

## CHAPTER LVII: REGARDING APPRENTICESHIP.

The laws and customs in respect to apprenticeship have a direct and continuous bearing upon the elementary industrial and technical instruction which is provided in the several Cantons.

### EXAMINATIONS, DIPLOMAS AND EMPLOYERS.

The following information was obtained in "Conversation" with Dr. Fr. Fritschi.

All boys who enter apprenticeship for joinery or mechanics, or any other skilled trade, and girls who enter apprenticeship for millinery or dressmaking, are required to pass an examination, theoretical and practical, at the end of their apprenticeship. To prepare for this examination they are required to attend Continuation Classes at least 4 hours a week. Most of them attend 6 hours a week. The employer is required by law to give the boy at least 4 hours a week during the ordinary working hours to attend these classes.

All apprentices must take the examination at the end of their period of service. Nearly all obtain their diplomas. Whenever a boy goes to a new place the employer asks, "Let me see your diploma; let me see how you worked."

In case an employer should seek to evade the obligation to let the young worker free for 4 hours a week, he might do so by taking him into his office or workshop and not making an agreement with him as an apprentice. However, the employers in their unions think it a point of honor to have the young people who work for them engaged as regular apprentices. If anyone fails to treat them in that way, he loses respect among his fellow tradesmen.

### MATTERS REPORTED UPON.

An understanding of the situation and practice can perhaps best be obtained from summaries of four official documents which constitute the remainder of the Chapter, viz.:—

1. Apprenticeship Law of the Canton of Zurich;
2. Copy of Apprenticeship Agreement;
3. Programme of Examination for Carpenters and Joiners;
4. Programme of Course and Apprenticeship Examination for Milliners.

Similar Programmes are published officially for apprentices to all the important trades.

## SECTION 1: APPRENTICESHIP LAW OF THE CANTON OF ZURICH.

(April 22, 1906)

The word "apprentice" in this Act comprises every minor of either sex who is desirous of learning any manual or industrial occupation in a workshop, a vocational school or a commercial business.

Apprentices may enter upon their apprenticeship in manual or industrial occupations on the completion of their elementary school attendance. Apprentices in commercial houses however, must be fully 15 years of age before entering upon their apprenticeship.

Every apprenticeship contract must be drawn up in triplicate, signed by the employer, the parent or guardian, and the apprentice personally. Copies are to be retained by the contracting parties, and one copy to be sent to the Welfare Committee, who are also to be informed of any alteration that may be made in the same from time to time.

The contract must specify the occupation to be taught, or any special branch of it, the length of training, the obligations on both sides, and the duration of the probationary period, during which the contract may be dissolved by either party at three days' notice.

The employer is bound to care for the apprentice's physical and moral welfare, and to teach him or her the specified business in a regular and consecutive manner, either personally or by a duly qualified deputy. Other than vocational duties may not be demanded of the apprentice, unless this is specifically mentioned and provided that the training of the apprentice does not suffer thereby. If the apprentice lives with the employer, a proper bedroom and separate bed must be provided for him or her. If the apprentice receives any remuneration, this must be paid directly to such apprentice at the specified time.

The apprentice is under the direct control of his or her employer, and owes him respect and obedience, being pledged to carry out instructions conscientiously and diligently, and to observe strict secrecy as to the employer's affairs.

Should an apprentice leave before the expiration of his or her term, the employer can obtain redress through the courts.

No apprentice may be employed more than 10 hours per day. This does not apply to the federal law regarding work in factories. Overtime may only be worked at exceptional times, such as stock-taking, etc., or in making up time after a breakdown, or other unforeseen circumstances, where it is necessary in order to avoid serious damage or loss or to protect other workers from loss of employment. Only apprentices over 16 may be employed at overtime work, and the day may only be extended by 2 hours at a time, or 75 hours per year. Apprentices may not be called upon to work on Sundays and holidays, or at night, i.e., between 8 p.m. and 6 a.m. Special regulations may be issued from time to time regarding the occupations in which apprentices may be employed at night and on holidays, and only in such cases where the business cannot be

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carried on without such an arrangement. Regular Sunday work must not exceed 6 hours, and the same applies to night work. In any case the apprentice must be allowed 10 hours' uninterrupted rest.

Apprentices may not be given work to do at home after business hours.

Where there is a vocational, general or commercial Continuation School within reasonable distance of the employer's place of business, the latter must see that the apprentice attends those classes which apply to his occupation, and allow him the necessary time, including not less than 4 hours weekly in working hours, such time to be counted in working time. The apprentice must also be allowed time for religious instruction.

On the termination of the apprenticeship, the employer must give the apprentice a certificate as to the nature and duration of the apprenticeship, and also, if asked for it, a certificate regarding diligence and good conduct.

Any agreement limiting the employment of the apprentice, after the conclusion of his apprenticeship, is illegal.

The apprenticeship contract may be broken by either party only in the most exceptional and urgent cases, such cases to be settled in the courts, and the party in default to pay damages as directed by the judge.

In case it should seem advisable to either party to terminate the arrangement, appeal may be made to the Welfare Committee and Cantonal authorities, who will decide the matter. Causes for which appeal may be made are:— (a) physical or mental deficiency of the apprentice, continued disobedience and idleness, ill-behavior towards his employer or the latter's family, deliberate injury to his employer, or a criminal offence for which he is punished by the courts of law; (b) incapacity or neglect on the part of the employer in teaching the apprentice his business, or neglect to fulfil his obligations towards the apprentice.

Persons who have repeatedly failed in their duties towards apprentices entrusted to their care, or who are known to be immoral or otherwise unsuited for the training of young people, may be prohibited from keeping apprentices for a period of 5 years. If it is found in the course of an apprenticeship that the employer is undesirable, the Welfare Committee may terminate the apprenticeship in the interests of the apprentice, should they see fit.

All disputes between employers and apprentices are to be adjusted by the Welfare Committee, the law courts, or the Cantonal authority.

#### APPRENTICESHIP EXAMINATIONS.

Every apprentice is compelled to take an examination, at the close of his or her apprenticeship, to prove efficiency; and the employer has to enter his or her name for this purpose. The costs are borne by the State, and regulations are issued from time to time as may be necessary. The Welfare Committee directs these examinations, but their organization and conduct may be entrusted to the Guilds and Trade associations, as also the selection of experts. Experts must accept office when called upon, unless prevented by unavoidable causes.

Every candidate for examination, if successful, will be awarded a certificate to that effect on the conclusion of his apprenticeship. Apprentices who are not successful may take the examination again six months later.

All laws relating to apprenticeship are enacted by the Government, who advise with the Guilds and other organizations regarding details. The Welfare Committee has the supreme control of apprenticeship and vocational training. Special vocational Inspectors and Inspectresses are appointed to look after the vocational schools. They are selected by the Welfare Committee and appointed by Government. The Government also selects the Committee for Factories and Industries and that for Commerce on the recommendation of the Guilds, care being taken to have the interests of employers and employees equally represented. These Committees have to deal with all the more important questions regarding industrial and commercial training.

The fine for contravention of this law is from \$1.25 to \$40.

## SECTION 2: COPY OF APPRENTICESHIP AGREEMENT.

The Apprenticeship Law in the Canton of Vaud is practically the same as in Zurich, the regulations for examination being almost identical. A specimen Apprenticeship Agreement is given below:

### APPRENTICESHIP AGREEMENT.

BETWEEN (Employer's name and occupation), domiciled at (place, street and number), of the one part, and (Name of Representative of Apprentice), domiciled at (place, street and number), acting for (Name of Apprentice, date and place of his or her birth, present residence, and name of parents,) of the other part.

It is agreed as follows:—

1. The employer will teach or cause to be taught to the apprentice, in a thorough manner, the business of ..... in the period of ..... years ..... months, viz. between ..... 19.... and ..... 19....

Further, the employer will initiate the apprentice into the requirements of his business, in the use of tools and ordinary merchandise, and will not employ him for work outside of his business. The apprenticeship shall be under the control of the supervising authority for apprenticeship.

2. The first ..... days of apprenticeship shall be a probationary period. During this period either party may cancel the agreement. Notice of cancellation to be given by the employer to the representative of the apprentice, or by the latter to the employer.

In case of the agreement being broken off, if the employer has boarded and lodged the apprentice, he shall be paid an indemnity of ..... per day.

3. The employer shall receive as the premium of apprenticeship the sum of ..... francs, payable in ..... instalments, that is to say (times of payment).

4. The apprentice shall receive from the employer, from date ..... 19.... remuneration at the rate of ..... per .....

In those occupations where insurance is compulsory, the apprentice shall be insured against accidents at the rate of ..... per day in the ..... Insurance Society. The premiums to be paid by .....

5, 6, 7. The employer is to treat the apprentice as his own son (or daughter), to give him (or her) sufficient and wholesome food, healthy and comfortable lodging, light and heat, in order that he (or she) may be able to study outside of business hours subjects pertaining to the occupation followed. Laundry and repairs to be paid for by .....

8. The employer is to see that the apprentice takes the examination at the conclusion of apprenticeship, and if a specimen of work is required, to give the time and materials necessary for its production, and to superintend its execution by the apprentice. If the latter wishes to keep the article, he is to pay the employer the cost price of the materials.

9. The apprentice is to be obedient and respectful, and to work zealously and conscientiously. He is not to divulge his employer's business secrets, or processes of manufacture, or to give any information about customers or the business of the firm.



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10. If the apprentice loses more than . . . . . days during his (or her) apprenticeship, through illness or other causes, the time is to be made up at the expiration of the agreement. Only a loss of more than . . . . . consecutive days is to be counted.

11. The apprentice may not join any society without the permission of the employer and the Apprenticeship Committee. Such permission will not be given if it in any way interferes with the apprenticeship or attendance at vocational instruction.

12. The representative of the apprentice will be surety for the latter's obligations.

13. Any disputes regarding the present agreement are to be submitted to the Apprenticeship Committee.

Any other conditions. (Penalty for inserting conditions contrary to the law, apprenticeship acts and regulations, is \$40).

Executed in good faith and prepared in triplicate in accordance with the law,.

At . . . . . this . . . . . day of . . . . . 19 . . . .

*Employer.*

*Representative of Apprentice.*

.....

*Apprentice.*

.....

.....

The agreement must be signed by the father or guardian. The 3 copies must be forwarded within 30 days to the guild or municipal attorney, to be entered by the Apprenticeship Committee of the district.

### SECTION 3: PROGRAMME OF EXAMINATION FOR CARPENTERS AND JOINERS.

The following relates to the examination of apprentices and the encouragement of apprenticeship.

The Cantonal Apprenticeship Offices of French Switzerland issued a pamphlet intended to inform parents, guardians and apprentices of the conditions of various trades and also masters regarding the training which they are to give to their apprentices. This pamphlet, based on information obtained from persons practising the industries named, was submitted to them for criticism, and their suggestions were followed as far as possible.

The following is a summary of the information given therein relating to the trade of carpentry.

Young men wishing to enter this business are recommended to study this pamphlet carefully, and to acquire such vocational training as may be necessary to enable them to become efficient workmen.

#### APPRENTICESHIP—CONDITIONS, PROGRESS, ETC.

The duration of apprenticeship is three years.

The conditions must be arranged in writing at the commencement of the apprenticeship between the parties concerned. A written agreement is required by law.

A carpenter apprentice should have a good elementary education, some familiarity with drawing and geometry, must be healthy, and active and intelligent.

Although it is not possible to state with absolute definiteness the exact arrangement of work during apprenticeship, the following division of time is given as a general guide, and it must be left to the employer to arrange the details.

*1st period.*—Knowledge and use of tools and materials, elementary wood work.

*2nd period.*—Continuation of same, and more advanced work.

*3rd period.*—Moulding, cupboard doors, windows and French windows, large pieces of furniture, glass doors, benches, etc.

The employer is recommended to teach the apprentice from the beginning, as fully as possible, how to plan the execution of work, estimate expenses, the various kinds of wood required, the buying of wood, its qualities and defects for different requirements, etc.

Every apprentice who has completed five-sixths of his term should be able to carry out from general directions all ordinary work in his trade, and the last period of his apprenticeship should be devoted to improving his knowledge of the various branches.

#### VOCATIONAL COURSES TO BE ATTENDED.

The theoretical instruction which the apprentice is required to attend extends over the whole period of his apprenticeship. Provided that it is available within a reasonable distance, the following course should be taken:—vocational drawing, elementary geometry, elementary descriptive geometry, elements of construction, arithmetic, measuring, accounting specially related to costs, special carpenters' course.

#### EXAMINATIONS.

At the close of the apprenticeship period, an examination is held on the subjects absolutely essential to the trade of carpentry. This examination covers 2 or 3 days.

#### SPECIMEN OF WORK.

If a specimen of work is required, it will be selected from the different articles used in ordinary buildings. The test will consist of the execution of a piece of furniture in miniature (no cabinet-making allowed) complete enough to enable the judges to estimate the candidate's proficiency. The piece of work must be accompanied by (1) the drawings used in its execution; (2) description of the tools used; and (3) a certificate stating that the drawings and article are the work of the apprentice, and mentioning the time spent thereon; (4) an invoice showing cost price of the work.

#### PRACTICAL WORKSHOP EXAMINATION.

The test piece will be a specimen of various kinds of carpentry, as follows:—(1) plan to scale of a piece of carpentry from drawing to scale; (2) execution of the same; (3) wood-work, assembling and finishing.

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## THEORETICAL EXAMINATION.

This comprises (1) drawing; (2) composition in candidate's native language; (3) one or more problems (written); (4) oral examination on the subjects essential to the trade of a carpenter.

(1) Drawing examination includes the geometrical drawing of a piece of carpentry in plan, section and elevation; all the calculations must be shown thereon.

(2, 3) The written examination comprises a composition on a trade subject, also one or more problems on surface, development, cubes, industrial accounting, cost price, etc.

The questions for the oral Vocational Examination may be selected from among the following subjects:—materials used, hard and soft woods, origin and use of same, measurement, special technical knowledge; various kinds of carpentry, assembling materials. In these oral examinations special attention will be paid to general knowledge of the trade, and also to names and uses of the tools; treatment of wood for different purposes; glues, oils, essences and dyes used, etc. Other questions may be set, but they must be related to the trade.

## FOR MECHANIC APPRENTICES.

The programme for Mechanic Apprentices is only slightly different from that of Carpenter Apprentices. The term of apprenticeship is 3 or 4 years, according to the branch taken up. It is advisable not to enter upon apprenticeship before attaining the age of 15.

## INSTRUCTION.

The vocational instruction to be followed comprises:

In the 1st year of apprenticeship:—arithmetic, geometry, technology, drawing. 6 to 8 hours weekly.

In the 2nd year of apprenticeship:—algebra, geometry, physics and chemistry, technical drawing. Algebra and geometry are taught especially in relation to technical work, and problems are taken from practical work. 6 to 8 hours weekly.

In the 3rd year of apprenticeship:—physics (industrial electricity), mechanics, machines and tools, with industrial drawing; industrial accounting. 6 to 8 hours weekly.

## EXAMINATIONS.

The final examination, extending over two or three days, is held on the conclusion of apprenticeship. Candidates have to bring their tool outfit, and any other appliances required by the committee. If a test piece is submitted, it is generally left to the choice of the candidate. It consists of a simple piece of mechanical work, sufficient to show the judges what degree of proficiency has been attained, and must be accompanied by drawings, castings, tools and certi-

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ificate as in the case of carpenters. The practical examination is held in the workshops, and the written and oral examination follows the same lines as that for carpenters, being adapted to the special needs of mechanics.

#### SECTION 4: PROGRAMME OF COURSE AND APPRENTICESHIP EXAMINATION FOR MILLINERS.

The period of apprenticeship is 2 years as a rule, and covers the complete study of all branches of the business, together with practice in adapting the work to changes of style.

A contract in writing must be drawn up, giving all particulars of the terms and conditions.

An apprentice should be able, on the completion of two-thirds of her term, to undertake any branch of her business, and the latter part of the time can then be devoted to cultivating skill and acquiring experience. Owing to the nature of the work, no definite programme can be laid down, and it is left to the employer to teach the apprentice all that she needs to know, as opportunity arises. The branches taught must include:—making up and trimming ladies' and children's hats; a knowledge of all the appliances used, the appreciation of their uses and qualities for ordinary and decorative purposes; estimates of cost; study of change in fashion, and harmony of colors. The following suggestions are given:—

*First period.*—The apprentice should learn to prepare hats, to construct simple shapes in various materials, to sew and finish the crowns, stitch the material and trimmings, and hem velvet and silk; to iron trimmings—velvet, lace, crêpe, etc. The theoretical teaching will deal with materials in silk, half-silk and cotton, with trimmings and other articles used in the trade.

*Second period.*—In this period the apprentice should learn to shape hats out of various materials, and to do more advanced work, in the course of which she will become familiar with the various goods used, such as ribbon, velvet, silk and half-silk, cotton, etc., and will learn to recognize their qualities and suitable use.

*Third period.*—The apprentice should now be able to construct a shape in buckram in any desired form, to make alterations and re-curl feathers.

She should be able to alter or make a hat in silk, velvet or crêpe.

*Fourth period.*—At this stage she should trim felt and cloth hats, make children's hats, bonnets and toques. She should also make up various trimmings, bows, knots, etc. and place them on the hat. She must be perfectly familiar with all the materials used in millinery.

#### CONTINUATION COURSES.

Apprentices must attend the classes held for their trade provided there are any within a reasonable distance. If no special course is available, they are recommended to take French, arithmetic and drawing. The time for attending classes is to be included in working hours.

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### PROGRAMME OF EXAMINATION FOR DIPLOMA.

This examination covers one or two days, and comprises theoretical and practical tests on the work done during apprenticeship.

#### SPECIMEN ARTICLE.

If the examining committee demands a specimen of work, to be made before the practical examination, it may be selected from among the following:— (1) a bonnet and bonnet shape made by hand by the apprentice; (2) a hat for a girl or lady; (3) a child's hat; all to be made entirely by the apprentice, certified by the employer. Flower trimmings are not to be used.

#### PRACTICAL EXAMINATION.

The practical examination includes the making up of various kinds of hats to the satisfaction of the committee, one of the following being selected: (1) a hat shape to model chosen by the committee; (2) trimming a hat; (3) trimming a child's bonnet.

#### THEORETICAL EXAMINATION.

This covers the following subjects:—

A. Theory of the different parts of a hat: (1) lining; (2) cutting and placing of bias; (3) ditto of wings; (4) arrangement of trimmings; (5) distribution of flowers, feathers and accessories; (6) different styles of hat to suit different ages.

B. Enumeration of the various styles of headdress.

C. Qualities of trimmings, such as stuff, muslins, ribbons, etc., and the quantities required.

D. Small accessories—buckles, pins, etc.

E. Precautions to be taken to keep customers' goods fresh and clean while working.

F. Estimating the cost price of a hat; various items to be taken into consideration.

Other questions may be set, but they must relate to the subject in hand. Practical work is to be demanded wherever possible, and credit is to be given for economy in the use of materials.

## CHAPTER LVIII: SECONDARY EDUCATION FOR INDUSTRIAL PURPOSES.

### SECTION 1: A TYPICAL CANTONAL SECONDARY SCHOOL AT ZURICH.

This school has three Departments—'Gymnasium,' Industrial School and Commercial School. The Gymnasium has a Classical and Modern side, and prepares especially for admission to the Hochschule and University. The Industrial Department or 'Ober-Realschule' prepares especially for admission to the Polytechnic School. The Commercial Department prepares officials for the Transport services, for the commercial section of the Universities and for Commercial High Schools (Handelshochschulen).

The entrance age is 12 for the 'Gymnasium' and 14 for the other two Departments. Pupils having higher qualifications are admitted to higher classes.

The building was well appointed and equipped for the training of pupils and imparting the general as well as particular knowledge regarding the products and processes of the different trades. As for example, one room was specially devoted to illustrations of the materials and products in connection with the silk industry. Specimens of the raw silk from different countries were arranged and graded. There were also splendid patterns of silk tapestry made by machinery, as well as made by hand. In the operating room each student weaves with a small loom from his own pattern. By this means the students learn to know the place and use of the different parts of each machine. The students prepare dyeing extracts, and specimens of all sorts of dyeing materials are explained and handled.

Similarly complete equipment and opportunity for training are provided for the textile industries in cotton and wool. The teaching of chemistry is made to bear directly on the process of dyeing.

Patterns of various fabrics are examined microscopically, analysed, then copies are made in drawing, and these are afterwards produced in the actual fabrics.

Two large rooms are specially arranged for freehand drawing and one large room for geometrical drawing.

#### SUBJECTS OF STUDY.

*In the 'Gymnasium,' Classical Section:—*

*Compulsory:* German, Latin, Greek, French, History, Geography, Natural History, Physics, Chemistry, Mathematics, Singing, Penmanship, Drawing, Physical Culture.

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*Optional:* Religion, Hebrew, Italian or English, Choral Singing and Stenography.

*In the Modern Section:—*

*Compulsory:* German, Latin, French, English, History, Geography, Nature Study, Physics and laboratory work, Chemistry and laboratory work, Mathematics, Geometrical Drawing and Descriptive Geometry, Singing, Penmanship, Drawing and Physical Training.

*Optional:* Religion, Italian, Book-keeping, Choral Singing, Stenography and Advanced Geometry.

*In the Industrial Section* (formerly the technical department of the 'Ober-Real-schule'):*—*

*Compulsory:* German, History, French, English, Mathematics, Geometrical Drawing, Descriptive Geometry, Book-keeping, Physics, Chemistry, Natural History, Geography, Freehand Drawing, Penmanship, Stenography and Physical Training.

*Optional:* Religion, Italian and Singing.

*In the Commercial Section:—*

*Compulsory:* German, French (with commercial correspondence), English (with commercial correspondence), Italian, Arithmetic, Book-keeping, Commercial Correspondence (German), Office Work, Commercial Law and Political Economy, History, Composition, Geography, Natural History, Chemistry, Physics, Geometry and Algebra, Writing and Stenography, Physical and Military Training.

*Optional:* Religion, Spanish, Technology, French Stenography, Drawing and Choral Singing.

Commercial Geography is given a prominent place in the course. Special commercial and industrial maps are used, showing the lines of communication and location of industries and mineral deposits.

## OTHER FEATURES OF THE SCHOOL.

Emphasis is laid upon the instruction in English and French. Picture postcards of English and Scotch places of interest and of eminent men and women are used a great deal. Students have a great deal of practice in making out bills for goods in English and French, and also practice in business correspondence in English, French and German.

The attendance in 1910-11 was 516 in the Gymnasium, 240 in the Industrial Section and 1034 in the Commercial Section.

Students enter the Gymnasium usually at 12 years of age and remain for 6½ years. Those who come from the ordinary Secondary Schools at about 16 years of age remain for 2 years. In the Industrial Section pupils usually take a course of 4½ years, at the end of which time they may obtain diplomas. In the Commercial Section students continue during 4 years, and at the end of that time may obtain a diploma which is accepted in lieu of other apprenticeship examinations required by the Canton.

## SECTION 2: INDUSTRIAL ART SCHOOL AT ZURICH.

This School has been in existence since 1878, but was completely reorganized in 1906, workshops being added for Carpentry, Metalwork, Weaving, Decorative Painting and the Graphic Arts. Special courses are held for Apprentices, and a general class for Drawing (Nature study, Life). In the Evening Classes the needs of journeymen are especially studied.

Pupils are trained by a progressive course of study to work out their own designs, design and execution being taken simultaneously. The problems set are those of daily experience, all the work being based on practice, and the school has opportunities for working with leading manufacturing firms. Special care is taken to keep up to date, and the latest designs and methods are studied in every branch. In the Embroidery and Weaving sections attention is given to producing original and beautiful effects by modern methods. In the Metal-working department the students have to make their own tools, and thus learn the infinite possibilities of their use. In the Bookbinding department they have to cut their own stencils, and in every branch stress is laid upon variety of design and execution, harmony of colors and of arrangement, and suitability to the purpose required.

### DEPARTMENTS OF SCHOOL.

The School has 4 Departments, viz.:

- (1.) Vocational School for Graphic Arts (Typography, Lithography, Photography, Bookbinding).
- (2.) Vocational School for Interior Architecture (Furniture, Metalwork, Lighting Fixtures, etc.).
- (3.) Vocational School for Decorative Painting (Harmony of Colors, Decorative and Flat work, Stencil Painting, Glasspainting).
- (4.) Vocational School for Textile Art (Pattern Drawing and Stencilling for Silk and Upholstery goods, Carpets, Gobelins, Weaving, Lace, Embroidery).

There is a General Class for Drawing and Modelling, Nature-Drawing, Life-class and Anatomy. The Special Classes and Workshop Classes include Nature-drawing and designing, to the completion of the article.

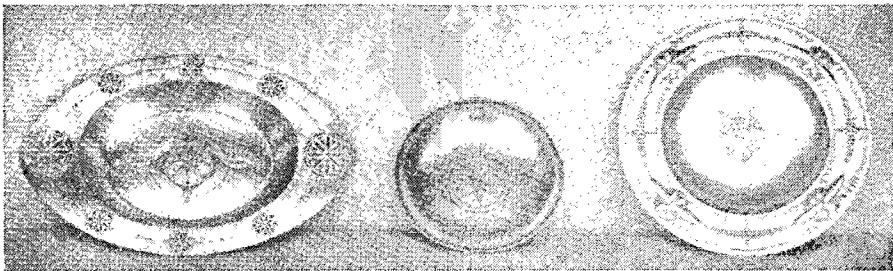
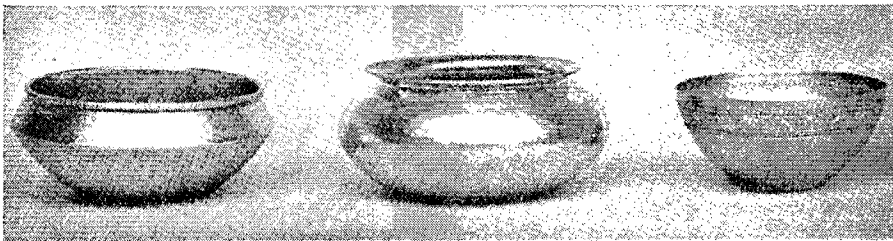
Evening Classes are held for outside pupils, combining Drawing and Vocational Instruction with practical work. Day pupils may attend Evening Classes by arrangement.

A class for Drawing Teachers is held every 3 years. Candidates must have completed attendance at one of the Sections of the School.

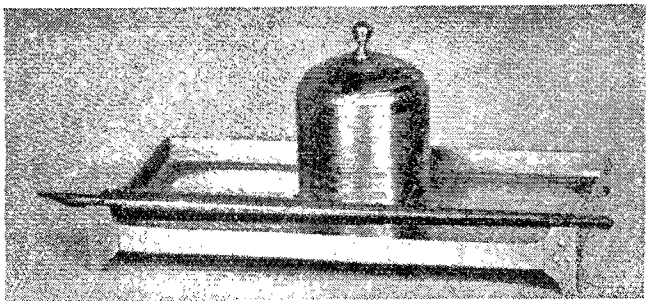
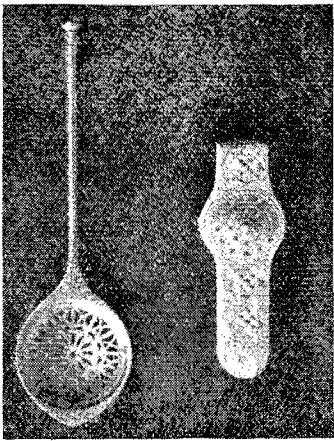
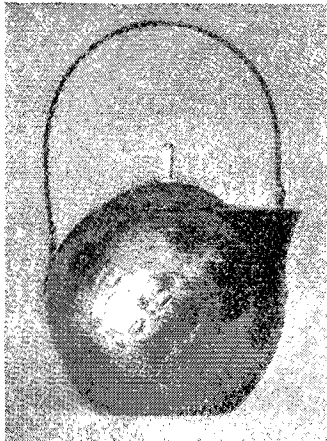
One or two Master Courses are held every year, dealing with general principles of instruction, and aiming to exercise an aesthetic influence on craftsmanship.



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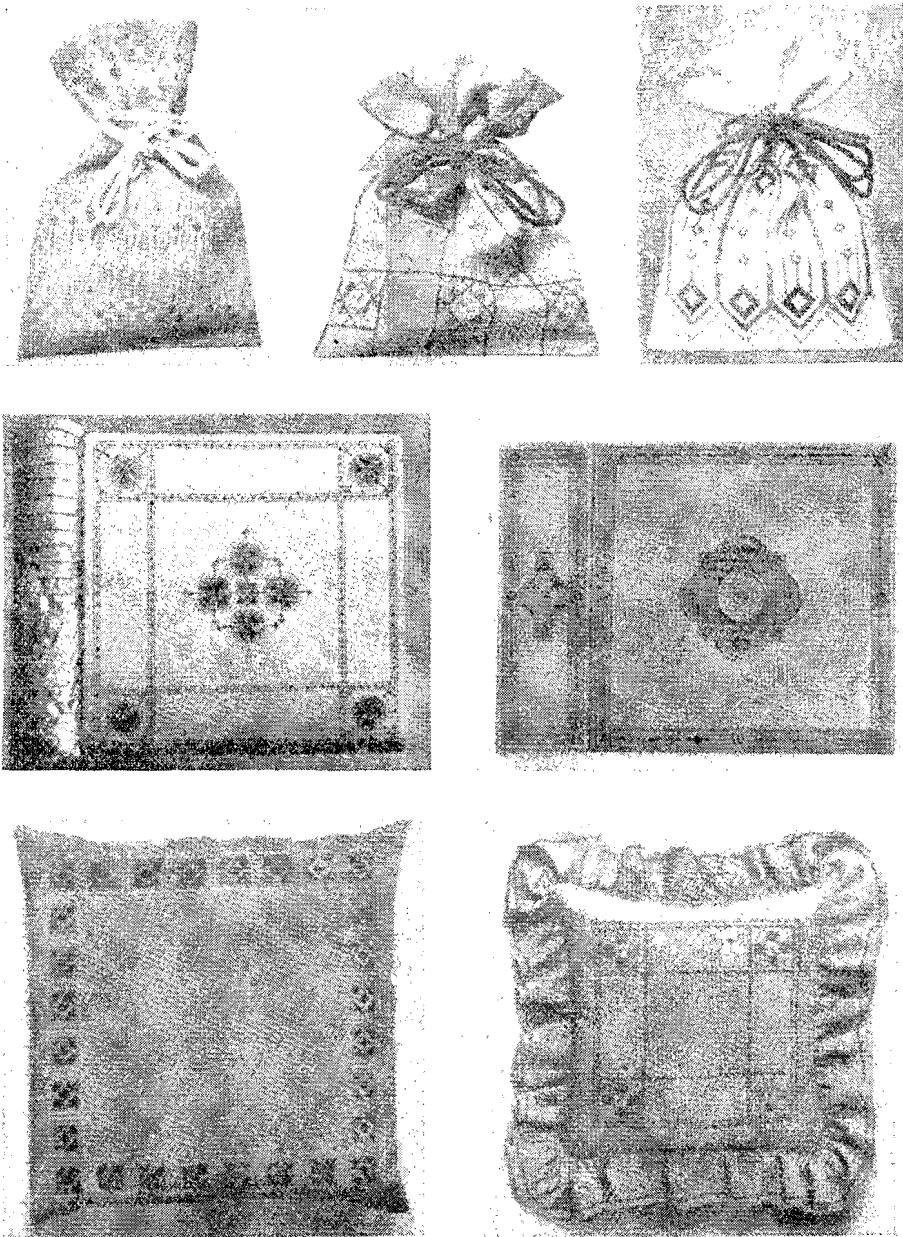


EXAMPLES OF METAL WORK: INDUSTRIAL ART SCHOOL, ZURICH.



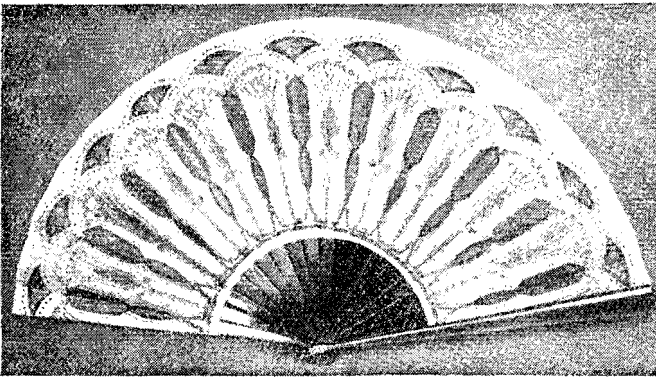
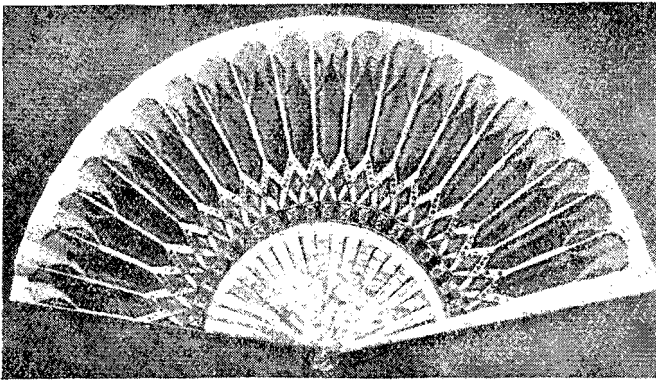
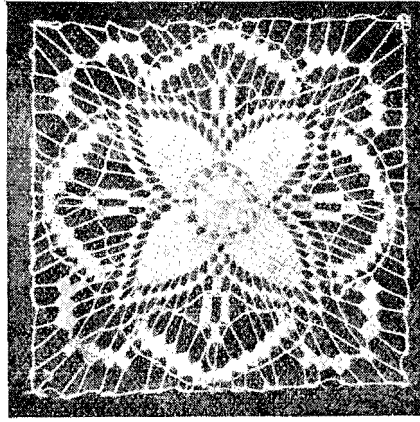
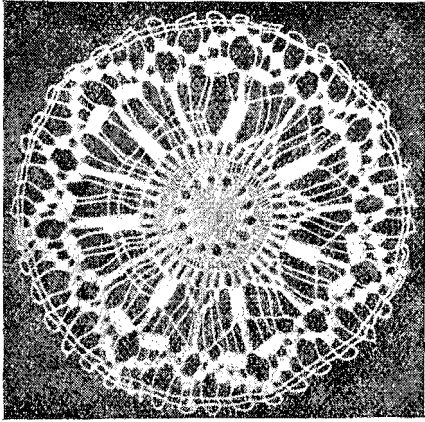
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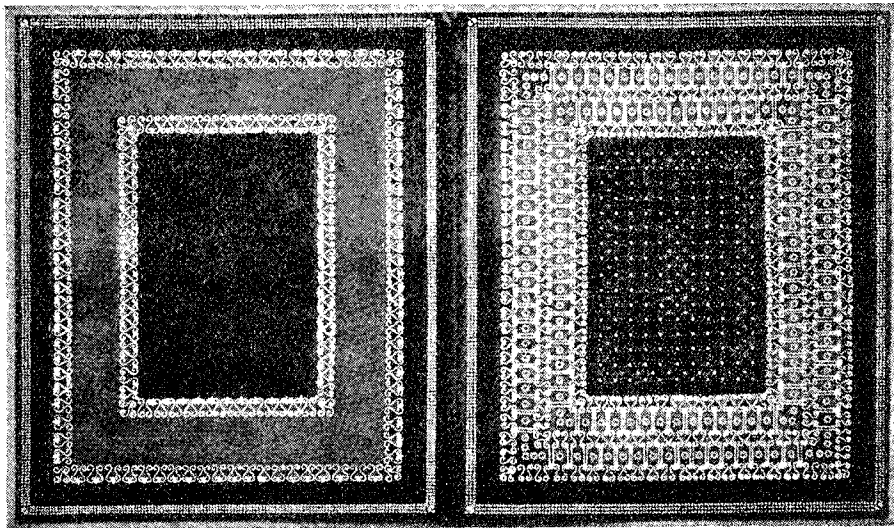
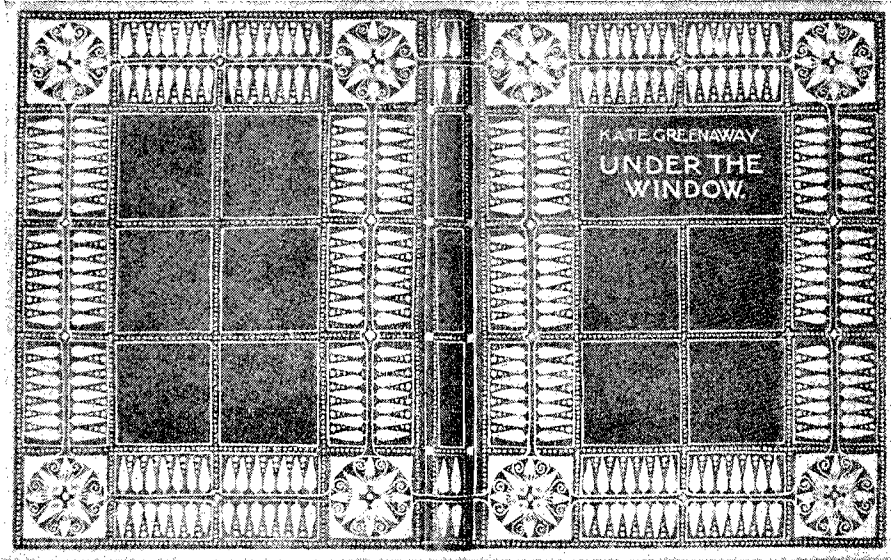
EXAMPLES OF EMBROIDERY WORK: INDUSTRIAL ART SCHOOL, ZURICH.

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EXAMPLES OF WORK (LACE AND FAN DESIGNS): INDUSTRIAL ART SCHOOL, ZURICH.

SESSIONAL PAPER No. 191d



EXAMPLES OF WORK IN BOOK COVERS: INDUSTRIAL ART SCHOOL, ZÜRICH.





EXAMPLES OF WORK IN LITHOGRAPHY DEPARTMENT (POSTERS): INDUSTRIAL ART SCHOOL, ZURICH.

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## CONDITIONS OF ADMISSION.

Regular pupils must have completed attendance at an 8-class Elementary School or its equivalent. Further, for Sections 1, 2 and 3, they are required to have had 2 or 3 years' experience in their selected branch, for Section 4 to have completed the Vocational School course in Composition, Business Correspondence and Book-keeping, the Evening School course in Freehand and Technical Drawing, or possess equivalent attainments. Occasional pupils are required in addition to be actually practising the occupation. Drawing Teachers must have completed a full course at the school. No entrance examination is held, but a probation of not more than 6 weeks is allowed, at the close of which it is decided whether the student is sufficiently advanced for the Vocational Courses. If not, he may be required to join the General Class for a time.

No fees are charged, but a deposit is demanded, which is returnable on satisfactory attendance.

Scholarships are available for needy students.

## COURSES AND EQUIPMENT.

The Compulsory Apprentice Courses are as follows:—Typesetters, Book printers, Lithographers, Bookbinders, Ironworkers and Locksmiths, Gold and Silversmiths and Engravers, Chasers and Copper Smiths, Carpenters, Cabinet-makers, Hand Embroideresses, Frame Embroideresses, Decorative and House painters, Glass painters, Photographers (Drawing). Courses last for 3 years in most cases, for 4 years in the case of Typesetters, Bookprinters and Lithographers.

Apprentices attend usually 4 hours weekly for either theory or practice. They may attend either day or evening classes.

Day Courses (General Class and Vocational Courses) are provided daily from 8 to 12 and 2 to 5 except Saturday afternoons.

Evening Classes are held every evening from 7 to 9 except Saturday.

In addition to the fully equipped workshops, there are the collections and library of the Industrial Museum, the copies and models for various branches of instruction, the collection of plaster casts, and living models. Pupils also have access to the Swiss National Museum and the Botanical Garden.

Competitions are held in each Section at intervals, and at the close of the year there is an exhibition of pupils' work. Prizes of books and copies are awarded to the 3 most successful competitors.

## IN CLOSE TOUCH WITH OCCUPATIONS.

This school seemed to be fully imbued with the vocational spirit and aims. It does not prepare for admission to the Polytechnic School.

Great attention is paid to drawing direct from the real object, and not from copies. As an example, one of the students who was to make a drawing of a cat, was required to have the cat on the table and to draw it direct from life.

The Director expressed the opinion that in the case of some of the pupils, when they realize that they can make good drawings, they decide that they should not continue at practical manual work. Repeatedly he had found that, when the making of drawings was separated from the making of the thing which the drawing represented, the young men were disposed to get away from skilled constructive occupations and to get into the drawing office.

Courses are given for Masters and Assistants for workshops.

High-grade mechanics assemble at this school occasionally from the various trades represented in the several departments of the school, and discuss new processes applicable to their several trades. A good laboratory is provided.

The Director's opinion is that the trend of development will be in the direction of making the workshops and schools more general and less specialized for the particular industries. He thought there would be great benefit to the community if men from different occupations came together on work of a general character, rather than on work only or chiefly specializing on the occupation.

#### EXHIBITIONS AND MOVING PICTURES.

The School seeks to develop an appreciation of art and to educate the public taste, by an exhibition of work in the exhibition rooms of the school. These are changed every month. The school also has a hall specially fitted up for giving cinematograph entertainments, showing costumes, etc. They have found this to be a very effective method of developing public interest. The best features or exhibits of the monthly exhibits are shown in a room. A charge of half a franc is made to see those exhibits, and the same charge admits to the cinematograph entertainment. The Director said the hall was filled every time they had it open for entertainment and instruction by the cinematograph. The subjects of most of the films used are industrial, art, costumes, pottery, wood carving, processes of silk making, interior of factories and travel. Films are also used to give illustrations of bacteriological subjects.

#### LIBRARY AND MUSEUM.

The Library and Museum are specially replete with documents and specimens appropriate to the work of the school. Specimens of all kinds of drawings and of all classes of illustrations done in Switzerland and other countries are available to the students. Examples of designs for embroidery filled cases on one side of the room, probably 30 ft. long by 9 ft. high. They were filed away in a manner similar to the vertical system of filing documents. An estimate was that there would be no less than 50,000 specimens in that collection.

### SECTION 3: INDUSTRIAL ART SCHOOL AT GENEVA.

This School, which was organized in 1909, is a school of apprenticeship for trades, industrial arts, construction and civil engineering, mechanical and electro-technical industries. It also admits pupils who are already apprenticed as outside pupils to classes pertaining to their occupation.



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The School was formed by amalgamation of the Technikum, the School of Trades, the School of Industrial Arts, and the Mechanics' School. Instruction is theoretical and practical, the aim being to train intelligent and efficient workers for the industries and art industries named. There are 5 Departments, viz.:—

- A. Industrial Department.
- B. Industrial Art Department.
- C. Construction and Civil Engineering Department.
- D. Mechanics Department.
- E. Applied Mechanics and Electro-technical Department.

## A. INDUSTRIAL DEPARTMENT.

This Département trains apprentices for the following trades: carpenters and joiners, locksmiths, tinsmiths and plumbers, masons and stone-cutters (theoretical course), cabinet-making and carriage-building. Graduates have no difficulty in finding employment, and are qualified to rise to high positions in their respective occupations. The equipment is of the best, including collections and a library well stocked with models and reference works. Pupils also visit works and industrial establishments.

The entrance qualification is age 14 and a good elementary education. No fees are charged to Swiss citizens, but foreigners pay \$5 annually. Occasional pupils pay 40c. a term per hour's lesson. All apprentice pupils are insured against accident. Sons of foreigners resident in the Canton may obtain an exemption if unable to pay fees, and scholarships are available for Swiss pupils. Prizes of tools, etc., are awarded during the course, and pupils receive a diploma on completing it.

The School does its best to find positions for its graduates, by keeping in touch with industrial employers.

## STUDY PLAN.

*1st year.*—(Same course for all trades)—Arithmetic and Geometry, Drawing and Technical Drawing, Projections, French, Gymnastics. 16 hours weekly.

Special Courses—Drawing and Construction for the respective trades. 2 to 4 hours.

During the summer term, 38 hours a week are spent in the workshop; during the winter term, 32 hours a week.

*2nd year.*—(Same course for all trades)—Geometry, Correspondence, Technology (part of year), Gymnastics (optional). 2 hours each.

Special Courses for the respective trades. 4 to 8 hours weekly.

During the summer term, 37 hours are spent in the workshop; during the winter term, 31.

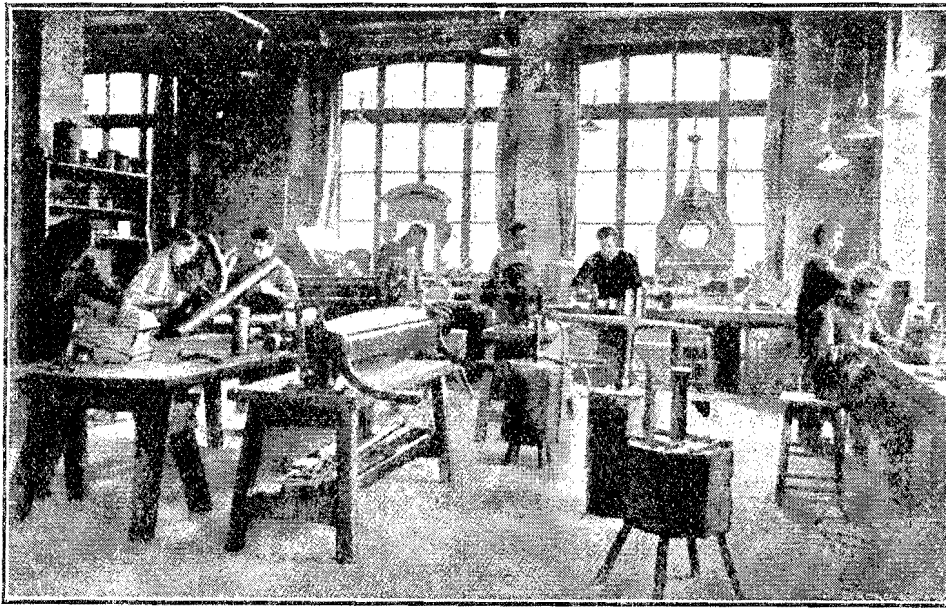
*3rd year.*—(Same course for all trades)—Correspondence and Gymnastics (optional). 2 hours each.

Special Courses for the respective trades. 2 to 6 hours weekly.

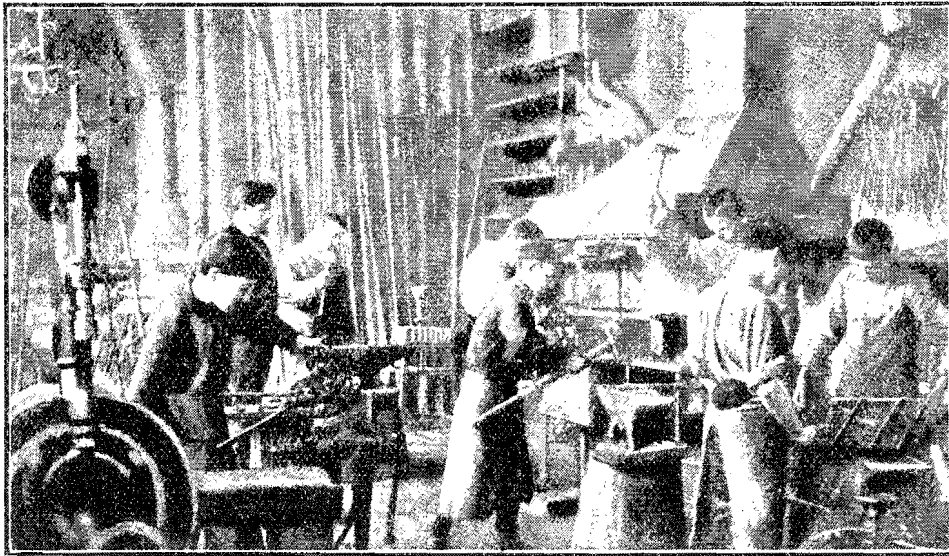
Workshop 39 hours in summer and 33 in winter.

## B. INDUSTRIAL ART DEPARTMENT.

This Department aims at turning out, not artists in the usual sense of the word, but *artistic workmen* and artisans, for the decorative art industries. Pupils take the training for their chosen trade, or for general art culture. The trades prepared for are decorative painters, ceramic workers, enamel painters, jewelers, goldsmiths, engravers, stone-sculptors, wood-carvers, iron-workers, moulders.



TINSMITHS' AND PLUMBERS' WORKSHOP: INDUSTRIAL ART SCHOOL AT GENEVA.

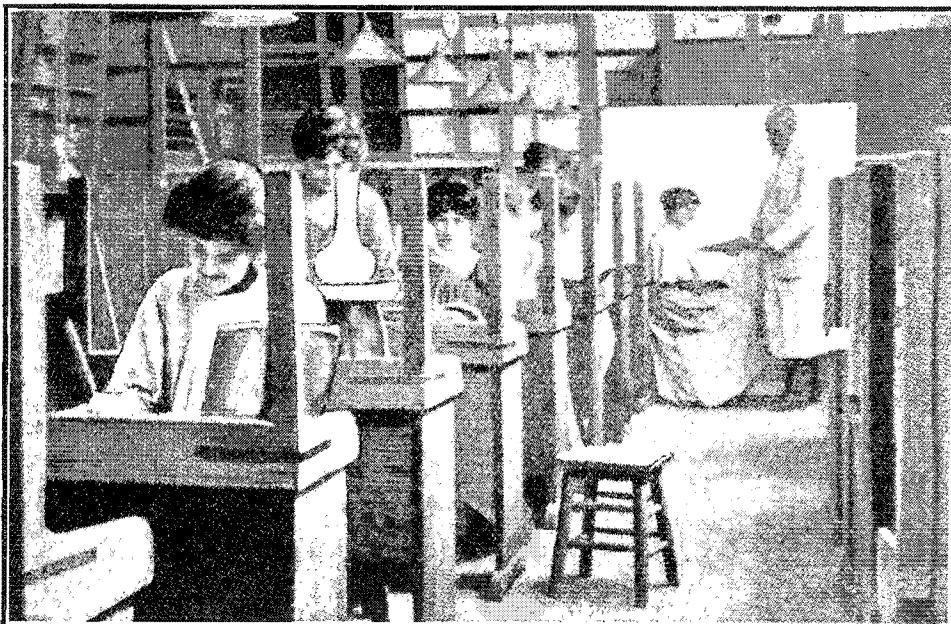


IRON WORKING SHOP: INDUSTRIAL ART SCHOOL AT GENEVA.

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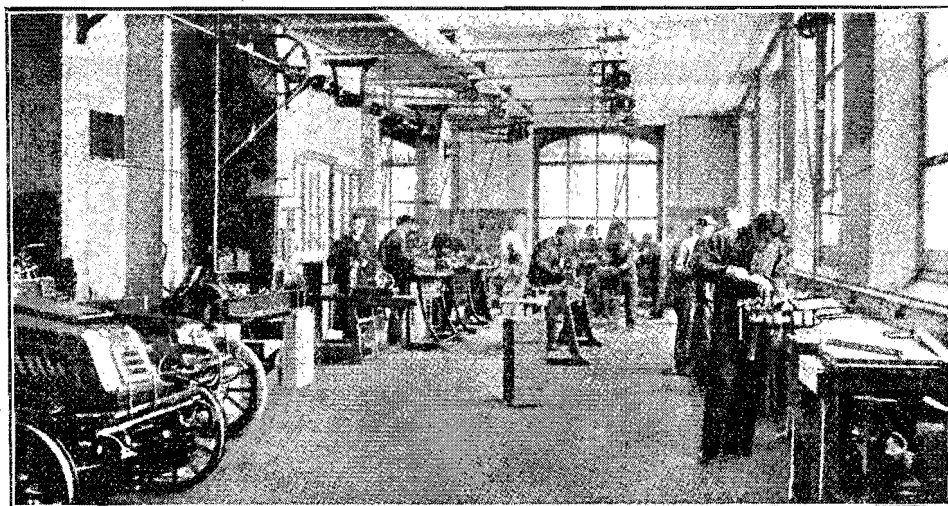


JEWELERS' WORKSHOP: INDUSTRIAL ART SCHOOL AT GENEVA.

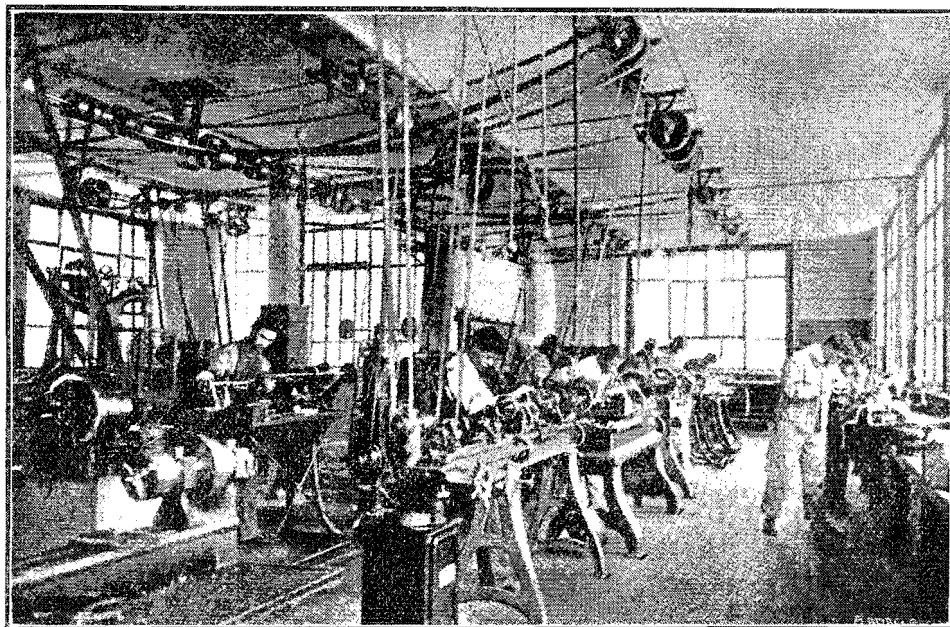


CERAMIC WORKSHOP: INDUSTRIAL SCHOOL AT GENEVA.

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MECHANICS' (FITTERS') WORKSHOP: INDUSTRIAL ART SCHOOL AT GENEVA.



MECHANICS' WORKSHOP: INDUSTRIAL ART SCHOOL AT GENEVA.

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There are two classes of pupils, regular and extra, the former taking the complete course, the latter attending some lessons only. Regular pupils must be 14 years of age, of educational attainment equivalent to the 6th year of a primary school, and have a fair knowledge of drawing. Pupils not having the necessary qualifications are not admitted as regular students until they have acquired them.

No fees are charged to Swiss pupils; regular foreign students pay \$5 per year; extra pupils pay 20c per term or 40c per year for one-hour lessons. All pupils are charged \$1 per year for materials. Pupils are insured against accident. Tools and appliances for workshop and class instruction, materials and special accessories are furnished by the School, pupils paying for their small requirements and articles needed from time to time. Needv and deserving foreign pupils residing in the canton may be exempted from payment of fees, and Swiss pupils can obtain scholarships. Certificates are awarded on the completion of the course.

In connection with this Department there is a library, a botanical garden for nature-study and drawing, furnaces for enamelling and ceramic work (these being also at the disposal of the public), and a museum of plaster casts.

This collection of models is lent out at reasonable rates by the school to artists, industrialists, schools, and others, carriage paid. Lectures are held on art and industrial subjects, and students visit museums and collections in the city, industrial establishments and works of various kinds.

## STUDY PLAN.

## Workshops.

|   |          | Hours<br>Weekly. |
|---|----------|------------------|
| Decorative Painting.....                    | 10 terms | 22               |
| Ceramics.....                               | 10 "     | 22               |
| Painting on Enamel and Enamelling.....      | 10 "     | 22               |
| Engraving, Chasing, Jewelry, Goldsmithing.. | 10 "     | 22               |
| Sculpture in Stone.....                     | 8 "      | 22               |
| Wood-Carving.....                           | 8 "      | 22               |
| Art Iron-Work.....                          | 8 "      | 22               |
| Plaster Moulding.....                       | 8 "      | 22               |
| Imitating old metals.....                   |          | 1 to 2.          |

## General Courses.

|   |    |
|---|----|
| Elementary Architectural Drawing.....     | 12 |
| Ornamental and Conventional Drawing.....  | 12 |
| Figure and Decorative Figure Drawing..... | 12 |
| Ornament and Composition.....             | 12 |
| Modelling (figure and ornamental).....    | 12 |
| Gymnastics (optional).....                | 2  |

The general courses, with the exception of gymnastics, are taken by all pupils, alternating month by month.

## C. CONSTRUCTION AND CIVIL ENGINEERING DEPARTMENT.

This Department has a 3 years' course, and prepares technical men for the industries, building, public works, etc.

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The conditions for admission are, age 15 and 2 years' attendance at a Vocational School or the 5th class of Geneva College. Entrance examinations are held, comprising French, Arithmetic and Algebra, Geometry and Technical Drawing Classes. are taught by specialists, and visits paid to museums, libraries, works, etc. Pupils not wishing to take the complete course may obtain the diploma of "Technician of the Construction and Civil Engineering Section."

No fees are charged to Swiss subjects. Foreigners pay a registration fee of \$15 per term.

The regulations as to exemptions and scholarships are the same as in the other departments.

Lessons are given at engineering works and at works in process of construction, and special courses are held on industrial law and protective legislation by experts in these subjects.

## STUDY PLAN.

*First Year.*

| <i>1st term.</i>               | <i>Hours<br/>Weekly.</i> | <i>2nd term.</i>              | <i>Hours<br/>Weekly.</i> |
|--------------------------------|--------------------------|-------------------------------|--------------------------|
| Algebra.....                   | 6                        | Algebra.....                  | 6                        |
| Mechanics.....                 | 4                        | Mechanics.....                | 2                        |
| Geometry.....                  | 6                        | Geometry.....                 | 6                        |
| Descriptive Geometry.....      | 4                        | Descriptive Geometry.....     | 6                        |
| Physics.....                   | 4                        | Physics.....                  | 4                        |
| Composition, Correspondence... | 2                        | Composition, Correspondence.. | 2                        |
| Civil Engineering.....         | 2                        | Civil Engineering.....        | 4                        |
| Construction, Drawing.....     | 16                       | Construction, Drawing.....    | 14                       |
| <b>Total.....</b>              | <b>44</b>                | <b>Total.....</b>             | <b>44</b>                |

*Second Year.*

| <i>3rd term.</i>               | <i>Hours<br/>Weekly.</i> | <i>4th term.</i>  | <i>Hours<br/>Weekly.</i> |
|--------------------------------|--------------------------|---|--------------------------|
| Algebra.....                   | 3                        | Algebra.....  | 2                        |
| Mechanics.....                 | 3                        | Geometry.....   | 2                        |
| Chemistry.....                 | 2                        | Technology.....   | 4                        |
| Resistance of Materials.....   | 4                        | Resistance of Materials and<br>Applied Graphic Statics..... | 8                        |
| Elementary Graphic Statics.... | 2                        | Civil Engineering.....                                      | 4                        |
| Civil Engineering.....         | 8                        | Construction, Drawing.....                                  | 16                       |
| Construction, Drawing.....     | 10                       | Workshop Practice.....                                      | 8                        |
| Workshop Practice.....         | 12                       |   |                          |
| <b>Total.....</b>              | <b>44</b>                | <b>Total.....</b>   | <b>44</b>                |

*Third year.*

| <i>5th term.</i>                                    | <i>Hours<br/>Weekly.</i> | <i>6th term.</i>                | <i>Hours<br/>Weekly.</i> |
|---|--------------------------|---------------------------------|--------------------------|
| Mensuration.....                                    | 6                        | Civil Engineering and Exercises | 20                       |
| Legislation.....                                    | 2                        | Construction, Drawing.....      | 24                       |
| Graphic Statics and Resistance of<br>Materials..... | 8                        |                                 |                          |
| Civil Engineering.....                              | 10                       |                                 |                          |
| Construction, Drawing.....                          | 18                       |                                 |                          |
| <b>Total.....</b>                                   | <b>44</b>                | <b>Total.....</b>               | <b>44</b>                |

Gymnastics, 2 hours weekly, optional for all students.

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## D. MECHANICS' DEPARTMENT.

The aim here is to train skilled workmen, who will be thoroughly familiar with their trade, and have sufficient technical knowledge to be able to take up the various branches of their work, and to rise to superior positions.

Apprenticeship lasts 3 years. The instruction is theoretical and practical, covering 54 hours a week, of which about 14 are devoted to Elementary Mathematics, Technical Drawing, Mechanics, and Elementary Physics, Electricity and Chemistry as required in the industry. The remainder of the time is given to practical work.

Attention is given not only to the manual and technical instruction of the pupils, but to the development in them of the qualities necessary in a good workman, and of healthy habits. A young man must not only be able to use his tools well, but must learn to work quickly and carefully, and to spend his time usefully, being careful as to his language and conduct.

The sub-committee of this Section, composed of well-known industrialists, examines the pupils' work each month, and sees that the instruction given is in accordance with the needs of the industry.

In addition to the annual examinations, pupils on the conclusion of their course may take the Apprenticeship Examination of the Department of Commerce and Industry.

Pupils graduating from this Section soon find good positions, and rise to comparatively high places in their occupations, which is satisfactory evidence of the efficiency of the school. The Committee spares no pains in improving and modifying the programme, or in insuring comfortable conditions for the students. The workshops are large and well ventilated, and equipped with the latest appliances, which are renewed annually, so that pupils are always up-to-date.

Students in this Section who have completed their apprenticeship may continue their course in the section of Applied Mechanics and Electro-technics, to the second year of which they are admitted without examination.

Intending students in this Section must be fully 14 years of age, and be able to pass an examination in the following subjects: French, Algebra, Geometry, Mechanics, Technical Drawing. Pupils graduating from the second year of the Vocational School or from the 5th class of the College are admitted without examination. In exceptional cases, pupils with practical experience may be admitted to higher classes, provided they pass the necessary examination.

There are no fees for Swiss pupils. Foreigners pay \$3 a month, and all pupils pay \$4 a year for materials and appliances. Outside pupils attending classes pay 75c a year for a one-hour lesson per week. All the more expensive materials are provided by the school, but pupils have to furnish their own exercise books, compasses, drawing board and T-square—total expense about \$1.50, which suffices for the whole course. Pencils and pens, ink and drawing paper amount to not more than 10c monthly. All pupils are insured by the State against accidents.

Regulations for exemptions and scholarships are the same as in other Sections.

The pupils in the various classes make complete sets of tools of the value of about \$24 a set. Pupils whose conduct is satisfactory and who complete their



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three years' apprenticeship, are allowed to keep a set for their own personal use. There are about 60 pieces in each set.

Second and third-year pupils are permitted to use books in the library, and under certain conditions to take them home. Third-year pupils also visit industrial establishments, central stations, or other installations.

Diplomas are awarded in each branch to pupils whose progress and conduct are satisfactory.

## STUDY PLAN.

| <i>Branches.</i>                      | <i>1st year.<br/>Hours<br/>Weekly.</i> | <i>2nd year.<br/>Hours<br/>Weekly.</i> | <i>3rd year.<br/>Hours<br/>Weekly.</i> |
|---------------------------------------|--|--|--|
| Algebra.....                          | 2                                      |  |  |
| Mechanics.....                        | 2                                      | 3                                      | 4                                      |
| Geometry and Resistance.....          | 3                                      | 2                                      |  |
| Physics.....                          |  | 2                                      | 1                                      |
| Chemistry.....                        |  | 1                                      | 1                                      |
| Electricity.....                      |  |  | 3                                      |
| Drawing.....                          | 6                                      | 6                                      | 6                                      |
| Workshop Practice.....                | 41                                     | 40                                     | 39                                     |
| Total.....                            | 54                                     | 54                                     | 54                                     |
| Gymnastics (optional) 2 hours weekly. |  |  |  |

## E. APPLIED MECHANICS AND ELECTRO-TECHNICS DEPARTMENT.

The aim of this 3 years' course is to train competent assistants to engineers and directors in the planning of projects, the direction and supervision of construction or exploitation works, and mechanical and electrical undertakings. On leaving the school they possess the knowledge necessary to enable them to become designing-constructors, head installators, managers, etc.

Intending pupils must be fully 15 years of age, and have attended the Vocational School for 2 years, or the 5th class of Geneva College, or failing these are required to take an examination. The course covers 6 terms, and the greater part of the instruction is of a general character, though 8 hours a week are taken in the workshops. Visits are paid to industries in the neighbourhood, and even further afield in the Canton and in other countries.

The course is divided into three sections, corresponding to the three years, as follows: Preparation, Development, Application. The aim is not to overload the pupil with knowledge imperfectly assimilated, but to train him to use the knowledge acquired, to work, reason and discover for himself. It requires fully 3 years for boys of 15 to be developed sufficiently before they leave the school to enable them to occupy positions which demand thorough technical training and responsibility.

On the conclusion of the third year, pupils whose attainments justify it may sit for an oral examination for the Diploma of the Section of Applied Mechanics and Electro-technics.

The pedagogical control and supervision of the instruction is undertaken by an official whose duty it is to keep in touch with the parents or guardians of the pupils and to report on the progress made.

The entrance examination comprises French, arithmetic and algebra, geometry, technical drawing. Candidates wishing to enter higher classes must pass an examination accordingly.



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No fees are charged to Swiss pupils. Foreigners pay \$15 a term, and all pupils contribute \$10 a term for materials and appliances. Pupils are insured against accident by the State. The same arrangements for exemptions and scholarships apply as in the other Sections.

There is a Library containing 1,100 volumes attached to this Section, available for 2nd and 3rd year pupils, either at the library or at home. Visits are paid to industrial establishments and lectures on general and technical subjects are held, legislation and protective measures being dealt with by experts.

Pupils desiring to continue their technical studies in Engineering Schools or at the University can prepare for the examinations here, or may attend the College of Geneva for that purpose.

TIME TABLE.

| <i>First Year.</i>                  |                      |                                     |                      |
|-------------------------------------|----------------------|-------------------------------------|----------------------|
| <i>1st term.</i>                    | <i>Hours Weekly.</i> | <i>2nd term.</i>                    | <i>Hours Weekly.</i> |
| Algebra.....                        | 6                    | Algebra.....                        | 6                    |
| General Mechanics.....              | 4                    | General Mechanics.....              | 2                    |
| Geometry.....                       | 6                    | Geometry.....                       | 6                    |
| " Descriptive (theory)...           | 2                    | " Descriptive (theory)...           | 4                    |
| " (application).....                | 2                    | " (application).....                | 2                    |
| Physics.....                        | 4                    | Physics.....                        | 4                    |
| Industrial Chemistry.....           | 2                    | Industrial Chemistry.....           | 2                    |
| Composition and Correspondence..... | 2                    | Composition and Correspondence..... | 2                    |
| Applied Mechanics:                  |                      | Applied Mechanics:                  |                      |
| Theory, Exercises.....              | 6                    | Theory, Exercises.....              | 8                    |
| Workshop Practice:                  |                      | Workshop Practice:                  |                      |
| (wood).....                         | 8                    | (wood).....                         | 4                    |
| " (iron).....                       | 2                    | " (iron).....                       | 4                    |
| Total.....                          | 44                   | Total.....                          | 44                   |

| <i>Second Year.</i>          |                      |                              |                      |
|------------------------------|----------------------|------------------------------|----------------------|
| <i>3rd term.</i>             | <i>Hours Weekly.</i> | <i>4th term.</i>             | <i>Hours Weekly.</i> |
| Algebra.....                 | 3                    | Algebra.....                 | 2                    |
| Geometry.....                | 3                    | Geometry.....                | 2                    |
| Graphic Statics.....         | 2                    | Physics.....                 | 2                    |
| Physics.....                 | 4                    | Industrial Chemistry.....    | 4                    |
| Industrial Chemistry.....    | 4                    | Resistance of Materials..... | 2                    |
| Resistance of Materials..... | 4                    | Electro-technics:            |                      |
| Electro-technics.....        | 2                    | Theory, Exercises.....       | 8                    |
| Applied Mechanics:           |                      | Applied Mechanics:           |                      |
| Theory, Exercises.....       | 12                   | Theory, Exercises.....       | 16                   |
| Workshop Practice.....       | 10                   | Workshop.....                | 8                    |
| Total.....                   | 44                   | Total.....                   | 44                   |

| <i>Third Year.</i>     |                      |                        |                      |
|------------------------|----------------------|------------------------|----------------------|
| <i>5th term.</i>       | <i>Hours Weekly.</i> | <i>6th term.</i>       | <i>Hours Weekly.</i> |
| Legislation.....       | 2                    | Electro-technics       |                      |
| Electro-technics:      |                      | Theory, Exercises..... | 14                   |
| Theory.....            | 19                   | Applied Mechanics:     |                      |
| Applied Mechanics:     |                      | Theory, Exercises..... | 24                   |
| Theory, Exercises..... | 17                   | Workshop.....          | 6                    |
| Workshop.....          | 6                    | Total.....             | 44                   |
| Total.....             | 44                   |                        |                      |

Gymnastics, 2 hours weekly, optional for all students.

## EXTRACTS FROM OFFICIAL REGULATIONS.

## THE SCHOOL COUNCIL.

The general direction and administration of the School is confided to a director who is in touch with the needs of local industries and possesses the necessary general, technical and artistic knowledge. He is assisted by a secretary-accountant.

The pedagogic control of each Section is in the hands of an official appointed for that purpose, who is responsible for the discipline and supervision of instruction. These officials are selected as far as possible from among the professors and workshop foremen.

The Director and aforementioned officials form the School Council, which meets at least once a month, and is presided over by the Councillor of State appointed by the Department of Public Instruction, or in his absence by the Director. The minutes of all meetings are to be kept by the Secretary-Accountant.

## SUPERVISING COMMITTEE.

The School is placed under the supervision of a Committee which has to advise on all questions of general interest to the establishment, submitted by the Department or one of its own members, especially on rules, programmes, methods of instruction, organization and management of workshops, scope of examinations, etc.

The Supervising Committee must include industrialists, artisans, artists and workmen. It is appointed for 3 years, and consists of 30 members, 10 being appointed by the Grand Council, 10 by the Council of State, and 10 by the Central Commission of the Board of Arbitration. The Committee must meet at least once a term, and may do so at any time that the President thinks fit, or five members demand it. It is divided into 5 sub-committees, each of which has charge of one section of the school. Each sub-committee appoints its own president and secretary, and controls the instruction given, and particularly the workshop courses, in its own section. It may call upon the Director, supervisors or heads of workshops to assist in its deliberations, and the latter may appeal to it if they wish. Members of the committee may visit the classes and workshops at any time, decide upon the courses and attend at the examinations.

## THE TEACHING STAFF.

Instruction is given by professors and workshop instructors. All are to meet periodically to discuss the affairs of their respective departments, and minutes of the meetings are to be sent to the Department of Public Instruction as soon as possible. Meetings are called by the Director when he thinks fit, or by the demand of one-third of the staff.

## WORK AND PAY OF THE STUDENTS.

The courses in this school take the place of apprenticeship to an ordinary master. The products of the work of the students are sold. The Director

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said, "I find it better to make machines to sell to the trade than to make them for our own use, because it brings our work up to a commercial trade standard."

In the division of Joinery, as a rule during the first year the students do not receive any part of the revenue from the products of their work. In the second year they receive one-third of what comes in from the products they have made, and in the third year they receive half of what comes in from the products they have made. In this division also the students sometimes work during the third year outside the school itself with a master joiner.

When the apprentice students leave the school and go to work, the opinion is that they do not work as fast as those who have been trained in commercial workshops, but that they are so much better instructed that they soon make greater progress. After they graduate, they are accepted into the trades unions and receive journeymen's wages.

#### STUDENTS TRAINED TO OBSERVE AND TO SERVE.

In the Industrial Art Department great care is taken to develop good taste, to make students go to Nature and Geometry for the originals of their sketches for designs. As one of the masters said, skill comes through observation and not through mechanical training. Much attention is given to Modeling in clay as well as Drawing.

In the Construction and Civil Engineering Department students are given projects to work out. Part of the final examination consists in a student, having received a certain amount of data, planning, designing, drawing and specifying all particulars, such as those for a steam engine or some other mechanical project.

In this Department also, before the students in Architecture graduate, each one is required to design and make drawings, and prepare specifications fully for a villa proposed to be erected on a site which has been assigned to the student in connection with this study.

In this Department boys of the first and second years do some routine work for the students of the third year, as for example, in coloring and tracing of plans. This experience is held to be good for both sets of students.

### SECTION 4: THE TECHNIKUM AT WINTERTHUR.

The Technikum in Switzerland is an institution similar to the Middle Technical Schools of Germany. The one at Winterthur may be taken as typical of the others. The instruction is chiefly theoretical. Liberal use is made of models and apparatus and appliances to illustrate principles and their application.

Intending students are requested to do practical work for one year before entering the school. If they have not done that, they may attend the course for one year and then do practical work in a shop for one year. As a matter of fact, the students who attend have in most cases completed their apprenticeship and done two or three years' practical work. Some of the students observed were at least 30 years of age.

The Technikum does not carry students as far as the Federal Polytechnic School. Seventy-five per cent of those who take the courses enter upon occupations; 25% continue their studies at the Federal Polytechnic.

The Technikum is controlled by the Canton, and receives grants for its maintenance to the extent of about 50% of the annual cost from the Federal authorities. The Federal grants are made specially for the School of Commerce and the Railway Officials' Department. About one-fourth of the 600 pupils in attendance receive free instruction, and some of them receive maintenance allowances from Cantonal sources.

The aim of the school is to train middle-grade employees in the theory and practice pertaining to their occupation. There are eight Departments, as follows:—Building, Machinery, Electro-technics, Chemistry, Industrial Art, Geometry and Surveying, Commerce, and Railway Work. The Machinery, Electro-technics, Chemistry, Geometry and Commerce courses cover 6 terms of 6 months each; the Building and Industrial Art 5 terms of 6 months each, and the Railway Class 4 terms of 6 months each. The 1st, 3rd and 5th grade of all departments is taken in the summer, the 2nd, 4th and 6th in the winter, except in the Building Department, which goes on all the year round.

#### THE BUILDING DEPARTMENT.

Students in this Department are trained in planning, calculations, execution and management of all civic buildings, and may also become architectural designers, building managers and building masters.

#### THE MACHINERY DEPARTMENT.

The main object of this Department is to train machine technicians who can take a position between that of a mere designer and that of a managing engineer in construction offices. They learn enough theory to place them above the purely practical worker, and to enable them to rise to higher positions. Industrialists who wish to instal machines in their works can here learn how to manage them, and special courses are offered in spinning, weaving and heating.

#### THE ELECTRO-TECHNICAL DEPARTMENT.

Men are trained for every branch of electro-technical work—construction, planning and managing installations, technical laboratory assistants, etc. Whilst general machine construction is studied, the men whose work will be in mixed industries are also considered.

#### THE CHEMISTRY DEPARTMENT.

Practical chemists for all branches are trained here, and after the general preliminary course necessary for all chemical industries, special courses are given for those wishing to take up bleaching, dyeing, finishing, printing, etc. Those students who will require a knowledge of machinery, as in cement, brick and paper factories, and in tanning works, are recommended to take the machinery and chemical courses consecutively.

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## THE INDUSTRIAL ART DEPARTMENT.

Industrial Drawing and Modeling are studied, with auxiliary departments in special subjects. Decorators, sculptors and wood-carvers come here for practical work, and a thorough preparation is given to those requiring advanced industrial art.

## DEPARTMENT OF GEOMETRY AND SURVEYING.

This Department is especially intended for surveyors, and prepares for the Government examinations. Theory and practice are taught on the lines laid down in the official programme, and students learn to lay out simple roads, streets, landscape architecture, drainage and water plants, and to qualify as technical agricultural surveyors.

## THE COMMERCIAL DEPARTMENT.

As this Department prepares for commercial careers, languages and arithmetic are emphasized. Political economy is taught, so that the modern merchant may understand the conditions of his business. There is a special course in merchandise, with laboratory work. Those expecting to take positions in the Post Office are recommended to attend this Department.

## THE RAILWAY DEPARTMENT.

This Department prepares officials for the railway service, and most of the pupils who attend are employees of the State Railway Department. The course is one of two years. The general education given is more advanced than that of the ordinary Secondary School, and special instruction is offered in addition. Railway apprentices who have taken this course are exempted from examination, and their apprenticeship is shortened to one year. As railway apprentices must be 17, this course fills the gap between Secondary School and apprenticeship.

## RELATION OF COURSES TO PRACTICAL WORK.

As this institution does not profess to give purely practical training it is advisable for young men attending the Building, Machine and Electro-technical Departments to have had a period of apprenticeship before entering, or failing this, to take it after the first two terms. The classes are so arranged that practical work can be taken in summer and theory in winter. Students in the Machine and Electro-technic Departments are advised to take their apprenticeship first, or the following arrangement may be made:—after three years at the Secondary School, the first two classes of the Technikum may be taken, then apprenticeship in a workshop or trade school, and finally the advanced instruction in the 3rd to 6th classes of the Technikum.

The one-year course at the Metal-Workers' School in Winterthur, consisting entirely of practical work, can be taken in conjunction with the second term at the Technikum, although the two schools are not connected in any way.

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Students in the Industrial Art Department should have taken one year's practical work before entering.

In the Geometry Department no practical experience is demanded, but 2 years or so should be taken after the fourth term, as students will then be better prepared for the work of the last two terms, and will have attained the necessary age of 18 for taking the examination.

#### ENTRANCE REQUIREMENTS AND FEES.

An entrance requirement for all departments is age of 15. No examination is required of those coming from the 3rd class of a Secondary, Real or District School.

The fees are \$6 a term, plus registration fee and a contribution towards the upkeep of the collections; also laboratory fees where laboratory is used. Outside students taking single courses or classes pay 40c. per lesson and 40c registration. Foreigners are charged double fees. Bursaries and free places are available.

The subjects included in the entrance examination are German, French (for commercial and railway departments), arithmetic, algebra and geometry.

#### SUBJECTS.

*Building Department.* German, arithmetic, algebra, geometry, physics, chemistry, linear drawing, freehand drawing, modeling, building construction and drawing and ornamental drawing, mineralogy and geology, ornamental modeling, stone cutting, calculations, heating and ventilation, water installation, book-keeping.

*Machinery Department.* German, arithmetic, algebra, geometry, physics, chemistry, machine drawing, freehand drawing, mechanics of construction, materials, statics, elements of machinery, dynamics, graphic statics. Optional—spinning and heating.

*Electro-technical Department.* German, arithmetic, geometry, geometrical drawing, physics, chemistry, machine and freehand drawing, materials, statics, mechanics, construction, power machines.

*Chemistry Department.* German, arithmetic, algebra, geometry, linear drawing, freehand drawing, physics, inorganic chemistry, analytical chemistry, technical drawing and sketching, mineralogy and geology, technical chemistry, machinery, bleaching, dyeing and printing, microscope work, laboratory work, agricultural chemistry, book-keeping.

*Industrial Art Department.* German, arithmetic, linear, ornamental and plant drawing, projections, architectural drawing, figure drawing, anatomy, technical drawing, modeling, style.

*Geometry and Surveying Department.* German, arithmetic, mathematics, physics, chemistry, linear and freehand drawing, plant drawing, descriptive geometry, geography, mineralogy and geology, surveying, agriculture, botany, building and materials, building mechanics, construction, plans and maps, technical arithmetic, agricultural chemistry, hydraulics, water installations, canals, French.

*Commercial Department.* German, French, English, Italian, history of commerce and civilization, commercial geography, arithmetic, book-keeping, correspondence, algebra, physics, chemistry, writing, stenography, foreign correspondence, commerce, political economy, merchandise, commercial law. Spanish is optional.

*Railway Department.* German, French, Italian, arithmetic, geography, physics, merchandise, stenography, railway law, transport service, telegraphy, internal and external service, first aid, currency, and prices. English is optional.

#### GENERAL NOTES.

Optional courses are held for students and visitors in languages, German literature, constitutional law and physical training.

In the summer term of 1910 there were 599 pupils in all Departments, in the winter term, 615.

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The building and other technical department students visit various works and industrial establishments.

The school has a library, a physics collection, and extensive collections of models for the various departments.

### THE INDUSTRIAL MUSEUM, WINTERTHUR.

This Museum is visited by students of the Technikum and by the general public. It consists of collections of industrial art objects, literature, reference works, etc. The value of the machinery exhibit is estimated at about \$7,000 and that of the industrial art exhibit at \$900.

Exhibitions are held of the work of students of the Continuation Schools and Metal Workers' School, and of apprentices' work for examination by the Cantonal authorities. Other exhibitions are held from time to time, and various courses of instruction for masters and others are arranged, for evenings and Saturdays, covering from 2 to 10 or more lessons. Objects are lent from the collections for inspection and copying, and maps are circulated among groups of students. The lending library was patronized by over 7,000 people in 1910.

### SECTION 5: THE TECHNIKUM AT BIENNE.

This establishment is under the administration of the Canton. The annual budget is \$50,000. There are 32 professors and 6 supplementary professors. The attendance was 340 students in the 8 sections or departments of the Technikum. It is similar in regard to its organization and courses to the Technikum at Winterthur already described. The departments are as follows: Mechanics, Electricity, Watchmaking, Architecture, Industrial Art, Engraving and Sculpture, Railways and Postal Service, and Preparatory Course.

The Railways and Postal Service Departments are equipped with all the apparatus in miniature that is used in these departments.

This Technikum is intermediate between the ordinary vocational or apprentice schools and the Federal Polytechnic School. The course covers 3 years, and is mainly theoretical, but closely connected with practical work. Men from this school take positions as foremen and superintendents.

Candidates for admission must have completed 9 years' attendance at a pro-gymnasium, or have served two years' apprenticeship. Pupils enter on probation for the first 3 months. The fees are \$10 per term, except in the Watchmaking and Mechanics Department, which cost \$2 per month. Foreigners pay \$14 and \$5 respectively. There is also a charge of \$1 per term for materials. Pupils who attend for lectures only pay 40c. per term for each course of 1 hour a week, or \$10 in all. Pupils may purchase articles made by them at cost price of materials.

Examinations are held at the end of each term, and diplomas awarded.

## SUBJECTS OF STUDY.

The subjects in the various departments are as follows:—

## I. MECHANICS.

A. *Upper Division* (for directors, foremen, etc.).

*1st term.*—French or German, English (optional), arithmetic, algebra, geometry, physics, chemistry, projection, freehand drawing, penmanship, and workshop practice.

*2nd term.*—French or German, English (optional), algebra, geometry, physics, chemistry, descriptive geometry, machine drafting, workshop practice.

*3rd term.*—Italian, algebra, geometry, descriptive geometry, physics, mechanics, theory of machines, technology, materials, machine construction.

*4th term.*—Italian, algebra, geometry, physics, mechanics, theory of machines, technology, graphic statics, strength of materials, construction of machines, electro-technical work, workshop practice.

*5th term.*—Mathematics, technical installation, (heat, motors, hydraulic, etc.).

*6th term.*—Mathematics, installation of heating plant, motors, theory of machines, general, estimation of cost, hygiene, factory laws, precautionary measures, etc., elevators, construction of machines, chemistry, kinematic geometry, electro-technical work, workshop practice (individual).

B. *Practical Division* (for metal workers).

## (a) THEORY.

*1st year.*—German and French, arithmetic, algebra, geometry, physics, chemistry, workshop technology, technical drawing.

*2nd year.*—German and French, algebra, solid geometry, physics, workshop technology, machine drawing.

*3rd year.*—Mathematics, mechanics, technology, machine drawing, book-keeping.

(b) PRACTICAL WORK in the Apprentice workshop (3 years).

## II. ELECTRICITY.

A. *Upper Division.*

*1st, 2nd and 3rd terms* the same as for Mechanics. *4th term* the same as for Mechanics, with more electro-technical work. In the *5th term* the same subjects down to chemistry, plus magnetism and electro-magnetism, laboratory work, mountings, construction of machines.

*6th term.*—Motors and mathematics, as for mechanics; Electro-magnetism, telegraph and telephone, laboratory work, electric railways, mounting plant, chemical laboratory.

*7th term.*—Mathematics, installation of works, plans for electrical outfits, machines and transformers, electrolysis, laboratory work.

B. *Courses for Electric Fitters.*

The same as for Mechanics and Electricians to the end of the 4th term.

*5th term.*—With electricians, elevators, and transportation machines (optional); applied chemistry, motors, electric technique, magnetism and electro-magnetism, installation, laboratory, fitting, theory and practice.

*6th term.*—With electricians, electro-dynamics, telegraphing and telephoning, dynamos, installation, motors, electric railways, electro-technical works, fitting, construction, drawing, laboratory work, alternating currents.

## III. WATCHMAKING.

Two languages, arithmetic, algebra, geometry, trigonometry, mathematics, physics, chemistry, cosmography, book-keeping, theory of watchmaking, mechanics, theory of regulating, technical drawing, letter engraving, electro-technics, practical work (about one-fourth of the whole time).

## IV. ARCHITECTURE.

Two languages, Italian (optional), arithmetic, algebra, geometry, trigonometry, physics, chemistry, caligraphy, geology and mineralogy, projection drawing, descriptive geometry, stone cutting, freehand drawing, architectural drawing, theory of construction, study of styles, nature of materials, mechanics, statics and strength of materials, practical work, land surveying, direction of works, legislation and hygiene, electro-technics, plans, book-keeping, perspective, modeling, wood joints, rural architecture, fire service, construction of machines, estimates, bridges and highways, embankments, hydraulic works, history of art and architecture, life-saving.

## V. INDUSTRIAL ART.

(A.) *Preparatory Course.*

Freehand drawing, linear and projection drawing, light and shade, architectural drawing, ornaments and figures, study of styles, practical work (21 hours a week the first term and 10 the second.)



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*(B.) Special Course.*

Perspective, vocational drawing, theory of ornamental forms, drawing from nature, drawing from living models, anatomy, work in chased leather (optional), modeling—plus the subjects of the Preparatory Course, except linear and projection and freehand drawing, and light and shade.

## VI. ENGRAVING AND SCULPTURE.

Freehand and technical drawing, perspective, theory of ornamental forms, drawing from plaster casts, calligraphy, industrial art drawing, study of styles, modeling, chemistry, anatomy, drawing of plants, drawing from living models, work in chased leather (optional), engraving and sculpture. More than half the time each week is devoted to practical work in engraving and sculpture.

## VII. RAILWAY DEPARTMENT.

Native language and one other, Italian, English (optional), geography, arithmetic, physics, chemistry, merchandise, calligraphy, stations and offices, signals, railway management, shipping, railway legislation, tariffs, service correspondence, telegraph service, practical work, practice in telegraphy, first aid, excursions in groups (about once a week).

## VIII. POSTAL DEPARTMENT.

Native language and one other, political economy, arithmetic, algebra, physics, chemistry, calligraphy, service correspondence, telegraphing, other subjects allied to postal service.

## IX. PREPARATORY COURSE. (1 year).

German or French, arithmetic, algebra, geometry, technical drawing, calligraphy.

## SCHOOLS FOR WATCHMAKING.

Throughout Switzerland there are also other schools for watchmaking and clockmaking. One of the schools visited was at Geneva. That school is maintained two-thirds by the Commune and one-third by the grant from the Federal authorities. There is no entrance examination. The Director takes some of the most promising young workmen from the shops and gives them special training. Pupils must be at least 15 years of age. The length of the course depends upon the aptitude of the pupils. It usually lasts from 3 to 6 years, depending not only upon the kind of work for which the student is preparing himself, but also on the extent of knowledge he desires to obtain. When pupils graduate from the school, they have no difficulty in obtaining situations. At the end of each year's work of the school, a certificate is granted, and then at the close of the period of training another certificate is awarded, containing a record of what the student has done in the previous years.

The annual budget of the Geneva School is \$13,000.

## CHAPTER LIX: THE FEDERAL POLYTECHNIC AT ZURICH.

This institution, which is really a Technical University, is one of the most renowned Polytechnic Schools, or Technical High Schools, of the world. It was magnificently equipped in the first place, and the equipment is constantly being added to.

### ENTRANCE CONDITIONS.

Candidates must be fully 18 years of age, and possess the graduation certificate of a recognized Swiss Middle School, failing which an entrance examination is required. Outside students may be admitted to lectures on passing the required examination. Students of Zurich University are admitted on presentation of entrance card. Older students may be admitted by arrangement, without complying with entrance requirements.

### DEPARTMENTS.

There are 8 Departments as follows:—

- I. School of Architecture,— $3\frac{1}{2}$  years' course.
- II. School of Civil Engineering,— $3\frac{1}{2}$  years' course.
- III. School of Mechanical Engineering,— $3\frac{1}{2}$  years' course.
- IV. School of Chemical Technology,—3 years' course in Technological Section,—2 years in Pharmacy course.
- V. Agricultural and Forestry Division,—
  - (a) Agricultural School—2 years;
  - (b) Agricultural Engineering School— $3\frac{1}{2}$  years;
  - (c) Sylviculture—2 years.
- VI. School of Special Teachers in Mathematical and Natural Science subjects,—
  - (a) Mathematical Section—4 years;
  - (b) Natural Science Section—3 years.
- VII. General Philosophy and State-Economy Division,—
  - (a) Mathematics, Physics, Natural Science and Technical subjects;
  - (b) Languages and Literature;
  - (c) History and Political Sciences, Art.
- VIII. Military Science Division,—
  - (a) Course for general students;
  - (b) Course for officers.

### AFFILIATED ESTABLISHMENTS.

The following establishments are affiliated with the Polytechnic, but managed and controlled apart from it:—

- (a) The Federal Experimental Institute in Materials and Construction—affiliated to Sections I, II, III.

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- (b) The Central Experimental Forestry Station—affiliated to Sylviculture Section.
- (c) The Federal Agricultural Experiment station for,—
  - 1. Agricultural Chemistry;
  - 2. Seed Control.
- (d) The Central Meteorological Station, less closely related to the school.

## AIMS OF THE SCHOOL.

The titles of the various departments sufficiently indicate their scope. From its establishment, the school has always endeavored to keep its character of Higher Technical School, and to give its pupils the highest possible scientific training for practical vocations by means of theory and practice combined. Modern conditions require specialists of a high order of intelligence for the solution of practical technical problems, and the aim of this school is to train such specialists.

The fundamental courses are the obligatory ones in pure mathematics, mechanics, physics and chemistry. These courses are uniform for all courses at the beginning, specialisation following later. The aim is to stimulate pupils to work for themselves and to assimilate the subjects intelligently, through combining practice with theory.

## ARRANGEMENT OF COURSES.

The general courses in History, History of Art, Literature, Modern Languages, Political Economy, Statistics, Swiss Constitution, Administrative and Commercial Law, Pure Mathematics and Aesthetics, are open to all students, who must attend them for at least one term, with a view to avoiding the separation of technical and cultural subjects, and insuring to all a certain standard of general education. The courses are divided into groups of related subjects, the first group consisting of Literature, History and Political Science, Philosophy and the Fine Arts; the second of Mathematics, Natural Science and their technical applications, with a wider scope than the special departments offer.

There are preparatory courses for some of the special sections, or for those students who merely wish to supplement their general education.

The Military Science Section was established and is maintained by the Federal Military Department, and its professors are separate from those in other departments. It is especially designed to train officers for the Swiss army.

Under the regulations of the school, professors may teach in either German, French or Italian. The native tongue of most of the students, and of the district in which the school is situated, being German, this is the predominant language of instruction; but as the school is national in its scope, French is largely used in addition to German, and in many of the principal branches professors of both nationalities are employed. The tendency is to combine the French with the German, each supplementing the other.

Teachers are of three classes, regular, assistant and honorary. Appointments are usually of 10 years for the regular teachers and indefinite for the other two classes. Salaries are paid partly from fees, and pensions are awarded.

## UNITED STATES.

### CHAPTER LX: THE ORGANIZATION AND ADMINISTRATION OF EDUCATION.

Education in the United States is so varied and diversified in organization, administration and method that nothing like a full or clear statement can be made within the limits of this Report. The Commission had the advantage of seeing representative schools and institutions for most of the several kinds of industrial training and technical education provided. A fairly complete report of the organization and courses of study in typical schools is presented.

The Commission had the advantage of "Conversations" with a number of very able men and women who have had experience in various fields of education, particularly in some form of vocational, industrial or technical instruction. In some cases the information derived from these "Conversations" has been put with the school or institution with which such person was connected. The Commission had also the advantage of "Conversations" with many other leading men and women in educational work in the United States. The choice of what to publish was made chiefly in consideration of the experience and the official position of the individual, and the appropriateness of the information given, or the opinions expressed, to the situation and conditions in Canada.

### SECTION 1: FROM REPORT OF THE COMMISSIONER OF EDUCATION.

By way of introduction, and to present a general survey of the whole field, the following extracts are taken from the Report of the U. S. Commissioner of Education for 1910:—

It is generally understood that we have in this country no national system of school administration. The primary responsibility for educational control rests with the several States. No one, I am sure, would seriously propose that the States be relieved of this responsibility or of the powers which accompany it. But the nation cannot be indifferent to that which forms the character of its citizens, upon which every national hope and aspiration depends. While we have no national system of schools, we have a national program of education. This program, in the nature of the case, must grow with our national growth, and every enlargement of our national power, resources, aims, and influence calls for a re-examination of our educational establishment to see whether it is keeping pace with the new requirements.

The annual reports of the Commissioner of Education are in effect a running account of the progress made by the nation in the carrying out of this educational program. But our aims become more definite as they are brought nearer to realization. So these reports are equally a record of the progressive definition of our program. While we seem to have gone forward rapidly in both the understanding and the performance of the work we have to do, it is pretty well agreed that in many particulars we are still laggard. This annual record of movements and events should not only clarify our aims but should concentrate attention upon those points where special endeavours are most needed.

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## AMERICAN EDUCATIONAL ORGANIZATION.

In this introductory chapter of my report for the year 1910, accordingly, a new attempt will be made to set forth some of the main features of the American educational program and to point out some of the places at which there is need of improvement.

Our educational organization, answering as it does our federal plan of government, presents peculiar advantages as regards the making of a varied, flexible, yet inherently unified system of instruction. It is an organization not readily understood by foreigners. It offers many obstacles to the carrying out of any plans for rapid and uniform improvement. Yet the self-governing character of its several members is of itself an incalculable advantage. Whatever unity is attained must be an inner unity, an agreement through conviction. There are a thousand forces working for unity and capable of giving us all of the unity that we need. To bring those forces to their finest influence, to do generously and effectively the things which under our form of organization may rightly be done, and by so doing to maintain through all the changes of history that national character which is to make us a unit of concentrated and uplifting influence among the nations—this is, in part, the work of American education.

Stated in briefest terms, the essential elements of our educational organization are the following: first, the school and university systems of the several States; secondly, the same State systems as united in free co-operation in matters of common educational interest; thirdly, the provision made by the Federal Government for the encouragement and furtherance of education under these State systems.

Such provision by the Federal Government has taken three forms: the granting of public lands for education in the several States, beginning shortly before the adoption of the Federal constitution and culminating in the grants for agricultural and mechanical colleges in 1862; the establishment in 1867 of the Federal Education Office which aids the States by its information service and furthers their co-operation; and finally, the distribution of Federal funds, under the oversight of the Bureau of Education, in aid of agricultural and mechanical colleges in all the States, under the acts of 1890 and 1907.

Other facts necessary to the most general understanding of our national organization of education are the following: That our public systems, which form the backbone of the educational provision in all of the States, are freely supplemented by institutions privately supported and privately managed; that we have been working out a peculiarly close integration of the several grades of education, elementary, secondary and higher; and that historically our education is in the main liberal and general in its character, instruction of a technical and professional sort being an offshoot from this central trunk.

If we add that in our educational activity we have shown ourselves hospitable in a marked degree to experiments, to incidental developments, and to all manner of popular extensions of the field of education, we have a fairly comprehensive statement of what American education has been and is endeavouring to be.

*Re* HIGHER EDUCATION, EVENING CLASSES, AND FELLOWSHIPS.

The democratic movement in higher education has taken definite form in several important administrative changes. In October, 1909, the College of the City of New York entered upon a series of night sessions. Speaking of the character of the students, Dr. Stephen Pierce Duggan, director of the evening sessions, says: "Their experience in life gave them a consciousness of the need of education that could not be expected of the day students." Columbia University has reorganized its extension service, providing classes and laboratory work at the University during the evening and classes at various places in the adjacent country during the day. Fresno, Cal., is the first city to make provision for the two-year post-graduate high school course recently authorized by the Legislature of that State. It will aim "to carry students through the first two years of college or university work."

One of the noteworthy efforts to bring higher education into closer relations with the industries has been the establishment of ten fellowships in industrial chemistry in the University of Kansas. The latest University catalogue declares that "the University believes the best training for an industrial chemist is pure chemistry. . . . It will accept from corporations or individuals of business standing and integrity, fellowships for the solution of industrial problems of public importance."

The centering of public interest upon our State universities and their relations with other educational institutions is one indication of a genuinely democratic movement in our higher instruction. Ezra Cornell proposed to establish "an institution where any person can find instruction in any study." President Van Hise has gone further in declaring that "So far as the University of Wisconsin is concerned, we propose to take up any line of educational work within the State for which the University is the best fitted instrument." And adds "It is my ideal of a State University that it should be a beneficent influence to every citizen of the State."

## LAND GRANT COLLEGES.

The land grant colleges have been active during the past year in establishing and improving their facilities for the preparation of teachers of agriculture and the mechanic arts, and in es-

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tablishing and developing their departments for extension work. Thirty colleges out of fifty-two are now giving special instruction in preparation of teachers of agriculture and the mechanic arts; nineteen have organized departments of agriculture or industrial education and are giving instruction in pedagogical subjects as well as in agriculture and the industries; thirty are conducting summer schools primarily for public school teachers, where they may receive instruction in agriculture and agricultural teaching; and forty have departments equipped for extension work.

The agricultural extension movement was stimulated by an action of the Association of American Agricultural Colleges and Experimental Stations at its annual meeting held in Portland, Oregon, in August 1909, when an amendment to its constitution was adopted admitting a "section on extension work" upon equality with the two sections then in existence. The experiment stations, since their establishment in 1887, have accumulated a mass of practical and scientific information concerning agriculture, which the college now propose to bring to the farming population in usable form. By movable schools and farmers' institutes, the teachers of agriculture and the experiment station investigators are coming into direct contact with these people and the contact is of mutual benefit. The new provision for travelling specialists in the States of Idaho and Georgia is a conspicuous example."

College departments of education and of agricultural extension are joined in a co-operative movement for the betterment of the rural schools. To this end, in addition to the summer schools already mentioned, the colleges in some of the States, notably, Florida, Kansas, Massachusetts and Pennsylvania are offering correspondence courses for teachers and several have established departments of rural education under the charge of an instructor who directs and gives advice in all matters relating to the teaching of agriculture and allied sciences in the schools. Such provision in the State of Florida, Kansas, Mississippi, Oklahoma and South Carolina may be mentioned.

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#### MORAL TRAINING, INDUSTRIAL EDUCATION AND HEALTH.

Generally speaking it may be said that moral training, industrial education and education for health are paramount concerns in the forward movement of this present time. The attention which they command is justified by immediate needs. They present intricate and difficult problems, and the contributions of any one year to the solution of those problems must be fragmentary at best.

\* \* \* \* \*

There are many activities closely related to education which have received a large measure of attention in recent months. Libraries and museums, apprenticeship, public playgrounds, home-and-school associations,—such interests as these are sometimes treated as lying just outside of the educational inclosure. There is, however, an unmistakable tendency to widen the inclosure and to bring these things into some relation with the regular scholastic administration.

There are moreover numerous undertakings which look to an extension of educational opportunities to those who have left school and have passed the age of compulsory schooling. Evening and other continuation schools, public lectures, correspondence courses, home studies of the Chautauqua type are all familiar examples.

Some of these things are distinctively American, and have helped to make our reputation for educational enterprise abroad. Others are better done in foreign countries than our own, and we are learning from their experience. The thing to be noted here is the way these undertakings, even if privately managed at first, keep gravitating towards the main body of our educational system.

The new attention to playgrounds and play opens up another avenue of approach to this end; for play is closely connected with the educational interests of health, of free expression, and of music, the drama, and the dance, through which we come into the field of the fine arts. Moreover, these associations of parents and teachers, which are accomplishing a great enlargement of the out of school uses of our public school buildings, bring work and play together in ways that are wholesome and interesting.

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#### SOME FUNDAMENTALS.

In these days the voters consent with all readiness to bear the expense and raise the taxes for a great variety of these newer activities. While this attitude is to be applauded and the most of the newer activities are to be regarded as calling for unqualified support, there is occasion for the strongest possible emphasis upon the old and basic needs of our educational establishment. There be three of those needs which occasion anxious thought; yea four of them will have the attention of wise men in our generation: the need of good teachers; of good schoolhouses; of good school attendance for full terms of school; and—equally important under modern conditions—of adequate supervision.

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## INDUSTRIAL EDUCATION.

By industrial education is meant here the new direction which has been given during the past decade to hand training. This new direction comprehends the training in school of youth for specific vocations in the industries. It differs from ordinary Manual Training in that it is vocational and specific, while Manual Training is cultural and general in its aim. In its broader application it is sometimes used to include every form of training for the industries, but in recent years the tendency has been to narrow the meaning to make it practically synonymous with trade training.

While it is not claimed that industrial education is distinctly a city school movement, it is true that the major part of what has been accomplished in this country for training for the industries has been in the cities. It is in the cities that industrial needs are the greatest. From a list of 142 industrial schools prepared in the Bureau of Education in 1910, 121 or 85% were found to be in cities of 25,000 population or over. This list however, did not include industrial schools for Indians and for the colored race, many of which are located in rural communities. But of the technical high schools which offer instruction more or less industrial in aim, practically all are in the larger cities.

Two agencies that have given decided impetus and direction to the new movement are the Massachusetts Commission on Industrial Education and the National Society for the Promotion of Industrial Education.

Though the new movement had an earlier origin it did not begin to take definite form in this country until about 1905. It was in Massachusetts that the first definite step was taken. Under authority of a resolve of the legislature of that State, approved May 24, 1905, the Governor appointed a Commission on Industrial Education to investigate the subject in the State of Massachusetts and as to similar educational work done by the other states, by the United States Government and by foreign governments. After several months of study the Commission made its report with recommendations, one of which was that a second commission be appointed to extend the investigation of industrial training and of local needs and to advise and aid in the introduction of industrial schools. This recommendation was embodied in the law of 1906 which created such a commission and defined its powers and duties. Under the provisions of this law, towns and cities were empowered to establish independent industrial schools and to receive state aid upon approval by the Commission. Prior to October 1st 1911, fifteen schools had been approved by the Commission and by the State Board of Education to which its functions had been transferred. On that date eight additional schools were in process of organization in anticipation of similar approval.

The appointment of the Massachusetts Commission and the publication of its reports gave great momentum to the movement for industrial education, but they have not stood alone in the exertion of such influence.

The organization of the National Society for the Promotion of Industrial Education in New York City in November, 1906, marked the beginning of a potent factor in both the development and the direction of industrial training. Its objects as stated by its founders are:

"To bring to public attention the importance of industrial education as a factor in the industrial development of the United States; to provide opportunities for the study and discussion of the various phases of the problems; to make available the results of experience in the field of industrial education both in this country and abroad, and to promote the establishment of institutions for industrial training."

The society holds annual meetings at which all phases of the subject are discussed and publishes a bulletin containing information designed to promote the objects of the organization.

In addition to this society a number of other organizations of national scope have interested themselves in industrial education. Two of the most important of these are the National Association of Manufacturers and the American Federation of Labor. By the adoption of the report of its committee on industrial education made in May 1910, the Association of Manufacturers committed itself to the policy of taking boys of 14 years of age and giving them four years of training corresponding to the high-school period—half skilled work and half suitable schooling.

At the thirteenth annual convention of the Federation of Labour held in St Louis in November 1910, the report of the special committee appointed to review the report of the committee on industrial education recommended: "That the special committee appointed by the authority of the Denver (1908) convention be continued and that committee be urged and authorized to prosecute their investigation and to lend every assistance to the accomplishment of the extension and completion of comprehensive industrial education in every field of activity." The convention concurred in the report by unanimous vote.

\* \* \* \* \*

## RECENTLY DEVELOPED TENDENCIES.

There is no question but that the thought of all interested in the problem of industrial education is becoming measurably clearer as to the ways and means best adapted to the American conditions. While the question of methods is very far from being settled, it is evident that the

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experience gained from the past five or six years is being evaluated and some important deductions drawn. It is being more and more appreciated, as actual results are studied, that economic quantities are the controlling elements in the situation and that only those measures are practical for wide application that take full account of these quantities.

In attempting a brief summation of the experience of the past few years and the tendencies of the present the writer would offer the following: the institutions that at present occupy an important place in industrial training in this country are the intermediate industrial or preparatory trade schools, the trade school, the evening school, the part time school, and the corporation or apprenticeship school. The economic factors involved in the conduct of these institutions are of two kinds: first, the expense of plant, operation, and cost of materials; and, second, the matter of expense involved in attendance on the part of the student. Of these the second is probably the more important in determining the practical possibilities of a school type.

#### INTERMEDIATE INDUSTRIAL SCHOOLS.

The first mentioned school is a comparatively new type of institution, aiming to reach some of the large number of boys and girls that leave the elementary school at fourteen years of age, and to supply a training that will give them a better equipment to enter industrial life at 16. Such schools take their students at an age when the question of wages is not so generally important as later on, and when many parents are willing to support their children at school for one or two years if convinced that practical benefits will follow. There are at present in Massachusetts and New York some 10 or 12 of these schools devoted to the woodworking, electrical, bookbinding, printing and machine trades.

Taking into account the practical benefits afforded by such schools and the possibilities of attendance by a considerable number of boys and girls well fitted to become industrial wage earners, and the not prohibitive cost for large communities, it is probable that such schools will become an important factor in industrial education in towns with large manufacturing interests and over 50,000 population and that in time they will reach a considerable fraction of those boys and girls that now leave school at the end of the compulsory school period. From the character of the training required and the close articulation with the elementary school, it is apparent that such schools are best fitted for administration by public school authorities.

#### THE TRADE SCHOOL.

The trade school taking youths at 16 years of age or over, and furnishing a training to take the place in whole or in part of the apprenticeship system, is an institution which labors under the severest economic difficulties, whether considered from the side of maintenance or expense of attendance. Figures from schools now in operation indicate a grade of expense that obviously makes such institutions prohibitive for any except large cities, representing exceptional specialization and concentration of industries; and even in such cities it is too early to prophesy that the results obtained will be permanently considered in proportion to the expense.

#### EVENING SCHOOLS.

Evening schools represent the first form of industrial education in this country, and they reach to-day by far the largest number of individuals under instruction in this field. As a means of supplementary instruction in mathematics, science, drawing and technical subjects, they present a simple and effective method of industrial education, at least for young men above, say, 18 years of age. Taking the young worker after the wage hours of a day are closed, such schools and classes represent the most easily available form of industrial education for the great mass of young workingmen and the simplest types from the standpoint of organization. Practical evening classes which afford an opportunity to broaden the shop experience of the day stand in the same relation to the worker, but they offer a more severe problem in expense of administration.

Evening continuation schools were for half a century the backbone of the German system of industrial education. To-day that country is coming to a realization that for students between 14 and 18 the evening is not the best time for instruction, and she is bringing the work of her continuation schools into the day period. It will naturally require considerable time for this country to reach the same point and to bring about a general agreement among manufacturers to allow learners in their establishments to attend industrial improvement schools during working hours. The positive benefits that result when such a plan is followed, and the close correlation that is made between the work of the shop and that of the class room have, however, been so strikingly shown that this system of industrial education deserves to be increasingly studied by both employers and schoolmen. When the time for attendance upon school work is granted to learners or apprentices by employers and the wages continued during this period, the economic problem for the boy is solved and inasmuch as the public school is not called upon to supply the costly equipment for practical work, but only that instruction specifically fitted to the technical needs of the learners, the administration expense is reduced to a minimum.



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In its beginnings such a plan is evidently most readily applied in cities and other localities where the concentration of high grade industries gives a large number of apprentices or learners in a comparatively few lines. The application of such a system to low grade industries and to cities of varied manufacture is evidently much more difficult both as an educational problem and as a matter of organization, but it does not seem unreasonable to expect that with increasing public support and co-operation of the employers a gradual and steady extension of this plan of education will result.

## CO-OPERATIVE INDUSTRIAL SCHOOLS.

Another type of part time or, better, co-operative school also demands special attention, viz., the type in which the initiative is taken from the school side and high school students are given opportunities to spend half their time at work in industrial establishments and half at school. Such a system gives a larger amount of time to general education, but although very promising results have been obtained from experiments at Fitchburg and Beverly, Mass., it still remains to be seen whether such schools will become an important factor in supplying a large number of workers to the industries.

## APPRENTICESHIP SCHOOL.

The apprenticeship or corporation school is a part time school of the first type, in which both practical training and instruction is given within the commercial establishment. Where the industrial corporation is of great size, it is probable that this method, which allows a maximum of co-ordination between both lines of instruction, will be increasingly adopted, but for a great majority of industrial establishments such a plan is hardly practicable and division of labor between the employer on the one hand and the public school on the other is the method that seems to make for the greatest efficiency and economy.

## SECTION 2: FROM DR. DAVID SNEDDEN.

*Information obtained from "Conversation" with DR. DAVID SNEDDEN, Commissioner of Education for Massachusetts.*

Massachusetts has always been very much interested in education, and has done a great deal for certain kinds of education, always holding the view, like their ancestors and the people of Canada, that a boy or girl growing up in a family should go out into an efficient life. That tradition is a part of the State's inheritance.

The evolution of the general elementary school in Massachusetts has been steady. Failures in development have been due not so much to lack of ideals on the part of the people, as to inability to get machinery to carry them out. The regulation compelling attendance of children up to 14 is now enforced quite rigorously; and up to 16 where a certain amount of literacy is required up to the fifth grade.

More than half a century ago there were people in the State who felt rather keenly the need of doing something to heighten its industrial efficiency; in fact, Massachusetts caught this influence from England when the Crystal Palace Exhibition in London brought it into consciousness in 1851. As a consequence, drawing was introduced into the Boston schools, being looked upon as the best instrument for the preparation of workers. In 1870 a special Normal School was started in the State for the training of teachers of drawing, naturally with the elementary school mainly in mind. Somewhat later Manual Training came to be thought about a good deal, not only with the idea of helping the individual but particularly to react on higher industrial efficiency, a sort of inheritance of the old family idea that a boy should be trained to do good work in

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addition to his school training. Manual Training was made to some extent obligatory in certain city schools—mainly, however, in reference to children under 14. This legislation came in the latter eighties, but the movement itself began earlier. The first beginnings of Manual Training in America were in 1876, and arose from certain exhibitions in the Russian Department of the Centennial Exposition in Philadelphia. Sweden, through Nääs, also contributed a good deal, and there is in Boston an excellent little school of Sloyd under Gustav Larsson, where teachers are trained for the Sloyd specialized form of Manual Training.

#### NEED FOR INDUSTRIAL EDUCATION.

But while the people of Massachusetts recognize drawing and manual arts and Manual Training as contributing to the enrichment of general education, they frankly confess that these did not amount to anything in promoting industrial education. A great deal had been said in regard to the need of Massachusetts for more industrial education. Some years ago the Southern States began to erect textile mills. Massachusetts, which had been the supreme textile centre before that, took alarm something like that of England in recent years that a great source of prosperity might be taken away from her. Then what came to be considered was that success must be achieved along the highgrade industries, the conception that is widespread in Württemberg.

There were other factors in this problem. The textile manufacturers themselves recognized that wherever there was foremanship and skill in their works, it was very likely to be in the hands of a Scotchman or Englishman who had got his training over there. Then people began to reflect upon what would happen when that supply of leadership was wanting; so there came a conviction gradually that there must be industrial education. Very few people, however, thought of that as a possibility before the age of 14; in other words, the great majority of people thought this industrial education must be beyond the age of 14, and that the school programme should only be moderately modified.

#### HIGHER TECHNICAL EDUCATION.

Long ago the State had made certain beginnings with regard to higher Technical Education, having two very well developed schools for the training of the engineering type, which is essentially professional, and also for agricultural leaders. Those belong to the college level of education; they have little to do with the rank and file of foremanship in education. Four or five years ago, after an inquiry by the Douglas Commission, the State created a Commission on Industrial Education. Obviously the spirit of the Legislature was that these schools must be really industrial schools, that they must not be imitation schools but that they must define for themselves their purpose, and then find the means of realizing that purpose. That Commission on Industrial Education produced several reports, and under its initiative schools were started in New Bedford, Lawrence and Beverly; beginnings were made in Worcester, and a variety

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of evening schools were organized. The State Board of Education had existed for many years in charge of the Normal Schools, and in general supervision of the schools of the State. A few years ago, after considerable agitation, a good many people became convinced that it was not desirable to have two educational authorities in the State, and the forces were unified. Certain executive officers were provided for the Board of Education; the old Secretaryship was abolished; and the law directed the Board of Education, which is a citizen body, the members serving without remuneration and acting in a rather legislative and advisory capacity, to have a Commissioner and two deputies, one of whom should have a special acquaintance with industrial education.

#### PRESENT SITUATION IN MASSACHUSETTS.

The situation in Massachusetts now is this:—the Legislature provided that there should be industrial schools, or as the leaders prefer to call them, vocational schools, under that term differentiating agricultural schools, preparatory schools for a number of manufacturing pursuits, and household arts schools preparing for the household arts callings. There is another group of callings, which might be termed commercial—business education, etc.—which is fairly taken care of by private and general public schools, hence does not come under Industrial Education. The Legislature furthermore provided that pupils must be 14 years of age before they can enter these schools. Then in order to open the way for their development it provided that any community maintaining these industrial schools could receive out of the treasury of the State, for reimbursement, an amount equal to half the running expenses of the school, to put it broadly.

It was perfectly apparent that what the State wanted in its industrial schools, towards which it was contributing this money, was something which was in a very genuine sense vocational or industrial education. There was no feeling on the part of any of the officials that the object of this was primarily to make more effective workmen in the sense that they would be of more value to employers; the primary conception was rather that industrial education was wanted because a large number of boys and girls did not have opportunity to learn how to work efficiently. It was felt that a good deal of boys' work, while profitable, did not lead anywhere except to a blind alley, and that there ought to be something that would do for the boy what the old-fashioned apprenticeship did—to give him a broader industrial outlook, better intelligence and a wider range of skill, so that as he marched into manhood he would find himself in possession of a much more complete range of powers.

#### INDUSTRIAL EDUCATION MUST BE DIFFERENTIATED.

Dr. Snedden had been working on the problem of vocational education a number of years in another State, and had become convinced that to realize the purpose of a good industrial education it must be differentiated rather definitely from the traditional education, especially the traditional High School

and Secondary Education, because the old-fashioned High School, of which there are many in Massachusetts, had its traditions so firmly established and its ways and methods so fixed, and its schoolmasters were so prepossessed with the academic and bookish way of doing things, that it was rather hopeless to try to make industrial education of an effective sort grow out in connection with their machinery. Hence Dr. Snedden had opposed the tendency, which he believed he found in the Board of Education and in the people who were discussing this subject when he came to Boston. He personally favored the notion that the thing to do was to build up a set of separate schools which, like infant industries, so to speak, should be allowed to work out their own methods and traditions; and that the only way to do that was to make a rather sharp line of separation—what perhaps might look to an outsider like an artificial line of separation—until they should know what the common school as such could accomplish. For about a year and a half they had been working towards the realization of that ideal; talking and lecturing over the State and writing some; assisting in the organization of schools and helping those who already had schools formulated to fix their standards and define their work.

#### SOME CONCLUSIONS REACHED.

Out of these things are coming two or three convictions which Dr. Snedden outlined with the understanding that though all the officials present agreed with them, they contained experimental features. First, Industrial Education is going to succeed only as it finds its group, and they must locate the group. As long as the assumption is that all boys are alike in point of ability and economic possibilities and surroundings, independent of interests and tastes and economic future, not much progress will be made, because in every community there are a certain number of boys whose economic position, tastes, aptitudes and opportunities of all sorts lie along the line of becoming members of professions that it is very important to have. After all, their number is limited, and they have been very well attended to in the education thus far.

Then there are other groups. To-day a very large number of boys and girls leave school as soon as the law permits, and go to work, many of them because they like to work and they like any kind of work better than school work, for they have reached the point where they don't care any longer for the very bookish studies of the school. That must be admitted, and accepted as a fact. In Massachusetts tens of thousands of boys and girls go into industry just as soon as the law permits them. The type of work to which they go is not very good, from the standpoint of its educational possibilities. It does not have in it very much of capacity for developing their powers, industrial or other. That period from 14 to 18 is peculiar, being not only the plastic period as far as the ability of youth to learn is concerned, but peculiarly the period during which the necessities of the youth require that he should be taught something substantial towards a calling.

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## PRACTICAL WORK FIRST, BOOKS SECOND.

These industrial schools are built up on separate bases, the conception being that they must be housed separately and work out their own conditions. The following conclusions, which are somewhat startling, have been reached. Under the present plan of procedure the idea is that a boy of 14 should give 60% 70% or 80% of his time not to studies in books at all, but to doing in some broad lines the work he is fitting himself to do. If it is a machine shop industry, he must give a large part of his time to machine shop work, always seeing that the task before him is adapted to him, and that when he has a moderate degree of power in it he goes to something more complex. That idea finds its source in the apprenticeship system itself, because that was essentially what it was. If a boy wants to learn printing, or even farming, he is expected to devote himself largely in his earlier years to practical work. Then as soon as the boy gets his feet firmly founded on the realities of the practical work, he is expected to be led by his instructors out into what may be called the intellectual interpretation of the work; to penetrate a little into science, and what science means for that work; into mathematics, and what mathematics means; into art and what art means for that work.

This reverses the traditional education program, which assumes that the first thing for a boy is to learn drawing or geometry and then go to his machine shop work. Now the boy does his shop work, and then comes to algebra, mathematics, hygiene, or the hundred and one subjects that can be coupled up with this. In that way Dr. Snedden thinks they can make the type of worker they are after—the person who has skill, but on the top of skill has industrial intelligence, breadth, adaptability, flexibility.

Professional educators will realize that this is a stupendous program; that there is hardly a teacher in the country prepared to carry it out; that there are no text-books or manuals to help prepare that kind of a program, it is so difficult. It is a new development. In a sort of essential way it assumes that the apprenticeship system was, after all, the best way to teach a young person to work, provided that system could be supplemented as it should be. The ideal apprenticeship system was that which took a boy at 10 or 12, or even 7, put him at simple tasks, and then saw to it that he graded up—that as soon as he could do anything moderately well he should be put into something a little more difficult. The thing Dr. Snedden thinks they can do in their schools is to supplement that work with studies that will enable the boy to get enough reach in drawing or science to command whatever abilities he has.

## AGRICULTURAL SCHOOLS DESIRED.

They are trying to carry that out in a great variety of special ways. For example, they want agricultural schools in Massachusetts. They have an agricultural college, but it takes the boy at 18 and assumes a high school education, and very few people are so situated that they can take that. A series of agricultural schools below that is wanted that will take boys from 14 to 15 and equip

them to be simply intelligent, broad-gauged, successful farmers. Merely putting a boy in a class-room and making him read about agriculture and perform some little experiment in a cellar or somewhere will not accomplish this result. The thing to do is to get the boy doing something in farming as certainly as the farm boy did before there were any agricultural schools. But this school must be organized in such a way that the boy can grasp the task as a whole; that he can see around it; that he can learn wherein this or that science, or these economics or this problem belongs to his farm.

That type of instruction can be had by organizing the units of practical work. Let a boy care for a sixteenth of an acre of corn as his first task, and carry it through to the stage where he has to sell it, doing every step of it on a field basis; and while he is doing that, let every step of his instruction be illumined by the best science that can be given by the agricultural instructor, who knows the science perfectly well; and let the boy take that in connection with the practical thing. When that boy has grown some corn and raised some chickens, and so on, he has gone through certain lines of type activity, and has the basis of his equipment. The machine-shop schools are on that line. That represents the pedagogical problem with which Dr. Snedden and his associates are struggling. It begins to appear highly probable that that type of school is expensive, and that many people will not be in a position to attend such separate and individualized schools as this.

#### PART-TIME SYSTEM MOST PROMISING.

There is a growing conviction in Massachusetts that what is called the part-time system of vocational education has, after all, the greatest promise. The difference between the part-time system and the other is that instead of building the shop in the school, advantage is taken of the shop as it exists, and the school is brought in to supplement the shop. At West Lynn the apprentices spend part of the time in their shop work and then they give part to the study of lessons that can best be stated in class-rooms, the latter having rather intimate connection with what they have been doing. Furthermore, what they are doing as apprentices is graduated, so that a boy is not kept indefinitely at one highly specialized task. One of the pathetic things about modern industries is that it does not make a great demand on skill. Little children can be picked up by thousands from the streets and put to work at once, and employers say, 'We don't need any industrial training'. Perhaps the ideal thing is to bring this part-time school in not for industrial training, but to carry along some strand of education while the child is at work.

At Beverly boys have one week of schooling and another week in practical work. Conditions could be imagined where it might be possible for a boy to go to school a week and learn things that had no relation to his practical work, but that is not permissible under present Massachusetts legislation.

The Legislature gave the Board of Education \$6,500 to make an investigation into this part-time work, and Mr. Murray has been appointed as special agent for that purpose. What is possible and feasible in the way of part-time education

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for those between 14 and 17? The formulation of the problem in that definite way illustrates what is being striven for in several directions at present in Massachusetts; that is, to define a particular problem and then attack it, not talking about the whole scheme of education so much.

Dr. Snedden and his associates believe that as soon as they can get the co-operative attitude on the part of employers, and some additional legislation they will find their greatest possibilities so far as the manufacturer is concerned. Much of the State's agricultural education also is founded on this part-time idea. Certain schools that Mr. Stimson is now organizing require that a certain amount of work shall be done on the boy's own home farm, such as the raising of a sixteenth of an acre of corn; and the instructor must have time to visit these farms. Many of the ideas for that work were taken from Ontario, from the work that is laid out from Guelph.

#### ELEMENTARY UNIFORMITY UNWISE.

At present there is usually no differentiation in school work below 14. The American people are very much afraid that if work is differentiated there, some doors of opportunity will be closed; and there is a widespread feeling yet that education must be kept uniform throughout the elementary schools. Personally Dr. Snedden does not agree with that view, and does not think it at all a wise tendency, and so far as his personal influence goes he is constantly urging differentiation in the seventh and eighth grade work, the seventh grade beginning about 12 years. This is the period of compulsory attendance at the school, and the children must attend. The fundamental American conception is to keep all the children together—not to have a labor class over here and a less-labor-class over there—and any attack on that idea would meet with disaster; but he believed it highly desirable and very feasible in one of the great city schools to make certain studies, say English literature and English expression, English language and geography and history, common for all children in the general classroom; then differentiate the remaining part along any one of four lines. A certain group of pupils might elect to take foreign language and possibly algebra and geometry; naturally those who are probably going to high school and college would be the ones encouraged to do this. Another group might elect a richer course of manual training than the present, which is about two hours a week. Ten hours a week would be very much better adapted to lay the foundations of subsequent vocational education, and if a group of boys wanted more generous shop work than at present, he did not see why it should not be done, and why arithmetic and drawing should not be studied in connection with that manual training. Another group might select commercial education—Arithmetic, tabulating and calculation being important for that group. Then a fourth group might take Household Arts, sewing and cooking. There should be no class differentiation at all, and the alternate groups would continue on an elective basis; alternative pupils are permitted to take Latin or German or French. That system is exemplified in the Fitchburg Normal School—a scheme that Dr. Snedden had been helping to encourage—and he believes that in a very few years the city school

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in Massachusetts will adopt it. There is a good deal of feeling against the scheme of differentiation, some thinking that if manual training is there everybody should have it, and that if the schools have German or French, everybody should have German or French. That is the peculiar feeling about study that prevailed fifty years ago at Harvard.

#### CITIZENSHIP TAUGHT THROUGH WORK.

There is a fine humane sentiment abroad in Massachusetts, and the people who hold it are sometimes alarmed lest in their work Dr. Snedden and Mr. Prosser are thinking of the worker as worker, of the producer as producer, and not as a person simply rising to a higher level of efficiency as producer; and that they are going to lose sight of the finer and more essential side of life—citizenship, with culture appropriate to what the individual can take in. Dr. Snedden said it was sometimes thought that the way to train a man to be a citizen was to tell him something about what a citizen should be; to get him to read books and pass examinations in the duties of the citizen, in the Constitution of the United States, etc., whereas in fact citizenship grows out of experience, as does a good deal of culture.

In illustration of this point he cited the case of the Manhattan Trade School for girls in New York City, organized by philanthropic people to meet the conditions of the tens of thousands of Russian-Jewish girls going, as soon as the law permitted, from poverty-stricken homes into lofty buildings to manufacture shirtwaists, etc., at power machines. As conditions are to-day, these children have to go to that work, for the families are desperately poor, with ten or fifteen children in a family. These philanthropists saw that while a certain percentage of those little girls survived the severe discipline of the factory, a great many of them broke down in operating the complicated machine. They were plunged suddenly into an awful wilderness of machinery and insane demands. These ladies realized that this was a very wasteful process; that those girls drifted into the streets and recruited the wastrel class of that city, so they decided to do what they could to fit the girls for that industry with a better preparation. The school course was short, practical, and six or seven months; and its one justification was that it was better than the conditions as they were. Their primary object was to put the girl on a basis where she could earn \$6 a week instead of \$4. But in following that object, inevitably and necessarily a lot of other kinds of education attached itself to this work. The girl had to work with textiles, but the little bit of attention gave that girl some discrimination as to the quality of textiles, color and harmony, and the girl got a certain amount of cultivation in that direction. That girl never thought about her health, but the women teachers asked what was she lunching on, whether she took proper precautions in her general regimen so as to preserve her strength, whether she wet her feet and left them wet during the day, etc. The girl saw the thing right before her, and was lifted to a high plane of physical efficiency such as an ordinary school, with its academic approach, could not accomplish. The traditional attitude of the girl was to skimp and evade wherever possible; she wanted



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to beat the employer because she believed it was the object of the employer to beat her. The school worked on this idea: Cannot you give more, and be a little more conscientious and faithful and honorable? Furthermore, what about your fellows? Do you work with them toward union among other girls? The teachers were constantly bringing up the idea that the girls should get together and work together, and not simply stand as individuals against a system that was so much bigger than they. What is the use of teaching the American Constitution? Nothing comes of that to bring the girl into a knowledge of her conditions; and here is the acting, living citizen.

#### MASSACHUSETTS EDUCATIONAL PROBLEMS.

In Massachusetts it was realized that the man working in a shop with a boy and leading him to a higher efficiency as a worker has an unrivalled opportunity to give that boy the text of actions that will make good citizenship possible, and that will make health and life under various contractions possible, because he starts from a significant, real, vital foundation.

Dr. Snedden noted that the schools spoken about during the afternoon practically centered about four lines of work for boys—(1) printing work, (2) metal and machinists, (3) woodworking and building, (4) electrical and engineering. The two greatest industries in Massachusetts are textiles and boots and shoes; these are largely within what Mr. Prosser describes as the automatic processes, and it is not clearly in evidence that schools are practical there, although they may come in within the part-time work. The product of boots and shoes is \$250,000,000 or \$300,000,000 yearly, and the product of the textile industry is probably more than that.

### SECTION 3: FROM MR. C. A. PROSSER.

*Information obtained from 'Conversation' with MR. CHAS. A. PROSSER, Deputy Commissioner, Massachusetts Board of Education, Boston, (now Secretary of National Society for the Promotion of Industrial Education, New York).*

Mr. Prosser spoke of the difficulties to be dealt with in connection with factory workers and wage-earners on a large scale. It was comparatively easy in considering only a few trades; but the great mass of factory workers in Massachusetts, most of whom are in unskilled occupations differing from each other, need to be analyzed. There are certain difficulties in that State, due to the sex of the workers, their capacity, the nature of their employment, and the economic, industrial and social conditions surrounding them.

It is well known that the typical female wage-earner is less than seven years a producer in her trade, all the rest of the time being a spender in a home of her own. This makes the problem somewhat different from that of the boy, and raises the question whether it would be profitable to train those girls for

the few skilled trades that are open to them—only dressmaking, millinery, high-power machine work, and certain other specialized trades in other occupations.

Some have said it would not pay to train those girls for that short time; that it would be better to train them for the occupation as wife and mother. Those who look upon occupation training as socially profitable for a girl point out that as she is going to marry she needs training for what will probably be her life work, but that all the training for skilled trades such as sewing and trimming hats, etc., is a kind that fits the girls to fulfil many of the duties of the home as well as to do effective work for a short time as producers in industry. Considering these two ends or goals for girls, it would seem that they ought to have two ways out, assuming that what is wanted in every case is to give these children an equal chance to have efficiency along some line or other.

#### VARIOUS GROUPS NEEDING TRAINING.

Conceive of the different groups of girls that need to be dealt with. Here is one in a skilled occupation who probably needs to be trained for it, even temporarily. Here is another in an unskilled operation, who has ability for dressmaking, and who probably ought to be trained away from her job in a textile mill and fitted for the other job. Here is a girl who has left school as an illiterate, and needs training in the elementary branches according to law so as to give her civic and domestic intelligence. Here is another who has ability to take high school subjects that will lead to self-improvement, better social standing, and all those things that are dear to the heart of a woman. Here is a girl engaged in an automatic process in some shop or factory, who should probably be given such directed recreation as would palliate the deadening effects of her employment. For the girl who is only going to serve temporarily in this occupation, probably the only way out is to give her proper training for home duties such as sewing, cooking, personal hygiene, first aid to the injured, care of the sick, care of children, and all those things that are later on to come into her life.

Those who believe in that sort of a program point out that training in the Household Arts offers two ways out for those girls. The girl who is fitted to carry on her elementary school work properly is sometimes able to do the English, reading, etc., better when she is approached through the practical Household Arts, for she learns to do by doing; hence the training might both remove her illiteracy and train her for her future occupation. In the same way this girl who is going to be trained for one of the skilled trades open to women is at the same time preparing herself splendidly for some of the home duties. Possibly, even in the case of a factory girl, evening classes and part-time classes during the day in the Household Arts might well constitute a sort of relief from the strain of her day's work.

#### PROBLEM OF THE GROWING GIRL.

It has also been pointed out that those who advocate the training for the home for girls between 14 and 18 must recognize what seems to be a handicap

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because of the lack of interest of the adolescent girl in household requirements. This suggestion appears to have a measure of truth in it. Girls between their birth and 10 years probably have a great deal of interest in the things of their home—their little stuff and cradle and bed and doli baby—and in their play go through a great many home activities, but about their tenth year they seem to lose considerable of that interest; while the adolescent girl in school or factory appears to have her attention entirely diverted from the home towards the problems of school, factory wage-earning, dress and social amusements, home duties being, if not repugnant, at least unattractive to her. That interest does not seem to return until some fellow begins to call at the house and she looks to him as a prospective husband, and possibly begins to consider how she is going to perform those duties, when she awakens to their importance. This is why many will receive greater results through training in Household Arts.

Between 14 and 16 there are difficulties because of difference in the capacity of those workers; they are not all cast in the same mould, and have not the same abilities. You have the illiterates that ought to be dealt with; and also the fellow ought to be given a chance by training that will lead to civic improvement, and possibly business or a professional career—many of which channels would be closed to the factory worker. Then you have thousands who have been drawn into service at one of those special machines highly speeded; who are employed in manual and manufacturing processes of all kinds, and need a way out in the form of day and evening recreation. But it must be remembered that the boy is to be a producer all his life, and not a spender; hence we have one end of the scale to face with the male worker, whereas we have two ends to face in the case of the female worker.

## UNSKILLED OCCUPATIONS.

The difference in the conditions surrounding the employment of those people should be taken into consideration. Probably more than 20,000,000 workers in the United States are engaged in unskilled occupations, for which the shop with its machinery can train a great deal better than the school; and it is probably a sound principle that the school should never seek to fit for an industry which can do that work better. These unskilled occupations are always overcrowded; there is no need of preparing workman for them, and there is no body of related study in arithmetic, drawing, science or art of any kind that can be given to those workers that will make them more skilful. Hence the problem in all cases is to train them away from the thing they are doing, over towards another occupation, or away from illiteracy and towards self-improvement, or deal with them through some kind of recreation.

## HABIT-CENTRES V. THOUGHT-CENTRES.

One of the most difficult problems to face is this constantly increasing group of people who are engaged in unskilled work of every kind. Social workers are agreed that such work is deadening in its physical, mental and probably moral

effect on the worker. The man engaged in a skilled occupation is calling into play his habit-centres, and the thought-centres are drawn out also; but the worker engaged on a machine is calling into play only the habit-centres, and when the day's work is over he seeks some sort of experience that will take him away from the habit-centres he has been exercising, and toward the thought-centres. He seeks excitement, and that often leads him into drunkenness and debauchery and criminality of all kinds. Many people today think that the only way out for the worker engaged in such employment, and who does not need training away from illiteracy, who does not want this education, and who has not capacity for skilled occupation, is to take him where he is at his job, and see what can be done by getting a certain portion of his time to ameliorate the deadening effect of his work. There are people who dream that the time is coming when these specialized machines have been developed to the full, when the workers in front of the machines will be so productive that it will not be necessary to run the factory so many hours to supply the world's needs, and the worker will be paid so much more that he will have more of his day away from his job. If that be true, there is a still greater responsibility resting on educators to direct the worker's leisure hours, which his employment to-day seems to make a point of danger to him.

Dr. Hermann Schneider, of the Cincinnati School of Engineering, who has thought on this subject of the thought-training of these factory workers, advocates dealing with them whenever they can be got hold of, during either day or night, or both, through all sorts of recreation and entertainment that will be a complete change of experience to the worker by resting the habit-centres and exciting the thought-centres. Hence he would favor for these people social settlements, recreation centres of all kinds, bizarre entertainments, moving picture shows—largely of an educational character—a dance hall, a theater that gave moral plays with the proper license, and directed play and amusement of every kind. While that may sound like an imaginative program, said Mr. Prosser, there is no telling to what this work will lead before it is through.

#### WOMEN WORKERS AND HOME SUPPORT.

In connection with the problem of the thought-training of the worker, his economic condition must be considered. A recent investigation by the Federal Government shows that in the textile establishments of the United States, the female workers contribute about 26% of the home support. This means that any time she is off from the factory we must consider the effect it will have on the family condition. Business is not a philanthropic institution, and reduction of hours of labor means reduction of wages; that is an economic proposition.

That means that there will be all sorts of groups to deal with, some of whom are able to go half a day to school, some a whole day, some two days, some day-about, and some who cannot afford to give any time from the factory, and who will have to be taken care of in evening school instruction of one kind or another. These are the problems that are facing educators, who must know whether it is possible for manufacturers to arrange their work so as to let these

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children out, and whether the shifting of those employees for a half day or a day will be a business loss by bringing in a new workman and interfering in some way with the continuity of the work or with the process; also whether it will be possible for the employer to secure employees to take the places of those who have been given time off. It has been said that if the "doffer boys" in textile mills were given half a day off a week, it would be necessary for employers to pay about two-thirteenths more to their present staff. Those things show some of the difficulties to be encountered in the attempt to deal with this problem.

## WORK THE PUBLIC SCHOOL MUST DO.

There are many difficulties from the school side, yet it seems as though the training of workers into effectiveness as wage-earners will probably have to be done through the machinery of the public schools. This program means a great deal more money, though the public schools to-day say they have not enough money to do what they would like with the group that has not yet entered on wage-earning.

One of the most necessary things is to secure a sympathetic attitude on the part of the public school people for such a movement. Regular public school men everywhere apparently lack an understanding of the existence of these groups of people and their needs, and fail to sympathize with the fact that they are probably the weakest link in the chain to-day, for whom the community must do most.

The regular schoolmaster tends to prove everything from his books, but those people from the industries have to be taught by doing; they have to be carried forward very largely out of their experiences; they have not very much power of imagination and visualization, but they grasp the principles of these things if approached on the basis of what they know and are doing. An illiterate girl who has failed to do the work taught in the public school could be reached through the things she does in sewing or cooking or in her special work, her arithmetic being the little things that arise in connection with that work, her spelling starting with names of utensils dealt with in her work. One of the large problems will be to bring the public schools people to sympathize with the needs of these workers, and also to be willing to change their methods so as to deal with these people in the only way in which it seems possible to handle them.

## ADVISORY COMMITTEES MUST CO-OPERATE.

The wage-earner, whether in the skilled or unskilled occupation, is to be dealt with just in proportion as the public school will be able to co-operate with outside agencies. There have been a lot of things dumped on the schools in the last twenty-five years—responsibilities they never faced before—and there has been a feeling in some quarters that they would be able to solve the problems without calling on outside help. Mr. Prosser did not believe they would be able to do it in industrial education until they were able to command the service of the outside people who have something to give. For example, if the public

school system is to fit the girls for skilled trades, they would be utterly lost without advisory committees composed of people who had had experience in these skilled trades. If they are to fit for a machinist a boy who was engaged in textile work, they would certainly need the help and advice of some machinists. What the practical man brings to such service above everything else, is the disposition to check up things from the standpoint of results, while the schoolmaster always puts emphasis on methods. By the combination of the two, they would probably get somewhere.

Mr. Prosser was of opinion that where public schools undertook to establish recreation centres for the wider use of school property, in an attempt to deal with workers on specialized machines, they might well call in the services of social settlement workers, philanthropists, people who had made a special study of such groups, and knew well about their experiences, and of course more about the way in which they needed to be dealt with.

It is also apparent that a great deal of experimentation is needed. There is a danger that even after a lot of facts have been learnt, a man seated in an office will speculate and theorize about things that will come to pass. Mr. Prosser closed by saying:—"We have not had any experiment in part-time far enough on to show its effects; we have not had any attempt to ameliorate the lot of the factory worker; I do not know of any adequate attempt to deal with the illiterates. The things we need are a knowledge of the conditions in the field, and then experiments along various lines that will be illuminating to us in our various efforts."

#### SECTION 4: FROM DR. S. D. BROOKS.

*Information Obtained from "Conversation" with DR. STRATTON D. BROOKS  
Superintendent of Public Schools, Boston, Mass.*

Dr. Brooks thought that our Commission might be interested in his impression of the comparative differences between what he saw in Europe and what America has. The first great difference he noted was that in the older portion of the German schools, for example, they cut very close to what the boy is going to be, while in American schools in from seven to nine tenths of the cases they had no notion of this. German education may thus direct itself more definitely to a specific thing. It is an accepted condition of society there that a boy is to be a mechanic or a laboring man of a certain kind, and there is no escape from it; but in America it makes no difference what a boy's start in life may be, he has the same opportunity as the other fellows if he can squeeze by and get to the top. Consequently the foreign school has a much easier problem in preparing a boy for a position because it is not trying to hold him in the non-restrictive phases of education.

#### JUDGMENT-TRAINING THE SCHOOL'S FUNCTION.

Dr. Brooks defined the non-restrictive way to be to open the powers and judgment of a boy, so that he may ultimately fit any opportunity that arises because

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of his sound judgment and to create a flexible habit of mind in which the boy is not at all bound by any given set of conditions, but can always meet new conditions. In America the courses of study, both elementary and high, emphasize the judgment side, giving a great variety of opportunity to judge things and training to ultimate ability to judge all kinds of conditions. It appeared to him that American education in twenty years had progressed very rapidly on the side of the judgment-developing subjects and had ceased to emphasize so much on the reflexes.

He thought that while schools must give a pupil reflexes, i.e., things that adults learn absolutely—such as multiplication, spelling, etc.—and must teach him certain facts, yet emphasizing the reflexes gives restrictive education, the purpose being to create a habit of mind that the boy cannot break, so that he must arrive at the right answer. While a boy trained in judgment-development is less able, when sent out at 14, to do accurately a specific piece of work than he would be if more time had been put on the reflexes and less on the judgment, he still believed that any education that makes the boy worth a dollar a week more at 14 makes him worth \$10 a week less at 25.

When we come to the reflexes of industry, the skill of hand to do a certain thing in a certain way as we find in the division of labor in a factory, Dr. Brooks holds that this has absolutely no place in the Public School education; it is absolutely restrictive. The more a man excels in it the less effective he is as a man in general. Such education has no field at all in education at the public expense. But where a man may become a better workman by the exercise of his judgment, there is the proper field for industrial education; and that means that he must learn to use materials of different kinds and be able to judge about them. In other words, the school—the industrial school—ought not to produce the finished product, because the finished product is the result of restrictive education, and you have made a man who cannot do anything else. In America, at least, we have not yet come to that, on the whole.

## EVOLUTION OF INDUSTRIAL EDUCATION.

Dr. Brooks was very much of the opinion that industrial education will go through stages; that we will have a lot of very specific schools trying to show that this boy is really prepared now to do something; and at the end of ten years they will do just what the manual training schools have done. Twenty years ago the manual training schools were opposed by labor interests because they were going to make carpenters and blacksmiths and machine-shop men; but he did not think any labor man abuses the Mechanic Arts High School now because they have generalized the proposition so that in schools the training in judgment, based upon material and tools in operation, with mathematics applied to that, enables boys who go out with that to begin as apprentices, but ultimately become foremen in shops because they have acquired a better education.

## GERMAN VS. AMERICAN IDEALS.

It seemed to Dr Brooks that the industrial education problem of Germany is quite different from that of America, where the feeling predominates that

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fundamentally, there is no society, no body, nothing except the boy's ability to compel him to go the bottom and stay there; whereas everywhere in Germany he had found evidences all the way along of causes to prevent any man getting out of his class, the number who rise being exceptional. They will point to this man who is Prime Minister, who started at the bottom, but he is only one out of a million, the rest are all at the bottom and are expected to stay there.

The other thing Dr. Brooks observed in Germany, more particularly in their schools as compared with those of America, was their attitude towards discipline and law. All through the public gardens in Munich there was no policeman, but a little railing, and no children over the railing. They all obey the law; if it is "verboten" to pass, they accept it so; and in the schools it is the same way all through. Then they go to the army and they have an absolute dictatorial control. Now, it appeared to him that all this produces a condition and type quite different from that of the average American. The latter have a habit of initiative, of starting to do things, and develop a responsibility for their own actions. The tendency now is to put it up to the child to take care of himself and to send him out as a citizen who has to take care of himself, not by force of law at all, but because he going to help make the laws.

Dr. Brooks thought the German system of education is not applicable to this country except in pieces, which meant that a particular type of method could be found that was excellent, and certain things that one would like to fit into the American system, certain things that are much better than anything to be found here; but he did not think the final product would fit American conditions as well as their own. He felt that American methods secure more variety, more initiative, more alertness, more quickness of judgment, more ability probably to start wrong and back up any time to get right. The trouble with the Germans is that if they ever started in wrong, by the time they could get stopped and reverse the thing, the other fellow would be all over with it.

#### PRACTICAL ARTS HIGH SCHOOL.

Boston has the ordinary elementary schools, then above them high schools of various kinds—High School of Commerce for boys preparing to be owners of businesses, on the whole; commercial courses in all the High Schools for stenographers and book-keepers; two separate High Schools, one for boys and one for girls, for college preparation; one Mechanic Arts School; Manual Training High School; and one school for girls called the Practical Arts High School, to which Dr. Brooks called special attention.

In this school an attempt is made to train girls, who are willing to stay, by means of the essential elements of a girl's education—preparing for the home—and to make everything in that school centre around the home, particularly in the application of art. For example in buying furniture they are given \$35 and take six months to look at all the sideboards in Boston; make a long study of what is best for the money and the art side of it; then they buy a sideboard which is supposed to be the best one for the money. An old house is rented and the girls decide upon what the window curtains shall be, make the design for them



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and make the curtains themselves. Then white cloth is bought that does not match what they have already bought and the chemistry teachers take up the matter of dyeing, and they are not allowed to put them up until they are dyed. Then they take up dressmaking and study the artistic form; then there are variations from that form, then variations from the design that would make it harmonious for their own particular form. They take up the same thing with dresses and hats. They all have these general purposes, not only to make dresses but to make them intelligently, and to make dresses for children; not to become milliner but to know processes, qualities and arbitrary values.

At the end of two years those who wish to become dressmakers may do so and they go into the regular dressmaking course and make dresses to sell. Anyone can order at this school a dress for his wife. Those who want to be milliners enter the millinery course, and they get positions in Jordan, Marsh and Company's and probably these girls will be forewomen some day and will be a power because they have the right artistic conceptions.

A very large share of very well-to-do people send their children to this school. The first two years the general principles of sewing are taught but the same thing is not repeated often enough to make them expert in it. The distinction is made between general and trade teaching. In the trade school pupils have to learn not only to make a good button-hole, but to make enough of them to earn a living at that; hence they have to keep at the same thing until they get speed. The course here is different.

## PRACTICAL WORK IN HOUSEKEEPING.

Take the cookery as a simple illustration. In the first place the girls, of whom there are 400 to 500, run their own luncheons. There is a committee appointed to buy from the market; they are allowed so much money, and it is their job to search the markets and report, make the bills and figure out the cost of the luncheon, which is sold at cost; and they get up for themselves a fairly good meal at about 8 cents a day. Secondly, in this rented house they take from time to time, and under certain circumstances, 16 boarders who come only for noon luncheon; and these pupils run the boarding house and prepare the meals for them at 15 cts. or 25 cts. or whatever it is. Thirdly, they run what is called the home table. Once a week they invite five or six and have a regular luncheon, just as a lady would have in her own house if she invited a company to dinner. That is generally done on Wednesday, and from Monday to Wednesday the teacher is not allowed to go into the building. Once they invited the Mayor to luncheon. Different girls conduct this luncheon every time. They elect a chief cook, with so many assistants from the first class and so many from the class below, and the committee in charge of the table decorates it. Sometimes they get a fixed sum, say \$3, to produce a dinner for six persons; then there will be five committees appointed, and each one sees which can get up the best dinner for \$3. Other times they reverse the process and see who can get up a fairly passable dinner for the least money, and so on. The mathematics, etc. are worked into the thing all through. They learn to can fruit, and in order to cover the expense they sell it again.

## DOMESTIC SCIENCE IN A SEPARATE SCHOOL.

The Board's experience had been this. They attempted eight or nine years ago to put domestic science in the High Schools and teach girls something about home-making. They hired very excellent teachers and put them into these separate classes; but the general interest of the school being something else, the children who elected it were in every case assumed to be incompetent, or not so brilliant, or poor, or somehow inferior. Hence it became decidedly unpopular and in fact died off entirely. Yet the minute the school was started in a separate building they had 200 to 400 girls a year, and more trying to get in than the building can accommodate; and those are girls from a social circle that would not be either poor or dull. There is not the slightest distinction in the public mind; this school is as good a school as any, and is attended by children of all classes of parents without distinction. Dr. Brooks did not think it ever entered their minds at all that it might possibly damage the school if it were looked on as one that only the children of poor people attended. It did not turn out so at all.

The difference between this separate school for Domestic Science and the general High School is this; in the latter pupils elect English and French, History and Domestic Science, but those in English or French are all getting ready for college, and are going to Normal School or taking a commercial course. In the separate school the girls take English, Art, History and Domestic Science, but the latter is the first thing—the thing that is emphasized. Every teacher there is an expert in dressmaking and art, and the whole art really has this basis. Pupils draw a design for the class, and that design which they make in the drafting room they have to work out in the next hour in the dressmaking department.

Of course History is not directly related, but for a time they were taught French on the basis that they were going to be heads of Millinery departments and to be buyers in Paris, and thus they had an entirely different notion than that they were simply studying French. The school has what is called "atmosphere"—the same as the Practical Arts High School has.

## PROVISION IN BOSTON COMPARED WITH GERMANY.

In regard to Continuation Classes, the German Continuation School of Munich, Bavaria, is a thoroughly equipped school covering every trade in that city. In general Munich is in what would be called the Arts and Crafts stage of development. Even their factories are practically hand-work, and are only developing from handwork from the fact that they have 20 or 30 fellows doing it. Munich has 6,000 artists who make a living mostly by designing things; and everything bought there is designed by an artist or an architect and worked out by a craftsman. Consequently they have developed a very complete system of machine-equipped continuation schools. In Berlin, on the other hand, Dr. Brooks did not find any machine-equipped continuation school—due presumably to the fact that North Germany is in a large factory system and has

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a different work problem. He found that they were reciting in civics for the purpose of making better citizens out of them; that they were making drawings and studying mathematics related to their business, but they got practically no training on the specific processes of their trade, whatever it was.

Compared with those things, Boston has had for 30 years what is called the evening drawing schools, in which are taught shop drafting, architectural drawing and general mechanical drawing, and Dr. Brooks thought them better than any he found in Berlin. They are continuation schools with this difference—that Boston students have to go in the evening, while in Germany the government control is such that they can make the employer let them go in the day time. What is called the Evening High School in Boston has courses for mechanical foremen, that is, mathematics and English that apply to their business. That is all Dr. Brooks found in Berlin, only they were doing it in the daytime, while Boston does it in the evening.

## TRADE SCHOOL WORK IN BOSTON.

The essential thing in a trade school for printing is that the boy shall learn in the school what he needs in the business but cannot learn in the shop about printing. Now, that differs from what a good many people have in mind when they talk about a trade school. They want the boy to learn exactly what he will learn in the shop. Of course you do teach him what he will learn in the shop to a large degree, but the important thing is to teach him what he cannot learn in the shop. For example, the boys are taught the proper setting up of type. Dr. Brooks showed a sample of the way one of the Board's Circulars had always been printed, and said that from the point of view of the expert printer it was very poor. He showed how it ought to have been set on a lead pencil design, which is psychologically and aesthetically correct. The children practice on this to get the difference of effect, and after they have got it drawn out right they set up the type and see the difference. That is a thing that no man who was paying them would allow them to do.

## CONTINUATION DAY SCHOOLS.

Definite continuation day schools were started in Boston two years ago and are now giving courses in salesmanship of various grades, in the raw leather business, in retail and wholesale drygoods. Employers let pupils come twice a week during the day-time without deducting from their wages. Two teachers do nothing else, and several teachers give only one class; then experts are obtained from the trade to give a very large share of the work. The Shoe and Leather Association sends down nearly every week some man to take up some phase. Forty young men in the leather business are studying. There are no classes in the day-time for men working at the trades, but in the Industrial Evening School there is organized instruction in any trade that the Union asks the Board to organize. The Board would equally do it if it was not the Union that asked, but it happens that the Union is the only crowd that get together, and the only

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ones that do ask it. The men in the machinists' trade asked for a course in jig and tool-making, which was the next thing above where they were, and 27 of them attended; 3 of them knew something about machine work, but had always had only one phase of it—they had either worked on the floor or at the bench or filing. Though they were Union men working at Union wages, there were only 3 that had a sufficiently wide knowledge of machine work to enable them to do jig and tool making. In other words, the men who came from the trade into that class were not as well equipped for advancement as were Mechanic Arts High School boys who never had had any trade at all, but who had had the wider opportunity to do things.

#### EVENING COURSES ON DEMAND.

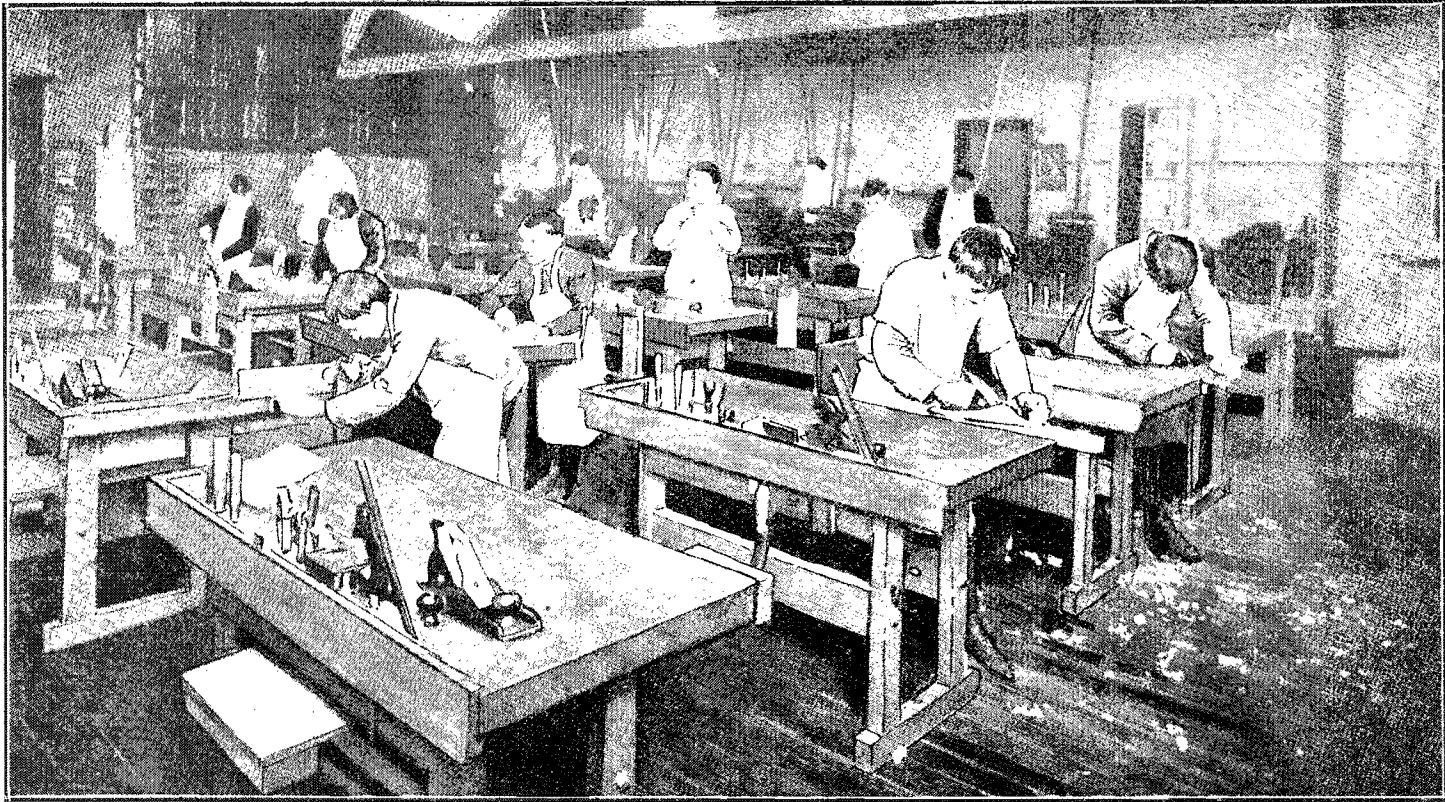
In general an evening course is started whenever the crowd gets together and asks for it, and there are probably a dozen such. The janitors would have to learn how to clean windows, how to use oil on the floor, to handle minor repairs, the relation of bacteria to dust, how to build fires, combustion, combustion units, the value of different kinds of coal and all that sort of thing.

Those evening classes are held in the Mechanic Arts Buildings, where there is also a day school. The day continuation schools must be held where the people are, so they take a loft or any kind of room, because they cannot get the people to go half a mile from work. So instead of taking a school building where they have to attend, as is done in Munich, the Board is coaxing them along, and they only attend when they like it and are quite willing to stand the loss of time, and the student comes back having become a better workman. Boston has nothing like the German Middle Technical School, where workmen who had been a good while in a shop could come back for a year or two.

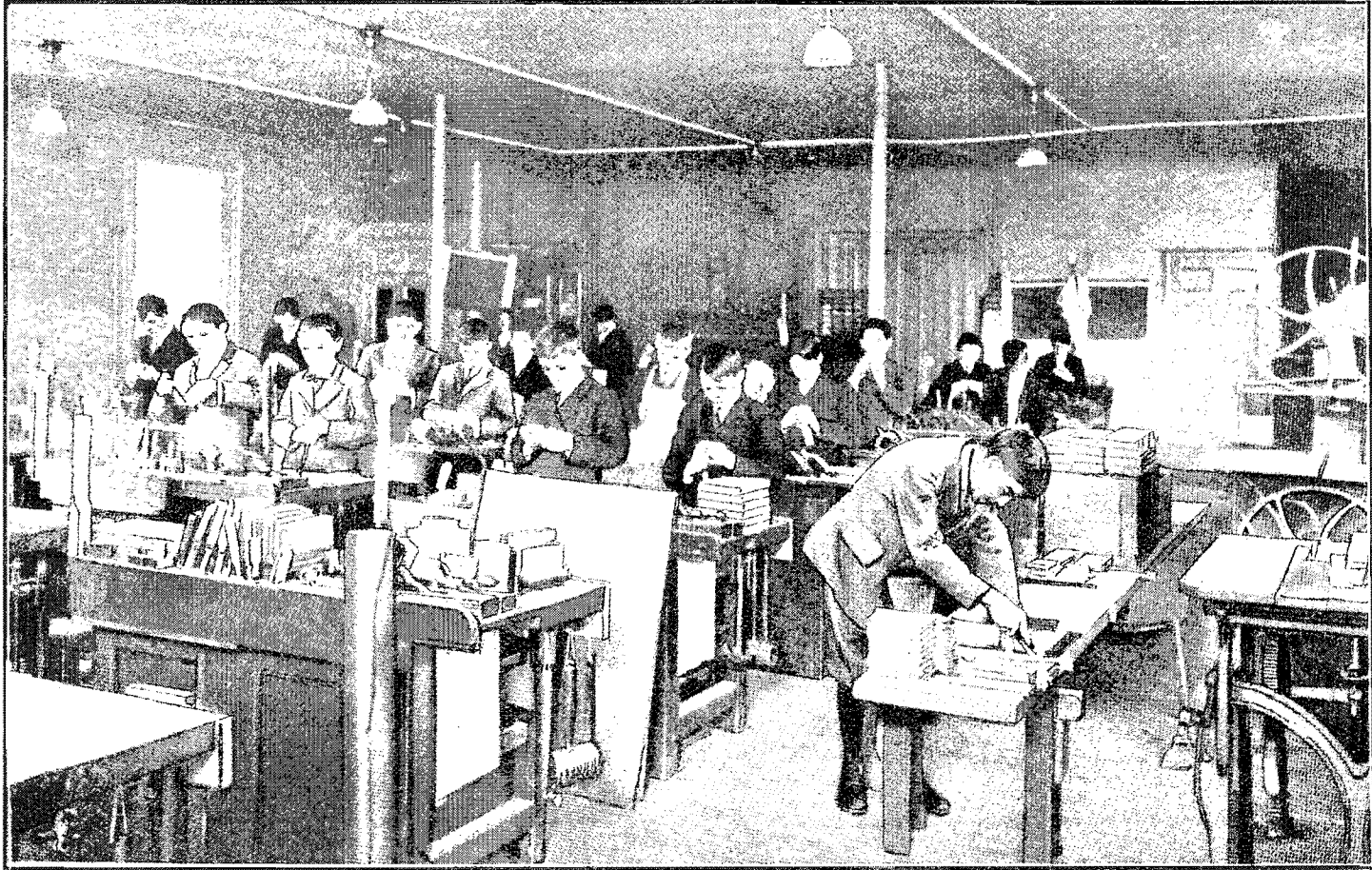
When asked by the Chairman whether he felt any sense of danger from young people who waste their time after 14 and have no interest in education, Dr. Brooks replied: "We have that and probably always will have it. An attempt is being made to minimize the danger by means of these trade schools—not because we believe the trade school better for them, but because they would not go to any other kind, and they might not go to this kind. But a great group of children who must stay in school until 14 don't really get any interest in what they are going to do in life until 18 and between those ages they ramble round. The Board would like to put in a different kind of school from what they have and are now trying to put in the industrial school. It is of course unknown whether the pupils will like that kind of school, or whether it can be made so they will like it."

#### VOCATIONAL GUIDANCE.

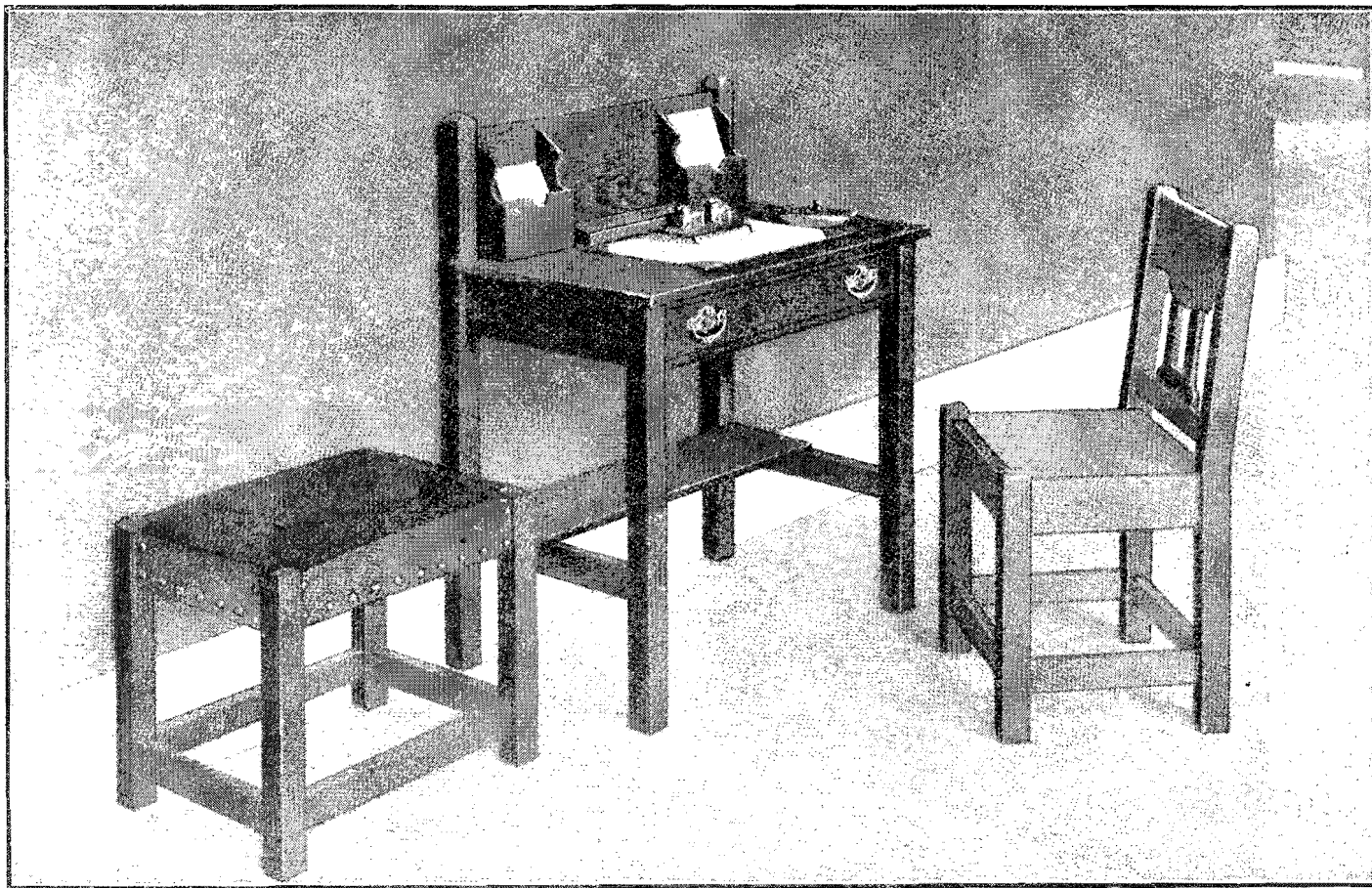
Boston has attempted in the public school to organize vocational guidance with a bureau that investigates all the businesses, determines what opportunities exist and what qualities are necessary for success, and in turn conducts courses for teachers for that purpose. Two selected from each school are called the Vocational Council; they attend these courses and find out what it is desirable



ELIOT DISTRICT INDUSTRIAL CLASS : BOSTON, MASS.

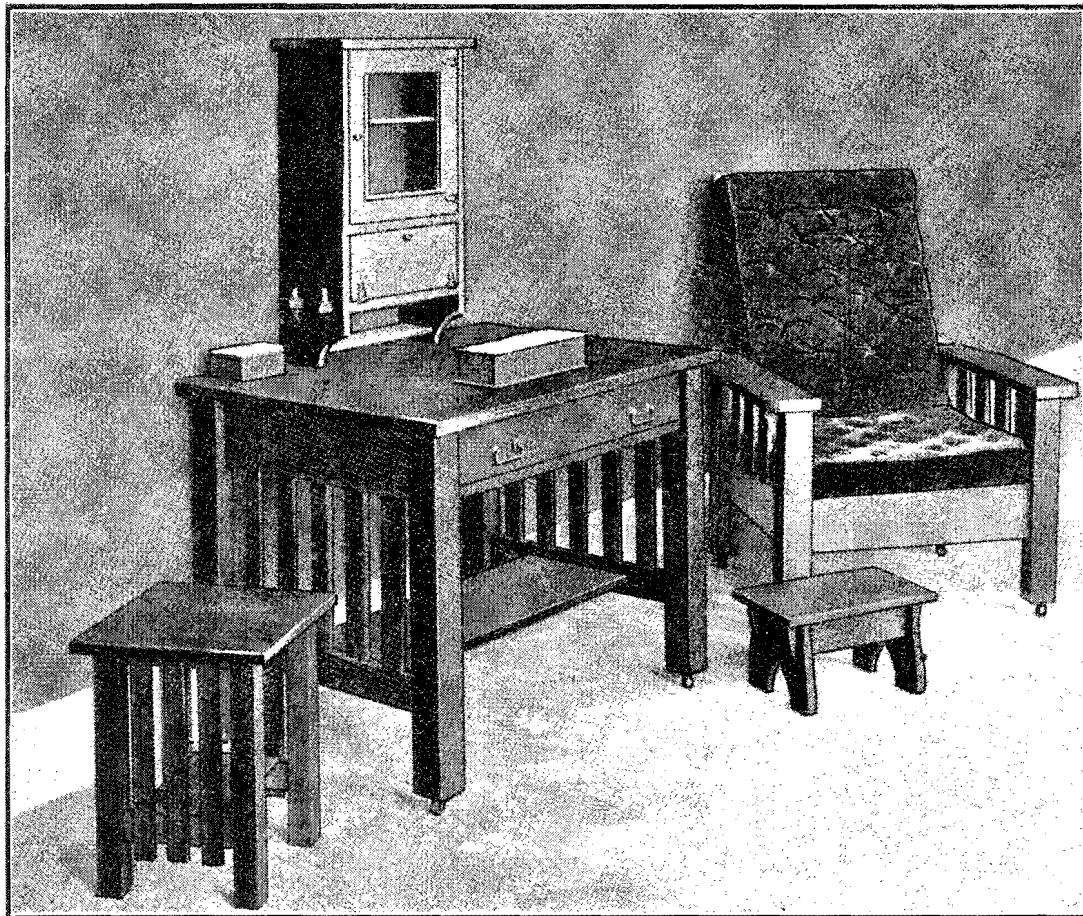


AGASSIZ DISTRICT INDUSTRIAL CLASS : BOSTON, MASS.



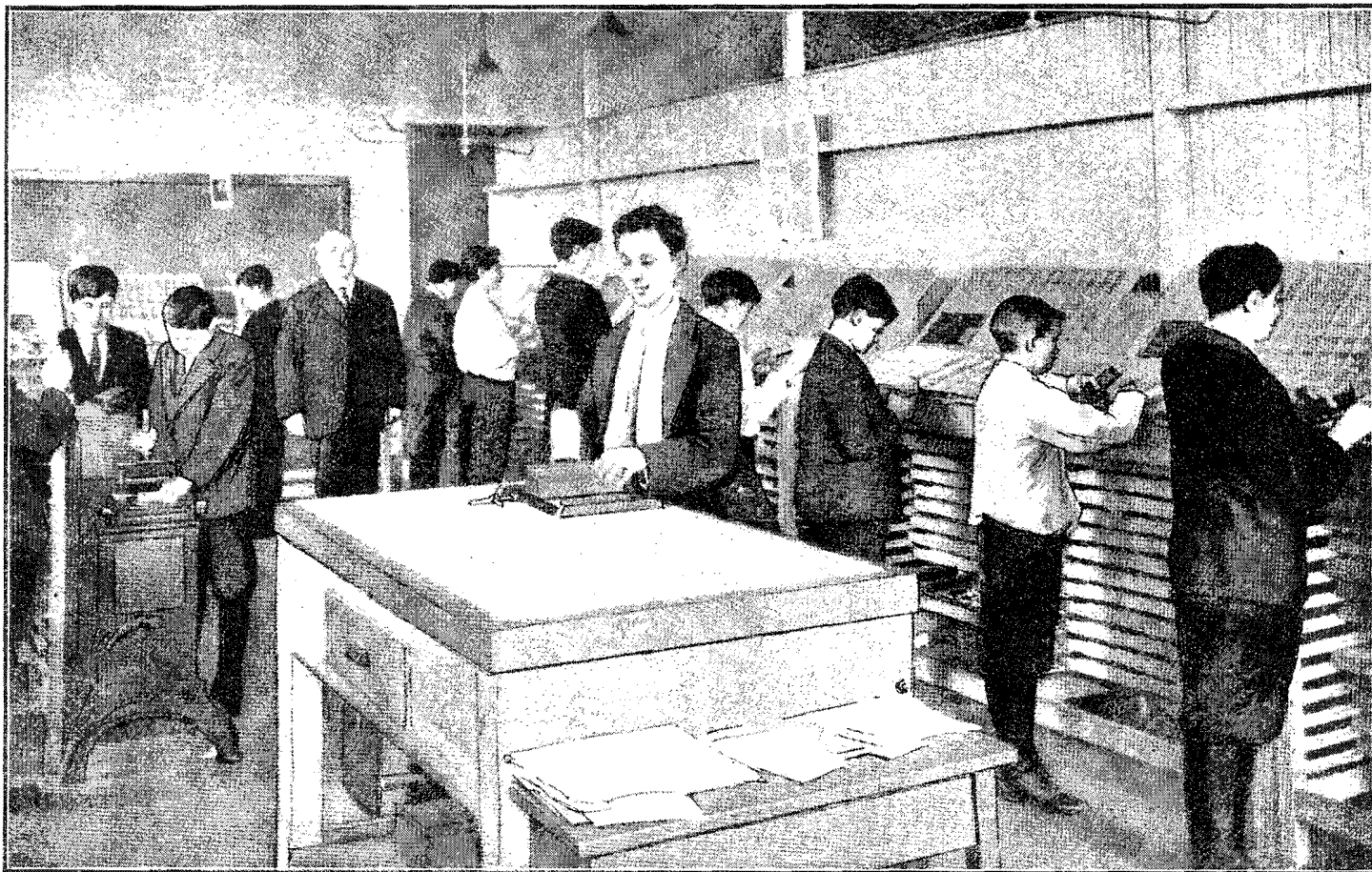
EXAMPLES OF WOODWORKING.—GRADE VIII : BOSTON, MASS.





EXAMPLES OF WOODWORKING.—GRADE VIII: BOSTON, MASS.





PRE-APPRENTICE SCHOOL.—COMPOSING ROOM: BOSTON, MASS.



PRE-APPRENTICE SCHOOL.—BOOKBINDING ROOM: BOSTON, MASS.

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what a boy or girl should be able to do on entering any kind of a business and they take time to discuss how to determine what a boy's real qualities are. Negatively, of course that is an easy job, for one can say at once that a boy who has no accurate physical control of his hands should not try to prepare for dentistry, or that one who had absolutely no qualifications in drawing should not try to become an architect. But, back of that specific problem, in which there is every opportunity to fail dozens of times, the Council are endeavoring to conduct lectures and courses, emphasizing in and through the parent that before the student leaves school he should aim in a certain way.

Without having any specific trade in mind, the school authorities are trying to give the pupils impressions of the ways in which trade develops and to enable them to acquire a certain alertness and skill in general.

An experiment of one kind was conducted in the Quincy School. A group of boys were put into elementary ironwork, and the School House Commission sent a lot of odd jobs, e.g. a lot of rough castings, and they learned how to file them. As soon as they have learned that, they will not do any more, because the object is not to make castings but to teach them how. They have certain drills, planers, etc. What is aimed at is to give the boy some appreciation of what work means, so that he may have some basis of choice, for example, as to whether he will go to a trade school or to a Latin school.

In printing this same thing is done; the seventh and eighth grade children are given two hours a week extra in the elements of printing before they come to the time when the pre-apprentice school starts. If it is found that the boy has no aptitude at all, the Vocation Councillor will tell him he has not the qualities to become a printer. To another boy she will say "I think you might succeed as a printer; you had better go to this trade school for printing." Dr. Brooks' opinion was, on the whole, unfavourable to differentiation before 14; he thought it was ultimately going to be disadvantageous to push the age of selection down lower. He was "going to stick for 14 years of freedom, and let the choosing be done after that."

## COUNTING THE COST.

Boston established a system of accounting with each school district separately, with all the items, and with the best possible division of the money spent in the school. In the Adams district the cost was \$26.38 per pupil, while in the Agassiz district it was \$35.05; yet those districts are supposed to be exactly alike. It was found that the average expense per pupil per year for janitor service was 11 cents in one case and 19 cents in the other. The janitor was spoken to, and the next year he had an expense of only 9 cents. By this accounting scheme Boston has saved \$100,000 a year. In addition to that, nobody now bobs up and says the Board is wasteful.

The endeavor is to standardize the system. Each principal is assigned a per capita allowance for certain items such as text books, drawing supplies, cookery supplies, etc. He is told he may have \$1.15 or \$4 per pupil, and then it is up to him. In general he is encouraged to spend all of that, because certain standards have been established and spending less money should never occur if

the school is to be weakened thereby at that point. One evening school cost Boston 18 3-10 cents, and another 21 1-10 cents. In the evening drawing schools the minimum cost is 38 cents and the maximum 54 cents. That difference was looked up, and it was discovered that by an old rule of years back things had been so arranged that if those drawing teachers happened to teach in one building they got \$4 a night, but if they happened to teach in another kind of building they got \$6, although any number of them would have been glad to do the work for \$3. So a new schedule was established beginning at \$3 and running up to \$5, and nobody resigned, they were all glad to take it. The Board's business agent now makes a report. For four or five years they merely ran along and "guessed." They "guessed" they needed so much for salaries; now the only guess in it is the number of children coming in that will require additional teachers; and allowance is made for that.

## SECTION 5: FROM DR. F. H. SYKES.

*Information obtained from "Conversation" with DR. FREDERICK H. SYKES, Director of Technical Education, Schools of Industrial and Household Arts, Teachers' College, Columbia University, New York City.*

One thrills with the possibility of education on seeing a nation like Germany in our own lifetime pursuing her policy unswervingly from small beginnings to great achievements, turning a poor nation into rich one, the most powerful on the continent of Europe. It is a question of efficiency. We cannot get efficiency without training, and under our modern system of industry we cannot get training without schools. All the new things have arisen by means of schools. Until recently, Medicine, Dentistry, Naval Architecture and Military science had no schools; and so all along the line of modern development, including Mechanical, Electrical, and Civil Engineering. No existing technical school in any industry is more than approximately a hundred years old; the watchmaking school in Geneva is claimed to be the oldest, but it was established only in 1824. The new things that have come up—called the professions as a rule—have their established schools which are today regarded as the normal way of proceeding, as the obviously right thing, producing efficiency in the lines that were planned for; but a hundred years ago that was not the normal way of learning law and medicine.

### THE NATIONAL PROBLEM OF EDUCATION.

Having proved this in one line, is it applicable all along the line? Germany says it is; they believe in it; they have organized it. Switzerland, Denmark, Holland, Belgium, France, Italy, Austria, also believe in it and have organized it. Scotland, even more than England, believes in it. The countries that believe in it most are making Technical Education obligatory, so that there is practically not a boy or girl as apprentice who does not get, in State-directed schools, all the technical knowledge of his trade or calling by an attendance of from 6 to 10 hours

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a week. That is true of the chemistry needed for the boy who is learning dyeing; of the drawing needed for the carpenter; of the bookkeeping for the business management needed by the shoemaker; of the drawing and design needed by the stained-glass worker. In addition to this general work—and here is the peculiar thing about the best of the German schools, the *Fortbildungsschulen*—they realize that a man is also to be a man and a citizen, and they do not neglect civics; and, in the religious countries at any rate, they do not neglect religion, though that may be a matter of politics as much as of education.

There is a mass of conviction represented by the experience of nations that have tried this experiment, and America is beginning to believe that what others have done it must do, and do quickly, for the United States is from 30 to 50 years behind Europe. In one thing the American people are in advance of any other country, viz., interest in women's education. That has characterized the United States.

## NEW ADJUSTMENTS AND EXTENSIONS.

The vitality of the public education system of the United States is receiving ample demonstration in the adjustments and extensions it is now everywhere making to incorporate the ideas and programme of industrial education. Educators realize that systems, if vital, must change, must grow, must specialize; and our system of education is fortunately so vital and responsive that it is ready to develop to meet the new demonstrated needs.

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The adjustments that have taken visible form in the work we call manual training, domestic science, domestic art, and so on, at first seemed to be merely a demand for "the practical" in education; they are now seen to be a clearer recognition of right method in education, of the facts and values of child development, and of the shortcomings of our educational system. That is what lies behind the new education to give it what we begin to realize is a revolutionary force.

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The root of the matter is that the public school system of the United States is not adequately efficient as an educative force. For reasons of faulty administration, indifference of parents and children, lack of adequate motive in instruction, the hardship of economic conditions, the public school system does not yet reach and hold the children it is provided to instruct. Even where it is best organized and administered, say in cities with a population of 25,000 or over, approximately half the children who enter are scholastically dead at the end of the seventh grade; a third of them enter the high school, and about one-twentieth actually graduate.

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## THE "DEADLY PARALLEL".

To put this generalization more definitely: Professor Thorndike of Columbia University has shown that in 1900, in cities of 25,000 and over, out of 100 eight-year-old pupils living long enough, the number retained till any given age is as follows:

SCHOOL LONGEVITY—PER CENT.

| AGE      | 10  | 11 | 12 | 13 | 14 | 15 | 16 | 17   | 18  |
|----------|-----|----|----|----|----|----|----|------|-----|
| PER CENT | 100 | 98 | 97 | 88 | 70 | 47 | 30 | 16.5 | 8.5 |

During the last 10 years we have increased the school longevity up to the 14th year by about 5%.

This school mortality is due, in part, to economic pressure, though less so than is currently believed. The main reason is that the material, method and direction of elementary education repel all pupils whose aptitudes and interests differ from those of the orthodox schoolroom, and repel them in increasing numbers as pupils grow in consciousness of their powers and likings.

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To separate the child in school from all his natural activities and environment, to train him through abstractions, chiefly to interpret and use symbols of reading, writing, and arithmetic, to teach subjects of instruction, not as related to the child's mind or life or future vocation, but after an order or classification of their own—that is the school practice which modern school reformers have not yet succeeded in breaking down. The kindergarten, the manual training movement, the household arts movement, the vocational education movement, have all been powerful centres for the diffusion of new conceptions of methods and material of elementary and secondary education. The older practice is, it is true, somewhat modified, but in the main it still persists.

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## THE NEW EDUCATION VITALIZES.

The question concerns first the elementary school. In recent years the most vital changes in material and method of instruction in the elementary school have come from the ideas and methods of industrial arts education. Elements of industrial education are already in elementary schools of the better type—drawing, clay modelling, wood working; something done in physics, nature study, commercial geography; here and there we find metal-working, dress-making and cookery, and would probably find them in all schools, if people would stop thinking of education as expense. Education, real education, it should never be forgotten, is not expense, but investment.

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These elements are already in many elementary schools; but many people are at sea in the bearings of the whole matter; as some one has phrased it, the idea of industrial education is to put blisters on the hands instead of on the mind. The basis of the new education is very different. The true basis for the new education in the elementary school lies in the nature of child thinking. Child thinking is essentially objective. It prefers seeing and handling a thing to mere talking about it. It prefers doing the thing to mere hearing about it. That is a principle, also, for much of our higher instruction—the laboratory and shop method of science and engineering. But it is the indispensable method in childhood and in the education of the child. The child thinks most when he plans what he is interested in doing.

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## PREPARATION FOR INDUSTRIAL LIFE.

Household and industrial arts are a part of the curriculum of every other civilized nation. Every modern European nation makes domestic science and domestic art—foods and cookery and household management, sewing, repairing, garment-making—an integral part of elementary education. The most advanced nations make wood-working and metal-working, physics and chemistry a part of public elementary education.

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In the same way the industrial arts subjects are a preparation for industrial life. They are not a trade preparation so much as a preparation of the understanding, the spirit, the habit. They cultivate familiarity with tools, the mental and physical co-ordinations called for in all industrial manipulation; they develop industrial intelligence and lend dignity to labor. They are the means, and the only means now available, for diffusing an interest in form and color—in a word, in beauty; and so through them we can do something to remedy that incredible lack of taste that marks a nation that has lost the traditions of art in all its industries.

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## WHAT WE MUST DO.

It is necessary first of all to accustom boys and girls in the elementary schools to think about the environment in which they live; about the things that are useful, helpful, interesting in that environment. That will differentiate the rural school from the town school, and the town school from the city school.

Then we must enrich the curriculum of that elementary school by constructive and artistic studies that bring out the qualities, the aptitudes, that are in the boys and girls there. That is the starting place; and any system of industrial education that starts in any other place will not start at the fountain head. Divergence of interest will be found in children from the Kindergarten. Towards the end of the elementary school there will begin to be divergences of natural

choice, interest and environment; strong divergences that will be marked in the city between industrial and commercial ends; between the boy who has a strong feeling for machinery and the one with a strong feeling for accounts. The girl also will begin to differentiate herself and some of her interests. By the seventh grade, normally 12 years old, you can begin to have classes that specialize on a particular line; that is to say, bench work, we will say carpentry, or cookery, dressmaking or needlework, etc.

Asked as to whether, in speaking of enriching the courses by some form of artistic training, he had in mind any addition to the course, or a modification of the existing course in so far as the subjects now taught might be taught in another way, Dr. Sykes said that would depend upon the conception of the normal type of school. In certain schools it would be an addition. Any good school, however, is expected to have work in the concrete—using that word in the sense of various objects, which may be clay, wood, textile work, spinning, cookery, or any work in the concrete—and to have that work begin in the first grade of that school and continue to the end, it being general in the earlier grades and specialized at the end.

The work done in a particular grade should be correlated; that is, all that the boy or girl does in that particular grade hour after hour should have connection with everything else that is being done in that grade. Therefore if they are doing some constructive work in a grade, the arithmetic there will concern the particular thing they are doing. If they are going to make a table, or tabaret, or something, the measurement and calculation of cost, stock to be used, etc. will constitute a correlation with the mathematics and arithmetic of the school. There should be a wider application in the schools of the correlation of all parts of the day's work and the week's work.

#### THE CRUCIAL YEARS OF LIFE.

The hope for the largest effect of trade education lies in those two anticipatory years, and then in the 15th and 16th years in definite trade schools before the boy can enter shop or factory as an apprentice. Most shops do not want a boy till he is 16; the boy does not want the school as at present organized; his parents do not want him at home, but want him to earn his living; so the boy is pushed around from corner to corner. The two most important years of that child's life—the dangerous and critical 15th and 16th years—he is filling in selling newspapers, carrying telegrams, any kind of unskilled labor that he can put his hands to, or drifting into crime. The testimony of the Chicago probation officers is that one of the greatest causes of crime is the neglect of children, in those two years, from the absence of proper educational opportunity.

Somebody may say, "Yes, but they have got to earn their living." Prof. Thorndike a few years ago had 1000 cases examined in the city of New York as to the reasons for leaving school, and his judgment is that the economic value of children going to work before they are 16 has been greatly over-estimated, and that it is not so much the economical reason that causes non-attendance at school, but that the school is not worth attending—for them; that it is built for another class of people who are being trained for universities.



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## INDUSTRIAL ARTS EDUCATION AND THE SECONDARY SCHOOL.

A percentage—estimated as high as 40—of the pupils of the elementary school (in cities of 25,000 and over) enter the high school. Is our high school education all that it should be? Revolution is now beating on the walls of every high school in our land. During the last two years 32 high schools of New York State have differentiated from the old-line type and put in household arts, agriculture, and shop work into their curriculum on a par with old-time subjects. But the old-time type is still the predominant type everywhere.

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The basis of a plea for universal industrial training by the State is that such training is the greatest factor in industrial efficiency, and that no other organization can adequately furnish it.

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Abroad, we see training and efficiency go hand in hand. In the countries where technical education is most highly developed efficiency strikes you at every turn: the cleanliness of the streets; the even, quiet movement of the street cars; the perfection of machines; the artistic lines and durable construction of the houses, the beauty of the stained glass, the quality and design of the linoleum you walk on; the planning of city extensions, of garden cities; the wealth of industrial countries like England, Belgium, France, Germany, the revival of Italian commerce.

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## THE NEW FORCE—TECHNICAL EDUCATION.

You get the conviction driven home and pressed in, that behind all that you see and experience, behind the whole movement for the betterment of the nations wherever you go in Europe, *the new directing force is technical education.*

On the one hand there is the striving to create and apply beauty to industry; on the other to increase efficiency in every line of production. And the total result is that mere living itself is better organized, is moving to a higher plane.

A change is coming in the economic situation, by increase in population; the old time of natural products is passing, and that of the manufactured product is approaching. Going further and beyond that, there is a movement from ordinary to finer manufacturing, and life is becoming more finely organized; problems such as transportation and big industrial combinations are becoming more and more complex.

Where are the people coming from that are to handle these things? You want a textile industry; well, you can have it by putting up a tariff; but what kind of textiles will you have?—Crude textiles that cannot be imported because the duty forbids; but if you want fine textiles where do you get them? From countries where they have fine textile schools and technical training. No matter what the United States tariff is on textiles, the fine ones must be got from France and elsewhere abroad. That is a beautiful story of the German manufacturer who bought cottons in England, brought them to Germany,

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put designs on them and sold them back to Great Britain. What he sold was brains, as he said, for he put brains into his product. All along the line of modern industry the nations are facing this need of a higher knowledge than was possible under the old-time industrial situation.

#### THE APPRENTICE PROBLEM.

The apprentice system has gone, both as a teaching and learning institution. The industrial revolution brought about a good many readjustments of relations between apprentice and employer, and in the readjustment somehow the employer's liability to teach was lost in the shuffle. The employer is no longer under obligation to teach, and does not; a trade is "picked up." Modern nations like Germany have faced the fact that the old apprenticeship system has gone, and therefore determined to have a new system for new conditions. They will not abolish apprenticeship, for they say it is a good thing to have a boy bound and to know that he is going to stay and learn thoroughly; but they realize that as a State they have to give a boy the training he cannot get in the trade. So they start all those State schools everywhere to supplement the training of the trade—not to give trade training, for they rely for that upon the factory and the shop and shop experience. But they believe that shop experience alone is inadequate, and that all the things that really can be well taught by means of schools should be taught by schools and added to what the boy or girl is getting in the trade.

Dr. Sykes thought it likely that the school authorities in America would provide a real trade school for the boy after 16 to teach him the trade as well as the principles, also continuation classes, so that the boy from 16 on would have shop experience of the trade while working for wages, and the theoretical side of it in the school.

Dr. Sykes said he was a strong believer in the use of the school plant to its utmost extent; and that the strong demand for training was to be seen among workmen everywhere in the way they attended evening classes, took correspondence courses, flocked into business colleges, and attended evening lectures; and he thought it was a disgrace that educational institutions were kept open for only five days a week and six hours daily.

#### COLUMBIA UNIVERSITY AS A TRAINING-GROUND.

Columbia University realized several years ago that their evening technical courses would furnish a new supply of trained teachers. Hitherto Manual Training teachers had academic qualifications plus a certain interest in mechanics. That type of teacher is able to teach academic subjects in a trade school but can never teach trade subjects or shop work. The evening courses in technical education gave the beginning of a large supply of trade experts—men who had finished their time in machine shops or as pattern makers, cabinet makers, wood carvers, foundrymen, forge hands and plumbers. Such people can now get the equivalent of one year of college work (from the point of view

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of their preparation for teaching) in three years, by giving 5 nights a week, or even 4 if they have a fair elementary and secondary education. This is the fourth year of that plan.

Dr. Sykes outlined the organization as follows:—The School of Household Arts is one unit; the School of Industrial Arts is another unit. Both schools are willing to operate at night or in daytime, late afternoons or Saturday night, it makes no difference; they want to get students. The group of experts who wish to become teachers is in charge of an adviser who sees that their programme is made out rightly according to the College requirements.

Asked whether if men, already technically trained in shops, gave their whole time for three months in evening classes they could prepare as teachers, instead of having them wait for two or three years, Dr. Sykes said he had asked the Board to establish scholarships so that they could get the men in the daytime and give them a year and put them earlier at work, but lacking State aid the only feasible thing was to make the cost as light as possible by leaving them in their occupations and allowing them to attend at night. He would regard three months as inadequate, but in six months he thought something very admirable could be done.

One course only is given to this evening group on what is called the teaching of industrial arts in trade and technical schools. It covers the meaning of industrial education, types of organization of those schools including curricula and methods of presenting particular subjects. When it comes to the methods of presenting particular subjects, the professor of Arts education steps aside and the professors of woodwork, mechanical drawing, machine shop and forging are called in to show how they give their subjects; so that, in a measure, the methods of teaching are presented. A man, if a good mechanic, might be prepared in a year to be very good trade teacher.

One peculiarity about trade teaching in America, Dr. Sykes remarked, is that it is beginning to specialize. In the older times the Manual Training teacher was a manual training teacher and taught anything. Now the demand is running along three lines—for specialists in drawing, woodwork, and metal work of the community. Other things needed, but in less demand, are electrical and photographic work, printing, etc.

#### SHALL THE SCHOOL PRODUCTS BE SOLD?

One of the very great problems, in Dr. Sykes' opinion, was what was to be done with the material product of the schools. The Manhattan Trade School for girls at New York was founded on the principle that the product should as far as possible be made on trade orders and sold. The school was successfully built up on those lines; the wholesalers co-operated in giving orders and disposing of the product. His own observations abroad summed themselves up thus,—that if they sold the trade product, the school was a good one; if they destroyed the trade product, the school was a bad one. There was no better illustration of that than the workshop school in Berne, which observes machinists' hours, the boys being at school in the same hours they would be in the factory. They have

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three weeks holidays which they would not have in the factory, but they are about half of the time at school work and half of the time at shop work; and all the stuff that they make there, that can be made without interference with the regular progress of their work, is done on trade orders and sold, these sales paying half the entire cost of the school. Apparently there seems to be a drawback in an educational organization that would sell product in competition with individual workmen; but we should consider that a boy in a trade school would otherwise be in the trade itself, and making the same thing in the trade, only making it not so well as he does in the school. In other words, you have the working boy and the product in either case, so it makes no difference. In the school his product would not be so large, because it would be dominated by the thought of making him familiar with many processes, with machines, with design and calculation; in other words, there is more human product and less mechanical product, while in the factory system there is a larger mechanical product and no human product to speak of.

#### POPULATION ALWAYS IN ADVANCE OF SCHOOLS.

Commissioner Simpson having suggested that in any system of education there would have to be a readjustment of the number preparing for any particular occupation so that the total number required would not be overrun, Prof. Sykes said that showed the necessity for co-operation with the people of the industry --the use of local Committees. Personally he did not feel this necessity, because he could not foresee an educational system that would ever be up to the training of all the people in any given industry; he thought they would always lag behind. In the textile industries there are, for instance, only five or six schools in this, the biggest cotton-raising country in the world. It would be a long time before the schools would ever catch up with the cotton industry. When Canada has a system of industrial education for 7,000,000 people, the country would have 10,000,000 people. The school would never catch up. In a stable country it would be different, but in a growing country it cannot be done.

#### INDUSTRIAL AND HOUSEHOLD ARTS.

The program of studies in these schools in connection with Columbia University is as follows:—

1. Graduate curricula leading to the degrees of Master of Arts, and Doctor of Philosophy.
2. Professional curricula, two years in length, leading to the degree of bachelor of science in education, with the bachelor's diploma in teaching; requiring for admission, two years of work beyond the high school, including two years' collegiate instruction in modern languages, in English, in mathematics or natural science, and one year's instruction in history, economics, or sociology.
3. Curricula, two years in length, leading to the special diplomas in teaching, open to mature students who can not meet the full academic requirements of (2).
4. Curricula, of one or two years, leading to special certificates.
5. Special students may be received in any special subject.
6. Part-time students may become candidates for degrees or diplomas.
7. Students are received without matriculation into Special Classes in Household Arts, and Evening Technical Courses in Industry and Commerce.
8. The Summer Session extends from July 5 to August 16.

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## SCHOOL OF INDUSTRIAL ARTS.

Students who wish to specialize in the field of Industrial Arts should take work in this school as their major subject. The requirement for admission is determined by the work they propose doing, as follows :

(1) *The degree of Master of Arts and Master's Diploma in Education*, with a major in industrial arts; open to college graduates only.

(2) *The degree of Bachelor of Science and Bachelor's Diploma in Education* with a major in industrial arts. Open to students who have done two years' work, subsequent to the high school, in normal school, college, or technical school. Such students follow a two-year Curriculum, which includes one of the major subjects below, together with additional elective courses to make up 60 points of college credit.

(3) *The Special Diploma for Teaching Industrial Arts*. Open to teachers who wish special training for the teaching of industrial arts; who are not able to meet fully the requirements of previous training under (2); the two-year curriculum outlined under (2) is followed.

(4) *The Special Certificate for Teaching in Industrial and Trade Schools*. Open to expert mechanics and craftsmen who desire to become teachers of shop-work. For these a special one year's program of full college work or a three years' program of night work is arranged.

(5) *The Bachelor's Degree and Diploma in Teaching Commercial Arts*. A two-year course, with the same requirements as (2) and (3), respectively, above. Also, a certificate course of one year.

(6) *The Special Certificate in Applied Arts*. A two-year course; open to students who have had full secondary education; this diploma qualifies for admission as candidate for a special diploma and the bachelor's degree and diploma (see above).

(7) *The Special Certificate in Drafting*. A two or three-year course of evening study open to those who wish to qualify for positions as mechanical or structural draftsmen.

(8) *The Special Certificate for Clerical Work*. A one-year course open to high school graduates who wish to qualify as a clerical and administrative assistants.

*Fees.* The annual tuition is \$150 with laboratory fees as stated. Part-time students may be admitted to any course in the School on the authority of the Director, at fees determined per course or at the rate of \$7.50 per point.

*Evening and Special Classes.* Courses listed as Evening Technical Courses are given at night and are open, without examination, to men and women who desire to obtain higher technical knowledge in their callings.

## THE SCHOOL OF HOUSEHOLD ARTS.

Students who wish to specialize in the fields of teaching, practice, social service, administration, and decoration as related to the Household Arts, should take work in the school as their major subject.

## GENERAL STATEMENT.

The School of Household Arts is a School of Teachers' College which has as its field the arts and sciences concerned in the conduct of the home, the hospital, the institutional household, and related vocations, and the educational courses related to instruction in these subjects in schools of various types and grades.

Students who desire to prepare themselves to teach Household Art or branches thereof are offered courses to qualify them: (1) as college instructors of household science, in chemistry, biology, economics, art, and administration, as well as in various technical subjects of household arts; (2) as directors and instructors of household arts in normal schools, secondary schools, technical and trade schools; (3) as supervisors and teachers of household arts in elementary schools.

As a technical school, the School of Household Arts offers the training necessary to persons engaged in, or wishing to prepare for the various occupations other than teaching represented in the activities of the School. Special opportunities are offered in house management, home cookery, household administration, house decoration, dietetics, institutional cookery, lunch-room management, nursery management, laundry management, and similar technical and industrial fields. Students who desire to follow the technical courses as a training for occupations other than teaching are admitted to all the facilities of the School. Qualified students can also take courses in other departments of Teachers College and the University such as fine arts, music, industrial arts, chemistry, history, economics, and sociology.

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The School of Household Arts occupies the new Household Arts Building, completed in 1909-10 at the cost of a half million dollars, which provides laboratories and all possible equipment for instructions and research in all divisions of the household arts and sciences, and contains as well a special library of household arts.

*Fees.* The annual tuition fee is \$150, with laboratory fees extra. Part-time students may be admitted to any course, on the authority of the Director, at fees determined per course or at the rate of \$7.50 per point.

*Special and Evening Classes in Household Arts.* Special classes are given in Cookery, Design, Dressmaking, and House Management, for persons who wish to secure part-time practical instruction without regard to certificate or diplomas. Classes begin in October and in February. They are not open to resident students without extra fees.

## ORGANIZATION IN THE UNITED STATES.

Writing in the Teachers' College Record on this topic Dr. Sykes makes the following statements:—

*Middle Technical Schools.*—Our highest schools of Engineering and Architecture provide more and more adequately for the highest class of professional and technical workers. But the men and women of the middle technical classes we neglect, and this class—the efficient instruments of the engineer and the architect and the superintendent—is probably 16 times as numerous as the highest class. In the city of London, the new provisions for technical education include 1 high engineering school, 7 polytechnic schools (middle technical schools), and an equal number of art-industrial schools. What we have already done sporadically in the textile schools of Lowell and Philadelphia, in the technical schools like Pratt and Carnegie and our Schools of Industrial and Household Arts of Teachers College must be done with an aim and a system by state and nation, adequate to the greatness of our commercial, industrial, and household interests.

*Art-Industrial Schools.*—Middle schools for those industries that depend in large measure on art for their character and value are a most urgent need in the United States. Schools of the art industries, such as the printing industries, the ceramic industries, the finer wood-working and metal-working industries, interior decoration, photography, have in foreign lands demonstrated their usefulness to an extent that stirs the American observer to admiring envy. Here the splendid gift of artistic inheritance that comes to us with our immigrants we waste and lose: the very boy who works in hammered brass in the elementary school to excite the teacher's surprise and commendation, is found next year driving a delivery cart. When we open up schools for the art-industries we shall have American-born artists in our industries. Then, perhaps, we may produce color prints to equal the Germans, and fabrics to equal the French, and porcelain to equal the English.

How the colleges will react from the pressure of vocational training it is not easy to foresee. That they will adjust themselves in part to the new demands is certain; but it is probable that before the adjustments are made, we shall have colleges of a new type established that will unite the so-called cultural studies with training in the technical arts.

*Libraries and Museums.*—In the provision of public libraries, we lead the world. The need of industrial and art-industrial and commercial museums has still to be recognized and supplied. What we have done for museums of fine arts needs to be done in every great city for the industries by which these cities live.

*Agricultural Schools.*—The organization of state systems of agricultural education from the rural school to the agricultural college will parallel in every stage the organization of the industrial and commercial schools of the towns and cities. Progress in this field of education is already rapid.

*Training Schools for Teachers of Technical Arts.*—The extension of program of normal schools to include the subjects of industrial (including commercial), household arts, and agricultural education is proceeding apace and should be pressed on. Technical schools have everywhere a duty and opportunity to select and to train the expert workers who can also teach; on such men depends the success of our trade and co-operative and continuation schools. Teachers College has tried to be forehanded by instituting its Schools of Industrial and Household Arts, the chief end of which is the training of teachers of technical arts; but already the demand exceeds the supply.

*Vocational Training a State Investment.*—This vocational training through schools has hitherto been the privilege mainly of the specially gifted or the specially fortunate; and in general this training has been confined to the professions, and the individual has had to pay for his training. We are ready now to think more broadly in this matter, and consider if national efficiency, which is a concern of the nation, can be provided for by state and nation; that the many to the measure of their ability and their needs, may have the training hitherto denied them; that we may utilize adequately our chief resources, the men and women of this land. The program outlined above will take money; but it is, we insist, not expense, but investment. Investment by the individual in education is shown to be financially remunerative to the individual; state investment in

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education is likewise demonstrably remunerative to the state; there remains then this final state investment in state vocational education. The burden is no more serious than that of any other type of secondary education.

*Summary.*—To sum up: The new education aims to train our people to meet the problems of livelihood and living—to apply science and art, craft and machinery, method and organization to make possible a higher achievement of living for all. The great new stream of education must penetrate like a vast irrigation system through the land, pushing its rills into the remotest communities—as universal, as essential, as beneficent as the free elementary school. This is the latest and most measurable contribution of education to life. “That man only,” said John Ruskin, “is educated who is happy, busy, beneficent and effective in the world.” To that idea—that men and women may in this land be happy, busy, beneficent and effective—the new movement of vocational education is devoted.

## CHAPTER LXI: VOCATIONAL SCHOOLS OF INDUSTRIAL TYPE.

### SECTION 1: INTRODUCTORY.

From all sides the Commission heard that the tendency to leave school at the age of 14 is so insistent that the ordinary school is unable to hold a large number of the pupils whose parents could afford to keep them in attendance longer. It is claimed that here the Vocational School is able to offer sufficient inducement. For example, in Buffalo more than 60% of the cases reported as leaving school at the age of 14 leave not from necessity, but because of the unsatisfactory opportunities of the regular grammar grades. This has been said without any intention of belittling the good work done in the ordinary day schools. It is complained that the fault lies in the system, not in the way it is carried out.

The immediate purpose of the Vocational Schools is not to teach a trade, but to give the pupils such series of experiences that they shall know what good workmanship is, and be better able to appreciate its worth and importance by being able to do the work with enjoyment. The boy who leaves the 6th grade is not ready to learn a trade; in most cases he has not the physical strength or the maturity of mind or body, but he is ready to do work from which he will form habits of care, thoroughness and accuracy, and discover to himself for what trade or occupation he is naturally fitted.

In the case of girls, Vocational Schools follow either the course of preparing them for home-making or for one of the industrial or commercial employments. In the course for Home-making, each of the three sections or departments of cooking, sewing and book-work receive full attention, usually not less than 2 hours per day during a 2 years' course. The cooking and sewing are brought up to housekeeping; millinery and dressmaking grow out of the sewing, and are substituted for it as the work goes on.

#### THE PROBLEM OF SCHOOL PRODUCTS.

In all these schools, what to do with the output of the school in the form of the products of the school shop raises questions which have to be answered in accordance with local conditions. Wherever the school can make articles to be used or consumed by the school authorities or the municipality, that seems a proper destination for it. It is claimed that where the pupils know that their products have a real commercial value, they do the work better, and are more interested in the school studies than where the things are made only for their own use. There is also the development of the social or civic spirit through the pupils knowing that they are in some measure contributing in towards the cost of the school.



## ARITHMETIC OF THE BOOK OR THE BOOKCASE.

Those in charge of the schools express satisfaction with the progress they are making. Where the book work and shop work are so conducted that the one gives meaning to and needs the help of the other, the pupils derive greater benefit from both. The lessons in arithmetic arise from calculations of the cost of the product, such as the desk, bookcase, a dress, a hat, or of the meals served to the teachers. The pupil feels a direct and personal interest in the number work, which does not arise when he is called upon to do a set sum in arithmetic. In many cases the pupils in these schools are taken for visits to factories. These occasions give rise to lessons in composition and other school work, all of which help to develop ability and interest in the industrial activities of the place.

## SECTION 2: "CONVERSATIONS" RE INTERMEDIATE INDUSTRIAL SCHOOLS.

The Commission had the advantage of discussions with Messrs. Murray and Allen, of the Massachusetts State Board of Education, as well as Commissioner Snedden and his deputy, Mr. C. A. Prosser, concerning the Independent Industrial Schools. Their aims, the character of the work they do, and measure of success which they had attained, were observed as far as practicable and discussed with the Principals and others. Out of that material the following general statements have been gathered.

In Massachusetts no community is obliged by law to give any form of industrial education. The practice has been to make a school or course of education permissive, and then to make it mandatory upon communities. Industrial education is at the permissive stage now.

The legislation under which the work is being conducted deals with three groups of interests:—

(1) Children at 14 years of age who may leave the regular public school and take advantage of the Industrial School, exercising their choice between the school opportunities and the situation with pay;

(2) The young man or woman who has already gone to work, and who may take either Continuation Classes or get the benefit of one of the part-time or half-time classes;

(3) Such schools in Massachusetts as, to a greater or less extent, serve one or more of these classes.

The complete system of industrial schools as contemplated by the State Law includes all-day sessions for the boys and girls; evening trade extension work for the mechanic who is employed during the day; and the opportunity in the day time for part-time instruction to young people who can get a certain time off from their wage-earning occupations. Experience has shown that the best way to introduce the work into all these classes of schools is through the medium of evening classes first. "Get the workers there, do something for them, and then get a sentiment in the community which favors industrial

education. By such means you will find that the people and the authorities of the locality quickly learn a good many things about industrial education that they did not know before, and thus become ready for development." The plan of the leaders in Massachusetts is to urge the people to begin evening schools. The State pays two-thirds of the salary of the instructor of evening classes.

#### EVENING COURSES FOR VARIOUS GROUPS.

Evening courses are established in many places in the Commonwealth, the conditions of admission being two:—(1) The student must be over 17, and (2) he must be on the job. These courses do not pretend to teach a trade. They simply take a certain defined group and deal with some very limited practical end of that group, without any relation to any other course whatever. There is another series of courses, *e.g.*, one school gives a course of house carpentry in roof-framing only. Another school opens its shops to men employed in a specialized line of industry, and says, "If you are a lathe hand and want to run a grinder, come in and we will put you on the grinder; that is all we do; that is all you say you want; we will give it to you." Another group says, "We are employed in machine work and want to become tool-makers in a special branch." The school says, "All right, we give a special course in tool-making for machinists." All those courses would be designated in that way, even if it was called academic work—the course in arithmetic for house carpenters; the course in arithmetic for machinists; the course in blue-print for machinists; the course in drawing for carpenters. It is called the "Unit" course. The scheme in every case is to serve a certain group already in the industry who have a certain specific need along what might be called a narrow line. An evening school undertakes to give that particular thing, and then so far as the school is concerned it is all off; there is not an attempt to give a series of related courses. It may be that the group comes back and says, "We want an advanced course in this same thing," and the school gives it; but there is no organization of series of related courses such as drawing, mathematics, English and machine shop practice. This particular school is the one that is aided by the State. The communities maintain other evening schools of a more general nature.

#### ATTENDANCE REQUIREMENTS.

All boys between 14 and 16 years of age must be either at school or at work. If a truant officer finds a boy on the street under 16, he asks why he is not at school. If the boy says he is working, the officer assures himself of the fact, or sends him back to school. The State law is reasonably well carried out. The 16-year law dates back 10 years; the 14-years dates back 30 years. It provides a heavy fine and a jail sentence for any employer who employs a boy or girl who should be in school, and there are State factory inspectors whose duty it is to see that the law is enforced.

It might safely be said that every boy in the Industrial School would be employed for wages if he were not at school. In the case of 95 per cent of the

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boys, if they were not in the Industrial School, they would be at some sort of job through which they would not be receiving training to fit them for work which would yield permanent satisfactions when they are grown up. The Independent Industrial Schools do not divert into themselves boys who would otherwise go on to the High Schools. In the case of New Bedford it was cited that after the opening of the Independent Industrial School the High School got as many pupils as ever and the Industrial School got 150 pupils who would not have gone to the High School, but would have left the Grammar School without further education.

## INDUSTRIAL SCHOOL FEATURES.

One characteristic of this industrial school should be kept in mind:— A vocational school is not in any sense an outgrowth from or ingrowth towards any other type of school; it is an outgrowth of the industry rather than of any other type of school. A boy goes into this school when he could go into the shop itself. This industrial school taps a new group, for these boys of 14 would probably have gone out to industries. Figures show that only 6 per cent would go from Grammar School to High School. After a while these boys are going to be leaders of industry. They will climb from the shop work to foremanship; and they will be socially superior to the fellows who find their way into the industries by accident, and get only the limited experience the shops now give. The Technical High School fellows will go to the Technical Institute, and go through by what is called the "white shirt" approach.

Experience with the industrial schools made it evident that the instruction must be quite specific towards qualifying the boy to do well in his vocation when he has left school. There is much closer scrutiny of the results of an institution which undertakes to train for practical achievement than there is of an institution which simply undertakes to give a general cultural training. The degree of efficiency is more easily checked up in the case of the industrial school. The school undertakes to train a boy so that he will be a competent mechanic, and by virtue of his training demand and expect better wages. The school gets a quick reaction on itself, both by the pupil and his employer, that does not come back to the school which has a course of general cultural work. It does not make so much difference in regard to the reputation of a High School whether 50% of the pupils are not trained efficiently; nobody seems to know or allocate the cause. In the case of the industrial school it gets a quick comeback. This has led those in charge of the industrial schools to differentiate very sharply in their methods of instruction. It has led to the teaching of the pupil on the basis of a working knowledge of the facts with which he will have to deal when he enters upon his employment.

## SHOP WORK AND CLASS WORK CORRELATED.

At first some schools were organized on the principle of what has been called the parallel experience. For the purposes of administration these were

regarded as two essentially unconnected experiences, although every effort was made by the teacher to co-ordinate or cross-connect them. Mathematics were taught as mathematics when the boy was in the class-room, in the regular sequence as arranged in the text-book, but sometimes using the content or subject-matter of shop experience. Now, the teacher learns what the boy has been dealing with in practical mathematics in the shop, and gives him experience in that class of calculation during his school hours.

In all cases the plan or scheme of the school includes the proposition to train the pupils through the turning out of products which have commercial values. In the case of some schools the pupils devote a portion of each day to shop work and the remainder of it to class-room work closely correlated or co-ordinated with it. In the case of other schools the pupils devote a period of a year more or less continuously to shop work, receiving their theoretical instruction in connection with the practical work they are doing. In the case of the school at Springfield, that is the way the instruction is given, although part of it is given in the shop and part in the class-room. Then one day every week the class-room work surveys what has been done, particularly in mathematics and drawing, with a view to giving the pupil a knowledge of the general principles which have been ascertained, and showing him how they may be applied to other cases.

#### DOES NOT LEAD TO THE HIGH SCHOOL.

When a pupil enters the Industrial School he cuts himself off from the schools intended for the professions, unless he goes back and starts over again. Fifty or sixty per cent of the boys who go into these Industrial Schools are those who have not completed the Grammar (Public) School course, and not having played the game by the rules they cannot enter the High School. As the High School does not recognize the training in the Industrial School as of value for its purpose, the boy would not receive credit for his industrial work. Consequently boys do not enter the Industrial Schools as a preparation for High School work.

"As the situation stands at present in this State the Industrial School is an independent organization, and not a preparatory school. It goes entirely on the principle that a boy is going out from that school right into life. That is what might be called the official standing of an Industrial School. In other words, a boy makes his choice in a broad way when he enters the Industrial School, and if he has made a mistake he must, to a certain extent, retrace his path."

#### QUALIFICATIONS.

A boy entering an Industrial School must be 14 and able to read and write. It is not required that he has spent up to the sixth form; a boy is admitted on exactly the same basis when he has given his age and the school certificate. The actual work of the school when he enters is the test whether he shall stay or not. If he shows he cannot do the work he has to leave. The actual work of the school raises the academic standing of the boy by testing him out. Mr. Allen gave a practical illustration of this. When he organized the New Bedford

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school he took with him a teacher of mathematics from the High School, and they found, as near as they could tell from their experience—Mr. Allen had considerable High School experience—that the boys who had had two years' training where academic work was related to shop work in this way, were better in mathematics and English and their power to understand than the average pupil they had been accustomed to deal with in the High School on more than a two year basis.

Mr. Murray corroborated this statement from his experience in the Newton Independent Industrial School, adding that the Board of Trustees, which is made up of some members of the city government and some members of the committee which controls the public schools, passed a resolution a year ago that any boy leaving the Grammar School at the sixth grade and taking three years at work in the Industrial School should be entitled to his Grammar School diploma just as if he had stayed in that Grammar School.

### HOW BOYS ARE "TRIED OUT."

When the boy enters the school he is asked what line he wants to follow. Mr. Allen said that when speaking of an Industrial School the leaders thought of a school fitting for a particular industry, such as metal or wood. If a school is undertaking to deal with more than one group, it is regarded as a group of schools; so that Worcester from their standpoint would be regarded as a group of two schools—one wood-work and the other metal-work. Take Newton: suppose a boy says "I want to be a printer," they set him to work in the printing department. After a while it appears that the Lord did not design him for a printer; so he comes back, and they agree there has been a mistake. Then the boy says "I have had my eyes opened in this school; I have stuck my head more or less into the machine-shop; I have a notion that is where I belong." They say "All right, go and try it." There is a trying-out process in the early stage of the game. That is the way the boy is taken care of, but he makes the test when he enters the school with the opportunity of making a new choice if it appears he made a mistake in the first place. The number of trials a boy has depends on how many trades the school provides. Newton has woodworking, metal, printing, and electrical work. Each of these schools is organized with regard to local industries.

### ADMISSION TO CLASSES.

As far as the State is concerned, there is no specific time for admission to these schools; a boy may come in today and be admitted. There is no regular admission once a year, except that he must be 14. That has complicated dealing with those boys, because they drop in all through the year, and it is almost impossible to deal with them on a class basis. Instructors must not have more than 15 boys in their class, for a man cannot do satisfactory work with a larger group. One school that started with a unit of 30 fell flat, and it practically put the school out of existence. The whole thing might be in one building, as in

Worcester. Under the law the local community furnishes the building and equipment, and the State does not care whether it is scattered over various places in the city; it is all the same organization. Very often these communities, having certain equipment which was frankly intended for another purpose, use it for the purpose of this State-aided plan, and sometimes it is used for another purpose also.

Dr. Robertson asked whether the gentlemen thought that the Industrial School was complete in itself, and did not call for another school to which some of its pupils might go on; or if it did require such a higher school, whether any existing school was suitable as a secondary school to the Industrial School.

#### FINISHING AT THE INDUSTRIAL SCHOOL.

Mr. Prosser replied that there is no demand for such a higher school in connection with the Industrial Schools.

Dr. Snedden thought that without doubt there would be a demand for continuation from the Industrial Day School in evening work. In Lowell there is an evening school for foremen which takes the high-grade artisan, those capable of handling the more complicated technical work.

Mr. Murray said that Newton Technical High School had made so much of a modification that it is practically open to the boys of the Industrial School, but with two exceptions the boys had not taken advantage of that. He cited the case of a boy who had really finished his three years in the Industrial School, and when asked why he was not attending the Technical High School he replied, "I don't think that is the place for me; I ought to get into work, and I believe I like the printing better than patternmaking." Though he had put in three years at pattern-making and did excellent work, he had taken up with printing. He believed a boy with that type of mind was better off at work than if he went to the Technical High School.

Mr. Allen said that the one great difficulty is the unwillingness of the intelligent boy to work his way up through the shop and enter an industry through what Mr. Prosser calls the "dirty shirt" end, although there is large opportunity in the State for shop-trained boys of ability to rise, and large establishments are looking for such boys. They could get plenty of technically trained men, but not the other type.

### SECTION 3: THE NEWTON (MASS.) SCHOOL SYSTEM.

*Information obtained from "Conversation" with DR. SPALDING, Superintendent.*

A chart has been prepared showing what the Newton School System stood for and was trying to do only half a dozen years ago, also what it now stands for and is aiming to do in the immediate future. For a long period, ending about 1905, it consisted of an elementary school topped off by courses the main idea of which was preparation for college, normal school or technical institute; but all the while the pupils dropped out from the 5th grade up to make a living.

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The uniform answer of these embryo craftsmen and home-makers to the question "What preparation have you had?" could only be, "Reading, Writing and Arithmetic." There was a barrier—"no preparation"—which was broken only by students who went to higher schools open only to those preparing for the learned professions. This old type of education was thus described by the School Committee of 1910:—"It selected, retained and educated those who were fitted by natural endowment and interest to profit by what the school thought fit to offer; others were eliminated all along the way, and with little concern for the precious material thus forced to waste. It stood for uniformity in materials of education, in methods and in product."

## THE NEW IDEA IN EDUCATION.

The new development has been inspired and directed by the idea that "it is the function of the school to educate every boy and every girl; to eliminate none, to accept all. It fits work and method to individual needs, and strives to send children out of school just as individually diverse as nature designed them to be, and as the diversity of service which awaits them requires." The "no preparation" barrier is lacking in this section of the diagram, and pupils are able to give answers showing some special preparation for different lines of work—commercial training, technical trades, machine trades, cabinet work, etc., in addition to reading, writing and arithmetic, which are basal.

In order to give specific preparation, there now appear on the diagram, instead of a single High School, two High Schools and several types of trade schools—all carried on under one roof in the Technical High School—besides the Independent Industrial School; also special classes for backward children, and the development of the elementary school that leads into the High School instead of the little elementary school for illiterates of some years ago.

Dr. Spalding stated that he considered vocational and industrial training but an incident, though a very important one—only a striking phase—of the growth of public conscience concerning the great problem of education as a whole, which has developed in that direction at present. Industrial and trade training, he asserts, has no conflict with Greek and Latin. It is simply an adaptive kind of training that certain boys and girls need, just as Greek and Latin form an adaptation and perhaps will always be needed by some boys and girls. He suspected that many other things which we now scarcely think of as educational or proper subjects for instruction will have to be brought into the curriculum of our public schools as the problem grows upon us and as we are solving it.

## VOCATIONAL EDUCATION.

Now we are beginning to do in our public schools just what our higher schools and colleges and universities have always depended upon for their main success—vocational training; for notwithstanding all we have heard about culture, the fact is that they have trained for vocation—they have trained the leaders in the higher professional walks of life. Now the public schools, filling a lower

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and earlier phase in life, must train in suitable vocations, such as society demands, those boys and girls who will not get their vocational training in higher institutions.

Massachusetts has local option in education as in all other matters. While the schools have always been organised under State laws, and are State institutions, beyond the very minimum of education the trade schools are developed locally, and up to the last three or four years localities could go as they pleased, being required to support them financially to the fullest extent. Excepting a few poor places, having valuation below a certain amount, no cities or larger well-to-do towns have ever received any State support in educational matters till within the last three or four years.

#### NEWTON'S SCHOOLS AND STATE AID.

The people of Newton have developed their educational scheme and worked out their problem as they saw it, in response to their own ideas and ideals, and in harmony with, but not going far beyond, any State requirements until recently. This community is paying the cost of this educational development, excepting that the State, under certain conditions, reimburses the city one-half (say \$3,000) the expense of maintaining the Independent Industrial School; also one-half the expense of evening classes in shop work and drawing held in the High School building. These two exceptions amount to less than 1% of the total expense of education. Manual Training and Domestic Science do not come within range of State help, though the State authorities will say at once that this does not indicate a lack of sympathy with that kind of education.

Out of a population of 40,000, the schools are attended by about 2,000 pupils doing work of High School Grade, or 5% of the total population.

Lunch is furnished to the pupils in exchange for tickets, by which means they can all be supplied in 5 minutes.

#### HOW THE NEWTON SYSTEM WORKS.

The city of Newton is made up of seven or eight villages, and pupils enter whichever school they please. The Technical High School building, which is used also for evening classes, is situated just across the road from the Newtonville Grammar School, and was visited by the Commission. This Technical High School Mr. Allen calls a "full-time full-responsibility" school. The Newton Grammar School is a High School with the usual literary and classical course.

While the two schools are organized separately and have separate corps of instructors, about 300 pupils come from the Grammar to the Technical School for practical handwork—girls in cooking and boys in mechanical shops.

In every year of every academic course fully a third of the pupils of the Grammar School take a minimum course of practical work in the Technical High and before they get through fully two-thirds of them will have had practical work at this school. Practical work is compulsory for those belonging to the Technical School, and those not wishing for it must go over to the other. The changes



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at the beginning of the year are about equal, 20 or 25 starting in one school and changing over in each case. It is a good opportunity to judge the two systems—the same ground, the same city, the same general system, and practically the same social standing.

### THE TECHNICAL HIGH SCHOOL.

In this school a very wide range of work is covered all the way from that which comes very close to trade training to the opposite extreme of preparation for college—without Greek, however, which has not been asked for, though a good many take Latin. The variety of courses running side by side under this roof would make half a dozen schools, such as Manual Training High School, School of Practical Arts, Trade School for Boys, Commercial High School, etc. The size of the place compels this school to maintain under one roof all these different departments. On the whole, Dr. Spalding thought the advantages outweighed the disadvantages, and that the school can do what it professes to do better than if the departments were separated. The work can be adapted to boys and girls as necessity arises; a girl can be shifted, or partly shifted, from one course to another, whereas the schools, if separate and distinct, would lose many misfits who start in the wrong place and drop out. The aim is to make the most of such a boy, and this school gets its hands right on to him, and if he drops out, the responsibility cannot be turned off from the school on to someone else.

The "transferred class" affords a concrete example of the determination not to sacrifice any boy or girl to a system or to any mechanical methods. There are grades and promotions, etc., but these are used all the way through in the interest of the pupil, instead of sacrificing the pupil to them.

### GRADING AND PROMOTION.

The idea all through the grade schools is to put the boy and girl where they can do the best work, and provided they do the work well, let them go as fast as they want to, or force them to go more slowly. This plan has resulted in getting together in the higher grades a considerable number—not nearly as large a proportion as this school or most schools used to have when following pretty rigidly the ordinary plans of grading and promotion. It has been found that altogether too many boys and girls were in the higher grammar grades who, though of proper High School age, yet judged by their standard of accomplishment in grammar school grades, could not get into High School; or could only get in very late, when they ought to be graduated from High School. The question was, "What is best for these particular boys and girls, regardless of any schemes or plans for grading or promotion?" The answer was this:—"Boys and girls who will be 15 next September, who have gotten into the 8th grade will be transferred into these special classes in the High School. Boys will be under instruction of a man for academic work adapted to what they need, correlated to hand work and shop work and mechanical drawing. Similarly the girls are gathered under one woman for their academic work adapted to and

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correlated with work in the kitchen, sewing room, etc. That academic work occupies 10 hours of the week, while practical work takes the other 20 hours.

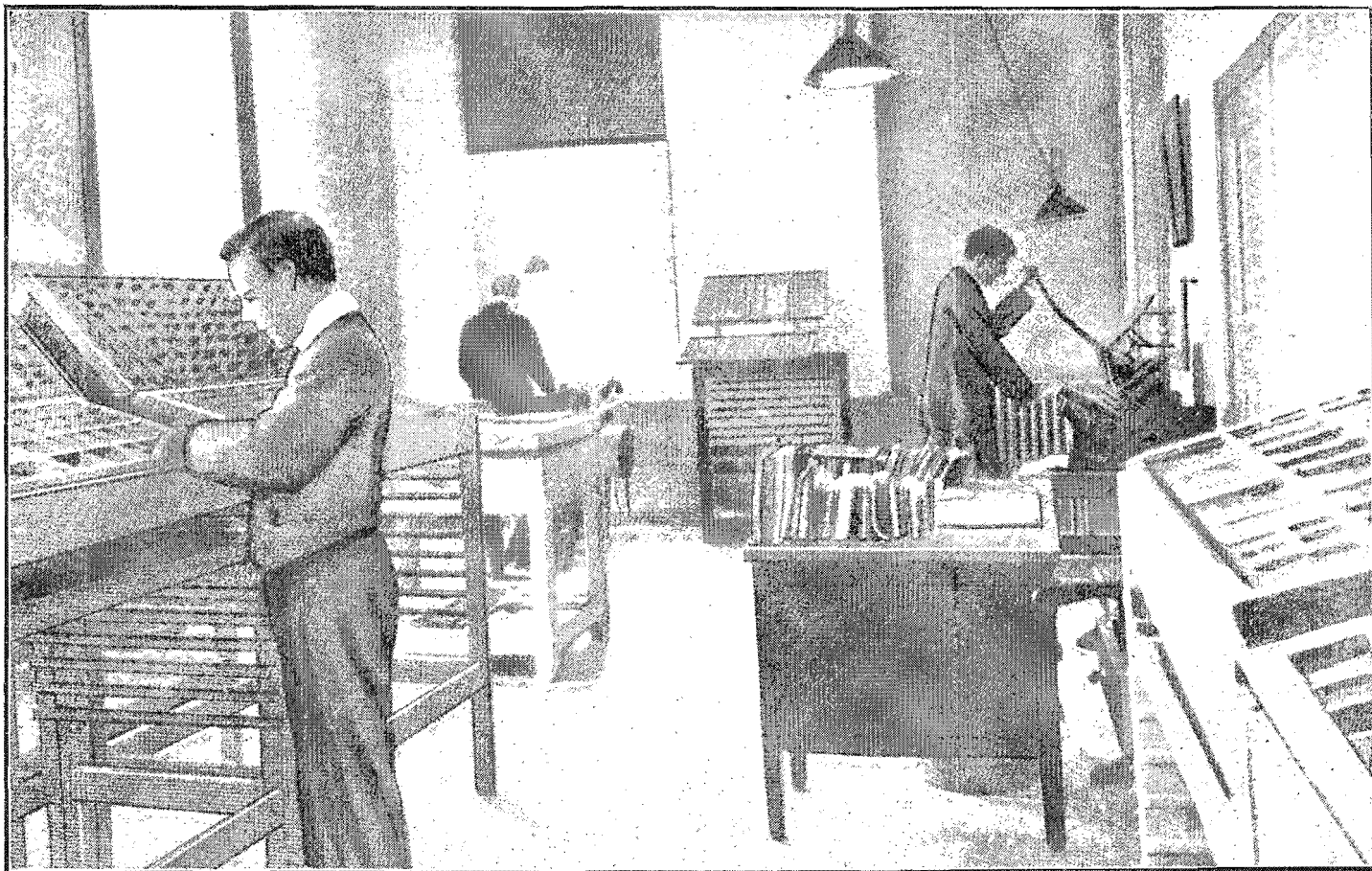
#### TESTING VALUE OF HAND-WORK.

Last year that class went through the whole course and it was found that many of the boys in particular were not deficient in grey matter, but they had been misapplying it. When their instructors understood them and gave them means of expression through the hands that appealed to them, they developed, even at the eleventh hour in their schooling, into boys of more than average ability. The girls did not show as high a grade of average intelligence, yet the results of their instruction were perhaps fully as marked. Instead of dropping out of school, as many of them ordinarily would have done, almost all, both boys and girls, stayed clear through the year; three fourths of them determined to go through the High School in some regular course. Out of about 40 girls of last year's transfer class, 27 are now in High School and have started on regular courses there. It is the custom for the instructor, at the end of 5 weeks, to inform parents of any deficiency or backwardness. Last term the pupils of the whole school had shown deficiency or weakness in their work in 326 subjects. Those 27 girls, to receive their proportion of the school average of such notices of weakness, would get 11 notices, and it would have been gratifying if they did not get any more, remembering the type of girls they were, the poor records they had made in the past school and during their year of transfer work, and because they were the very lowest strata of the school enrollment. Instead of 11 the whole lot received only 3 notices of weakness. Dr. Spalding considered this a perfectly fair test, for the teachers who send those notices in many cases do not know the girls at all. That was the strongest endorsement of the success of the one year's work. There were 27 girls in the school doing better than average—enough to get their pass marks and a great deal better than the average total in the school—and they were of the type that would have been lost to education if they had not been brought into this school.

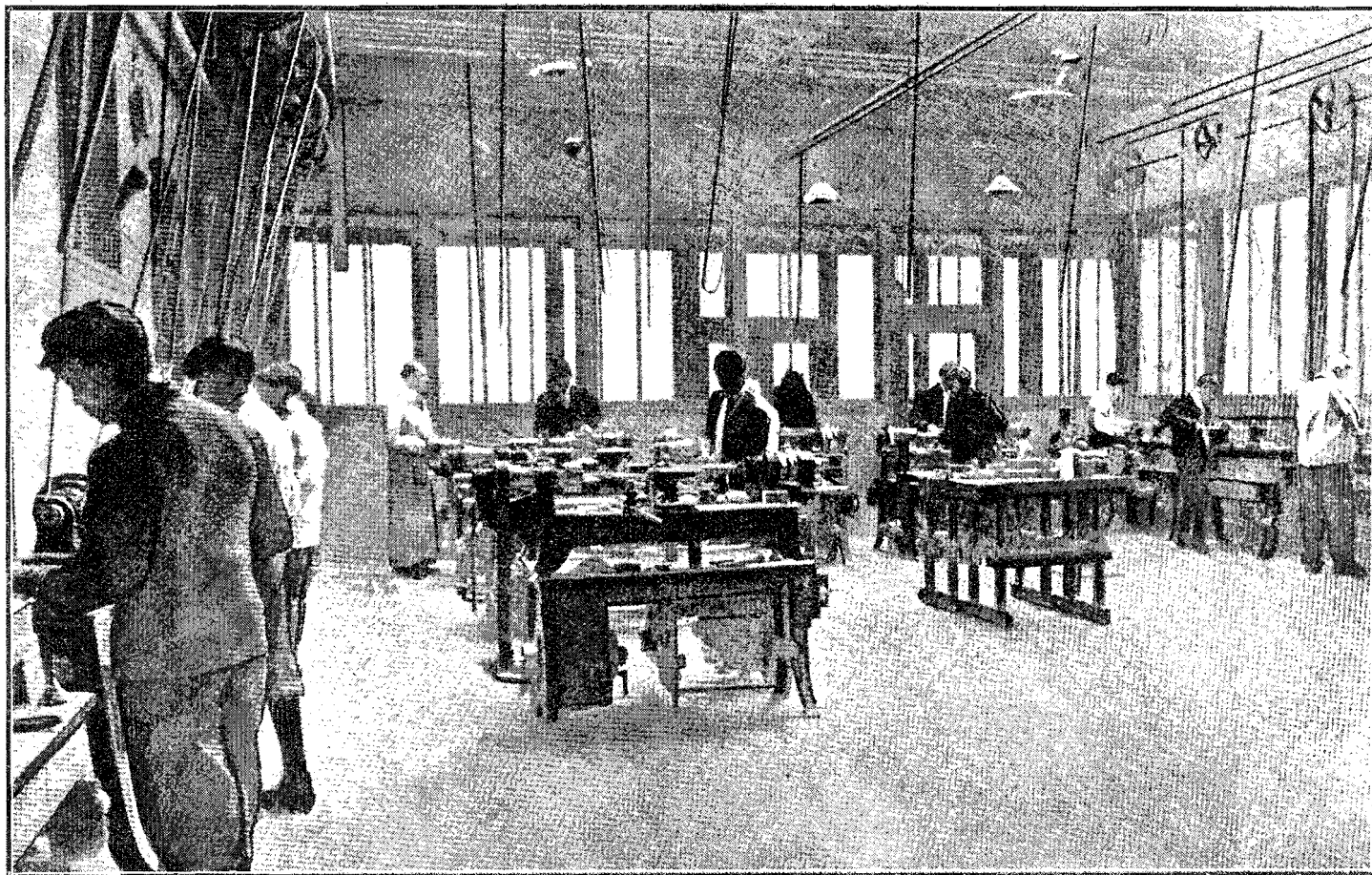
#### NEWTON LEADS IN FACILITIES.

Dr. Spalding remarked that the city of Newton had made more adequate provision for education than any other large city in the country. It has a bigger plant, a bigger corps of teachers, and better equipment, than any other community, and the people have grasped the problem so that they can see around it. They are ahead as to accommodation, and have room for the future, so there is no temptation to eliminate pupils; their function being not to keep out, but to bring in everybody. Newton has never been behind so that they have had to have part-time classes. The idea of a permanent part-time class has never been known in this city.

In addition to the Technical High School, with Commercial Department, there is the Newton High School. The two Newton High Schools are separate, but co-operative in organization and administration. Most of the academic subjects



PRINT SHOP, NEWTON TECHNICAL HIGH SCHOOL.



WOOD-TURNING SHOP, NEWTON TECHNICAL HIGH SCHOOL.

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are taught in both schools, but courses are not duplicated, being arranged to suit various needs. Some are for pupils who will probably complete their schooling with these courses and enter commerce or industry; others give an all-round academic training with a view to either finishing at High School or going on to some higher institution. Nine distinct and complete courses are offered. Three (the general, the classical and the scientific) are given in the Newton High; the others (the technical, the extra-technical, the technology-college, the fine arts, the clerical and the business) are given in the Technical High. The wide range of elective and optional studies offered in connection with each course makes it possible to furnish every pupil with just the work and opportunity he most needs.

#### NINE DISTINCT COURSES.

The *General* Course (4 years) offers a wide choice of elective subjects. The *Classical* Course (5 years) includes Optional Handwork for boys and Household Science and Art for girls in all years. The *Scientific* Course (5 years) includes general subjects as well as manual and domestic work, more time being allotted to the latter. The *Technical* Course (4 years) prepares for admission to all normal schools and to the State Textile Schools. The *Extra-Technical* Course (4 years) prepares for work in the productive industries, and gives an all-round technical-academic education. The *Technology-College* Course (5 years) prepares for admission to all schools of Technology, or departments of colleges, and all Normal Schools. The *Fine Arts* Course (4 years) prepares for admission to the Normal Art School and all higher schools of Fine and Applied Arts, giving an all-round academic education, strong in Fine Arts. The *Clerical* Course (4 years) prepares for commercial life in every branch, while the *Business* Course (4 years) trains for more responsible business positions, whilst giving a broad general education.

Singing and Physical Training are compulsory for the first year, and Physical Training for 3 years in the Classical and Scientific courses.

Graduates of the Technical High School are expected to arrive at positions as foremen and superintendents, having more knowledge of science and mathematics, though less of practical manipulation, than boys from the Industrial School.

There is a Preparatory Class for those who have reached High School age but have not passed Grade 8; course 1 year, one-third being given to academic subjects and two-thirds to practical, including mechanical drawing and shop-work.

#### COMMERCIAL COURSE LEADS.

There are more pupils in the Commercial Course (400) than any other. The percentage of attendance of girls is almost the same in both schools. Preparing for higher technical instruction such as the Institute of Technology, Cornell, etc. there are 170, and the boys in the Technical course are about 170. There are about 50 students taking the Fine Arts course only. In 2 years' time

there will be a larger proportion relatively taking the technical as distinguished from the commercial courses. If the 4th year were cut out, that would take about 50 off. Principal Palmer explained that many boys and girls have gone from the Commercial Course into business in the last 7 or 8 years, and such efforts have been put forth to assist graduates in finding employment that boys and girls coming to that course know that on completing it they will have an earning power 3 months after graduation of \$8 or \$9 per week. The boys and girls looking to the Extra-Technical Course, which more nearly approximates a trade course prepared for mechanical work, do not have that outlook. The dollar does loom large; in many cases the bribe to change to the commercial course is the knowledge specifically of just what they can earn when they get through that course.

#### INDUSTRIAL AND ACADEMIC RELATIONS.

Dr. Spalding said it was not proposed to make the industrial training of the school the dumping ground for those who could not do anything on any other subject. Referring to the claim that practical training opens up the mind and gives impulse *per se*, Dr. Spalding said that those pupils and many others would have succeeded a good deal better if they had had practical training. He thought the failure of pupils under ordinary conditions was due in many cases to inappropriate subject-matter, unsuitable teaching, and other things. He added that instead of technical grammar and some of the more difficult portions of arithmetic they had been for two or three years substituting more handwork, even to 10 or 12 hours weekly in Cooking and Manual Training. More of this will be done where found necessary or advisable.

#### DIFFERENTIATION OF STUDIES.

As regards differentiating at entrance, any graduate from the elementary school may attend either the Technical or the other High, though a good deal is done in the way of advice by the elementary school teachers. Those who do not graduate regularly are simply transferred, because it is better for them to be in this school. They may be transferred conditionally. Before this was done, a good many were being put into this school who could not go into the High School, and they did about as well as the others. They were put in on trial, which spurred them to their best endeavour, and not more than 2% dropped out. Some condition might be made about the subjects they could follow.

#### DIFFERENTIATION AND DISCIPLINE.

Principal Palmer, when asked whether any need was found for differentiation, two years before pupils leave the elementary school, for those coming here as compared with those going elsewhere, said he would consider differentiation in work for various individuals rather than in relation to this or that school. Dr. Spalding added that those who needed differentiation would naturally come to the Technical High School. Out of 33 girls who entered High Schools the prev-

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ious fall, 26 had come to this school, and 7 to the other. Dr. Spalding mentioned that the printing class at the Stearns School helped it to differentiate.

Mr. Palmer remarked that schools of this type get pupils who have selected work for which they are better fitted and more competent. Some boys, who are differentiated from other groups and specialize on pattern-making, can do anything that comes within their range or power, and they are orderly, diligent and attentive, because they have found what they want. In the later years of the commercial course, when boys and girls have found what they are expected to do, there is more aim, so that there is no question of discipline; they work diligently and take care of themselves.

## VOCATIONAL GUIDANCE.

The School has an Advisory Committee consisting of 25 business men resident in Newton, but mainly connected with business in Boston. It is organized into several committees, one of which is on manufacturing. These men have intimated that when the school has graduates from a senior class in its Extra-Technical Course, they would be glad to take them on. The pupils have already done something in the summer vacation, and there is one now on part-time.

## MANUAL AND INDUSTRIAL TRAINING.

Mr. Murray explained that the Manual Training of the course is general for all pupils who wish to take it, and all pupils take it in the city, no matter what High School work they are going to do. In the 6th grade in one school girls and boys devote about 10 hours a week to cooking and sewing, woodwork or printing. That has been a success viewed from the amount they have accomplished in their academic work, and what they have done in the printing work. He thought that Grades 7 and 8 should have 4 to 10 hours Manual Training weekly, and classes in the Secondary Schools should have 6 to 10 hours weekly of Industrial or Manual Training work.

The work of the Independent Industrial School, Mr. Murray added, is going to be made as skilled as possible. The boys from that school seem to enter the industry as skilled workmen, and probably quite a number will come up through to positions of responsibility. In the Technical High School they are more likely to approach it from the other end. From the Technical High School, up to the time this school and the one in Cleveland were established, less than 5 boys passed into productive industries. The fellows who take the Extra-Technical Course will probably soon become foremen, and there are quite a few specializing in drafting. Last year there were boys out drafting who got \$10 and \$12 a week. The boys in the Industrial School will be ahead of the boys in the Technical High School in the matter of manipulative skill, whereas the Technical High School boys will be ahead of the others in scientific matters. The group in the Industrial School would never have been reached by the High School, and in the Technical High School they could not have had the amount of shop work they get in the Industrial School.

Referring to the foundry, Mr. Murray said that if he were doing the work again, he would not put in a forging shop, but would have a better foundry than this, and make more of the foundry end, putting only a few forges in connection with the machine work. Forging as an art is going out; more drop-forging is being done. Mr. Murray would have had a big enough foundry so that they could have had an iron-melting cupola.

#### **SECTION 4 : THE INDEPENDENT INDUSTRIAL SCHOOL OF NEWTON, MASS.**

A brief statement has already been made on the Independent Industrial School at Newton, Mass., in the chapter on Elementary Education. (See pages 91, 92).

At the time of the Commission's visit the School had been established 3 years, and had 50 or 60 pupils under 4 teachers. The cost of maintenance was \$7,780, of which \$1,200 was for equipment. The State pays half of the current expenses. Boys must be 14 on entering. Three years is considered as long a course as a boy will take; a job is then found for him, and he gets a diploma after he has been at work a year. He may then be regarded as about half through full apprenticeship. Boys are warned during their school time of the danger of being kept at one machine job, which makes them narrow.

It was stated that 90% of the boys in Industrial Schools would be in "cheap" jobs if there were no Industrial Schools. There is a by-law in Newton that boys and girls of 14 to 16 must be either at work or in School. The Industrial School has not interfered with the High School attendance. The school time is 6 hours daily for 5 days a week, 11 months of the year. At first half the time is given to practical work; later on, two-thirds.

The school prepares specially for Pattern-making, Cabinet-making, Machinist, Printing and Electrical trades. After going to work, the boys may attend evening classes in the Technical High School building, upheld by the Unions; while day pupils have access to the better equipment of the latter school for special purposes.

Boys may enter at any time, hence class treatment is not always possible. Classes are generally limited to 15, and individual instruction is given. The work is undertaken on a commercial basis, being profitable to a certain extent, but not so as to exploit the boy or interfere with his instruction. Usually apprenticeship shops in schools are strong on products, in order to make the school pay, but the Industrial School reverses that method.

#### **SECTION 5 : THE INDUSTRIAL SCHOOL, NEW BEDFORD, MASS.**

This school was opened in 1909, and in 1911 was removed to the present building, which was originally an old carriage factory. The boys themselves did most of the fitting up and adapting of the new building to the requirements



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of the school, the only work they were not capable of accomplishing being some of the plumbing and the plastering.

The course of study is mainly intended to develop the experience of the boys along the lines outlined in the policy of the State. The age of admission is 14 for the day classes and 17 for the evening classes. The courses of study (3 years in length) include Machine Shop Drafting, Machine Shop Practice and Automobile Construction; Architectural Drafting, General Construction, and Cabinet-making; Steam Engineering, Electrical Engineering; together with Millinery and Dressmaking for women.

The evening classes are intended primarily to improve young men in the calling which they have adopted, and not to take a young man from one calling and fit him for another.

In the day classes there are about 110 boys and 30 girls, and 400 to 500 pupils in the evening classes. The cost of both day and evening work amounted for the year to \$23,000, of which 20% was for evening work.

## SECTION 6 : THE VOCATIONAL SCHOOL, SPRINGFIELD, MASS.

At the time of the Commission's visit this School was temporarily established in the upper floor of a factory. The pupils had lined the wires, put up the shafting and fitted up the whole shop. The flat was divided into two sections, one for school work and mechanical drawing, the other for woodworking and iron work.

There were 85 boys in attendance, taking a 3 years' course. Principal MacNally had 4 assistant teachers.

Boys come here in lieu of finishing their grammar school education, and if not here they would be out looking for a job. The departments are Woodwork and Machine-work, the latter being divided into tool making, machine tool building and repair work. The Woodwork is divided into cabinet-making, pattern-making, and carpenter work. The labor unions are anxious to have a bricklaying course, and an electrical course has been suggested, but this can be met in evening classes. The Machine department is far better attended than the Woodwork, owing to the impression that this work pays better, though in fact when the boys learn conditions in both trades they find that woodwork is best. Mr. MacNally proposes to start a printing class and relate it to the literature class. The class-room teacher selects what will be printed, and it is carried out in the Manual Training shops at two centres in the city, where the boys go in for type-setting, which is related to literature, drawing, designing and shop work.

Work is done at the Vocational School to meet the needs discovered in the grammar school, and Mr. MacNally, being Supervisor of Manual Training in the grammar schools, is thus enabled to make the one serve the other.

## BOYS WORK ON "PROJECTS."

This school has no text-book on mechanical drawing; the boys draw what they are working on. They work on the "project" basis; all the school work centres on the project the boy is working on. The boy must work up his specification for the job; he must make his working drawings, and his estimates; then he comes in and works on the job in the shop. When it is finished he writes up his notes and makes the cost record, and is ready for the next job. (See "Job Record" and "Cost Record" hereafter.)

The teacher-machinist was taken right out of a shop, and has proved a first-class teacher; there is no disorder when he is in the shop. A house carpenter who had been doing regular contract work in the city was tried out that year and had been found most satisfactory, and the boys have accomplished many times more work than they ever did before.

This school has not 24 benches all in a row, with all the boys doing the same thing; here is apparent confusion, but in reality discipline through intelligent diligence. By this means it is doing more for the lads and getting a greater amount of work. For an hour a day instructors interchange; one has had industrial teacher-training; the other is wholly an industrial man and not trained as a teacher. Both men are a sort of midway between the formal academic man and the shop man. The academic man has a different group every day; this school has five groups, and as there are five days in the week, it is a smooth arrangement.

The formal class-room work for one day in the week is based on shop experience. The boys are not handicapped by the class-room group. The boys have five hours in the academic part; in the shop part they have six; that gives the academic teacher an hour to go into the shop, get the records, take them home and get ready the work for the next day definitely related to what they have been doing.

## BOYS FINDING THEIR VOCATIONS.

There is no indenture of any kind to hold the boys in school. Many are found to be inapt, and their parents are told that they are not adapted for this. Some boys show particular aptitude for a trade and anxiety to get out and make money.

There is a vacation of two months in this school, as in the grammar school. Mr. MacNally has had more of the old boys coming back at the beginning of September than he has at the end of June. That meant that some had quit in June and gone out to work, but that they were ready to come back in September, and they were better boys when they came back. Mr. MacNally thought the actual experience of being out and hunting for a job about as good as anything they could get.

Mr. MacNally gave one or two instances of boys who had proved backward or troublesome in the grammar school but had turned out very well in this school, where the work is concrete.

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## THE SPRINGFIELD VOCATIONAL SCHOOL.

*Job Record.*

Name.....

Date.....

Job.....

Dept.....

|  |       |       |  |  |  |  |  |  |  |  |  | Rating. | Instructor. |  |
|--|-------|-------|--|--|--|--|--|--|--|--|--|---------|-------------|--|
| 1. Specifications  |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| Sheets, No.  |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| 2. Drawings  |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| Plates, No.  |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| 3. Estimates: One on specifications                                      |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| Six on varied specifications   |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| 4. Shop work: Progress ( ). Workmanship ( ). Total time ( ).             |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| Month.   | Dates | Hours |  |  |  |  |  |  |  |  |  |         |             |  |
| 5. Shop notes: Give sketches, tools, processes, principles, difficulties |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| 6. Cost Record   |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| 7. Materials: Sources, processes of preparation, strength, etc.          |       |       |  |  |  |  |  |  |  |  |  |         |             |  |
| 8. Related studies   |       |       |  |  |  |  |  |  |  |  |  |         |             |  |

*Cost Record.*

Name.....

Date.....191

Year.....

Order for.....

| Material    | Total Cost | (See other side for Details) |        |  |
|-------------|------------|------------------------------|--------|--|
| Time        | " "        | " " "                        |        |  |
|             |            |                              | Totals |  |
| Began       | 191 ,      | 5% Incidentals               |        |  |
| Finished    | 191 ,      | Total Cost                   |        |  |
| Workmanship |            |                              |        |  |
| Remarks     |            |                              |        |  |

*Details.*

|      |              | Quantity | Price      |  |  |
|------|--------------|----------|------------|--|--|
|      |              |          |            |  |  |
|      |              |          | Total..... |  |  |
| Time | Construction |          |            |  |  |
|      | Finishing    |          |            |  |  |
|      |              |          | Total..... |  |  |

**SECTION 7: FROM MR. ARTHUR D. DEAN.**

The following information was obtained from "Conversations" with Mr. Arthur D. Dean, on the occasion of the visit of the Commission to Albany, N. Y., supplemented by information contained in the Eighth Annual Report of the Education Department of New York.

The vocational schools will succeed only when they are suited to and an expression of the life of New York State. The problem has been to interpret this life in terms of educational effort. For years a well-knit and unified system of schools has been in existence in this State. With the passage of a law authorizing vocational schools there came the problem of administering them in the letter of the law and at the same time continuing the best traditions of our State system of education.

The problem was deeper than the mere establishment of a few isolated and special schools. It was the problem of establishing a new type of education which would work alongside of, and not be antagonistic to, the older type. It was to be a type that would assist the older in doing better a few things that its good intentions led it to do, and at the same time develop within itself a line of work which it could do a bit better than its neighbour who had primarily other things to do.

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## STATE SUPPORT TO INDUSTRIAL COURSES.

Differences in the amount of State support and administration between the courses called Industrial in the 7th and 8th grades of the grammar schools and the lower ones are as follows:—

An Industrial School or class may draw a State grant of \$500 towards the salary of the first teacher, and \$200 for the second one, while a grant of only \$200 may be drawn for a teacher in the lower grades.

The Industrial School or Classes must have a course of drawing, shop work and related bookwork—the latter as close as it can be made considering the lack of teachers of experience and the want of subject-matter well arranged pedagogically to enable them to make the one fit the other well.

The local authorities provide the shop accommodation and shop equipment, deciding upon the character of the equipment—which must be adapted to the locality and the industries—after study and consulting with the State Department of Education. The State gives a grant towards the cost.

The main object of the shop work in the 7th and 8th grades is to arouse the interest of pupils in industrial matters, to bring about a knowledge of fundamentals of the industries of the locality, to give them a good general elementary education. The Industrial School prepares and qualifies them (1) to go from the school to actual shop practice for wages, or (2) to go on to a higher school and obtain preparation for entering upon employment.

Mr. Dean's ideal of the kind of school for a comparatively small town or village is a class with just one teacher who knows the practical work in one or more of the industries, and mechanical drawing. He cited the case of one successful school with one such teacher, who knew plumbing and sheet metal work, had fair ability in mechanical drawing, and could do something in electricity and carpentry. The boys took some carpenter work, did little jobs of plumbing, put up electric bells, wired the basement of the school, made drawing tables, benches, etc.

Outside of New York City there are now 109 teachers giving instruction in homemaking to 17,113 girls in the upper grades of the Grammar School and in the High School. In the same territory there are now 68 teachers giving instruction in manual arts to 13,320 pupils in the upper grades of the Grammar School and in the High School.

## THE INTERMEDIATE INDUSTRIAL SCHOOL.

The plan as now operating provides that five-twelfths of the school program shall be given over to shop, laboratory and drawing instruction and that the remaining seven-twelfths be devoted to "book studies," closely related to the shop work and drawing—which practically amounts to saying that the pupils shall for the remainder of the time take the regular elementary school studies corresponding to the seventh and eighth grades. Both boys and girls have similar work in English and history. The arithmetic course for boys differs from that for girls. The geography is viewed as an outgrowth of the life-long problem

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of providing food, clothing and shelter. The physiology is studied from the view-point of hygiene and sanitation rather than from the structural only. The shop, laboratory and drawing work differs with the sex concerned.

The questions naturally arise: Are these children receiving an education? Can they enter the High School? One superintendent writes: "We had no trade school for our graduates of the Intermediate Industrial School to enter. They were obliged to enter our regular courses in the High School. We had hardly expected that many would care to. That was the reason for advising them to enter the vocational school. The majority, however, did enter the High School, and for all I can see are doing as good work as those who finished the eighth grade in the regular schools."

## HOW INDUSTRIAL WORK HELPS THE ACADEMIC.

On the surface it would seem impossible to do as much bookwork in seven-twelfths of a day's program as the regular seventh and eighth grade pupils accomplish in a whole day; nevertheless, thus far the pupils in the Intermediate Industrial Schools seem to be accomplishing it. Let us note the possible reasons. We must remember (1) that in the vocational sections a teacher does not handle more than 25 pupils at a time and more individual instruction is possible; (2) that the book studies of English, history and geography may be so correlated that penmanship and spelling are brought into every written lesson, and that practice in reading appears in the history and geography; (3) that the bookwork is not interrupted by the visitations of a drawing, music, or manual arts supervisor; (4) that the connection between the shopwork and the bookwork is so close that one naturally assists the other; and (5) that the hours spent in the shop and drawing room afford a relief from brain fatigue.

## CONDITIONS OF STATE AID.

The law states clearly certain conditions which a vocational school must meet in order to be considered as entitled to special State aid. (1) It must be independently organized—not necessarily in a separate building, but most assuredly established with a distinct vocational purpose in mind; (2) must have an enrolment of at least 25; (3) must employ full time of a teacher; and (4) must have a course of study meeting the approval of the Commissioner of Education. The first three conditions admit of no changes, and are to be enforced in all places without variation from the word of the law. The fourth condition allows for considerable latitude and discretion.

Although separate organization does not require a separate building, it does require a definite and separate register of pupils, a definite yearly report to the Department, and a definite purpose distinct enough from any other educational purpose within the school to avoid any obscuring of the vocational idea. The vocational work is not to be mingled or confused with the work of other departments or courses, though including much in common with them. The plan of work need not prevent pupils enrolled in "schools" of agriculture, mech-

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anic arts and homemaking from reciting English, history and other "book studies" in the same classes with other pupils in the local school system. It should be kept in mind that the "agricultural school course" does not refer merely to a single line of study, but to a group of related studies forming in itself a scheme of education having a distinct vocational purpose.

### THE "OPEN DOOR" POLICY.

The general industrial, or Intermediate Industrial School, is intended to explore, through various kinds of industrial work, the industrial capacities of children. It assumes that teachers will keep a watchful eye upon individual interests. In short, it assumes that when a boy leaves this school he has some knowledge of where he is going, and some preparation for his work. Some boys will know, for example, that they want to be plumbers. They know this because the Intermediate School gave them some instruction in tinsmithing, sheet metal work, and mechanical drawing, together with the elements of other groups of trades. They deserve the open door. To open the door to a High School course is to offer an opening through which they can not and will not pass. In effect, it is really a closed door. To furnish them a place where they can learn a trade after they have settled upon it is the best kind of an open door.

There are now 35 industrial and trade schools, employing 145 teachers. These schools have a day enrolment of 3370 pupils and an evening enrolment of 2933 pupils, or a total enrolment of 6303 pupils. There are 527 other pupils using the equipment, but not enrolled in these schools.

## SECTION 8: SENECA VOCATIONAL SCHOOL, BUFFALO, N.Y.

This school started with cabinet-making, but soon there was a demand for printing, and a small hand-press with one type case and a small amount of type made up the equipment. Soon a power press was added, with a large assortment of type. At the end of the first year there were 60 pupils, 3 teachers and 3 trades—carpentry, cabinet-making and printing.

The school admits boys who have completed the 6th grade and are over 13. At the end of the 2-years course pupils graduate with Junior Trade School Certificates, issued by the State, but they may remain 2 years longer for advanced work and receive Senior Industrial Certificates, or enter the Technical High School. There are now 96 boys enrolled.

The school is in two divisions, A. and B. All who have not completed the seventh grade are placed in the B. division. One-half the time is spent in the shops while the other half is spent in the academic work. Those in the A. division take up Arithmetic, Algebra, Book-keeping, Business English, Spelling, Commercial Geography, Practical Physics, and Chemistry. Those in the B. division study Arithmetic, Spelling, English, and Commercial Geography.

## LABORATORY METHODS IN TEACHING.

The academic work is closely correlated with the shop work. To illustrate: the carpentry students learn how to figure, by arithmetic, the lengths of different timbers used in a house, such as common, hip, jack and other rafters of any shaped roof. The knowledge gained in the academic room is in turn applied in the shop.

The teaching is done with the aid of models and drawings. The shop teachers furnish the academic teachers with such problems as they find actually coming up in their work. In this way no time is wasted in teaching things which are not practical.

The last addition to the academic department is a well-equipped laboratory. The table is large enough to accommodate 8 boys. Each boy has his own reagent bottles, Bunsen burner and an electric heater and furnace. For the physical experiments there are a double-cylinder hot air engine, a motor and generator, pulleys, weights, air-pumps, telephone and telegraph instruments.

For the work in chemistry the Babcock test is used, the New York State Board lactometer in the analysis of milk, thermometers, a still for water, and all the common chemicals. It is believed that every boy ought to know something of the chemistry of foods, as it helps to make his work more interesting and renders him less dependent on the judgment of salesmen.

## CABINET-MAKING AND CARPENTRY.

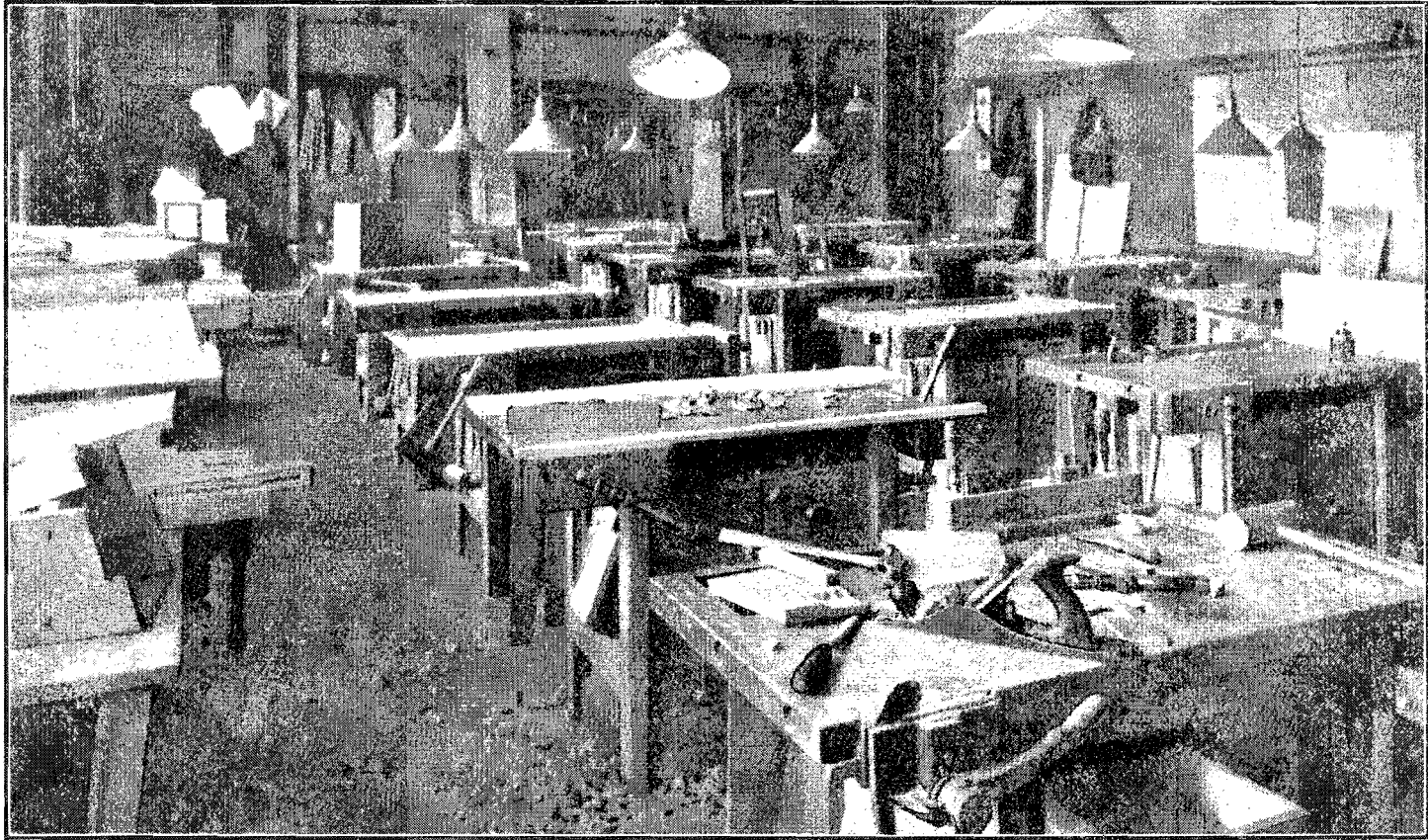
The cabinet-making course begins with the most elementary work, such as jointing up boards, and leads step by step to the making of complicated pieces of furniture. Since this is the age of veneer and inlaid work, much time is spent on these branches of the industry. This work is done only by advanced students. In this department tabourettes, book cases, book racks, piano seats and chairs have been made.

The carpentry classes are taught to lay out the different parts of a house with the square, just as it would be done in actual work. They have put up the frame for a house and constructed the roof. They have built doors and windows and the frames for each. All the work is done according to blue-prints made by the boys. To make this work still more practical, they have constructed 60 sand boxes and a large number of screens to be used in different schools.

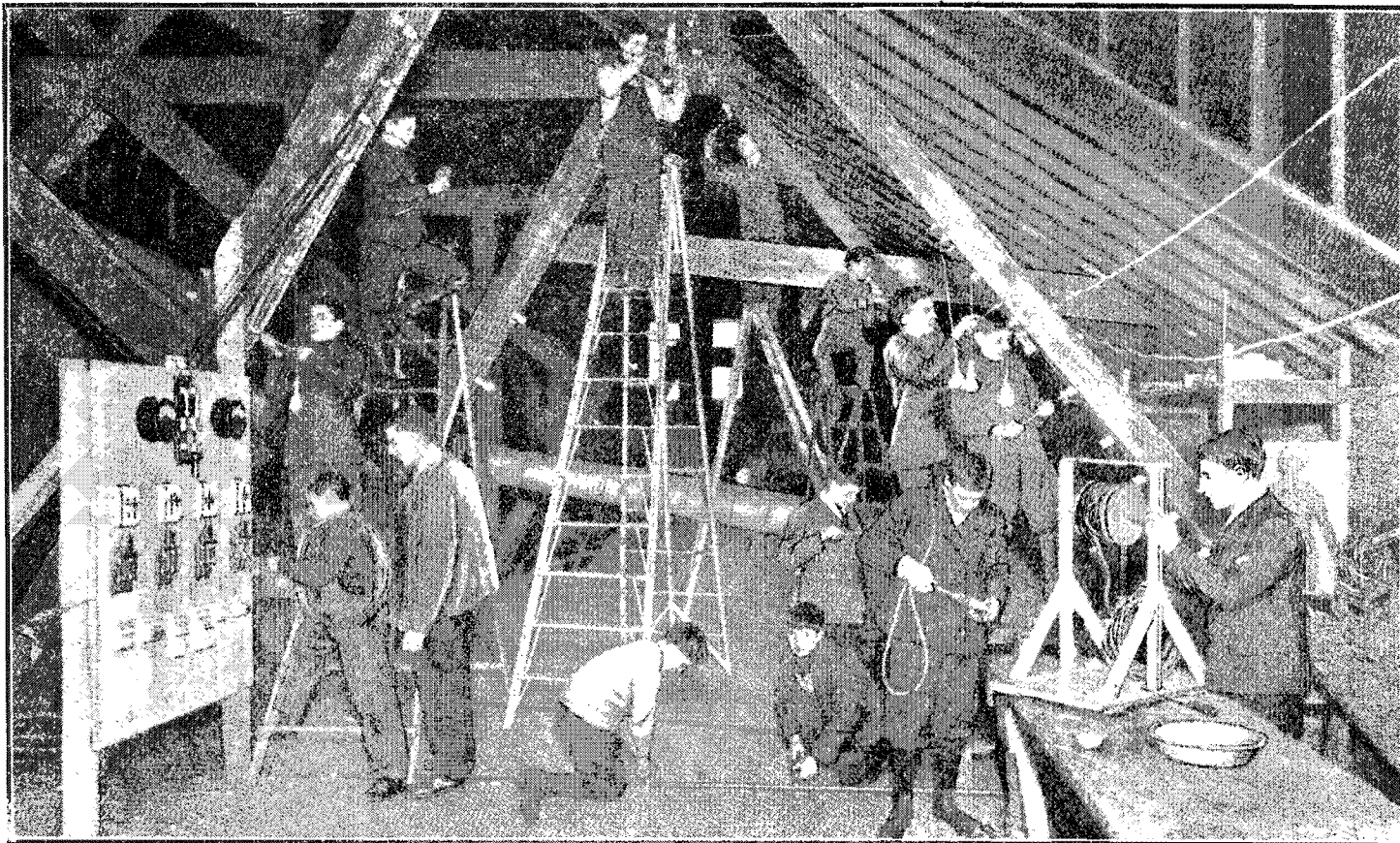
## PRINTING DEPARTMENT.

The next department is the printing. Here may be found all the up-to-date materials used in a commercial shop. The equipment consists of type up to and including 72 point (about  $\frac{3}{4}$  inch high), type cases, stands and cabinets, galleys and galley racks, wood and metal furniture, and two Gordon job presses, driven by an electric motor. There is also a stitcher and a lead cutter. Upon entering his class, the boy makes a study of the type and cases so that he may

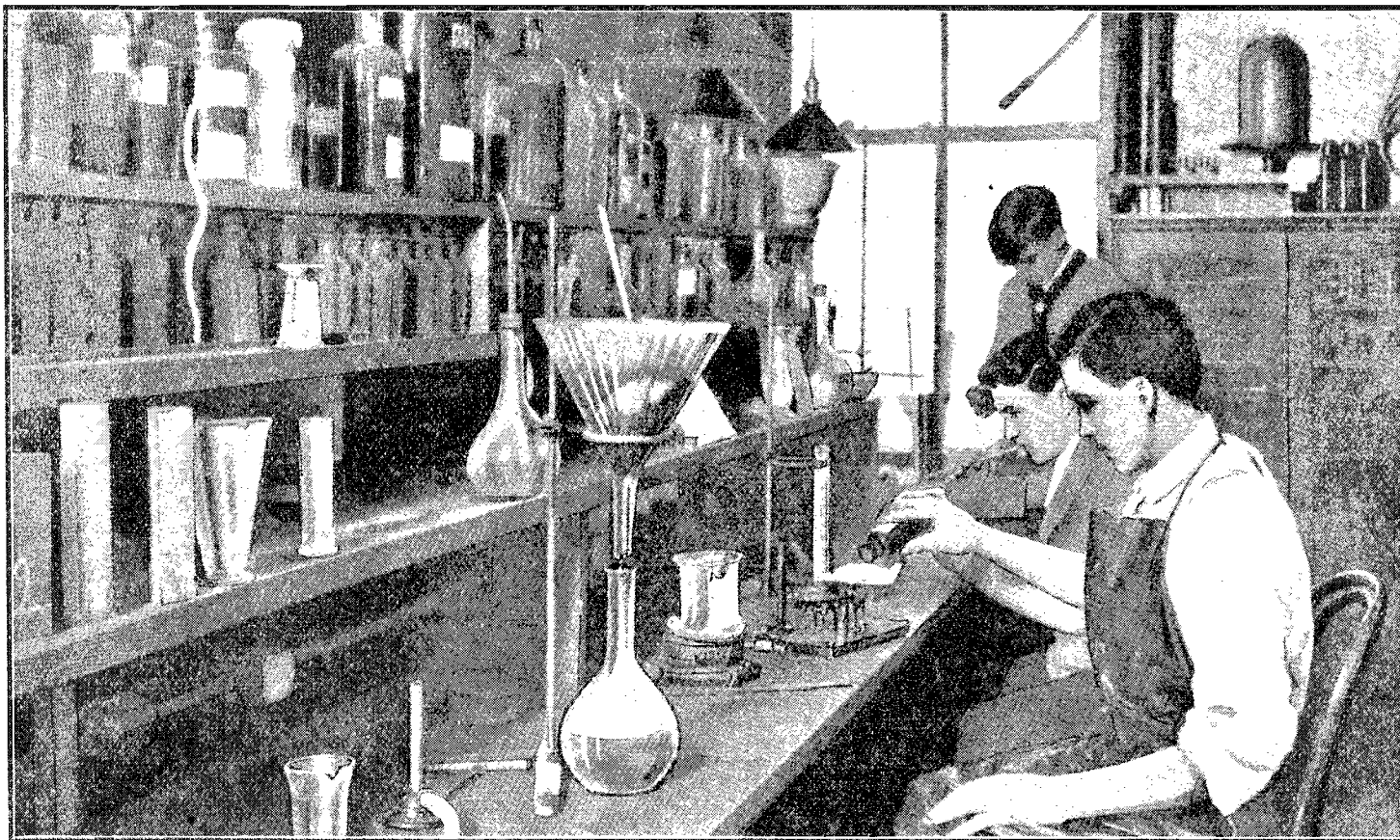




THE CABINET SHOP, SENECA VOCATIONAL SCHOOL: BUFFALO, N. Y.

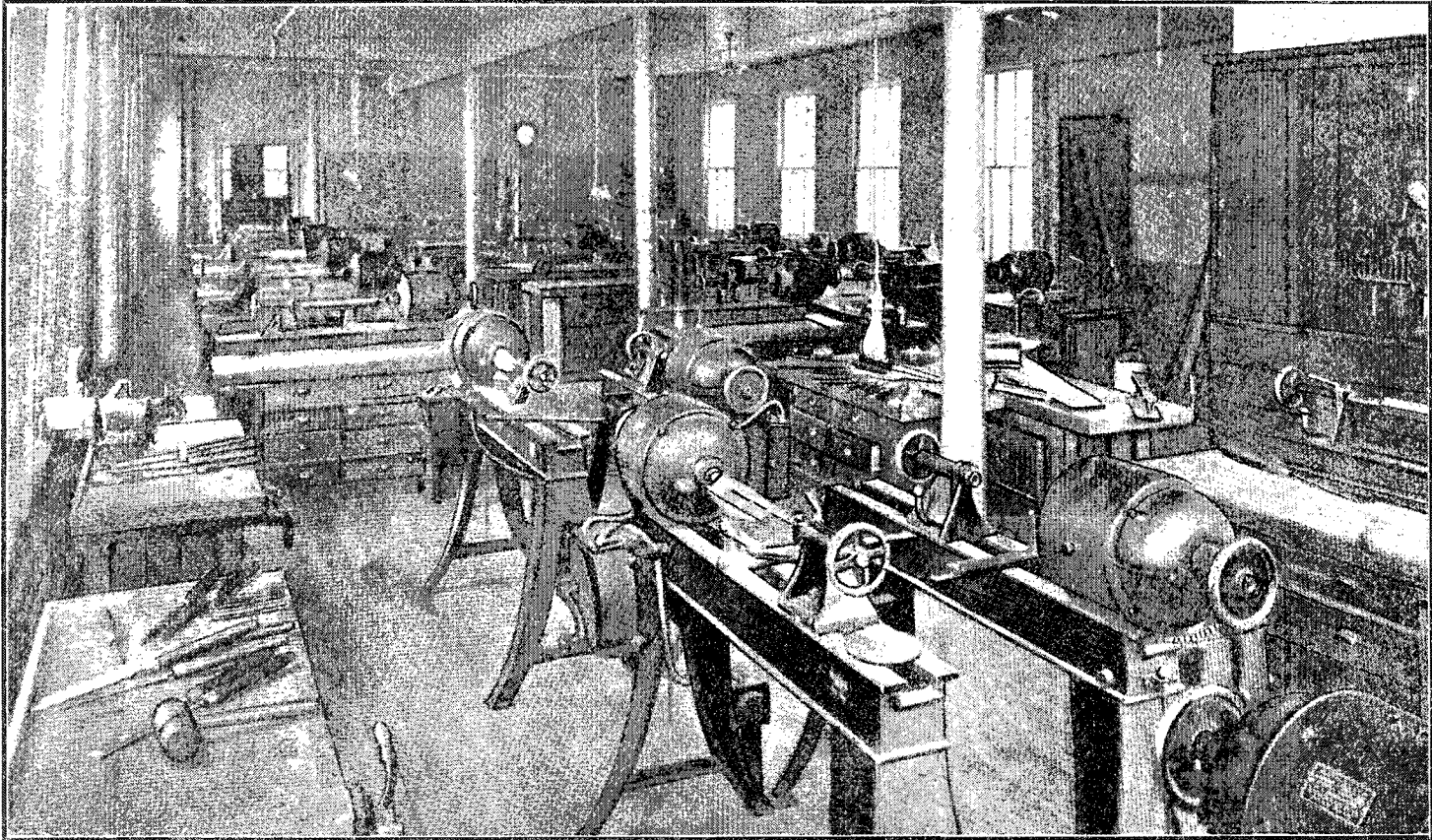


CLASS IN ELECTRICAL CONSTRUCTION, SENECA VOCATIONAL SCHOOL: BUFFALO, N. Y.

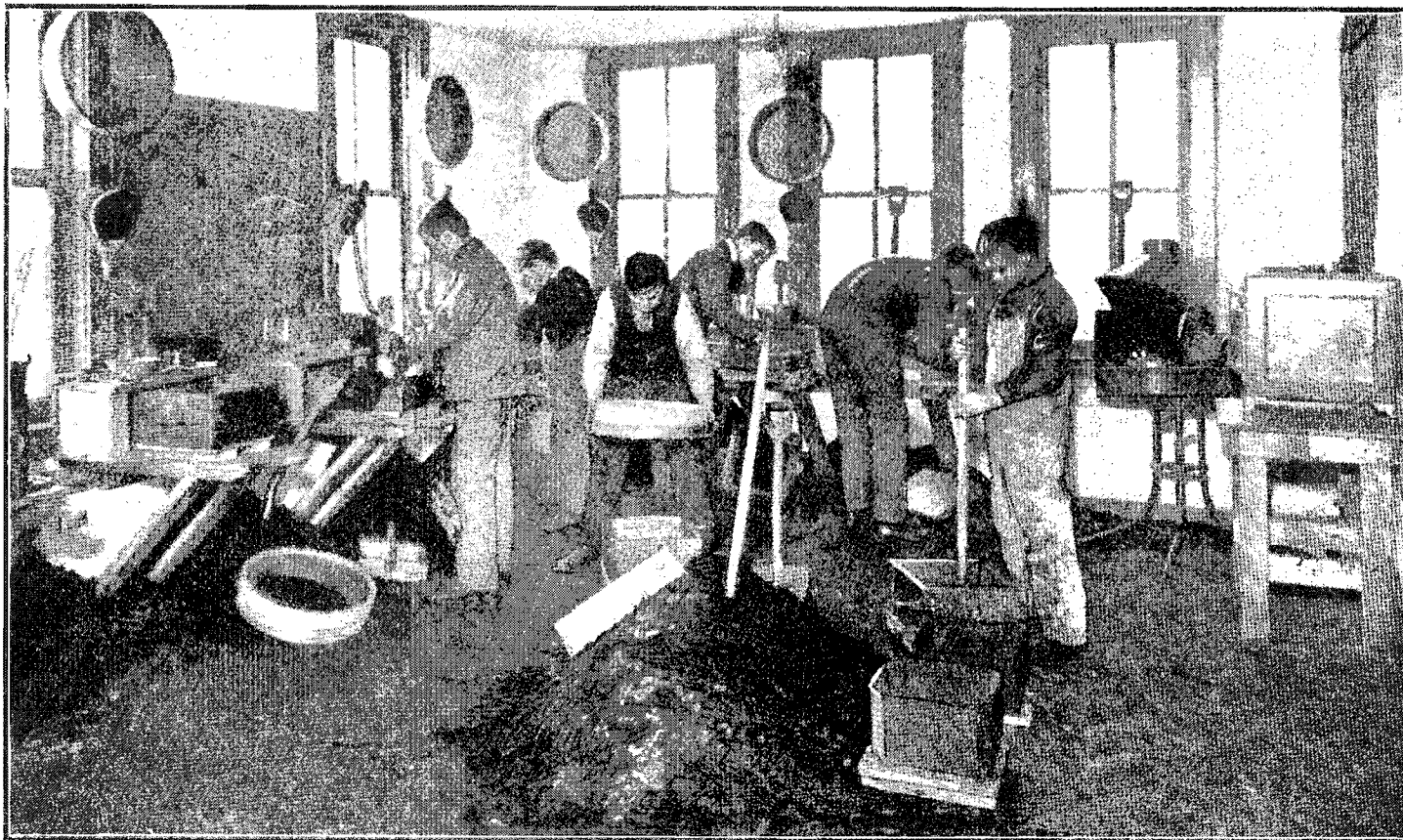


FINDING OUT THE REASON FOR THINGS, IN THE LABORATORY, SENECA VOCATIONAL SCHOOL: BUFFALO, N. Y.





A LARGE WOOD TURNING SHOP, BLACK ROCK VOCATIONAL SCHOOL: BUFFALO, N. Y.



FINDING OUT HOW TO WORK, IN THE FOUNDRY, BLACK ROCK VOCATIONAL SCHOOL: BUFFALO, N. Y.

3 GEORGE V., A. 1913

know where to find the letters and characters used in printing. From this he advances to distributing type, to setting type, to making ready on the stone and to press work. He is also taught how to mix inks, and he studies color harmony.

The printing department produces beautiful cards, books, pamphlets, advertisements and straight composition work. It prints many of the blanks used in this school and has done small jobs for the other schools.

#### ELECTRIC CONSTRUCTION.

The electric construction class is very popular. The student first learns the terms used in the trade, then takes up bell wiring, telephone and light wiring, and so on to more advanced work. The work is done so as to pass inspection by the fire-underwriters. The school has a large attic where construction work is carried on. In the shop the boys experiment with the electric furnaces, heaters, transformers and other practical apparatus. The school now has an electric generator equipment that is to be used in electro-plating.

### SECTION 9: BROADWAY VOCATIONAL SCHOOL, BUFFALO, N.Y.

In the city of Buffalo printing has always been one of the leading crafts, and today stands in the forefront among business enterprises; hence the purpose of this school is to furnish pupils with practical work in printing, at the same time not neglecting their general training. The work is divided into two parts, half the time being spent in the academic department and half in the printing department.

#### ACADEMIC DEPARTMENT.

*Business English.*—Essentials of grammar, with special emphasis on sentence structure, paragraphing, composition; use of capitals, punctuation marks, abbreviations; division of words; use of diphthongs, initial letter, small capitals, italic, proof-reader's marks; shop letters, business correspondence; oral discussion of current events and topics related to the printing industry.

*Mathematics.*—Fundamental processes of arithmetic and practical application of same, as illustrated by the industrial phases of printing; common and decimal fractions; denominate numbers; applications of percentage; rapid calculation in finding cost of printing, paper-cutting, etc.; business forms, simple book-keeping, bank accounts, discounts and modern business systems.

*Reading.*—Selected from United States History and Commercial Geography.

*Spelling.*—Systematic course from a standard speller, supplemented by words selected from subjects met in daily work; the "dictionary habit."

*Drawing.*—Freehand practice in lettering of Gothic, Roman and Italic types; principles of design and decoration in drawing of letter heads, bill heads, business cards, cover pages, etc.; freehand object drawing for proportion and shape; color harmony and its application in the use of papers and inks.

*Science.*—Study of mechanics, heat, light, sound, electricity and the chemical properties of matter; especial emphasis on the physics and chemistry involved in printing.

*Commercial Geography.*—Geographic influences affecting food, clothing, shelter; raw materials and chief sources of supply, methods of manufacture, centres of manufacturing, chief routes of transportation.

*Industrial History and Civics.*—History of printing, paper-making, etc.; industrial progress of the United States and European countries, touching on primitive hand work, inventions of labor-saving machinery, beginnings of organization of capital and labor, relations of employers and employed, duties and responsibilities of good citizenship.

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## COURSE IN PRINTING DEPARTMENT.

*First Year.*

1. Plain and book composition and elementary job work involving type-setting, distribution, spacing, justification, proof-taking, proof-reading, proof-correcting.
2. Elements of press work, involving stone work, make-ready on press, press-feeding, care and use of rollers, varieties of ink and paper.
3. Talks on various phases of the industry including type-casting, point system, shop conduct, etc.

*Second Year.*

1. General Composition.
2. Typography of books and pamphlet making.
3. Job Work.—“Lay out” of job work involving application of design, harmony, appropriateness.
4. Imposition of book forms.
5. Elements of press work; mixing of ink; color harmony; papers; underlaying and overlaying.
6. Talks on different phases of the industry.

The printing department is supplied with a Chandler and Price 10 x 15 platen press, a 1-3 H.P. electric motor, a 24-inch paper cutter, a Boston wire stitcher, a Rouse mitring machine, a proof press, a lead and a rule cutter, an imposing stone, individual racks and type cases for every pupil, a very complete assortment of type, and the customary furniture, materials and tools of a modern printing office, selected with special reference to the requirements of the school.

The course covers 2 years, on the completion of which pupils are awarded Junior Vocational School certificates issued by the State. After graduation, those who wish to continue their studies are eligible for admission to the Buffalo Technical High School or an advanced Trades School, while those who have to go to work will speedily become skilful workmen with a little experience and practice in a shop. Their training, shop practice, and acquaintance with materials and tools, as well as their workman-like methods, will all combine to give them an intelligent start in their trade.

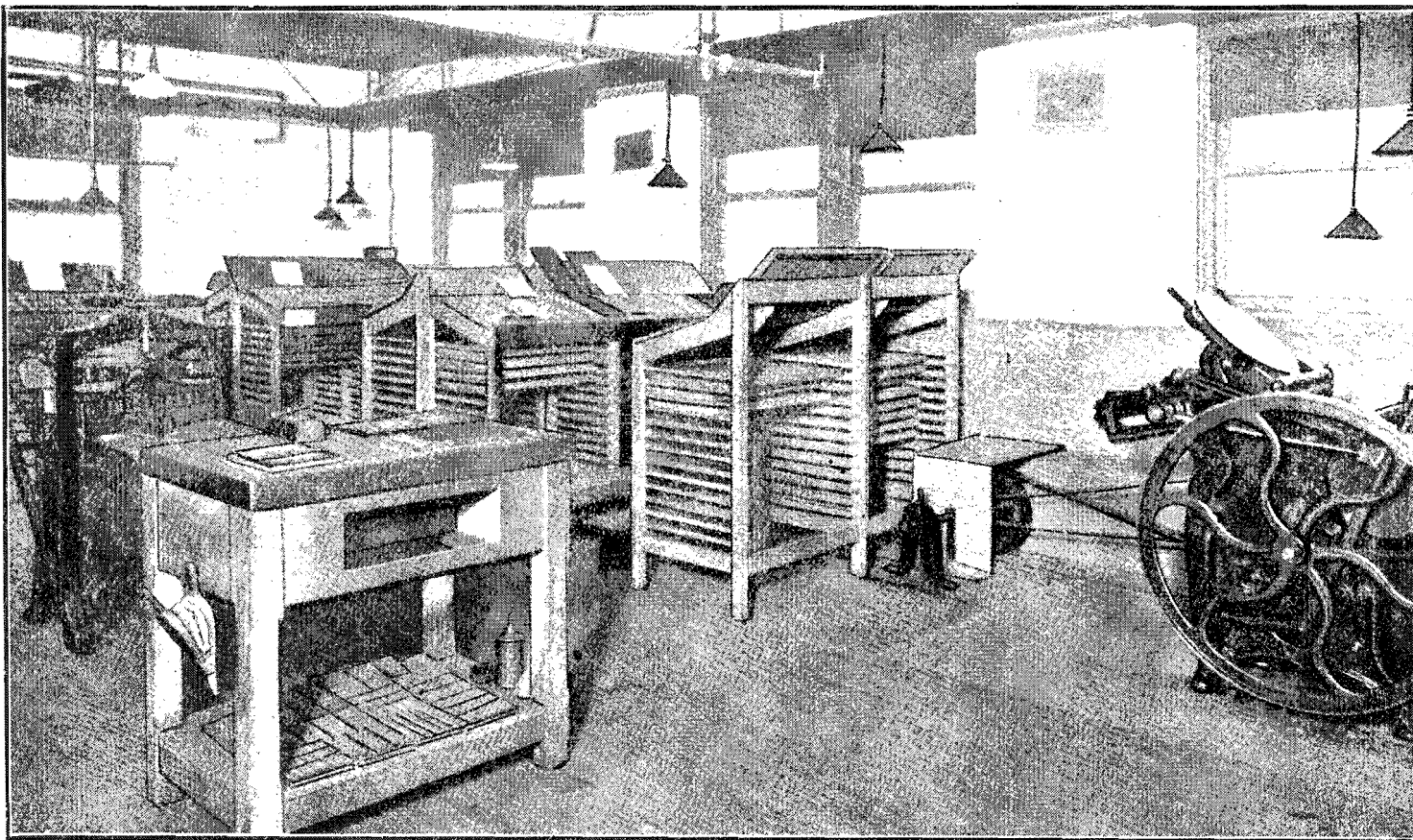
The students of this School compose and print a 4-page weekly journal (now in its 3rd volume) entitled “The Week in Review, a Summary of Newspaper Clippings on Vocational Education,” with editorials telling of the progress in this field, and dealing with other timely topics.

A beautifully illustrated and printed magazine of 88 pages, entitled “Vocational Education” is published by the Vocational Schools of the Department of Public Instruction, Buffalo, the composition, press work and binding being the work of boys in the Broadway and Seneca Vocational schools reviewed above.

This Department is organizing a Vocational Guidance and Employment Bureau.

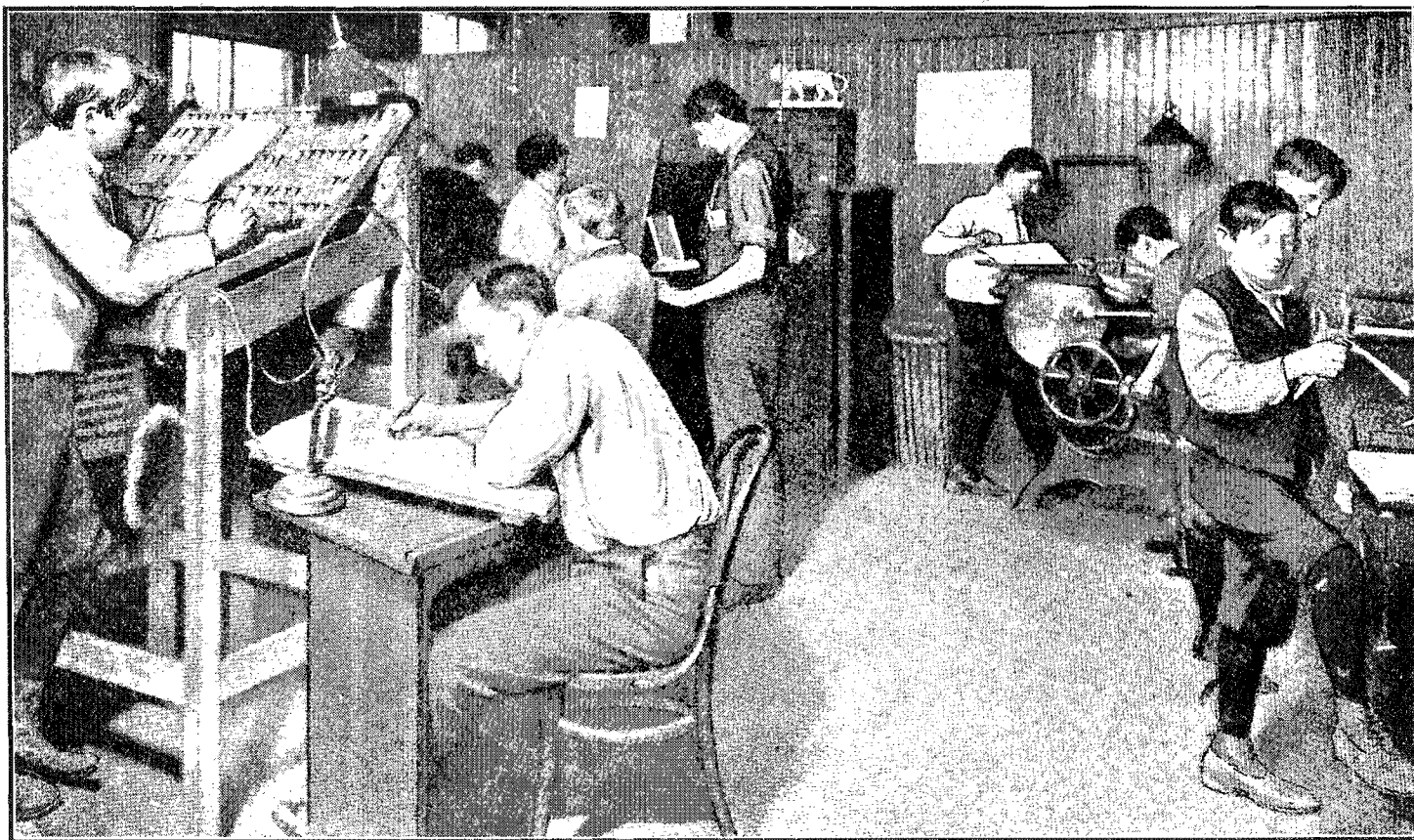
## SECTION 10: THE ROCHESTER FACTORY SCHOOL.

A good example of a school of this type exists at Rochester, N.Y. A large building which was previously occupied by an industrial school of the old type had been turned over to the public school authorities and was by them fitted up



A WELL-EQUIPPED PRINTING OFFICE, BROADWAY VOCATIONAL SCHOOL: BUFFALO, N. Y.





TYPE SETTING AND PRESS WORK IN THE PRINT SHOP, SENACA VOCATIONAL SCHOOL: BUFFALO, N. Y.

as an industrial school for boys from 13 years of age and upward whose parents and selves preferred the industrial training and education, combined with theoretical instruction, to the course usually given during the last two years of the elementary public schools.

The following statement concerning that school was made by Mr. L. A. Wilson, at that time Principal of the School:—

#### AN EXAMPLE OF FACTORY SCHOOL TRAINING.

The Rochester Factory School has for its aim the training of the boys, who come to it, along general industrial lines, and in the fundamental principles pertaining to certain trades. It does not aim to teach a trade; it does aim to develop efficiency and rapidity in execution so that those who go out with a diploma will be better fitted to enter their chosen trade than they would be under any other conditions.

When the school was first opened in 1909 only one course was offered, Cabinet-making. At that time 40 boys entered, and two teachers furnished the instruction. One instructed in shop work and the other in the grade work and drawing. This proved such a success that it was necessary to open another course, and in the following February a course in Electricity was offered. At this time two more teachers were employed, one to give the shop instruction in electrical work and the other to take charge of the grade work. The mechanical drawing from this time on was taught by a separate teacher. At this time the number of boys in attendance increased from 40 to 100.

#### NEW COURSES ADDED.

From February 1, 1909, to February 1, 1910, the school was run on this basis, but it was soon discovered that it was impossible for the shop teachers to give instruction in other lines of work. Requests on the part of many boys in the city led to the establishment of two new courses, those in Carpentry and Plumbing, in February, 1910. This necessitated the hiring of three new instructors, as it was necessary to have a principal. The plan of the work from this time can be considered as nearly ideal, the shop men having classes of from 13 to 15, and the grade and drawing instructors classes of from 25 to 30. Another decided advantage of this plan is the fact that not over 15 boys will finish any one course during the year, and it will be easier to locate positions for them.

In September, 1910, the courses in Architectural Drawing and Machine Design were offered.

The school is under the immediate supervision of the Board of Education, and is free to any of the city boys of 14 in the sixth grade or above. The school is maintained by funds supplied by the State and city. At present courses are offered in Cabinet-making, Carpentry, Electricity, Plumbing, Art Drawing, Machine Design. The length of each course is two years of 40 weeks per year and 30 hours per week.

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## AIM OF THE SCHOOL.

It is the aim of the school to place the boys in conditions as nearly as possible like those to be found in actual practice, and for this reason the school has more of the "air" of a shop than a school. It is in session from 8.30 until 11.30 and from 12 to 3 o'clock. The early closing in the afternoons allows many of the boys to do outside work, and thus remain in school for a longer period.

The work of each course covers the hours weekly as indicated:—

Shopwork 15, Shop Mathematics 5, Drawing 5, English  $2\frac{1}{2}$ , Industrial History or Geography  $1\frac{1}{2}$ , Spelling 1. Five hours of home work on Spelling and Shop Mathematics is required of all the students. The boys in the Electrical Department are required to spend three hours per week on Electrical Theory.

The following text-books are used in the correlation with the shop work:—Smith's Practical Arithmetic, Schultze's Advanced Algebra, Thurston's Economics and Industrial History, Jackson's Electricity and Magnetism.

## POINTS NOTED BY THE COMMISSION.

The Principal of the school at the time of the visit of the Commission was Mr. Fletcher. In conversation with him the following points were brought out as represented in the aim and work of the school:—

The school is a little factory. Work is done by the boys which has commercial value. Pupils make desks, chairs and other furniture for the public schools. They do plumbing for the School Board at various schools, also electric light wiring. Mr. Fletcher is of the opinion that it will be necessary to take in commercial work. He holds this plan to be desirable for the sake of the educational values, and not for the money-saving or money-earning results. He finds that this principle can be worked in harmony with the Trade Union men, who recognize the value of the school, and that its extension of work to the turning out of products for sale does not injuriously affect the interests of organized labor. The boys in the manual training and industrial work, who make things having commercial values, are very much more interested in them than in manual training models made chiefly for suitability for the training of the pupil.

## INDUSTRIAL WORK HOLDS BOYS AND GIRLS.

Two thirds of the boys who now attend this industrial school had not intended going on to the High School, and would have been out of school contact but for the industrial school; 90% of the boys here and the girls at the Vocational School would have left school altogether and gone to work, into stores, etc.

The boys' school can turn out 7 plumbers, 15 carpenters and 20 cabinet makers each year. Employers report favorably on boys from this school, and state that they are worth more money almost from the start than boys coming direct from the grammar school. Letters received from manufacturers, managers and foremen have proven beyond doubt that this school is supplying a definite need and increasing the efficiency and earning power of its pupils.

Another building for a Vocational School has been fitted up to provide courses for girls suited to those who desired to qualify for domestic occupations or for the trades which women enter in connection with textiles and garment making.

These schools do not profess to teach a trade, but they provide opportunities for experiences which qualify pupils to enter upon the occupation they are to follow with some knowledge of materials, tools, machines and processes used in it, and of the more simple principles which underlie the operations.

### PROFESSOR FORBES DESCRIBES THE SCHOOL.

When at Rochester, the Commission had the advantage of discussing the question with Prof. George M. Forbes, of the University of Rochester, who was on the Executive of the Board of Education when the Shop School at Rochester was started, and who continues a sympathetic student of the problems connected with it. The following information was obtained from "Conversation" with Prof. Forbes, supplemented by extracts from an article by him in the magazine "Vocational Education,"\* which brings his survey of the subject to a later date.

The first positive conclusion is that it is well to begin on a small scale. The advantages of such a beginning were very great. One was that the school started with no shock, no disturbance, no resistance of the taxing authorities, no protests from conservative tax-payers. There was no campaign in which the advantages and probable results of industrial education, as a cure for educational and industrial ills, were exaggerated or over-emphasized in such a manner as to lead to inevitable disappointment and reaction.

### NECESSITY FOR EXPERIMENTS.

A second value of the small beginning, and one which it is difficult to over-estimate, is *flexibility* in administration. Flexibility is essential to experiment and experiment is essential to the solution of any problem. This school was a pioneer, being the first in the country of its exact type. Hence experiment was the very breath of its life; but so it is to any beginning in any community, for the individuality of community life and needs makes local adjustment an absolute condition of the success of industrial education. The school was then, as an administrative proposition, thoroughly, completely *manageable*, and the administration could at once attack the problem which it was clear must take precedence of all others, viz., that of the synthesis, the amalgamation, of school and shop.

Now, the antithesis between these in existing practice was clear and sharp. The shop was real and vital, directly serving the community by creating and distributing values; but its aim was *profit*, its activities were all organized about the product, and the human factor was only one means to the sole end. In contrast to this the school was artificial, isolated from the industrial struggle of the community, concerned solely with the human factor and indifferent to any material product. Was a synthesis of these factors possible? That was the

\*Published by the Manual Arts Press, Peoria, Ill., March, 1913.

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first question. The answer obviously turned upon whether the school could be organized to produce a standard commercial product, meeting a real need of the community, and produced under something like shop conditions.

## A SCHOOL ORGANIZED AS A SHOP.

The determined attempt to try out this was due to the conviction that if the school was nothing but a school, it would not get the boy; that nothing would appeal to the boys so powerfully as industry that was real, and not mere industrial gymnastics with waste of materials; that to rouse his pride and self-respect there must be set for him something like the task of a man and the standards of a man. The first requirement was a real demand for a commercial product which the school could supply. This was found in the school system itself. The demand for teachers' desks, manual training benches, book-cases, etc., was more than the school could supply, and notwithstanding the subsequent expansions, the demand is still greater than the cabinet-making division of the industrial school can supply. The same method was followed in the trades that were gradually added, and at present the actual needs of the school buildings demand all the labor available in the school, including cabinet-making, electricity, plumbing, printing and carpentry.

## EFFECTS OF REWARDS TO PUPILS.

At the first transition from school to serious labor, some boys were inclined to complain that they were getting no direct benefit from their labor. This led to experiments with rewards of various kinds, including sets of tools and the privilege of making things for themselves.

The effect was not good. In fact the stimulation of the selfish point of view was weakening to the community spirit, the teamwork spirit, which had already appeared. All artificial incentives were abandoned, and sole reliance placed upon the creation of an atmosphere of workmanlike pride in the product and in its service to the community. The ideal of a real shop, a standard product, and consumers thoroughly appreciative of the service rendered, has proved to be the most permanent and thoroughly effective incentive without an element of selfish appeal. It is difficult to overestimate the social and civic value of this attitude towards the work and towards the community.

## PROBLEMS OF THE HUMAN FACTOR.

First, regarding selection, the original school was intended for boys from 14 to 16, as being the normal period of transition from elementary school to skilled industry. The intention was to meet the needs of two classes of boys:

*First*, those who through economic pressure could no longer continue academic studies, and who, though adapted to skilled industry, were shut out by immaturity and by lack of preparation, and so forced into trivial employments. The chief guide here was the Report of the Massachusetts Commission.

*Second*, the big boys, dull and backward in book studies, who showed zest for manual training and were presumably capable of skilled industry. These were selected to relieve the elementary school of one of its most serious problems. Both classes were admitted on equal terms, but the backward boys were found to preponderate and to give tone to the school. Experience soon showed their inferiority, even in shopwork, to the boy who had successfully completed the work of the elementary school; and to complicate the situation this led to an embarrassing social alignment among the pupils. Subsequently the Binet mental tests were applied throughout the whole school system, and many of the big, backward boys were found to be subnormal or borderline cases in mental capacity. The problem was solved by the formation of a separate school where the instruction could be adjusted to their capacity, and this arrangement has been found to furnish the needed relief to the elementary school.

The experience was precisely the same with girls, and shows that industrial schools cannot be used, except in rare cases, to transform the dull and persistently backward boys into skilled industrial workers. Success presupposes the securing of an all-round mentality fully up to the normal average, and selection of pupils is now made according to this standard.

#### APPROXIMATION TO SHOP PRACTICE.

Other experiments were made with a view to securing the closest practicable approximation to shop practice, and methods were adopted or rejected according to the result. For example, student foremen were appointed for subordinate groups, and this promised well and showed marked advantages, but was finally rejected wholly from the educational standpoint. The student foreman and his subordinates missed important educative elements in the work, the penetration to the principles involved and the new insight which could only be secured by the illuminating suggestions and comments of the competent instructor. A time-clock was installed with registrations of arrival and departure, and this has proved of permanent advantage, and the shop day of 8 hours for boys and 7 hours for girls has proved most satisfactory after considerable experiment.

The school and the shop come back out of their artificial isolation when the needs of intelligent practice compel the more thorough study of facts and demand the guidance of laws and principles. Under the influence of this conception much progress had been made in the union of shop and school.

#### HOW THE PROBLEM WAS SOLVED.

At first school time and shop time were sharply divided, four hours being given to each. The school teachers were distinct from the shop teachers, and the school was conducted in the ordinary way except that the selection of subject matter was made with reference to shop use. Now school teacher and shop teacher are the same for each particular trade and the group that is studying it, e.g., cabinet-making, electrical work, plumbing, printing, carpentry. The head

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of each of these departments teaches the necessary knowledge of materials, scientific principles, the mechanical drawing, the shop theory, and also the mathematics involved in the computation of cost and the making of estimates, all of which teaching is, as it were, done *in situ*; it is vitalized by its necessary relation to successful practice in the daily work of the shop.

On the other hand, the subjects which recognize that the boy is to be bigger than his immediate task, that he is to be in sympathetic touch with all industry, and is to be a citizen as well as workman—in short, the subjects which pertain to all trades alike, e.g. English, the elements of physics, industrial history and geography—these are still taught by separate teachers in combined classes.

But the central problem of such an institution viewed as a *school* is not in the method of instruction, important as that is. The truth is, that just as when viewed as a shop its problems centre in the *material* product and the necessary organization for its efficient production and disposal, so when viewed as a school, its central problem is in the selection and disposal of the *human* product, the boys and girls who are being prepared for industrial life.

## VOCATIONAL SELECTION.

The trying out of the more general question whether the boys admitted are or are not misfits in the industrial field as a whole, involves a still larger and more difficult problem, indeed one of the most imperative and difficult problems of modern education.

This means that for the adolescent period there should be no fixed and changeless course of study, but rather the greatest mobility; it means that change of course for many pupils during this period is not necessarily waste, but may be the only path to success, and that the education of the whole period is properly tentative, and experimental, with a view to finding the most effective powers through the most fitting activity.

It means also that two or more activities may go on simultaneously, and thus shorten the period of tryout and hasten the final decision with its corresponding concentration of activity on the essentials of a permanent vocation.

The conclusion is this: A type of industrial education has been developed which amalgamates school and shop in an effective way for pupils from 14 to 16, and the principles of such amalgamation, as herein outlined, seem permanent. They show how an effective instrument can be created; but these principles obviously do not and cannot show how this admirable instrument can be adequately correlated either with the human need, or the industrial need for which it was created, and increasing experience is showing that this correlation is now inadequate. Hence the suggestions as to the direction in which better correlation will be attempted. Success or failure in this direction can only be recorded after further experience. On the whole we may say that we have taken some steps, outlined above, of which we are pretty sure, and which constitute real progress toward a remedy, but to find the complete remedy, the ideal and wholly adequate organization, we have still far to go.

## SECTION 11: THE VOCATIONAL SCHOOL FOR BOYS, NEW YORK CITY.

This school, situated between Lenox and 5th Avenue, is intended for boys who desire to prepare for industrial as distinguished from office work. They learn the elements of a trade, and study Architectural, Freehand and Mechanical Drawing, while continuing their general education on lines that will best fit in with this work. A boy's earning capacity is undoubtedly increased by such a course, and he receives a training which he could never secure as an unskilled apprentice.

The school is free, and all supplies are provided. Pupils of good moral character who have graduated from the elementary school are eligible for admission.

The course covers 1 or 2 years, and boys may remain longer. The school is open 5 days a week, and the holidays are the same as in the public schools. Sessions are from 9 a. m. to 5 p. m. with 1 hour for lunch, thus accustoming boys to actual business life. No home lessons are given.

Those boys who have decided on a trade may begin the work on it at once, while those who have not yet made up their minds are given a variety of work, to enable them to select a suitable trade, and as soon as they have decided, they devote their time to it. There are no regular classes, and each boy progresses as fast as he can. In addition to the trade work, all boys have to take trade Drawing, together with the non-vocational subjects, to which they devote about a quarter of their time.

The trades are taught by experienced mechanics, and everything is done to make the school conditions prepare boys for actual business practice. The Principal makes a special point of reproducing shop conditions as nearly as possible. A diploma is awarded on completion of the course, and this is of great help to boys in obtaining employment.

The building is new, and supplied with every requirement, including a lunch room.

The school does not undertake to place its graduates, but the Principal and teachers endeavor to keep in touch with suitable openings, and to recommend boys for them.

### RELATIONS TO LABOR CONDITIONS.

The Principal, Dr. Pickett, stated that he was in touch with the Labor leaders, and found no opposition from them. A committee of the National Federation of Labor expresses itself in favor of this form of industrial training.

Dr. Pickett definitely stated that the school does not profess to turn out journeymen, as the boys require experience and maturity before they can claim to be journeymen. He said, however, that in knowledge of principles and theory of the trade, and in skill of hand, a boy who has been in this school for 2 years is ahead of the average journeyman in the trades represented, and in plumbing can do shop work of as good quality as journeymen. In the printing trade a boy increases his earning power greatly by a year in school.



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There were 600 boys in attendance at the time of the Commission's visit. Since the school was opened it has sent about 240 boys into industries.

No work is done by the school for sale, but a good deal is done for the School Authority of New York, e.g., printing, making tables for the recreation department, etc. As the boys know that this work is for real service and use they take a keener interest in it than they otherwise would.

While no allowance is made in apprenticeship for time spent at this school, these boys make faster progress in their trades, and in the printing trade 3 years at school are counted as 2 years' apprenticeship, and 4 years as 2½ years.

Dr. Pickett stated that the great obstacle to the Vocational School was the attitude of the schoolmen and teachers in High Schools. He deprecated the providing of short courses in the art of teaching.

Dr. Pickett thought that neither a boy nor his parents could know before he was 14 what he would be fit for.

## COURSES OF STUDY.

## A. VOCATIONAL.

*Wood Work.*—House Carpentry and Construction. Cabinet-making and Bench Work. Wood Turning. Pattern Making in Wood. Use of Wood-Milling Machinery. *Metal Work.*—General Machine Shop Practice. Sheet Metal Work. Forging. Plumbing. Moulding and pouring patterns. *Electric Wiring and Installation.* *Printing.*—Estimating Costs. Imposition. Composition. Press-work. *Book-Binding.*

## B. DRAWING.

*Mechanical Drawing.*—Working Drawings. Isometric Architectural Drawings. *Freehand.* *Industrial Design.* *Making and Reading Blue-Prints.*

## C. NON-VOCATIONAL SUBJECTS.

*Trade Mathematics.*—Arithmetic. Use of Symbols (Elementary Algebra). Plane Geometry as used in trade. Trigonometry as used in trade. *English.*—Business Letters. Reading with oral and written expression. Drawing of Contracts. Writing Specifications, etc. *Industrial History.* *Civics.* *Industrial and Commercial Geography.* *Applied Physics.* *Industrial Chemistry.* *Simple Book-keeping.* *Elements of Commercial Law.*

It is planned to add other lines of technical work during the year.

SECTION 12: STATE TRADE SCHOOL, BRIDGEPORT,  
CONN.

This is a group of shops and class rooms for teaching the beginnings of trades to boys and girls, and is free to any boy or girl over 14, the school being supported by the State. It is open every day in the year except Sunday, and 6 evenings weekly from 7.30 to 9.30.

In *Woodwork* the course is 2 years, for carpentry and pattern or cabinet making, including Shop Practice, Shop Science, Drawing, Mathematics and Civics.

The *Machine Work and Tool-Making* course is 2 years, including Shop Practice and Science, Drawing, Mathematics and Civics.

The *Dressmaking Department* has a 1-year course in plain sewing for girls who wish to become seamstresses, and an advanced second-year course for those who are to be dressmakers. The courses include Shop Practice, Study of Textiles, Art and English.

The *Plumbing* course is 1 year, including Shop Practice, Science and Sanitation, Drawing, Estimating, Civics.

The *Print Shop* offers a 2-years' course in typesetting and presswork, including Shop Practice, Drawing, Estimating and Civics.

The *Drafting Room* bears exactly the same relation to the shops as in a manufacturing plant, all designs and work drawings being made here before being constructed in the shop.

Each department has complete equipment.

All boys receive daily  $6\frac{1}{2}$  hours of actual shop practice and  $2\frac{1}{2}$  hours of instruction in Drawing and applied bookwork.

The school sessions run from 8 to 12 and 12.30 to 5.30 (9 hours daily, 48 hours weekly).

All girls receive 5 hours of actual shop practice daily and 2 hours instruction in class work. The sessions run from 8.30 to 12, and 12.45 to 3.15 (7 hours daily, 38 hours weekly).

The instructor in Science and Mathematics plans his lessons to meet the needs of the shop as outlined by the shop foreman.

Apprentices from various city factories attend this school one forenoon weekly, at regular wages, for Mechanical Drawing and Shop Mathematics; every forenoon of the week is devoted to this purpose.

Young men may alternate two weeks' work in factories with two weeks in school. The school work includes Mechanical Drawing, Shop Science, Mathematics, Civics, also Shop Practice on a machine which the boy does not use in his fortnight of factory work.

The anti-junk-heap idea is fundamental in this school, the shop work of all departments (except plumbing) being performed on a commercial product, sold in the open market, or made to order.