ROYAL COMMISSION

ON

INDUSTRIAL TRAINING AND TECHNICAL EDUCATION

REPORT OF THE COMMISSIONERS

PART II

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1913

ROYAL COMMISSION ON INDUSTRIAL TRAINING AND TECHNICAL EDUCATION.

OTTAWA, 31st May, 1913.

The Honourable T. W. CROTHERS, K.C., M.P.,
Minister of Labour.

SIR.—By direction of the Royal Commission on Industrial Training and Technical Education we most respectfully submit Part II of the Report.

JAS. W. ROBERTSON,
Chairman.

THOS. BENGOUGH,
Secretary.

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SECTION 1—*Continued.*

CHAPTER I: ELEMENTARY EDUCATION IN RELATION TO INDUSTRIAL TRAINING AND TECHNICAL EDUCATION.

SECTION 1: ELEMENTARY EDUCATION IN GENERAL.

There was a general agreement of opinion, as expressed to the Commission, that Elementary Education in Canada affords satisfactory preparation for entering Secondary Schools, but that it does not give the kind of training or the kind of knowledge which should be possessed by those who leave school at 14 years of age or thereabouts and enter upon industrial, agricultural or housekeeping occupations. Considerable changes have been introduced during recent years to give such pupils a more specific preparation for their life work. Manual Training has been introduced partly with this object in view and partly for its cultural influences on the general powers of the pupils. Domestic Science finds a place on the programme chiefly for its practical value; School Gardens have been taken up and Nature Study has been extended particularly for the purpose of cultivating the powers of observation and increasing the knowledge of the children concerning the things of Nature which lie close to them and all about them.

Pre-Vocational Work.

More recently in several other countries the activities of the children during the last year or two of their attendance at school give them a definite preparation for the vocations which they will follow. For a long time the only vocations which the schools intentionally and definitely prepared for were those of the learned professions. Now in public Elementary Schools in England, Scotland, France, the United States and elsewhere the children do work at school with materials and tools from 12 years of age and upwards for the definite purpose of giving them industrial and technical (trade) preparation for the occupations they are to follow. This education is closely co-ordinated with the other or literary part of the schoolwork wherever that is practicable with advantage to the pupil.

In London and other places in England, at the age of 11 to 12, children whose parents so desire may receive education for 2 or 4 years in schools with what is called an industrial bias, or a commercial or domestic occupations bias. In some other places this is called Supplementary Education, or Pre-Vocational Education, or Trade-Preparatory Education. The object is to combine with the work of the Elementary School such series of experiences as will qualify boys and girls upon leaving school to enter upon occupations with as much preparation as is practicable, considering their age, strength and capacity.

The industrial bias means that the courses give the pupils experiences of such a sort as to awaken their interest in industries and their processes and products, and to increase their knowledge concerning these. The courses are arranged to develop ability and understanding by practice in doing work of a kind as nearly similar as possible to that of the industries themselves.

Some Conclusions.

From the testimony received it appears highly desirable in the interests of vocational efficiency,—

That all children to the age of 14 years should receive the benefits of elementary general education up to at least the standards provided by the school system of the place or province where they live;

That the experiences of the school should tend more directly towards the inculcation and conservation of a love of productive, constructive and conserving labour;

That, after 12 years of age, for the children whose parents expect or desire them to follow manual occupations, the content of the courses, the methods of instruction and the experience from work undertaken at school should have as close relation as practicable to the productive, constructive and conserving occupations to be followed after the children leave school.

The Commission is further of opinion,—

That benefits from such Pre-Vocational education would accrue (a) from the interest awakened in manual occupations; (b) from the discovery through their experiences at school to the pupils themselves, and to the teachers and the parents, of the bent of their abilities and aptitudes; and (c) from the taste and preference thus developed leading the children to follow skilled occupations for which they are suited;

That further advantage would result because the interest which this form of education would arouse in the children would dispose them to desire further education after they had begun to work, and cause them to keep in touch with educational effort in some form;

That the time and attention devoted to Pre-Vocational or Trade-Preparatory work in no way detracts from or hinders progress in general education of a cultural sort.

SECTION 2: ELEMENTARY EDUCATION FOR VOCATIONAL EFFICIENCY.

Important Considerations.

The kind and amount of Industrial Training and Technical Education which an individual is able to take up and profit by is determined to a large extent by the previous general education. General education is here taken to

mean the formal studies in reading, writing, drawing and arithmetic, together with the experiences got from association with others in work, in play and in social intercourse, which have developed the powers of mind and body and have furnished the knowledge possessed by the individual.

Those who have this general education in hand will best provide for subsequent vocational efficiency by ever bearing in mind the following propositions:—

I. It is important that health should be protected and preserved.
II. It is important that the harmonious growth of the powers of body, mind and spirit should be fostered.
III. It is important that the senses, the avenues of impressions whereby knowledge is acquired in the first instance, should be trained.
IV. It is important that ability and desire to work and play with enjoyment, intelligence, skill and energy should be developed.
V. It is important that good habits should be formed, particularly habits of obedience, courtesy, diligence and thoroughness.
VI. It is important that proper standards of conduct and character should be maintained and that high ideals should be followed.

The schools of Canada accomplish much towards these ends, but in order that their pupils may be prepared to profit to the fullest extent by Industrial Training and Technical Education, the evidence which has been received by the Commission requires us to submit the following suggestions regarding general Elementary Education, for its improvement, extension, enlargement and enrichment.

I. Training of the Senses and Muscles.

Provision should be made from the beginning for series of experiences whereby the senses and muscles would be trained and developed, as by the Kindergarten and the Montessori Methods, followed throughout all the elementary grades by appropriate Construction Work and Drawing. Tasks with a meaning which appeal to the pupil furnish better lessons than mere exercises which do not call forth willing and purposive effort. They should be arranged to ensure the training of,—

The Sense of Seeing, to discriminate closely between forms and sizes; the Chromatic Sense to distinguish between colours and shades of colours;

The Sense of Feeling to discriminate by touch, temperature and weight;

The Sense of Hearing, to discriminate quickly and closely between sounds;

The Muscles by such conscious and purposive movements of the arms, hands and fingers, in co-ordination with the eye and also blindfolded, as would develop what might be called muscular aptitude and muscular memory.

II. More and Better Drawing.

Provision should be made in all schools for practice in Drawing. Nearly all children, from five years of age, have a desire and some ability to make "Pictures". They should be encouraged and directed to represent their impres-

sions and thoughts (mental images or pictures) in form and colour. Such efforts lead to habits of careful observation of whatever thing is being studied. Material from Nature is the best subject matter; next, objects in common use. Making copies from flat drawings, before considerable facility has been acquired in representing forms and colours, appears to be a waste of time. The teacher can render most help by suggestive enquiry and by leading the pupil to compare the drawing critically with what it purports to represent.

III. More Physical Culture.

Physical Culture, co-ordinated with the training of the senses and muscles, should be part of general education in all schools. The series of experiences provided should have regard to the preservation of health, the exhilaration of recreation, and the harmonious development of the powers of the child through directed and willing control of the body, in movement, in repose, in action, in work and in play.

IV. Nature Study and Experimental Science.

Nature Study, from its beginnings in the observation, consideration and recording of common phenomena, particularly in those out-of-doors, leads naturally to the use of those sciences called Biology, Physics and Chemistry. At this stage a simple laboratory is necessary. It need not be elaborate in its appointments. Systematic study by experimental laboratory methods would be of advantage, whether a pupil is to go directly to work after leaving the Elementary School or on to a Secondary School and perhaps later to a College.

V. Pre-Vocational Work.

There should be differentiation in the instruction and the activities of the pupils after the age of 11 or 12, with due regard to the occupations which they will probably follow. Series of experiences at school may be entirely educational and at the same time prepare the pupils for carrying on the operations and processes which are common to groups of fundamental vocations, such as the agricultural, industrial, commercial, housekeeping and professional. They have to do, as far as materials are concerned, chiefly with soil, plants, clay, paper, wood, textiles, metals, leather and foods.

VI. More and Better Singing.

Class Singing of good songs, and singing by the school in mass, should be encouraged as a means for cultivating the patriotic spirit and the control of the expression of emotions. Singing should provide frequent recreations for the feelings during every school day. From three to five minutes when lessons are changed would suffice. The cultivation of a love of good music and the development of ability to sing would naturally follow.

There are many benefits from frequent periods of enthusiastic singing in class and in mass; and also advantages from periods of immobility and silence. But few schools, outside Germany and Denmark, have learnt the value of such alternate experiences as preparation for quick and clear receptivity and correspondingly clear and competent power of expression.

VII. Play and Games.

Organized and Supervised Play and Games should be provided as a regular part of the school course. Some attention should be given to such forms of play, games and recreation as could be continued by the pupils and followed with enjoyment and benefit after they become adults.

Relief of the Time-Table.

It is to be remembered that these suggestions do not imply the introduction of any new subjects into the course of study. The relief of the time-table from the pressure of a multiplicity of separate subjects as such is an evident necessity. The work of the school should gradually be arranged less and less on subjects as such and more and more on occupations, projects and interests, each of which would form a centre for the correlated study of several subjects such as reading, composition, number work, writing and drawing.

The Formation of Habits.

Educational progress towards efficiency for working is made when the individual pupils form the habit of treating every lesson, when practicable, as a cycle of activities including:—

Attending and responding, that is reacting with purpose, to material things, forces and thoughts;

Observing closely and, by the aid of knowledge already possessed and by experiment or inference, using impressions obtained to form new ideas or concepts;

Reflecting on the increased content of the mind by holding ideas in relation to each other and planning for subsequent co-relative expression;

Expressing thoughts, feelings and purposes in various forms, such as, speaking, drawing, writing, making, modelling, painting, acting, singing, etc.

Applying the knowledge thus acquired to new cases and reasoning to conclusions in general principles, thereby gaining new power and ability for reacting, observing, reflecting and expressing.

Impression and expression have a reciprocal relation, the permanence of the impression depending on the interest felt in the expression, and the truth of the expression on the clearness of the impression. The educational value of both is the extent to which they form habits serviceable for the practical needs of daily life.

The processes indicated in the foregoing paragraphs are not wholly separable from each other. That form of statement is used for convenience of explanation. The point is that the lesson or lessons, which constitute an educational project or occupation, should not stop short of the full cycle of experience in observing, reflecting, expressing and reasoning to conclusions as indicated. Such a use of the matter to be dealt with in lessons would naturally result in the carrying over of the ideals of such procedure into other activities. In consequence we might reasonably expect the formation of habits such as:—

Managing the self and things with ever lessening waste of time, force and material;

Co-operating with others to give objective expression to inner conceptions through working, playing and living.

Biological and Social.

Since education is recognized as having two chief functions of service, one biological and the other social, it can doubtless serve individuals better by the discharge of those functions concurrently, than by separating them for attention at successive stages. Whether stress should be laid on one more than another at different times during the period of education is a question for the teacher. Education being for individuals who are living in a world of things (animate and inanimate), of forces (personal and external), of ideas and of emotions, it must attempt to train for useful, happy life by methods which recognize all these factors at every stage of educational progress.

Having regard to the fact that all education is for life, and that the occupation absorbs a large proportion of the strength and time of life, it appears wholly desirable that education at the school or elsewhere should prepare for occupation by having the pupils over 12 years of age participate in the activities of some fundamental occupation, as well as receive intellectual instruction.

Further Conclusions.

The Commission is of the opinion,—

(1) That education should have regard to the growth of the powers of the body, mind and spirit concurrently, and that it should have regard to the preparation of the pupil for later life as an individual, as a working earner, as a citizen and as a member of the race;

(2) That education should be provided of a kind suitable to meet the needs arising from the changes in the nature and methods of occupations, the manner of living and the organization of society;

(3) That existing institutions, in so far as necessary, should be modified or altered and have additions made to the courses of study or kinds of work taken up;

(4) That the preparation of teachers for the new and different kind or kinds of education is a first necessity and duty in order that they may be qualified to do the new work successfully;

(5) That such improvement, extension, enlargement and enrichment as have been indicated would let the school experiences become a reasonable preparation for beginning working life and entering upon Industrial Training and Technical Education; and that without such preparation no system of Industrial Training and Technical Education can, to any considerable extent, be permanently successful.

Some Recommendations.

The Commission is of opinion that the teaching of Drawing, Manual Training, Nature Study, Experimental Science and Pre-Vocational work (including Domestic or Household Science) in Elementary Schools is of great importance and value and should be provided for generally.

Having regard to the cost of carrying on these branches in the Elementary Schools, until teachers are available who themselves have been taught them during their school days, and bearing in mind that such school work was not contemplated as part of public education at the time of Confederation when the Provinces accepted the responsibility of legislating for the maintenance and control of education within their borders, the Commission ventures to recommend that a Fund be created from which payments would be made to the Provincial Governments during a period of ten years.

The Commission suggests that such a Fund should receive not less than $350,000 a year for ten years from a Dominion Parliamentary Grant; and that it should be divided into nine portions, in proportion to the population in each of the nine Provinces as determined by the latest census, and allotted to each Province accordingly.

The Commission further suggests that there should be paid to each Province from said Fund (if and when the amount to its credit in said Fund is sufficient therefor) an amount not exceeding 75% of the amount which such Province had paid, during the immediately preceding fiscal year, for the promotion and support of Drawing, Manual Training, Nature Study, Experimental Science and Pre-Vocational work, including Domestic or Household Science, but not including the provision of buildings.

It would appear to the Commission that a certificate by the Chief Education Officer of any Province, setting forth in detail the places, the work done and the sums paid by the Province in furtherance of these branches should be regarded as satisfactory evidence of the amount earned by said Province.

Any portion of the Fund allotted to a Province which may remain unpaid or unearned at the expiration of any fiscal year should be carried forward and remain in the Fund for said Province until earned.

SECTION 3: PRE-VOCATIONAL INDUSTRIAL EDUCATION IN ELEMENTARY SCHOOLS.

At many of the places visited the local committee or other representative body, to whom the Commission was indebted for opportunities to learn what was being done in Industrial Training and Technical Education, first guided the Commission to an Elementary School to show the character of the Hand Work which was provided for. That was the case more generally in Europe than in Canada. Out of that experience grew the conviction that a Report on Industrial Training and Technical Education would not represent fairly what was being done unless it included at least a brief statement concerning the Pre-Vocational or Trade-Preparatory parts of Elementary Education. Consequently some information is presented on recent developments of these parts of Elementary Education in England, Scotland, the United States, Germany and France.

(1) CONSULTATIVE COMMITTEE OF THE BOARD OF EDUCATION (ENGLAND AND WALES.)

The Consultative Committee was created by the Education Act of 1899, which empowered the Crown to appoint a Committee, two thirds of whom represent universities and other bodies interested in education, for the purpose of framing regulations for the registration of teachers and of advising the Board of Education on matters referred to it. It consists of 21 members, appointed by the Crown on the nomination of the President of the Board of Education, holding office for 6 years, one third retiring every second year.

The following are extracts from the *Report of the Consultative Committee on Attendance, Compulsory or Otherwise, at Continuation Schools* (1909).

"The Committee feel that some reference to the education and training given in the Day School is an inevitable preliminary to the consideration of the problem of Continuation Schools. The Day School and the Continuation School are integral parts of a whole, and it is useless to discuss the possibilities of the one without considering those of the other. The Continuation School works upon the material prepared in the Day School. Its curriculum, its methods of teaching, must be a natural development of the Day School.

"Even what they have learnt is often of an academic rather than a practical nature, and if, as often happens, they go at once into unskilled work, and have no opportunity of applying and fixing the knowledge they have acquired, they soon forget even what little they ever learned.

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"Exposition, now often given in excess, would be replaced in part by constructive work, and the consequent development of each child's individual powers would lead to an increasing desire for a lengthened school life.

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"But if it is believed that within certain age limits the brain development of children is better secured if their hands are brought into play than if they are wholly confined to book instruction, and this view is strongly held by the Committee, then an examination of what is being done in the Elementary Schools shows how far we are from reaching any such ideal. Training in handwork is no doubt common in the case of infants in kindergarten classes. But when infants are promoted to the lower classes of the upper school, this form of training is frequently dropped and not resumed until the children become eligible at the age of 11 or 12 to earn grants for instruction in the Special Subjects enumerated in the Code, and then only in a small percentage of cases, chiefly in the larger towns. The Committee understand that the movement in favour of increasing opportunities for handwork in the Day School for children between 7 and 11 or 12 years of age is growing, and that in some Public Elementary Schools much is already done.

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"The Committee feel that these figures point to a very serious defect in the Day School. They think that manual instruction should, in some form, enter into the curriculum of all schools for older scholars, as is the case already in London and some other large towns, and that this important branch of their training should not be dropped, as it so often now is, when children leave the Infant School.

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"There are, of course, other ways in which the curriculum of Public Elementary Schools could be improved, so as to give the scholars not only a better education during their Day School period, but one which would fit them better for further education. But the one outstanding fact is the need for more handwork in the curriculum."

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(2) LONDON COUNTY COUNCIL.

The following extracts from the Report of the Education Committee of the London County Council, approved March 1910, indicate the trend of opinion and action.

There is at the present moment a wide-spread feeling that it is of great importance, in the interests of the community at large, to give more attention to the development of "practical" education in the elementary schools. Both educationists and men of affairs seem to concur in the view that education can be made more effective if the pupils can be taught more by "doing" and less by listening. It is considered that the intelligence of both boys and girls can be stimulated and trained not only by the imparting and acquisition of knowledge by means of books, but also by the exercise of hand and eye upon concrete objects. It is felt that a boy on leaving the elementary school should have had an all-round training of his faculties, and should have acquired that readiness and adaptability which will enable him to turn his hand to the task that awaits him in the workshop or factory. Working-class parents are themselves fully alive to the importance of obtaining this kind of training for their children, as is shown by the recent formation of the National Industrial Education League, which has for its object the promotion of a system of education for boys in the elementary schools which will enable them to hold their own in the industrial world.

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The formation of the various Trade Consultative Committees, which are now assisting the Council in its work of technical education, also shows the importance which the workers in the various trades attach to education. Another sign of the present trend of thought is given by the fact that a deputation from the metropolitan borough councils recently waited upon our General Purposes Sub-Committee and called attention to the importance of making education in elementary schools more practical.

We are of the opinion that this movement of public opinion gives an indication of the method which the Council should adopt in the organization of the proposed schools. They should, in our opinion, be schools which will give their pupils a definite bias towards some kind of industrial or commercial work while ensuring that their intelligence should be fully developed and they should occupy a distinct position from the secondary school. They should avowedly frame their curricula with a view to the pupils leaving at an age between 15 and 16. Their courses should be so framed as to provide for the pupil the best possible equipment for entering upon the industrial or commercial world as soon as he leaves school while at the same time qualifying him to enter upon a special course of training for some particular industry at a polytechnic or similar institution if he desires to continue his education further.

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(3) CENTRAL SCHOOLS OF LONDON.

In addition to the Elementary Schools which supply the usual type of general education the London County Council has organized a number of Central Schools with a view to providing for those boys and girls who are to stay at school till about fifteen years of age an education which, while being general, will have a commercial, industrial or domestic subjects bias. It is proposed that there should be about sixty such schools and that they should as far as practicable be distributed uniformly throughout London. The pupils are selected from the ordinary schools when between the ages of 11 and 12 and they are chosen partly on the results of a competition for scholarships and partly on the results of interviews with the Head-teachers and Managers.

Much Constructive Work.

Only those pupils are accepted whose parents desire them to receive from that age some definite instruction and training to qualify them for the occupation which they are likely to follow when they leave school at 13 to 15 years of age. These schools make no attempt to teach trades as such. The pupils are given opportunity to acquire a knowledge of materials, tools and manipulations which will make them more useful and more able to learn quickly when they go to work in shops and factories or homes. The theoretical instruction and the practice in Arithmetic and Drawing are given a direct relation to the practical work of the pupil. Although there are differences in individual schools, in general about one half to two thirds of the time of the pupils is devoted to work on subjects usually taught in Elementary Schools, and about one half to one third of the time to manipulative or constructive work.

Scholarships.

A limited number of bursaries or scholarships tenable from the age of 14 to about 15½ are awarded to those pupils who need financial assistance to enable them to stay at school beyond the age of 14.

These schools are distinguished from the ordinary Elementary Schools by the fact that the pupils are selected and are expected to go through a complete four years' course with a special curriculum. They are also distinguished from the Secondary Schools by the fact that they are public Elementary Schools providing free education and that the curriculum is framed with a view to enable pupils leaving school at the age of 15½ to be in a better position to earn their living. The total number of Central Schools that had been organized up to 1911 was 39. Of these 13 have an industrial bias, 13 a commercial bias and 13 both an industrial and commercial bias.

The Commission understood that when the Central School scheme comes into full operation it is the intention to have the schools reserved for only pupils over 11 years of age.

The Commission visited a number of typical Central Schools. The following are notes of some of the suggestive or instructive features:—

West Square Central School.

This is a school for boys and girls with an industrial bias. About half of the whole time was given to practical or manipulative work including Drawing. Out of ten sessions per week one and a half sessions were devoted to work at benches in the workshop. The bench work was with wood only. The Principal of the school would prefer wood-working during two years and then wood and iron-working concurrently during two years.

The courses of study are grouped under several divisions, namely, Industrial History, Economic Geography, English, Mathematics, Handicrafts, Drawing. These are all closely correlated. For example, in the Wood-working department the boys make the apparatus required in the Science Laboratory. The school is situated in a working district and is specialized towards industrial life. Other Central Schools at the differentiation period give both commercial and industrial instruction. This school leaves out the commercial. The Commission received a volume containing a statement of the schemes of work in detail and illustrated by the pupils. It is a matter of some regret that space cannot be found for a representation of this document. Several hundred drawings illustrate the general syllabus for Science, Handicrafts and Drawing.

INDUSTRIAL HISTORY.

In the division of Industrial History the following brief statements are given as illustrations of the syllabus:—

First Year's Course: General Scheme.—Outlines of general history 1066–1485 with special reference to the Doomsday Book and the Feudal system; origin and growth of towns and guilds; economic effects of the Feudal system; agriculture, the principal industries, manufactures and trades, England's monopoly of wool, the effect of the Crusades on foreign trade; the Black Death and its economic results; the Peasants' revolt of 1381, and the subsequent condition of the people at the close of the Middle Ages.

Then follow details of the syllabus and the mention of reference books.

Second Year's Course: General Scheme.—Outlines of general history 1485–1689 with special reference to trade and industries, and the conditions under which the people lived; the conditions prevailing at the close of the Middle Ages and the great changes arising from the Wars of the Roses; the rapid growth of foreign trade owing to colonization; the increase of the mercantile classes; the revival of learning.

Then follow detailed particulars with mention of reference books.

Third Year's Course: General Scheme.—Outlines of general history 1689–1820, with reference to the "Bloodless Revolution" and its effects on industry and trade; the rising power of the trading classes; the acquisition of colonies and dependencies and the expansion of foreign and colonial trade; the transition from the domestic system of industry to the establishment of factories; the age of inventions.

Then follow detailed particulars with mention of reference books.

Fourth Year's Course: General Scheme.—Outlines of general history 1820 to the present time, with special reference to the industrial progress of the nation; the improved means of transit internally and with colonial and foreign ports; introduction of penny postage and the electric telegraph; the growing power of the industrial classes and organization; the general reform of social conditions; local government and extension of self government to the colonies.

Then follow details of the syllabus with mention of books for reference.

DRAWING.

In the Division of Drawing, Free Drawing and Mechanical Drawing are carried on concurrently during the whole of the four years. Free Drawing from Nature in the form of stems, leaves, flowers and shells goes practically hand in hand with Mechanical Drawing. In the fourth year the Free Drawing takes up the application of the forms of stems, leaves, flowers and shells to simple design, while the Mechanical Drawing goes as far as simple Mechanical Drawing as applied to machine construction with Isometric Drawing as applied to technical work.

A serious effort is made to shape the instruction so as to qualify the boys for the industrial life of the district. No attempt is made to teach the boys directly any trade, but to give them a degree of familiarity with tools in general besides the scientific elementary principles applicable to all trades.

Similarly girls are trained so as to be fitted for home-life. The girls' courses cover cooking, laundry, housewifery or house-keeping, dressmaking, needlework or embroidery; and preparation was being made for the introduction of millinery.

INTEREST AND ENTHUSIASM.

A detailed course of study was also obtained from the Childerley Street Central School. It is somewhat different from that of West Square Central and was framed to meet the conditions of working and living in its area.

At the Childerley Street School the children between the ages of 11 and 12 are drawn from 17 other schools. The Commission was impressed by the evident interest of the boys and girls in their work. As a case in point, upon entering a drawing room where 25 boys were at work, instead of the presence of the Commission creating distraction there was only a casual glance of observation and then every boy went on intently with his work.

Other Central Schools were visited. A volume would be required to contain particulars regarding all the good work carried on at them. The Commission was impressed by the enthusiasm, native ability, alertness and educational experience of the Headmasters and the Headmistresses.

Physical Drill and Music were in evidence, boys singing what appeared to be difficult music in excellent harmony. Boys between 9 and 10 drilled with a precision of movement that was quite remarkable. In the Physical Drill of the girls more attention was directed towards grace of movement as illustrated in simple dances.

From one of the Central Schools it is reported that 70% of the boys enter industrial work. The Headmasters are in touch with employers and do their best to place every boy in a situation on the completion of his course.

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(4) TRADE PREPARATORY SCHOOLS IN LEEDS.

The Trade Preparatory Schools of Leeds belong to this class, They do not attempt to teach a trade as such, but to give information and training which prepare the boy to make progress without loss of time after he goes to work. These Pre-Vocational or Preparatory Trade Schools are also said to satisfy the boys and girls that through them they are acquiring experiences, developing abilities and gaining knowledge which will be directly beneficial to them. When this attitude of mind is common throughout the classes of the school, teachers say, pupils make much more progress. That is what might be expected.

Good All-Round Training.

The Holbeck Preparatory Trade School is a good example. It was opened in February, 1906, and was in full working order when visited by the Commission. The course of instruction given in the Trade Preparatory School is calculated to answer two very useful purposes. In the first place the hand, eye and brain are trained on sound commonsense lines, with a view to the ultimate employment of the boy in some branch of engineering. Secondly, the boy has many opportunities of observing and taking part in different kinds of work and processes. His interest is aroused and stimulated, He competes with his class fellows and often develops ability in quite unexpected directions. By this means the boy is encouraged to select some particular branch, and to some extent to specialize thereon, with a view to following it up in the works. When the time

comes for him to be drafted into the particular shop or office selected, he goes with a clear understanding of what is before him and with a mind fully prepared to master all the intricacies of his craft in record time.

The leading local employers are in full sympathy with the aims of the school, and the opinion in Leeds is that the time is not far distant when a full Preparatory Trade Course will be an essential qualification for entry into the better class of engineering works, which correspond with what are known in Canada as the Metal Machine Trades

The course of instruction provided covers a period of two years, and is laid down with the object of improving the general education, developing common sense and reasoning power, and enabling a boy to acquire the neccessary manual dexterity to ensure that he shall be put at once on useful work when he enters the shops.

Boys are admitted who have attained the sixth standard. That is two years before the completion of the Elementary School. The age is usually from twelve to thirteen.

Features which Impressed the Commission.

The following is a brief statement of the features which impressed the Commission on the occasion of their visit:—The school takes in lads intending to go into industrial work and an undertaking is required from the parents to the effect that the lad will not be withdrawn in less than one year. While the school authorities prefer that each pupil should stay at least a year and a half they let the boys go whenever a suitable place is obtainable. The main object is the improvement of the capacity of the youth before he enters on a trade. It aims at developing industrial capacity in lads of from twelve to thirteen. The courses of study are set out in full in the announcement; they are practically arranged in three divisions as to time, one third to English subjects, one third to mathematical subjects, and one third to shop work in metal and wood. The teachers engaged are men who are skilled workmen. They take a personal interest in preparing the boy for his future work and also in securing a place for him. Both the teachers and the boys themselves are on the lookout for suitable places. The equipment of the school was suited for handwork, foot power being used on the lathes. It was held that the boys learned more and learned better in that way. The attitude of the pupils revealed earnestness and keen interest in their work. The excellent quality of the work was specially noticeable in the wood and metal products and in the drawings.

Mr. Graham's Opinion.

Mr. James Graham, Chief Education Officer for the city of Leeds, told the Commission that he desired very much to see work such as that done at the Holbeck Trade Preparatory School put into every Elementary School for boys throughout Leeds, so that between the ages of 12 and 14 they may obtain a knowledge of the principles underlying all the main trades of Leeds. Their

English will be better than at present, their ability to draw will be better, they will read a plan easily and be able to make measurements and work out in practical arithmetic, based on measurements, statements of machinery details, etc. In short he anticipated that they will rapidly become skilled workmen, either at the bench or lathe. If they are going to be that, the sooner they are into the works after 14 years of age the better the boys will be as mechanics.

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(5) SUPPLEMENTARY COURSES IN SCOTLAND.

There is a considerable development of this type of educational work in Scotland. There it is known by the name of "Supplementary Courses of Instruction".

These may be considered as the most advanced work of the Primary School. They are designed for pupils who are to leave school at the age of 14. The instruction is to a certain extent specialized, and the Department indicates the nature of the specialization in specimen Supplementary Courses. These are:—I. Commercial Course; II. Industrial Course; III. Course for Rural Schools; IV. Household Management (Girls) Course. Navigation is suggested for seaboard schools. It is expressly stated by the Department that these courses are mainly suggestive and cannot, as a rule, be satisfactorily overtaken in their whole extent by pupils who leave at the age of 14. However, they are carried on in such a way that the pupil can continue them in the more advanced Continuation Classes.

Circular 358 of the Scotch Education Department states:—

School work has for its end and aim objects more important than preparation in the narrow sense for any particular occupation. It should aim at producing the useful citizen, imbued with a sense of responsibility and of obligation towards the society in which he lives. It should render him—so far as the school can do so—fit in body and alert in mind, and should prepare him for the rational enjoyment of his leisure time, as well as fit him for earning his living. These are ideals, no doubt; but they are ideals towards which the school should constantly strive.

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With regard to the special instruction to be given in the several Supplementary Courses, my Lords do not expect, nor do they at all desire, that such instruction should attempt to take the place of that kind of knowledge which can only come from the daily practice of some particular occupation. But this instruction, rightly given, should make that practice more intelligent, and should remove certain difficulties from the way of the learner. It should be sufficiently general in scope to make it profitable even for those who for one reason or another will not follow in after life the particular group of occupations which has been kept mainly in view.

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It is obvious that great differences will exist, particularly between town and country schools, as regards facilities for the formation of courses such as those now suggested. In considering the problem of these courses, my Lords have had constantly in mind the position of the small rural school taught by one teacher. In such circumstances class teaching of the small number of pupils who have reached the Merit Certificate stage is clearly out of the question. But my Lords are scarcely disposed to regard this as being, in certain respects, any real disadvantage. It has been frequently noted as one of the defects of the large town school, with its minute subdivision of classes, that the pupil is left little leisure to think for himself, and

that the habit of depending upon the instructions and explanations of the ever-present teacher is apt to become ingrained. On the other hand, it is the opinion of not a few experienced observers that the country lad, as compared with his contemporary in a town school, shows towards the close of his school career greater intellectual resources, and that this is due, not so much to inherent mental ability or to any superiority in the teaching, as to the fact that—the aid of the teacher not being always available—he has been forced by circumstances to think for himself. Be this as it may, it is clearly desirable, in the case of a pupil who is to be more or less his own master at fourteen years of age, that there should be in school a period of preparation for this state of semi-independence, during which transition period he shall be regarded not as a pupil of a class, but as a student studying, under direction, certain subjects for ends which he himself in some degree realises and desires.

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Not merely should self-reliance in study be fostered, but a sense of responsibility should be inculcated, by giving him at this stage some authority as regards conduct in the playground, and the minor matters of discipline, as well as a position of honour in exercises common to the school, such as drill. The boy at this stage tends to acquire a sort of authority among his schoolmates, and it is most important that this natural influence should be enlisted on the side of law and order, rather than that it should be driven, as it easily may be, into opposition. There seems to be no reason why it should not be turned to account in primary schools, as it frequently is in secondary schools, as an instrument in the development of character, and in the fostering of a healthy *esprit d'ecole.*

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But whether in town or country, whatever the opportunities for collective instruction may be, the distinguishing note of the work of the pupils in the Supplementary Courses should be individual study directed to practical ends. So far as the acquisition of knowledge is concerned the object should be, not so much to impart information to the pupil as to exercise him in obtaining for himself from sources within his reach, and setting out in an orderly manner, all necessary facts relative to a given topic. Great use may be made of the daily newspaper as a starting point of such investigations. For instance, having made an analysis of the shipping returns for a given port the pupil may ascertain the general character of its trade; look up in an atlas the various places mentioned in the shipping list; make note of their relative position and distance; gather from school geography, gazetteer, or encyclopædia certain information as to the more important of them, and finally set forth the information obtained in a well digested and orderly form.

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All this is not matter for formal and regularly recurring lessons in geography or history, but for individual investigation extending over, it may be, several days. The newspaper will also be useful in other ways. Its various articles will afford material for exercise in *precis* writing; difficulties of vocabulary will give occasion for frequent and useful reference to the dictionary; above all, perhaps, the market reports will furnish a body of material for exercises in calculation much superior to the cut-and-dried examples designed to illustrate the rules of a textbook, while their perusal may be made the occasion of acquiring much incidental information of practical value. It is by means such as these that a sense of actuality may be given to the work and a spirit of initiative cultivated in the pupils. But the examples given are not intended as directions to be implicitly followed; it is much more important that individual teachers should exercise their ingenuity in devising for themselves the best means they can for achieving the essential objects aimed at.

Twelvefold Increase in Ten Years.

An indicative of the growth of Supplementary Courses the following information is taken from the report of the Committee of Council on Education in Scotland, 1910-1911:—

A notable educational development of recent years has been the attempt to add reality to the work of the Primary School in its later stages by setting aside some time for the consideration of what has been already learned, in its practical bearing on the probable future occupation of the pupil and the employment of his leisure time. That is the special function of the "Supplementary

Courses" to which it is desirable that one or, if possible, two years should be given before the close of the period of general education. During the year ended 31st August 1910, 60,683 candidates were approved by the Inspectors, under Article 29 of the Code, for enrolment in Supplementary Courses or Higher Grade Departments.

During the same period the average attendance on which grant was claimed in 1,945 Primary Schools was 43,287, representing the scholars who have received instruction in Supplementary Course Work, and on whose account grants have been allowed at the advanced rates under Article 21 of the Code. Some idea of the progress in advanced work in Primary Schools during recent years may be gathered from the fact that in 1900 the number of these schools was only 162, with an average attendance of 3,282 in Supplementary Courses, paid under Article 21. But there is room for increased effort in this direction, and the need for Managers to make suitable provision for practical instruction in terms of Schedule VI. of the Code cannot be emphasized too strongly.

The foregoing shows an increase of over twelvefold in ten years; and yet the authorities, it will be noted, emphasize the need for increased effort.

Examples in Edinburgh.

The Commission visited schools in Edinburgh and saw classes in the Supplementary Courses at work in rooms fitted up in the ordinary public schools. In the Gorgie school, out of a total enrolment of 750 pupils, 80 boys and 80 girls were in the Supplementary Classes. In the Dalry School there was a similar proportion of pupils in the Supplementary Classes. Edinburgh has gone ahead with the plan of providing three special schools in which these Supplementary Classes can be conducted for children of twelve years of age whose parents desire their education to be somewhat specialized according to the trade or profession which they wish their children to follow. They will have a larger equipment for practical work than is at present provided.

Before they can get admission to the Supplementary School the scholars have to pass a qualifying examination of the Scotch Education Department so as to ensure that they are capable of taking advantage of the instruction imparted in it. The children are grouped into two divisions, those going on to the trades in one group and those desirous of a commercial career in the other. The curriculum is adapted to suit their needs. For those about to learn trades the workshops in connection with the school will be utilized. These workshops at the one school already erected, known as Tynecastle Workshops, provide for instruction in the following branches: Elementary Engineering, Brass Finishing, Tin-smithing, Moulders' work, Pattern Making, Elementary Building Construction, Plumbing, Carpentry and Joinery, Cabinet and Furniture Designing, Upholstering, French Polishing, Plasterers' work, Tailors' work, Tailoresses' work. There are also classrooms for Cookery and Laundry work.

Certificate of Merit.

To pupils who have satisfactorily completed the course of the Primary School, including attendance for at least one year at an approved Supplementary Course, the certificate called the Certificate of Merit is granted.

While there is no doubt that in many of the Supplementary Courses good work is being done, those in close touch claim that there is still need of improvement, especially in the direction of preparation for the future work of the pupil in the Continuation Classes. At present too many come to the Evening Classes with little of the special training that the Supplementary Courses are designed to provide.

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(6) EXAMPLES FROM THE UNITED STATES.

Fitchburg, Mass.

In the United States during the last few years beginnings have been made at many places in providing what are called Independent Industrial Schools and Schools of Manual Arts. An example of the latter kind of school is the Observation and Practice School at the Normal School at Fitchburg, Mass. At this school the pupils who take the Practical Arts Course begin at about 11 or 12 years of age to do manipulative and constructive work, the products of which have economic values. The children devote about 20 hours per week to the usual school subjects and 10 hours per week to the industrial activities.

The School is called the Manual Arts School of Fitchburg, Mass. Pupils from any part of Fitchburg who have completed the 6th grade are admitted at about 11 or 12 years of age. Four courses are offered, the successful completion of any one of which admits the pupil to the High School, where he may continue the line of work upon which he has begun or may take a fresh start by electing a different course.

A Commercial Course—30 hours per week—for those who expect to take the Commercial Course in the High School or Business College, or who intend to go to work in offices or stores at the end of the grammar grades.

12½ hours to Literature, Composition, Spelling, Penmanship, Mathematics, Geography, History, and Science.

7½ hours to Physical Training, Music, General Exercises, and Recesses.

5 hours to Bookkeeping, Business Forms and Procedure, Business Arithmetic, and Related Design.

5 hours to Typewriting and Hand work,.

A Literary Course—30 hours per week—for those who expect to go on through the High School and College.

12½ hours to Literature, Composition, Spelling, Penmanship, Mathematics, Geography, History, and Science.

7½ hours to Physical Training, Music, General Exercises, and Recesses.

5 hours to a Modern Language.

5 hours to Drawing, Designing, Making and Repairing. (Household Arts for Girls.)

A Manual Arts Course—30 hours per week—for those who expect to take the Industrial Course in the High School, or who intend to go to work in the trades, the mills or factories at the end of the grammar grades.

12½ hours to Literature, Composition, Spelling, Penmanship, Mathematics, Geography, History and Science.

7½ hours to Physical Training, Music, General Exercises, and Recesses.

10 hours to Drawing, Designing, Making and Repairing.

A Household Arts Course—30 hours per week—for girls who wish to devote a large amount of time to the arts of home making.

12½ hours to Literature, Composition, Spelling, Penmanship, Mathematics, Geography, History and Science.

7½ hours to Physical Training, Music, General Exercises and Recesses.

10 hours to Household Arts.

An unusual amount of time, it will be noticed, is given to handwork, which takes the form chiefly of Typewriting in the Commercial Course, and which in the other courses is devoted to a great variety of useful labour. No work is undertaken except in response to a real need. The finished work must meet the need adequately, and must be performed with despatch and in a workmanlike manner. Pupils are therefore directed not only by teachers, but also by skilled journeymen who work with them. Beauty of design, colour and ornament are not neglected.

NEWTON, MASS.

Other schools of this sort, at which pupils do industrial work which has economic as well as educational value, have been established during recent years in Massachusetts and other States. Some of them take only pupils above the Elementary School age, although they are not required to have completed more than the sixth grade of the Elementary Course. Such schools as receive only pupils over 13 years of age, but who may not have completed the regular work of the Elementary School, lie on the border between Elementary Education and further education for industrial purposes. Such schools are more fully discussed in the Report on the United States under Independent Industrial Schools.

THE GRAMMAR SCHOOL.

The visit of the Commission to Newton was to see the Independent Industrial School and the Technical High School. Those to whom the Commission was indebted for the opportunities of the occasion conducted the Commission first to one of the Grammar Schools. In the Grammar School (the U.S. term for Public Elementary School) a printing office was found as part of the school equipment, and printing work was done by a number of the boys as part of the Elementary School course.

The first aim was to develop the boys' English. The printing is done for the school and for the Principals of other schools. For example, arithmetic papers are printed instead of being put on the blackboard. Everything turned out is intended for use, and not merely as an exercise for the boys. After a little practice in printing the boys make fewer mistakes in spelling.

Some boys who had not done well in ordinary school subjects did so well in this department that they gained confidence in themselves and afterwards did better in all school work. The boys have a choice between Manual Training in woodwork and printing. The Principal of the school was of the opinion that if the choice lay between the two he would put printing in the school in preference to woodwork. While the printing does not bring the larger muscles into full action, he thinks the training in manipulation is as fine as in Manual Training in wood.

The boys who have had the printing in the public school obtain places more readily and obtain higher wages when they leave.

The Independent Industrial School.

In the fall of 1908 it was found that in the City of Newton, Mass. there were a number of boys who had reached the age of fourteen who were not profiting from the Grammar School work and likely soon to leave school but who could profit from a school in which hand work should predominate, with academic work and Drawing correlated closely with the shop work. A number of other boys were found who were doing excellent work in the grades, whose family circumstances rendered it impossible for them to complete a High School course, but who would make superior mechanics if given an opportunity to learn a trade or lay the foundation for a trade.

It therefore seemed advisable to establish in Newton a school which should be the intermediate step between the Grammar Grades and the occupation in which such pupils should find their life work; a school which should be industrial in character, aiming to lay the foundation for an industrial career; also varied enough in the industrial branches taken up to give each pupil a chance to prove his ability for some definite trade.

Accordingly the Newton Independent Industrial School was authorized by the Board of Aldermen of the City of Newton, Jan. 12, 1909, with the approval and subject to the supervision of the Massachusetts Industrial Commission (now consolidated with the State Board of Education).

Relation to the Public Schools.

The school is governed by a Local Board of Trustees consisting of seven members. It is conducted independently of the regular public school system, although articulating with it.

Pupils are admitted who are over fourteen years of age and fitted to profit from the work given.

While the Industrial School is primarily intended for boys who could not or would not profit from the High Schools, yet admission to it does not prevent pupils from entering the High School later if their academic and economic circumstances warrant it.

TEACHERS

The policy regarding the instructors in this school is that only such men shall be engaged as teachers as have had actual shop experience sufficient to become recognized as journeymen mechanics, and have satisfactory qualifications in personality, character, academic training and teaching ability.

The aim during the first part of the course is to have the boys brought into contact with several lines of mechanical work in order to find out what trade each is best fitted to follow. In this respect it agrees with the Central Schools of London and Manchester and the Trade Preparatory Schools of Leeds and Ireland. During the last year or year and a half, each pupil specializes along the line of his greatest ability. The curriculum includes Woodworking, Machine work, Electricity, Sheet Metal Work, Printing, Mathematics, Mechanical Drawing, English, Commercial Geography, Science and History.

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(7) INDUSTRIAL TRAINING IN ELEMENTARY SCHOOLS IN BOSTON, MASS.

When the "*Macdonald Manual Training Fund*" was provided to extend Manual Training in Canada, much helpful information was obtained from the schools of Boston, Mass., and particularly from Mr. Frank M. Leavitt, Supervisor of Manual Training in the Public Schools of that city. In a paper presented by Mr. Leavitt at a Conference on the Training of Children for the Trades and Practical Life, held in New Haven, Conn., April 27, 1910, the plan followed in Boston is traced. The following extracts present some of the salient points in greater detail than they were recorded in the notes of the Commission on the occasion of its visit:—

Boston has established various schools and classes in which industrial training is given to pupils in the elementary grades.

Our present educational scheme fails to recognize that the bulk of industrial workers must remain permanently industrial workers. The whole tendency of industrial development during the past two hundred years has been to concentrate in the hands of fewer and fewer men the management and direction of industry, until, while the theoretical possibility of rising out of the ranks to be a captain or a general of industry still exists for each individual, the probability is about as remote as that the promising boys in some senior class may live to be presidents of the United States, and for the masses such advance is absolutely impossible.

RELATIVE COSTS OF ELEMENTARY AND HIGH SCHOOL EDUCATION.

Our scheme of education is planned for the few rather than the many. It is a selective process, and the methods and machinery are adapted to those who go to the top.

Of course, no one would suggest that we should restrict the opportunity of any pupil, but we should remember that equal opportunity for all does not mean identical opportunity; and we should provide a differentiation for those who definitely plan to take only a fragment of the course, such a fragment as can be covered before reaching the age of fourteen, whether it be much or little.

Let me explain by a concrete example something of what is involved in this plan for an earlier differentiation. Let us take the cases of two Boston boys, eleven years of age, just about to enter the sixth grade, the sixth year in school. The parent of one boy says: "I am planning to send my boy to college." The parent of the other says: "I am planning to keep my boy in school until he is fourteen years of age, and then put him to work." What will the public school system do for these boys? It will admit the first boy to the Latin School, and will give him a six years' preparatory course at an annual cost to the city of $102.00, or a total cost of $612.00. It will permit the second boy to remain in the elementary school for his three remaining years at an annual cost to the city of $28.00, or a total of $84.00; $612.00 against $84.00. The first will have the advantage of small classes, highly paid and exceptional teachers, and a curriculum exactly suited to his requirements. The second will have the disadvantage of large classes, relatively cheaply paid and possibly inexperienced teachers, and a curriculum somewhat vague and decidedly general in its purpose, and interrupted at any point where he happens to be when he arrives at his fourteenth birthday.

I think you will readily agree that we owe something different and something more to this second boy. He is said to be typical of a large number of our boys, variously estimated at from 60 to 75 per cent of all those entering the schools of the United States. As I have said, our educational scheme has failed to recognize the needs of these—the majority of our boys. It is a vital defect.

MANUAL TRAINING AND INDUSTRIAL TRAINING.

Manual Training was introduced in response to a demand for industrial training, which began to take shape shortly after the Philadelphia Exposition in 1876. As early as 1878, thirty-two years ago, the Boston School Committee had reached the following conclusion: "The question of teaching trades in our schools is one of vital importance. If New England would maintain her place as the great industrial centre of the country, she must become to the United States what France is to the rest of Europe—the first in taste, the first in design, the first in skilled workmanship. She must accustom her children from early youth to the use of tools, and give a thorough training in the mechanic arts."

In 1906, the Industrial Commission of Massachusetts made an exhaustive report on Industrial Education, a report which has done more to shape thought and action than any other volume which has been written on this subject. The report devoted less than a half page to the subject of Manual Training, and the conclusion reached was as follows:

"It (manual training) has been urged as a cultural subject, mainly useful as a stimulus to other forms of intellectual effort—a sort of mustard relish, an appetizer—to be conducted without reference to any industrial end. It has been severed from real life as completely as have the other school activities. Thus it has come about that the over-mastering influences of school traditions have brought into subjection both the drawing and the manual work."

INDUSTRIAL TRAINING AND ELEMENTARY SCHOOLS

The present demand for industrial training is a revival of the earlier demand. Its keynote is "reality". It means the fitting of a real boy for a real job. There are some of us who believe that it calls for as close a duplication of real shop conditions as is possible and desirable, the turning out of a real product that will be readily used. It means the training of the rank and file of the industrial army.

Boston has undertaken the work, and it is now my purpose to describe briefly one of the earliest experiments in industrial training in the elementary schools. There was organized in September, 1907, what has been known as the Agassiz School Industrial Class. The primary purpose in establishing the class was to provide an experiment, the results of which would assist in answering one or all of the following questions:

(1) Is it possible so to modify the elementary school curriculum that it will become more effective in training pupils for industrial pursuits, while maintaining the same efficiency in preparation for high school?

(2) Will a considerable number of boys and their parents be interested in such a course of study, should it be established?

(3) If taken by boys otherwise likely to leave school at fourteen years, will this course have the effect of inducing them to stay longer in school?

(4) Will the pupils be as interested in manufacturing a product which is to be used by the city, as in making for themselves the ordinary manual training models?

The experience of the three years would seem to indicate that all these questions should be answered in the affirmative. Each year, approximately 33 per cent. of the boys in the sixth grade of the Agassiz School have requested permission to enter the Industrial Class, and each year more than the average number of boys have been regularly promoted, so that at present there are 132 boys taking the industrial work. These boys are distributed as follows: Grade VI, 50; Grade VII, 44; Grade VIII, 38.

Fewer boys have left the school on arriving at the age of fourteen than would ordinarily be expected in this district, only two boys having thus far left the industrial class to go to work. The product has been a practical one, manufactured in quantity and used by the school department. It should be noted that the boys have done all of the regular work of the school, excepting the manual training which the industrial work supersedes.

Especially are the boys taught the value of material and of time, and the industrial value of the division of labor; and this is brought about by appealing to that incentive which has been the mainspring of industrial progress in all ages, the desire to produce an equally good article at less cost; that is to say, with less waste of material and less expenditure of labor.

It is believed that this experiment has been, on the whole, eminently successful and enlightening. It would seem to demonstrate the desirability of providing for those pupils electing it, an elementary introduction to industrial training as early as in the sixth or seventh grade. It would also seem to demonstrate the necessity of providing schools of secondary grade but with shorter courses than our present high schools, because it is felt that many of the boys on graduation from the elementary school will wish one or two years more of very definite and intensive instruction.

A similar class was organized in the Oliver Wendell Holmes School, the shop work, however, being cabinet-making.

In both of these schools the classes are ungraded and no pretence is made of fitting for high school. Ten hours a week are given to shop work.

Still another experiment is the Pre-apprentice School in Printing and Bookbinding. Boys in the printing class are fourteen years of age or over, and are supposed to remain in the school for two years and to take apprentice positions at the end of that time. While no written agreement exists, the School Committee and the Typographical Union have a tacit "understanding" regarding this class. Both boys and girls are admitted to the class in bookbinding, which is not yet organized on the pre-apprentice basis, but rather on a basis like the Agassiz class.

The least we should be satisfied with, is a flexible educational scheme which will provide:—

First: Manual training in all elementary grades at least two hours a week.

Second: Industrial classes open to pupils so electing, which will prepare for high school, while giving nevertheless five hours a week to some practical constructive work, awakening an interest in things industrial and giving a familiarity with tools.

Third: Ungraded industrial classes open to boys so electing, for whom high school for any reason is out of the question—classes which prepare for and lead to industrial schools of intermediate grade or, should the boy leave at fourteen, prepare for a more intelligent entry into the lower grades of industrial work.

Fourth: Diversified secondary schools.

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(8) NATIONAL EDUCATION ASSOCIATION.

The National Education Association was founded in 1870, and reorganized in 1906 under a special act of Congress granting it a charter. In 1880 the National Council of Education was formed, consisting of 120 members selected from the general association, to serve for 6 years, and this constitutes an inner council to consider topics on which general action is desirable. The corporation is managed by 5 trustees, and a board of 28 life directors and 50 elected directors, representing geographical divisions. Its work is carried on through 18 departments, composed of members specially interested in a particular phase of education (e. g. elementary, secondary, agricultural education, child study, manual training, etc.) Annual meetings are held in July, the Proceedings of which are published.

The following are extracts from the Report of the Committee of the National Education Association on the "Place of Industries in Public Education" (1910.)

"Those educational reformers who have striven to reorganize education, making it more interesting and more in accord with the nature of the child, have usually been pronounced advocates of constructive work. We may dis-

tinguish between two general uses for which it has been employed; (a) to give motive for school work otherwise meaningless and uninteresting, and (b) to render more positive and lasting the results of instruction.

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"It is at this age that the rate of elimination of pupils from school becomes portentous. The reasons that cause children to leave school are very numerous, but unquestionably a very large proportion, at least a majority, give up because they cannot feel that it will repay the sacrifice of effort or expense or both. Other reasons are for the most part contributory. This one is fundamental. There are two classes of children to whom school work does not seem worth while. One of these consists of pupils who can and do get on well in the school but find the activities on the outside more interesting and profitable. The other is composed of pupils who do not prosper in the school. Such children naturally grow discontented. No one can be expected to regard as worth while for him that which he is incapable of doing. Moreover in such a competitive atmosphere as a school merely to pass means practically to fail.

"For those who fail in the older studies of the school the constructive work may offer a field for success. For both classes it should constitute the main part of the later school program. As an integral part of the preparation for life, it deserves a place proportionate to the number of those who need such preparation and the amount of such preparation it is possible and desirable to give.

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"Since a large part of the population, three-fourths to nine-tenths, accordingly to locality, never succeeds in entering any other than the Elementary School, three obligations, distinct and somewhat conflicting in the demands which they make upon the curriculum, would seem to be placed upon this school:

1. To develop as much as possible of culture—enrichment of life through knowledge and appreciation of human achievement in history and art.
2. To give the best possible start towards the life-work in which the person will be most content and most efficient.
3. To furnish the best possible training for citizenship through developing a sense of social obligation and by preparing for effective membership in the various social groups.

To these might be added the aim of giving to a minority the best possible preparation for continuing their education in higher schools.

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Special Industrial Classes.

"However, even with the fullest development of the industrial element in the regular course, the educational needs of a large percentage of the pupils will not be met. This is especially true in the cases of those pupils who do not readily respond to our usual methods, and who, therefore, do not progress regularly from grade to grade.

These pupils leaving school at fourteen, especially when they leave from the lower grades, are unable to secure occupation which promises regular and satisfactory advancement. These workers, entering as they do into unskilled or into highly specialized industries where the subdivision of processes is minute, require for their own well-being and for the benefit of their employers a general rather than a specific industrial training.

For these reasons it is extremely desirable to introduce industrial classes in connection with the regular work of the last two or three years of the Elementary School that will appeal directly to the above groups of children and occupy four or five hours a week.

Admission to such a class might be limited to pupils fourteen years of age, or those on whom the school has no further legal hold. It would obviously interfere with entrance to High School, and should presumably be placed before the pupils as an inadequate substitute for a secondary course, none being admitted except upon evidence of inability to afford or profit by the conventional High School course and upon written consent of parents.

The work of such a class might deal with a small or larger number of industries according to local conditions and requirements. In either case, however, with such a time-allowance it could clearly be more thorough, systematic and technical than that of the regular Manual Training Courses. It might well be expected not only to give a semi-vocational preparation to a considerable number of the more mechanically minded boys, but also to lengthen materially the terms of their school life—in which case both the industrial and the academic work secured would be for the pupil just so much clear gain.

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"From the evidence which the Committee has obtained, it is clear that boys who enter mechanical trades, almost without exception, leave the public schools before graduating from the Grammar (Elementary) School. It should be recognized therefore that the beginnings of trade education, if such education is to articulate with our present school system, must be had in schools that will draw their pupils largely, if not entirely, from the class of boys who have not graduated from Elementary Schools. Such schools (Intermediate, Industrial or Preparatory Trade Schools) cannot therefore be really parallel with existing High Schools.

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"The courses of study for this type of school must always be sufficiently intensive on the vocational side to give them the necessary economic value, while at the same time the instruction should be suited to both the mental and the physical capacity of pupils from fourteen to sixteen years of age. There should be in the curriculum, therefore, nothing that is not of direct assistance for preparing pupils for work in the industries."

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(9) FROM "CONVERSATIONS" WITH LEADERS.

Information from "Conversation" with DR. T. M. BALLIET, *Dean of the School of Pedagogy, New York University.*

Dr. Balliet had very strong convictions that there ought to be differentiation in the kind of work which pupils under fourteen do in the Elementary Schools. There is very little differentiation below High School, that is, during the first eight years of school life. There is perhaps more in New York City than elsewhere. In some Elementary Schools they take young people of fourteen or approaching that age, who are to go into the stores as cash-boys, saleswomen, etc., and give them a special training in rapidity in legible flowing writing, rapid addition, and accuracy in figures to a degree that would be a waste of time for other children who are not to go into such employments. That plan could easily be pushed further.

A law on the Statute Books of New York State which has not yet been worked out in the schools provides for differentiation in Elementary Schools at the end of the sixth school year; that is usually at 12 years of age, one class of pupils then being given a good deal of Manual Training and the beginnings of industrial work. There is another differentiation for those who are to go to High School, and a third for those who are to go into commercial business. There is no provision yet for the teaching of Latin, even to those who are to go to College. It seemed to him that a differentiation was needed there for many reasons. All over Europe they separate, at a much younger age than we do, children who are to go to the University or higher institutions.

DIFFERENTIATION IN THE WAY SUBJECTS ARE TAUGHT.

The keeping together for eight long years of all children, the dull and the bright—and they vary very much—with such different aims in life—one intending to go to college, another to a profession and another to work at fourteen, necessarily involves waste. The course is usually arranged more or less for those who go to higher schools.

The school men in the United States are in the midst of the discussion, and many are in the dark as to what is to be done with Industrial Education before High School. There is a great deal of wild talk, so one would think the whole elementary curriculum was to be pointed to Industrial Education. The thought

of differentiation is not widespread yet, but the schools are running up against the difficulty. Different studies should be taught differently.

Take Arithmetic for example. If a child is to go to High School or College, and studies the theoretical part of arithmetic as the basis of algebra and the higher mathematics, it would not matter about his knowing the commercial side of arithmetic, beyond calculating interest and a few such direct topics, because if he goes into business he can pick that up very soon after his full college course. The boy that is to go to work would waste his time on the theoretical part of arithmetic. He wants to get the direct side of it, and ability to deal with problems that come up in the ordinary workman's life.

So with Geography. The child preparing for College should have the scientific part of Geography; Physical Geography and the causes and relations would be the main thing taught to him; while the child that is dull in Geography would require a geographical reader describing different countries in an interesting way, and would study maps and memorize the places, and deal with causes and relations as far as he could. But the treatment of Geography should be different for the two, and it should be a good deal briefer for the child that is to go to College.

So in History. American History can be cut down a great deal, and the child that is to go to College can begin European History, Mathematics and the so-called higher studies earlier than the other child.

Bright children in the United States lose time in the schools, for the teachers aim to get the bottom ones promoted, not to have too many stop over, and thus all instruction aims at the lower third of the class. This cannot be remedied by jumping the grades. Some of that has been done, for the teacher is willing to let those jump who are really far ahead of their class, but those who are just a little ahead, 'who could do harder work and more,' the teacher will not promote into a new grade, so they simply mark time. There are reasons for differentiation there. A good many children in the United States cannot tell until pretty well on in their studies whether they will go to College or even to High School.

The bright child and the dull child should not be taught by the same methods; that is true of nearly every study. The brilliant child can put in the "dropped stitches" in the instruction, but with a dull child you must go step by step, and if one step is omitted the child cannot grasp the next one. With brilliant children study is made distasteful by putting in all the steps, and it has very much the same effect as of explaining a joke, whereas the children want to "see the point" themselves. We all realise this in reading a book like Emerson's Essays, which is suggestive because there is so much between the lines that is not said; if it were said it would be a very dull book; we prefer to supply it ourselves. As teachers aim at the lower third of the class, the talk is more or less insipid to the bright scholars, and they lose time.

Manual Training Discovers Aptitudes.

Children who are to go to work at fourteen ought to take more Manual Training, more Cooking, more of the things that would enable them to become productive laborers, and enough of those beginnings of industrial work to enable them to "find themselves." One reason why the Elementary School curriculum should be broad and have a good deal of Manual Training and those other things is not only because that sort of training is good for all-round development, but because it enables the children to try themselves on various things. With the old curriculum which had only book work, a boy could learn whether he could or could not do book work; and if he could not, nothing in the school enabled him to discover what he should be. He simply got discouraged and left school. It is the duty of the school to make provision in the school by which all can actually discover what they can do.

A boy who is skilful with his hands and of a mechanical turn of mind ought to discover that in school, and not be thrown out into the world without aim to blunder and perhaps never find his place.

Manual Training is goodf or all children, and that is the thing to establish and push in Elementary Schools. Every child ought to have any work that develops it, and a good variety of it. The relation of Manual Training to industrial work is somewhat like that between the College course and the professional course in a law school. It lays a particular basis of motor training for the specialized sort of work that is learned in a trade. The thing to keep in mind in trade instruction is to make workmen versatile, so that they can turn from one thing to another. In learning their trade in a shop they learn only to run one or two machines, and when these become obsolete and the man is 40 or 45 years old he is apt to be stranded. Before they take up their trade children should get as much academic training as they can take, and a pretty broad hand training.

Difference Between Manual Training and Industrial Training.

The principal thing to the children is not that they are making things for the sake of learning, but rather for the sake of having something to give to somebody. That is the industrial motive; so there is no difference to the child between Manual Training and Industrial Education. The child ought to have the motive to do the thing for the sake of the thing made. On the other hand, the teacher's motive in Manual Training ought to be to give the child a broad motor training and an insight into the laws of mechanics.

In industrial work, of course, the teacher has an interest in the thing made as well as in the process of making it; and it is necessary to push that far enough to get speed. In Manual Training we do not emphasize speed; we let a child go as slowly as he wants to provided the work is of good quality. But in an Industrial School with pupils that are to go out and practice a trade, they must not only do things of good quality, but in a reasonable time.

A good instance of the latter is found in the Williamson Trade School near Philadelphia. The head of that school was a teacher of Mechanical Drawing. After holidays he would take the senior class alone in the Drawing room, everything being just as it would be ordinarily with nothing got ready; then he would take out his watch and tell them the time; then in the presence of the class he would get everything ready to execute a piece of work in Mechanical Drawing as rapidly as he could do it of good quality, and jot down the time. He would then say, "I will give you 40% more time than I took, and at the end of this year all those who can do that in 40% more time will graduate, and others will not." They worked for speed when they had ability for quality. That is a pretty good principle.

Motive in Education.

Speaking of motive in education Dr. Balliet said the children eat their breakfast because they like it, but the mother has another motive, she watches what they eat. It is that way in study. The really great problem that some men are working at now in the Elementary Schools is how to present each subject and each part of each subject in such a way that the child will want to learn that thing to help him to solve some puzzle in his own life that he is now interested in. The child feels no interest in learning something that will do him good 20 years from now when he is grown up.

From "Conversation" with Dr. Charles L. Richards, *Director of Cooper Union for the Advancement of Science and Art, New York.*

New York City has a scheme of Manual Training generally representing shop work in the last two years and other things in the years below; but that work has not been, at any rate until very lately, so much influenced by industrial practices and vocational requirements as by rather pedagogic formulae. Dr. Richards said that fourteen years ago he turned aside from technical work to take up the matter of training teachers for Manual Training because he believed that that was one of the great means for affecting the whole situation, and for ten years he was head of the department at Columbia University. He still believes in it as a tremendous thing at the bottom of any full and complete system of Vocational Education. We must have in the Elementary School experiences that deal with the industries and with vocations to the extent of developing intelligence in regard to them—an understanding of their qualities to the extent of leaving the boy and girl at the end a freer choice of vocation because of stimulation in those different directions.

Manual Training and Industrial Education.

Within the last two years he had noticed at Conventions and other meetings upon Industrial Education the frequent reference to Manual Training, whereas five years ago, when the interest in Industrial Education was growing so rapidly,

it was the custom to decry Manual Training as being a mere namby-pamby, a school teacher's product and something that had no vital quality about it or any special meaning in the field of Industrial Education. He had also noticed that manufacturers and employers in the last few years had come to see that at the bottom there should be a good system of Manual Training in public schools —though nobody has yet discovered what is meant by a good system. Beyond that there has been no reaction from above to any great extent, though he thought it would come in the near future.

Vocational Guidance.

As the matter of Vocational Guidance develops, the question of the pupils' careers must be viewed through what the community represents in vocations; data must be had of those vocations showing how the various industries lead forward in a progressive way to certain remunerative trades. If these could be reduced to terms of social and economic value to the school system, and used in advising boys and girls as to their after careers, there would be a more effective reaction of that environment on the school curriculum than has ever been the case.

Miss Julia Richmond, who is a District Superintendent of Public Schools, is trying a similar experiment on the lower East Side, taking boys and girls from the public schools at 12 and 13, sometimes 13 and 14 if they are backward, just previous to the working period, and giving them a preparatory training in vocational ways which will not make them competent trades people but will put them in the way of "finding" themselves and give them a little gumption about industrial work. This work is more intensive than Manual Training. It is for ten hours a week, with twenty hours academic work.

That is a rather radical thing, and with the Fitchburg work represents a very new element, but it will undoubtedly be a long time before the principle they represent becomes predominant in the U.S., for the American people regard the Elementary School as a sort of sacred institution dedicated to general education and not to be touched in any other way. In fact it is only of late years that they have been content to allow advocates of vocational education to take the period between 14 and 16; and that only because they see that the boy and girl are going to leave. This is one of the things that is working for the best good of the great mass of the boys and girls leaving school—the plan of reaching down a little below fourteen and trying to help them to get their working powers trained before they leave school.

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(10) PRE-VOCATIONAL WORK IN ELEMENTARY SCHOOLS IN GERMANY.

The Commission did not find special classes or courses in the Elementary Schools of Germany which correspond to the Pre-Vocational or Trade Preparatory Schools of England, Scotland or the United States. The Volksschule of Germany, with its 8-year course from 6 to 14 years of age, is provided definitely

for those who intend to leave school and enter upon employment at 14 years of age. The whole course of instruction from 10 to 14 years of age is based on that understanding. The pupils who are to continue at school after 14 are expected to enter one of the Secondary Schools at the age of 10. The courses in the Lower Secondary Schools (Pro-Gymnasium, Pro-Real-Gymnasium and Real-Schule) continue 6 years; those in the Higher Secondary Schools (Gymnasium, Real-Gymnasium and Ober-Real-Schule) carry the pupils on during 9 years. In the city of Munich since the fall of 1907 all boys have been required to remain at the Elementary School for an eighth year which is devoted mainly to manual work. The purpose is to give a definite bias towards their choice of a skilled occupation. This eighth year class is intended to form a basis or foundation for the Technical or Continuation Schools.

Dr. Kerschensteiner's Practice.

Dr. Kerschensteiner stated to the Commission that ten years ago of the 5,400 boys in the Continuation Schools of Munich, nearly 1,000 were in unskilled employment and in danger of becoming loafers. The result of bringing workshop instruction into the Elementary Schools, and of making the eighth year compulsory, was that in 1909 of 2,200 boys who left the highest class, 2,150 went at once into handwork or other skilled employment. This surpassed the expectation of the school authorities. While in part it was due to the re-modelling of the Industrial Continuation Schools with their fifty workshops, the first cause was undoubtedly the pleasure in the handwork itself gained in the Elementary School. The effort has been to get both Elementary and Continuation schools out of their isolation from all other influences affecting the life of the town child by connecting the work more closely than elsewhere with the activities of the workshop and the home. "Under the influence of joy in its work the child is more receptive, and we gain power to influence its other likings."

Books to Supplement Experiences.

In following out his fundamental aim for Vocational Education, Dr. Kerschensteiner has applied certain principles and methods to the Elementary Schools and courses. A statement of the governing principles will shed some light on the problems of education for communities in Canada.

Instead of beginning the work of the school with the analysis of words and sounds, and drill in word and sentence formation or building, the child begins his school life by the observation of the things in the school, in the home, and on the street, and by the use of these as a basis of the oral and written lessons in language, drawing, mathematics, history and geography; that is to say, the things of interest to the child in the world in which he lives are used as the material for his educational progress and growth.

From the time the child starts at school, he, or she, is regarded as an active living being, and not as a reservoir to hold or register a record of the things

set down in books to be committed to memory, to be available when called for. By means of observation lessons and lessons in science and industry, the child throughout the grades is being treated as an active being seeking growth and development through self-expression and self-realization.

When books are introduced, they are books that shed light upon the real life interests of the child and which widen the instruction and information given in the school itself.

Life and Work are Made the Central Features.

Up to a few years ago, the general Continuation Schools of Munich had carried on instruction which was largely a repetition and enlargement of the bookish work of the Elementary Schools, and that had a little interest for the young apprentices. Dr. Kerschensteiner proposed a new course of study or kind of work for the Continuation Schools, the central point in which was in each case to be the shop work or occupation of the pupil. Believing that the trade or occupation was, at that age, the centre of interest for the young worker, he introduced many different kinds of shops into the schools for apprentices and in these the typical processes of the various trades are carried on under the direction of competent workmen as instructors. He connected the work in drawing, in mathematics, in civics, and in fact all the work, with the shop practice.

The marked success which has resulted from this course indicates the wisdom of making the major life interests, appropriate for the pupil at any stage of his development, the central feature in the course of study.

Day Industrial Schools in Bavaria.

In Bavaria a number of Continuation Schools have been organized as Day Industrial Schools. Students are admitted to these after completing 6 years in the Elementary School course and when they are about 12 years of age. The course is sometimes one year and sometimes two years. In the former case the one year replaces the seventh year in the Elementary School, while the two year course takes the place of both the seventh and eighth years.

These schools aim at providing vocational education before the boys begin their work as apprentices. In this respect they differ from the ordinary Continuation School, which only admits pupils who have gone to work. These Day Industrial Schools require the full time of the pupils, and Apprentices' Continuation Schools and Drawing Schools for handicraftsmen are united with them. In Bavaria there are 16 of these schools with about 500 pupils.

In some other schools in Germany of a similar character the qualification for admission requires that the pupils shall have completed the course in the Elementary School.

These schools appear to be successful. Students finishing the course have the usual apprenticeship shortened as they are able to take up the work in the shop advantageously from the very beginning.

It is to be observed that these schools in Germany, with the exception of Munich, do not include workshop instruction where the students are made acquainted with materials, tools and machinery, and where they acquire some skill in the use of these. The instruction is theoretical without workshop experience, and in that respect these schools differ from the Trade Preparatory Schools of England, Scotland, Ireland, and the United States.

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(11) PRE-VOCATIONAL WORK IN ELEMENTARY SCHOOLS IN FRANCE.

Supplementary Courses for Boys.

These classes are intended to supplement the primary course for those pupils who, having completed the Primary School, will enter manual occupations. Pupils who hold the certificate of primary studies are eligible from 12 years of age. The total number of hours per week is 35, of which 15 are devoted to general education and 20 to Modelling, Drawing (freehand and geometrical), Singing, Recreation, and Manual Work. In the second year the number of hours for Drawing is reduced, and that for Manual Work proportionately increased. The general subjects are taken in the morning, the practical work and Drawing in the afternoon, the time-table for a week being as follows:

Morning.

Arithmetic and Accounting	1¼ hrs.
Geometry	2
Civics and Common Law	¼
History and Geography	2
French	3
Gymnastics	1
Physical Science and Technology	2½
Morals	¼
Recreation	1½
	15

Afternoon.

Art Drawing	7 hrs.
Modelling	2¼
Geometrical Drawing	2
Manual Work	6½
Singing	1
Recreation	1½
	20

In the second year—6 hrs. Drawing, and 7½ hrs. Manual Work.

These classes are parallel to the Higher Primary Schools, but have more latitude in their syllabus, which is a continuation and amplification of the primary course. They may have smaller classes than the Higher Primary School.

Supplementary Courses for Girls.

These are arranged on the same plan as the classes for Boys, the total number of hours per week being 40½, of which nearly one half may be counted for general education and the balance regarded as vocational. The time-table is as follows:—

Morning.

Morals	1	hr.
French	4½	
Arithmetic	2½	
History and Geography	2½	
Science	1	
Hygiene and Domestic Economy	½	
Singing	½	
Gymnastics	½	
Civics and Law	1½	
Cooking and Ironing (or Commercial)	1	
	16	

Afternoon.

Dressmaking	4	hrs.
Whitewear Making	4	
Millinery	2	
Drawing	8	
Singing, Gymnastics	½	
Book-keeping or English	2	
Theory of Dressmaking	2	
Theory of Whitewear Making	2	
	24½	

Higher Primary Schools in Paris.

Schools providing higher primary instruction are designed for young persons who are going to enter business or banks, industries or industrial arts, public or private offices, and vocational schools that do not require classical studies. They even lead to the bachelor's degree, to the Central School, or to the courses preparatory to the Day Schools of Mining, Bridges and Highways.

These schools, as a rule, take only day boarders. The instruction is free Those who can pay are furnished the noon meal for a trifling sum; others receive

meals free. Pupils enter on an examination open to pupils of private as well as public schools. Candidates must have been within the following age limits on October 1st of the year of examination: 1st year, 12 to 15; 2nd year, 13 to 16; 3rd year, 14 to 17..

There is no exception as to age limit. The ordinary course is 3 years; then the pupils must be examined for final certificate of higher primary studies.

No pupil is allowed to pass from 1st to 2nd year, or from 2nd to 3rd year, unless he has proved by positions and examination that he has profited by his courses.

The 3rd year class has two sections—Commercial and Industrial. In the latter, greater importance is attached to Mathematics, Physics and Drawing; in the former, to the applications of Arithmetic and Algebra to commercial and banking operations, Modern Languages, Commercial Geography, Penmanship, Accounting, Stenography, and Typewriting.

A 4th or supplementary year was opened for pupils holding the certificate of higher primary studies who show particular aptitude for the sciences, and they receive more extensive and special instruction to enable them to compete for the great Professional Schools.

By ministerial decree these schools are allowed a certain amount of liberty in fixing their programmes. For the first 3 years they follow the programmes of the Department as a basis for teaching; but these programmes, as well as time-tables, may be modified according to the existence either of a 4th year of studies, or of special sections which prepare pupils for definite careers. The 4th year programme, and also that of special sections, is made out for each school by the director or directress, after consulting the professors.

What gives a distinctive character and a special value to the instruction given in the Higher Primary Schools is the large number of special professors.

SECTION 4: EXAMPLES OF THE PRACTICE IN ELEMENTARY SCHOOLS IN TWO CITIES.

An embarrassment to the Commission has constantly arisen from the necessity of choosing between places and schools, to be cited for illustration of the best which was found as preparatory for, or as part of, Industrial Training and Technical Education. In many schools in Canada excellent examples were examined of correlations of Hand Training with book studies. Even where not much had been done in the organization of courses with that end definitely in view, the teachers generally said they were aiming towards as large a measure of that as was practicable under their circumstances. These matters are reported upon in Part IV of the Report.

The extended descriptions for Los Angeles, Cal., and Cincinnati, Ohio, give an outline of those features which the Commission considers will be suggestive and instructive for Canadian authorities.

(1) LOS ANGELES, CAL.

The school population of Los Angeles is 39,000, of which 6,500 are in the High Schools, promotion being made from Public to High Schools on recommendation of teachers of Public Schools. The following particulars of the Public School course are cited as representing what is being done by one of the most advanced and advancing communities whose schools were visited in the United States.

As set forth in a report of the School Board, the Public School course has been drafted after the high ideal expressed by Ruskin: "Education is to make people not only do the right things, but enjoy the right things, not merely industrious but to love industry, not merely learned but to love learning, not merely pure but to love purity, not merely just but to hunger and thirst after justice."

It is not offered as a perfect plan of school work, but the Board believes it is a step in the right direction. An effort has been made to cut away the useless parts and to make the course of study thoroughly practical throughout.

Mechanical Drawing.—A thorough course, put on a practical basis as far as possible for the convenience of those who work in the shops. Lectures are given illustrated by blackboard drawings, and diagrams. Further instruction is furnished in the form of blue prints and notes prepared by the instructor, but most of the instruction is individual.

Manual Training Course.—In addition to the shop work for those already engaged in the trades, a course similar to the manual training course of the high schools is presented. Sufficient time is given each subject to enable the pupils to understand the general principles of each trade, and in this way it is hoped that many boys will be enabled to decide for themselves in which branch of industry they may become most proficient.

The following subjects are presented:—Simple Bench Work in Wood, Pattern Making, Cabinet Making, Forging, Wood Turning, Machine Shop Practice, Mechanical Drawing, Elementary and Advanced, Elementary Architectural Drawing.

When properly qualified, pupils may elect certain courses and omit others; for instance, forging, foundry and machine shop work may be taken and woodworking omitted. In order to take up cabinet making or wood turning, a course in simple bench work in wood, similar to the work in the seventh and eighth grades of the day schools, must have been satisfactorily completed. The course in cabinet making must be completed before taking up pattern making. Persons who so desire, may spend more than one year in the cabinet work in order to make more substantial pieces of furniture.

Mechanical drawing must also be a part of each one of these courses.

Students for this course must be at least 16 years of age.

Arithmetic and Reading.

Several of the routine and traditional parts of Arithmetic have been eliminated entirely, but more attention is given the essentials of that important subject than heretofore. The work in Reading is outlined with a view of teaching pupils not merely how to read, but to read. The lists for home reading are an important part of it. More adequate provision is made for Spelling than in the past. The work in Writing is given both more time and more attention. English is given a large place in the course, and Grammar the small one it deserves. The most important modifications have been made in the knowledge subjects, such as History, Geography, Literature, and Nature Study. The common schools try to provide each child not only with the form, but also, as far as possible, with the content, of knowledge. These important studies are rightfully entitled to a larger measure of attention than the older education gave them.

With the conviction that instruction in morality is the most important part of school work, a course in the fundamental virtues, has been introduced to the end that no child may go forth from the schools without having had the lessons of honesty, uprightness and honor impressed upon him.

And being persuaded that all these things are of no avail unless the mind be habituated and trained to keep its body strong, provision has been made for daily lessons in the proper methods of walking, sitting, standing and breathing, that the schools may not fail to do their work of ministering to the health of the children in them.

The directions to teachers on the subjects which form the basis of Technical Education are interesting :

WRITING.

Finger writing is not allowed. The fingers are too short to propel the pen rapidly and easily, and consequently soon tire and fail to do writing easily and well. Finger writing is easy to learn, but tiring to use and much too slow and ugly for commercial purposes. We want instead to write with the muscles of the forearm. The half-arm movement is somewhat difficult to acquire, but when it is once learned it is easy and in all respects more satisfactory than the finger movement. Nothing but practice will bring the ability to write a good hand. Therefore the first necessity in learning to write well is that each teacher and each pupil stick to the thing daily and not only in the writing lesson, but in the spelling lesson and in every other lesson in which writing is required.

SPELLING.

The teaching of spelling must not be allowed to interfere with the teaching of writing. Position and movement are just as important in writing a spelling lesson as in a writing lesson. During the first year the writing should be entirely upon the blackboard. The writing of words in columns should be entirely given up in all grades. In place of narrow strips of paper the standard foolscap sheet should be used, and the words written from left to right one after the other until the line is filled. Too great emphasis upon the necessity for neatness will be sure to produce finger writing, the thing which we are striving with all our hearts to avoid. See that the spelling lesson is written according to the principles taught in the writing lesson, or not at all. The tendency of children to whisper words over to themselves while they are studying is probably nature's plan for re-enforcing the impression of sight by adding that of sound. The statement coming from many schools for defectives, that it is very difficult to teach the blind to spell, whereas the deaf learn without great effort, would seem to bear out the conclusion that impressions through

the eye are stronger than those coming in by way of the ear. To these forms of memory must be added the motor memories whereby the hand automatically writes the word that is in the mind, for it is ability to write the given word and write it in conjunction with other words in a sentence that is demanded. The teacher should strive after two main objects, a clear picture of the word as it looks on the page, combined with an audible or whispered iteration of the letters which compose it; and a readiness in transcribing with the pen this auto-visual image.

DRAWING.

The purpose of art education is not so much the securing of scientific accuracy as it is the encouraging of appreciation of what is good along art lines. We do not aim to make artists of our pupils, but we believe that only through practical experience in drawing and painting can they acquire observant, discriminating and intelligent eyes. The child, in his effort to create, gains a knowledge of what is good in shape, filling and color. We want our pupils to become aware of the good things in art, and to apply this knowledge not only to their drawings but to the furnishing of their homes and the choosing of their pictures and clothes. The child pays too much attention to detail, allowing the main idea to suffer. Because of this tendency toward over-elaboration, the value of simplicity in environment and personal expression must be emphasized. Art study should not remain a thing apart, but enter into the actual life of every child. The most important line of work in the drawing course is composition or design, because it supplies the basic principles of all art work. Any drawing in which special attention is paid to the pattern and the space divisions is a design. We begin composition in the lowest grades. There is opportunity even in a little child's work for individual selection and arrangement. In every grade, in every lesson, there should be opportunity for the pupil to exercise his individual choice in order that the work may be more than mere imitation.

NATURE STUDY.

In nature study there exists the happy combination of sense-training, motor-action and life out of doors. The beauty and order of the world acts to call forth the marvellous development of the child. In addition to the study of plants, flowers, animals and their industries, insects, birds, the heavenly bodies, weather, combustion, etc., instruction is given in all grades and in all classes during the entire school course in manners and morals and upon the nature of alcoholic drinks and narcotics and their effects upon the human system.

AGRICULTURE.

It is expected that in each class the teacher will introduce as far as possible simple experiments illustrative of the subject under consideration and encourage such experimentation by the pupils at their homes. Much opportunity should be given for class discussion and occasional written descriptions required. By arousing a proper interest in this subject it can be made a valuable adjunct to the home life of the pupil and also serve to engender a proper appreciation of the value and dignity of agriculture, the basic science of life.

PHYSICAL EXERCISE.

The school must set aside regularly-recurring periods when the mind can be rested, and the body strengthened by pleasing, helpful exercise. In the selection of muscular exercises the teacher should take those which tend to secure for the child: (1) A desirable hygienic effect on the body as a whole, for which nothing can take the place of the rollicking romping games which are played out of doors. Active games of the sort ordinarily played by school children are perfectly safe and healthy for boys and girls when not carried to extremes in duration and intensity. A moderate amount of fatigue is not unwholesome, but, in general, the game or exercise should stop short of severe fatigue. Every teacher should interest herself in the outdoor activities of her children, and seek to foster in her pupils a wholesome interest in such forms as will make for mental relaxation and fine physical tone. She will find that with thought and study she can suggest many games and activities to her classes which will prove interesting and profitable, and at the same time thereby indirectly increase her hold upon the affections of her children. (2) Certain desirable special effects, most important among which are the correction and prevention of faults of form or carriage of the body at rest and in motion. These faults are: failure to hold the neck erect; round or stooped shoulders; curvature of the spine; undue protrusion of abdomen. The physical exercises of the school room should be directed toward securing work for the big muscles of the back and neck, and to stretching the muscles of the breast, rather than to the

exercising of the smaller ones of the arms and legs, which can safely be left to the activities of the playground. Teachers will therefore be required to devise such suitable breathing and muscular exercises, and to give them to their classes at regular times each day. As far as practicable, when giving these muscular drills, the windows and the doors should be thrown wide open to the fresh air, or better still, if it can be done, have the drills conducted out of doors, in the open air.

MANUAL ARTS.

This course does not include the introduction of useless talks by teachers on topics not directly related to the work in hand, but it does assume that the construction work of the pupils should be made inteiligent, and that a sufficient number of "whys" and wherefores"" regarding the work should be given in a manner that will closely relate the pupils' work to their immediate surroundings. It also requires and admits more individual choice and planning by both teachers and pupils, and it enables teachers to see the industrial processes in the schools as types of the industrial processes by which society keeps itself moving. This course of procedure will eventually lift the teachers out of dogmatic limitations. It provides also for large and useful pieces of work, a practical sequence of constructive principles, and introduces and makes pupils acquainted with a great variety of materials. It demands that the teachers must be able to draw and illustrate, group, classify and originate.

In general, the work for the third and fourth years contemplates cardboard construction and work in the textiles: that for the remaining grades comprises work in wood, and, to some extent, in other materials.

The plan contemplates that in addition to other things, pupils at the end of the eighth grade should be able to make a simple working drawing, read a simple blue print, and understand how blue prints are made.

DOMESTIC SCIENCE.

It is a generally accepted standard that only those subjects shall be admitted in the public school curriculum which have a vital bearing on life, and it is on this basis that domestic science has acquired its position in the elementary schools.

We claim that "right living should form the fourth R in education,"and that no subject is of more importance than domestic science. In our work the sociological aspect comes first, but we have arranged the course so that the educational side is not lost sight of. There is a rich field right here—the food problem in many different phases: the production and manufacture of food materials, their digestibility and their wholesomeness, the study of the food elements and the effect of heat upon them.

We begin to prepare the way for physics and chemistry, bacteriology and industrial history, while, at the same time, we are continually training in neatness, order, foresight and personal responsibility. We work both individually and in groups, thus fostering a spirit of mutual helpfulness, while we also develop each Clothing, Foods and Housing child's thoughtfulness.

The work begins in the fourth grade (A4), with simple problems in sewing which are designed to meet the requirements of the child nature, and at the same time give practice in the fundamental stitches. In the fifth grade the same plan is followed and more complex problems are given, but all of such nature that they may be completed before the interest of the pupil has been lost. Following this work comes a course in simple drafting (by measurements entirely), and the making of undergarments for themselves, and where the work is completed and time allows, a simple wash dress may be made before the completion of the work.

During the course, talks on different kinds of cloth, their value, use and cost are given, together with a simple study of their production and manufacture. The study of decoration, its use and abuse, comes in connection with the garment making, and the aim here is to lay a foundation upon which others may build securely.

When the pupils begin their cookery, they have reached the age when they want to know the reason of things. Hence we have tried to combine the discussion of the theory with the practical cleaning and cookery in proportions which would make the work not only intelligible to the pupil, but alive and desirable as well.

Beginning with water and milk we go on to the study of fruits, sugar, starch, vegetables, eggs, meat and fish. Following these come simple combinations and a sequence of batters and doughs.

In the last year of the course a few lessons are devoted to thel aundry, and as much time as possible is given to the study of the proper combination and serving of foods, together with their varying cost and food value.

Throughout the entire course the thought is emphasized that the home is the centre of strength, and that a thorough knowledge of how to care for it in the best and simplest way should be part of the life equipment of every girl.

The training in sanitation is continuous throughout the course, and during the last half year lessons are given on the simplest aids to the injured and on the care of the sick. Believing that in these grades the time for science as science has not yet come, the emphasis is laid upon the practical side, especially upon the skilful manipulation and right use of tools, the desirability of serving a few things perfectly cooked. Yet we aim to give sufficient knowledge of the elements of which foods are composed, the effect of heat upon these, their value in the body and why they should be combined in certain proportions, so that each girl may go from school able to prepare and serve simple, well combined meals in her own home.

(2) CINCINNATI, OHIO.

The Commission was favorably impressed by the extent and quality of the educational work in Cincinnati. Some of the chief features of the Elementary Schools which have direct relation to preparation for occupations and for Industrial and Technical Instruction are described.

"No other school system in the nation, within the last decade, has been subjected to so many vicissitudes because of legislation, as has the school system of our city," remarks Superintendent Dyer in his Annual Report on Education in Cincinnati. He commends the progressive and liberal spirit of the Board since they have been responsible for the tax levy, which in 1910 was 8.5 mills.

English.

The Schoolmasters' Club has rendered great assistance in studying conditions in the teaching of English. The composition work of all the Fifth Grade classes in the city has been examined, and the committee that investigated made an extended report. Their suggestions are epitomized in the following series of propositions upon constructive work in English.

To compose is to put one's thoughts together with a definite end in view; to so group and interrelate them as to make them available for orderly use.

Composition is essentially a thinking exercise.

Teaching information that is to be used as a basis for composition work is not composition. It is Geography, History, Literature or something else.

The material to be composed must be familiar to the child before composing can begin. The composition work proper then should be the reorganization of that material for the solution of a genuinely new and interesting problem.

To give reality and immediacy to the work in composition, and to make it socially serviceable, we should continue to keep in view that it is, in most cases, to be undertaken with the idea of being used in helpful and entertaining ways in the class or in the school or elsewhere.

Merely reproducing a story or any piece of information from memory contains the minimum of genuine composing.

The problem selected for Composition should be of such a character as to furnish a strong motive for the best form in the first draft. The practice of copying corrected compositions encourages careless work in the originals and overemphasizes the mechanical points involved in copying.

The ideal in the finished composition should be, to have both the thought and the form childlike and natural. The imposing of adult standards of expression and mechanics hinders the necessary freedom and spontaneity.

Art.

The art work is under the direction of a Supervisor and eight assistants. Each goes to a series of schools, conducts the classes, and instructs the grade teachers how to continue the work. In the two lower grades the special teachers

gave little class instruction, but regular meetings of the teachers of these grades were held at eight different centres, thus making sixteen meetings per month. Each centre was in charge of a special teacher, who made a brief exposition of the month's work. Emphasis in the primary grades has been placed on illustrative Drawing, and in the upper grades on design and object Drawing. In the High Schools, courses of craft work have been introduced giving practice in design, both constructive and applied, and affording pupils a choice between academic and industrial work. The most popular work with teachers and pupils is nature representation in colour. This work is interesting from the standpoint of structure as well as of colour. While it is not the function of the art teacher to teach Nature Study as such, the lessons on nature representation incidentally open the way into the delightful mysteries of Nature to the children, especially in downtown districts, and they become familiar with the names, characteristics and beauties of plant life. An exhibit of more than two hundred charts, displaying the work of all grades, was sent to the National Convention of Art Supervisors at St. Louis, where it was given a prominent place. On its return, it was placed on exhibition at the Public Library. The Librarian reports that exhibits of this kind attract more attention from the public than any other, and that he believes them to be a source of education for the masses. There is increased interest in school room decoration, and local dealers are responding to the demand for a better class of pictures for that purpose. More suitable pictures can now be found in a single stock-room than could have been found in all the stores of the city collectively.

The Supervisor is frequently called to address clubs in the community upon art education. The Schoolmasters' Club gave an entire session to the subject, and made the following interesting deliverance showing the close relation of Art to school buildings, furnishings and education.

Old school buildings generally are ugly and box-like, violating both architectural and educational laws; remodelled buildings much improved in both respects; in new ones the lines are symmetrical, harmonious and beautiful, and there is special adaptation to the purposes of education.

In interiors the tinting in old buildings is the same in all rooms, and often trying to the eyes, while in new and remodelled buildings the effort is made to aid the sight in dark rooms and relieve eye-strain in bright ones. Recent removal of the blackboards from rear of rooms and from between windows gives larger areas for decorative treatment and pictures.

In all the city schools the disposition is to let the Department of Art or other competent authority dictate the colour scheme for walls and ceilings. This has secured harmonious effects and beautiful tinting.

Art objects have been purchased by various local organizations and by the scholars through entertainments, to the extent of several thousand dollars yearly, in the effort to beautify school-rooms, auditoriums and corridors. Colour, story or action, or a combination of these, suitable to the needs and desires of children, is embodied in pictures for lower grades; ethical, classical or historical subjects in artistic representation for higher grades.

Landscape gardening has been done at three schools, window gardening at few schools, and a fine school garden at one, but little artistic treatment thus far at most, as the lots are too small.

The Club suggests the treatment of rooms and corridors in accordance with a general plan of decoration and treatment; the selection and arrangement of decorative effects and the purchase of art objects by a competent person or committee in conjunction with teacher or principal; school and home gardens should

be officially encouraged, seeds and bulbs furnished at cost or, if necessary, free, and the effect on the neighbourhood and pupils observed; the enlargement of school lots to permit beautifying of part of the grounds and the gardening of part is recommended. While local effort for securing works of art is a proper and commendable function for mothers', civic and students' organizations, the Club believes that the time is approaching when such work will and should be considered the duty of school boards.

The Women's Club has employed a Supervisor of Gardening, who visits schools and gives illustrated lectures, procures and distributes seeds, and oversees the work at home and school.

Art in its relation to industry and commerce is well set out as follows:—

> The educational, ethical and social aim must be consciously kept in view in all cases where art is used in or about schools, so that pupils leaving school after eight or twelve years' attendance may have taste and appreciation for good art in its various expressions. Everything about the school should be selected and arranged with an eye to its beauty as well as its utility. "Beauty is utility, and is coming to be recognized in American life and industry. To create ideals of beauty for industrial uses is one aim in giving the pupils beautiful environment, artistic objects, and encouraging self expression in art work. The great problem in the industry of nations has come to be the esthetic one—how to give attractive and tasteful forms to productions so as to gain and hold the markets of the world.

At the beginning of 1909 a Normal Art Department was arranged between the Art School and the Board of Education, a course of one year in Normal Art being designed for students who were already expert in Art. All who took the course secured positions as Art teachers, most of them in near-by suburban towns. The course is maintained by the Board of Education as a department of the College for Teachers. It is taught by an expert teacher in the Drawing Department, under the guidance of the Supervisor of Art and the Dean of College for Teachers, but there is the closest affiliation possible with the Art School of the city, and the teacher conducting the work must be approved by that school. The course will be extended to two years. A pre-requisite for entrance is High School graduation and three years' special work at the Art School.

The Art Museum of the city is becoming a prominent factor in assisting the teachers in the esthetic education of the children by organized visits, lectures, collections of illustrative prints, etc.

KINDERGARTENS.

The Kindergarten Training School is closely affiliated with the University of Cincinnati, and five of the recent appointees are graduates of both institutions. The students serve an apprenticeship for 6 months as cadets in one of the schools, and are then appointed in order of rank as determined in practice and by examination. The Kindergartners visit the homes of the children, supplying clothing when necessary; 1838 hours were devoted to visiting over 6000 homes in one year. A Kindergarten farm, rented by the Mothers' Club, was equipped by the Board of Education for playground purposes, and on each pleasant day in May and June two Kindergartens were taken out there, many mothers also going. In addition, almost every Kindergarten has some kind of a garden, and many excursions are made to parks, to the zoo, and to suburbs.

Manual Training.

The course in shop work extends from the sixth grade of elementary to and through High School. It is also given in all grades in the retarded and other special classes and schools, and to fourth and fifth grade children in a few places where these children are unusually mature. In the eighth grade many useful pieces of furniture for school or home are made, such as hat-racks, bulletin boards, tables, plant boxes, library chairs, book racks, sewing cabinets, hall seats and stereopticon stands.

Domestic Art.

Sewing is given in the sixth and seventh grades, Cooking in the eighth, and the same provisions for domestic work are made in special schools as for Manual Training. The Domestic Science work parallels the shop work throughout the elementary grades. In the High School the domestic art work continues throughout the course. As the pupils enter the High School with a knowledge of the stitches and their application, there is only a short review of handwork given. The main work of the first year is the use of the machine, taking of measurements and drafting of patterns, and the making of garments according to the drafted pattern, During the year, the students make a four-piece suit of underwear, a simple shirtwaist suit of wash material and a more elaborate skirt or waist, or both. These garments are made by machine, but a certain amount of handwork is required on them, and most of the final dresses are embroidered by hand. The second year's work includes a fall and spring term of millinery and a winter term of dressmaking. In the millinery work the students are taught the principles of the work, such as making of bandeaux, making of frames according to measurement and from sketches, making and covering of wire and buckram frames according to measurement, making of folds, facing bows, and trimming. This includes study of design, fitness of material and colour scheme. The winter period is devoted to dressmaking of woollen materials and the making of a cloth skirt and a waist of wool or silk or a whole dress. The spring term is devoted to the making of an elaborate thin dress.

In the first year patterns are drafted by the students for two reasons: First, that the students may have a knowledge of the principles upon which the patterns are drafted and thus be able to handle patterns intelligently; and secondly, because the bought patterns rarely fit the growing girl. In the second year bought patterns are used so that the student may have experience in fitting the pattern to the particular needs of the person. During both years much attention to, and instruction concerning, fabrics is given. The fitness, durability, style and cost of material are considered, and each student keeps a record of the materials used, cost of each, and total cost of each article made. The first year, eight periods a week are given to the construction work and one period to Drawing; the second year, ten periods a week, one of which is devoted to Drawing and Design.

Extension Work of Schools.

Under this head are here included those activities conducted outside of the conventional school hours under the direction of the Board—vacation schools, summer academic school, evening schools, playgrounds, and continuation (day) school.

The pupils of each of these schools are classified upon the basis of age into advanced, primary and kindergarten. The advanced classes are conducted on the departmental plan, classes changing every forty-five minutes. The nature of the work was as follows:

For Boys.—Bent iron, wood-sloyd, basketry, raffia weaving, drawing, water-colour work, clay modelling, cardboard, nature study, stories, songs and games, gymnasium and baths.

For Girls.—Sewing, millinery, cooking, basketry, raffia weaving, drawing, water-colour work, clay modelling, cardboard, nature study, stories, songs and games, gymnasium and baths. The millinery department, a new feature, was so pronounced a success that it will always be one of the attractive features of the vacation school curriculum. Paper flower making and beadwork were introduced into one or two of the schools by way of experiment, and both were found worth while. Cooking, notwithstanding the warm weather, was one of the attractions for the girls.

Primary Department.—Much of the work mentioned above was carried on in this department of course adapted to the little fingers that were to perform it. These little folks had their songs, their storytime and their playtime, and were as busy and as happy as could be.

Kindergarten.—In this department regular kindergarten work was carried on, carefully planned, of course, for a six weeks' course. The children of this department were given as much of the outdoor life as possible, excursions to the parks near the several schools being made two or three times a week.

All the children were given occasional dips into the outdoor life under the guidance of the games teachers, being taken by them to the parks for their games.

It was discovered very early in the term that, while all the children loved their play under the direction of the enthusiastic teachers, a number of them wished to do handicraft work as well. There was no possibility of responding to the wishes of the boys along these lines, but sewing and crocheting classes were organized for the girls, and once formed, they continued through the summer. One young blind girl took great pains in initiating some of the girls into the mysteries of raffia-work, and presently she had quite a flourishing class. There were story classes for both boys and girls, and occasional lantern lectures.

The Kindergarten was a most interesting feature of the work of the playground, and it was well patronized. All summer this class of little people held its own as to numbers, and without doubt many housebound mothers took comfort in the thought that their little folks were free from the dangers of the streets, because of this safe and beautiful place. These Kindergartens had their playtime at a regular hour each morning, and then the sandboxes, slides, seesaws, rings and swings proved quite as fascinating as the lovely games indoors.

In addition to the playgrounds, each of the four vacation schools gave attention to the games and play, each school having two teachers for this purpose.

Evening Schools.

The total enrolment in 1909 was 4,418, 1,775 of whom were females, the total cost to the Board being $25,757.

The industrial branches offered consist of sewing, dressmaking, millinery, art needlework, and cooking; cabinet making, carpentry, wood-turning, pattern-making, mechanical and architectural drawing, forging, machine shop practice, etc. In the new schools gymnasium and music classes are also held. Approximately one-half of the student's time is taken up with mechanical drawing and academic instruction incidental to his trade, and vitally essential to the first-class artisan.

It is found that a continuous course, arranged in an orderly sequence of topics or principles, and running for at least two years, holds students better and is altogether more profitable than short, take-what-you-please courses. The commercial students were for a time fluctuating and irregular, but when a full-two-year course of hard work was arranged they became serious in their work, faithful in attendance, and their number in a year or two increased four-fold—to 800. It was the same in the academic Night High School, when a systematic four-year course leading to an accredited diploma was established; instead of proving a death-blow, as some feared, it was a new birth, and the High Schools since have grown not only in the confidence and respect of higher institutions, but many-fold in numbers and character of work done. The number of graduates last May from Evening High Schools was 199—83 from the academic four-year course, and 116 from the commercial two-year course.

Instruction in shop work is largely individual in order that it may be supplemental to the pupil's regular shop work, and not a repetition. For example: A pupil would be given instruction in his chosen trade, but it would be applied to the making of machines or parts of machines other than those with which he comes in contact every day in order to broaden his view.

Pattern Making.—This course is intended for pattern makers and pattern maker apprentices. Applicants should be at least 16 years of age, and should have had at least one year's experience in a pattern shop. Every effort is made by means of special problems to make the work as practical as possible to each individual pupil.

Forging is offered for blacksmiths and blacksmiths' helpers, who may be anxious to get a variety of work not offered in daily practice, supplemented by lantern slide lectures and talks on the mining and making of iron and steel, transportation and reduction of ores, mining and transportation of coal, and the making of coke.

A Special Course is offered to machinist apprentices who now attend the Continuation School, not to make blacksmiths, but to learn to forge and temper lathe tools, planer tools, and cold chisels, and so gain a better knowledge

of the properties of steel under heat and temper. This course is also supplemented by lantern slide lectures. The shop is equipped with the latest type of forges and power tools, and also with a sufficient supply of hand tools needed for the work.

The courses consists of demonstrations and talks on building of fires, characteristics of good forging coal and coke, sulphur in coal and its effect on steel, the use of various kinds of flux, followed by practical work at the forge consisting of forming, bending, upsetting, welding, the use of jigs and templates for duplicate work, and the making of various useful articles, case-hardening iron and soft steel by the various processes; also a study of the various tempers by the use of colours and shades, using water, oil, and various chemicals in hardening and tempering; the forging and tempering of machinists', blacksmiths' and other special tools, including taps, dies, reamers, milling cutters, etc.

Architectural Drawing.—For carpenters and apprentices and those who wish to fit themselves for work in architects' offices. This course consists of a study of house framing and construction and the drawing of plans, elevations and details of wooden frame and brick houses.

Machine Shop Practice.—The newly equipped shop with the most modern type of Cincinnati-made tools, offers to machinists and apprentices an opportunity to become all-round workmen, to get away from being mere machine tenders and to become expert on a variety of work and machines. A few months spent in this shop would be an education to any machinist, merely to study the various types of tools assembled in one room. It is the most complete and the only collection of all kinds of Cincinnati machines in the country. The course consists of work on the planer, shaper, milling machine, cutter, grinder, and various types of lathes. Opportunity for fine vise work is offered, and illustrated lectures and talks on the work done in various parts of the world.

SECTION 5 : PHYSICAL CULTURE AND HYGIENE.

In Germany, Denmark and Switzerland very ample provision in the way of gymnasium accommodation and equipment is provided for all grades of schools. In the larger towns Elementary Schools are frequently, if not quite generally, provided with gymnasiums such as one would not find in any except the High Schools or Colleges of our largest cities.

In Denmark at a Central Rural School one half the ground floor space of the building was alloted to the gymnasium. This indicates that the physical exercises and physical culture of the gymnasium are used there to supplement the ordinary exercises which are found in abundance among the young people of Denmark, who lead very active and industrious lives. The great attention paid to these in the schools is doubtless due to the influence of the many citizens who have passed through the People's High Schools. In them Singing and Physical Culture have a recognized place of great value. One mature woman

said, on the occasion of our visit, that her course at the People's High School had given a meaning to her whole life. When asked what subjects, course or courses had done most good she said "History, Singing and Physical Culture." She was representative of a large class of Danish women whose intelligence, housekeeping ability and general culture are worthy of all admiration and praise.

PHYSICAL CULTURE.

The Swedish system of drill is generally followed. A very brief description of its essential features, appropriate for this reference, is taken from pages 157-8 of "*Education and the Larger Life.*" By C. Hanford Henderson.*

The method of this gymnastic is very simple. It uses very little apparatus, and may even be carried on without any whatever. All it requires is a large open floor or a hard dirt court. Bars and ladders and wooden horses are used where available. but they are not essential. The system is primarily a scheme for general bodily exercise prompted by individual will power. It seeks to cultivate the will through the greater control of the body. It is, indeed, a system of carefully thoughtout organic education. Like all true sense culture, it belongs more properly under the head of mental culture than under the head of what is commonly meant by physical culture. Notice some of its fundamental principles. It dispenses with music, because the rhythm then becomes the guiding factor in place of the human will. It dispenses with all action on the part of the instructor during the class movement, for this would substitute imitation for the directing power of the will. Both of these provisions are very subtle, and they do accomplish their purpose. The movement is explained and illustrated by the instructor, and each child knows perfectly what is to be done. But he must do it himself, of his own volition, and quite unaided by music or model. All commands are short and clear, so that they may reach the intelligence with the utmost directness and speed. The response must be equally quick and direct. The first command—"Attention!" asks that the faculties be alert and ready to act, and the body in a suitable position of vantage. The second command names the part of the body to be called into action. The third command tells the direction of motion. The last command describes the motion and calls for it. Thus: "Attention—right leg—upward—bend!" Each word is spoken quickly and distinctly. The exercise is not only meant to develop the body through the muscular exertion required, but still more to develop the power of command. The exercises are all light, and the majority of them would scarcely bring fatigue if persisted in for considerable periods of time. But where the system is well carried out, and the commands follow one another in fairly rapid succession, mental fatigue comes before muscular fatigue, and indicates very positively where the work is being done. The whole purpose of the Swedish drill is to increase the health of the body, to make it alert, quick, usable; above all, to put it under the absolute control of the will.

WORK AND PLAY.

Purposive exercises make the courses in Physical Culture attractive, and when young people participate in them they are often thereby led to take up courses in other studies and work. The physical exercises of work have perhaps the highest value, especially when they are called forth in response to definite purposes and achieve something desired by the worker. The purposive factors in work and play put them on a higher plane of service for development than exercises followed with the best of apparatus, but without conscious meaning or purpose in the mind of the pupil.

WHAT IS DONE AT EDINBURGH.

The Board has appointed a Superintendent who gives his whole time to the supervision and inspection of the work of Physical Training, including

* Published by Houghton Mifflin Company.

swimming and games, in all the day and evening schools of the Board. In many Elementary Schools the teaching of Physical Exercises is severely handicapped through want of space.

In all the schools attention is given to Organised Games. A large number of the teachers devote part of their spare time in the evenings and on Saturdays to the superintendence of these games. Associated with the Board's Standing Committee on Games, which has supervision of the games, recreations, and athletic sports taken part in by the scholars, there is an Advisory Committee of Teachers and Officials, whose duty it is to make recommendations to the Games Committee. Each game is managed by a Committee of Teachers representing the schools taking part in the game, and these Committees are responsible to the Advisory Committee.

All this is typical of the best that is being done in other progressive cities, where also notable headway is being made, in education for vocational and social efficiency.

The Teaching of Hygiene.

A most excellent paper on "The Teaching of Hygiene in the Public Schools" was read by Miss Edith Hurlbatt, M.A., Head of the Royal Victoria College, Montreal, before the Public School Society, at the National Convention, Montreal, February 23, 1912. It embodies aspects of the question which were impressed upon the Commission by visits to many schools and conversations with many leading educators. The following brief extracts are selected as expressing what the Commission heartily endorses.

Hygiene is a late comer into the company of subjects that have to be dealt with in the primary school. But it may be assumed now that on this continent it is recognized that hygiene has a place among the subjects to be dealt with in the school course.

The scope of the idea of sanitation has been greatly enlarged; it is not only the school offices, etc., the provision of drinking water, the provision of washing appliances and the adequate ventilation of the teaching rooms which are now looked at from the point of view of sanitation, but also the lighting, the arrangements for the hanging hats and cloaks and for the drying of clothes (so that the children may "change their feet," as the Scotch say), the design for seats and desks and facilities for physical exercise.

The provision of space for exercise is now being insisted upon by progressive educational authorities—for example, the English Board of Education is withholding grants in aid of buildings which make no adequate provision for this purpose.

THE HEALTH PROBLEM.

But the health problem must be recognized as a school problem not merely because of the large or small proportion of sickly and ill-developed children who find their way into schools, but because school life exposes children to an accumulation of conditions unfavourable to their healthy and normal development, calculated to affect injuriously their future social power. These children are now to be given instruction in hygiene and physical education, and a place is being claimed for these subjects in the regular curriculum of the school.

There are three factors which have hastened the movement for placing hygiene in the school curriculum. The public and especially medical opinion, having been aroused on the subject of physical deterioration, and having been discouraged by the apparent indifference of parents and educational authorities to the need of enlightening ignorance which now leads to the perpetuation of preventable defects and diseases, has at times pressed for the direct teaching of hygiene with an emphasis upon its pathological aspect rather than upon the laws of healthy living.

A second factor has been the influence of supporters of the temperance movement with their plea that throughout the child's school life a constant stress should be laid upon the evil effects of the use of narcotics and stimulants.

The third factor has been the desire of many—overwhelmed by the gravity of the problem of infant mortality—that the public schools should be the direct educational agencies for making girls aware of their future duties as mothers, should instruct them in the care of infants and in those things which go to home making. "Of what avail," say they, "are the schools if the girls do not carry away the knowledge that will help them in their daily life and upon which the happiness and welfare of their families will depend?"

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KNOWLEDGE FOR GOOD HABITS.

The aim of the teaching of personal school hygiene should be to give knowledge upon which to build up good habits and high ideals in respect to physical and moral life—not the perverse method of describing and explaining disease, however fully accompanied with plentiful warnings. Educational opinion tends toward the belief that the laws of healthy living are better taught during the earlier periods of school life, through actual practice and by the agency of nature study or elementary science; and that direct teaching should be confined to the latest years, the ground having long been prepared by continued and well-diversified indirect instruction. Indeed, according to this view, very little direct teaching would begin in the public schools owing to the early age at which pupils leave, though in the high school, in which the pupil remains during adolescence, the instruction can be more normal and direct, though still preferably correlated with biology and with domestic science. In secondary schools the teaching given in elementary biology as well as in chemistry and in physics affords even greater opportunities for laying a foundation upon which to build concurrent or subsequently permanent and practical interest in hygiene. "But the mere formal treatment of hygiene should never take the place entirely of the unforced effective application of any line of thought or interest to practical human living; for only by the latter means can hygiene be made one of the great humanistic studies. The teacher with inspiring personality, keen insight, sound judgment, unselfish devotion to the interest of the child, will be able to utilize the teaching of hygiene not only for the pupil's self-protection, but as a means of broadening the intellectual horizon, for deepening the sense of social responsibility, and for the raising and strengthening of ethical ideals." Hence the question of equipping the teacher with the right knowledge and the way of using it has to be met.

TRAINING FOR TEACHERS.

In 1908 the International Congress on School Hygiene passed the following resolution: "Whereas the improvement in health of, and the hygienic conditions surrounding, school children depend largely upon the intelligent coöperation, the competency, the interest and faithfulness of teachers and principals in matters of hygienic importance, therefore be it resolved that all schools having courses for the training of teachers should give instruction in (a) personal and school hygiene and (b) the principles and practice of physical training (and to each of these subjects should be given as much time as to the major subjects in the course), and that the principles and practice of hygiene should form a regular part of the curriculum of all institutes in which students are trained to become teachers in schools of all grades."

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It is understood, from early announcements, to be the intention of the executive committee of the Strathcona Trust, which is made up of representatives of the Department of Militia and Defence and representatives of the educational authorities of the various provinces, to recommend the introduction into the schools of the system of school drills now in use in England. There it has been already recognized, to quote the English Board of Education, that "a system of physical exercise should aim not merely at improving the physique of the scholars; it should tend in addition to develop qualities of alertness, decision, concentration, and should promote the complete coördination of the movements of the body under the control of the mind." The latter aim, it is pointed out, has an intimate connection with the rest of the school work, and in so far as a course carries out that aim it is educational in the best sense."

CHAPTER II: SECONDARY AND HIGHER EDUCATION IN RELATION TO INDUSTRIAL TRAINING AND TECHNICAL EDUCATION.

SECTION 1: SECONDARY SCHOOLS.

A common criticism levelled against Secondary Education in Canada has been that the Secondary School has tended to give the youths a distaste for manual labour, and has dulled any inclination towards skilled handwork from want of opportunity to develop ability in that direction; also that it has been organized and conducted chiefly to prepare for the Colleges and learned professions, and does not give good preparatory training for the life and occupations of those who have to leave school at about 16 or 18 years of age.

Another criticism has arisen from the fact that the kind of education offered in the Secondary Schools of Canada has not been such as to appeal to the large number of boys and girls who are rather slow, or have little ability or interest, in exclusively book or theoretical studies or subjects, but who have intellectual interest and power in productive and constructive work. Experience has indicated that many youths, who are negligent, uninterested and unsuccessful in book studies and purely theoretical subjects, are attentive, diligent, interested and successful in construction and expression work calling for skill of hand, closeness of observation, exercise of judgment, initiative and co-operation with their fellows.

Faulty Methods of Instruction.

The opinion has been expressed by members of the Faculties of Technical Colleges that the Secondary Schools have not given the students the right sort of preparation in the sciences and have not qualified them adequately in knowledge of materials and the use of tools and instruments, to enter upon the College courses without waste of time. The faulty method has had an eye chiefly to the imparting of information as recorded in books, and to the use of books as the chief means of education. When new science subjects were introtroduced in the course of study of Secondary and Elementary Schools these usually came as the result of standards of examination from the University or College. The method of presenting a subject to students of 18 years and over at the University or College had been by adopting a logical intellectual treatment appropriate to mature minds in acquiring a new subject. The more recent laboratory methods of teaching have begun to prevail in Secondary Schools and to remove the reproach. In this connection the method of teaching science outlined hereafter by Dr. C. J. Lynde is commended.

There have been statements also to the effect that the training in the use of language had not given the students ability to express themselves clearly, correctly and adequately on the actual work they were doing or to express their opinion or judgment on their experiences or observations.

Little Provision for Hand Workers.

Secondary Education in Canada has been almost entirely of a sort which occupies the whole time of those receiving it. In other countries Secondary or Supplementary Education is carried on while the young people are actively engaged in gainful occupations and following employment or learning a trade which will serve them in mature years. For example, in the Co-operative Industrial Schools of the United States, young men from 15 years of age upward attend High School and workshops, where they are employed, week about. In the Continuation Schools of Germany the young people engaged in gainful occupations attend Continuation Schools from four to ten hours per week. In several states in Germany the attendance at the school must be over before seven o'clock in the evening. Frequently the employers arrange to let the young workers free to attend the school in the morning or during the forenoon when they are fresh and most able to profit by the opportunities they have.

At present in Canada there is scarcely any provision for Supplementary Education for those who have left school at about 14 to go to work and who desire later to resume continuous attendance at a school which will help them in their occupations. In Germany, particularly, there are many Secondary Technical Schools to which such workers can go for courses of from one to three years. These provide Secondary Technical Education for suitable young men seeking qualification as foremen or superintendents and for the directive positions of the minor sort. Those who are to fill the highest positions as superintendents and directors are often those who have been able to take advantage of the highest technical institutions which in Germany are known as Technical High Schools. They do not correspond with the Technical High Schools in Canada or the United States but are on a level with, or higher than, the faculties of applied science of our Colleges and Universities.

(1) METHODS OF TEACHING SCIENCE.

The laboratory method, especially where there is not an elaborately appointed laboratory, has been found in every respect better than the lecture or book method of instruction alone. The sequence in which the several experiences of the educational steps follow each other for young children holds good also among young men and women at least until 17 or 18 years of age. The following steps which are not separable from each other indicate an order of sequence which is suggestive:—

Observing carefully and closely and using impressions from all the avenues of intake, together with instruction received and previous knowledge possessed, to form new ideas or concepts; reflecting on such ideas and planning towards some act or series of acts for the expression of these ideas; giving expression to them in language, drawing, calculations, actions or material products; reasoning to conclusions from any general principle deduced and applying it to other cases.

A valuable memorandum was submitted to the Commission by Dr. C. J. Lynde, Professor of Physics, Macdonald College, Que., on the teaching of the sciences of Physics and Chemistry in the Elementary and High Schools of Canada. The principles and methods which it sets forth are commended particularly to all authorities responsible for the courses in science in Secondary Schools. The following is the memorandum:—

SUGGESTIONS REGARDING THE TEACHING OF PHYSICS AND CHEMISTRY IN THE ELEMENTARY AND HIGH SCHOOLS OF CANADA.

Two methods of teaching the sciences.—In teaching the sciences to beginning students, the instructor may follow one of two courses:

(1) He may treat the subject logically from the standpoint of the science, or,

(2) He may treat it logically from the standpoint of the development of the child.

In teaching botany, for example, one method is to start with the simple cell and develop the subject from that; the other is to take the children out into the fields, gardens and orchards, draw out their knowledge of the familiar grasses, weeds, roots, tubers, trees, fruit, etc., and develop the subject from the knowledge they already possess. This latter method seems to be the rational one.

Elementary science teaching in Canada.—Judging from the text books in use, the elementary science teaching in Canada is of the former kind. The subject is developed logically from the standpoint of the science, but no consideration is shown for the child. In the majority of cases no attempt is made to lead from the known to the unknown; to use the knowledge the child possesses as a basis for an advance into a wider field.

The order in which the subject matter is presented is the same as that used in the universities in training scientists. The text books used are university text books simplified; the subject matter is simpler, but the order in which it is presented is the same.

The laboratory courses are university laboratory courses made down; the child is asked to make the same experiments a university student is asked to make, only the apparatus is cheaper and therefore gives poorer results.

The reason.—The reason for this state of affairs is that the sciences were first taught in colleges and universities, and the text books were written for college and university students. When the sciences were later taught in elementary and high schools, the text books and laboratory manuals prepared were copied from those used in colleges and universities.

The result is that the books at present in use are not suited to the needs of young students. They aim at the logical development of the subject matter, whereas they should aim at the logical development of the powers of the student.

WHY?

Why do we wish boys and girls to study the sciences?—In order to answer the question, "How should the sciences be taught to beginners?" we should first answer the question, "Why do we wish boys and girls to study the sciences?"

The answer to the question "Why do we wish boys and girls to study the sciences?" is somewhat as follows.—The human race, in its long struggle upwards from savagery, has acquired a vast fund of knowledge of nature; this knowledge is a treasure to the race; it has been classified and made exact, and laws have been discovered which tell us how the forces in nature will act under given conditions.

We wish boys and girls to study the sciences, because we wish them to acquire the most essential parts of this knowledge without the long struggle, and because we wish to give them, through this knowledge, the power,—

(1) To understand and control the forces of nature for their own benefit and the benefit of others;

(2) To find new ways in which these forces may be made to serve mankind;

(3) Possibly to discover new forces in nature or new manifestations of the forces already known.

In a word, we wish to make them, as far as possible, masters of their environment, through knowledge of that environment.

HOW ?

Before answering the question "How should the sciences be taught to beginners ?" we should distinguish between the meanings of the two words, *information* and *knowledge*. Information is that which we have been told, and knowledge is that which we have learned by experience.

In planning how to teach the sciences to beginners we should remember four things:

(1) That our object is to have the child obtain power through *knowledge*.
(2) That all teaching should begin with the known and lead to the unknown.
(3) That the child has an intense interest in natural phenomena, and is eager to understand them.
(4) That the child comes to a beginning class in any science with a large knowledge of nature which he has been acquiring ever since he was born. This knowledge is more or less unsystematized and inexact.

The answer to the question, "How should we teach the sciences to beginners?" is somewhat as follows:—

(1) We should begin with those things in nature in which the child is *interested* and of which he has firsthand *knowledge*.
(2) This knowledge should be organized, extended, and made exact; the approach to the laws of nature should be made through this knowledge; and when the law is understood the child should be led to see that it helps him to group together and understand certain phenomena with which he is familiar, and then to group together and understand phenomena with which he is less familiar.
(3) The work of organizing, extending and making exact the knowledge possessed by the child should be aided by experiments which the child himself makes.

PHYSICS.

When the teacher lays stress upon the logical presentation of the subject matter rather than upon the logical development of the powers of the child he is engaged in teaching Physics, whereas he should be engaged in teaching children.

In many cases no attempt is made to lead from the known to the unknown, to use what the child knows of the physical world about him as a basis for an advance into the unknown. For example; the course upon "Heat" usually consists of exercises in expansion, specific heat and latent heat, and no reference is made to the many heat appliances with which the child is familiar—the kitchen range, the hot air heating system, the hot water heating system, the steam heating system, the method of supplying the house with hot water, the steam cooker, the double boiler, the refrigerator, the ice-cream freezer, double windows, clothes, etc., etc. The child has a large fund of first-hand knowledge of heat and heat appliances which should serve as an excellent foundation for a course on heat, but, as a general rule, no use whatever is made of it.

The method of teaching the other branches of Physics is open to the same criticism.

In each branch of the subject:—

(1) Begin with those things in which the student is interested and of which he has first-hand knowledge.

(2) Draw out this knowledge; organize it and make it exact, and then use it as the basis for the advance into the unknown. As each new fact or physical law is understood by the student, lead him to correlate it with his first-hand knowledge.

(3) Treat the experiments as the means and not as the end; lead the student to ask the question to which the experiment supplies the answer.

Examples.

Mechanics:—The study of Mechanics might be entered upon through the knowledge the student possesses of the tools and mechanical appliances used about the home, the farm, etc., the crowbar, wheelbarrow, pitchfork, shovel, scales, windlass, pulleys, jackscrew, etc. Draw out this knowledge, organize it and make it exact. Then take up Mechanics systematically, and as each new fact or law is brought out, lead the student to correlate it with the knowledge he has of tools and mechanical appliances.

Heat:—Similarly the study of heat might be entered upon through the knowledge the student has of the heat appliances used about the home: the kitchen range, the hot air heating system, the hot water heating system, the steam heating system, the method of supplying hot water to the home, the steam cooker, the fireless cooker, the refrigerator, the ice-cream freezer, double windows, clothes, etc.

Electricity:—The average young student is intensely interested in electricity, but has little first-hand knowledge of it; for this reason the early experiments he makes should be designed to supply this first-hand knowledge. They should be qualitative rather than quantitative. For example: allow him to take apart and put together electric cells, make permanent magnets and experiment with them; make electro magnets, examine and install the electric bell with push button; experiment with telegraph instruments; light small electric lights by means of batteries and by means of a hand-power dynamo; take apart and put together a hand-power dynamo, a small motor, and experiment with them; use two telephone receivers as telephones; examine many electrical heating and cooking devices and many motors in use; trace the wiring of a house; trace the current from a dynamo in the power house to the fixtures in the home (if possible); visit an electric light plant; street car railway power house; telephone central station, etc. Use the first-hand knowledge gained in this way as the basis for the more systematic course in electricity.

Light:—Begin with the sources of light in the house, the best arrangement of lighting fixtures in the different roome in the home, the library, dining-room, kitchen, bedrooms, etc.

Sound:—Begin with the simpler musical instruments, the guitar, violin, piano, whistle. Then take up the study of sound systematically, and as each new fact or law is brought out, correlate it to the knowledge possessed by the student.

CHEMISTRY.

Chemistry is probably the most difficult science to teach to beginners. The present method seems to the writer to be entirely wrong, and this opinion is held by many university teachers who state that they would prefer to have their students come to them without any preliminary training in chemistry, rather than have to deal with the product at present turned out.

Instead of the present course, which is exactly the elementary course used in colleges and universities, the child might be given a course in what might be called fundamental operations.

Fundamental operations.—This course would teach the child how the things are made which he sees about him and uses every day. For example, teach him how the following are made:—bricks, lime, cement, mortar, plaster, concrete, glass, paper, metals, lumber, paint, etc.; also flour, bread, butter, cheese, syrup, sugar, vinegar, salt, pepper, leather, cotton, linen, woollens, starch, candles, soap, coal gas, etc., etc.

This should be partly a laboratory course and partly a reading course. The child should, as far as possible, *gather the raw material*, bring it into the laboratory, and *make the thing*, while reading about the method of making it.

Examples.

For example, with a simple furnace the child could gather clay, bring it into the laboratory and make a brick while reading about how bricks are made. Similarly, using the same furnace, he could gather the raw material and make lime, cement, glass and pottery. Also with the furnace he could reduce one or more of the metals from their ores.

He could go into the bush, gather different kinds of wood, finish them, and learn the qualities of different kinds of lumber.

He could gather the proper wood, and make a rough paper.

He could see an animal skinned, take a piece of the skin, gather oak or hemlock bark, make an extract of it, and tan the skin into leather, with and without the fur.

He could use the fat of the animal to make soap and candles.

He could *milk* a cow and make butter and cheese.

He could gather wheat and make flour, and turn the flour into bread.

He could gather oats, make meal, and turn it into porridge.

He could gather sugar beets and extract the sugar, also extract sugar from sugar cane supplied to him.

He could gather potatoes and extract the starch; wool and flax and make thread and cloth.

He could learn how to preserve meats, fruits, eggs, etc.

He could make syrup, vinegar, baking powder, coal gas, etc., etc.

This course would be intensely interesting to the child. It would touch "nature study" on one side and "manual training" and art on the other. It would be an excellent training for life, and would give the finest kind of foundation for a systematic course in chemistry.

SESSIONAL PAPER No. 191d

(2) THE TEACHING OF SCIENCE IN SECONDARY SCHOOLS IN PRUSSIA.

The teaching of science has received much attention in Germany. The official Prussian Regulations for schools for girls set forth the aims and methods as follows:—

A—GENERAL AIM.

(1) *Natural History.*—The close and thoughtful observation of nature. Elementary notions of structure and the most important physiological phenomena of animals and plants; of the mutual relations of the different living creatures and their relations to man. General laws of health.

(2) *Natural Science.*—To impart, by means of experiments, an elementary knowledge of the chief laws and processes of Physics and of Chemistry, especially of those which are most important for domestic and social life, and which help to determine the progress of civilization in these days.

B—PROGRAMME OF WORK.

Class VI. Two hours a week.—Description of simple flowering plants actually before the pupil. Explanation of the most important parts and forms of the roots, stems, leaves, flowers and fruits. Fundamental conditions of the lives of plants. Description of some important native mammals and birds, in relation to form, colour and size from specimens at hand, or illustrations if sufficiently large, together with information about their mode of life, their usefulness or their harmfulness.

Class V. Two hours a week.—To extend and supplement the work of Class VI with the addition of the study of reptiles, amphibious animals, and fishes. Fundamental principles of anatomy of human beings.

Class IV. Two hours a week.—Comparative description of the related genera and species of flowering plants from actual specimens. Biology of plants. Poisonous plants. The lower animals, particularly the useful and the harmful, as well as their enemies, with especial reference to insects and their significance in the economy of nature. The commonest minerals of everyday life according to their appearance, extraction and value.

Class III. Two hours a week.—The most important cultivated plants and their uses. Fundamental principles of the anatomy and physiology of plants. The most important facts about cryptogams and the diseases of plants. The structure and physiology of the human body, with instruction in hygiene.

Class II. Two hours a week.—The principal chemical processes, with special reference to mineralogy and geology. Physics: Heat, magnetism, electricity.

Class I. Two hours a week.—Equilibrium and motion of solid, fluid, and gaseous bodies; sound; light.

C—REMARKS ON METHOD.

In view of the wide extent of ground to be covered in these subjects, and the comparatively small amount of time that can be given to them, very great care must be exercised in making a suitable selection. The aim of the teacher must be first of all to guide the pupils to observe and to think for themselves, and carefully to avoid overburdening them with mere memory work. Experiments and direct observation are in all lessons to take the foremost place. It is desirable to enable the pupils to carry out experiments themselves. No importance is to be attached to a knowledge of botanical and zoological systems and schemes of classification. The plants and animals which are of most importance for human civilized life are to be put in the most prominent place; natural objects in the vicinity and their vital connections are first of all to be made known to the pupil. Natural objects themselves, when they can be procured, are to be preferred to illustrations. The instruction in anatomy and physiology of the human body and in hygiene, is, on the one hand, to be given without diffidence, but, on the other, with due regard to feminine sensitiveness. In Physics, a mathematical treatment of the subject is only permissible when there is a natural connection with the teaching of geometry. A special text book for teaching natural science appears unnecessary. If one is used it must be suitable for a girls' school, short and clear, and must avoid all appearances of being a scientific treatise.

Purpose of the Teaching.

The following explanatory paragraphs are taken from pages 280, 281 and 282 of Volume 9 (Education in Germany) of "Special Reports on Educational Subjects" compiled for the British Board of Education in 1902.

It is generally recognised by German educationists that the careful study and observation of Nature, of plant and animal life, not only afford a mental discipline of the utmost value, but are also an important aid in the formation of character. Some training, therefore, in the rudiments of Natural Science forms an indispensable part of the carefully-planned curriculum of a girls' school, care being taken that the symmetry of the curriculum is not disturbed by giving undue prominence to the subject. Natural Science in secondary schools is regarded as a single subject, and must be taught as far as possible as a connected whole, and not sub-divided into separate branches. If sub-division is necessary for the purposes of convenience, the close relations existing between the different branches must never be lost sight of.* These must be taught in connection with each other, so as to train in the pupils the faculty of observing, of describing accurately, and of drawing logical conclusions from observations and experiments.

It being distinctly understood that the Natural Sciences are to be regarded and treated as one subject, the order in which the different parts shall be taught is clearly indicated in the official Prussian programme. The parts, or groups of parts, which are most closely related to each other are taken together or in succession. For example, it is generally agreed that to begin with the study of Botany is most convenient. Specimens are easily accessible, and can not only be seen but handled by the pupils. The study of plant life naturally leads to that of animals, and from thence the transition to the rudiments of human anatomy and physiology is obvious. The laws of health are studied; then follows an introduction to elementary geology and mineralogy, while, incidentally, some knowledge of a few of the most important chemical processes is gained. The course in Physics is strictly 'outline,' and includes study of the more remarkable phenomena, and the laws of its different branches, so far as this can take place without application of mathematics.

In view of the enormously wide range of this subject, very great wisdom must be shown in the choice of what is to be presented to the child. No exhaustive treatment of any branch is aimed at; on the contrary, it is not deemed possible or desirable to gain a thorough knowledge of the principles of any one branch of science while at school. To quote Mr. Russell again: "To understand the relations existing between sciences is worth more than the extensive knowledge of any one."

In the best schools ample provision is made for teaching Natural Science. There are rooms specially built for the purpose, furnished with supplies of expensive apparatus, there are huge cupboards stored with specimens, botanical, zoological, and geological; illustrations, diagrams, charts are found in bewildering number and variety. Rows of benches, each one raised above the other, render it possible for all pupils in the class to follow every stage of the experiments performed by the teacher.

Preparing Boys to Study any Science.

The course of study appointed for boys is more comprehensive than that for girls, and fewer limitations are imposed upon the teacher. Some stress is laid upon practical work, and, doubtless, far more is expected of the boys than of the girls. Speaking broadly, though the aim of teaching differs, the methods are much the same. Apart from pedagogical considerations, the teaching of Natural Science to boys has the practical end in view that they may receive such training as will enable them, when they enter the university, to study any science intelligently. But even in their case very little practical work is done in the laboratory while at school. Mr. Russell's remarks upon the comparatively small part played by laboratory work in science teaching in German Boys' Schools, and the reasons for this, are of special interest here. He says: "The presence of splendid laboratories in most German schools shows that the present method of science teaching is a reaction against earlier notions concerning the function of laboratory practice. So long as the aim was to teach the sciences *per se*, laboratory work was necessary for each individual, but with the advent of the idea that the sciences are no more to be considered independent studies than any other subject of the curriculum, and that mental development of the pupil is of more consequence than definite information upon any one subject, class instruction comes to the foreground. Laboratory work is still deemed an exercise of great

*"They are not taught as distinct sciences, but as a means of assisting the individual to a more complete realisation of his surroundings."—J. E. Russell, Ph.D., *German Higher Schools*. Longmans.

value, *but its aim is to facilitate application rather than to promote individual investigation.*" And, again, "Laboratory work, if done at all, is introduced so that pupils may duplicate the experiment performed by the teacher, or make other demonstrations putting to practical test the knowledge just acquired. The function of laboratory practice is to make application of facts already learned, not for the purpose of presenting new truths or arriving at new deductions."*

(3) THE PRELIMINARY MATHEMATICAL TRAINING OF TECHNICAL STUDENTS.

Closely related to the teaching of science is the teaching of mathematics to those who intend to enter upon technical courses. A paper on this subject was prepared by Mr. P. Abbott, Head of the Mathematical Department at the Regent Street Polytechnic, London, for presentation to the International Congress of Mathematicians, at Cambridge in 1912. It has been published by the Office of Special Inquiries and Reports of the Board of Education. The following paragraphs are selected from it as being instructive in this connection:—

Previous Training Under Present Conditions.

The majority of day students come to the Technical Institution from secondary schools, while a few come from public schools. In certain provincial colleges, where most of the students come from one or two large secondary schools in the same locality, there is a certain amount of homogeneity in the character of their work, but in general there is more variation, not only in the amount of mathematical knowledge attained, but also in the nature of their training. In a fair number of cases the previous training is satisfactory, especially where the teaching has been on modern lines, but in others the differences are so wide and the deficiences so marked, that some preliminary course within the Institute itself is necessary before a beginning can be made with the technical course proper.

Where faults exist they consist in the main of a lack of accuracy, both in working and thinking, inability to apply knowledge to new problems, hazy notions as to fundamental principles, and a tendency to regard Mathematics as something aloof from the phenomena of every-day life. Their training has frequently been too academic in character; there has been too much stress on manipulation and too little on application. A few specific examples of criticisms which have reached the writer may be quoted:—

"Students admitted are very unequal in mathematical attainments. Arithmetic is generally satisfactory; about one-half can do algebra to quadratics, the other half know little. Perhaps 10 to 15 per cent. have done a little trigonometry."

The great fault which I always have to find is that apparently the students have never, or very rarely, been taught to think for themselves, and are greatly lacking in initiative in solving problems. Far too much reliance is placed on the use of formulae. In the majority of cases also the students have little idea of arranging their calculative work concisely, systematically and clearly.

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Co-operation of Teachers.

In the preliminary training of technical students there are two factors which are essential for ultimate success. One, the co-ordination of the work in Technical Institutions with that of the evening continuation schools, has already been dealt with. The other is almost as important; it is the co-operation of the various classes of teachers who are affected. There are four such classes, elementary teachers, secondary teachers, teachers in evening continuation schools, and technical teachers, and in the opinion of the writer no completely satisfactory solution of the problems involved will be reached until co-operation between these different classes has been secured. It is most desirable that in each locality the technical

*J. E. Russell, Ph.D.: *German Higher Schools.* Longmans.

and secondary teachers should confer on problems affecting the day technical students; while co-operation between technical teachers, evening continuation school teachers, and elementary school teachers is essential if we are to obtain a proper sequence of work for evening students with a minimum amount of disturbance on transference from one kind of institution to another.

To provide for this co-operation, I would suggest the formation, in each locality, of an advisory committee of studies for Mathematics, composed of representatives of the different classes of teachers concerned. If such committees can be got to work, many misunderstandings will be cleared away, and many of the difficulties in the preliminary training of technical students will be removed.

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(4) NATIONAL EDUCATION ASSOCIATION.

The following are extracts from the Report of the Committee of the National Education Association on "The Place of Industries in Public Education" (1910).

The problem of secondary industrial and technical education calls fundamentally for a clear distinction between elementary and secondary education which shall take account of the significant differences of children in economic resources, and in the interests and aptitudes that appear before the end of the present period of elementary education. Such a distinction points to the end of the sixth year of school as the appropriate beginning of secondary, that is differentiated, education; it does not in any sense contemplate a six-year course as the maximum provision or requirement for any group of children.

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THE SECONDARY SCHOOL FIELD.

The sub-committee was directed to examine the possibilities of technical education in the secondary school field, and to define the functions of technical high schools. This type of school (in the United States) is just now in process of development, and it is difficult to forecast just what its ultimate character is to be. We have the engineering schools of collegiate rank, but we have had until very recently no public schools which provided thorough technical training of secondary grade. There is a great variety of positions coming between the engineer on the one hand and the mechanic on the other.

The special function of the technical high school should be to train men for these positions. The engineering schools have their own functions and do not give the practical training involving the essentials of a variety of trades and industrial processes which foremen, superintendents of shops, and men of that type need. The technical high school can give this practical training, and in addition, all the scientific and literary training which is necessary for such positions. No doubt a large number of foremen and superintendents, designers and manufacturing experts will, in the future, come from the ranks of the mechanics as heretofore, but the majority of such positions are more and more requiring a broader equipment than is afforded in commercial practice.

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Can industrial-arts education of intermediate grade be related to the higher technical training? Many educators feel that no system of education should be allowed to develop blind alleys, and they wish to see the way kept clear for any youth to pass from one school to the next higher. While in many cases this is an impractical demand from the standpoint of vocational education, it is by no means impossible to pass youths from intermediate industrial-arts training into the higher forms. While they lack something of the technical training, they will have gained on the side of a knowledge of practical conditions. In Germany, it is well known, a large number of the youths who take the intermediate technical training (not that of the engineering level) must have served a period of apprenticeship. Then the chosen ones from among apprentices are admitted to the middle technical schools.

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Definitions of Three Types.

From careful analysis of the existing practices in Secondary, Industrial and Technical schools, and of the needs of this field of education, as evidenced by the testimony and expressions of opinion from a great number of educators, the Committee has formulated the following definitions of three types of schools:

A. *The manual training high school*, or *the manual-training school*, is a school of secondary grade in which a greater or less amount of handwork is included in the curriculum and in which the greater part of the academic instruction is similar to that found in other high school and college-preparatory schools, neither the manual nor the academic instruction being specially planned to be of direct vocational service.

B. The *secondary technical school*, or the *technical high school*, is a school of secondary grade having the distinct purpose of preparing its pupils for industrial leadership, that is, for positions in industrial life requiring skill and technical knowledge and of greater importance and responsibility than those of the skilled mechanics. In such a school the instruction deals not only with the important manual operations, but also with those principles of science and mathematics and their direct application to industrial work that will help to prepare the student for successfully mastering the more fundamental processes and problems of those groups of industries which the school is designed to reach.

The secondary technical school, or technical high school, should have for its main object the preparation of its pupils for efficiency in a large group of important positions in industrial life. Its aim is to cultivate industrial intelligence and those qualities which are essential for efficient industrial leadership rather than abstract reasoning power.

C. *The trade school* and the *preparatory trade school* are schools which have for their definite purpose the preparing of boys or girls for entrance to the skilled mechanical trades, and which deal with their pupils during a briefer course and allow for earlier preparation for practical work than the technical high school. Such schools place their greatest emphasis upon practical handwork instruction under conditions resembling as closely as possible those prevailing in commercial practice. Such schools relate the academic instruction at every point closely to the practical work, and include little that is not of direct bearing on trade work.

SECTION 2: INDUSTRIAL TRAINING AND TECHNICAL EDUCATION OF COLLEGE GRADE.

The Commission found itself unable to make a complete study of Technical Education of University and College grade. It directed its enquiries in this respect almost entirely to a study of the effects of the highest forms of Technical Education upon progress in industry and trade, and did not attempt a thorough examination of the organization of the institutions or their courses of study. In France, Germany, Switzerland and the United States the power and influence of Technical Education of the highest types appeared to be greater than in the United Kingdom or in Canada. In England the opinion most frequently heard—and it was earnestly urged—was to the effect that hereafter the industries must somehow secure the services of more men of the highest scientific attainments with thorough technical training, or her manufacturers and merchants will not be able to hold their own against foreign competition.

The Faculties of Applied Science of Colleges and Universities in Canada have the reputation of preparing engineers for professional work in a thorough and satisfactory manner. From what was learned abroad the opinion appears

to prevail that students in Technical Colleges should have, at some time before they graduate, obtained experience with materials, tools, machines and products for the purpose of giving them a clear understanding of principles, and a correct knowledge of the conditions of production and construction, which prevail in shops and factories. It is not important that they should have enough practice to develop either skill or speed as workmen in manipulative labour.

(1) CO-OPERATIVE COURSES IN THE UNIVERSITY OF CINCINNATI.

A plan has been tried at the University of Cincinnati according to which some students in the Department of Engineering spend week about at the University and in the shops of the city. The plan has been in operation only since 1906, therefore practical results, as they may be discerned in the work of the students after they have graduated, have not yet been determined. So far the working of the plan has been satisfactory to the University authorities, to the employers of the students in the shops and factories, and to the members of the student body themselves.

Plan of Instruction.

The College of Engineering offers two sets of courses, the four-year theoretical courses, similar to those of other Engineering Colleges, and the five-year co-operative courses.

The Co-operative Courses are planned to combine and co-ordinate theory and practice. The theory is taught in the University, and the practice is obtained at the manufacturing plants of the city. Students in these courses work alternate weeks at the University and at commercial shops. The classes are divided into two sections which alternate with each other by weeks, so that when one section is at the University, the other is at the shops. The length of the course is five years, the alternation being carried on eleven months of the year. Each student has a two weeks' vacation during the summer, and a week's vacation at Christmas.

The practical work at the shop is as carefully planned as the theoretical work at the University. In Mechanical, Electrical, and Metallurgical Engineering the students follow, as nearly as possible, the path of the articles manufactured from the raw material to the finished product. In Civil Engineering the students work with structural iron companies, ferro-concrete companies, railroads, and the City Engineer's office.

The entrance requirements for these courses are precisely the same as for the regular four-year course. The theoretical work given at the University is as thorough as the work given in the regular four-year courses. It is given over a period of five years. None of the subjects of the course are abridged and none are omitted.

SESSIONAL PAPER No. 191d

PLAN OF PRACTICAL WORK.

The practical work is planned to give a thorough course, beginning with the simple labour of actually doing things and going on to and including the more complex advanced work of engineering practice. For example, a young man desiring to become a Railroad Engineer, begins work as a labourer on a track gang; he remains on this until he is competent himself to direct the work of the gang, after which he goes to the bridge-carpenter gang. Following this he is transferred to a bridge shop to learn fabrication. He then goes back to the railroad on ferro-concrete work and switch and signal work. After a short time in the motive-power departments, he finally reaches the engineering department of the railroad. In mechanical engineering, a student goes through much the same apprenticeship as the machinist, with foundry work in addition. In his later years, he also goes into the engineering department. Through a system of co-ordination by special instructors, who visit the shops weekly where the students are at work, the theoretical and practical departments are brought into close connection.

Student apprentices are paid for their work at the prevailing commercial rate paid any other person doing the same class of work. There is a minimum scale of wages, however, beginning at 10 cents per hour and increasing 1 cent per hour every six months.

SHOP WORK

In all cases the Dean of the Engineering College and the Professor of Civil, Electrical, Mechanical, Chemical, or Metallurgical Engineering, as the case may be, confer with the manufacturers in planning the course of shop work, so that the students get a logically and carefully arranged shop training. The work of the shops is co-ordinated with the work of the University by a special set of teachers called Co-ordinators.

The shop co-ordinator is a college graduate acquainted with shop practice. He spends every morning at the University and every afternoon in the shops. His function is to make a direct weekly co-ordination of the work of the shop with the theory of the University. One afternoon, for example, he may be at the shops of a local manufacturing company, where he will observe the student apprentices at work. He will know what they are turning out, their speeds, feeds and cuts, the angle of the tool, how the batch of work is ticketed, how the work is set up, the power drive, everything important in connection with the operation. The next week these young men will be grouped together with their classmates for two periods in class, when he will explain the functions of the particular articles, on which the students were working, in the machine which the local manufacturing company builds. He will take up all questions of speeds, feeds, cuts, accuracy, etc. Figuratively speaking, he will take from the student apprentices the blinders which would restrict their vision except for this explanatory work. The ticketing of the batch of work is gone into,

and the system of routing is explained. Ultimately during the course all problems of shop organization, shop accounting, cost keeping, shop planning, power transmission, heating, lighting, etc., are discussed.

In conjunction with this, a card system is employed by means of which everything the student does in the shop that exemplifies a theory taught in the University, is called in detail to the attention of the teacher of theory, so that when the student comes to that particular theory, the exemplifications which he has had in his practical work in the shop are called to his attention. It will be seen, then, that out of the student's own experience is drawn much material for his course in mechanism, thermodynamics, machine design, strength of materials, shop economics, etc.

A similar system is followed in railroad work, construction work, and in all the other co-operative fields.

Co-operative courses are given in Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Metallurgical Engineering.

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(2) TECHNICAL HIGH SCHOOLS (TECHNICAL COLLEGES) IN GERMANY.

A fairly full report on the character of these institutions is given in the Report on Germany. As already mentioned the Hochschulen, or High Schools, correspond to the highest technical institutions in this country. Dr. Kerschensteiner of Munich puts the case thus:

> It will be advisable to distinguish three groups of schools, according to the grade of training to which they aspire. German industry and trade require, precisely like the German army, a number of intellectually highly-trained officers, a number of well-trained subalterns, and an army of efficient soldiers.
>
> The group of technical officers is almost exclusively recruited from the German technical colleges. These institutions are open only to students who have passed through the 9 classes of the secondary schools. They educate the technical leaders of industry and also the state and municipal officials who are entrusted with the execution of technical problems. They receive their pupils after a school course of 12 or 13 years, including the primary and secondary school, running from the pupil's 6th to his 19th year. Frequently a year of practical work is thrown in between the secondary school and the technical college. These technical colleges supply us for the most part with the higher technical heads of factories, whose duty it is to strike out new paths and discover new tasks and methods.

Mr. Max Wurl in a Paper on "Technical Education in Germany" read before *The North-East Coast Institution of Engineers and Shipbuilders* at Newcastle-upon-Tyne,* presents the objects and nature of the Technical High Schools in this way:

> The aims of the technical high schools are to train the student to independent thought in technical affairs. He is taught to take a wide view in all of his considerations and all his doings, to avoid the mistake of one-sidedness which is but too common. All points, practical, theoretical, commercial, etc., must be studied with equal care and thoroughness; a failure in any undertaking always shows that something has been overlooked or neglected, and on the other hand we may be sure of success, if we include in our considerations *all* the different conditions according to their importance.

*Minutes of Proceedings, Vol. II.

As a preparation for this study the best obtainable general education is considered necessary; only people who have gone through the full nine years' course at a *Gymnasium*, *Real-gymnasium* or *Oberrealschule* and have gained at the end the certificate of maturity by passing that well known, rather severe, *Abiturienten-Examen* are admitted as students. People without that certificate can get permission to study as *Hospitants*, but the fees are higher for them and they are not admitted to any examinations and can of course not take degrees. The newest regulations exclude *Hospitants* who are not in possession of the "one years' service certificate," i.e., have not passed that particular examination after a six years' course at a secondary school.

ORGANIZED IN SECTIONS.

Every student who wants to take degrees must have had at least one year's workshop practice before his first academical examination. This new clause was not introduced until an enquiry had been made as to the readiness of industrial establishments to accept volunteers in their works. 520 engine-works, shipyards, electrical works, ironworks, foundries, bridge building firms, etc. have now agreed, and about 1,750 places are available every year, in addition to those provided by the State for training its railway engineers. For this latter group the regulation is, that the State-Railway Engineer Students work six months in the fitting shop and two months each in the machine shops, foundry and pattern shops; they have to keep an account of their work, and being *Volontäre* receive of course no remuneration.

The object of the workshop practice is not to teach the future student any handicraft as such, but merely to make him acquainted with the materials, tools and working methods, and last, but not the least, with the workmen; the purpose is to give him an idea about the conditions, means and limits of manufacture and workmanship.

FREEDOMS ARE WIDE.

Having passed all these stages of preparatory training the youth will be freely accepted at any German *Hochschule* on account of his certificates and without further examination; entrance examinations do not exist either at the universities or at the *Hochschulen*.

As a student he enjoys an almost perfect freedom; he may take his apartments and use his time as he likes; he is not even compelled to attend the lectures, and no control is exercised by examinations, etc., during the session.

This "Academical Freedom" is considered essential for the individual evolution of the mind. However dangerous it may become sometimes, nobody who has once been a German student and enjoyed the charm of that freedom would ever admit it being in any way curtailed.

This freedom exists in the teaching as well as in learning. The Professors are independent in expressing their thoughts, and only responsible to science itself. Socially they are standing directly under the Minister of Education, who appoints them and often fixes their salary with them privately. The salary consists in a fixed annual sum plus the student's class fees. Besides these ordinary Professors there are generally a number of qualified private teachers (*Privat-Docenten*) lecturing either on the same or on special subjects; they have no fixed salary, but receive as a rule the whole tuition fees paid by their students for their lectures, or at least a part of them.

ONE YEAR OF SHOPWORK REQUIRED.

The instruction at the *Hochschule* is for the first year chiefly general in character; later on specialization into the different branches of engineering takes place. To suit this arrangement the *Hochschule* contains different sections (*Abteilungen*) and every student is entered into one of them. At Charlottenburg for instance there are six sections:—

1. Architecture.
2. Civil Engineering.
3. Mechanical Engineering.
4. Naval Architecture.
5. Chemistry and Metallurgy.
6. General Sciences.

Every student belongs for the first year to Section 6. Although free in his choice, he is recommended to follow a certain course of studies laid down in a programme for the different sections; he may also obtain advice in this direction from the *Abteilungsvorsteher* of that section, a professor detailed for this special duty every year. The method of forming a separate section for the students of the first year, originally copied from the French "*ecole polytechnique*," has become more and more a matter of form; and the programme of study for the first year, i.e., the subjects recommended, are no longer quite uniform for the different branches of engineering.

THREE PARALLEL METHODS.

For the training of the *Hochschulen* three parallel methods are in use; viz.: lectures, practical courses in drawing and designing, and experimental courses in laboratories.

The lectures are held in the usual way; the students make their notes while the professor is speaking and explaining. Some of the lectures are public, *i.e.*, free of charge, while the first three lectures in every subject are as a rule also free in order that students may form an opinon before entering the class. Libraries, models, art collections, etc., give every student an easy opportunity to widen and deepen the knowledge acquired in the lecture rooms; for the same purpose a number of excursions are made every year.

The instruction by lectures has to go hand in hand with the courses of drawing and designing. The latter bear at first a general character and extend, for instance, over ornamental drawing, geometrical drawing, graphical statics, etc. After these, follow more specialized designs, at first of details and later of whole constructions. The rooms provided for drawing and designing are open to the student all day from 8 a.m. to 8 p.m.; he may divide his time as it suits him, but assistance is only given at the particular hours appointed for the courses.

The training itself tends to an individual development of each student; the object is to educate him to self-dependence and self-reliance. The help of the Professor and his assistants is generally confined to suggestions and criticisms concerning the most practicable way of designing, the leading principles for the design and the application of the details; the student is supposed to learn not only what is general practice but also why it is general practice. He must even find his way if his practical experience fails, as for instance when he finds himself confronted with the task of designing an engine of which he has never seen an example in practice.

Similar principles apply to the laboratory courses, which are intended to develop the student's faculties of observation. The great value of laboratories for technical education is fully recognized and much has been done lately for their development, especially for mechanical engineering. Large and well equipped laboratories have been established in several places during the last ten or fifteen years. Formerly we had only laboratories for chemistry, physics and electricity, but at present, kindred institutions are in existence for mechanical engineering, technology, electro-chemistry, metallurgy and other subjects. This variety and specialization is further extended inside of the different laboratories so that each student may train his abilities in any direction which suits his particular taste and inclination.

SOME CONCLUSIONS.

The Commission is of opinion that:—

(1) Secondary Vocational Education should be provided for those persons who are to follow manual industrial occupations, producing occupations such as agriculture, conserving occupations such as housekeeping, and commercial and business occupations;

(2) Such persons should have opportunities for acquiring Secondary Education which would be as fully advantageous to them in their vocations as the Secondary Education provided in the general school system has been advantageous to those who enter the learned professions, other professional occupations, or the leisure class;

(3) Secondary Education for those who have gone to work should be provided in day and evening classes in close correlation with their occupations while they are still learners, as apprentices or otherwise, and also when they have become skilled workmen or journeymen or have come to fill positions as foremen, superintendents or managers:

(4) Technical Education for the preparation of Technical Engineers, and other persons being trained for professional work of a grade and rank similar to theirs, would be improved by further extensions in the directions indi-

cated by the practice in Germany and at the University of Cincinnati. This applies particularly to the education of such men as might become principals and teachers in the Middle Technical Schools and Technical High Schools in Canada. The Commission commends the consideration of this matter to the authorities of the Technical Colleges in the belief that they alone are qualified to render a final decision in regard to it.

The Universities and Colleges are providing technical courses to meet the demands from an increasing number of students. The rapid growth and development of the country, and the further application of science and scientific methods to all forms of production, construction, conservation and administration, will call for still larger numbers of graduates. In consequence the Universities and Colleges are sure to require increased financial support. The Commission is of opinion that this should be provided from some source without causing the fees required from students to be so high as to exclude suitable young persons who may seek the highest grades of technical instruction.

CHAPTER III: MANUAL TRAINING; NATURE STUDY; SCHOOL GARDENING; HOUSEHOLD SCIENCE; VOCATIONAL EDUCATION; INDUSTRIAL TRAINING AND TECHNICAL EDUCATION.

The loose and indefinite way in which writers and speakers use names and terms, to indicate different kinds of education, frequently obscures their meaning and prevents clearness of understanding. Some names are used interchangeably, although they mean different things. One group of these names may be cited as follows:—Educational Handwork, Construction work, Hand and Eye Training, Handwork Instruction, Manual Arts, Sloyd and Manual Training.

Other groups contain such terms as Nature Study, School Gardening, Elementary Agriculture, Agricultural Education and Rural Education; Domestic Science, Household Science, Domestic Occupations, Housekeeping, Practical Arts, Domestic Economy and Home Economics; Commercial Education, etc.; Professional Education, etc.

Still another group includes: Industrial Training, Industrial Education, Technical Training, Technical Education, Technical Instruction, Industrial Arts, Practical Arts and Vocational Education.

The confusion is jumbled worse than ever when various grades of such kinds of education, as are indicated by the foregoing terms, are spoken of as Primary, Elementary, Higher Grade, Supplementary, Superior, Intermediate, Secondary, Middle, High, Higher, Highest.

One can only hope to help a little towards clearness of understanding of what is being done or what is meant by the forms of education which the terms indicate. Orderly thinking, as the first step towards well-ordered organization, is what is aimed at, rather than uniformity in the terms of classification.

SECTION 1: MANUAL TRAINING AN INCLUSIVE TERM.

The following paragraphs are offered as a contribution towards clearing up the question and bringing about a more intelligible usage by educators and others. The terms Educational Handwork, Construction Work, Hand and Eye Training, Handwork Instruction, Manual Arts, Sloyd and Manual Training are dealt with first. The term Manual Training is coming to be regarded as including all the others in this group.

For Development of Pupil's Powers.

All of these terms are used with reference to education whose chief aim is the development of the powers of the pupil for cultural purposes rather than for their application to any particular occupation. Such education looks towards the systematic training of the powers of the pupil into ready co-ordination for accomplishment. It helps to conserve and develop the love of constructive work. It also provides recreation through active physical work which plays, in the education of the pupil, a part somewhat similar to that of organized games and play in life. It is a means of awakening and maintaining the interest of many pupils who are not naturally interested by theoretical and abstract studies when separated from doing something with concrete things.

The forms of activity which are carried on by pupils under these various names satisfy some of the natural instincts "to do." These have been stated as: Sympathetic instincts—to talk and listen and to act in the dramatic sense: Scientific instincts—to know the "Why" of things and to construct things; Æsthetic instincts—to dance and sing and to draw, paint and model. These have also been arranged under the terms of "Communicative," "Dramatic"; "Inquisitive," "Constructive"; "Musical," and "Artistic" instincts.

In the forms of education carried on under the several names already mentioned there is similarity but not identity in the aims of the work. In all cases there is use of material or materials, such as paper, clay, plasticine, wood, cloth, leather, metals, and incidentally pastes, thread, paint, etc., and also training in the use of tools or instruments. The direct object put before the pupil is to "make something." That something may take the form of an exercise in making part of an object, such as a wooden joint, without making a complete article. Under the Sloyd system the exercise is directed to making a complete model known to the child as being useful and, so far as practicable, beautiful.

The "exercises," or "things to be done," or "things to be made," are arranged in order of difficulty according to the age and capacity of the pupils. At the same time they are arranged to give training in handling materials and tools, to impart knowledge of materials and to develop power to turn the thought or concept of the mind into a drawing and, where practicable, from the drawing into a concrete object corresponding to it in form.

Aims and Values of Manual Training.

It is now generally admitted that Manual Training work should have a recognized place in the course of study from the Kindergarten until about the 11th or 12th year of age, for cultural or self-realization purposes. After that the "Manual Training" (the term is used to represent all the others) might be directed more definitely towards discovering aptitudes and tastes and developing skill and ability for some occupation.

The proportion of time devoted to work involving manual activity varies a great deal. No one rule can be adopted with advantage in all schools for all classes of pupils, but the tendency is towards not less than a quarter of the time in school from the Kindergarten up to the age of 12 being devoted to some form of handwork, in correlation with the other studies and subjects.

The arguments which have been used in favour of Manual Training have some resemblance to those which are urged on behalf of Industrial Education. They both plead for a fuller recognition of motive as it appeals to the pupil in school work and a better adaptation of the course of study to the large majority of the pupils in the hope of accomplishing thereby the reduction of the numbers who leave school before the completion of the elementary courses and the development of ability for industrial life.

Manual Training, or Hand and Eye Training, has particular value in the biological function of education. It is a means of developing the sense organs and of training faculties and powers to meet the things and forces of the outer world with intelligent discriminations. Whether this results in an increase of brain power is a question elusive of proof. The evidence, however, is clear that it adds to the happiness of the pupil, causes the knowledge which he acquires to be retained and available for use, and quickens the rate of his progress in other school work.

A recent book, "Handwork Instruction for Boys,"* by Dr. Alwin Pabst, Director of the School for Training Teachers of Handwork, Leipsic, Germany, presents the case for handwork in Elementary Education with such clearness, authority and moderation that selected extracts from it are introduced here. The paragraphs as selected are not continuous in the book as they appear, but they are in the same order of sequence. The headings are inserted by the Commission.

THE REAL SIGNIFICANCE OF HANDWORK.

In reality it concerns not simply a new branch of instruction, but a deep-rooted principle of our whole education system. Therefore something further must be brought out if one is fully to comprehend handwork in its significance for education. The superficial way in which this question is frequently treated in meetings and by the Press can lead to nothing but a war of words, at the end of which neither opponent convinces the other.

Knowledge in itself is not power, but it becomes power in the service of the will and understanding.

Scarcely a phase of intellectual life reflects the national character of a people so clearly as that of education.

Examples drawn from an inexhaustible supply of material may suffice to show the origin of the first tools and their significance in the further development of civilization; at any rate they give us some idea of the truth and meaning of the assertion of Edmund Reitlinger that "the entire history of man, if examined carefully, finally reveals itself in the history of the invention of better tools."

The tool constantly serves the purpose of giving to man a greater mastery over nature and her products. Through the use of mechanical tools this mastery is remarkably increased and strengthened. Even the scientific instruments and apparatus are nothing but improved and refined tools, which are especially constructed to secure for us a more complete knowledge of the natural bodies and the powers of nature than would be possible for us with our senses alone. Just as the ordinary tools assist the hand, so the microscope and the telescope assist the eye, the telephone the ear, and the telegraph makes possible communication at great distance without change of place.

*Translated from the German by Bertha Reed Coffman, A.M.; published by the Manual Arts Press, Peoria, Illinois.

The improved tool demands a more skilful hand, and in the same measure as the tool of the present differs from that of primitive times, the skill of our hand differs from that of the hand of the primitive man.

Nature has also provided that it should not be possible for a person to receive a wholly one-sided development for a particular service; if a particular service of the eye or hand is required from a person, the entire man must be developed to a certain power of achievement.

REFINEMENT OF THE MUSCLES.

What we call rough work calls into activity the groups of large muscles with their coarser adjustment, while the finer work exercises groups of small muscles with their more delicate adjustment. Therefore, the rougher work develops only a few of the crude motor functions, while the finer work develops the more exact motor functions and requires a finer adaptation of the movements of the muscles. This latter alone is educative, while the hardest kinds of handwork dull the motor perceptions.

If the training is started at the right time, the movements of the muscles can attain a certain stage of perfection which is not possible if begun at a later period in life.

The practical conclusion resulting from these statements of psychological research must be that instruction in handwork should not begin too late. As experience has long taught, it is joined with the play of the children before the school period and in the first school years; and in general it ought to be pursued as the chief thing in the period from the eighth to the sixteenth year. By postponing systematic school exercises for the development of the motor perceptions, the best time is lost and the result becomes thereby questionable.

To be sure we must not fall into the opposite mistake and have the finer exercises, especially those of the fingers, commence too soon. Even here a carefully graded arrangement is indispensable; the universal, methodical maxim, "From the easy to the difficult," when applied particularly to the motor exercises, would be stated: "From the larger to the finer."

And so this line of thought also leads to the statement given above, which might be the central idea of all such discussion, that the entire history of civilization finally reveals itself in the history of the invention of better tools.

HANDWORK AS INTELLECTUAL TRAINING.

It is not possible here to go into detail in these difficult questions, which are not even wholly cleared up by research; but this much is in any case certain, that systematic training and education in dexterity of the hand must be demanded even in the interest of the development of speech. Each individual movement of the hand has its effect on the brain; indeed it must be said plainly that dexterity of the hand does not have its seat in the hand at all, but in the head and brain. Consequently, hand work is without doubt a kind of intellectual training, and the hand is the sixth sense, a way which leads directly to the brain. The customary distinction between "head work" and "handwork" rests upon a fundamental error! There is no kind of handwork which does not require at the same time more or less brain work, and "the man who works energetically and artistically with his hands, as well as the philosopher, must possess a good head." Firmly rooted laziness is inseparably connected with stupidity and dullness.

Handwork arouses the initiative, sets in motion the essential activities of the mind, attention and will, and requires a correct expression of the will. Thus it is an important tool for the development of the intelligence and the permanent retention of knowledge in the brain.

First of all, the play of children is for them serious work. The child is never more industrious than when he plays, and since something definite must be accomplished in the play he learns through play how to work. But an essential difference still remains: play is voluntary, work required; and so through work we learn obedience, the most sterling virtue of children, better than in any other way.

But it is false from a pedagogical point of view to demand of the child only so-called head work, the regular learning of the school. This is, for the first school years especially, a truly bitter food which the child would not take of his own accord. On the other hand, with well directed and selected activities for the hand, he immediately becomes unwearying in his zeal; it is a well-known experience which can be encountered daily in carefully directed courses in handwork, that one finds there scarcely any children who are not industrious, attentive, and willing.

ITS SOCIAL SIGNIFICANCE.

The social significance of instruction in handwork rests especially upon the fact that it gives opportunity for association in work, and for mutual helpfulness and advancement, such as is not permitted in any other branch of instruction. The external relationships themselves give rise to mutual consideration and helpfulness; and besides, it lies in the very nature of productive work

that it leads to association and common interest in work. The social differences are forgotten in zeal for work; each is a friend and helper of his fellow workman.

The entire system lies chiefly in developing independence in the pupils and in giving them practice in perceiving and reflecting. The more sparing of words the teacher of practical work is, the surer will he attain this end; and the more perfectly he has the technique of his work at his command, the greater will be the confidence of his pupils in him.

THE DEVELOPMENT OF THE WILL.

If psychology teaches that the will is a thought brought into execution, then the motor conceptions which excite the muscles to conscious movements are also in a certain sense the raw material out of which the ethical will is formed. Flabby muscles and a weak will can be traced back to the same causes; namely, to a lack of motor activity of the brain. All kinds of physical exercises, gymnastics, and sport, naturally arranged, contribute not simply to develop the muscles, but also to make them subject to the purposes of the will. In this matter instruction in handwork is especially effective. As has already been shown, all finer work is controlled by groups of small muscles, and this limitation also demands accurate control over all the muscles which are not even used in the movement concerned. This power of mastery and the concentration of attention, which is connected with it, form an element which is of the highest significance in the development of the ethical will.

Pestalozzi states that the development of mechanical ability, which is still necessary—in other words, the development of the physical side of artistic training—includes the training of the human senses and the limbs. Their goal is "the highest possible control of the nerves, which gives assurance and perfect control of hand and foot." Both phases of artistic training, the intellectual and the physical, must be carried on together from the cradle up, and in close relation to each other.

Other places in Herbart's works show that he recognizes in physical labour an excellent preparation for systematic activity and at the same time an important means for forming character. He says, "Many a growing boy 'finds himself' sooner at handwork or in business or in agriculture than in school."

A FOUNDATION FOR INDUSTRIAL LIFE.

Among the representatives of the Herbartian school Ziller and Ernst Barth in Leipsic have especially valued instruction in handwork. Ziller sees in it an essential broadening of the general instruction in the preparatory school, and a foundation for the later technical instruction in the trade school or workshop. Consequently instruction in handwork necessarily belongs to the training of pupils who wish to devote themselves later to a practical calling.

Barth shows how instruction in work is to be carried on in the different grades. It is united to the history of civilization and natural philosophy, to geography, geometry, and drawing. From the twelfth year on, but not until then, preparatory instruction for the training for a life work is to be offered in special classes, which is to be adapted to the local conditions and branches of industry.

Professor Biedermann, who through his inquiries into the political life of the middle of the last century, and through his comprehensive studies in the history of civilization, became convinced that there was need of a thorough reform in the German system of education, justified his demand for "education through work" by pointing out, first of all, the drawbacks and disadvantages of purely theoretical instruction. In connection with it he calls attention to the overburdening of the pupils, and especially to the injuries to the health which exist in all kinds of schools as a result of the overloading. In a later chapter, Schule and Leben, (School and Life), he correctly emphasizes the fact that the theoretical knowledge and acquirements gained in the school have in some respects little significance for life; moreover, that the school not infrequently weakens in the pupils the taste for domestic and practical pursuits, and accustoms them to look down with scorn from the height of their imagined wisdom upon the activities of their parents and companions. In order that the school may really be a preparatory school for life, he demands of it the following: along with knowledge and understanding, along with memory and the other powers of receptivity, it must also develop important means of independence, viz.: practical ability, the inclination for construction, keenness of eye, skill of hand, and, above all, will power; in a word, it must not only be a school for teaching and learning in the usual sense of the term, but at the same time a school for work, and must assume its task of educating the pupils for work.

Moreover, the social and economic conditions, which have entirely changed, require the introduction of these activities into the school, because the complete transformation of the entire system of production by the use of machines and the elimination of the most important productive work from the activities of the household and their removal to the factory, have caused the growing child of the present day to lose a great many educative influences, which a few centuries ago were still felt. On that account the education of the school must include these, and thus make reparation for that which is lost. This can only be done by the introduction of practical instruction in the activities of the household and in the problems of the workshop. Wherever

the school offers this kind of instruction, not only as a new course, but as a principle which must penetrate through and embrace all instruction, it is fit for the task which it has, or ought to have, in the social life of the present.

EDUCATION FOR WORK, EDUCATION THROUGH WORK.

That these three tendencies are especially worthy of notice, no proof is needed for him who has in mind, above everything else, the practical results of our education. We are to learn, not for school but for life, and all training should tend to make the person useful for life. For this reason it is necessary to test all aims and means of education in what way they are efficient with reference to the connection between school and life, and with reference to the education of the individual for becoming a member of the social community.

Thus we see a return to the ideas of Friedrich Fröbel, who made self-activity, the development of the creative powers of the child, and joy in work, the main thought of his education. Without doubt further progress will be made along this line, and constantly new systems of instruction and more advanced methods of teaching will be undertaken by means of the application of these principles.

According to our ethical ideas, a commonwealth cannot exist without the work of the individual in the service of the whole, just as a gradual steady development of humanity is not conceivable without serious work, which is performed by the individual within the whole. The higher the culture of a people, the more is work exalted, and it is certainly not a good sign for our German civilization that in our education, training toward a respectful regard for work, especially physical work, is almost wholly lacking. People who are ashamed of handwork do not fully comprehend culture. Education which inspires respect for work and a will for work is a direct means of keeping a high standard of culture, because it compels the wealthy to share with the needy in efforts to obtain culture, and in the distribution of it; and even the commonest labourer who performs the most menial service ought to have the consciousness that he is do ing it for the community as a whole and that by means of that work he is gaining for himself the place to which he is entitled within the whole. "Education for work" and "Education through work" are the two cardinal points around which social pedagogy finally turns.

The introduction of the workshop into the school is the symbol of the changed method of education, which has been developing slowly but surely. Perhaps in a not far distant future the statement will be true: "Only he is truly a teacher who teaches the secret of work."

SECTION 2: NATURE STUDY, SCHOOL GARDENING AND RURAL EDUCATION.

Another group of names or terms is made up of Nature Study, School Gardening, Elementary Agriculture, Agricultural Education and Rural Education.

Nature Study, while often involving some manual activity, is less concerned with training through activities of the body than with giving the pupils an intelligent acquaintance with the phenomena of nature. It holds about the same relation to the terms "agriculture" and "agricultural education" as construction work in the early grades, does to the vocational training of the mechanic.

It is an exercise of the powers of observation and reasoning rather than of the powers of productive manipulation or management. When taken in connection with School Gardening it becomes, in the garden, a form of Manual Training. It appears in every way desirable that Nature Study and School Gardening should occupy a place on the course of study alongside the kind of work which is indicated under the inclusive title of Manual Training. Nature Study and School Gardening are not a substitute for Manual Training; they should be carried on concurrently with it wherever practicable from the eighth to the twelfth year of age. After that they will fittingly pass into courses of vocational education, and will thereafter be more fittingly known under the names of Elementary Agriculture or Agricultural Education.

It appears in every way desirable that Nature Study and School Gardening should occupy a place in the course of study of every rural school and of all town and city schools where ground and facilities can be provided.

School Gardening at the Elementary Schools is a branch of Nature Study with a form of Manual Training, and not a technical training for the industry. At the same time it aims at producing results in plants, flowers, seeds, etc., which are in themselves of economic value. The educational value of the processes is increased by the keen interest of the pupils in preparing for and taking care of living things which are all their very own. In Circular 746, "Suggestions for the Teaching of Gardening," issued by the Board of Education of England, the question is presented with much clearness. The following extracts are taken from that paper.

School Gardening in England.

The Practical First.

3. School gardening, therefore, rightly understood, is a branch of "Nature Study" rather than a professional training for an industry. But it is also—and this is what makes it particularly suitable for the education of children—a study which aims at producing visible and tangible results, which appeals to their practical and utilitarian instincts, and is closely connected with their domestic life. It is, or should be, thoroughly "practical," and the theoretical part of the instruction should be directly related and, indeed, subordinated to the practical.

Nature Study and the Garden.

4. It is certainly not the purpose of this memorandum to underrate the value and importance of "Nature Study" in town schools or in country schools where the circumstances are unfavourable to the establishment of school gardens. There can, however, be no doubt that even in town schools the interest of Nature Study is greatly increased if it is illustrated by cultivation of plants on such a scale as is possible, and that the further development of Nature Study into gardening reacts most favourably on Nature Study itself and supplies it with a meaning and interest the value of which can hardly be exaggerated. Where this particular development is impossible, such other means as are available must be used to guard against the chief danger which affects Nature Study, viz., its tendency to fall back into a series of disconnected object lessons which, on the one hand, make no particular appeal to the interest of the child, and, on the other, lead to no understanding of general principles.

Useful for Experiment.

5. In one respect gardening has a great advantage over some other studies in that it lends itself very readily to experiment on the part of both teacher and scholar. Mistakes and failures in gardening are often more educative than successes, and though, where separate plots are cultivated by individual scholars or pairs of scholars, it is desirable to guard against the discouragement arising from wholesale failure, it is equally desirable to cultivate a sense of responsibility in the scholars by allowing them to realize the consequences of bad or slovenly methods, such as sowing too thickly, insufficient thinning or weeding, or neglect to act promptly when the onion or carrot fly appears. In this, as in all other subjects of instruction, the teacher has to keep to a just mean between doing too much and too little for the scholars.

Correlations.

6. As has already been indicated, gardening affords one of the best means of making the ordinary school work more concrete and more interesting. All education involves effort on the part of the scholar, and, even in favourable circumstances, some drudgery is inevitable, the discipline of which is wholesome. Drudgery, however, always involves waste of energy, and if we can set before the scholar an object of practical interest, the pursuit of which demands at the same time a high degree of accuracy and thoroughness, we reduce this waste of energy and make his education more profitable as well as more pleasant. The practical interest of the school garden can be used to give reality to all the ordinary class subjects, such as reading, writing, arithmetic, and composition.

Interests Parents and Ratepayers.

It is quite permissible for those who believe in the value of education, apart from results, to emphasize the utilitarian aspect of gardening. In the country as in the towns it is difficult to exaggerate the importance of enlisting the sympathy of parents, and of ratepayers who are

not parents, with the work of the elementary schools. Gardening is, perhaps, the most important domestic industry of this country; it is in close touch with the kitchen on the one hand and with agriculture on the other. The handy and resourceful workman, whether on the farm, or in the workshop, is usually a good gardener, and the keen competition at village flower shows extends to all classes. There is therefore in the rural community a large stock of sympathy and interest to draw upon, and interest of a kind which will tend to protect school gardens against the danger of dilettantism. The suggestions of the practical rural economist are indeed very likely to enlarge the education influences of the school garden.

Requires Competent Teacher.

10. Instruction in gardening should, wherever such an arrangement is at all possible, be given by a member of the ordinary school staff. It is, of course, very desirable that the teacher should take every opportunity of improving his qualifications by attending such courses of instruction as are available, and he will naturally welcome any help which the Local Education Authority's organizer or superintendent or visiting instructor in horticulture may be able to give. But the importance of maintaining an intimate and reciprocal relation between the garden work and the ordinary school work is so great that the employment of the ordinary teacher, with his personal knowledge of the scholars and of school methods, is usually preferable to the employment of a highly trained or professional visiting instructor, even if, from a technical point of view, there is some loss of efficiency. And from a purely practical point of view the ordinary teacher has the great advantage of being able to alter his time-table to suit the weather.

On the other hand, where there is no teacher in the school who is competent to give reasonably effective instruction in gardening, it will be necessary to secure the services of a competent visiting instructor if gardening is to be attempted, though the ordinary teacher should always attend the instruction both as a learner and with a view to keeping up the connection with the ordinary school work. Where this outside assistance is not available, and where there is no teacher in the school who takes an intelligent interest in gardening, it should not be attempted at all. Perfunctory and insincere work in the garden is mischievous both to teacher and scholar, and discredits the whole movement towards practical education.

School Gardening in Ontario.

Ontario has a Director of Elementary Agricultural Education, with his headquarters at the Ontario Agricultural College, Guelph, Ont. From time to time excellent circulars and bulletins regarding School Gardens and pupils' work in them are published by the Department of Education in co-operation with the Department of Agriculture and the Schools Division of the Ontario Experimental Union.

The Experimental Union, as it is usually called, was formed in 1879 for the purpose of encouraging the scientific study of farm crops and farm operations amongst the students of the Ontario Agricultural College.

While actual membership has been restricted to students, ex-students and teachers of the College, it offers everyone the opportunity of taking part in its co-operative experiments. Up to the end of 1911 over 70,000 experiments were carried on by its members and associates in the Province of Ontario in different lines of work relating to Agriculture—Farm Crops, Fertilizers, Poultry, Fruits, Vegetables, and Forestry. This has helped very much in advancing the chief industry of the Province.

A Schools Division of this Union was organized in 1909. It aims to adapt the work of the Union to the needs of the schools, giving to boys and girls a training in careful work and observation, so that when they are older they may take up some of the larger experiments or solve for themselves the problems that will arise in their daily work.

To be a good member of the Union implies:—

1. That you will learn to look forward and plan your work.
2. That you will follow instructions carefully.
3. That you will do your work well and not neglect it.
4. That you will observe closely what is happening to the plants in your garden; that every day you will learn a little more and become a little wiser and a little more patient.
5. That you will grow the very best flowers and the very best vegetables that can be grown in your garden, and the very best grain in your experimental plots, and that you will not be satisfied with anything but the best.
6. That you will be interested in your schoolmate's efforts, ready to help him and ready to acknowledge his helpfulness to you.

The circulars of the Department of Education are appropriately illustrated. One deals with the general subject of Children's Gardening under such headings as:—

How to keep your Garden Journal;
Garden Tools and their Care;
What to grow and how to procure Seed;
Locating and laying out a Garden at Home;
Preparation of the Soil;
Planning the Plot and planting the Seed;
Protecting Seedlings;
Mulching, Watering and Cultivating;
Thinning and Transplanting:
Picking Flowers;
Gathering Seed; growing Bulbs;
Garden Rubbish, etc.

Circulars are also issued giving detailed information on the work of a school experiment, with a particular plant or crop. Under the subsidiary *Cultural Directions*, useful suggestions and directions are offered in regard to: Time of Planting; Soil and Manuring; Sowing; Cultivating; Weeding; Thinning; Harvesting; Storing; Estimate of Yield; Using; Reporting.

Other circulars contain the requisite information on the carrying on of simple experiments with cereals, and are accompanied by charts which illustrate some of the experimental work at the Agricultural College. Another chart with its supplementary circular contains just the information boys and girls in rural districts should have on Alfalfa or Lucerne, with the offer of seed to sow a small plot and directions how to care for the crop.

SECTION 3: HOUSEHOLD SCIENCE.

A third group of educational names, to be dealt with briefly, includes Household Science, Domestic Science, Domestic Occupations, Household Arts, Housekeeping, Domestic Economy and Home Economics.

Domestic Science and Household Science in their elementary forms shade into Nature Study and Manual Training, and have close relation to them. It would be well if, until the 11th year of age, they were not used in connection with pupils' work as indicating anything different from or other than Nature Study

and Manual Training. The terms Household Science, Domestic Science, Household Arts, Housekeeping and Domestic Occupations would then indicate the forms of education to be given for vocational purposes after the girls were 11 or 12 years of age. Sewing before 11 or 12 years of age finds its appropriate place as a division of Manual Training.

The terms Domestic Economy and Home Economics have been used to include the whole range of educational work for home-making and housekeeping occupations.

SECTION 4: VOCATIONAL EDUCATION, INDUSTRIAL TRAINING AND TECHNICAL EDUCATION.

Vocational Education is the term which has come into frequent use during recent years to indicate the form of education which purposely provides definite training and definite knowledge expected to be useful in enabling an individual to carry on his vocation in a way most advantageous to the community and satisfactory to himself. Vocational Education has been classified for convenience of explanation under six headings, each one designating the group of vocations included under it, such as professional, industrial, agricultural, commercial, marine, and housekeeping. Industrial Training and Technical Education is another way of designating the same thing as Vocational Education for all except part of the professional group, such as Lawyers, Doctors, Clergymen, etc.

In some quarters a narrower interpretation has been given to Industrial Training and Technical Education, and confined it to such instruction and training as have a bearing directly and chiefly on knowledge and ability with materials, tools, machines, manipulations, processes and products. However in all the countries visited by the Commission systems and methods of Industrial Training and Technical Education provided by public authorities include also instruction in Language, Arithmetic, Science, History, Literature, usually Physical Culture and Civics or good citizenship, and not infrequently Singing.

Vocational Education is older than any form of liberal education. Men have always followed occupations, requiring more or less skill and intelligence, by which they could secure a livelihood; and they have always trained the young for these occupations. The reason given for the enlargement of the field of the public school is that the changed conditions of industry, and of living in towns and cities, have withdrawn from children opportunities which were formerly theirs of participating in housekeeping and industrial work in such a way that they were prepared to go on with it after their school days were over. The school was really organized to supplement, by the arts of reading, writing, arithmetic and drawing, what the participation in the work and life of the home and occupations of the parents did provide. The changing conceptions of education are due not wholly to the existence of new or different needs on the part of the people. Formerly the training of the home, of the occupation, of the community and its various institutions, was only supplemented by the education of the school. Now the school is absorbing the whole time of the child, while the changed

conditions of industry and living have withdrawn the old opportunities. Where and while this is the case, the school becomes the only agency available to provide the new supplementary training for the all-round equipment of young people for occupations and citizenship. It must be made competent and adequate.

Changing Views of Educators

The change which has come over the views of the leading educational authorities, as to what may be expected from the school, is set forth in very many reports and books of recent years. Extracts are given from the book, "The Problem of Vocational Education" by Mr. David Snedden, Commissioner of Education for the State of Massachusetts; from "Beginnings in Industrial Education," by Mr. Paul H. Hanus; and from the report of The National Society for the Promotion of Industrial Education.

"THE PROBLEM OF VOCATIONAL EDUCATION," BY DAVID SNEDDEN, PH.D.,

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The Relation of Vocational Education to Manual Training.

In modern educational doctrine, MANUAL TRAINING occupies an intermediate field between VOCATIONAL and liberal education. In the minds of many, who were originally influential in introducing drawing, manual training, household arts, and mechanical arts, these studies were designed to contribute to vocational efficiency. By school-masters and educational administrators, their contributions to liberal education have been constantly exalted, and these subjects have been largely divested of vocational significance.

Few will doubt that a wide range of contact with tools and the materials to which tools are applied, as found in the hand-work, bench-work, gardening, cooking, and in the machine-shop work of the modern schools, is exceedingly desirable. It is a fact, however, that the MANUAL TRAINING so given is rarely controlled by the motive of vocational training, and that it rarely results in any recognizable form of vocational efficiency. In its contributions to VOCATIONAL EDUCATION, it is more nearly comparable with the development which results from play and other forms of spontaneous experience-getting.

The MECHANIC ARTS and technical high schools, which were originally expected to train the higher ranks of factory and trade-workers, have generally failed to achieve this end. These magnificent schools have been sought in increasing numbers by youths so situated as to be capable of an extended liberal education.

The spirit of approach has been that of the amateur, or dilettante, rather than of the person interested in attaining vocational fitness. Only slowly has the work been removed from the field of amateurish effort.

Furthermore, a generous course in MANUAL TRAINING actively followed provides a variety of suggestions for subsequent choice of a vocation. Through it, many boys will discover a bent, or capacity, along which a VOCATIONAL EDUCATION may be carried out.

If we assume that little distinctively vocational education will be found in the elementary schools, we may also assume that many pupils will be allowed even greater opportunities than are now available for the development of their capacities in the field of the INDUSTRIAL ARTS, studied mainly from the point of view of gaining variety and range of experience, and a basis for the subsequent selection of vocational activities.

Here again, as in the last section, it must be asserted that MANUAL TRAINING and VOCATIONAL EDUCATION should be controlled by different purposes to a considerable degree, though each contributes measurably to the purposes of the other.

VOCATIONAL EDUCATION must be carried on, as far as possible, under the conditions of a workshop. MANUAL TRAINING, as a part of liberal education, must not divorce itself from contemporary life; but, on the other hand, it must be approached from the standpoint of the breadth and interest inherent in the true instrumentalities of liberal education.

SESSIONAL PAPER No. 191d

"BEGINNINGS IN INDUSTRIAL EDUCATION," BY PAUL H. HANUS.

It seems worth while to indicate in a few sentences the difference between MANUAL TRAINING and INDUSTRIAL TRAINING. Manual training is a means of general education just as history or chemistry or language is a means of general education. It has materials of its own and a method of its own, and hence the result is a peculiar kind of knowledge and power due to the nature of the subject and the method that it demands.

It is, however, as now carried on, usually much too general to be comparable to industrial training. MANUAL TRAINING abstracts the principles of all trades and teaches them. It ought to make a pupil generally "handy." It is, if properly carried on, an excellent preparation for industrial training. INDUSTRIAL TRAINING goes further. Besides teaching all the processes of a given trade from the first attack on the raw material to the last touches on the finished product, it teaches the theoretical foundations of that trade. Hence it gives the worker a TECHNICAL KNOWLEDGE of his trade, and begins the development of skill in the practice of it. It must not be inferred, however, from what has just been said, that an industrial school can turn out a journeyman. The skill of the journeyman can be developed fully only in the factory.

In the industrial school everything has its specific application. Therein lies its value and its significance. In training for a trade or in the pursuit of that trade itself, there is constant opportunity for the application of all that the pupil has learned, and hence the possibility of of progressive growth in thinking about his calling and in his command over it, not only in the processes of the trade, but in all that the trade means.

THE NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION.

As reported by Mr. Charles R. Richards, with whom the Commission had the advantage of conversations and discussion on the subject, the National Society for the Promotion of Industrial Education, at its annual convention in Boston, 1910, considered the question of nomenclature used in discussions on Industrial Education. The Executive Committee of the Society formulated a brief presentation of desirable terminology, involving some important distinctions; and this terminology which has been adopted by the Committee is as follows:—

Vocational Education includes all forms of specialized education, the controlling purposes of which are to fit for useful occupations.

Vocational Schools in a broad sense include all commercial, agricultural, industrial, household arts, and professional schools with the above purposes.

Industrial Education denotes the field of vocational education designed to meet the needs of the manual worker in the trades and industries, including the occupations of girls and women carried on in workshops.

Agricultural Education is that form of vocational education which fits for the occupations connected with the tillage of the soil, the care of domestic animals, forestry, and other useful work on the farm.

Household Arts Education is that form of vocational education which fits for occupations connected with the household.

Manual Training is the training of the hand, especially by means of the tools which are used in various industrial processes, employed as an agent in general education.

Manual Training High Schools (Mechanic Arts Schools, sometimes called Technical High Schools)—Manual Training had its beginning 30 years ago in secondary schools with four distinct avowed objects in view: (1) To educate the whole boy, to develop the entire area of his brain; (2) to lay a broad and appropriate foundation for higher education; (3) to enable a boy to discover his innate mental and physical aptitudes; (4) to furnish a broad basis for an industrial career should one's aptitude lie in the direction of the mechanical arts. It admitted only boys of 14 years or more who had finished the Grammar grades—the average was about 15.

Manual training high schools are defined in the report of the Committee on the Place of Industries in Public Education made to the National Education Association in 1910, as follows:

"The manual training high school, or the manual training school, is a school of secondary grade in which a greater or less amount of hand-work is included in the curriculum, and in which the greater part of the academic instruction is similar to that found in other high schools and college preparatory schools, neither the manual nor the academic instruction being especially planned to be of direct vocational service."

It is evident that manual training schools as represented by the above definitions are not vocational schools as previously defined.

Industrial Schools include all special schools (a) that prepare for entrance into industrial employment and (b) schools that give supplementary instruction to those already engaged in such employment.

Trade Preparatory Schools (General Industrial Schools, Intermediate Industrial Schools, Pre-apprenticeship schools)—Trade preparatory schools are schools that offer training for boys and girls between 14 and 16 years of age in practical industrial processes, including such drawing, science and mathematics as will prepare them for entrance into the trades or industries as efficient beginners.

Trade Schools are schools that afford specialized practical training in manual trades with the object of preparing for immediate practical work at the trade as a wage earner. Such schools aim to take the place of apprenticeship in whole or in part.

Technical Schools are schools giving training in practical industrial processes, and which at the same time offer advanced instruction in the scientific and mathematical principles upon which these processes are based.

Technical High Schools are public schools of secondary grade having the distinct purpose of preparing pupils for industrial careers requiring scientific and technical knowledge beyond that needed by the skilled mechanic.

Continuation Schools—1. Evening Continuation Schools.—Evening Continuation Schools are schools attended by those already engaged in useful employment which provide instruction directly related to such employment. Such instruction may consist of either practical work, or related subjects of study, or both.

2. Part-Time Schools or Day Continuation Schools.—Part-Time or Day Continuation Schools are schools for persons (commonly apprentices or other learners) engaged in useful employment, which give instruction supplementary to such employment during a portion of the working time of the pupils.

Co-operative Schools are schools conducted under an agreement between the school and an employing establishment, by which students entered in schools are given opportunities for practical work in the establishment for a portion of their time.

English and Canadian Opinion.

The English Education Act of 1899 contains the legal definition of technical instruction for the purposes of that Act and for the application of public money under it:

"Technical instruction" "shall mean instruction in the principles of science and art applicable to industries, and in the application of special branches of science and art to specific industries or employments. It shall not include teaching the practice of any trade or industry or employment."

In a communication furnished to the Commission by Dr. W. L. Goodwin, Director of the School of Mining, at Kingston, Ont., he states:

"Technical Education may be defined as a course in the principles and applications of the sciences with the purpose of preparing men and women for professions and occupations requiring trained intelligence, skilful manipulation, and more than the usual store of information.

"Industrial Training may be defined as the actual teaching of skilled labor, as formerly done by the apprenticeship system, but now in the more advanced countries, as in France, Germany, Switzerland, etc., carried on in schools where there is an opportunity of teaching more than the mere showing how a thing is done.

"But Technical Education and Industrial Training shade into one another. In fact a completely organized system of Technical or Industrial Education provides for every grade of worker from the engineer who plans and directs to the skilled labourer who uses his hands and head, rather than his head alone. Such a system should be so constructed as to provide from the beginning for

the advancement of the likeliest youths through the lower schools and their diversion at certain points to the schools and courses leading to the higher and the highest kind of technical education. On the other hand the pupils whose ability is seen to be more mechanical should be turned towards the industrial training schools. This is the ideal towards which we must intelligently work."

Dr. John Seath, in his report on *Education for Industrial Purposes*, says:—

The term Industrial Education is applied, in its limited sense, to general courses which prepare for any trade, as well as the special courses which prepare for individual trades. In many countries it includes, also, the education of those engaged in transportation. It deals with both theory and practice; but in all the schools that provide it, especially in the Trade Schools, the emphasis is on the practice. Locally, it should be added, the term has a still more limited meaning, being applied to the courses in those schools in which are trained, for various manual occupations, the waifs and strays from the elementary schools.

The term Technical Education is applied, in its limited sense, to the courses provided for those who are designed for the higher directive positions in connection with the industries; that is, the courses for overseers and superintendents, as well as for students of the technological schools and the university departments of Applied Science. Here, however, the emphasis is on the theory, and machinery and other apparatus are generally used only to establish the connection between the theory and the practice. Quite mistakenly in Ontario the term Technical has been applied to the cultural and practical courses in Manual Training and Household Science. With greater appropriateness, however, it is applied to both Industrial and Technical Education, as defined above. Accordingly, when in this report the context makes the meaning clear, I will use each of the terms in its more limited sense, and the term Technical to include both.

General Conclusion.

The examination of many explanations, besides those already quoted, and the current usage of the terms support Dr. Goodwin's statement that Technical Education and Industrial Training shade into one another, The most, and perhaps the best, that can be said is that, where the emphasis is laid upon the development of ability and skill in the handling of materials, tools, machines and products, the training or education may fittingly be called "Industrial"; and where the attention is given chiefly to science and calculations, and emphasis is laid upon the acquisition of knowledge of principles and their applications, the training or education may be called "Technical." No dividing line can be used to mark the one from the other. The experiences of an education which is mainly "Industrial" are a means towards the accomplishment of the object of the education which is "Technical." Each, in some measure in its processes, includes part of the other. On the industrial side progress in knowledge of qualities and principles comes from doing; and on the technical side some progress towards industrial skill and ability results from the processes of acquiring knowledge of qualities, theories, principles and calculations.

SECTION 5: THE MACDONALD FUNDS.

Funds were provided by Sir William C. Macdonald, of Montreal, to promote Manual Training, Seed Grain Selection, School Gardens, Nature Study and Household Science as parts of a movement to assist in building up the country

in its boys and girls. The story of that Movement is found in the Report of an Address before the National Education Association of the United States for 1909. In view of the great extensions and improvements in Canada of what was aided in the beginnings by the Macdonald Funds, the statement is presented here. This is done in order that provincial and local authorities may have the facts before them when considering the best way to use any grants which may be obtained from Dominion or other sources to promote Drawing, Nature Study, Experimental Science, Manual Training and Household Science.

Object of the Movement.

The Macdonald movement, as helped by Sir William C. Macdonald, has nothing destructive in it. It does not desire to destroy anything that now exists in rural districts, except weeds, but it hopes to help in building up something better than is now known and done, and thereby displace what is poor. It aims at helping the rural population to understand better what education is and what it aims at for them and their children. It plans to help in providing more competent leaders for the horticultural and agricultural population. Somebody's watchfulness, somebody's thoughtfulness, and somebody's thoroughness, are always required; and the progress of the people in all worthy ways can be increased in what might be called geometric ratio through intelligent leaders who possess and use such qualities with unselfish public spirit.

In 1898-99, in fact before that, Sir William C. Macdonald had been most anxious to help to improve rural schools in Canada, and he sought help in the way of plan-making and administration. It appeared that the first thing to do was to give object-lessons of Manual Training in the elementary schools of cities and towns so as to educate public opinion in favor of better methods of education in places where newspapers were published and to which the country people looked for guidance.

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The man in the rural district imitates the man who lives in town. The man who lives in town has the best chance of being a leader; and the man in the country would not be willing to take a lower grade of education for his boy than a town or city man. It was important to get the leaders from the city to recognize improvement by means of practical education. This was the reason for the Macdonald Manual Training Fund and its work. Manual Training was the first step in this plan. The rural school was not an after-thought; it did not come out of the Manual-Training Movement. The Manual-Training Movement was a step toward the other end—that of improving the rural schools. Hitherto the wealth and wisdom of the country have been given to town schools. The little rural school has been left without help.

Manual Training Centres.

Sir William C. Macdonald furnished funds to establish Manual-Training Centres in connection with the public schools in twenty-one places, from Prince Edward Island to British Columbia, and to maintain them without cost to the pupils or the public for a period, in most cases, of three years. At first special teachers of ability and experience were brought in from outside, mostly from England. Some twenty-seven Manual-Training teachers were thus brought into Canada. As time went on Canadian teachers were trained and became duly qualified. Before the end of the period of maintenance by the Macdonald Fund, there were forty-five Manual-Training teachers on the salary roll at a cost of some $3,600 per month, and more than 7,000 boys were taking the courses. Summer courses were provided for teachers of urban and rural schools. In the cities on Saturday forenoons, or at some other convenient time every week, classes were arranged for the teachers from whose rooms the boys went to the Manual-Training-Centres. In Ottawa these classes were attended by over ninety teachers, and in Montreal and in Toronto by over a hundred in each place. In 1903 (in Montreal in 1904) the local authorities in the several provinces took over and extended the work. The equipment was presented free to the school boards, and in the case of the Normal Schools to the Provincial Governments. In 1909 over 20.000 boys and girls in Canadian schools received the benefits of Manual Training in their regular course under the school authorities as a result of Sir William's benefaction in giving that form of industrial and agricultural education a good friendly lift.

Seed Grain Prizes.

Out of the Macdonald Manual Training Fund came the Macdonald Seed Grain Competition carried on by boys on farms dotted all over Canada from the Atlantic to the Pacific. The main purpose of this movement was to improve the crops of Canada by encouraging the general use of seed improved by selection from varieties the product of which is in demand or has a relatively high market value. The use of such seed increases the quantity of produce per acre; makes the quality better, and thus renders rural occupations more profitable and the people who follow them more prosperous and more contented. Here was a great chance to do some educational work in progressive agriculture; to do something interesting, something attractive, something definite, something beneficial to the whole c.mmunity, s mething easy and yet with plenty of difficulties. Farmers and their families may fail to appreciate the educational advantages of a plan or scheme set out in a written statement, but here was something which would be so helpful and instructive to boys and girls that they would go on with it, and the habits of observation and thought and study would remain with them. $10,000 for prizes would set and keep this going for three years. Sir William Macdonald provided the money with all goodwill as prizes to boys and girls to encourage them to carry out in practice the plan of selecting the largest heads of the most vigorous plants and growing seed from those heads on a plot by itself.

The yields from the crops of 1903 compared with those of 1900, on an average for all Canada for spring wheat, showed an increase of 18 per cent. in the number of grains per hundred heads, and 28 per cent. of increase in the weight of grains per hundred heads. In oats the figures were 19 per cent. of increase in the number of grains per hundred heads, and 27 per cent. of increase in the weight of grains per hundred heads. These were results from several hundred seed grain plots operated by boys and girls. Altogether over 1,500 entries were received. Out of that number 800 completed in full the first year's work, and 450 of them completed the three years' work in a satisfactory manner.

Canadian Seed Growers' Association.

Many of the farmers on whose farms the competition was carried on were formed into the Macdonald-Robertson Seed Growers' Association, out of which grew the Canadian Seed Growers' Association. Its annual reports contain a marvelous record of valuable public service. Leading members of the association have reported several distinct and definite gains from the method of selection which had been followed by the members of the association, namely: the size and quality of the kernels definitely improved; the strains of selected seed maturing more evenly; the strains becoming better adapted to local conditions; varieties being kept pure; the strains becoming more resistant to disease, and gaining in productiveness. All these features are highly desirable, and give added value to the crops in every case.

School Gardens.

Under the Macdonald Rural Schools Fund, arrangements were made for providing a school garden at each of five rural schools in each of five Provinces. A trained instructor was placed in charge of each group of five gardens and of the Nature-Study work at them. He spent one day at one school and at the others in turn. The cost of this was met by Sir William Macdonald.

At the School Gardens an effort was made to give the children information and training in three important matters in connection with agriculture: the selection of seed; the rotation of crops; and the protection of crops against weeds, disease, and insects. This is really Industrial Education. Children find out something by doing, observing, and recording the results themselves. All worthy progress, in matters that are worth thinking about, springs from learning the lesson of consequences—the application of the principles of cause and effect. As soon as a child understands that, and governs his life accordingly, he becomes a better pupil and the promise of a better citizen in every sense.

The School Garden is one way of making rural life more popular as well as efficient. It may be the first step toward inducing the people to pay more to make the schools more efficient. The best education in rural schools should make the people love rural life, and also enable them to make it more profitable. The best way to make any workman like his work is to make him understand it. The beginnings of all that and much more are laid in the schools.

In the largest school, two hours' work per week by the pupils was found requisite to keep the gardens in proper condition. In one school the enthusiasm was so great that the pupils did all their garden work outside the regular school hours. At this school, also, the garden did not suffer from neglect in the slightest degree during the midsummer vacation of six weeks. Experience indicates that when the gardens are fully organized the plots can be well kept by devoting two half-hours per week to the work. This time is mentioned, not as the ideal condition, but as an encouragement to those who may desire to start School Gardens in districts where prejudices are likely to be met. The fact is that in the ordinary ungraded school, and for that matter in the urban school as well, the working power of the pupils is ill-sustained throughout the day owing to their merely forced interest in much of the prescribed work. An awakening as to the educational waste of our schools is coming, and when the School Garden is seen in its true relation, it will have a period in each day of the school program during the growing season. The children have ample time to spare, and the work of the gardens is promoting their intelligence and progress in the ordinary school course.

The following extracts are from letters and reports received from teachers in charge of School Gardens, Carleton County, Ontario:—

The School Garden seems to fill in the weak parts of our education for the growing child, as it tends to the molding and developing of his character. I know that the general discipline in my room has been helped by the garden work, and also that the pupils like their work in the schoolroom better on account of it. If our politicians would try teaching school with a garden and then without one for two years, as I have done, I am certain that they would be willing to grant all the financial support required; yes, probably be too liberal with it.

(Miss) M. York
Richmond Public School

My pupils are more observant than they were before we started School Garden work, and seem to acquire a clearer understanding of all their work. Mr. A——— told me that the School Garden had been a benefit to his boys, and that they were more independent in their work both in school and out of school.

W. Pettapiece
Principal North Gower Public School.

I am ready to put myself on record as saying that the School Garden has relieved much of the drudgery of the school work to which I was always accustomed. This year we had our School Garden, and it has been the pleasantest year of my school work. I would never again pass a summer without a School Garden. I consider that the chief value of the School Garden lies in the effect which it produces on the moral tone of the school. The juvenile sense of ownership is the greatest insurance on the success of the garden, and incidentally on the care of the whole school property. The garden is the central point of interest for this end of the township, and it is not unusual to have as many as a hundred visitors at the garden on one Sunday afternoon. I have noticed that the cultivation of flowers has received more attention in the homes since the advent of the School Garden, and I am often consulted about this work. I have not heard any unfavorable opinion expressed by responsible persons in this community, but on the other hand the most progressive men have spoken highly of the garden work.

B. A. Howes

Macdonald Consolidated School, Guelph
(Late of Bowesville Public School).

It is impossible to overestimate the value of School Gardening on our boys and girls. Instead of being detrimental (as at first supposed) to their advancement in the other branches of learning, it has had the opposite effect. Since engaging in the work my boys and girls have been first in all examinations, competing with children from other schools, including city schools. The whole tone of the school has been improved morally, socially, and esthetically. Our boys and

girls have now a reverence for life unknown before, and it has awakened in them, as nothing else could do, a deeper interest in all life around them. It has helped to make school life a pleasure. Now the boy makes the excuse to get to come to school instead of the excuse to remain at home. It has aroused the interest of the entire community. The parents take a pride in "the work of our boys and girls in the School Gardens," and never fail to bring visitors to see the work that is being done there. The pupils learn practical gardening, and already their advice and assistance are often sought by parents and others interested in the cultivation of plants. Its influence is seen also in the plots and flower borders outside. Our school board has come to realize the value of this work and are anxious to have it continued.

G. A. Moore
Principal Carp Public School.

Consolidated Rural Schools.

Four object-lesson Consolidated Rural Schools were provided by the Macdonald Rural School Fund—one in each of the four Provinces of Ontario, New Brunswick, Nova Scotia, and Prince Edward Island.

They were located at places chosen or approved by the Provincial Departments of Education. In each case a new building was erected to take the place of the small schools which at that time were serving the single sections proposed to be consolidated. They were each equipped with ordinary classrooms and an assembly hall, and also for Manual Training, Household Science, and Nature Study with a School Garden.

A Consolidated School Board was elected according to the school law of the Province concerned. The school in Nova Scotia was opened in September, 1903; in New Brunswick, September, 1904; in Ontario, November, 1904; and in Prince Edward Island, early in the summer of 1905.

The Macdonald Rural School Fund met for a period of three years the additional expense of the Consolidated School over the cost of the small rural schools which formerly served the locality. The school sections contributed exactly the amount of the former expenditure, and the extra cost was met by the Macdonald fund for three years to enable the people of four provinces to have these object-lessons and experiments in education.

The educational results from these schools have been entirely satisfactory to the authorities, to the teachers, and especially to the parents and children. The average daily attendance at the Consolidated Schools was on the whole over 55 per cent. higher than the average daily attendance at all of the schools which formerly served the localities; at Kingston, N.B., it was over 140 per cent. higher.

The attractiveness of the Consolidated Schools becomes in itself a form of compulsory education—the interest of the children being the power which secures regular attendance. A great point has been gained when love of the school and love of education there set the pace for progress.

One of the gratifying results is the larger number of boys and girls, young men and young women, from rural homes, who are doing advanced or High School work. At one of these schools there were about 100 pupils in the High school grades. Many of these are preparing to be teachers in rural schools. When teachers, who themselves have been educated in Consolidated Rural

Schools, with Nature Study, Household Science, and Manual Training, teach in single rural schools they will make the influence of their own training tell throughout many of the one-room schools.

The Macdonald Institute.

Sir William Macdonald gave the sum of $182,500 to provide buildings and equipment at the Ontario Agricultural College, Guelph, to train teachers now in the service for this "new education." Besides serving that purpose the institute has become a headquarters for Manual Training, for Household Science, and for providing short courses of instruction and training for farmers' daughters and others in cooking, sewing, domestic art, and other branches of Domestic Economy. Two buildings were erected. Short courses of instruction in Nature Study and School Gardens were provided without fees to teachers. The governments of four eastern Provinces where the Consolidated Schools were estal lished gave scholarships to enable teachers to attend. Over 200 teachers took these courses. When pupils who pass through Consolidated Rural schools go on through the Normal Schools, each with advanced work and suitable professional courses in Manual Training, Nature Study, and Household Science, they will be thoroughly qualified to carry on this better system of education.

Macdonald College.

Macdonald College grew out of Sir William Macdonald's keen desire to help the rural population to build up the country and to make the most of it and themselves. In some measure it grew out of the School Garden Movement and the Consolidated Schools, to serve as a headquarters for the training of leaders. In some measure it grew out of the Manual-Training movement, which is a first necessity in the general education of pupils if they are to profit by Technical and Industrial Education afterwards. In some measure it grew out of the oft-expressed desire on the part of the educational leaders, over the whole Dominion, for such advancement and improvement of education for rural communities as would not only prepare the children for life at its best in rural occupations, but would also satisfy the people as being the right training for their children.

The work of Macdonald College is carried on in three departments or schools. In connection with the School of Agriculture there are the research and illustration departments.

There is a School of Household Science with research, and instruction for the homes of the people. That branch treats of the three prime necessaries of life—food, raiment, and housing. It is just as important that the woman should be educated for her sphere of management as the man for his.

In the School for Teachers the instruction and training are for teachers preparing for city and rural schools. It is important that the rural school and its teacher should stand in with those two other activities—the occupations and the homes of the parents—and that the children should be thoroughly

trained toward ability for, as well as an understanding of, what will be required of them in the fields and in the homes. The threefold character of the College fits it to train leaders for rural communities.

The instruction is vocational for the three fundamental, mothering occupations which nurture the race: (1) farming, whereby man becomes a partner with the Almighty and, through co-operation with nature, obtains the benefactions of Providence for food, clothing, and shelter; (2) the making of homes; (3) the teaching of children.

At Macdonald College the education of leaders for those fields of human endeavor is being carried on in close correlation. In times gone by the segregation of teachers-in-training, in institutions devoted exclusively to their use, had been no better for them than the isolated training of leaders for rural life in Colleges of Agriculture had been for their students. Until recently, neither of them had much in their courses which identified formal or liberal education with the activities of the homes. The substantial advantages of co-education, in this larger sense, are already evident. The homes, the schools, and the farms are finding the common centre from which radiate plans and labours: "A little child shall lead them."

CHAPTER IV: INDUSTRIAL TRAINING AND TECHNICAL EDUCATION IN RELATION TO NATIONAL PROBLEMS.

SECTION 1: THE NATIONAL HERITAGE.

Self-governing peoples grow ever stronger when they are animated by some dominant purpose to maintain their ideals by further achievement. The reputation of Canada is a matter of concern; its character is of much greater consequence. Its place of honor, influence and power among the nations is worth caring for; the kinds of training and instruction which determine the abilities and qualifications of its young people for working and living are of supreme importance.

Towards the end of the last century Canadians began to find themselves as a united nation of agricultural, industrial, fishing, mining, commercial, and professional workers and home-makers.

Never before in the history of the race did seven millions of people have such a heritage come into their free possession. If the area of Europe is eleven, that of Canada is twelve, and much of it destined to be the setting of good homes of a robust people. Where else can be found a better place for homes for a people moved by the dominating purpose to win their way up by the strength of intelligent labour, justice and good-will, and to bring up with themselves all who may come to them?

The Physical Setting for Homes.

One can afford to speak of Canada in dimensions of thousand-mile stretches. Physical setting means much for the glory of human life in the first stretch of a thousand miles in from the Atlantic. The human race can be at its best in physique, in endurance, in tenacity, in aspiration, where apple trees grow in beauty and bounty and the summer air is full of the fragrance of clover blossoms. Here there is plenty of running water, with showers and sunshine in alternate abundance and, best of all, wholesome children rolling on the grass, picking flowers and climbing the apple trees.

Then there are a thousand miles of wilderness, a great reservoir north of the Great Lakes. It tempts the adventurous to seek gold and silver; its great areas for trees and lakes moisten the air and refresh the thirsty land on both sides by genial rains gathered from the wastes.

Then come a thousand miles of prairies, stretching out to the foothills of the Rocky Mountains. It took a thousand times a thousand years to make that place fit for habitation now. The frugality of prodigal nature was storing plant food in the soil for crops, not only that men might ship wheat, but that boys and

girls should have the finest chance that the race has found hitherto to be a strong, dominant, lovely and loving people.

Then half a thousand miles go over the mountains to the Pacific Ocean. It is a piece of the Creator's fine art in the rough, with the impressiveness of nature's majesty and the instability which endures. Tucked in between the mountains are fertile valleys with apples and plums and wheat to sustain the homes. A great asset is that five-hundred mile stretch, the mountain slopes with forests and coal and gold and silver, and the streams teeming with fish from the inexhaustible feeding places of the north.

That is a glimpse, merely the headlines, of the real estate for the national home. The responsibility now is that the people may be quite a match for it.

Occupations Call for Constructive, Conquering Qualities.

Occupation conserves the best that humanity has achieved. Canada is happy in occupations that minister to greatness in character. A new country needs the constructive and conquering qualities as well as the sedentary, absorbing, remembering capacities.

There are forests in vast areas, some of them as yet unsurveyed, and a climate and soil which let nature far more than restore the lumberman's cut. The forests are inexhaustible, in the abundance of their serving power for coming generations, now that a beginning has been made to conserve them by preventing fires, by providing patrols, and also by diffusing knowledge, training and conviction throughout the common schools.

Then there are fisheries. Men who are not afraid, who go down to the deep in ships, see the wonders of the Lord while they do their duty for their families. There is conservation of the quality of life by the unboasting, and the uncomplaining, heroic commonplaces of daily toil. With quiet tenacity, against conditions of discomfort which cannot be escaped, and carelessness of personal ease, such men teach others how to live.

Canada has great potential wealth in minerals. The areas and quantities of coal, iron, nickel, copper, silver, gold and oil are still in course of exploration and enumeration. The development of coal mining has been greatest in Nova Scotia, New Brunswick and British Columbia. The miners in Cape Breton may be taken as typical of the best of the others. Their physique and intelligence are tributes to the sturdy stock from which they sprang. The effectiveness of their training must be continuously enlarged and extended to all mining workers.

The water powers are not merely to illuminate houses and run machines, factories and cars, but to enlarge leisure by having the heaviest tasks done by further control and application of the electric current.

The other fundamental occupations which engage the large majority of people are farming, industrial work, making homes and teaching and training the young. These together provide some of the opportunities and means of culture which young people and grown people can turn into power—power of knowledge, of action and of character.

The farmer follows one of the conquering, constructive occupations, gathering wealth out of the otherwise chaos. His labor creates wealth and conserves the health and virility of the people. Farming is much more than moving soil, sowing grain, destroying weeds and harvesting crops. It is taking care of part of the face of Mother Earth as a home for her children,and providing their daily bread.

Uniting Rural and Urban Communities.

The growth of industrial activities has been marvellous for a period of 25 years. The prospects for the next 25 years are that the total growth will be very much greater.

The increasing numbers of thriving industries in comparatively small towns throughout all the eastern Provinces is a matter for congratulation. There are many establishments from which products are being shipped throughout the whole of Canada. In many cases these towns enjoy no special shipping facilities or any apparent advantages in cheap power or nearness to source of raw materials. The enterprise, ability and energy of a few men enabled them to make beginnings upon a small scale from which businesses employing from 20 up to 200 persons and over have grown up. The factories are situated where abundance of fresh air and light prevail, and where workmen and women can provide homes under favorable conditions.

Many instances might be mentioned from the observations of the Commission. From a furniture factory in Nova Scotia the products were being shipped throughout Canada, nearly one-half to the area west of Winnipeg and a portion to Newfoundland. This factory was not located on the main line of a through railway. In Prince Edward Island a machine shop employing about 100 men, was turning out gasolene engines, one-half being shipped west of Winnipeg. In New Brunswick a Foundry and Stove Works was doing a local trade and also supplying its output throughout the Northwest. At a comparatively small place in the Province of Quebec four prosperous industries, all of which had grown up within the last even or eight years, were shipping furniture, chairs, iron bedsteads and clothing to distant places, in each case about half to points west of Winnipeg. In a score of the smaller cities or towns in the Province of Ontario, similar activities and conditions prevailed. The cases cited may be regarded as typical and not exceptional.

While the industrial development of Canada has been going on in a recognized and prodigious way in the large cities there has been a concurrent development in the smaller places. In these latter, particularly, the interests of the surrounding rural population, through its surplus of workers and through business and social intercourse, are tied up closely with the industrial progress ot the towns.

Better Training Needed.

In the building trades the most notable feature of the new structures, small and large, is the increasing attention given to provisions for the health

and comfort of the occupants. In the realization of beauty of exteriors, the progress is slow and meagre. A very large proportion of the skilled workmen received their training before they came to Canada.

Adequate training for the young and appropriate instruction, under opportunities suited to the conditions, are needed and wanted everywhere for all industrial workers and industries.

Making homes is much more than building houses and providing furniture, food, clothing and things. It is creating a temple, not made with hands, as a place of culture for the best in human life.

Teaching and training the young is much more than instructing them in the arts of reading, writing and reckoning—those flexible useful tools of the intellect. Much of the time of the school has been consumed in these tasks; but one already sees in Canada the dawn of a happier day when those arts will be acquired joyfully by directed educational play, instead of painfully, reluctantly and with difficulty as separate school subjects. Then a larger portion of the time and efforts of the teachers may be devoted to caring for the health and the habits and the standards of the pupils while watching and directing the development of their powers of body, mind and spirit.

SECTION 2: MEANS OF DEVELOPMENT.

Canada is Behind the Times.

Until recently Canada was an interested and debating spectator of the movements for industrial efficiency. The training of young workers to deftness in manipulation and technique, and to an understanding of the principles and sciences which lie at the base of all trades and industries, was not provided for in the courses. When manufactured goods were wanted in increasing quantities and variety, and towns and cities were growing by leaps and bounds, it was discovered that there had been practically no organization of means for preparing the hundreds of thousands of young people to become the best qualified artizans, farmers and housekeepers in the world. The country's growing wealth was ample for the cost; but the educational work was becoming bookish in the extreme, and, worse than that, was developing into school systems that had few points of contact with or relation to industrial, agricultural, or housekeeping life. When boys and girls grew restless at prolonged book work, few schools provided anything in the way of tools, materials or time for "fads", as manual training, nature study, school gardens and housekeeping subjects were called. The deep of the ages in human life was calling to their complex instincts and aptitudes, but the schools turned a dull ear, and most of the boys left as soon as they could.

The Way of National Progress.

Further advances are to be looked for through such means as these: First, those which lead young people to the achievement of joy through the processes

of labor as distinguished from its wages or other rewards. Secondly, those which produce the pleasure of working together for some end believed to be good for all. Pupils and students may work themselves into industrial and social efficiency by co-operating in productive labor, as well as play themselves into ability by means of team games. Both together are better than twice as much of either alone. Thirdly, those which yield gladness through creative, constructive, conserving work whereby each individual strives to give expression to his own concepts of utility and beauty in concrete things as well as in words and other symbols.

Heritage of Liberty, Justice, Intelligence.

The best that Canada has inherited is the quality of her life. The more immediate ancestors of the present generation loved liberty, cherished justice, and prized intelligence. These they had won by courage, by struggle, by patience and by privation. They left them to be improved by education.

All life is an unceasing struggle. The point is to choose the right objects and means. In the past Canada has been winning all along the line, with an occasional setback. Her warfare is ever against ignorance, helplessness, poverty, disease, vice and ill-wills. Industrial and technical education is to train individuals for that warfare. Its endeavours are most successful when the experiences, which it provides for each individual, are in themselves a vital part of the hard campaign. It must ever vary its strategy and tactics and weapons, as the field of operations is moved forward. The need of the times is education to qualify all to achieve satisfaction through labor and service and good-will.

The State and the Individual.

The interest of the State, as such, is that the individuals who compose it should be healthy, intelligent, capable, animated by goodwill towards their fellows, and that they should be able and willing to fill their places in the community as citizens discharging their duties and preserving their rights, as individuals in the economy of life, and as earners contributing to the material prosperity of the State.

The problem of finding an occupation suitable to the personality of the individual, and of preparing the individual to follow it with satisfaction and with benefit to the community, is ever present and becoming more complex and difficult.

So far as the individual is concerned, education is required for the preservation of health, the development of powers, the increase of knowledge, the maintenance of justice and liberty, and the strengthening of desire and will-energy to give effect in everyday life to the concepts of duty, truth, beauty and goodness.

Moreover, individuals require education to enable them to provide as workers what is requisite for the sustenance of life and the improvement of its conditions

for themselves and those dependent upon them. They require education as contributing earners so that their labor will provide satisfactory returns for themselves and also contribute to the advancement and prosperity of the State. They require education as members of society, as citizens in a community, and as members of the race. Otherwise advancement would cease, and progress would not be in the direction which the best men and women of all time have indicated as being desirable and right.

Education through Working.

So long as the homes and the occupations of the grown people gave the children an opportunity to participate actively in carrying on the work of the community, the instruction and teaching in the schools completed what was required for the all-round development of their ability. Until recent years opportunities for young people to participate in labor, such as grown people follow, were found in the homes and other places of work outside of school hours and school premises. Owing to the great changes during the last twenty or thirty years in the way in which the work of those who live in towns and cities is carried on, and the altered conditions of housekeeping and living, the children have less and less part in the work of the adult population, and less and less opportunity to learn by sharing in it. In consequence it has become evident that some other means must be taken to conserve in children and young people the love of work through participation in it, and to develop ability to do it well with happiness.

The Processes of Education.

Clearer insights into the character and mode of growth of the bodies and minds of children and young people, as well as a recognition of the need of training for occupations, have led to changed conceptions of the kind of education the schools should provide. While the education which was chiefly from books and concerned with theories and principles without actual practice or experience in the management of self, or the makings of things, or the control of affairs, served well as a preliminary education for those who were to take a college course and fellow the learned professions or lead lives of leisure, it did not meet the needs of the great body of pupils who went directly into earning a livelihood by means of active bodily labor.

The opinion prevails more and more that education has two main functions which are not separable—the social and the biological. One has to do with qualifying the individual for meeting the social relations and economic obligations, and the other with developing the individual to the extent of his capacities and powers.

The processes of education are made up of acts and actions, controlled by intelligent purpose to bring about series of experiences which result in the growth of power, capacity and refinement of thinking, feeling, playing, working and living. The quality of intelligence and the extent of its control determine the

direction of development, while the degree of intensity in purpose sets the pace for the rate of progression. All real education comes through series of experiences in the individual learner, and some kind of it goes on as long as life and growth continue. The instruction given by a teacher and the information furnished by books contribute to the ideas and to the kinds of experience; but the experience of the learner is the process whereby his education is advanced.

Methods to Include Bodily Toil.

The aims of education have determined the kinds of experiences which have been provided for during the years of formal education in courses of study and training. The systems of education have depended upon the political and social conditions of the time and of the people. In all countries they have been a growth and evolution out of previous conditions, usually to meet the recognized needs, ambitions and aspirations of the individual and of the times; and, to a less extent, to prepare for conditions expected or hoped for by the individual, by society or by educational leaders. The methods of education have grown out of the experiences of the past, and they have been modified by the specific object aimed at by the teacher or school in a particular field or area of education. In their essence they consist in the application of what are believed at the time to be the principles of causes and effects.

It must not be forgotten that invigorating toil—invigorating bodily toil—is the only known road to health, strength and happiness. Agri-culture, industrial culture, technical culture, liberal culture, have no origin in idleness, indolence or sloth, which make for the corrosion of all the vigors of the physical, mental and moral nature. Culture is not always gained by the learning of languages, living or dead, or the acquisition of knowledge, scientific, mathematical or historical. It is the residuum in character—in body, in mind and in spirit—after every completed cycle of an educational experience.

The Steps in an Educational Experience.

Put into the language of everyday life, the main steps in every cycle of an educational experience are: observing, reflecting upon ideas, planning towards expression, feeling and managing into some form of expression. It appears that the closer in point of time the steps are taken together, the greater the growth of power and the surer the formation of habits. Frequency of experience is what forms habits, and not repetitions of instructions or information. In so far as these experiences can have close relation to practical activities, so much the better for the culture of the student. Such activities are those of body, mind and spirit in the individual's capacity as an earner, a member of society, and a trustee in the scheme of life.

The Consultative Committee of the Board of Education for England says:—

> Throughout English education (and the same course of thought may be observed in America and in other countries), efforts are now being made to combine these two ideals of general and industrial training. Handwork of all kinds is steadily, though slowly, forming a

larger part of the Elementary Day School course. Civic and general instruction is recognized as having a claim to a more important place in courses of technical education.

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A combination of practical and general instruction for boys and girls, during adolescence, is of great value to the individual and to the community.

General Education Crowned by Industrial Training.

Industrial Training and Technical Education serve to supplement general education, and give to it a finishing course of experiences with special reference to the requirements of workers in industries, agriculture, housekeeping, commerce, transportation, mining and other occupations. They are means whereby the individual, the family, the community and the nation seek to develop the powers of the individuals for work, to prepare themselves to meet the conditions of working life, to alter these conditions in directions which seem desirable, and to conserve what is esteemed to be worth while out of the past in knowledge, c stoms, methods, institutions, standards and ideals.

From actual practice comes skill in the gentle art of living happily together while working for some good end. Alike in school and college, on the farm and in the factory, in shop and office, in home duties and public affairs, that kind of life develops a quick sense of responsibility, it establishes good standards close by which are understood, it nourishes conscience and strengthens the will-energy towards further culture, better work and happier living.

SECTION 3: CAUSES OF GERMANY'S PROGRESS.

Germany's Objects and Methods.

In the case of Germany, the problem which presented itself about forty years ago was the creation of a true national spirit, based upon ideals common to the whole people. The problem was how to bring about efficiency at home, with national solidarity through the ability and power of the individuals, animated by some common purpose which bound them together.

At first Germany organized the entire system of educational institutions in the several States of the Empire with a view to developing all the powers of the individual. That led to friendly struggle between individuals in the one State for place, positions and possessions. It was first self-preservation, then self-improvement, and then later on the conquering of the place in the world's market by the excellence and cheapness of the products to be sent to them.

Many other factors enter into the means whereby the industrial and commercial development of Germany has been brought about. Without describing these in detail, they may be mentioned as the extension and improvements of railways, improvement of canals and rivers, the opening up of ports, the creation and development of a merchant marine, all of which led not merely to the increase of facilities for communication and transportation, but also to a reduc-

tion in the cost of transportation. Another factor was the better utilization of natural resources by the application of scientific methods. And third, there was legislation protecting and stimulating industrial enterprises. Along with these there was the conservation and development of the individual's power by means of industrial training and technical schools. Thus technical education has taken a principal part in the development of Germany. It has been concurrent with other large movements, and they have all fitted into each other. It is practically impossible to do more than indicate some of the causes for the marvellous development within the nation during the present generation.

GERMANY FROM THE ENGLISH POINT OF VIEW.

Dr. Reynolds, Director of the City of Manchester Institute of Technology, said in his address to the Imperial Education Conference at London, in 1911:—

Whether we are "tired of Germany as a model" or not, she is too formidable an antagonist in the sphere of world politics, in the domain of high learning, in the field of manufacturing industry, and in the world's market, for us to ignore her rapid advance, or to be indifferent as to the cause.

Within a generation of living men her sun has risen above the horizon, and has blazoned forth, as it is rising towards the zenith, with a splendor that compels our admiration, even though it may fill us with alarm.

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In short, it was to education, thorough and far-reaching, that these wise counsellors looked for the means whereby their nation should regain and enhance its position in Europe and the world, and the faith and hope which inspired them has, as we all know only too well, been more than justified.

Mr. W. Harbutt Dawson, who is recognized as an authority on Germany and German conditions, in his book on the "Evolution of Modern Germany" mentions some of the reasons why, in his opinion, Germany has succeeded as far as she has done. His conclusions are:—

1. Germans work harder and for a longer number of hours.
2. The Germans regard commerce and industry as a science and an art, whereas elsewhere these are often counted as matters of rule-of-thumb.
3. The German standard of living is simple and less pretentious than the English or American, and the German manufacturer is content with less profit than would satisfy a British, American or Canadian manufacturer.
4. The German pays smaller salaries and lower wages; but German workmen enjoy substantial advantages in three great insurance benefits—sickness, accident and old age. The low wages and the long hours of Germany are being gradually changed, the wages becoming higher and the hours becoming shorter.
5. In general, the persistent endeavor of the Germans to come to the front has been supported by a skilful and even masterly adaptation of means to ends.

Where the German merchant as well as the manufacturer outrivals his competitors, his success may be attributed to one or other of three reasons:

(*a*) The lower price of his goods.
(*b*) Their superior or at least more serviceable or attractive character, and
(*c*) The more efficient arrangement which he makes for reaching and attracting purchasers.

Mr. Barker North, President of the British Institution of Teachers in Technical Institutions, makes the following statement:—

The great German industrial concerns, knowing the value of the scientific expert, will wait for years for the final results of researches, which they realize will ultimately revolutionize an industry or may provide entirely new industries. Germany has developed a scheme of practical education of the masses which will provide her industries with an army of well-trained workers, and at the same time she has developed to the highest pitch the scientific training of original technologists. It may be that we require more Dreadnoughts, but no number of battleships will prevent our being left far behind in the race of industrial progress if we continue to rest self-satisfied on the laurels of the past.

American Opinions of Germany.

Mr. Edwin G. Cooley states in his "Vocational Education in Europe":—

> The German has therefore re-organized his entire system of educational institutions, with a view to developing all his powers, not only for the struggle between individuals in the German State, but in the struggle for supremacy in the industrial and commercial fields of the world. It was then not merely the motive of the subdual that led to this movement, but self-preservation, as in matters of this sort there is no such thing as standing still. Germany was compelled to move on to new conquests after the completion of the war with France, and she made use of German thoroughness in her campaign for industrial supremacy.

Some of the reasons for Germany's growth in industry and commerce are presented by Mr. Harlow Stafford Person in his prize essay on Industrial Education. They are substantially as follows:—

> Industrial Germany as we know it has developed mainly within the last twenty-five years. Germany has achieved what she has done not because of any extraordinary resources, nor merely because of her rapidly increasing population. Two factors are worthy of special mention. One of these is the quality acquired through centuries of intensive labor, the capacity for taking pains; the second is the paternalistic state. The paternalism of the German Empire, applied to the creation of industrial efficiency, has secured wonderful results from the limited natural resources of the Empire. The creation of this powerful industrial state has been due not to superior natural resources, but to deliberate effort in the face of relatively inferior resources. Germany relies upon her advantage of having a highly developed system of technical education. The Germans themselves attribute their accomplishment of the last twenty-five years to their system of industrial education.

An Eminent German's Explanation.

While popular opinion attributes the rate and extent of the industrial and commercial progress of Germany to its systems of technical education, it is wholly impossible to assign to any one definite cause the marvellous development within the nation during the present generation. Dr. Kerschensteiner, the administrative head of education in Munich, may be regarded as one of the most competent authorities on this question. He attributes the lion's share in the rise of German industry and commerce to other causes. He puts first the German character with its tendency to reflection, its thoroughness, tenacity, and capacity for subordination. He indicates as another cause the German merchant with his flexibility, adaptability, and his zeal in the study of foreign languages and foreign conditions. He suggests that German poverty may have been a third cause. Before 1870 Germany was a poor country. Its people were frugal, industrious, and like other poor races they had forged for themselves one of the best weapons in the struggle in developing the faculty for doing without things, or of dispensing with things. He wonders whether the riches which have come to the empire in one generation will bring weakness rather than increased strength. To quote his words:

> The Germany of to-day has grown rich within one generation. It remains to be seen if it has strength enough in spite of this wealth, to work and struggle in the sweat of its brow. History generally teaches the contrary. Yet our over-population and the tension existing in all other civilized states may perhaps supply us with the same motives we formerly owed to poverty.

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One factor, however, has been of eminent importance in the development of Germa industry. That is the scientific training of German Engineers; in other words the serious scientific spirit that rules in our German technical universities.

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And among other economic causes it is certainly this spirit of unselfishness, of devotion to an ideal aim, that has led our technical officers of industry to victory. We thus arrive at the conclusion: that real scientific culture in union with that discipline of character which teaches thoroughness and devotion to aims lying outside of ourselves are of no less importance for the industrial development of a country than technical training.

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Among the answers given by German manufacturers to the inquiry of the German Committee for Technical Schools there is one which lays its finger on the essential point of all education:

"A far more important problem for the machine-builders' schools than the exact amount of instruction in the single branches is to develop the character and intelligence of the pupils. Teaching suited to the future calling must be regarded merely as a means to this end. We shall always be able to work successfully with men of character and intelligence, whether their schooling has led them further in one branch or another. Knowledge learned at school can never be more than the rudiments of knowledge gained by experience in special work."

This lesson which a German machine-builder gives the committee must be taken to heart by the German day trade schools and all the trade schools of the world. Technical instruction must be regarded in the first place as a means of character-training, and it must be supplemented by other forms of instruction with a view to making it as many-sided as possible. In the life of great economic groups and of nations there are moments, and they are the critical moments, in which neither knowledge nor skill, but character, decides the day—character that has learned to regard its own egoistic interests as of no account when their sacrifice is demanded by the welfare of the community to which we belong, the welfare of the service that we have chosen, the welfare of the subordinates intrusted to our care.

SECTION 4: GENERAL SUMMARY.

Character and Capable Management.

Experience has made it evident that technical education and industrial training which prepare an individual to earn a living and to contribute to the prosperity of the State by means of productive, constructive and conserving labor can also be the means of culture for his mind and of development o his spirit. There need be no separation between the training which qualifies young persons to become good workm.n or good workwomen and the education which broadens the sympathies and enlarges the interests through literature, history, science, art and religion.

The organization of an efficient system of industrial training and technical education and keeping it going afterwards are questions of men and women and management. The progress does not depend upon having conditions without drawbacks and difficulties. Every country for itself and place for itself must depend upon men and women who have fine initiative, sound intelligence, and plenty of wholesome persevering diligence.

Capable management stands out supreme above natural advantages. To observe carefully, to think clearly and consecutively, to learn from others, and then to put all together with the least possible waste—that is the immediate task before Canadians.

The National Depends on the Individual.

Every national problem can be dealt with to the greatest advantage by intelligent and capable men and women. Intelligence and ability are fruits of education limited in extent according to the measure of inherited capacity, personal diligence and accessibility of opportunities. Training and instruction in some form are the chief means for conserving and developing the powers, capacities and characters of individuals.

As the powers and influence of individuals in matters of government—Local, Provincial and Dominion—become greater, it becomes correspondingly necessary that each and all should have the kind and amount of education which will enable and cause them to live and work better because of it than if they had not had it.

Some Conclusions.

In consequence it appears to the Commission that Industrial Training and Technical Education should be provided:—

(1) In order that the interest of boys and girls in their own training and instruction might be increased and an understanding of their relation to working and living might be clearer to themselves from twelve years of age onwards.

(2) In order that the period of authoritative supervision, and of organized education to the extent of at least half a day per week, should be prolonged during adolescence, and that boys and girls should themselves desire those advantages until the age of seventeen or eighteen years.

(3) In order that all might become qualified, to the full extent of their capacities, to fill their places as individuals, as contributing earners, as citizens and as members of the race.

(4) In order that the nation as a whole might be more intelligent, capable and prosperous, and more united in its efforts to meet national problems and solve them wisely as they come.

The Commission holds that the large inclusive aim of Canada is that her people shall be great in character and ability, even great enough to match the matchless heritage that has come to her in blood and ideals, in possessions and institutions, in opportunities and obligations. The greatness of her composite races will come through the perfecting of the finest of all fine arts—the fine art of living happily and prosperously together WHILE WORKING WITH INTELLIGENT SKILL AND UNALTERING WILL for ends believed to be for the common good. Industrial Training and Technical Education are among the means to that end.

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CHAPTER V: INDUSTRIAL TRAINING AND TECHNICAL EDUCATION IN RELATION TO THE NEEDS, DUTIES AND RIGHTS OF INDIVIDUALS.

SECTION I: THE INDIVIDUAL IN CIVILIZATION.

Under modern conditions the term civilization is commonly used as a bland, omnibus word to indicate the forms of organization and effort employed for the achievement of the main aims and ideals which animate and dominate a people for the time being. At present the objects are obtrusively commercial and industrial. The forms themselves are ever changing, while the inner force which uses them persists. The inner power of the people expresses itself progressively in human qualities and social and economic conditions.

In the struggle of modern industry to produce goods cheaply in order to make profits, three elements are of importance—raw materials, labor-saving machinery and organization. These three receive so much attention that sometimes the conditions of and results upon the individual workers are entirely lost sight of. The most important asset in any State is the value of the individual citizens themselves. While the conservation of natural resources and the promotion of industries are important and the development of trade has possibilities of benefit, the conservation of life and ability in the individual workers is supreme. Next to that comes the provision for conservation of opportunity for satisfactory employment.

Imperfectly or Improperly Employed.

Already in Canada there have been times when want of employment to even willing workers has been keenly felt; and but little care has been taken to guard against the continuation of conditions under which great numbers are imperfectly employed. Such are those who are employed at occupations for which they are not qualified or for which they have no taste. Little has been done to correct conditions which permit and encourage considerable numbers to be improperly employed. Such are those whose time and ability are devoted almost entirely to acquiring control over property, instead of doing something which contributes to the sum total of wealth or the welfare of the people in themselves.

The Hope of Civilization.

Fundamentally and permanently the organization and effort of civilization include:

(1) Whatever has been planned for, hoped for or undertaken to keep the individual and the family going on towards the realization of justice, liberty and happiness.

(2) Whatever has been planned or undertaken to add to the reserves of wealth in material things and in the uses of the materials and forces of nature.

> In this sense wealth is represented by such things as buildings, furniture, clothing, foods, and materials for these; roads, sidewalks, railways, steamships and other means of transportation and conveyance; objects and instruments of science and art; tools and machinery of all kinds and products from them; warehouses, shops, telegraphs, telephones; domestic animals, improvements to agriculture, fisheries, mining and forestry; improvements in the utilization of fuels, water powers and waterways; water and sewerage systems and other public utilities.

(3) Whatever makes for the enlargement of friendships and the increase of friends.

(4) Whatever makes for the improvement of capacities, knowledge and powers of individuals for accomplishment, achievement and attainment in body, mind and spirit.

(5) Whatever helps towards making opportunities for well-being, through labor, leisure and living, more accessible and less avoidable.

(6) Whatever makes for the formation of good habits, the maintenance of high standards of conduct and character, and the cherishing and following of high ideals of duty.

(7) Whatever makes for the protection of children and the betterment of the quality of life.

(8) In general, whatever ministers to progress through service which combats ignorance, lack of ability, poverty, disease, vice and ill-wills.

Part Played by Industry.

In each of the foregoing spheres of desire and action, industry plays an important part. It has always done so. The dominant industrial activities, which occupy the people for the time being, set bounds to attainment in each of the spheres outlined. Personal human values and opportunities are the only terms in which the progress of civilization can be adequately measured, and these can be immensely enhanced by the union of education and industry.

Where the individual provides for his own primary wants in the way of food, clothing, shelter, tools and weapons wholly by his own labor, he requires the kind of training which qualifies him to do all the work involved. When he devotes himself to the production of more of one kind of commodity than he wants for his own sustenance and that of his family, and desires to exchange it

for other things, that marks the beginning of specialized industry and commerce. During the last century the trend of development was all in the direction of such specialization, with its consequent increase in internal and international commerce.

Factory Methods Limit Development of Individuals.

The differentiation of the kinds of work done by individuals in their occupations has led to an almost entire change in the kind of knowledge, strength and skill required by the individual for following his particular occupation successfully. When the specialization of occupations had proceeded to great lengths the organization of the workers in factories in many of the industries and occupations was brought about. That resulted in what has been called the industrial revolution, under which the single craftsman gave way to the worker in a factory organized for the most economical production of things by the use of machinery. The application of steam power and of water power, and more recently of electrical power, to the driving of machines, and the specialization of machinery itself for the accomplishment of complicated and difficult processes of manipulation and manufacture have, in many cases, made the workman occupy only the place of a skilled attendant upon a machine. Less of personal constructive, manipulative skill is required. While deftness and quickness of movement are found essential, only a few individuals are required to understand the machine and have knowledge of all its parts and ability to correct or adjust anything that goes wrong with it.

The organization of industrial activity into factories has not affected all trades alike, although it has modified nearly all occupations known as skilled crafts. Examples of these may be named as the trades of spinning, knitting, weaving; the production of clothing; the manufacture of boots and shoes; the manufacture of instruments, utensils, vehicles and tools; woodworking for the production of furniture and parts of buildings; metal working for the production into useful forms of iron, steel, etc.; the production of cutlery and other forms of hardware; printing and the making of books; the manufacture of paper; the making of glass; sawing in lumber mills; milling; the manufacture of dyestuffs, and a hundred other forms of occupations and crafts.

Such an organization of industry as has been indicated calls for the service of a relatively small number of men with directive ability. It also gives opportunity to persons possessing control of capital or wealth to provide the material means through which the unskilled labor finds its application to meet human needs.

Where the organization of industry provides for the employment and payment of a comparatively large number of unskilled workers, whose main contribution is bodily strength to carry out simple appointed tasks requiring little skill, initiative or intelligence, the forms of education required by such persons for their occupations are few and easy to provide. As workers many of them occupy a plane hardly higher relatively than that of slaves when civilization permitted that form of ownership of life.

SECTION 2: THE PROTECTION OF EDUCATION REQUIRED.

To Prevent the Exploitation of Labor.

But such workers as free citizens and voters require education; and the State, for its protection and benefit, requires that they should be educated to enable them to discharge the duties of citizenship in a safe and satisfactory manner. The safety of the State and considerations for the welfare of the race demand that they should receive education suitable to their needs as individuals in the long chain of life, in order that it might not be debased or weakened in their hands.

In the earlier stages of civilization industry was the servant of humanity, and was always employed to meet some need of service by individuals or communities. The question thrusts itself forward now, as to whether modern organized industry is to continue as the servant of humanity, or whether it is becoming an instrument in the hands of a comparatively few individuals, whereby they seek to obtain control of wealth (the reserves) and of the means of producing more wealth, including the control of human labor. When the main object of industry ceases to be products for service, and turns to profits for the employers and undue returns on capital, the conditions and situation are full of danger.

In this connection it is worth while referring to some of the conditions which have prevailed in and through one of the textile industries. A study of the conditions under which the cotton industry in its various aspects has been developed, reveals a saddening record of human degradation along the whole trail. In the production of cotton there was the exploitation of slavery and slave labor; and on the other hand in the manufacture of the cotton in factories there was the exploitation of child labor and women labor with the long hours, the confined and debilitating air, the infernal rattle of machinery, and the whole ghastly story. The beneficent cotton plant, capable of being turned into products of beauty and use, with nothing inherent in any of the tasks of its production or manufacture which might not have ministered to the development of ability and the creation of conditions for happiness and satisfactions, has been the occasion of blight on millions of lives. The exploitation of ignorant labor has ever been an injury and a menace to wholesome civilization, while the education of labor has ministered to progress and the well-being of the workers.

Commerce Follows Factory Methods.

Those who are occupied with the exchange of commodities in the field of commerce have found their occupation becoming organized in a manner somewhat similar to that which has prevailed in the production of manufactured articles. Whereas the shop-keeper with an assistant or two used to be the middle-

man supplying goods to his customers, he, in many cases, has given place to the departmental store or to the huge emporium which employs a large number of sales clerks. With each clerk confined in his activities to one department, the requirements of knowledge and executive ability, while not less exacting, are less complex and comprehensive than formerly. The departmental head in commerce parallels the foreman or superintendent in the industrial factory; and, at the top, those who have directive and organizing intelligence and ability, and power to command and use wealth or capital, are like the managers or owners of industrial establishments.

In the field of transportation a similar evolution has taken place, and even large railway systems are being consolidated into still huger concerns by amalgamations or understandings. In this department there is less need and less demand for unskilled labor except in the manual labor of constructing roadbeds and work of that sort.

Organization Lacking Where Most Needed.

Farming is the one occupation which has lent itself least to, and seems least likely to follow, the trend of the other occupations which have been mentioned. In Canada the individual farmer in most cases combines in himself the positions of manager, foreman, superintendent, skilled workman, laborer and chore-boy. He has to know not only the systems and methods of management and the processes and operations of production, but he is required to have scientific knowledge of soils, seeds, manures, crops, animals, products, diseases, insects and influences of weather. Farming is the application of common sense—that is, of organized knowledge or science, organized wisdom and organized good-will—to all these things and to his fellows. He must have commercial knowledge and intelligence regarding markets, qualities of products, packing, transportation, etc. And he must learn to organize and co-operate with his fellow-farmers in business.

In addition to the general knowledge, outlined but not exhausted in the foregoing enumeration, if he specializes in any particular department he must have a more thorough knowledge of the principles, methods, processes and conditions which belong to it or prevail in it. For instance, if a farmer specializes in fruit growing he must know how to manage the plants which produce fruit, and to provide for the conditions under which he will be able to sell it to the greatest advantage.

In fisheries, in mining and quarrying, and in forestry, fewer changes have taken place in the conditions of production so far as the skill and knowledge of the individual worker are required for the efficient following up of his calling. But he requires the new knowledge, which is now available to him and which was inaccessible to his predecessor, of natural laws whereby he may obtain the best results from the expenditure of his labor.

Factories Absorb Girls and Women.

The ultimate products of the labor of women are not widely different in their nature from the products of women's work before the time of the industrial revolution. The labor of women has always been applied towards the production of the clothing of the family, the preparation of its food and the maintenance of the house and home. Since the organization of industry made it practicable to produce articles of clothing, etc., by means of machinery and organized labor, in factories at less cost than by the single worker in her home, the woman worker has been absorbed into the factory system. The withdrawal of woman from the home, in many cases, has not meant that her labor was applied to a different kind of service for the community, but to production under different conditions. That applies in perhaps greater measure to the production of the various forms of clothing, ornaments and furnishing of the homes than to the preparation of foods. In this connection also it is to be remembered that the preparation of foods for consumption in modern cities calls for a different measure and kind of cooking. Few families of wage earners now purchase flour and make their own bread. Cooked meats, cooked fruits, "ready mades" of all sorts are purchased and used, whereas formerly the raw materials were produced or products were bought and prepared for use by the woman or women of the house.

The more expensive scale of living has brought about demands for scores of products and things which were almost unknown in the homes of the same class of workers a generation ago. Women and girls go into factories for the production of these things, such as garments, ornaments, confectionery, buttons, boxes and dozens of small articles of common use. Women are employed also in increasing numbers in sales shops and in offices in connection with business administration, correspondence, and the keeping of records.

Women Workers Need Special Training.

To enable the women to perform these several gainful occupations with success, that is, with satisfaction to their employers and satisfaction and contentment to themselves, they require special knowledge and special training. If these are not obtained, the effectiveness of the worker and the results of her work are to that extent lessened.

The great fundamental occupations of housekeeping and homemaking are still almost exclusively in the hands of women. Without question they have natural aptitude, and most of them natural liking, taste and preference for employment in these capacities. It is none the less highly important that they should be enabled to acquire the knowledge necessary to meet modern conditions and to obtain experience in early life which will enable them to develop adequate ability without waste, disappointment and injury to themselves and others.

It seems an obvious obligation and privilege upon all the people to ensure that the girls will have opportunities, assistance and guidance to enable them to become qualified for that occupation which, more than any other, is necessary

to the continuous well-being, strength, health, progress and happiness of the whole people. While food, raiment and shelter are not the main objects of life, life is more worth living to the individual and the community where the houses and homes are kept and managed by women who have been educated in such a way as to enable them to make the best use of the native talent which they possess.

SECTION 3: MORE SERVICE REQUIRED FROM THE SCHOOL.

Larger Duties of the School.

The evolution of the school has been as notable as that of any other institution. The elementary school, which came in first to supplement the training and instruction which the boy and girl received in helping their parents, has been left to accomplish nearly the whole task from six to fourteen. The demand is everywhere insistent that the schools shall meet the larger duties which are now thrown upon them by the changed social and industrial conditions.

The following extracts are taken from a Report by the Consultative Committee of the Board of Education of England.

The desirability of giving to adolescents a better Educational Equipment *for their future duties.*

So far as boys are concerned, therefore, the Committee have no hesitation in saying that, under modern industrial conditions, the majority are not sufficiently equipped for the battle of life when they leave school. Nor have they, in many trades, any reasonable opportunities of obtaining that necessary equipment during the course of their work.

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As regards the general question of the educational equipment of adolescents, three questions may rightly be asked of those who advocate a great extension of educational opportunity for the rank and file of the younger workpeople in this country. First, will the education which it is proposed to give make the young people better off pecuniarily when then come to manhood and womanhood? Second, will it give them happier lives? Third, will the outlay from public funds which the proposed educational changes must involve be repaid, fully though indirectly, to the nation, through the increased economic efficiency of the community?

(1) Does Capital, by promoting popular education, secure skilled service at a cheaper rate, retaining for itself most of the advantage which it would otherwise have had to share with its highly paid employees—highly paid because they could command the high rent of scarce ability?

Posts of responsibility are not predetermined in number by some iron law of markets. An increasing stock of practical ability in a nation enlarges the range of its ecomonic activities and rapidly adds, through all the gradations of directive responsibility, to the number of well-remunerated posts, which could never have existed if men had not been forthcoming to fill them.

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(2) A more difficult issue is raised by the question whether increased opportunities of education enhance the happiness of the mass of the people. The point was raised by one of the Committee's witnesses, and they feel they ought not to ignore it. In their opinion, all turns upon what is meant by happiness. Education may well destroy the easy-going comfort of a thoughtless mind. It may impart a desire for an intellectual or artistic occupation which the individual has not the means or opportunity of entering. It may stimulate ambitions which cannot be realised. It may increase a man's sensitiveness to the hardships and limitations of his lot. Like all great changes, it brings evil with it as well as good. But few would identify true happiness with obtuseness of feeling, coarseness of sympathy and torpor of mind. The right kind of education, working upon a character which is susceptible to its power, gives a man adaptability, self-reliance, balance of thought, sobriety of judgment. It may raise him above self-interest and beyond the

reach of individual disappointment to a point of view from which he sees the whole of which his individual life is but a part, and may bring him to the state of mind in which he finds a real happiness in work well done.

(3) The third question is whether the increased economic efficiency of the community will repay to the nation as a whole the outlay involved in great extensions of educational opportunity to the masses of the people. From a purely economic point of view, this question may be answered in the affirmative, provided that the education is at once practical and humanising. The enhanced economic power of the community increases the production of wealth and the efficiency of its thrifty distribution. It will make possible a more scientific distribution of labour, a fairer adjustment of tasks, a more prudent anticipation of the future. It will lessen waste and, through the avoidance of waste, may enormously increase the fund of wealth available for distribution among the community.

What is true of the material gain which may result from improved education is true also of the moral gain. The temper, the outlook, the recreations, the ideals of a nation may be so refined and raised by the right kind of training as to secure for the mass of the people a more choiceworthy life.

Adaptation to New Conditions.

The following extracts are taken from the Report of a Committee of the National Education Association of the United States on *the Place of Industries in Public Education.*

Much of the current discussion of reform movements of various kinds is vitiated because adequate attention is not paid to the fundamental forces which are producing the visible social changes.

In the first instance the social environment, including the sum total of influences which bear upon the life of the individual, has been enlarged. People, intelligence, goods, now come from or go to distant parts of the earth quickly, regularly, and surely. The world of the twentieth century is one vast neighborhood; no dark, unknown continents remain upon the map. In the second place, specialization of industry has tended to confine the life and activity of the vast majority of workers of all grades within very narrow grooves. While modern methods of communication and transportation, world markets and the multiplicity of industrial products offer opportunities to broaden the mental horizon and tend to differentiate the demand of each individual for necessities, comforts, and luxuries, occupations have been specialized and subdivided until the life of the individual is cramped. Earlier forms of industry gave the worker a relatively broad outlook, and did not force him into a rigid routine. Our daily work and home environment usually tend under modern conditions to astigmatize our view at the time when democracy and world unity should thrive. This is the grim and forbidding paradox of modern industrial life.

The factory system, for example, is an economical and labor-saving device; but it has certain undesirable features such as extreme specialization and the employment of young children. How can the system be preserved and the danger reduced to a minimum? is our problem. It is not: How can the system be abolished? The task is not the preservation of the old intact; but it is the adaptation of social, political, ethical, and educational ideals and methods to the unique conditions produced by industrial advance.

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The greatest wealth of a modern nation is bound up in its citizenship; and its citizenship, thanks to the "industrial factor" in modern life, is chiefly a social product. The presentation of abstract educational ideals and values without due regard for the conditions of home, shop, and leisure-hour environment, is a futile process. The great problem of the present, the one which towers above all others, is to universalize opportunity for decent health and comfortable living not for a few but for all; it is to give to each and every child in this great and rich land of ours the heritage of a child—decent home surroundings, sufficient and proper food, opportunity to play, and a chance to use hand and brain in some form of constructive work. This is the social, political, and educational problem of the age; and the peculiar form in which it is presented to the present generation is due to industrial advance. The key to its solution can be found only by him who searches by way of the path of industrial evolution. The "industrial factor" is the chief factor in modern social, political, and educational problems; because industry is the determining factor in fixing the conditions of living, working, playing, associating, resting.

Personal Welfare and State Prosperity.

In view of these and similar considerations it becomes more and more evident that education must have a vocational aim and result if the industrial

activities of the people are to be of benefit to all the individuals and to the State which they constitute. It must be kept in mind that the first and chief object of Industrial Training and Technical Education must be the personal welfare of the individuals who are to participate in it; second, the prosperity and strength of the State; and, third, the advancement and improvement of Industry as such, and that only as consistent with and subordinate to the other two.

In the organization of this form of education, the attempt must be made to meet all the needs of all the people, with care that none shall be debased by the occupations for which they are prepared, and none shall be debarred from earning satisfaction, as well as satisfactory wages, from labor.

Some Conclusions.

In the opinion of the Commission it is important,—

(1) That workers in factories whose main task is to attend or operate machines should receive instruction and training which would develop some all-round power and skill, widen their knowledge and increase their interests beyond the routine of automatic operations. By such means industrial activity would minister to the development of human life instead of subordinating it to the gain of profits without concern for the well-being and happiness of the individual workers.

(2) That such training should be provided as will conserve and develop occupations wherein skilled handicraft is required,—this for the sake of the workers as well as for the quality and character of products of certain kinds.

(3) That the interests of the rural population should be conserved and promoted as far as possible by Industrial Training and Technibal Education suitable to the needs of its workers.

(4) That the needs of girls and women for organized instruction and training in the elements of the sciences and arts, which underlie successful housekeeping and home-making under modern industrial conditions, should be recognized and provided for. The housekeepers and the homemakers are always the mainstay of advancing civilization.

(5) That increasing attention should be given to opportunties, which now exist or which may be provided, for the conservation of life and health and for the development of human powers to the end that individuals generally may attain happiness, prosperity aad contentment through intelligent labor in Canada.