association of philanthropic people was formed in the city of New York, whose object was to promote the domestic industrial arts among the laboring classes, to diffuse true principles and correct methods of living and to establish a centre of reference and consultation. This association was succeeded in 1884, by one with a broader basis and a larger field of usefulness in view. The new organization was known as the Industrial Educational Association. Its aims were:

To promote special training of both sexes in those industries, which will tend to make those receiving it self-supporting.

To devise and introduce systems of domestic and industrial training into schools.

To form special classes for technical training.

To train teachers who may assist in this work wherever opportunity offers.

The association was eminently successful in its educational work, but a weakness soon developed owing to the lack of trained teachers to carry it on. One of the guiding spirits of the association was President Barnard, of Columbia University; and largely through his influence the college for the training of teachers was begun in 1887.

Private bequests aided the work, until now there is a splendid building with magnificent equipment, an excellent staff and a school covering all grades of work, from kindergarten through high school subjects. As might be expected in such an institution, the fittings and appliances are the best that can be obtained.

The high school department so nearly resembles that of the Pratt institute in methods and aims that I need not stay to describe it in detail. The arrangement of the curriculum, both for students and for teachers in training, follows the principle that school work should be first and above all educational, that to get the fullest mental discipline out of it for the student, drawing and manual training should have a due proportion of time and attention with the more strictly academic subjects. It is claimed that such a course, while detracting not at all from the purely educational side, adds a practical and serviceable training for young people who may, and in all likelihood will be compelled to make their own way in the competitive struggle for advancement, and possibly even for existence, under the adverse conditions of modern industrial life.

THE BOARDMAN MANUAL TRAINING SCHOOL, NEW HAVEN.

New Haven is a city of about 100,000 inhabitants, an important shipping port on the sound, and the seat of a large number of important manufacturing industries.

About six years ago a private bequest of \$70,000 for the purpose of establishing a school for the advancement of manual training work, put the city in possession of the institution I am writing about. It has accommodation for 450 scholars, with an attendance of something more than that, and it is almost a certainty that additional room will have to be provided very soon. There is another high school in the city doing language work such as is required for matriculation. As Yale University is in New Haven one would naturally expect that the Boardman school would not be overcrowded, but such is not the case, because the attendance is already beyond the limits of good accommodation, and the signs point to greater increases in the future.

It must not be concluded that because the term "manual training" forms part of the title of the school that all attention is centered in that department. On the contrary, it occupies under most favorable conditions not more than two-fifths of the students' time. The Latin High School and the Manual Training High School are the official titles, and are adopted simply because Latin is a typical study in the preparation for Arts matriculation and the professions, just as Manual Training is a typical subject of the alternate course that prepares for the scientific schools and for engineering and mechanical work.

Latin, English, German, mathematics, history and civil government, botany, physics, chemistry, are all on the curriculum. In most American high schools students are permitted to select one of several courses and carry it throughout the four years. The plan in the Boardman school is different from this, as there are only two courses,—one, in which Latin is required, prepares for entrance to Sheffield scientific school, the science department of Yale University; the other is the regular technical course of the school which covers English, science, mathematics and manual training.

The practical work for girls parts right at the beginning from that for boys, and later on, in the academic work, girls substitute a modern language for the higher mathematics which the boys require. The manual training for boys in the school is made up as follows:

First year—Freehand and mechanical drawing, bench work, wood turning, wood carving.

Second year—Drawing, mechanical and freehand, pattern making and moulding in foundry.

Third year—Drawing, as before, forging and sheet metal work.

Fourth year—Drawing, machine shop work.

I was particularly struck with the facility and the independence which the girls had gained in their special work. In the drawing class, for instance, casts and statues had been sent to the garret, or to ornament the rooms and halls; instead of them, one pupil was selected to mount the platform and occupy a seat on it, then the remaining members of the class set to work with crayon and pencil to make a sketch of the sitter. In another class of twenty-five girls apparently there were twenty-five different designs being worked out. One was busy with a water color sketch on a fancy cushion cover, one with a stencilled design in colors for a book cover, another with a poster ornamented with a figure and fancy lettering in colors; so round the class every member was busy either upon some article for home ornamentation, or for use in the industrial arts.

The Boston High School of Mechanic Arts.

In Boston the classical courses of the former secondary schools, and the studies that go to make up the education necessary for the citizen and business man long ago parted company, and established themselves respectively in the Latin high school and the English high school. About six years ago the board of education deemed it necessary to make another cleavage, and to establish a school capable of carrying on, to a somewhat advanced stage, the manual training started in the public schools. Thus the Mechanic Arts' high school of Boston had its origin; and I believe that no one questions its position as easily the leader of such institutions in the New England states. I mention this because all the other first-class schools I have described have been founded or aided by private persons. This is entirely a municipal one, administered by the board that controls the other education of the city.

The school has an attendance of 600 boys; apparently there is no similar provision made for girls, but this will doubtless come very soon. The course of study resembles, in subjects, those of the other schools described, but rather more attention is given to the manual training and drawing. These two take up about half the time of the students, the other subjects being mathematics, history and English. The regular course covers three years, but a fourth year's work is optional if students wish to return. The only foreign language is French, and only such training is given as will enable the student to read the language with facility.

Some Observations.

What I have said about the size, equipment, character, and curriculum of the schools described will give some idea of the degree of efficiency aimed at by those in charge of that class of work, but it does not give any idea of how wide spread this movement has become in the educational machinery of the United States. If one travels from New York to Boston, by the New York, New Haven & Hartford railway he will make a journey of about five hours on a fast train, in other words, the distance is comparable to that from Kingston to Montreal or from Kingston to Toronto. In that five hours trip the traveller will pass through Bridgeport, New Haven, Springfield, Hartford and Worcester, every one of which has a manual training high school with good equipment and staff, doing such work as has been described; while in the same district he will find The Stevens Institute of Technology at Hoboken, the Sheffield Scientific School at New Haven, The Worcester Polytechnic at Worcester, The Lawrence Scientific School at Cambridge, and The Massachusetts Institute of Technology at Boston. Every one of these is a scientific and engineering school of high standing, the last mentioned being probably unsurpassed in the world.

Again, with Boston as a centre, one finds in that city the Mechanic Arts High School. In Cambridge, to which the traveller goes by street car, is the Rindge Manual Training School. An hour's ride down the coast takes him to Providence, which has a noted manual training school. Half an hour's journey up the coast the

other way takes him to Lynne, with another manual training high school. An hour's journey in another direction lands him at Lowell where he will find still another such institute. And not only are the schools that give this technical training increasing in numbers and strength, but the ordinary high schools have for their object the furnishing of an education suitable for the mass of the people. The tendency of this education is to give more attention in the earlier years to such subjects as manual training, nature study and domestic science.

A second observation, which is forced upon one that has much to do with schools, is the general demand for what is called education, for sake of the material advancement which it is hoped will follow. Only a short time ago a year or two in the shop either as an apprentice, or a junior hand, with another year or two's practice as a journeyman was thought sufficient to qualify a tradesman as an expert workman. Now the shifting of manufacturing work from the tradesman's shop to the great factory, from the widely scattered country towns and villages to the centres where power is cheap and shipment convenient, and the replacement of the hand driven tools of the workmen by the steam driven automatic machine of the mill has forced the mechanic to give up his shop, the employer to discharge his hands. Then the mechanic from the shop and the man discharged, who found themselves with trades by which they could not make a living and without the power of adaptation to the new circumstances, turned blindly, clamouring for legislation for themselves, thinking that a government, especially if it be a democratic one, can do all things for the individual, and equally blindly calling for education for their children imagining that the thing they call education has magic to bring material prosperity.

I am told that in the American cities, where the stress of industrial competition is so keen, this looking to education as an agency for placing the young in positions of advantage is particularly strong; but this demand requires intelligent guidance and discrimination as to the quality of that education if service is to be rendered to those who seek it. Are we not daily enacting the tragedy of handing a stone to the child who is asking for bread?

A third observation is that this movement in secondary education seems to have originated in private enterprise and by private aid in the United States. Higher institutions, such as the Massachusetts Institute of Technology, were sometimes started and aided by the state, but the grammar schools and high schools seem to have taken action only after a demand for that kind of education had been created by the establishments due to private generosity.

Another observation is that boys and girls in the American High Schools seem better fitted by their training to go out into life than are those whom we send out. This is not due to greater intelligence on the part of either pupils or teachers, but to a more rational and elastic system. There seemed, in every school that I saw, to be a familiarity with the current affairs of life and an originality in thought and plan which we seldom meet with on this side of the line. I watched closely to find the cause of this and concluded that it was mostly due to freedom in the class as regards work, and the effort to adjust the school curriculum so that students readily understood the bearing of important portions of it upon the affairs of active life.

In these schools the outside examination has very little influence, the standing of which the teachers' certificate is evidence, counts for everything; with us the outside examination is all, the school record is nearly always nothing, and when it does count its influence is so trifling that it is on the whole a negligible quantity. The result is, as in my judgment from what I saw it works out in practice, they do not try to make scholars but to educate, we do not try to educate but to make scholars of sufficient calibre to answer a small percentage of the examiner's questions. I think, therefore, that our students in high schools are not so well equipped as they might be for intelligent progress in life.

I have also to mention the brightness and decoration of the school buildings. Pictures of good quality and not of chromo type were plentiful, casts and statuettes were in the halls and class-rooms, and the whole air and appearance of the rooms were in most cases cheerful, pleasant and agreeable. This was, of course, partly due to the exercises, but largely to the fixtures and surroundings.

Some Conclusions.

1. That the high school course should be made for educational ends, and not with a view to give mere academic standing, as for teachers' or matriculants' qualifications.

2. It should be made as broad as circumstances will permit, not by allowing choice of subjects to students, but by permitting teachers and schools freedom for work by optional courses, each fixed within its own limits.

3. In order that the high school may be as widely serviceable as possible at least one course of study should provide such training as will turn the students' minds towards the practical occupations of life as distinguished from the professional.

4. That the student who spends one-quarter to one-third of his time in manual training does not thereby fall behind in his regular classes. The question was asked by me repeatedly, and the answer was always to the effect that students in high schools who took manual training were not hindered in their other work by it; and that generally when they went to higher institutions such as schools of technology and scientific departments of universities, they forged ahead of others who went in with equal academic standing, but without workshop practice. The explanation is that time spent at the bench is a relaxation from the regular work of the school and the problems of the shop develop mental activities and originality in overcoming difficulties that help in the class-room, the laboratory or the study quite as much as they do at the bench.

5. Students who have completed a course of study such as that of the manual training schools of American cities meet with much readier employment than do others. This seems to be particularly the case with manufacturing concerns, and large supply houses who require intelligent boys to train up either as expert workmen or as department managers. In two of the schools described I was told that a single large manufacturing firm in each city was prepared to give employment to all the members of the class graduating from the school who chose to enter that line of business. In other cases the report was that the boys from the manual training high school had

preference over all others in entering the service of large manufacturing and commercial firms.

6. A manual training department of a school does not seem in any sense to be a reforming institution. A dull boy in the ordinary classes in language or mathematics may be exceedingly clever in the shop or vice versa, but the evidence seems to be that the boy whose home training (for this is always due to the home, not to the school), has made him worthless or vicious, or educationally a degenerate in ordinary work of school, will be equally worthless or vicious or degenerate in all departments. It is regularity, system, order, obedience, that he is rebelling against, quite as much as against work.

7. The teachers whom I asked about the matter were without exception of opinion that students who were in attendance at the manual training departments of the schools took more interest in their work than did the other scholars. For instance, one said to me: "They have to keep order in the class-rooms, but order keeps itself in here." Permission to remain in the shops to work after hours was held out as a privilege which could only be enjoyed by diligent application during regular hours and this privilege is generally sought.

8. Manual Training taken by itself is no proper school subject. The ability to perform certain operations with tools is of no value whatever educationally, and next to none industrially. It is only when this subject forms a section of a curriculum, carefully correlated in all its parts, that it deserves a place in school. Then the object should be entirely to gain power from the doing,—not to gain the power to do.

9. In that district of the United States which has been mentioned as so thickly dotted with scientific and technical schools, every village, town and city is humming with the bustle of mill and factory. This, doubtless, has had its effect in causing the establishment and growth of the schools. The account is balanced every year by scores of experts, trained in theory as well as practice, who turn into these same industries and give their knowledge, their experience their energy to increase the sum of the productive capacities of the

country; while hundreds of others from the schools, less mature but with minds trained and faculties alert, and ambition spurring them on to become the leaders in their occupations, are all adding their abilities to increase the ever-growing total of industrial output.

More than once it has occurred to me that these cities and towns clustered along the shores of the New England States, with their mills and schools so closely connected, have for us in Ontario a lesson, as to how we might solve the great industrial problem of bringing into proper conditions and relations the raw material of the human factor with its undeveloped capacities and powers and the raw material stored away by nature in mine and forest, in order that they may interact to produce that commercial prosperity and financial success which will ensure the largest and best life for the nation and the individual, with all that best living implies, both materially and intellectually.

Training for Girls.

In the schools which I saw, and from what information I could obtain, there seems to be a well-recognized course of practical instruction for girls as well as for boys. The aim, however, is somewhat different. For the girl the object is to give her the power to at least oversee home duties, such as cooking, cleansing, decorating the home, sewing, millinery and dressmaking, doing simple nursing of sick persons, with enough scientific basis for these various operations to intelligently perform them.

As a matter of right girls have an equal claim with boys to a course of study which will be for them both educative and preparatory for future life, but as a matter of fact they have always been compelled to take the same studies and to the same extent that boys have done.

The aim of all school work is to adjust the individual to the conditions of the community in which he will have to perform his part. One may well wonder how far our high school work in this province tends to fit girls for their duties either in the home, the community or the state. We have, it is true, made many of them into teachers,--the only profession that has been open to them until recently; and lately we have prepared a few for

clerkships. So far, however, as the gaining of any knowledge that would be useful for homemaking purposes, or of a training that would help to make that home attractive or healthful or economical, we have had none.

To put the matter on its lowest possible level,—the dollars saved in household administration are more valuable than the same number of dollars got by extra service on the part of the wage-earner, because they are not the cause of waste of energy and vitality. Girls should certainly have a course of work in school that would develop good taste in matters of dress and household ornamentation; that would give the ability to efficiently and economically administer the affairs of the home; and that would produce the power to adapt oneself to governing conditions, and to acquire the mental culture which brings enjoyment of what is good in life,—otherwise our education is failing of what it should do.

A Word of Warning.

There are two points from which the success of this movement in school work is endangered. These are (1) the extravagant claims made on its behalf, (2) unqualified teachers. It may be said at once that a great deal of rank nonsense has been talked and written about the value of manual training and domestic science. They will not lure the truant back to ways of virtue; they will not transform the dullard into an intellectual star; they will not turn the school reprobate into the reputable pupil; and even if every boy and girl in the land could perform the operations of the department with accuracy and facility, no sudden educational or industrial revolution would follow.

The claims that I think may be legitimately made in their favor are (1) an added interest, for the intelligent pupil, in school work, and consequently more rational progress; (2) a more complete and rounded training of faculties and an added attention to the observation and constructive elements in education; (3) development of greater self-reliance and independence of action in the pupils; (4) a turning of the minds of children toward the ordinary activities and occupations of life, with an increased interest in school work and the consequent desire to continue longer at school.

On the other hand, except as a portion of a properly correlated course of study, such as that outlined on page 11, these subjects have no right to a place on the school curriculum. Pupils are not apprentices and schools are not mechanics' shops to teach handicrafts, as such.

As regards the teacher, it is upon him exclusively that this department as an educative agency depends. A mere mechanic or cook, no matter how skilful, who simply gives directions in performing certain work will accomplish nothing useful. The teacher, it is true must be an expert workman, but in addition to training the eye to see accurately, and the hand to perform as the mind directs, he must keep in view as the underlying object, the training of the mind for control and power. The mechanic aims at doing a certain piece of work, and if that is all, the apprentice and the tradesman's shop are the conditions for learning. The teacher aims at giving the boy or girl power and adaptability to meet successfully the conditions that will confront the individual in life; and the ability to do certain things is entirely a secondary consideration.

What Can Be Done.

In the larger cities, Ottawa, Toronto, Hamilton, London, Montreal, Winnipeg, a course of study similar to that outlined in this report at page 14 can very well be introduced into the public schools at the kindergarten stage, and carried to completion in a technical high school, established by the municipality, just as are the present high schools for the language courses. Another solution, and one that is better both from the point of organization and of education, is that in which the whole school from the kindergarten to the machine shop and the nursing room, together with the necessary science, &c., would all be arranged in one institution and under one management.

The schools of this class that to-day are doing the best educational work on the continent had their origin in private endowments. There are philanthropic people in Canada who are in a position to aid educational institutions, and who have in many cases liberally done so in the past.

The wide spread benefits and the possibilities of good to the rising generations that originate in such schools as those here described, make it pertinent to suggest that such an endowment may be quite as philanthropic a matter as the founding of university chairs, and that the greater the number of students who in early years can be provided with a suitable preparatory education the greater will be the call for university work at a later period and the higher the educational standing of the country.

In the smaller cities and larger towns the elementary part of the course can be carried on in the public schools with the present work ; but as the establishment of separate high schools is probably beyond the means financially of these municipalities, a technical course made up of the most necessary part of the curriculum can be introduced into the existing collegiate institutes. For boys this selected course would be kindergarten exercises : drawing, both freehand and mechanical ; wood-working exercises and wood-carving. For girls, kindergarten exercises : drawing, freehand and ornamental designing ; needlework as far as easy dressmaking and millinery ; and simple cooking and nursing operations. In all cases however, the classroom work consisting of English, Science, Mathematics and optional languages (if desired) should be taken without curtailment.

What is Practical ?

Much has been said lately in praise of the practical in school work, and unfortunately most people understand by *practical* the actual preparation for a trade or calling. If schools ever become degraded to this degree it will be a case of good-bye to all education because learning a trade, even typewriting or shorthand, is not becoming educated. *Practical*, as applied to school work, must mean and mean only the gaining of the power to perform all the various duties which will devolve upon the individual and the citizen, —in short the adaptation of the man to the society and the civilization about him. Winning dollars is but a part of the duties that will come to him, and it is a curious perversion that arrogates to this one function all that is *practical* in schools and occupations.

Outfit for the Work.

The appliances in the way of tools and fittings for carrying on the manual training and domestic science course outlined in this report, may be obtained for about the following outlay :

PUBLIC SCHOOL.

Drawing materials (Bradley Kit), each.....	50c.	\$1.00
Sloyd Knife, each.....	25c.	
Watercolor box, each.....	25c.	
Crayons, each.....	5c.	
Scissors	25c.	

HIGH SCHOOL.

Woodworking—(the last sum mentioned is the actual cost of the outfit in the Kingston Collegiate Institute).

DRAWING.

Tables.....	\$3.00 to \$10.00.	\$5.20
Boards.....	.25 to 1.00.	.65
Instruments	5.00 to 15.00.	6.00
T. Square, scales, triangles.....	1.50 to 4.00.	2.75
Ink, pencils, rubber, tacks.....	50 to 1.00.	.65
Appliances for demonstration and occasional use..		26 74

WOODWORKING.

Benches.....	\$6.00 to \$15.00.	\$12.00
Vise.....	.75 to 6.00.	6.00
Tools.....	7.00 to 20.00.	13.25
Appliances for demonstrating and occasional use.		50.22
Lathe.....	\$40.00 to \$100.	60.00
Motor.....	50.00 to 150.	75.00
Shafting		10.00
Tools		3.00

DOMESTIC SCIENCE.

Range, and cooking utensils.....	\$50.00 to \$100.00	
Tables, gas burners and fittings for each —two members—about.....		10.00
Occasional appliances for dining and nursing rooms.....		40.00
Sewing machine.....		25.00
Water color outfit, per pupil.....	\$1.50 to \$ 3.00	

In purchasing and fitting up for technical work all tools and appliances should be first-class,—not bought for show but for use.

Hammacher, Schlemmer & Co., 209 Bowery, New York city; and Chandler and Barber, 124 Summer St., Boston, Mass., are dealers in supplies for manual training work.

Milton Bradley, Springfield, Mass., will supply water colors.

Keuffel and Esser Co., Fulton St., New York city, can furnish anything required in the way of drawing instruments and material.

A Final Word.

The course of study outlined in this report is intended not to make boys and girls adepts at this dribble of work or that, but to provide that general and systematic training which will make men and women of power to meet and turn to their advantage the circumstances of actual life; and not only that but to live both intellectually and physically to the greatest extent possible the life that lies before them. This is the aim of all education. The foundation for active, strenuous, intelligent living is not laid in the strife for examination marks, but by careful training, culture and adjustment of the life within the school to the life beyond it.

Has the time not fully come for us in Ontario to cease degrading our whole primary and secondary schools into mere factories for preparations of teachers and matriculants, to cease the constant altering of curriculum to meet the requirements for entrance to higher institutions? Should we not rather have a course that will be really educational for all members of the community; and for once let the greatest benefit to the greatest number be the guiding principle of our system?

This report is intended to help toward that end.

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