

## CHAPTER XLVII : SCHOOLS FOR MACHINE AND METAL WORKERS.

### SECTION 1 : SUMMARY OF THE SYSTEM.

In the field of industrial instruction for metal workers the Central Industrial Office of Prussia met two problems when the transfer of Vocational Schools was made to the Ministry of Commerce and Industry. These were first how to separate the technical classes of some of the Secondary Schools (called *Real-schulen*) and organize them independently and second how to increase the number of schools for metal workers to meet the practical needs of the industries. The change in the first respect was gradual during the last 20 years of the nineteenth century so that at present (1910) there are 23 Metal Workers' Schools with 115 classes, whereas in 1884 there were only 10 such institutions with 24 classes.

Many of the present engineering schools developed out of the schools for builders, the engineering departments being organized as independent institutions, and at the same time Workmaster Schools were inaugurated by the Government followed by Middle Technical Schools. In 1898 the Workmaster Schools were reorganized as Machine-Construction Schools or Engineering Schools, and the Middle Technical Schools became Higher Machine-Construction or Engineering Schools.

The value of and need for these schools increased from year to year, and they were liberally assisted by the Government, until they now offer the highest standard of instruction in these branches. They were reproduced in other parts of the German Empire, and it is through them that all the available powers of scientific knowledge and research are directed upon the problems of the iron industry, and that the products of German shops and foundries have become famous.

Where the industries of the district necessitate it, Metallurgical Schools are associated with the regular Engineering Schools, and in many cases Evening Classes are held in connection with both branches of these schools.

#### RESERVED FOR SPECIAL INDUSTRIES AND WORKERS.

In Prussia, in accord with the wishes of the local Boards of Trustees which represent local manufacturing interests, it has always been recognized that the aims of these schools, which are intended for the lower or middle class of workers, should not be placed too high. Especially all approach to the Polytechnical Universities should be avoided and they should remain Mono-technical in scope. This principle was not only kept in view in the regulations issued in 1901, but is constantly adhered to in the deliberations concerning a still later reorganization now going on.

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In the establishment of Monotechnical Schools for metal industries, the Central Office has insisted upon the principle that such schools should be opened only in the localities having adequate factories and that in provinces lacking metal industries no such schools were necessary. Experience has proved that the establishment of such schools is always the outcome of a flourishing industry, such as cutlery, locksmithing or machine building. Such a school then, is opened to prepare the required skilled laborers in large numbers, but it never calls into life a new industry, nor preserves the life of a dying industry.

#### VARIETY OF FORMS TO MEET VARYING NEEDS.

In accordance with the varying needs of different industries, the vocational schools for metal workers have developed a variety of forms. Thus, at present, there are, besides the Machine Builders' Schools one Secondary School for the building of ships and ships' engines, two smelting schools, three schools for the cutlery and other small metal industries, one school for the bronze industry, one coppersmiths' school, and one school for electric mechanics. The establishment of a school for electric installations is now under consideration.

The Central Industrial Office has paid much attention to the social aspects of the schools for the metal industries. For that reason it interests itself particularly in Machine Builders' Schools requiring for the admission of students, besides a practical shop experience of several years, only an elementary education, and its interest is directed also to Evening and Sunday Schools and special courses affiliated with Machine Builders' Schools.

The *Higher Engineering Schools* train young men who intend to become supervising or constructing engineers in large machine shops and to conduct the highest grade of engineering enterprise, and directors or owners of machinery works.

The *Lower Engineering Schools* train for a lower grade of supervising or constructing engineer, superintendents of smaller shops and factories, workmaster, foremen and mechanics of secondary foundries.

The *Evening Schools* meet the needs of those who have not the time or means to take a full course, but who can improve their knowledge and prospects appreciably by a course of study suited to their requirements.

Thus, each grade of schools supplies a certain grade of the industry with men suitably and adequately trained.

#### THEY BENEFIT WORKERS AND INDUSTRIES.

Through these Machine Builders' Schools (schools of mechanical engineering as some may be called) it is intended to improve the young men who must earn the money for tuition fees by the work of their hands in shops and factories. This is also in the interests of the factories, for experience shows that the graduates of these schools become the most useful workers. Factory owners, who for a time showed little sympathy for these schools, are much more friendly to them now that conviction of their usefulness spreads.

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The Evening and Sunday classes, as well as the special limited courses, are intended chiefly for young metal workers who cannot afford to spend many hours in the Day Schools. They are of use not only to those who attend them, but also to the industry in general, since they increase the number of skilled laborers. That is the reason why the Evening and Sunday classes and special limited courses have increased their attendance so largely in recent years. In future these considerations will be decisive in the further growth of the system of Schools for Metal Workers.

## CONDITIONS OF ADMISSION.

The required preparation for admission to the lower schools may be proved: (1) by testimonials showing that the applicant has successfully attended a classical, semi-classical or modern Secondary School up to the grade called "Lower Secunda," that he possesses the necessary skill in drawing, and has done practical work in a workshop or factory for two years; (2) by giving proof of having attended for two years the preparatory class of any Machine Builders' School and possessing the required knowledge and skill for admission; (for admission to these preparatory classes a good elementary education and two and one half years' apprentice work in a workshop are required); (3) by producing a testimonial showing that he has obtained the privilege of one year's army service, that he possesses the required skill in drawing and that he has completed two years of practical work in shop and factory; (4) by producing a report of successful attendance at any vocational school designated by the Ministry of Commerce and Industry, and showing that he possesses the required skill in drawing, and that he has completed two years of practical work in shops or factories; (5) by passing an examination for admission and proving three years of practical experience in shops or factories. The Directors of the Institution may, with the consent of the local Board of Trustees, reduce the requirement of three years of experience.

## COST OF ATTENDANCE.

Tuition fee, 75 marks (about \$18) per semester. The school in Cologne charges 100 marks (\$25). Other expenses for books, drawing utensils, stationery, etc., about 120 marks (\$30); board and lodging for ten months are calculated to amount to about 500 to 700 marks (\$125 to \$175). Needy Prussian students may obtain bursaries or be released from paying tuition fees.

## CURRICULUM.

The courses cover two years.

*Higher Schools.*

Business Practice, Mathematics, Physics, Chemistry, Mechanics, Machine Parts, Boilers, Levers, Engines, Hydraulic Motors, Gas Motors, Machine Tools, General Technology, Metallurgy, Electrotechnics, Constructive Engineering and Drafting, Estimating, Descriptive Geometry, Drafting of Machine Parts, and of Boilers, Levers, Engines, etc., Laboratory Practice, First Aid.

Total number of hours per week—42.

*Lower Schools.*

German, Business Law and Practice, Arithmetic, Mathematics (practical), Physics, Chemistry, Mechanics, Electrotechnics, Machine Parts, Boilers, Levers, Engines, Hydraulic motors, Gas Motors, Machine Tools, Metallurgy, General Technology, Constructive Engineering, Estimating, Geometrical, Freehand, Technical Drawing and Projections, Drafting of Machine Parts, etc., Laboratory Practice, First Aid.

Total number of hours per week—42.

In Lower Schools only offering 1½ year's course, more attention is given to German, Penmanship, Drawing (technical and freehand), Mathematics and more essential parts of the Engineering study, the total number of hours per week ranging from 46 to 48. The course is divided into 3 grades, each having 2 periods of 10 weeks each.

*Metallurgy Schools.*

German, Business Practice and Legislation, Mathematics, Experimental Chemistry, Mechanics, Electrotechnics, Theory of Combustion, Chemical Technology, General Science of Metallurgy, Metallurgy of iron and other metals, Mineralogy, Analytical Chemistry, Mechanical Technology, Engineering, Book-keeping, Calibration of Rollers, Technical Freehand Drawing, Geometrical Drawing and Projection, Vertical Writing, Laboratory Practice, First Aid.

*Final Examinations* are held by a Committee appointed by the Government, and diplomas awarded to successful candidates by means of which they can obtain many good positions.

WHAT THE SCHOOLS LEAD TO.

The diploma of graduation from these schools serves as a proof of the student's possession of the required technical knowledge and skill for the position of technical secretary in the navy, for the position of administrative railroad engineer or for the position of railroad secretary in the administration of State railroads.

Conditions of admission, costs of attendance and privileges arising from attendance are somewhat similar, with the necessary variations in respect to the differences in the trades provided for in those of the following other classes of schools, grouped under those for metal workers.

*Schools for Ship Builders and Ship Engine Builders* (with a course of four semesters): These schools are intended to supply administrative engineers or officers of construction for shipyards, and offer future owners and superintendents of such industrial plants opportunities to acquire the necessary knowledge and skill.



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*Lower Machine Builders' Schools* (with a course of four semesters): These schools are intended for lower technical foremen in shops and for clerks in the factory offices; also to equip owners of small shops with the required knowledge and skill in drawing.

*Technical School for Coppersmiths*: This school is intended to prepare foremen and technical heads for coppersmiths' works; also to offer the necessary knowledge to shop and factory owners, especially the required accomplishment in Drawing and Designing.

*Other Technical Schools for the Iron and Steel Industry* (with courses of from four to six semesters): These schools are intended to prepare skilled workers in the cutlery trade and in other so called small iron and steel industries; that is to offer the theoretical knowledge and practical skill to enable them to rise to higher positions such as foremen, inspectors and independent masters.

*Evening and Sunday Schools for the Metal Trades*: These schools are affiliated with Secondary Schools for the Metal Trades. The courses are for engine builders, locksmiths, blacksmiths, shipbuilders, etc. Their object is to impart the necessary knowledge for the various trades and to train the students in Drawing.

*Courses for Locomotive Engineers* (with two semesters, 10 hours a week): These courses offer only theoretical instruction for the preparation of locomotive engineers.

## DO NOT TRAIN FOREMEN.

The development of the Lower Schools of Machinery in Prussia has been exceedingly satisfactory, and the pupils turned out by them have been able to meet all requirements of industry. They have never trained foremen. They give men, with a Primary School education and long practical experience, a technical training suitable to the preparation they have received, and leave the manner of their subsequent occupation to industry.

## SECTION 2: COLOGNE.

Population 516,000. The principal industries are machinery, printing, and the manufacture of perfumes.

## ROYAL UNITED ENGINEERING SCHOOL.

This school prepares young men for responsible positions in the machine-construction trades, in

1. Day Classes.
2. Evening and Sunday classes.

It also provides instruction for master-workmen who wish to improve their skill and knowledge in their respective trades.

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The school is under the supervision and control of the City and State. Four members of the Board of Governors (Kuratorium) are members of the City Council.

Fees.....	40,000 marks.
City.....	30,000 marks.
State.....	150,000 marks.

Subscriptions are received also from the Society for the Encouragement of Industry in the Rhine Province and the Industrial Society of Cologne and Vicinity.

#### COURSES.

- A. Higher Machine Construction Course.
- B. Machine Construction (Workmasters' Course).
- C. Evening and Sunday Classes.
- D. Special Courses for,—
  - 1. Gas and Water installation and fitting.
  - 2. Electric installation and fitting.
  - 3. Gas masters (plumbers).
 All these are finishing courses.

#### ENTRANCE REQUIREMENTS FOR THE COURSES.

Course A. Either (a) Einjähriger certificate, and at least 2 years' practical experience, or (b) evidence, by school certificate or examination, of necessary attainments, completion of 18th year, and at least 3 years' practical workshop experience.

For Preparatory School, leaving standard of Boys' Middle School and 3 years' practical work.

Course B. Volksschule leaving standard and at least 4 years' practical experience, and Continuation School if possible.

Course C. Only those not liable to compulsory attendance at Continuation School.

Those who have taken the higher course usually start to work afterwards at less salary than the ones who have come in with more practical experience, but they usually reach higher positions in the end.

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ATTENDANCE. Number		Length of Course.	Fees.
Summer 145	Winter 151	A. Five Classes, 2½ yrs..... Preparatory Class (if required) ½ yr.	100 marks per term.
103	101	B. Three Classes, 1½ yr.....	30 marks “
342	340	C. Each half-year a complete course. Up to 3 hrs. weekly..... Up to 7 hrs. weekly.....	2 marks per lesson per term. 1.50 marks per lesson per term.
	277	D. Two months.	

Foreigners pay five times above fees.

*Subjects. A.*

1. Civics, Commercial Law.
2. Mathematics.
3. Physics.
4. Chemistry.
5. Writing practice.
6. Geometrical drawing.
7. Mechanics.
8. Elements of machinery.
9. Power machines.
10. Lifting machines.
11. Electro-technics.
12. Construction.
13. Technology.
14. Laboratory work.
15. Prevention of accidents and business hygiene.

*Subjects. B.*

Foregoing subjects, (with addition of German) 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 15, plus Geometrical and Projection Drawing, Technical Freehand Drawing, and Arithmetic.

*Subjects. C.*

*Evening.* German, Machine Construction, Technology, Installation, Special Course for Stokers and Machine-minders, Planimetry, Stereometry, Physics, Electro-technics, Mechanics, Workshop Bookkeeping and Calculation, Arithmetic, Algebra and Chemistry.

*Sunday.* Geometrical and Projection Drawing, Technical Freehand Drawing, Drawing for Machine Construction, Electro-installation, Gas and Water Installation, and various classes of Metal Trades.

## GENERAL REMARKS.

This was the finest and best equipped Machine Construction School seen by the Commission. Not only does it prepare men in a 2½ year course for responsible positions in the machine construction industry, but, by establishing short courses for master workmen, the school has enabled the small manufacturer to learn the special technique of new developments in trades. It also enables the small manufacturer, by greater skill and special knowledge, to avoid impending ruin from factory competition. 1,000 masters have been trained in this way in the school, and they in turn have trained a lot of apprentices.

## INSTITUTE FOR THE ENCOURAGEMENT OF INDUSTRIES IN THE RHINE PROVINCE.

This Institute was established under the auspices of the Industrial Society of Cologne and Vicinity, and is supported by the following:—

State.....	15,000 marks.
Province.....	3,000 marks.
City of Cologne.....	12,680 marks.
5 Chambers of Commerce in surrounding districts, 400 marks each.....	2,000 marks.
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	32,680 marks.
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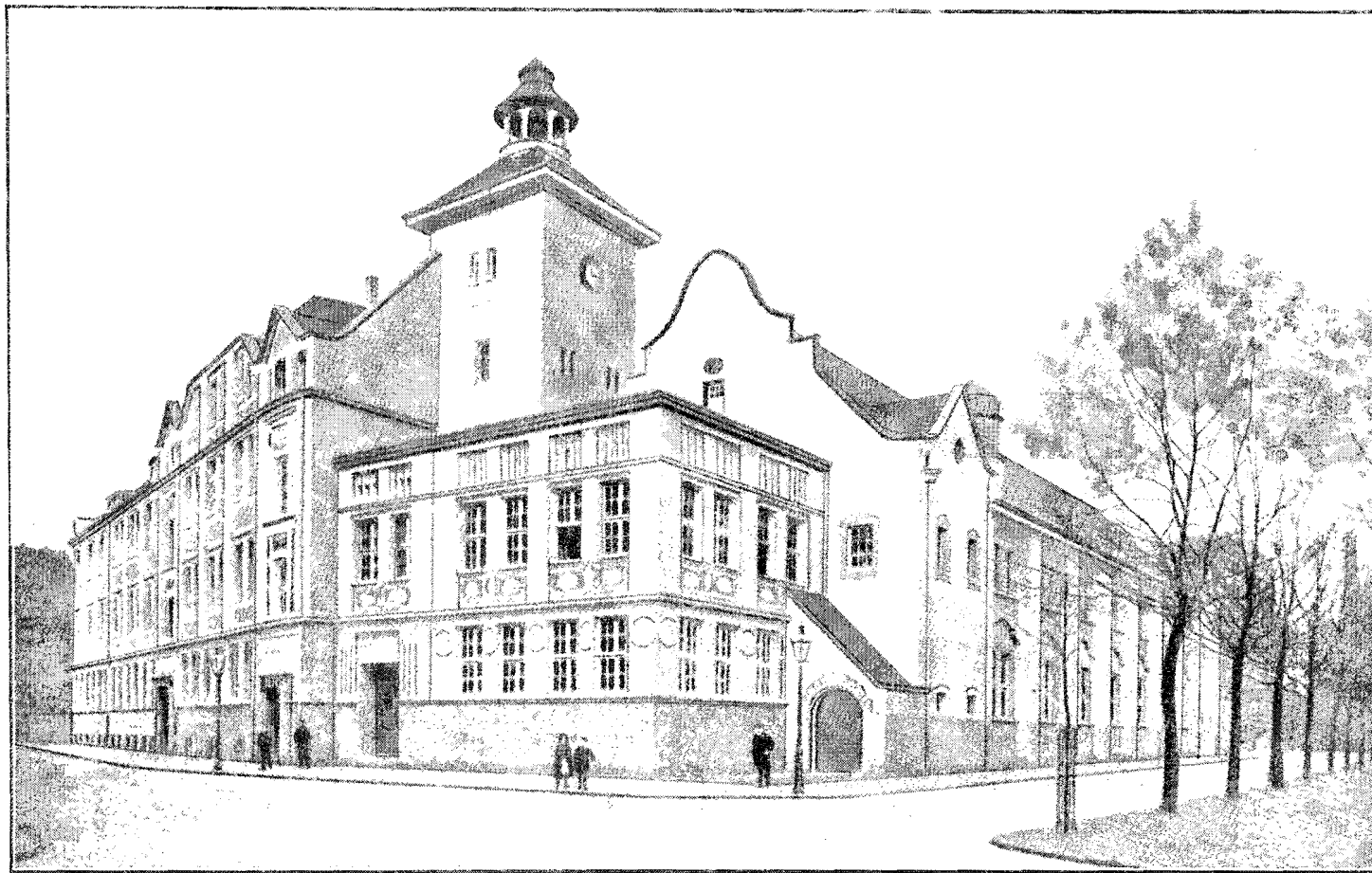
Special contributions from the above for Master Courses in various trades; 54,880 marks in all.

*Controlling Body:* Hon. President, Over-President of Rhine Province, Mayor of Cologne and Curatorium.

Under the Director of the Machine Construction School but in separate buildings.

*Aim:* To improve the technique, intelligence and skill of individual craftsmen who are working for themselves. It applies to several trades and is about to be extended. Classes in commerce are held in the same building, under the auspices of the Rhenish Association.

It provides also Company Courses, as business capacity combined with co-operation is the foundation on which handicraft may once more hope to flourish. Companies are frequently not formed for want of suitable people to control them, and often fail for the same reason. These Courses have met with great success in Berlin and elsewhere, both for Credit Companies and Raw-material and Labor Companies.



INSTITUTE FOR THE ENCOURAGEMENT OF INDUSTRY: COLOGNE.

*Equipment:* 1. Permanent exhibitions of machinery and tools for small businesses as well as noteworthy and peculiar products of handicraft and industry. Machines are shown at work, and trials are undertaken on request.

2. Master Courses for Masters and Assistants in the various trades with model workshops where they can learn the arrangement and use of the machines for their business, and receive business training.

3. To avoid duplication, part of the equipment of the Machine Construction School is available for some classes.

*Methods:* One necessary adjunct is the Exhibition or Museum, to show workers what is required. This collection is permanent and the 'exhibits' are kept up to date by co-operation with the manufacturers. Exhibitors are assured of material advantage. This Museum has had considerable influence on the industrial development of the Rhine Province and the City of Cologne.

*Teachers* are all skilled master-workmen, receiving 4,200 marks yearly.

*Courses:* Master courses, 3 courses yearly, of 8 weeks each, for carpenters, locksmiths, and iron workers, shoemakers and tailors (masters and journeymen). Lessons morning and afternoon. Classes limited to 10 pupils.

*Part Courses* are arranged for those who cannot spare time for full courses.

*Fees:* 50 marks per course.

*Attendance* (1909): 98 in all courses.

#### GENERAL.

Evidently the teachers are giving their men special knowledge and skill in several trades, such as cabinetmakers, tailors, chimney-sweeps, ornamental iron workers, etc., to enable them to make and do things that the factory cannot turn out.

The Commission saw the bootmakers making special boots for cripples and deformed people, and also specially fine shoes for the wealthy. The tailors, too, were making special stylish suits of fine quality for the better class of trade. They were given special instruction in the new development of trades such as metal-coloring, etc.

The school was doing exceptionally high-class work.

### SECTION 3: DORTMUND.

In the Westphalian coal-mining district, having a population of 143,000. Mining is the principal industry, but there are also steel and iron works.

#### ROYAL UNITED MACHINE CONSTRUCTION SCHOOL, OR SCHOOL OF MECHANICAL ENGINEERING.

This school was established in 1889 as a Foremen's School of elementary school standard. In 1891 it was united with the new Technical Middle School of Machine Construction; and in 1893 the two schools were amalgamated as a

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State institution bearing the present title, under the Ministry of Commerce and Industry, with a Curatorium on which industrialists are represented in immediate control of the school.

*Support:* The city provides the building and equipment in full. The annual maintenance is divided:—

City.....	12,000 marks.
Fees.....	40,000 marks.
State.....	138,000 marks.

Firms also contribute towards scholarships.

*Control:* A Curatorium on which industries are represented.

*Entrance Requirements:*

A. The 'Higher' School takes boys who have attained the Einjährige standing, and who have had at least 2 years of practical experience in actual industry. A boy who has had three years of practical work may enter on passing an examination set by the Minister of Commerce and Industry.

B. The 'Lower' School takes boys who have Volksschule standing and have had at least four years of practical experience.

C. Takes students who attend the Evening and Sunday Classes and are assistants, journeymen, or master workmen of the neighbourhood.

FEES AND ATTENDANCE.

<i>Department.</i>	<i>Attendance.</i>	<i>Yearly Fee.</i>
A. Higher.....	80 .....	150 marks.
B. Lower.....	237 .....	60 marks.
C. Evening and Sunday..	300 .....	40 marks.

Foreigners are charged five times the usual fee.

*Objects:* A. Higher School. Training machine engineers and prospective owners. Eligible for railway service, Superintendents.

B. Lower School. Trains foremen, owners of small businesses and technical assistants in construction offices.

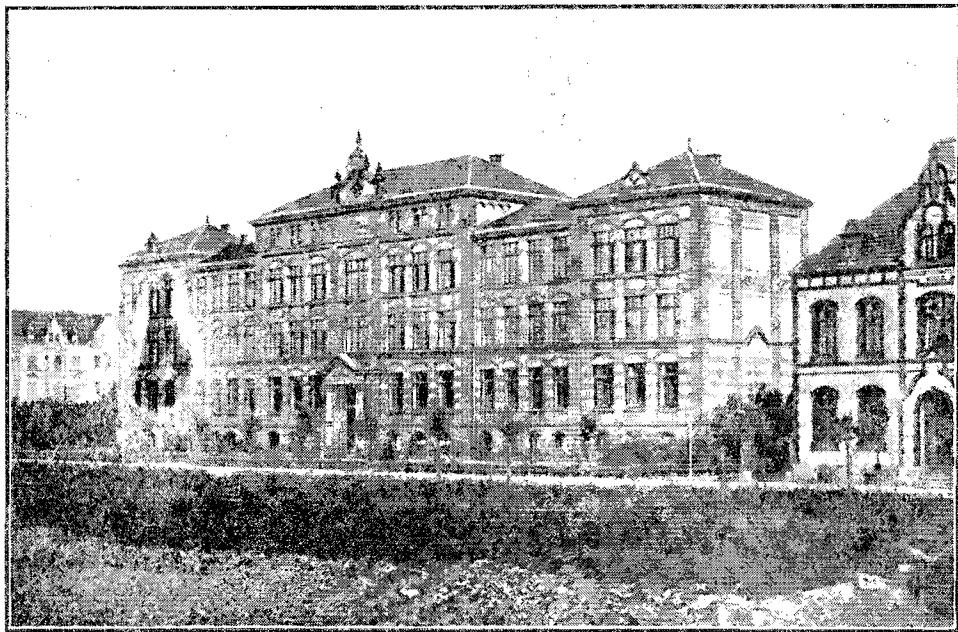
C. Sunday and Evening Classes. For apprentices and assistants. Course is equivalent to lowest class of B., so that students may enter one class higher on completing the Evening Course.

*Building and Equipment:* Building and equipment worth 750,000 marks of which 160,000 marks is due to equipment.

*Teachers:* University and Technical High School training plus practical experience in technical subjects.

*Special Feature:* Students' excursions to neighbouring works. Special (State-aided) tour of Director and staff to gain experience of home and foreign methods. One Engineer spent several months in America, others in various countries.

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**SECTION 4: DUISBURG.**

Population of 93,000. Situated on the Rhine-Ruhr Canal, along which Westphalian coal is shipped to the Rhine and thence to the sea. The principal industries are machinery and iron works, shipbuilding, sawmills and canal shipping.

**ROYAL SCHOOL OF MECHANICAL ENGINEERING—MACHINE CONSTRUCTION AND METALLURGY.**

This is a Secondary or Middle School established in 1893, and now maintained jointly by State and City, as follows :—

	Marks.
Fees.....	18,000
Rhineland Province.....	10,000
City.....	5,000
State.....	147,000
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	180,000

Also 29 industrial companies contribute towards scholarships of the school.

It is under the Minister of Commerce and Industry, and a Committee including industrialists.

The members of the Examining Committee, and also some of the members of the Curatorium, are leading captains of industry in the Rhine district.

Students come from industrial life, having elementary school standing, plus 4 years' practical experience in the work chosen, and Continuation School.

The total attendance is 320, two-thirds taking Machine Construction and one-third Metallurgy.

Students are mostly between 18 and 35 years at entrance and nearly all have been soldiers. This is considered of importance, as they have been taught the value of system and of hard and regular work.

This is a finishing school, and aims at training foremen, machine masters, etc. for the metallurgical and chemical trades. It also gives technical training to smiths, locksmiths, coppersmiths, tinsmiths, etc. Both foremen and masters obtain here a thorough knowledge of details, which they require to be successful in business.

**COURSES.**

A. Mechanical Engineering (Machine Construction) School.

B. Metallurgical School.

C. Evening and Sunday School.

A. and B have four classes of 6 months each, and both include all the science necessary.

In C. students take subjects as required for their occupations.

*The Evening Classes* are especially for those who wish to enter the third instead of the fourth class of the School, or those who do not wish to take the whole course.

Pupils are accepted in Government railway and building departments. Special preference is given to students of the Metallurgical School.

This school specializes in metallurgy of iron and steel, whereas the Metallurgical School in Gleiwitz is general and includes the non-ferrous metals as well.

*Buildings and Equipment*: A well-equipped, up-to-date, model school. Building cost 1,000,000 marks and equipment cost 300,000 marks, the latter showing signs of economy.

In the main building, two rooms at different ends of the building are fitted up one with all parts for machine construction, and the other with all parts connected with power transmission. On the side of each room is a sketching room, to which parts are taken. Thus each of the two collections may be used simultaneously by two different classes.

*Teachers*: There are 25 teachers on the regular staff and 4 additional. All must have had academical, Hochschule or University training. Teachers are allowed to, and most of them do, engage in outside work.

## SECTION 5: MACHINERY SCHOOL, PRANCKHSTRASSE, MUNICH.

This school is intended for apprentices and helpers in the machinery and allied trades. There were 300 apprentices and 200 helpers attending the Machine Construction section. The chief trades taught are machine construction, mechanics, metal work, joinery, lead working, chemigraph printing and photographic work, bookbinding and printing. The chief trades are taught in 4 buildings; iron workers attend for one whole day a week. This school is one of six of a similar grade and character in the city, some of the trades being taught at one school and some at another, as required.

The classes range from 15 to 32 in the larger sections. The students make models of machines, and balances, which are sent to the Elementary Schools for use there.

The teachers begin as part-time teachers, but as the work develops, they are employed full time.

Each trade has to attend the *Chemistry* classes 16 or 20 hours a year for studying the fundamental principles of chemistry.

The Commission visited the rooms for the work in metal, lithography, printing and bookbinding. The enthusiasm of the boys was very marked. The Kleistine process for colouring paper covers of books was being used. The process of marbling was shown, the jelly for marbling paper being made from Icelandic moss. The boys seen were all apprentices, taking one whole day a week at the school. Those from different trades came on different days. The students in typography were making designs; printers were working in colors; the photo-engraving students were drawing.

In reply to questions, the Principal stated that wood and metal work is given in some of the Elementary Schools in the 7th year, but it is not general yet. The

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8th year classes in the Elementary Schools are voluntary. Putting handwork in the 8th year classes had directed the children into skilled occupations, and things were improving considerably, as more children take the 8th year of school work. Of those attending compulsory apprentice classes, 1800 came from the Continuation Schools. The feeling in favor of compulsory attendance has been growing, and the bigger factories send their assistants, so that the difficulty is disappearing, and public opinion is considerably more friendly now, and becoming more so every day.

## SECTION 6 : COURSES FOR TRADE SCHOOL\* FOR MACHINISTS, INSTRUMENT AND GUN MAKERS, MUNICH.

### PRINCIPLES OF ORGANIZATION.

*a.* Corresponding to the apprenticeship term of four years, the school is divided into four progressive classes. The school is for all kinds of mechanical and gun-makers' apprentices, with the exception of the fine mechanics, for whom a special school is maintained.

*b.* The number of hours of instruction per week amounts to nine for all classes. The instruction is to be given on one week day.

*c.* The distribution of the periods of instruction among the various trades and the hours allowed to the different classes, are shown in the following tables.

*d.* The practical instruction in Materials and Trade Practice is given by capable workmen. The remaining instruction is taken care of by adequately trained teachers of the public and Continuation Schools of Munich.

Subjects of Instruction.	Hours of Instruction.					
	I Class	II Class	III Class	IV Class	III Class	IV Class
	Electro-mechanics				Mechanics	
Religion.....	1	1	.....	.....	1	.....
Business Composition and Reading.....	1	1	1	.....	1	.....
Arithmetic and Bookkeeping.....	1	1	1	1	1	1
Hygiene and Civics.....	1	1	1	1	.....	1
Physics.....	1	1	1	2	.....	.....
Electro-technics with Practical Exercises.....	.....	.....	.....	3	.....	.....
Descriptive Engineering.....	.....	.....	.....	2	1	2
Trade Drawing.....	2	2	2	.....	2	2
Practical Instruction in Materials and Trade Practice.....	2	2	3	.....	3	3

\*Meaning Continuation School.

*a. RELIGION.*

The subject-matter of instruction is selected by the higher ecclesiastical authorities.

*b. BUSINESS COMPOSITION AND READING.*

The instruction in composition is designed to enable the student to draw up the most important documents of private and business life and to fill out in writing the customary business and commercial forms. Exercises of general content and purpose are introduced in all classes as occasion dictates.

*Class I.* Private letters: communications to the family, to relatives and friends in regard to the apprentice's vocation, as well as on subjects occurring otherwise in the school exercises. Business letters: letters in regard to working conditions and apprenticeship affairs. Advertisements, acceptances, apprentice agreements, apprentices' certificates. Journeymen's affairs: advertisements, labor agreements, notifications and counter-notifications, notices of accident, offers of services, applications.

*Class II.* Private letters: communications in regard to matters relating to the journeyman-period. Business letters: inquiries as to prices, orders, notices of receipt, payments by means of money orders and registered letters, protest of remittance, offer of goods, execution of orders, delivery and receipt notices, consignment by parcel-post or freight, charges to follow bill with accompanying letter, acknowledgment of payment, receipt, inquiry in case of inaccurate order. Correspondence between the workman and his firm on the basis of certain business occurrences.

*Class III.* Setting up in business, giving attention to the difficulty of establishing independence. Request for a loan, certificate of indebtedness with security. Announcements, advertisements, circulars. Letters regarding conditions of payment: cash payment, notes and checks, postal checks. Pressing payment: dunning letters. Payment with excuse or request for extension of time. Postal orders. Admission to journeyman's examination with story of career.

As to the lessons in reading, the selection of materials in all classes is left to the teacher. This exercise aims to promote the general and moral development of the student and to stimulate his pleasure in and taste for good literature. For this purpose the school library is to be used and occasionally a strictly classical selection is to be read.

*c. ARITHMETIC AND BOOKKEEPING.*

This branch of instruction should impart to the student the knowledge necessary for keeping private and business accounts in a systematic way and acquaint him with the commercial and technical calculations of his trade. To attain the last mentioned object, attention is first to be given to geometrical arithmetic and all the determinations of weight based thereon; secondly, to the utilization of tables of cross-sections, weights and

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frequently recurring figures; and thirdly, to examples from workshop practice that are within the student's capacity and of importance for the comprehension and execution of his work.

*Class I.* Private and business accounts: earnings of apprentices and journeymen, expenditures for the necessities of life. Technical arithmetic: introduction to general use of figures, to the extent that is sufficient for the requirements of the school. Geometrical arithmetic: square, triangle, Pythagorean theorem, polygon, circle and parts of the circle.

*Class II.* Business arithmetic: inventory of materials and tools, wear of tools and machines, transferring. Geometrical arithmetic: prism and cylinder, pyramid and cone. Technical arithmetic: the most important mechanical motions applied in trade practice, their application to wheels, pulleys, tools and objects. In connection with this, gear wheels, relation between pitch-line, pitch and number of cogs.

*Class III.* Business arithmetic: exercises in tax and insurance affairs, calculations of exchange, short course in bookkeeping, using simple business examples; simple cost calculations. Geometrical arithmetic: truncated pyramid and cone, sphere. Technical arithmetic: simple and complex gears in transmission and machine tools. Setting the change-wheel for screw-thread cutting.

*Class IV.* Geometrical arithmetic: calculation of surfaces by approximate conversion into simpler forms; calculation of parts of the sphere by approximation formulae; easy examples in finding the center of gravity; calculations on revolving bodies. Technical arithmetic: the work on machine tools, cutting speed, ratchet speed, working time.

d. HYGIENE AND CIVICS.

The object of this instruction is to teach the student the necessity for a rational mode of life. It consequently treats on the one hand of the problems of hygiene and on the other of the questions arising in connection with vocational, community and state organization, and aims at giving him a clear insight into the necessary correlation of interest of all social classes and industrial groups.

*Class I.* The apprentice, his status, his indenture. Deportment: conduct at home, in the school, in the street, in the social gathering, towards teachers and journeymen. Hygiene: consideration of the construction of the human body; the eye; nutrition, respiration, circulation of the blood, disorders in assimilation; automatic regulation of vital heat through the body. Clothing, dwelling-place. Disturbances in the regulation of bodily warmth. Bones, muscles, nerves. Work and recreation. Trade influences injurious to health and their obviation; first aid in accidents.

*Class II.* Civics: The most important features of trade organization: apprenticeship affairs, journeymen's examinations; journeymen's affairs, tribunals, workmen's protection, masters' examinations. Guilds, workingmen's assemblies. General trade history: domestic system, wage work, the handicraft; guild organization, zenith of German guilds, decline of the guild; transformation of production and commerce, separation of retail and wholesale business; associations.

*Class III.* Civics: Organization and government of the community; community economy; honorary offices of citizens of the community; district and circuit. The state constitution of Bavaria: rights, duties and honorary offices of citizens of the state; Bavaria's government; state economy. The constitution of the German Empire: review of the development of the Empire during the nineteenth century, the federal council, the imperial chamber, imperial officials, imperial diet, the federal upper-house, functions of the Empire; imperial economy; legislation relating to workingmen's insurance.

*Class IV.* Civics: History of mechanical trades in particular: forerunners in mechanics in ancient times and in the middle ages (Archimedes); the progressive development of mechanics in conjunction with the increasing knowledge of physical laws (Galileo); the principal fields of activity in mechanics in our own times; its gradual separation into special departments; mechanics proper, optics, electro-technology, allied trades. Germany's economic position in the world at large: importance of the German colonies; the consulates in foreign lands Imperial protective laws; patent laws, trade-pattern laws, trade-mark laws, original rights in patterns and models. Laws for workmen's protection; regulations in regard to mechanical apparatus and factory operation, regulations for the prevention of accidents. Industrial companies. Elaboration of the work in Class I on first aid to the injured.

#### e. PHYSICS.

The instruction is for the purpose of familiarizing the student with the laws of physical phenomena as far as this knowledge may be of service to him in the intelligent pursuit of his occupation. He must be taught to recognize natural forces as the conditions of resultant effects in his experiences and to understand the reciprocal interaction between physical cause and technical result. In the lessons on electricity, the most important phenomena and laws are to be discussed. Herein an effort is to be made with the aid of auxiliary demonstration and analogies, to afford the student an insight into processes so that he may be in a position to follow intelligently the subsequent lessons in electro-technology. The lessons, with due regard to the interest of the student, are to be based on well-chosen examples and as far as possible should be carried out in school exercises.

*Class I.* Fundamental laws of statics and dynamics. Force, simple combinations of forces. Equilibrium, the lever. Centre of gravity and immobility. Rectilinear and uniform circular movement. Inertia and centrifugal force. Pressure and pressure measurement, transmission of pressure in gases and fluids. Expansion and compression of gases. The air pump. Elastic properties of solid bodies.

*Class II.* Expansion through heat. Heat quantities, transmission of heat by conductivity, flow and radiation. Combustion heat. Evaporation and melting, evaporating and melting heat. Working efficiency. Heat and work. Working efficiency of gases and vapors.

*Class III.* The storage battery. Current production by contact, polarity, tension, conductors of the first and second class. Electrolysis. Electrolytic

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determination of strength of current. The electric light. Heating effect of the current; decrease of tension in conductors. Resistance: Ohm's law. Parallel and serial connection in current production and consumption. Current bifurcation; measuring resistance. Shunt; special consideration of incandescent lamps; the flame arc.

*Class IV.* The Galvanometer; deflection of the magnet, principles of multiplication; needle galvanometer. Electromagnet. Coil-winding instrument. Deflection of conductor in magnet field. The galvanometer as ampere and volt-meter. Other magnetic effects. Soft-iron instruments. Arc-light regulators. Automatic switches. The motor principle. Series and shunt motors. Disposition of the armature windings. Working efficiency of the current. Watt. Available efficiency. The generator. Fundamental phenomena of induction. The motor as generator. Dynamo principle. Counter electro-motive power. Rules for winding. Regulators and starters.

*f.* ELECTRO-TECHNOLOGY.

Building on the lessons in electricity, the most important instruments, apparatus, devices and machines are to be explained as regards construction and method of operation, and opportunity is to be afforded the student to use the same in his work and to make simple experiments. He shall be instructed in the usual practical installations and in the directions and regulations related thereto.

*Class IV.* Minimum current installations: general considerations: conductors and insulations. Bells, relays, annunciators, contacts, switches, safeties. Connections and diagrams of same. Testing conductors. Intense current installations: general considerations; conductors and insulations; laying the conductors; commutators, switches, safety-catches, distribution boards. Setting and illuminating devices: incandescent lamps, arc lamps; conductor testing. Dynamo machines and motors, regulators and starters. The rules and regulations related to the above.

*g.* DESCRIPTIVE ENGINEERING.

The student must first learn to distinguish the most important and most generally used machine parts in regard to purpose, form, material and construction, and must be made to understand the internal relation of these various factors. He shall also be instructed in the construction and operation of the machines of greatest importance to him.

*Class III.* Mechanical elements, with particular regard to bicycle and power-vehicle parts, the essentials regarding power machines in general: the explosion motor.

*Class IV.* Power-vehicles according to development, construction and mode of operation; the most important systems. Traffic regulations.

*Note.* If there is a sufficient number of gun-makers' apprentices, there will be special instruction for them regarding the most important applications of physical laws in their calling, and concerning the subject of weapons.

#### *h.* TRADE DRAWING.

The primary object of this instruction is to afford the student a knowledge of technical drawings; moreover, his ability to draw is to be so far developed as to enable him to make a usable hand-sketch and a simple working-drawing of an existing or imaginary piece of work, as well as to pick out a part from a combination laid before him.

*Class I.* Simple geometrical constructions: division of straight lines, circles and angles, polygons. Rounding by quarter circle, tangents on simple forms used in the trade. Preparation of scale sketches in prescribed views and sections from models. Production of separate drawings from such sketches.

*Class II.* Construction of joined circles: the most important curves from suitable models; preparation of related sketches and drawings. Formation of threads and screws. Representation of screws; easy composite models.

*Class III.* Continuation of the exercises in sketching simple and composite models with regard to the special trade of the apprentice. Drawing of separate parts from combinations.

*Class IV.* More difficult composite models: for bicycle and automobile mechanics, bicycle and power-vehicle parts; for gun makers, gun parts with special consideration of the most used forms of lock construction; for electrical mechanics, apparatus, diagrams of connections, motor parts, motors.

#### *i.* PRACTICAL INSTRUCTION IN MATERIALS AND TRADE PRACTICE.

This instruction is intended to acquaint the student with the various technicalities of trade practice, to train him in precise, clean work, and to instruct him in making for himself the most necessary of his tools. It shall afford him opportunity to gain a knowledge of the most important measuring instruments, tools and machine-tools as regards their construction and operation, and an ability to use them. The instruction moreover imparts the necessary knowledge of the occurrence, acquisition or production, properties and uses of the raw materials most important for the trade. Finally it affords the students an opportunity to put into practice and check up their knowledge by working from drawings.

*Class I.* Materials: iron; how obtained, the blast furnace and its products, crude iron, cast iron; wrought iron, welding-iron, welding-steel; cast iron, cast steel according to manufacturing process and properties; cementation steel, crucible steel, special steels; change in the quantity of carbon in finished pieces; tempering, inlaying; production of the commercial forms of wrought iron; defects, their causes and recognition. Practical instruction: filing exercises; smooth, parallel and rectangular filing without regard to measurement; the same with respect observance of measurement (plate, four-sided prism); fitting exercises and the necessary tools and measuring instruments (rule, point-compass, calipers and inside-calipers, slide-gauge, micrometer and vernier); turning a cylinder between points and between hollow centers; centering by means of the point-compass, high marker, eight-screw-chuck, three-jaw-chuck with chisel



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and centre-point, and in the lunette; simple tools: screw-drivers and the like.

*Class II.* Materials and Trade Practice: the remaining materials of the trade with special reference to the alloys: copper, lead, tin, zinc, nickel, aluminum; brass and the remaining alloys in regard to production or manufacture, properties, uses and working-up; commercial forms. Practical instruction: continuation of the filing and turning exercises (six-side, three-side, diagonal angle), simple tools (punch, centre-punch, breast-drill and tap, radius-gauge, flat cross-cutting chisel, grooving iron and knife steel); discussion of the necessary measuring, instruments and tools (universal angle, tenths gauge, internal, external and limit gauge); the lathe.

*Class III.* Trade Practice: turning, planing, milling, stamping, sawing, grinding; the tools and machines for these purposes; turning and threading cutters, planing cutters, milling cutters, saws; lathe, planing-machines, stamping. Filing and turning exercises, diagonal measure, angle measure, vertical pivot machine, milling machine, stamps, grinding apparatus. Practical instruction; the manipulation of steel, forging tools; making tools for hand and rest turning; and canon drills; joining work; soft and hard soldering; finishing work, polishing and lacquering.

*Class IV.* Trade Practice: continuation of the discussion of machine tools with detailed consideration of special contrivances, apparatus. Practical instruction: various turning, filing, milling and planing operations with regard to the special vocation of the student; thread cutting on the slide lathe; square and sharp threads with nuts; making caliper points and thread dies; screw stocks; modern working methods; finishing work (gray and blue staining, yellow and black burning).

*Note.* The gun-makers' apprentices in this school will be sent for a certain number of hours to the trade school for engravers to gain a rudimentary knowledge of the use of the graver.

## CHAPTER XLVIII : SCHOOLS FOR THE BUILDING TRADES.

The object of these schools is the training of masons, carpenters and other workers connected with building and giving them an opportunity of acquiring the theoretical knowledge and schooling necessary for successfully and independently carrying on their trade. Second, the education of assistants in the office and in practical building, such as draughtsmen, overseers, superintendents of offices and building operations. Third, the preparation for intermediate technical official work such as that of clerk to Boards of Works, technical, government and railway secretaries.

### SECTION 1 : SUMMARY OF SYSTEM.

When the administration of Secondary Schools for the building trades was transferred to the Ministry of Commerce and Industry there were only 7 institutions of this kind in existence in Prussia, and every year a large number of young workers engaged in the building trades were denied admission. The first object of the administration was therefore to increase the number of schools and to extend those already established. The State subsidies for the support of existing schools were therefore increased; more advantageous conditions than heretofore were offered to cities intending to establish new schools for the building trades; and finally when these inducements were not sufficient to obviate the difficulties, the State Authorities gradually took into their hands the schools already existing and induced Communal Governments to join hands with the State in the erection of new schools<sup>1</sup>. The results were an increase in the number of schools to 24, the organization of courses of ten grades, and an increase of students from 1,000 in 1885 to 9,000 in 1908. The number of students who had to be denied admittance was thus reduced to a minimum. This vigorous development of the system was made possible by increasing the State's quota for its support from 88,000 marks (\$19,040) to 1,500,000 marks (\$357,000), or an increase from 85 marks (\$20.23) per capita of the students in 1885 to 166 marks (\$39.51) in 1908. The cities increased their quota to even larger amounts, and in recent years the largest cities of the Kingdom have defrayed one half of all the expenses, or all expenses not covered by tuition fees and State subsidies.

The courses of study of the separate schools showed essential deviations, so that transfer from one institution to an advanced grade of another school was extremely difficult, if not impossible. Therefore in 1898, a normal or uniform course of study was prescribed, although only in outline, for all the schools for the building trades; and to secure results as uniform as possible, considering the often greatly differing standard of preparation of the students, uniform conditions of admission were officially prescribed.

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## THE SURFACE IMPROVEMENT BRANCHES.

Together with the issuing of a normal course of study, a measure was taken which for the development of this school system has proved of great importance. It was this: the surface improvement branches (Tiefbaufächer) had hitherto found no attention, though many graduates were already engaged in hydraulic works and railroad building service, in city surface improvements, and in road bridge, and tunnel building. It was therefore determined that the schools for the building trades in Posen and Munster should open such courses for students who had already passed through two years' practical study of architecture. The students should devote the remaining two years to the essential branches of surface improvement (hydraulic works, road building, bridge and railroad building). How far this new arrangement met the existing needs is seen from the large number of applications for admission to the classes offering that kind of instruction. Year after year it became necessary to arrange new courses, so that at present all Schools for the Building Trades, except the one in Eckernförde, have such departments. The increase in the number of students from 30 in 1900 to about 1,500 in 1908 proves that many students, previous to the opening of such departments, had to be satisfied with an altogether insufficient preparation for their future calling.

## REVISION OF COURSES.

A thorough investigation resulted in the preparation of a new course by the Central Industrial Office, which prescribed a term of five semesters. After this course had been submitted to and discussed by expert teachers and men of affairs especially interested in the Schools for Builders, it was finally adopted in the autumn of 1908. In the deliberations concerning the best organization of this kind of instruction, not only the duration of the course, but also the extent of the subject matter of instruction received attention, especially the relation between æsthetic and constructive instruction and its methods, and consequently a thorough reorganization of the entire work of the Schools for the Building Trades took place. In consideration of the fact that the technical men who construct by far the greatest number of buildings in cities and in the country had come from the Schools for Builders, much weight was given to the æsthetic education of the students. The order in which the subject matter of the instruction was arranged resulted in the possibility of benefiting also those students whose capacity and means precluded graduation from the completed course or whose future vocation would not require them to go through the entire course of five winters. Such students are enabled now to take up the application of their architectural knowledge and skill after two or three winters and without having fully completed their departmental course.

The fact that architectural instruction (Hochbau) may be discontinued after three winter sessions makes it possible in the two upper grades to pay particular attention to surface building and improvements (Tiefbau), and to make the course in that department more thorough. In order to utilize these Schools

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for the Building Trades for ever widening circles it is considered of importance, if possible, to open Sunday and evening classes in all the existing schools.

#### OBJECTS AND ORGANIZATION.

The Schools for the Building Trades are throughout vocational, intended to prepare, (1) laborers for the building trades who aim to become independent contractors, as masons, carpenters, stone masons: such schools offer opportunities for the acquisition of theoretical knowledge and accomplishments in drafting and designing, the necessary requisites for the independent practice of the trades; (2) to prepare for architecture and the work of surface improvement (Tiefbau) office draftsmen and designers, as well as building foremen; (3) to prepare for provincial, county and communal administrations, officers employed in governmental, military, railroad and city building or surface improvement.

In these schools the foundation is laid for official careers, such as those of architectural secretaries, inspectors and superintendents of the erection of water-works, railroad contractors and construction engineers, building inspectors, secretaries of military works in the War Department and technical secretaries in the Navy Department. The communal administration also as a rule require for inspectors and contractors for their technical building and surface improvement, an education such as these Schools for the Building Trades furnish.

These schools are all State Schools except the one in Berlin, which is chiefly supported by the City Government. All are under the authority of the Minister of Commerce and Industry.

The schools for the Building Trades are divided into architectural schools and schools for surface improvement, and are of five grades. In Gorlitz (Silesia) special arrangements have been made for the technical preparation of stone-cutters. The three lower grades offer instruction both in architecture and surface improvement, while in the two highest grades the two branches are separated. For students whose education is insufficient for admission preparatory classes may be opened.

The courses of study are arranged for semesters and are carried out in winter and summer; hence the course, if taken without interruption, may require only  $2\frac{1}{2}$  years, but few students are able to pass through the entire course in that time. The students are advised not to interrupt their attendance by more than half a year and to attend the two highest grades without any interruption.

If a student shows that he is incapable of following the theoretical instruction owing to his lack of practical experience, further attendance may be denied him until he has gained that experience. Students wishing to enter a higher grade than the first must prove to the satisfaction of the Faculty that they possess the required knowledge and skill; hence an examination for admission is necessary.

#### TUITION FEES.

The tuition fee is 80 marks (\$20) per Semester; in the schools at Cologne, Frankfurt on the Main, Essen and Berlin it is 100 marks (\$25). Foreign

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students must pay 400 marks (\$100) and 500 marks (\$125) respectively. In exceptional cases a reduction may be granted by the Provincial governments. The fees must be paid in advance at the beginning of each Semester. If a student enters later than on the day of opening, or leaves before the Semester is closed, no reduction or rebate is allowed. Besides the tuition fees a small contribution for accident insurance is charged. The required drawing boards, utensils and drawing materials, as well as the text-books, blue prints, etc., must be bought by the students themselves. Information as to the things required is given at the beginning of the term.

#### FREE TUITION AND BURSARIES.

Indigent students may be released from paying the prescribed fees after they have passed through the work of one grade with success, and have conducted themselves faultlessly. Bursaries are granted only to indigent and successful students.

Regulations regarding the decorum and conduct of students inside and outside the school are quite full. Certain privileges arise from attendance at any School for Builders recognized by the State. The following two indicate the appreciation of the technical instruction by the authorities:

In selecting clerks and secretaries of building, Communal or State, for the offices of building administration, or clerks and secretaries in Army and Navy Offices, applicants must produce a diploma from a State School for the Building Trades, or from a similar institution designated by the authorities as of equal efficiency.

Students who have gone through the two courses, architecture and surface improvement, are preferred in filling subordinate technical positions in any hydraulic or railroad construction office under the Government.

There are in Germany altogether about 40 Building Trades Schools supported by public authorities and 7 private institutions.

## SECTION 2: BUILDING TRADES SCHOOLS AT BERLIN.

There are three classes in the Building Trades in Germany as follows:—

1. Artisans, apprentices and helpers.
2. Masters.
3. Employees of University rank.

The Handwerkschule is for men preparing for the 2nd class, and they take  $2\frac{1}{2}$  years, concluded by an examination. They work every day from 8 to 5. That means that a young man puts in  $3\frac{1}{2}$  years of hard work as a journeyman after the age of 18. Most of them save money and then come here for full-time instruction, taking the higher course of 2 or 3 years after having been at work for wages.

The fees are 100 marks per term of 6 months.

There are about 50% of pupils who pay no fees, having free scholarships from the city. The Handwerkerschule grade is so inexpensive as to be practically free.

*Courses.* Mathematics, physics (theory), then physics, chemistry and the materials of construction, modeling, drawing, constructing on paper all that is done. Then follows designing, in two divisions, viz. actual construction and drafting or planning; the composition of building materials used in large construction. Pupils are able to help both the *architect* and *builder*, thus being more useful than if trained in only one department. They can do both drafting and building, but are not architects proper, merely expert workmen, able to estimate quantities. There is not time here for artistic architectural work; it is pure technique. The highest class has to plan actual houses; first they select the site, then estimate, and adjust to local by-laws; make plans with the architect, and then make working drawings, finally figuring out the actual cost.

They use light tracing paper for their plans, and the work is rapid and sketchy at first; afterwards they make scale drawings. Students suggest the character of the buildings. In the lowest class they are given simple construction of detail. In the middle stage they draw different sections of a building, such as roof, dome, joints, etc., with written explanations. Students, when they finish, are able to construct any kind of roof.

The students were strong, clean, bright fellows, aged 22 to 26.

*Entrance Requirements* (to lowest division).

Age 16, with 12 months' practical work as mason, carpenter, stonemason or roofer. Educational requirements:—writing, arithmetic to decimals, plane geometry to triangles, and freehand drawing.

*Leaving Examination.* A large committee is formed from the Guild or Government and the school authorities. The teachers of the school examine, and the others attend to see that all is properly conducted and give the certificates to successful students.

Students must have put in three half-years of practical work before receiving Leaving Certificate.

### SECTION 3 : THE ROYAL BUILDING TRADES SCHOOL, AT AIX-LA-CHAPELLE.

A coal-mining centre of 160,000 inhabitants, situated near the Belgian border, having textile and woollen mills and iron and steel works.

This is an Intermediate or Secondary School, one of 24 such in Prussia.

The School was established in 1900; the present building was erected in 1907.

It is a State School under the Minister of Commerce and Industry and is inspected by a Government District Officer from time to time and every two years from Berlin. The District Inspector is also Chairman of the Examining Board of the School.

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<i>Support.</i> Fees.....	30,000 to 40,000 marks
Aix City.....	12,000
State.....	balance
Approximate total expenses.....	120,000 marks

Students enter from building trades directly they have had at least one year's practical handwork (not office work) and are 16 years of age.

*Objects.* To produce architectural draftsmen, private architects for smaller buildings, estimators for contractors, middle officials for Government and municipal service, railway work etc. Students are given preference in Government employment.

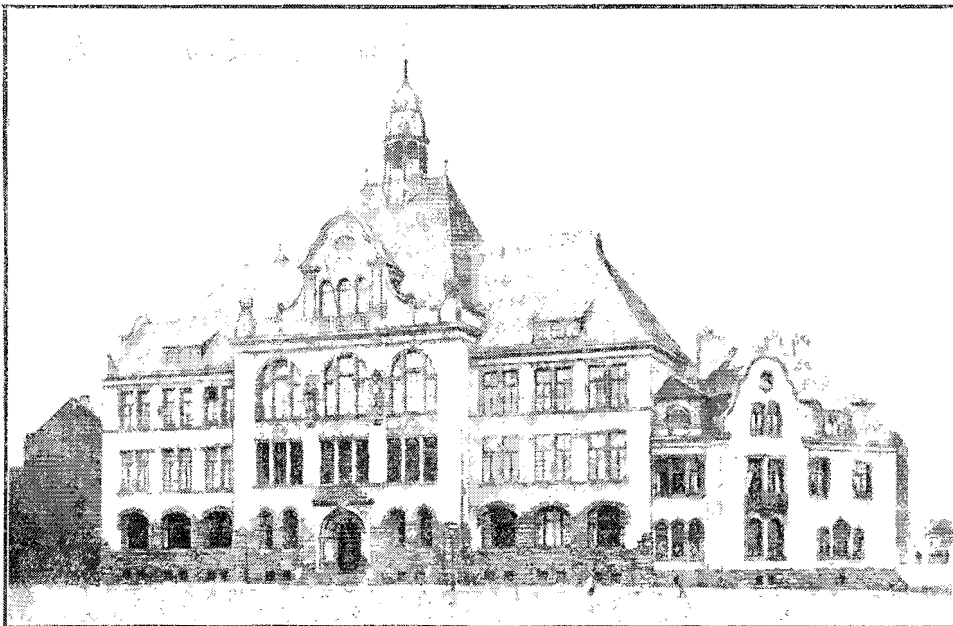
For specially good work, such as design, in this school, students may have their work accepted in lieu of languages and thus qualify as "Einjähriger", enabling them to postpone military service until completion of course.

*Building and Equipment.* Building and site were provided by city, value 650,000 marks. There are a fine library, a very complete set of models and an up-to-date equipment.

*Teachers.* Have Technical High School training generally.

Salaries 2,400 to 7,200 marks plus 990 marks for rent allowance and the usual pensions. Allowed to do private work.

Courses are offered in (1) building above ground, (2) underground, hydraulic and railway building.



ROYAL BUILDING TRADES SCHOOL, AIX-LA-CHAPELLE

## SECTION 4 : THE ROYAL BUILDING TRADES SCHOOL AT BARMEN-ELBERFELD.

A textile centre, having a population of about 300,000 in the two towns combined.

This school grew up from a few classes in Drawing and Handwork applied to building construction, which were formerly given in the Mechanics' and Industrial Art School. It is supervised and financed jointly by the State and City. The powers and duties of the Curatorium are nominal except in matters concerning the general welfare of the School. The Director is the real guiding spirit and administrative head of the School.

*Entrance Conditions.* Elementary School standard with one year of practical work.

*Objects.* This is a finishing school for bricklayers, carpenters, stonemasons, assistants to building contractors, assistants to architects, who come here to learn the theory, drawing and science, applied to construction, in order that they may rise to positions of medium responsibility in the branches of industry connected with construction.

The Government draws a very large number of its middle grade technical officials for the Civil Service from these Building Construction Schools.

*Courses.* They consist of 5 half-years, the three first being identical for both above ground and underground departments.

*Teachers.* In all technical subjects the teachers have had a Technical High School training plus 3 years' practical experience. They are put on probation for 2 or 3 years before they are definitely appointed.

*Observations.* This School devoted more effort and time to handwork than the other schools of this class visited. In the basement were two shops for carpentry and cabinet-making, where the students constructed models of roofs to scale; and in the lower hall there were models of arch work and masonry construction, made by using small cement brick.

Annual Revenue from.....	Marks.
City of Barmen.....	12,000
City of Elberfeld.....	12,000
Fees.....	24,000
State.....	110,000
	<hr/>
	158,000
	<hr/>

Attendance:—Summer.....	116
Winter.....	198
	<hr/>
	314
	<hr/>



## SECTION 5 : COURSES FOR THE SCHOOL FOR WORKERS IN THE BUILDING TRADES AT MUNICH.

### PRINCIPLES OF ORGANIZATION.

a. The trade school\* for workers in the building trades comprises, corresponding to the term of apprenticeship of the pupils, three progressive yearly classes, instruction in which is given during the period from September 15th until July 14th in each year.

b. Attendance at these classes is compulsory for all masons', stone-cutters' and carpenters' apprentices during the entire period of their apprenticeship or until the completion of the eighteenth year of their age.

c. Instruction is confined strictly to the above-mentioned trades and includes the following subjects: Religion, Business Composition and Reading, Trade Arithmetic and Bookkeeping, Hygiene and Civics, Trade Drawing and Practical Instruction in Materials and Tools.

d. The hours of instruction are ten per week in all three trades during the winter semester, that is, from October 15th to March 15th; and during the summer semester, that is from March 15th to October 15th, six hours per week. In the winter these hours fall on a single workday from 7 to 12 o'clock in the forenoon and from 2 to 7 o'clock in the afternoon; and in the summer, on the afternoon of a single workday, from 1 to 7 o'clock. Care is to be taken, however, that apprentices of different grades coming from the same concern, do not attend school on the same day.

e. The course of study is distributed as follows over the three school years and the respective ten and six hours of instruction:

Subject.	Hours per week in the three classes.	
	In winter semester.	In summer semester.
Religion.....	1	1
Business Composition and Reading.....	1	1
Trade Arithmetic and Bookkeeping.....	1	1
Hygiene and Civics.....	1	1
Trade Drawing.....	3	2
Practical Instruction in Materials and Tools.....	3	—

f. The instruction in drawing and the practical instruction in materials and tools is to be imparted by craftsmen; the remaining instruction is to be given by the trained teaching staff of the public and Continuation Schools of Munich. It is, however, provided in advance that all the teachers shall be in very close

\* Meaning trade Continuation School.

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touch with the trades, so that, with a view to practical application, they may be familiar with trade requirements.

g. The defrayal of the expenses of instruction, as well as the provision of the necessary classrooms, remains as heretofore the duty of the community of Munich.

h. The Guild of Master-Builders (masons, stonecutters, and carpenters), announces its willingness to undertake to supplement the supply of wood and plaster models for the drawing instruction or of observation models for the instruction in materials, where such need shall at times arise.

#### SCOPE AND DISTRIBUTION OF THE SUBJECT-MATTER OF INSTRUCTION.

The subject-matter of instruction, with regard to the vocation of the pupils, shall accord with the following schedule:

##### a. RELIGION.

Lessons following the regulations of the Archbishopial Inspectorate, or the Protestant Superior Council.

##### b. BUSINESS COMPOSITION AND READING.

The instruction in Composition aims at preparing the pupil to draft with grammatical, orthographical and formal correctness all of the more important forms of private and business correspondence.

*Class I.* Ordinary private letters to members of the family, relatives and friends, relating to events in the life and vocation of the pupil; inquiries and replies, applications for employment, announcements, statements of acceptance, declinations, indentures. (In connection with this, postal forms). Compositions on the subjects of hygiene and materials.

*Class II.* Compositions on matters of purchase and labor: written and open bids on building materials, inquiries as to prices, orders for goods and labor, purchase and labor agreements, business instructions, delivery notices, bills, cash payments, receipts, part payments, refusal of payments and suspension of payments. (In connection with this, the procedure of the money and parcels post and of the freight traffic). Complaints, excuses, opinions, certificates, recommendations. Compositions on the subject of materials.

*Class III.* Compositions on the subject of indebtedness; shipment of goods on credit, certificates of indebtedness and security bonds, dunning letters, claim letters, letters of respite, abatements, correspondence on bills of exchange, drawing-up mortgages and notification on same. Correspondence with officials: petitions to magistrates, to the city building commissioner, state building officials, commercial and industrial commissions, the government, and trade tribunals.

The instruction in reading is intended above all to promote the general and moral education of the pupil. It is also designed to arouse the pupil's interest in the best literary works. For this purpose the school library is also to be utilized

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and now and again a classic poem should be read. In order to further the above objects, the teacher in each class is to make a suitable, systematic choice of appropriate selections.

## C. ARITHMETIC AND BOOKKEEPING.

The instruction in arithmetic has for its object primarily to impress on the pupil the necessity for acquiring a thorough system of private and business accounting and to instruct him in the proper method of conducting the same. But in addition it shall prepare the pupil to make, with as much self-dependence as possible, the more simple calculations of cost and estimates, and in particular it shall ensure his adequate skill in special building calculations. The work in arithmetic for the three classes is arranged as follows:

*Class I.* Personal accounts: earnings and living expenses of the building-trades workman; reckoning of hourly, daily and weekly wages, wages ledger and pay roll, monthly and yearly income, comparison and equalization of summer and winter earnings; the daily, weekly, monthly and yearly expenditures of an individual, of a family; household expense book, monthly and yearly balances. Calculations of percentages: savings accounts and interest (various methods of calculating interest, up to absolute accuracy). Geometrical calculations with direct reference to problems in building, exercises in lines, simple surfaces and solids (square, extraction of square root, rectangle, cube, four-sided prism), calculation especially of extent of walls on metric system, old style measurements and their conversion (foot, square foot, land measure, decimals).

*Class II.* Geometrical calculations, extension of the work in surfaces and solids (rhombus, rhomboid, trapezium, triangle, Pythagorean theorem, triangular prism, circle, circumference, cylinder, hollow-cylinder, pyramid, and cone and sphere with special application to examples from masons', stone-cutters' and carpenters' practice). In connection with the above, practical calculation of weights.

*Class III.* Business accounts: With the instruction of this class in business accounts is connected the bookkeeping, as far as its formal completion can be effected in the classroom. Purchase of building materials, purchase and sale of land and buildings, with accompanying profit and loss, calculation of averages and more complicated problems in percentage. Work by the day and job work, including partnership calculations, transportation of building materials and outfit, sundry other trade calculations. Cost figuring for building trades. Calculations and estimates of a simple character. Liquidation of debt, instalment calculations, computing the value of financial paper, notes and checks, calculations of tax and insurance.

## D. HYGIENE AND CIVICS.

The instruction in hygiene and civics has the purpose of familiarizing the pupil with a rational way of living, physical and intellectual, and consequently relates on the one hand to sanitary matters, with special consideration of work-

shop hygiene; on the other hand, it deals with the duties of life in the vocation, the community and the state, and above all else, with those affairs from which the pupil will most quickly gain a recognition of the necessary interdependence of interest of all social and industrial groups.

*Class I.* The apprentice: a. admission to employment, indentures. The workshops and factories from the hygienic aspect, the observance of cleanliness. b. Deportment: behaviour at home, in the school, towards fellow workmen and employers in the workshop, on the street, in social gatherings. c. Hygiene: construction of the human body in general, nourishment, food and food luxuries according to their value or uselessness. Respiration and the circulation of the blood. Lodging and clothing. Work and recreation, care of the sense organs and nervous system. First aid to the injured, practice in bandaging.

*Class II.* Trade History. Development of architectural plans and processes, especially in Germany; in connection therewith, the conditions of the building-trades craftsman; masters who have been prominent in the building trades. The development of the building-trades guild in Munich from the fourteenth century to the present time; trade guilds and associations, the free corporation.

*Class III.* The most important features of trade organization. Journeymen's and masters' examinations. Workmen's protection and social legislation. Trades Council. Trade arbitration. Trade tribunals. The building-trades craftsman as a member of the community. Community organization. Problems of the community. Honorary offices of the citizens of the community. The building-trades artisan as a citizen of the state. The state constitution of Bavaria. Objects of the state organization. Honorary offices of citizens of the state. Government of the Bavarian Kingdom. Duties of the state authorities. Constitution of the German Empire. Trade and commerce in modern times and its importance to the welfare of the citizen. Competition. Allied trades. The importance of labor in the state. The interconnection of trade interests. The value of the German foreign consulate.

#### e. DRAWING.

The instruction in drawing is intended to impart to the student in addition to the greatest possible accuracy and dexterity in the use of drawing tools, the capacity for presenting clear and intelligible drawings of individual masonry, stone-cutting and carpentry operations and constructions, as well as for drafting simple sketches of plans correctly and preparing original plans. He must therefore be made acquainted with the various methods of drawing and coloring. Where it appears practicable the student's comprehension of his work shall be promoted and tested by the execution of working plans, or the isometric reproductions of single parts. A further feature of this instruction is to be found in the arousing and increase of the interest of the pupil in the buildings and architectural affairs of the city as well as of his æsthetic and artistic taste in general. The instruction is divided into mechanical and free-hand drawing. The latter is in every respect to be so planned that wherever possible

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It shall support and supplement the former; in all classes, as far as possible, practice is to be given on designs or models that are actually used in the trade. The general principles of drawing that prevail in all trade schools are to be kept in view. The subject-matter of instruction is as follows:

## THEORETICAL WORK FOR MASONS.

*Class I. Geometrical and projection drawing.* The most important geometrical elements, with constant reference to their technical execution and their application to practical examples of masonry; linear designs, erection of perpendiculars on a brick wall, line division for a wall design, metrical measurement for a pedestal with reduction to scale, angle division for a crown arch. The circle and its elements in a round window. Finding the centre point for arch construction, circular division and polygons in a chimney plan. Tangential theory in door and window plans. Diminished arch for a church window. Ellipse in a house entry. Building-stone measurement. Patterns for facing walls.

*Class II. Technical drawing (from models only).* The elements of mouldings and their combinations to form mouldings. Simple solids used in building done in horizontal, vertical and side projection, and horizontal and vertical cross sections of the same; isometrical representation of single building stones and simple elements of building construction. The different styles of wall-bonds (stretcher, binder, English and lateral bond), wall angles, joining and crossing walls; chimneys, hollow walls, buttresses. Construction of main and partition walls for several adjoining apartments.

*Class III. Technical drawing (from models only).* Irregular forms of walls; arch construction in brick (crown, depressed, round, flat, pointed and relief arches), their form-stones and mouldings. Decorative work on windows and doorways. Simple dome construction; simple lunettes.

*Free-hand drawing:* In free-hand drawing for masons and stone cutters the object is, in all three classes, to impress the principle that only such decorative work is of value and artistic importance as answers a constructive purpose or which is designed to give the building and its surfaces rhythm, articulation and graceful proportions. For this reason, no model is to be drawn unless its connection with the whole is clear to the pupil. Besides there can be selected as models, simple serial ornaments for wall bands and parts of mouldings; various fillings for square, rectangular, circular and oval wall surfaces, for wall friezes and pilaster strips, for window casings, etc.; simpler and more ornate foliage and flower forms for templet work or ornament; spiral scrolls and their decoration, their use in consoles, keystones and gables. Coats of arms, shields and cartouches for facade ornamentation.

## APPLIED ART FOR MASONS.

*Class I.* Purpose of the school workshop: general idea of building; lessons on tools; scaffold building; instruction in brickwork bonds (English and lateral bond, partly with model stones, partly in the forms of dry masonry, with bricks and sand).

*Lessons on materials:* Lime, lime slaking, preparation and hardening of air mortar. Bricks: face bricks, moulded, perforated and arch bricks, Dutch bricks, paving tiles, flags, roof tiles, earthenware pipe, chamotte clay and stone.

*Class II.* Instruction in bonding acute and obtuse wall-angles, as well as bonded-in walls and piers. Suavian and Dutch bond, herring-bone bond. Exercises in English and cross-bond with adhesive material. Lessons on materials. Cement (its production, properties, and application, Roman and Portland cements), concrete, concrete moulding; plaster and its use; wall decay by efflorescence (its cause and prevention); wood fungus (its cause and prevention); sand, gravel (river and pit sand); the natural building-stones; lime stone, sand stone, volcanic stones (trass, from near Nordlingen) granite; gompfolite (its origin).

*Class III.* Masonry with facing stones, masonry of chimneys and arches with practical exercises. Arch masonry work. Setting of window and door uprights. Caulking the interstices of window uprights with excelsior or similar material. Protecting structural parts from climatic influence. Setting and building-in overload supports. The finishing coat. Its preparation with lime and cement mortar (inside and outside finish): mouldings with bends, etc. Explanations in regard to the nature and construction of foundations. Anchoring and under-pinning the structural parts. Preparation, clearing the ground, etc., for quite simple rectangular buildings. Method of constructing simple firing contrivances (wash-fire places, country baking ovens). Steps for the protection of wood against danger of fire. Suggestions regarding drainage arrangements of buildings. Rabbitz, Monier and plaster-board walls. Concrete ceiling. Covering of iron parts.

#### THEORETICAL WORK FOR STONE-CUTTERS.

*Class I. Geometric and projection drawing.* The geometric elements with constant regard to their practical-technical execution and their employment in stone-cutting; line patterns, laying-out angles from a stone base. Line dividing on a free-stone wall, scale and transfer of scale on a stone pedestal, angles and their division in bossage or a window lintel. The circle and its parts, finding the centre of a segment arch or a circular window. Circle division and polygons in a stone filling. Tangent problems in a torsional twist, in a window scale. Basket-handle arch for a church window. Ellipse on a bridge arch. Spiral in a stairway.

*Class II. Technical drawing* (from models only). Moulding details and their combination into mouldings. Simple forms of stones in ground, front and side plan. Cut forms and isometric representations of the same. Cut-stone bonds, building them into brickwork. The various types of arch construction (crown, depressed, round, pointed and elliptic arches, smooth and serrated arches, coupled arches). Pillars, railings and balustrades. Simple projections.

*Class III. Technical drawing* (from models only). Patterns of garden pillars and columns. Base, belt and main moulding-courses and building them into brick walls. Round and pointed-arch moulding. More ornate window

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and doorway construction. Niches. Free and wall curbs. Simple open steps. Projection of complicated stones.

*Freehand drawing:* For each of the three years, there is a systematic selection of suitable patterns in stone sculpture adapted to the proficiency of the students in drawing, such as: egg and leaf-stem mouldings, other serial ornaments, various fillings in friezes and pilaster strips, in stone bases and pediments, in door and window scrolls, in balustrades and other railings. Stone volutes and their ornamentation. Scroll, leaf and flower work for wall surfaces, door jambs, capitals and key-stones. Foliage and fruit scroll work, arms, shields and cartouches as façade decorations, for pilaster and pillar ornament, decorative columns, simple animal forms and allegorical figures, lettering.

## APPLIED ART FOR STONE-CUTTERS.

*Class I.* Explanation of the tools used by masons and stone-cutters. Various lifting apparatus (from the iron crow-bar to the devices for power operation). Setting up scaffolding. Setting into the brick masonry bond (English bond with three-quarter and split stones). Practical exercises in slaking lime and building (foundations, carrying out of stairways, setting cut stone). Working cut stone (practical exercise on an easily cut stone and one more difficult to cut, lime-stone and granite), gulletted, chiselled, granulated, axed, smoothed and polished.

*Instruction in materials:* Properties, production and uses of bricks; properties, production and uses of air or white lime mortar. Quarries and quarry operation. Masonry of unfinished and cut stone. Concerning the setting of cut stone, lime-stone and varieties of gypsum.

*Class II.* Stone-working machines. Pneumatic chisel, lathes, rubbing machines, etc. Practical exercise in making setting-joints (explanation of stone-cutting). Exercise in stone-cutting on plaster models or soft stones. Working on model in granite (entry steps, steps without profile, end-step with nosing, main exit steps with pedestals, steps with profile). Models in lime-stone (simple stone-cutting, various mouldings).

*Lessons in materials:* All the stones occurring in nature with regard to their applicability to building (granite, lime-stone, sand-stone and volcanic stone, and clays, e.g. pozzolona, terranova, etc.).

*Class III.* Practical exercises: Splitting and working up of simple and complicated stones (for instance, core arches, wagon-vault and groined vaulting), first of all in gypsum. Making of various springers and keystones in limestone. Making the necessary wood forms for core-arches. Making core-arch springers of granite. *Lessons on materials:* Plaster mortar, water, hydraulic or cement mortar, the cements (Roman and Portland cement) in greater detail. Concrete and artificial stone.

## THEORETICAL WORK FOR CARPENTERS.

*Class I. Geometrical and technical drawing:* Elements of geometrical drawing with constant regard to their technical execution and application to carpentry. Line patterns and laying-out of rectangles. Line division in board

and picket fence. Metric measurement, reduced scale, and transfer of measurements on a wooden column. Angles and their division in a garden gate. The circle and its parts in a roof window. Circle division and polygon in a well enclosure. Tangent exercises on a sawed-out gable. Three-centered arch in a window-frame. Ellipse for a gallery. Moulding elements and their assembly.

*Class II. Technical drawing:* Simple wood solids done in horizontal, vertical and side projection, cross sections of the same, their design in isometrical presentation. Beam joints (running-joint, tie-joint, mortise-joint, dovetail-joint skew-notch-joint, upper strut, hanging tie, strut frame—all from models). Close walls, balconies. Simple doors and gates. Centering.

*Class III. Technical drawing:* Roof plans, location of beams, simple raising. Roof-prop parts. Roof-prop details at the eaves, at the intermediate purlins, at the ridge (by use of models). Jack rafters. Simple roof supports: standing, lying purlins, collar-beam and truss-frame roofs, dormer-window plans. Plans for simple stairways.

*Freehand drawing:* Adapting the various exercises to the drawing ability of the student during the entire three years' course, a suitable and systematic selection is made from the manifold forms of beam and board ornamentation: various patterns of hanging tenons, upper-strut and beamhead decorations, tappets, coronas, barge, verge and hanging boards. Other kinds of sawed work. Simple carved panels of smaller and larger dimensions. Sketches of details of peasants' houses obtained on walking excursions.

#### APPLIED ART FOR CARPENTERS.

*Practical Instruction in Materials and Tools:* The object of this instruction is to familiarize the student with the most important tools, instruments and machines of his trade, and with the appearance, properties and varieties, the relations and comparative prices, the proper manipulation and the practical use of the materials used in the trade. This instruction is designed especially to fit the student for making correct estimates, and for this reason as close a connection as possible is to be made with the instruction in arithmetic in order to have it become a real aid in estimating. The lessons include the following subjects, given separately for the three trade branches of the school, and relate in matter as closely as possible to the given field.

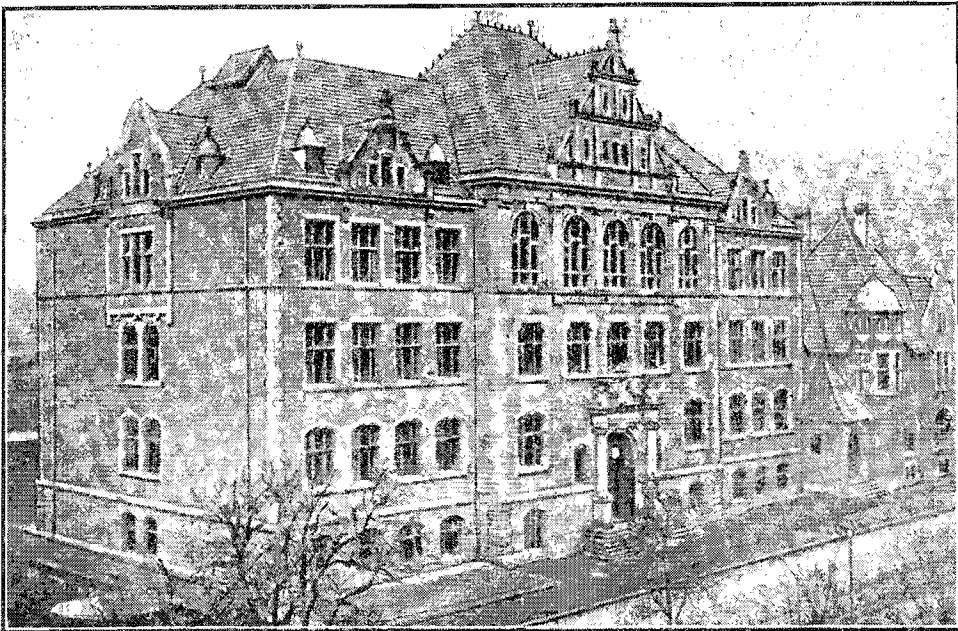
*Class I. Tools and instruments.* Practical exercises, first of all in the use of tools. Technology of wood: wood as building material; its growth, properties, varieties, defects and diseases (wood fungus, its origin and prevention). Felling and further working-up of wood into cut goods. Priming and impregnation of wood.

*Class II.* Exhaustive consideration of the domestic varieties of wood: fir, pine, spruce, larch, summer and winter oak, red and white beech, maple, ash (woods more rarely used: alder, lime, elm, birch, poplar, willow, pitch pine). The utilization of these woods according to their properties. The most important fruit trees and foreign building woods. Wood-working machines. In the practical exercises, making of the various simple wood-joints always in connection with the drawing instruction. Concrete moulds.



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*Class III.* Extension of the practical instruction to include the more difficult joints, beam setting and roof joining, according to the ability and advancement of the individual students. Note: The practical instruction for the third and fourth classes is related to the drawing lessons in the respective classes.



THE ROYAL BUILDING TRADES SCHOOL: BARMEN-ELBERFELD.

## CHAPTER XLIX: SCHOOLS FOR TEXTILE INDUSTRIES.

### INTRODUCTORY.

The schools for textile industries were founded originally to meet the requirements of trade and industry. The introduction of the power-loom turned the workman himself into a machine. All that he had to do, or that he still has to do, is to watch the unvarying movement of a machine that is complete in itself. He has nothing to do with the process of weaving and nothing with the building of the machine. Thus he generally lacks any kind of stimulation from without, and consequently remains devoid of any higher mental or technical development. Yet even the textile industry requires intelligent workers who can be made use of as foremen and directors. This fact led manufacturers to demand the establishment of Lower Schools for Weaving and Spinning, and in some cases even to take the matter into their own hands.

In other districts, where weaving was extensively carried on at home in the winter months, schools were founded in order to give peasants' daughters and servants, and young men as well, an opportunity of at least learning how to make linen, half-linen and cotton fabrics for personal use. This last object was the origin of the numerous weaving workshops in Hanover and Silesia. As the artistic taste for hand-woven carpets, curtains, and furniture covers is increasing in Germany, it is not improbable that these simple opportunities of instruction will spread still further in poor districts, as has been the case in Sweden.

Later on, after the number of power-loom had multiplied exceedingly, and the processes of weaving wool, cotton, linen, silk and velvet had been correspondingly developed, the sons of manufacturers began to feel the need of Higher Schools. The foundation of these Higher Schools was also favoured by the desire on the part of the manufacturers to make themselves independent of foreign countries. In the first half of the 19th century young men who wished to learn the secrets of weaving were forced to go, at great expense, to Lyons, where both public and private weaving schools had long existed.

### DRAWING, COMMERCIAL COURSES AND DRESSMAKING.

German industry was also greatly hampered by the difficulty of procuring patterns, and the necessity of training pattern draftsmen became self-evident. Courses in Drawing had become especially indispensable in the schools for the woollen industry, in which the pattern is generally attended to by the same employee who has the post of supervision in the machine room. The Higher Weaving Schools could be made use of for this purpose. A factory-pattern

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Drawing School was soon attached to the oldest German Weaving School, in Elberfeld, founded in 1845. A second Weaving School was founded in 1854 at Mulheim on the Rhine, and a third in 1855 at Crefeld. The Elberfeld school was also enlarged, at the suggestion of the manufacturers, by a chemical department for dyers, printers and bleachers. In the same manner the development of German trade made it necessary to add commercial courses to the weaving schools, for the instruction of clerks in drapers' shops and factories in the knowledge of wares and the processes of work in the different branches of the textile industry. And finally the weaving schools are sometimes combined with courses for dressmaking, frequented mostly by female pupils. These courses are most numerous in Berlin, the principal seat of dressmaking in Germany.

**SECTION 1: SUMMARY OF THE SYSTEM IN PRUSSIA.**

Instruction in textile schools was conducted for a long time differently from that offered in other vocational schools. It consisted chiefly of free lectures and exercises, and the teachers rarely determined by examinations whether their lessons were successful or not. The teachers imitated university professors, but for such methods the students were too immature. For that reason, during the last decade of the past century new courses of study and rules were formulated which guaranteed earnest and diligent study and work on the part of the students. Graduation examinations were prescribed also, in which it was necessary for teachers and students to prove that the prescribed objects in view had been reached. Hand in hand with this change went the establishment of separate courses for workmen, foremen, superintendents and factory owners. For the practical education of workmen, shops for weavers were established; for foremen, Secondary Technical Textile Schools; and for superintendents and factory owners, Higher Schools which taught all the branches of the textile industry. Naturally the latter courses were opened also to foremen, and even to ordinary workers if they were capable of following them. A separation of vocations further led to the inauguration of courses for model draftsmen, merchants, etc.

Experience finally proved indisputably that it was not possible to teach all the branches and bearings of the vastly extensive textile industry in a single school. Neither was it possible to obtain teachers who possessed the knowledge of every textile branch, nor could a school be conducted successfully if it attempted to cover such a vast amount of work. Hence special schools were established for the cotton, wool, linen and silk industries. These schools did not confine themselves, however, to teaching weaving, but each undertook to teach also spinning, dyeing, finishing, lacemaking, ribbon weaving, machine knitting, and finally, all the numerous bearings of its branch. In consequence of this policy it is to-day possible in Prussia to have represented every branch of the textile industry in schools, to equip the latter with good shops, machines, raw materials, and to provide thoroughly expert teachers for the staff.

## OBJECTS AND ORGANIZATION.

These schools are classed as Weavers' Apprentice Shops, Lower Textile Schools, and Higher Technical Schools for the Textile Industries. In the Weavers' Apprentice Shops young men are trained in serving at mechanical looms, and women and girls from the country are trained in using hand looms at their own homes during the winter. In the Lower Technical Textile Schools foremen are trained, and in the Higher Textile Schools it is the superintendents, owners and directors of factories who receive a thorough preparation. In this particular each institution pertains to a specific branch of the vast industry represented in the locality. In some institutions separate classes are opened for merchants and for designers, some have separate classes in which the young women are taught intricate handiwork, preparing linen for the market, and tailoring.

The tuition fees for the full higher course are 100 marks (\$25) for natives, 500 marks (\$125) for foreigners, per semester. Students who take part only in the practical exercises pay 50 marks (\$12.50) if natives; 250 marks (\$62.50) if foreigners. For native temporary attendants, who may choose their own lectures the fees are 15 marks (\$3.75) for one course (a lecture and attending exercise) a week; for foreigners 50 marks (\$12.50). There is also an admission fee for foreigners of 60 marks (\$15.00) for the full course.

The fee for a full course in the Lower Technical Schools amounts to 30 marks (\$7.50) per semester for natives; 250 marks (\$62.50) for foreigners. Students who take part in the practical exercises only pay 30 marks (\$7.50) per month if natives, 125 marks (\$31.25) if foreigners. The admission fee is 30 marks (\$7.50) for the full course, but this is charged only to foreigners.

The fees for the courses for designers and dressmakers, as well as for the evening and Sunday schools, vary a good deal and are adapted to the prevailing local conditions.

## SECTION 2: MUNICIPAL HIGHER WEAVING SCHOOL AT BERLIN.

This is a day school with courses as follows:—

- A.
  - 1. Commercial course for textile workers (various kinds of textiles).
  - 2. Designing.
  - 3. Dressmaking.
  - 4. Trimming.
  - 5. Hand and machine embroidery.
  - 6. Weaving and knitting courses.
  - 7. Dyeing course.
- B. There are evening and Sunday schools. These provide:—
  - 1. Commercial course.
  - 2. Dyeing course.
  - 3. General instruction.

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520 pupils in day and evening classes. Pupils come from Continuation Schools. Very few have been at work. There is an advantage with those who have.

#### DRAWING.

Preliminary Drawing first from form then later with color schemes. Students begin to make designs from units of natural objects conventionalized such as butterfly, grasshopper, flower, etc. They then make Drawings for designs. To make clear that the designs are practicable, students afterwards make designs on cards for the loom and proceed to weave them in materials.

All students start with hand looms to increase definite and exact knowledge of weaving processes and then go on to the higher forms of machine weaving.

#### EQUIPMENT.

There are many one-person embroidery machines, in form like an ordinary sewing machine and one power embroidery machine which enlarges the pattern in the materials from a needle point traced over design in sight of the operator. Products from looms are sold to students at cost of materials only. When not wanted by students any surplus of products is sold to friends of the students or put in the school.

### SECTION 3: ROYAL HIGHER TECHNICAL SCHOOL FOR TEXTILES AT AIX-LA-CHAPELLE.

A technical institution for instruction in cloth-weaving, giving theoretical and practical instruction in the production and preparation of woollen goods, The Dyeing department comprises wool, cotton, half-wool, silks, etc. There are 4 sections, viz.:—

1. Spinning.
2. Weaving.
3. Dyeing.
4. Shrinking and finishing.

*Entrance:* Age 16 and ordinary education, with (if possible) practical experience, but this is not an essential.

*Courses:* Half a year each, of about 21 weeks, with 44 hours instruction weekly.

*Fees:* Germans, 100 marks per term; foreigners, 500 marks.

*Support:* The school is the property of the Weaving School Society of Aix, and receives assistance from the Prussian Government, the Provincial Government of the Rhine Province, the local Union for the Encouragement of Industry and the Cloth Manufacturers' Association. The contributions of these various bodies are as follows:

Rhine Province 10,000 marks annually.  
City gave site and gives 3,000 marks annually.  
Prussian Government two-thirds of the deficit.  
Weaving School Society the balance.

*Aim:* Prepares buyers and sellers of woollen goods, superintendents and managers of factories, dye experts and dye chemists, designers of textile machinery, spinners and weavers, etc.

*Buildings and Equipment:* These were not very well arranged at the time of the Commission's visit, but plans were in hand for a new factory, with up-to-date machinery. In each department they had *special small* machines for demonstration, a number of Jacquard looms (foot-power) and power-looms.

*Special Feature:* The school has a regular factory and takes outside orders. 30 to 40 workmen and some boy apprentices are employed 9½ hours daily. The latter learn the weaving and spinning trade, but receive no special instruction in day or evening classes.

*Teachers:* All have had practical experience, some only practical, while others, as in chemistry, physics, dyeing, etc., have had Technical High School training as well. Some are sent abroad to study.

*Attendance:* Day, 60 to 70. Evening and Sundayclasses limited to 60. Most of the day students are sons of employers, and of mature age. The total attendance for 1909—both terms—was 295.

*Spinning Department:* In this department special attention is devoted to woollens, the other materials being taken up incidentally. The subjects are:—Spinning (theory), Materials, Weaving (theory), Special Arithmetic and Book-keeping, Chemistry and Dyeing, General Machinery Instruction, Drawing and Sketching, Textile Law, and practical work.

*Weaving Department:* Weaving (theory) Chemistry and Dyeing, General Theory of Machinery, Drawing and Sketching, Textile Industrial Law, and practical work.

*Dyeing and Finishing Departments:* As above, with special stress on subjects belonging to these departments.

#### SECTION 4: ROYAL HIGHER WEAVING SCHOOL AT BARMEN-ELBERFELD.

The combined population of the two towns is nearly 300,000. The textile industry is the principal one.

This school grew out of an Evening Class, and started in 1899, using an old school building for the purpose. A factory building and equipment were added later.

It is supported by fees, by State and City aid, and by a special Grant from the Rhineland Province. Some manufacturers contribute towards scholarships and the financial assistance granted to necessitous students.

The attendance at Day Classes is 130, at Evening Classes, 270.

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*Entrance:* Einjähriger standing required in case of manufacturers' sons, owners and managers. Full Volksschule course in case of designers and foremen.

*Object:* For the instruction of owners, managers, salesmen, designers, merchants, stock clerks, foremen, weighing-room assistants, apprentices and workmen of the textile industries in the vicinity, and women superintendents.

To supply the technical knowledge demanded by the very varied textile industry of Barmen, which is best obtained in an institution fitted with all necessary appliances.

*Teachers:* Only one of the staff is a Technical High School graduate, the others were selected from the industries, stressing:—(1) expertness in his special line; (2) general personal qualities for teaching.

The Curatorium deals with the general welfare of the school, particularly financial matters.

*Courses:* The following table gives particulars of the courses:—

## DAY COURSES (44 hrs. weekly.)

	Length of Course.	Tuition.*	Books.
		\$	\$
1. Manufacturers, (owners and managers)			
(a) Cloth Weaving.....	1 yr.	50 00	10 00
(b) Ribbon and trimmings, weaving and lace.....	1 yr.	50 00	10 00
(c) Braiding.....	1 yr.	50 00	10 00
2. Dyeing and Chemistry.....	1 to 2 yr.	50 00	10 00
3. Designers and foremen.....	1 yr. or more	15 00	10 00

## EVENING COURSES (6 hrs. weekly.)

1. Foremen, warehousemen and weighing assistants (as a, b, c of Day School).....	2 yrs.	7 50	3 75
2. Designers and stencillers.....	1 to 2 yrs.	7 50	3 75

## SPECIAL COURSES FOR GIRLS.

1. Plain Hand and Machine Sewing.....	6 mos.	15 00	10 00
2. Fancy Work.....	1-2 to 1 yr.	inclusive	
3. Dress and Mantle Making.....	1-2 to 1 yr.		
4. Trimmings.....	1 yr.		

*Subjects of Instruction:* All departments are considered with which pupils will have to be acquainted—not only one special line. Where possible, *individual instruction* is given. Special stress is laid on practical work as early as possible in the course to accustom students to independent work.

\*Foreigners pay five times the usual tuition fees.

*Means of Instruction:* First-rate appliances and collections for theoretical instruction, constantly being added to. Dyeing laboratories well stocked with latest inventions. Shed for practical experiments. Library of over 1,000 volumes, and large collections of Bergiach Verein for the advance of Textile Industry, giving students the opportunity of observing patterns of various articles and developments of fashions. Instructors have had practical as well as school experience. Machines are of German make, except in the case of some of the weaving looms.

*The Course for Textile Designers* trains Designers for the following branches of industry:—

1. Weaving, patterning plain linen and cotton goods, silk, furnishing goods, carpets, etc.
2. Ribbon-weaving—bands, trimming, upholstery trimmings, etc.
3. Lace Manufacture—especially Valenciennes (duchess) and Torchons.
4. Hand and Machine Embroidery, viz., decoration of costumes and interior decorations.

*The Dyeing Course* aims at giving practical and theoretical instruction in all branches of dyeing. Instruction mostly individual and combined with practical study in bleaching, washing, dyeing, etc., in the new, up-to-date dyeing establishment attached to the school.

Excursions are made to other works and scientific expeditions are organized.

*Course for Salesmen in Textile and Making Up Branches:* It is necessary for salesmen, both wholesale and retail, to have a thorough knowledge of manufacturing processes, possibilities of design, nature of raw materials, etc. The salesmen's course provides for this and offers opportunity for studying processes of manufacture in actual practice.

*Girls' Division* has for its general aim and object preparation for both the home and the trade in Day and Evening classes. The study plan includes:—Plain and Machine Sewing, Fancy Sewing, Dress and Mantle Making, Trimming, Designing, German, Arithmetic, Knowledge of different kinds of Weaves, Laws of Textile Industry.

## SECTION 5 : TEXTILE SCHOOL AT CREFELD.

A manufacturing centre of 130,000 population. The principal products are velvet and silks.

### A.—THE SPINNING AND WEAVING SCHOOL.

Erected and maintained by State and City, it prepares men as managers, owners, superintendents, designers, buyers and salesmen in the textile branches. It also provides supplementary education for workmen wishing to better their positions, and has a Girls' Department where instruction is given in Dress-making, Millinery and Embroidery for home purposes. A spinning and weaving factory in connection employs 40 hands and a number of boy and girl apprentices.



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300 students were in attendance.

Students must be 16 years of age and have a good preparatory training, which should include some practical knowledge.

*Equipment:* The School has the newest machinery and can meet all requirements.

*Departments:*

1. Silk Waste Spinning, with Silk Waste and Cotton Winding.
2. Weaving.
3. Pattern Drawing.
4. Fancy Embroidery by hand and machine.
5. White Sewing.
6. Dressmaking.

*A Dyeing and Finishing* establishment is attached for practical work.

Those intending to go in for textile machine building can practise in work-shops attached.

*The Silk Waste Spinning Dept.* has about 540 fine spindles and 120 cotton spindles. Spinning process in all its stages from the raw product to the finished thread, learnt theoretically and practically.

*The Weaving Dept.* has about 30 hand looms, 75 mechanical looms and all other necessary machinery.

*The Pattern Drawing Dept.* gives practical as well as artistic training.

*The Royal Weaving Collection*, second largest in Germany, is at the disposal of students.

The course extends over 18 months, the fees being 200 marks per annum for Germans, and 1,000 marks for foreigners.

#### B.—DYEING AND FINISHING SCHOOL.

Under the same Curatorium as the previous School, but having a different Director. It is one of the best of its kind.

Students are sons of employers, apprentices and workmen seeking to better their condition, and also men from other schools who wish to obtain a special knowledge of the dyeing industry. The entrance requirements are as in A, and the course covers 3 years.

No regular factory is attached, as in the former school, but when necessary for instruction orders are taken.

The objects of this School are:—

(1) To give theoretical and practical instruction in all branches of Chemistry, with special reference to manufacturing and practical applications.

(2) To instruct persons who wish to devote themselves to any branch of color industry, especially in chemical processes, dyeing, printing and finishing of fabrics, manufacture of dyes and mordants, etc.

Some of the pupils are sons of industrial employers, destined to enter their father's business. The remainder find good positions as masters, dyeing experts, colorists, etc. Some wish to qualify in special branches, such as straw or leather dyeing, wood, paper, etc.

The differences between fees and cost of maintenance is made up as to two-thirds by the State and one-third by the City. The State paid for the building and extension, the site having been presented for the purpose. The building contains several large halls—two lecture rooms with preparation rooms, library, weighing-room, two chemical laboratories, one chemical-technical laboratory, one dyeing laboratory, one dyeing room with drying-room and dye kitchen, bleaching room, blue dyeing and printing and finishing rooms, and several smaller rooms, besides necessary storerooms for chemicals, utensils, etc.

Experience showed it was useless to make small patterns on narrow machines, so machines were built over and new, full sized ones installed, to width of 180 cm. The 50 machines and appliances of different systems admit of all kinds of material being handled.

#### MUSEUM OF TEXTILES.

At Crefeld the Royal Museum of Textiles has a collection of ancient and mediaeval stuffs. It has also samples of the best modern productions and is visited by many thousands of designers in the course of the year. There is evidence of the practical value of the well planned, well organized and well supplied museum under competent direction. Exhibitions of textile fabrics are held occasionally. Sometimes these result in the foundation of new industries. These museums are generally replete with examples of all classes of industrial art, design and workmanship, ancient and modern, native and foreign. They contain collections of art and technical books. Practically all the current journals and publications relating to art and industry together with trade catalogues, directories and address books of other countries are on the file. The officials give every assistance to designers and manufacturers.

### SECTION 6 : THE ROYAL SAXON ART SCHOOL FOR THE TEXTILE INDUSTRY AT PLAUE.

#### THE TEXTILE MUSEUM IS IMPORTANT.

Plaue is known as an important centre of the lace and embroidery industry. The Art School for the Textile industry was visited. The director, Prof. Albert Forkel, was most courteous and communicative. The school was established and continued by the Industrial Association of Plaue. It is a school and museum combined. The museum part is open to the public free. It is particularly well supplied with selected specimens of lace from different countries. Manufacturers may borrow these in order to imitate them. The collection is most extensive and is kept up from year to year, new specimens being chosen by the Director. The grant for the museum amounts to 15,000 marks annually from the State of Saxony and between 6,000 marks and 7,000 marks from the Industrial Association. The fullness and completeness of its contents was very noticeable. There are examples of old productions

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as well as of modern. Portions of contents of museum were sent to eight other places which were in association with Plauen for this purpose. The museum had also a collection of examples of modern patterns of wall paper. These were used by the students in connection with the making of designs for laces and room draperies.

## DRAWING FROM FLOWERS.

Much time was devoted by students to drawing from flowers for patterns. They were drawing from single flowers, a few flowers, a bunch, and large bunches. The school has a garden and conservatory to furnish specimens for drawing in order to produce designs. The Drawing Room was divided into sections by means of moveable screens. The students sat with their left side to the window and faced the screen. It was made of what appeared to be burlap material, brown in color, medium tobacco shade. These screens were moveable and extended across the room leaving a passage only at the side on which there were no windows. Four or five students in a row were working in front of each screen.

## OBJECTS OF THE SCHOOL.

The school aims to furnish competent workers to local textile art industry. Large factories are inspected for study in practical execution of designs. Lectures on lace industry are given to the public and apprentices. Collections and library are open to the public. Objects from museums are lent for other exhibitions.

The Departments are:

- (1) Pattern-drawing.
- (2) Manufactures.
- (3) Drawing apprentices. (Four branch schools for drawing apprentices).
- (4) Women's work.

Department (1) gives the necessary artistic training to young people who wish to take up pattern drawing. Evening lectures are given on the development of old and modern lace, and lacemaking machines.

Department (2) is for young business men and others interested in free-hand drawing, practical manufacture of hand and bobbin machine work and weaving.

Department (3) for drawing apprentices gives the necessary drawing training.

The branch schools aim chiefly to give to pattern and stencilling machine apprentices a knowledge of ornamental and plant forms which will enable them to transfer patterns in an artistic manner. Three year courses.

Department (4) for women's work specially trains women and girls for whitewear making, and also seeks to enable women of the industrial classes to practise either at home or in business. It provides also embroidery lessons. With this course is combined one for needlework teachers.

The school contains a library with a collection of patterns, a museum of the textile trade, a collection of models and a collection of natural history. Whilst serving in the first place as a means of instruction, they are also open to the industrial population. Manufacturers also have the opportunity to exhibit specially successful products in a hall reserved for the purpose, free of charge. Other collections borrow patterns from here for their own use.

*Conditions of Admission:*

Elementary education.

Entrance examination in drawing.

Fee: Germans, 60 marks; foreigners, 300 marks.

Preparatory class (six months) three classes; and trade class (one year each).

*Subjects (General):* Drawing and painting of ornaments, animals, plants, etc., from nature; figures; designs of plant ornament, with help from nature; conventionalised ornament; linear drawing; projections, shadows; perspective; German, arithmetic, book-keeping, physical training; (*Special*): practical weaving, stencilling, machine embroidery; technical drawing of patterns for machine embroidery and lace; designing patterns for lace, hand and machine embroidery, weaving of curtains and stuffs from historical models and from previously made ornamental studies of plants, animals, etc., for every kind of textile product.

EVENING COURSE.

(1) Lectures on the development of lace and on the manufacturing of lace on the bobbin machine. Fee: 10 marks; foreigners, 120 marks.

(2). Machine embroidery; technique of weaving; and freehand drawing and enlargement of patterns. Admission as machines are available.

Fee: 20 marks for Germans; 120 marks for foreigners.

*Subjects:* (a) Practical embroidery, four hours weekly; comparison of hand and machine work; details of machines (hand and bobbin); materials; dissection of patterns and calculation of stitches; practical illustration by teacher on various materials; theory of weaving, three hours weekly (materials, calculation, dissecting patterns).

(b) Practical weaving: materials and tools, various kinds of looms, hand and mechanical looms; freehand drawing and pattern enlarging; general practice; drawing applied; enlarging patterns, to attain proficiency in sketching.

(3) Three classes, three years' course. Fee: Germans, 20 marks; foreigners, 120 marks.

1st Year: Drawing from nature and ornament; linear drawing; German and arithmetic.

2nd Year: Drawing as above; drawing historical lace; study of style and taste; German; arithmetic; theory and technique of machine embroidery and principles of enlarging.

3rd Year: Elementary pattern designing for machine embroidery; composition from historical models; drawing from nature and ornament, lectures on lace.

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(4) One and a half years' course—three classes, graduated; also (1) Department for fancy embroidery and pattern designing, and (2) Preparatory course for needlework teachers' examination. Fee: 60 marks for Germans; 300 marks for foreigners.

*Lower class* (half year):

Drawing patterns for underwear; hand sewing; freehand drawing; white embroidery; book-keeping; German.

*Middle class* (half year):

Making of underwear; drawing patterns for the same; freehand drawing; white embroidery; millinery; book-keeping; German; ironing.

*Upper class* (half year):

Dressmaking patterns; freehand drawing; white embroidery; millinery; ironing.

In the fancy embroidery and pattern drawing department, 34 hours weekly, taking principal branches of the subject; also, if desired, drawing and pattern designing.

## PREPARATION OF NEEDLEWORK TEACHERS (1½ YEARS).

*Subjects:* Knitting, crocheting, cross stitch design, hand and machine sewing, white sewing, embroidery, darning, dressmaking, freehand drawing, pedagogics, German.

The branch establishments give three years' courses in drawing, painting, pattern drawing, and enlarging.

## MUSEUM AND COLLECTIONS.

The Library contains 6,252 works, including artistic supplements to magazines, etc. (6,000 sheets with 23,000 pictures).

The Collection of copies contains 155,626 pieces (lace, woven goods, printed stuffs, trimmings, curtains, carpets).

The Library also includes patent registration office. Patents can be seen and studied at any time.

The Museum of textile industry has departments for embroidery, lace, woven goods, printed stuffs, trimmings, curtains, carpets.

*Regulations and methods:* Only such articles are included as will be of value as models to the local industry. Archaeological considerations have no weight.

Preference is given to modern patterns, but older ones are not excluded if of value as models. The Museum contains 21,092 articles.

A collection of models for teaching purposes only contains 1,306 plaster casts and wood carved models.

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The total number of objects in the collections is 186,613. They are free to the public to view but only members of the local Industrial Society may borrow them. The public drawing hall and collections were visited by 50,000 persons in the course of the year 1908-9.

#### INDUSTRIAL SOCIETY.

The Industrial Society exists for the promotion of home industries by the following means:—

(a.) Supporting and adding to collections at Textile Art School and making them available to the public.

(b.) Instituting travelling exhibitions (loans from collections) in the area of its operations.

(c.) Carrying on discussions of subjects relating to the industry.

*Membership:* Any citizen may belong. The annual subscription is twenty marks, in return for which the member may take out any object from the collection on loan whenever he likes.

*Management:* The management is by a committee of 17 elected for four years, four and five members respectively retiring the third and fourth years. They are eligible for re-election.

## CHAPTER L: SCHOOLS OF ART FOR INDUSTRIAL TRADES.

### SECTION 1: INTRODUCTORY.

The number of Secondary Schools devoted to the industrial arts and trades in Prussia in 1884 at the time of the transfer to the Ministry of Commerce and Industry, was 19. Of these a few have been abandoned. The list for 1909 contains 41 such institutions, which illustrates the extensive growth of industrial art and trade instruction during the last 25 years. Still more remarkable is the change that has taken place in the internal organization and management of the schools. Of these institutions it may be said that they are a new creation during these 25 years, for nothing like them existed before. The time previous to 1884 was marked by industrial drawing schools—that is institutions in which a trade worker learned the drafting more or less necessary in his particular trade. Side by side with these drawing schools there were in existence a few vocational schools fitted for certain manufactories and designed for the special purpose of promoting certain local industries. Real industrial art schools, schools of design with vocational lessons in the daytime, were not anywhere in existence in Germany.

#### NEW TYPE OF SCHOOL.

At about 1885 a new type of trade and industrial art school began to take shape in Prussia, and at the close of the century the present form of such schools developed rapidly. This effective change had its origin in the evening schools devoted to trade drawing, which schools, feeling the pulse of the time, took on a more and more vocational character. Certain occupations required a change from evening classes to day schools for more advanced workers. It also became necessary to consider the wishes of those who meant to devote some years to their vocational improvement as designers, model draftsmen, pattern-makers, etc. The fusion of purely trade education, such as is offered in evening drawing schools and vocational classes of trade schools, with the more artistic instruction offered in day classes in schools of design, is a characteristic feature of the development in Germany. This fusion ensures a natural selection of more talented students, and makes it possible for the buildings and means of instruction of one institution to serve both purposes.

#### NATURE STUDY THE BASIS OF DRAWING AND DESIGN.

The change in artistic taste which began about 1895, and was recognized not only in Germany, but more or less in all European countries, has affected the instruction in trade schools and industrial art schools. The change was  
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marked by the partial abandonment of the study of conventionalized historic ornament and its replacement by thorough nature study, which latter is today the basis of the entire instruction in ornamentation. From that comes recognition of the necessity of supplementing the work on the drawing board by work in materials in order to arrive at more purposeful and realistic forms. This recognition has led to the establishment of school workshops (the need of which had been urged by Gottfried Semper in his first program of industrial art education as early as 1851, and the establishment of which had been repeatedly called for in memorials by commissions of experts). The workshops have become, since then, an integral part of all Prussian industrial art and trade schools. They have extended and deepened their courses of study by adding the training of the hand; above all, they have exercised a perceptible influence upon the erection of new school buildings, for in the old ones a combination of drafting rooms and workshops could not always be arranged.

#### OBJECTS AND ORGANIZATION.

The institutions called variously "Industrial Art Schools," "Schools for Industrial Arts and Trades," "Trade Schools and Schools for Industry," or simply "Trade Schools," serve the purpose of furnishing skilled labor and intelligent direction for all kinds of industries or trades. The Industrial Art Schools are mostly day schools; the Industrial Art and Trade Schools are open during the day and offer evening lessons to workers who are employed in wage earning work and cannot attend in the daytime. The Trade Schools are almost all Evening Schools, and arrange their lessons so as to serve young workers and apprentices.

One feature is common to all schools, namely, that each adapts its course or program of studies to fit the peculiar industrial conditions of the locality; they offer opportunities for instruction in all kinds of skilled labor and all branches of art industry (designing). The program of studies consists partly of individual courses in exclusive arts, partly of groups of courses all related to a predominant local industry; for such groups a fixed course of study is arranged. In no school is the course so rigidly enforced, however, as to prevent talented students from branching out into individual and original work. In most schools of this kind preparatory classes are opened, either for students insufficiently prepared for admission, or for those deficient in sketching and drawing. At every school of this kind vocational classes are organized at which the purely artistic work in designing or general technical drawing are taught. Lectures in these schools give way to designing and drawing, and in late years the workshops have assumed an ever increasing importance.

#### EVENING SCHOOLS.

The Evening Schools for apprentices provide for both demands—designing and technical work. In many schools instruction is given also in mathematics, mechanics, physics and knowledge of metals. The different branches of Drawing



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in the day schools are divided into general and technical branches; the general branches are differentiated again into artistic Design and practical working Drawing.

## COURSES ADAPTED TO VOCATIONS.

The vocational courses for which the general Drawing Courses prepare, are the most important part of the instruction in Industrial Art Schools. Adaptation to local industrial conditions is the reason why few of these schools have uniform programs of vocational study. In all Industrial Art Schools are found fixed courses for decorative painters, for furniture designers, for sculptors and modelers, for locksmiths and jewelers. Most of these schools offer, besides those mentioned, courses for engravers, etchers, enamelers, chasers, flat design draftsmen, lithographers and book designers; in some there are courses of wall decoration, of ceramic arts and of bookbinding and some teach weaving designs for hand looms and women's artistic handiwork.

In every one of these specifically vocational courses the student receives, as far as possible, complete preparation for his occupation, so that he or she may sketch or design all artistic work or trade plans and be enabled to practically execute in material proposed designs or plans, as well as invent designs. The program of each vocational class offers instruction and adequate training also in the related artistic and technical arts, as well as careful application of working drawings and vocational designs. Aside from the various Drawing classes, there are lectures on technical subjects, such as knowledge of metals, science of construction, making estimates, and business rules relating to trades.

In the form of class lectures all Industrial Art and Trade Schools treat the history of art and principles of style with which knowledge of ornamental forms is connected. A further subject of class lectures is anatomy.

## WORKSHOPS ARE USED.

All these schools have a number of workshops. The shops most frequently found are those of the decorators, modelers, chasers, engravers, enamelers, and wood carvers. In classes for decorators the actual application of size-water-colors is practised. Some schools have workshops for lithographers, jewelers and printers; a few have also shops for artistic bookbinding and gilding, for the ceramic arts, for handweaving, stone cutting, women's art work, leather working and photography. The aim is everywhere the same, not to replace the master courses, but, first of all, to raise the execution of any task to a higher artistic and technical level.

## DRAWING IS EMPHASISED.

In all Industrial Art and Trade Schools evening and Sunday classes are maintained. Instruction in these classes is confined strictly to the limits of the separate trades. Every apprentice has the opportunity during the evening to participate in lessons of vital interest to his trade; and the abundant provision of such

lessons, as well as the liberty granted him to select from among them, enables him to find interesting instruction and work for every evening of the week. The lessons in Drawing and Designing during the day are divided into general artistic and vocational Drawing lessons. In general lessons instrumental and geometric Drawing are preferably taught from the first or elementary steps upward. In freehand Drawing the subjects are human forms as well as tools and objects of nature; in many schools copying from plaster casts and flat copies is found. For lessons in lettering, especially round-hand lettering, all these schools make provision.

Technical or vocational Drawing begins here, as it does in Continuation Schools, with Drawing according to scale of objects pertaining to the particular trade of the student. For trades approaching art industry, such as those dealing with ornamentation, ornamental Drawing and Modelling are taught from the beginning.

The vocational classes in the evenings cannot, as a matter of course, aim, like the classes in day schools, at making original designs; but they offer to their students of the more technical vocations an amount of knowledge and skill in Drawing which proves very useful in the pursuit of their trades. In more artistic vocations at least a certain artistic taste is developed.

The duration of these vocational courses varies from two to four years; most of them are arranged for from six to eight semesters.

#### DEVELOPMENT IN SCOPE AND NUMBERS.

Attendance at these schools does not result in any kind of privileges, except that in some schools, having classes for the building trades or for machine building, the privileges held out to students of the Builders' and Machine Builders' Schools are granted likewise. The principals of Industrial Art Schools are often able to secure for their students the privilege of only one year's army service granted students of Schools of Fine Arts.

Foreigners are uniformly charged five times the amount of tuition fees paid by natives.

Besides the 41 institutions in Prussia there are 3 in Bavaria, 56 in Saxony, 7 in Wurttemberg, and 5 in the other States. There are also numerous vocational schools for special industries and crafts, part of them provided with workshops, as for example, schools for woodworking, for basket making, for lock work, for watch making, for printing, for carving in ivory, for die-making, photography, violin making, for the millers' trade, for tanning, etc.

For pottery and tile making there are in Prussia 3 and in Bavaria 2, and in other States 2 Provincial schools. By "Handwerkerschulen" (artisan or trade schools) is meant those schools in which for the various handicrafts full day teaching is given. A trade is not taught in the schools, but instruction is given to handworkers in drawing, mathematics and science, and theoretical subjects related to the trades. The course may be one of only a year or half a year. Such schools are often called "Kunst-Gewerbeschulen" (industrial schools of art). As Drawing is the chief subject of instruction in these, frequently they cannot be distinguished from the Higher Industrial Schools of Art.

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## SECTION 2 : HANDWERKSCHULE, Lindenstrasse, BERLIN.

This general industrial and technical, also Industrial Art School, contains 30 or 40 branches, in which evening classes are given. Some day classes are also held for men who can afford to leave their practice and come here for full time.

The evening school is principally finishing from the Continuation Classes, and well advanced pupils may come here for the special Drawing in the second year.

*Aim:*—This school caters especially for apprentices and helpers, as a supplement to the workshop, and also takes prospective teachers of Continuation Schools.

*Entrance Requirements:* Completed Elementary School. Attendance does not exempt from Continuation School until the second year.

Free choice of courses is allowed as required. Classes are principally in the afternoon and evening, some on Sunday morning and a few on weekday mornings.

*Subjects:* freehand drawing, water-color, circles and projections, descriptive geometry, trade drawing (as required), building and architectural drawing, carpenters' and joiners' drawing, decorative painting, industrial drawing, modeling, arithmetic, mathematics, physics, mechanics, electro-technics and practical exercises, machinery, chemistry, technology, book-keeping, and various trade classes.

*Special Features:* A day school for painters is held during the winter months, to give them an opportunity of improving their drawing and painting and learning the various technical branches of their trade, especially drawing sketches and working plans. Pupils are given work suited to their attainments on entering the school. The fees for this class are 10 marks monthly, foreigners paying five times this amount.

The day class for carpenters includes drawing (freehand, geometric and technical); proportions (of furniture, etc.); and book-keeping. The upper division takes more advanced courses in the same subjects. Fee is 10 marks monthly (five times this amount for foreigners), with some free places for needy and deserving pupils.

## SECTION 3: MECHANICS' AND INDUSTRIAL ART SCHOOL AT BARMEN-ELBERFELD.

The school was established in 1894. It originated from a Continuation School.

Both State and City unite in the provision and support. Each pays half the annual cost after deducting fees. It is controlled by Government from Dusseldorf, being under supreme control of the Minister of Commerce and Industry and a Curatorium. It aims to train designers and foremen for

handwork and artistic work, as well as for the development of manual dexterity on the completion of workshop course, in day, evening and Sunday classes; it also gives full preparation for Master's Certificate and for Drawing Master's Certificate. Talented students can qualify for their Einjahrig examination.

A special feature is the Course for the trades associated with the printer's art.

Sons of employers or others, wishing to qualify themselves for technical or commercial conduct of a printing business, had no opportunity of acquiring in a short time the necessary knowledge. Competing firms will not take them and technical schools are almost exclusively devoted to the training of assistants in special branches.

This course, started in October, 1910, exclusively for sons of principals, *i.e.*, future owners or managers of businesses, has aroused great interest, both at home and abroad.

The course gives a thorough training in the whole field of the printing trade—setting up, book printing, lithography and chemical printing. Course lasts one year, and comprises:—

1. Demonstration, explanation and personal practical work.
2. Lectures on subjects bearing on printing trade.

Only one teacher had academic training; the others have had a good deal of practical experience in their special lines; they are appointed on 2 years' probation.

#### *Attendance:*

Summer. Day, 100. Evening, 300.

Winter. Day, 150. Evening, 400.

#### *Entrance Requirements:*

Assistants over 17—without further test.

Apprentices under 17—if sufficiently qualified.

Half-day students—if room.

#### DEPARTMENTS.

##### *Day.*

- I. (a) Decorators (painters).  
(b) Drawing Teachers.
- II. (a) Printers and Lithographers.  
(b) Book Printers and Setters.  
(c) Photo-mechanical process.
- III. (a) Furniture Designers.  
(b) Carpenters' Foremen.  
(c) Workshop Training.  
(d) Architectural Designers.
- IV. (a) Sculptors and Modellers.  
(b) Engravers and Stencillers.

##### *Evening.*

Printers and Lithographers.  
Book Printers and Setters.  
Photo-mechanical process.  
Painters (3 sections).  
Painting from Nature.  
Sculptors and Modellers.  
Engravers and Stencillers.  
Building Trade Laborers.  
Carpenters.  
Locksmiths, Tinsmiths, Mechanics.  
Electro-technical.  
Shoemakers, Tailors.  
Master's Certificate and extra subjects.

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Excursions are conducted by teachers and others to places of interest such as:—A glass-painting establishment, the Berlin Industrial Art Museum, Hamburg Natural History Museum, Exhibition at Folkwang, and 'Garden City' in connection therewith, oriental carpet factories and exhibitions, etc.

## SECTION 4: MECHANICS' AND INDUSTRIAL ART SCHOOL AT CREFELD.

This is a development from an elementary Industrial School. It is under the control of the Minister of Commerce and Industry and is supported by the State, the municipality, and fees.

*Aim:* To prepare sufficient craftsmen for the requirements of the art handicrafts and industries; also efficient teachers of drawing, and architects.

*Entrance Requirements:* Full pupils must have adequate experience in practical work and drawing (minimum 2 yrs.). Pupils the nature of whose occupation makes it impossible to continue during the winter (building trades), may be accepted with one half-year's practical experience, on pledging themselves to resume work the following summer. The only pupils received exceptionally without practical experience are those who have attended the Crefeld Industrial Day School (preparatory for handwork and technical, with workshop instruction in wood and metal) for one year, or, by examination, those who hold Einjähriger certificate. For training as drawing teachers, only those having Einjähriger certificate, or, for female teachers, those who have completed course at Higher Girls' School.

Leaving certificate is only given after 3 years' satisfactory attendance.

*Day Classes:* 8 a.m. to 12 noon, and 2 to 6 p.m. except Saturdays. Day pupils may join Sunday and evening classes free.

Half-time pupils (up to 4 half days per week) who cannot attend whole time, are accepted, but have to pay extra for Sunday and evening classes.

*Evening and Sunday Classes* in drawing and technical subjects for masters, journeymen and other adults; for apprentices and journeymen still subject to Continuation School attendance who have completed the Industrial Continuation Course; and for masters' and journeymen's certificates.

Certificates from technical or Continuation Schools previously attended must be produced.

Outside students can attend Sunday drawing classes without further previous training.

*Fees:* Day students, 30 marks half-yearly; half-time students, 15 marks; (maximum 16 hours weekly). Evening and Sunday students 6 marks half yearly (2 to 12 hours weekly). Free places for needy and deserving students.

Bursaries are awarded to students who distinguish themselves. Competitions are held for money prizes and diplomas.

### BOYS' ELEMENTARY DRAWING SCHOOL: CREFELD.

A municipal school under the Director and Curatorium of the Crefeld Industrial Arts School.

The course is an optional one of 3 years' duration. Boys of 11 to 14 may enter from the Elementary and other schools. About 400 in attendance. The fee is 3 marks half-yearly.

Annual cost of up-keep 6,000 marks.

The hours of instruction are: Wednesday and Saturday 2 to 4 and 4 to 6 p.m.

Attendance at this school is particularly recommended for those students who later intend to learn a manual trade, industrial art trade, or a technical trade, as for these trades a good knowledge of drawing is most important, and, further, knowledge of such a kind as will be required in the future trade. The aim of this school is, therefore, to follow the modern spirit of Art in industry, by avoiding mechanical reproduction of natural and ornamental forms, rather to stimulate intelligence and encourage initiative, to awaken a sense of proportion, and by the use of colors to develop the feeling for beauty in the pupils. The same objects are kept in view in the modeling class.

In the workshops attached to the school, endeavor is made to cultivate not only the mental but manual talent of the boys, and by means of methodical hand training to direct the creative instinct of youth, to instil practical sense, love of work and respect for manual labor. Further, the work done is to develop good taste in the production of artistic work, and to help the man of the future to be capable of the simpler handwork required in everyday life, to cultivate his resourcefulness, even if he does not eventually take up any trade. The results so far obtained have been gratifying.

Pupils, who have attended this school satisfactorily, obtain better results at the Industrial Day School and Continuation Schools which they may subsequently attend, and can more speedily reach the stage of actual technical instruction than they otherwise would. Those requiring apprentices give the preference to pupils of this school.

Diplomas and rewards are given at the end of each year, and special certificates are awarded when drawings and other works are retained for exhibition purposes.

*Courses:* Freehand, ornament, linear drawing, modeling, woodcarving, application of modeling to woodcarving.

Pupils construct objects in the workshop from their own drawings.

### ART EXHIBITION.

The members of the Commission visited the Art Exhibition at Crefeld. Here was a very creditable exhibition of work of the Industrial Art School, the Industrial Day School, Industrial Continuation School and Boys' Drawing School.

The most striking feature of the work was the Drawing and Design of the Boys' Drawing School, boys of 10 to 14 showing remarkable ability in freehand Drawing, conventional color design and mathematical Drawing.

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## SECTION 5 : ROYAL ART SCHOOL AT MUNICH.

The aim of this school is to teach the various branches of industrial art from the artistic and technical side; also to train art teachers. It is an institution amalgamated from two others founded respectively in 1868 and 1872. The courses are both general and special.

Students must be 16 and not over 30, and have school certificates and adequate educational attainment plus an examination in freehand drawing and modelling. The special courses or classes require special qualifications for admission.

*Fees* are charged: Winter term 30 marks; Summer term, 20 marks, plus insurance and entrance fee. Foreigners pay double. There are various scholarships and bursaries.

The total number of pupils in 1909-10 was 400, of which 256 were men and 144 women.

In the Royal Industrial Art School there is a *Women's Department* which provides complete drawing courses, general and applied to the various trades, including lithography, leather work, stencilling, etc. There is also a drawing teachers' class. Of the 144 women pupils, 12 took drawing courses for general personal use and 132 for industrial use. These may be classed as follows:— 27, pattern drawing for textile industries; 10, decorative painting and drawing; 10, illustration and lithography; 5, plastic work and sculpture; 4, chasing; 1, glass painting; 2, architectural drawing; 72, as drawing teachers.

## CHAPTER LI: COMMERCIAL TECHNICAL SCHOOLS.

### SECTION 1: INTRODUCTORY.

In Germany there is no system of Commercial Technical Education covering the whole country. Industrial Training and Technical Education are much in advance of Commercial Technical Education. Some of their own authorities state that Commercial Technical Education is only now at about the same stage of organization and development as was Technical Industrial Education twenty-five to thirty years ago. There are a few Commercial High Schools of almost equal status with the Technical High Schools. Commercial Middle Schools do, for those engaged in commerce, what the Middle Technical Schools do, for those engaged in industries, are few. On the other hand there are a great number of Lower Commercial Schools which, in addition to preparing for commercial occupations, do some general educational work. They serve a similar purpose to that which is served by the Continuation Schools and the Lower Technical Schools. In the Commercial Schools the courses of study and instruction are not specialized for different divisions of commercial work as they are in the case of industrial work. No sharp or clear division is made between those who are to be leaders and those who are to be assistants. That may be due to the fact that in commerce more than in industry, every competent assistant may expect to be a leader or a principal.

#### FOUR GRADES OF SCHOOLS.

1. The Handels-Hochschule (Commercial High School) stands for the Commercial University. It is for the purpose of giving to young people who intend to devote themselves to commerce a scientific training necessary for, or advantageous to, them in the management of business affairs. In addition these schools train for public positions, such as those of officials in the Chambers of Commerce. The training of the teachers for the other commercial institutions is also a part of the work of these Commercial High Schools. The central interests in the course of study are in national economics, the elements of law, and foreign languages. Attention is also given to geography, the study of articles of commerce, and the principles and methods of commercial technique. Commercial technique includes the science and art of business bookkeeping, arithmetic and correspondence. The plan of instruction is similar to that in other Technical Colleges—lectures and class work.

2. The Middle Commercial Technical Schools usually go by the name of Higher Commercial Schools. Sometimes they are organized as separate institutions; in other cases they form one division of a general educational institution,



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such as a Realschule. In that respect they resemble the commercial department of a High School in Ontario or the commercial department of an Academy in one of the other provinces of Canada where that name is used.

3. The Lower Commercial Technical Schools are usually called Commercial Schools. Of these there are three kinds. The first is a purely technical school giving a special training for one or two years in geography, languages and the technique of commerce, in order that the pupils who are to enter commerce afterwards may make more progress as apprentices; or this class of school is for those who have already finished their apprenticeship to commerce in offices or elsewhere. They give them the special training in the general technique of commerce, in its relation to special branches of business, and give instruction in the principles of commerce and law.

4. Two other classes of Commercial Schools are organized in connection with general educational institutions. The one gives a general course, so arranged that it will prepare the student in the most thorough way for apprenticeship. The other specializes more on the technique of commerce and the actual work which an apprentice will be occupied in doing. It partakes more of the nature of the trade school and less of the general preparation for the specific parts of the apprentice's work.

The great mass of the young people in commerce must receive the educational help which is available to them after they leave the elementary school by means of the Commercial Continuation Schools. These schools differ according to the needs of the pupils who attend, considering the kind of employment, the length of time during which they can take the courses, the time per week which they can give to the instruction, evening, morning or other hours when they can be free from business, and in the character of the teachers who are available.

## SECTION 2: MUNICIPAL COMMERCIAL SCHOOLS AT DUSSELDORF.

These schools comprise:—

### 1. Commercial Continuation Schools.

- (a) For Boys.
- (b) For Girls.

### 2. Commercial School for Girls.

### 3. Trade or Special Commercial School for Boys.

- (a) Course for assistants in business.
- (b) Course for apprentices qualified as 'Einjähriger.'
- (c) Optional course for continuation scholars.

The Commercial Schools above given cover the field of commercial education for girls, between the Elementary School and the Commercial High School, and for boys who wish to enter commercial life as apprentices or clerks, and also for boys and men who are in commercial life, and want to further their knowledge along that special line.

The buildings in which the schools are held are far from types of good management. The scholars, on the contrary, seemed to be making good use of their time. Many of them were young women.

#### COMMERCIAL CONTINUATION SCHOOLS.

The following is a synopsis of Dusseldorf's By-law *re* attendance at Commercial Continuation Schools.

All business employees of both sexes are obliged to attend up to completion of 17 years. This period may be extended if progress is unsatisfactory. Exempt are those who have passed *Einjahrig*e examination or graduated from a higher school of 9 classes, or from a commercial day school. Persons engaged in business, but not compelled to attend, may do so on payment of 5 marks quarterly. For every employee liable to attend, the employer has to pay, in advance to the City, 5 marks quarterly as a contribution towards the maintenance of the school. On proof of poverty being furnished, the school fees may be partially or wholly remitted. Parents and guardians are required to see that employees attend, and employers to notify the headmasters of employees liable to attendance and to notify cases of illness. The penalty for non-compliance on the part of parents, guardians and employers, is a fine of not exceeding 20 marks or 3 days' imprisonment.

Classes are arranged from 8-12, 2-4 or 2-5, so as to give each 6 hours weekly.

#### COMMERCIAL CONTINUATION SCHOOL FOR BOYS.

*A. Preparatory Class—3 grades:* for those whose general education is insufficient to enable them to join the Continuation School. Hence, subjects are more general than special—German, arithmetic, writing.

*B. Continuation School, Lower Division:* German lessons treat of subjects familiar to pupil, thus adding to his general knowledge whilst improving his German. Historical buildings, monuments, etc., may form subjects of lesson, thus fostering patriotism. Commercial subjects are treated on similar lines. Owing to limited time, choice of subjects is left to discretion of teacher. Pupils are guided as to reading and encouraged to read at home on subjects given. Recitation and story-telling evenings are held—where possible with lantern slides. Verbal and written exercises include the re-telling of stories, etc., studied in lesson.

*Middle and Higher Division:* The same system is followed; subjects become more commercial, such as business correspondence, general commercial subjects, commercial law.

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## COMMERCIAL CONTINUATION SCHOOL FOR GIRLS.

*I. Lower Grade:* 1. German and writing, the object being to increase knowledge and fluency. Subjects are,—the shop or business, its various departments, duties of employees, etc. Special attention is paid to handwriting. Correspondence and commercial law are combined, so that the latter may be taught by means of the former. Instruction is given in forms of commercial correspondence.

2. Commercial law; origin and history of commerce; the more important details of commercial, civil and industrial law; further attention to composition and German. Subjects are,—commerce, retail trade, companies, etc. Letters are composed orally and in writing, with special attention to improvement of power of expression.

3. Arithmetic; review; foreign money; weights and measures; mental arithmetic.

*II. Middle Grade:* The main subject of instruction is credit, from business, legal and commercial view; letters on the various forms of credit; practical exercises; arithmetic, commercial geography, bookkeeping.

*III. Upper Grade:* 1. Correspondence and commercial law. correspondence in connection with bookkeeping; letters on all subjects arising therefrom; commission business, transport, foreign trade arrangements; banking; towards end of course, the more important rules and decisions of civil law.

2. Arithmetic; 3 methods of calculating interest; special attention to mental arithmetic.

3. Commercial geography and study of various classes of goods.

4. Bookkeeping, with special attention to neatness in keeping books.

## COMMERCIAL SCHOOL FOR GIRLS.

2 grades: one year in each grade.

1. *Upper Grade:* The aim is to give such instruction in commercial subjects, foreign languages, international law and commercial geography, as will enable its students on the completion of the course to perform the work of an office efficiently and intelligently.

2. *Lower Grade:* This gives theoretical and practical instruction to the standard required of apprentices in commercial houses.

*Entrance Requirements:* Graduates of Higher Girls' School or 9-class Middle School without examination to Upper Grade. Others by examination. To Lower Grade, graduates of Elementary School or corresponding class in Middle or Higher School—or by examination.

## COURSE OF STUDY.

1. *Upper Grade:* German correspondence and office work, commercial arithmetic, commercial geography, commercial law, bookkeeping, laws of

business, French or English, shorthand and typewriting, physical training, singing. (A second foreign language optional.)

2. *Lower Grade*: Same as Upper, with addition of German and writing.

#### TRADE COMMERCIAL SCHOOL FOR BOYS.

##### *A. Commercial Course for Business Employees.*

To enable business employees to add to their knowledge. Specially intended for those who have completed course at Commercial Continuation School and wish to supplement their knowledge. For those who have not attended any Continuation School, and therefore cannot follow the course with the others, special supplementary courses may be arranged.

The subjects are:—German correspondence and commercial law, book-keeping (double entry), commercial arithmetic, commercial geography, shorthand, French, English, other languages if sufficient pupils.

All students must select at least two courses, but they are advised not to take too many.

*B. Commercial Course for Apprentices* holding Einjähriger certificate and therefore exempt from Continuation School attendance.

The subjects are the same as in *A.* and there is the same stipulation as to courses.

##### *C. Optional Course for Continuation School Pupils.*

As the time table of the Commercial Continuation School does not allow for either foreign languages or shorthand, these optional courses have been arranged so that continuation scholars may have an opportunity of studying these subjects. Any pupil of a Continuation School may attend. The subjects are: French, English, shorthand. (Only one language may be taken at a time.)

The course is 1 year for languages, 6 months for shorthand.

### SECTION 3 : COMMERCIAL SCHOOLS AT DORTMUND.

Commercial education is provided for by:—

- A. Higher Commercial School,
- B. Commercial School,
- C. Compulsory Commercial Continuation School,
- D. Voluntary Commercial Evening Course.

All these started from voluntary evening classes and are controlled by the City, except for a State contribution to the evening classes.

*Entrance Requirements*: The Higher Commercial School takes pupils who have had secondary education up to the 'Einjährige' standing. The other departments require only a Volksschule leaving certificate.

<i>Attendance:</i>	Boys	Girls	Total
Higher Commercial.....	21	32	53
Commercial (boys' section to be started).....	..	32	32
Voluntary Evening School.....(mixed)	..	..	387
Compulsory Continuation School.....	587	223	810

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Graduates enter trade and commerce. The demand for graduates of the Higher Commercial School exceeds the supply.

The teachers are mostly graduates of the Higher Commercial School, except in Continuation and Evening Classes. Some of the teachers in the Continuation School have been elementary teachers, and some of the Evening Class teachers are specialists engaged in trade and commerce during the day.

*Courses:*

	Length.	Fees.
Higher Commercial School.....	1 yr.	250 marks
Commercial School.....	1 yr.	100 marks
Voluntary Evening School.....	1 yr.	vary.
Compulsory Continuation School.....	3 yrs.	"

*Subjects:*

	Weekly Periods	
	Boys.	Girls.
Higher Commercial School:		
Commercial Arithmetic.....	5	5
Bookkeeping and Model Counting House.....	4	4
Commercial Correspondence and Office Work.....	2	2
French and French Correspondence.....	4	3
English and English Correspondence.....	4	3
Trade and Currency.....	3	2
Political Economy and Civics.....	2	1
Commercial Geography and Merchandise.....	3	2
Physical Technology.....	2	..
Commercial History.....	1	..
Handwriting.....	2	2
Typewriting.....	1	3
Shorthand.....	2	3

## Commercial School:

Correspondence and German.....	4	4
Commercial Arithmetic.....	5	4
Bookkeeping.....	4	4
Commercial Law and Civics.....	3	2
Political Geography and Merchandise.....	2	2
Writing.....	2	2
Typewriting.....	2	3
Shorthand.....	2	3

## Compulsory Continuation School:

## Lower Grade:

Arithmetic.....	2 hrs.
German and Commercial Correspondence.....	2 hr.
Bookkeeping(Single Entry).....	1 hr.
Writing.....	1 hr.

6 hrs.

## Middle Grade:

	Boys and Girls.
Arithmetic.....	2 hrs.
Commercial Law and Correspondence.....	2 hrs.
Bookkeeping (Double Entry).....	2 hrs.

6 hrs.

## Upper Grade:

Arithmetic.....	1 hr.
Commercial Law and Civics.....	2 hrs.
Bookkeeping and Correspondence.....	2 hrs.
Political Geography.....	1 hr.

6 hrs.

## Voluntary Evening Courses:

1. Bookkeeping (simple, advanced and elaborate).....	2 hrs. and 1 hr.
2. Arithmetic (3 grades).....	2 hrs. and 1 hr.
3 a. Correspondence and German.....	2 hrs.
b. Correspondence, Exchange and Currency.....	2 hrs.
4. English for beginners.....	2 hrs.
English, advanced.....	2 hrs.
4. French, beginners.....	2 hrs.
French, advanced.....	2 hrs.
5. Foreign Correspondence(advanced) German and French, 1 hr. each	2 hrs.
7. Elements of German Commercial Law.....	1 hr.
8. Elements of Political Economy and Civics.....	1 hr.
9. Political and Commercial Geography.....	1 hr.
10. Handwriting (round hand and ornamental or only one).....	2 hrs. or 1 hr.
11. Typewriting.....	2 hrs.
12. Shorthand (2 systems).....	2 hrs.

The by-law *re* attendance at Continuation School is similar to that at Dusseldorf.

## SECTION 4: COMMERCIAL SCHOOLS AT COLOGNE.

### (1) GENERAL COMMERCIAL CONTINUATION SCHOOL.

This school provides a three years' course for apprentices who wish for a more complete course than the ordinary Continuation School. Attendance exempts from attendance at Continuation School.

#### COURSES.

1st year (Lower). German, writing, arithmetic, with introductory course in office work and commercial correspondence.

2nd year (Middle). German and writing (roundhand), with further practice in correspondence, arithmetic, and simple bookkeeping.

3rd year (Upper). Arithmetic, shorthand, bookkeeping, (double entry and American system), industrial law.

Pupils are required to attend for 6 hours weekly, the classes being held on Wednesday and Saturday afternoons from 2 o'clock to 6 for 42 weeks in the year. The time given to the various subjects is as follows:—

German (with correspondence), 2 hours first two years; writing, 1 hour first year; office work, 1 hour in each year; commercial arithmetic, 2 hours first year, 1 hour second and third; bookkeeping, 2 hours second and third years; shorthand, 2 hours in last year.

The teachers are not exclusively employed at this work. Remuneration is according to number of hours given.

The expenses are 23,239 marks, of which the State gives 4,417 marks. Fees charged are 4 marks half-yearly, and there are 37 free places.

The attendance in Summer is 840, in Winter 780.

### (2) HIGHER COMMERCIAL CONTINUATION SCHOOL.

For young people either engaged in, or about to be engaged in, commercial pursuits, to supplement their knowledge more satisfactorily than they could do in a general Continuation School. Attendance exempts from latter. The School has two Divisions: Lower, 3 years; Higher, 2 years.

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*Entrance Requirements:*

Lower Division—Leaving standard of elementary school, or equivalent.

Higher Division—Einjährige certificate or equivalent; business assistants having adequate knowledge; students who have passed Lower Division satisfactorily.

The Lower Division has 3 grades—Lower, Middle, and Higher.

The following are compulsory subjects in the Lower Division:—

Grade 1.	Grade 2.	Grade 3.
German. Writing (office work). Arithmetic.	Correspondence. Commercial Law and Civics. Arithmetic. Simple Bookkeeping.	Correspondence. Commercial Law and Civics. Arithmetic. Bookkeeping (d.e.).

*Optional subjects:*

French or English. 2 hrs. each.	Shorthand. French. English. } 2 hrs. each.	Political Economy. } (2 hrs. French. } each). English, }
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Typewriting for advanced pupils only.

In the Upper Division (two years) the following subjects are taken:—

1st Year.	2nd Year.
Correspondence, Commercial Law and Civics..... 2 hrs.	Polit. Economy..... 2 hrs.
Bookkeeping (2 grades)..... 2 hrs.	Bookkeeping (American and other system)..... 2 hrs.
Commercial Arithmetic..... 2 hrs.	French (Corresp. and Conversation) 2 hrs.
French (Correspondence and Conversa- tion)..... 2 hrs.	English "..... 2 hrs.
English (beginners)..... 4 hrs.	Italian..... 2 hrs.
" (advanced)..... 2 hrs.	Spanish..... 2 hrs.

Two Courses are held for teachers.

Classes are held every evening but Saturday and last 1 hour and 50 minutes.

Expenses in 1909-10 were 22,723 marks, of which the State gave 1,470 marks.

Fees for both divisions are 30 marks yearly for 2 lessons weekly; if more than 2 lessons are taken, 40 marks.

There are thirty free places and one assisted pupil.

The attendance in summer is 474, in winter 410.

## (3) COMMERCIAL REALSCHULE.

(A 6-year Realschule plus 1 year of commercial work.)

This was an ordinary 6-year Realschule up to 1897, when a commercial class was added and the name changed. It is administered and supported by the town, but comes under the supervision of both the Minister of Public Instruction and the Minister of Commerce and Industry. The fees are 90-120 marks annually.

In the last two years of the school course, an optional course in bookkeeping is added, but the commercial class is only open to boys who have obtained *Einjahrig* standing, and continues for 1 year. There are 500 regular students, 16 commercial.

The building is 10 years old, and cost 1,000,000 marks; equipment and collection additional. It has splendid equipment for physics and chemical demonstration, but no students' laboratory; also a fine room for a very complete collection of charts and specimens relating to biology, zoology, botany, etc., and also a second fine room for a splendid collection of charts, maps, etc., for history and geography.

No handwork or manual training is done.

Boys of the commercial class are prepared for business life. With 2 years in actual business after taking commercial class course, a boy may enter the Higher Commercial School, but very few go higher than this school.

Courses of study for Commercial Class, after *Einjahrig* standing is obtained are as follows:—

German (reading classics and literature).....	2	hours weekly.
Commercial Correspondence, Commercial and Political Economy.....	2	“
French Language and Correspondence.....	5	“
English Language and Correspondence.....	5	“
Commercial Geography.....	2	“
Commercial History.....	2	“
Merchandise (chemical technology).....	2	“
Commercial Arithmetic.....	5	“
Bookkeeping.....	2	“
Commercial Law.....	1	“
Physics and Mechanical Technology.....	2	“
Shorthand and Writing.....	2	“
Physical Training.....		

#### (4) COMMERCIAL HIGH SCHOOL (OF UNIVERSITY STANDING).

1,500,000 marks was donated by a private citizen towards establishing this school. It was erected by the City—under the Ministry of Commerce and Industry and the Minister of Public Instruction.

The sources of income are:—Fees, 120,000 marks; City, 300,000 marks.

The Chamber of Commerce grants annually 10,000 marks towards upkeep of the Industrial Museum. and 6,000 marks towards that of the Library.



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## AIMS OF THE SCHOOL.

The aims set forth in the regulations are:—

1. To provide young persons wishing to devote themselves to commercial pursuits with a broader and deeper measure of general commercial instruction.
2. The special theoretical and practical instruction of future teachers of commercial schools.
3. To enable younger administrative and consular officials, secretaries of Chambers of Commerce and similar persons to ground themselves in the elements of commercial science.
4. To afford opportunities to persons engaged in business and commerce of increasing their knowledge of commercial matters and operations.

## QUALIFICATIONS FOR ADMISSION.

The following are eligible:—

- (a) Graduates of higher 9-year German schools or equivalent.
- (b) Commercial people (industrial, bank, insurance, etc.) with *Einjährike* standing and at least 2 years' apprenticeship.
- (c) Foreigners having equivalent attainments to those required of German candidates.
- (d) Seminary-trained teachers who have passed 2nd examination.

Most of students have already served 3 years in actual business before entering.

## COURSES.

Political economy; commercial technics (commercial business, including bookkeeping); law, private and public.

Optional subjects:—

Insurance and company matters; geography and merchandise; natural science and technique; languages; public lectures.

Pedagogic training for commercial teachers of both sexes is given.

The teachers have University or Technical High School qualification.

## REMARKS.

The building is a very splendid and dignified structure. It has admirable equipment for physics and chemistry. The Industrial Museum contains splendid models and photographs showing the processes of manufacture and the products. Nearly one half of the museum was devoted to the mining industry and contained a more complete set of models than some of the special mining schools or the mining department of the Hochschule visited in Aix.

SECTION 5: COMMERCIAL SCHOOLS AT FRANKFURT.

(1) COMMERCIAL APPRENTICES IN THE PREPARATORY SCHOOL.

The question of the theoretical training of apprentices has been much discussed. The annual Report deals with it as follows: Compulsory Continuation School interferes with work, consequently employers will not take apprentices liable to Continuation School attendance. The only solution is the Preparatory School which the boy can attend for a year after leaving school and acquire commercial knowledge. The drawback is that the boy has no acquaintance with practical work, and therefore takes less interest in the lessons. A Preparatory School will not be able to impart knowledge which can only be really acquired in conjunction with practical work. Three years of Continuation School during apprenticeship are of more value than one year at Preparatory School before apprenticeship. From moral and educational standpoints too, the Continuation School is desirable—its influence is longer continued, at the time when this is most necessary (until 16 or 17).

If both schools are sanctioned, it means that each place must have two schools, one for those pupils who can afford the extra school year, and the ordinary Continuation School for the rest.

(2). MUNICIPAL COMMERCIAL SCHOOL.

*Comprises:—*

- A. Higher Commercial School for Boys.
- B. Commercial Realschule for Boys.
- C. One-Year Commercial School for Girls.
- D. Two-Year Commercial School for Girls.
- E. Commercial Technical School for male apprentices and employees.
  - (a) One Year's Course.
  - (b) Three Years' Course.
  - (c) Druggists' Course.
  - (d) Preparatory Course in French for Middle School pupils.
- F. Special Subjects—Evening Course.

This is a City Institution, under supervision of the Minister of Commerce and Industry, but controlled by the Municipal Board.

The sources of income are as follows:—

City.....	165,000 marks
Fees.....	90,000 marks
Chamber of Commerce.....	15,000 marks
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270,000 marks	

It supplies commercial education in the forenoon to boys who are in actual business apprenticeship. It does not do as much for girls as it does for boys.

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The buildings are somewhat old. The science equipment is complete and modern—also the equipment for teaching druggists.

Teachers are of University or Commercial High School standing in the higher departments only.

## SUBJECTS IN THE DIFFERENT SCHOOLS.

A. German, French (and correspondence), English (and correspondence); commercial arithmetic, commercial law, German business correspondence, bookkeeping, exchange and mercantile law, political economy, general commercial history, commercial and political geography, physics, chemistry and chemical technology, raw materials and mechanical technology, writing, physical training.

There were 37 pupils (in 2 classes) in 1911.

B. Religion, German (with history) French, English, history, physical geography, nature study, physics, chemistry and technology, mathematics, arithmetic, exchange and currency, correspondence and bookkeeping, writing, shorthand, freehand drawing, physical training, singing.

Six classes, with 265 pupils.

C. German and Correspondence.....	3	hrs. weekly.
French       “.....	4	“   “
English       “.....	4	“   “
Commercial Arithmetic.....	4	“   “
Bookkeeping.....	4	“   “
Exchange and Commerce.....	3	“   “
Commercial Geography.....	3	“   “
Shorthand.....	3	“   “
Writing.....	2	“   “
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	30	hrs. weekly.
Typewriting (optional).....	2	hrs. weekly.
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	32	hrs. weekly.

114 pupils.

D. Same as C., with addition of commercial correspondence and singing. 24-25 hrs. weekly.

E. (a) 1 year's course: French, English, commercial arithmetic, business correspondence and bookkeeping, exchange and commerce. 7 pupils, Feb., 1911. (b) Three years' course: German, civics, commercial arithmetic, exchange and commerce, correspondence, bookkeeping, commercial geography, raw materials, writing. Optional: English, French, shorthand. 12-14 hrs. weekly. 208 pupils in 3 classes. (c) Druggists' Class: Same subjects as (b) with addition of chemistry, physics and drugs. 74 pupils in 3 classes.

F. Special Evening Classes: Attendance in summer 418, in winter 392.

## CHAPTER LII : HIGHER GIRLS' SCHOOLS IN PRUSSIA.

### SECTION 1 : GENERAL EDUCATION.

The Prussian system of Higher Girls' Schools is the result of forces which for years have been at work among the people, but may be said to date from the Weimar Conference of 1872, called together by Director Kreyenberg of Iserlohn, with a view of crystallizing the prevailing views on female education. This conference, which was attended by 164 teachers, 54 of whom were women, resulted in a memorial being presented to the various governments, setting forth the demands for female education as follows:—(1) that the Higher Girls' Schools with a ten-year course should be under State control and under the same jurisdiction as the boys' schools; (2) that two foreign languages should be taught; (3) that the qualifications, salaries and pensions of the teachers be on exactly the same footing as of those in boys' schools; (4) that the Higher Girls' School be distinguished from the Middle School; (5) that State Normal Schools be established for the training of teachers.

The promoters of the Weimar Conference called another meeting in the following year, at Hanover, with the result that an association entitled "The German Association for the Secondary Education of Girls" was formed. This body has had a tremendous influence in the development of female education in Germany.

#### THE STEPS OF PROGRESS.

In 1894 the Prussian Government issued regulations on Girls' Schools and Teacher Training, prescribing a 9-years course; special elective courses subsequent to this course; the inclusion of two foreign languages; and a higher examination for women teachers leading to the title of Oberlehrerin (Higher Teacher) and the right to teach in the upper classes.

Formerly the State only provided for the establishment of Higher Grade Schools and Normal Schools, with no further provision, except for the elective courses, which were inadequate. The course only covered 9 years, and tended more towards the development of feeling than of the understanding. Practically nothing was done for the training of the future housewife and mother, or for the girl who wished to go to the University. The teaching conditions made it difficult to secure good teachers for these schools.

The present system of Secondary Education for girls in Prussia comprises:—

(1) The Higher Girls' School.

(2) The Lyceum, consisting of (a) The Women's School and (b) The Higher Normal School.

(3) The University Preparatory School.

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## PROVISION FOR DIFFERENT KINDS.

To make the situation clear, 8 typical girls will be taken, requiring 8 different classes of education, and their careers traced throughout their school life, beginning at 6 years of age.

The first girl, who merely desires a general education, to terminate as soon as possible, can go through the Higher Girls' School, spending a year in each class, and receive her diploma at 16.

The second girl desires the same general education, but also further training for domestic duties. She remains 10 years in the Higher Grade School, and then passes to the Women's School, where she spends two more years, and receives her diploma at 18.

The third girl wishes to become a Kindergarten teacher, and after completing the Higher Grade course enters the training school for Kindergarten teachers (a part of the Lyceum), receiving her diploma in 2 years' time (at 18).

The fourth girl wishes to teach domestic science, and enters the Women's School at 16, receiving a diploma at the end of 2 years' training which qualifies her to teach this subject in Elementary and Middle Schools. For teaching in Higher Grade Schools, further training is required.

The fifth girl intends to be a teacher, not University-trained, but for ordinary teaching. She enters the Higher Normal School at 16, and takes a 4 years' course, the last year being practical work. On completing this course she is qualified to teach in an Elementary, Intermediate or Higher Grade School, and should she wish to take a University Course later on, she is free to do so.

The sixth girl desires to go to a University, and therefore takes the full classical course, entering the lowest class of the University Preparatory School at 13, when she begins Latin. At 15 she begins Greek, and at 19 she passes her matriculation examination.

The seventh girl requires the same as the previous one, but without Greek, and therefore goes at 15 into the 'Realgymnasium' or modern course, taking her matriculation diploma at 19.

The last girl, No. 8, wishes for neither Latin nor Greek, so remains a year longer in the Higher Grade School, takes the Oberrealschule course, with modern languages, and likewise passes her matriculation examination at 19.

## PROVISION FOR DOMESTIC SCIENCE.

In the Higher Girls' Schools of Prussia provision is made for Domestic Science. During two years, courses of 5 hours weekly are given, 4 of which are devoted to practical work, such as firing and preparation for cooking simple meals, children's meals, invalid cookery, cleaning of utensils, kitchen and dining rooms, laying table, cleaning, scrubbing, handling linen.

In the oral lessons the following are taken:—Arrangement of household, household arithmetic, cost of food, clothing, furniture, decoration, etc.; year's scheme of expenditure, including service, social expenses, entertaining and amusements, saving, management of income, simple book-keeping, correspondence, etc.

*Domestic Science* occupies 5 hours a week for 2 years, of which 3 or 4 are devoted to practical work. The equipment is not elaborate, but the work is thorough and seems well calculated to meet the ends for which the course is planned. There are two sections in the class, those who intend to become teachers, and those who merely desire to prepare for home duties, and the instruction is varied accordingly.

*Domestic Book-keeping* receives 1 hour a week for 2 years. The pupils make sample estimates of percentage of expenditure on different requirements according to income, and although the system is somewhat too elaborate to be carried out by a busy housewife, it teaches the girls the relative cost of different items, and the general cost of living. Sample household budgets for 2 incomes, one of 1,200 marks and the other of 3,600 marks, are as follows:—

Item.	Income of 1,200 M.	Income of 3,600 M.
	%	%
Rent.....	20	18
Clothes.....	12	10
Food.....	44	42
Heat and Light.....	5	4
Physical Improvement.....	4	4
Intellectual Improvement.....	4	4
Insurance and Taxes.....	4	5
Wages.....		5
Repairs and Replacements.....	4	3
Minor Expenses.....	1	2
Reserve Fund.....	1	2
Savings.....	1	1

There is also a 2 years' course of 4 hours weekly in Hygiene for personal, home and child management, with practice in children's homes, cooking for children, supervision of work and play, encouraging children in domestic activities, first as visitors, then as helpers, and finally independently. There is also a brief nursing and first aid course. Lessons in theory occupy not above 2 hours weekly.

There are also courses in needlework for home use, including the cutting and making of home decorations, sewing, crocheting, knitting, embroidery, darning, mending, machine sewing. There are advanced courses, including dressmaking, millinery and fancy work.

## SECTION 2 : VOCATIONAL SCHOOLS FOR GIRLS.

### INTRODUCTORY.

Most of the Elementary Schools in the towns of Germany provide instruction in home-making and women's trades in the latter years of the course. These courses are not always popular with the elementary teachers, but this opposition

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is diminishing. Many good schoolmen, however, insist that this is not enough and that the elementary school cannot solve this particular problem, which is not a problem of educating children, but of educating adolescents. Dr. Otto Lyon, Director of the schools of Dresden, urges the importance of a Continuation School for girls which shall be neither a continuation of nor a supplement to the Elementary School instruction, but rather an independent institution with its own peculiar character.

Continuation Schools for girls are not very numerous in Germany, but there is a decided tendency to increase them in number and efficiency. Great organizations of women throughout the Empire are agitating for industrial schools of all sorts and are supporting many by their own contributions.

According to the Prussian vocation statistics of 1895, of the 1,259,000 girls between the ages of 14 and 17, there were 661,000 or 51.9 per cent actually engaged in earning a livelihood. Of these, 218,000 or 17.2 per cent were engaged in domestic service, and 443,000 or 34.7 per cent in the industries. In 1901, there were in the 603 Prussian public and private schools for girls, including 339 commercial, trade, industrial, cooking and household arts schools and 204 sewing, embroidery and weaving schools, altogether only 24,313 pupils, leaving in Prussia 638,687 girls without any Continuation School instruction. These figures prove that only about 3 per cent of the girls now receive vocational instruction in the schools.

In the report of an Industrial School for girls in one of Germany's most famous cities, the following appears:—

"Different but equal opportunities must be provided for the two sexes. 'The various vocations open to women must be taught in the schools, with 'the constant thought that each woman is a member of a family and will be 'the centre of a new family. In vocational education it must be remembered 'that the boy is to be a citizen as well as a workman. In the education of 'girls it must be remembered that they are centres of family life as well as 'workers in industries."

The inference is that the boy must be taught civics and the girl housekeeping.

### (1) DOMESTIC SCIENCE SCHOOLS.

Apart from the schools for industries are the Domestic Schools, which originally were intended for the lower classes who had to earn their living on leaving school at 14. These also grew up during the latter part of the 19th century, when the aforementioned Central Prussian Society called attention to the necessity for Continuation (Welfare) Schools for girls of working class families, because often homes and marriages were wrecked by reason of the girls, early independent, spending their earnings on amusements and luxuries and not having the necessary skill in sewing, mending and patching, dress-making, cooking, or any training in economy, domesticity, and management. Such schools increased rapidly with the larger numbers of women workers in hand and factory work, during the last 25 years, especially those established by welfare societies and by large manufacturers for their female workers.

## WIDE FORWARD MOVEMENT.

Latterly the need was felt for the same kind of training for daughters of the well-to-do classes. It was more widely recognized that the training acquired at home alone was often insufficient for the management and care of a household, as the majority of mothers have neither the inclination, time nor ability to train their daughters adequately for present requirements. Hence in addition to industrial schools, cookery and housewifery schools have grown up. Latterly some of them have been combined with industrial and commercial courses. Commercial and Industrial Continuation Schools had been established for the benefit of girls of the lower classes; and recently there has been a marked tendency, due to social and political considerations, not to separate the classes but to provide institutions which all can attend equally. All who are qualified to express an opinion on the subject agree that the industrial and domestic training of all girls, of whatever station, should be assured by suitable provision being made. This has become so expensive of late that it can no longer be undertaken adequately by private bodies or individuals. Consequently Women's Societies, the State, Province, District, Communities and Trade and Commerce Guilds have helped more extensively every year.

## ELEMENTARY AND ADVANCED.

Young women who wish to become familiar with the duties of housewives must enter the Department of Domestic Science. Here they are taught according to a fixed plan, cooking, washing, ironing, various work required in a household, and the supplementary arts of economy, including the keeping of books for household expenses; also, simple handiwork, such as sewing, patching, darning, mending and machine sewing; lastly they are taught hygiene, nursing of children and invalids. After the completion of this course the student may acquire more thorough improvement in the main branches in separately arranged post-graduate courses. To these special courses, other students, not having had the benefit of the general course outlined above, are not admitted unless they can prove to the satisfaction of the authorities that they possess the knowledge and skill required to pursue the advanced special courses. Thus, for instance, no student is admitted to the course in making underclothes if she lacks the accomplishment of plain sewing, and no one is admitted to the course of tailoring who lacks skill in machine sewing. Almost all middle and advanced institutions for girls' vocational education have adapted themselves to this organization. The practical results have contributed much to the gratifying development of these institutions.

## (2) SCHOOLS FOR INDUSTRIAL AND DOMESTIC TRAINING.

But little provision was made in Prussia for training girls or women in industrial or domestic subjects until about 1860 or 1870. Formerly only the daughters of the working classes had to earn a living, and they went into



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service, factories, shops, or skilled trades, such as dressmaking. The establishment and extension of these Vocational Schools resulted from the more and more keenly felt need or desire of the middle and upper classes for economic independence for their daughters. The large numbers of unmarried girls of the middle classes for whom there was no provision at home, and who could only go out as governesses or companions, at low pay, called for keen sympathy not only among the class concerned, but all thinking people. This led to the establishment of private Commercial Schools in various cities. It was not, however, till the "Central Prussian Society for the Welfare of the Working Classes" took the matter up that anything systematic was done. Dr. Adolf Lette, the President of the Society, had published a pamphlet on this subject in 1865. The result was a Society bearing his name, which still does good work for the higher education of women in earning occupations, by a variety of methods.

#### OBJECTS OF THE "LETTE-VEREIN."

This Association set before itself the following objects:

1. The removal of obstacles and prejudices in the way of employment of women.
2. The fostering of industrial institutions for the commercial and industrial education of women.
3. The furnishing of information regarding opportunities for learning trades and securing situations and help, in so far as existing institutions were inadequate.
4. The establishment of women's exchanges for the exhibition and sale of women's handwork and other artistic products.
5. The protection of working women from danger, moral and otherwise, especially by giving them information regarding suitable lodging houses and by organizing credit societies to enable them to secure sewing machines.

The institution of the "Lette-Verein" is a large one, with over 3,000 students. It includes a Commercial School for Girls, with a 2 years' course, and a so-called "Industrial School," with courses in handicrafts, machine sewing, tailoring, history of costumes, dressmaking, millinery, hairdressing, embroidery (both hand and machine), industrial design and composition, washing and ironing, lacemaking, cooking, diet for the sick, sewing, preserving of fruits and vegetables, ordinary housework, and simple book-keeping. There are also divisions for kindergarten work, training teachers for industrial schools, training servants for houses, tailoring, bookbinding and photography. An Employment Bureau is maintained to assist women in securing positions.

#### EXTENT OF PROBLEMS AND SCHOOLS.

Other similar societies followed, and the "General German Women's Society" founded industrial schools, hostels, and finally higher schools for girls. The work was then generally imitated and numerous private schools were started, many of which, however, had neither the equipment nor facilities to fulfil their objects.

Many cities have taken up the work of women's education, and great progress has been made in the commercial, industrial and art training of girls under the direction of the public authorities.

In Prussia there were in 1901, 603 public and private institutions for girls, industrial, commercial or domestic, having 24,313 pupils. Bavaria had 39 women's work schools with 3,462 pupils, and 5 seminaries for the teachers of the same, with 73 pupils. Saxony had 14 industrial schools, 30 bobbin schools and 3 straw-plaiting schools, attended by 1,800 pupils. Wurttemberg had 16 female continuation schools and 26 women's work schools, with 5,422 pupils. Baden had 36 women's work schools. The other States nearly all had one or more.

There seems to be a necessity for looking deeper and going further. There are 866,414 more women than men in Germany. Early marriages must be given up, as the modern home offers less opportunity for work or occupation than formerly. Better education leads the girl to other aims, and makes her less willing to be a household drudge than hitherto. The German vocation census of 1907 shows a great growth in women's work in the industries. The number of women who are in the industries has doubled in 25 years. In 1882 it was 4,200,000; in 1907, 8,200,000. Almost one-half of the grown-up women of the country are at work in the industries.

### SECTION 3 : TRAINING OF TEACHERS FOR VOCATIONAL COURSES.

#### IMPROVEMENTS IN COURSES OF STUDY.

Until recently the courses of instruction in the industrial schools for girls in Prussia were not laid out according to plan, but were fitted to the various purposes of the pupils. Nor was a distinct aim prescribed; consequently neither in regard to the branches of study nor to the hours of study per week, nor to the duration of the course, were any definite rules in force. Gradually some of the schools, supported and directed by efficient societies, abandoned this free-and-easy mode of procedure and adopted a more pedagogic organization and management. The results accomplished in such schools led to the adoption of regular courses of study in three State institutions, to wit, in Posen, Rheydt and Potsdam, to which lately has been added the school at Thorn. The entire matter of instruction was divided into separate and ascending courses, and the length of each fitted to the difficulties of the separate branches. If a student wished to be admitted to the middle or higher grades, it was necessary for her to prove that she was in possession of sufficient knowledge and skill of the matters taught in the lower grades. This provision secured a more uniform preparation of the classes and the accomplishment of more uniform results of the prescribed courses.

In Prussia the difficulty of giving the various classes of vocational teachers pedagogic training has been only partly overcome. The training of the younger

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class of teachers for Girls' Industrial Schools has progressed according to strict rules, but the steadily increasing importance of the system of Girls' Industrial Schools resulted in an order being issued by the Government in 1907, stipulating that a normal department should be established in connection with all Schools of Domestic Science and Art, and subsidized by the State; also regulating the courses of such departments.

## THREE STATE INSTITUTIONS.

The three State institutions at Posen, Rheydt and Potsdam all undertake the training of teachers for women's vocational work. Each of these schools has four divisions: A school of household arts, an industrial school, a commercial school, and a seminary for training teachers. Every student is urged to take the course in household arts, which includes an outline of all that a good housekeeper should know. The students receive instruction in cleaning and other household tasks, cooking, baking, sewing, mending, science of nourishment, care of children and of the sick. Special optional classes are given, such as courses for continuation school work and simple handiwork, dressmaking, sewing, millinery, drawing and painting, cooking, baking, washing and ironing. It is proposed to add also a training course in kindergarten work.

## THREE GROUPS OF TEACHERS.

There are three groups of teachers for vocational work for women in Prussia: (1) teachers of women's handiwork; (2) teachers of household arts; (3) vocational teachers for the industries. Careful provision is made for training teachers of each of these classes. Teachers of the first group are specially prepared for the work of teaching children in the Elementary, Middle and Higher Schools to do some handiwork, such as knitting, crocheting, sewing and embroidery. Teachers of the second group are trained to give instruction in school kitchens of the Elementary Schools where cooking and ordinary housework are taught. Teachers of the third class are prepared to teach older girls in the special Continuation Schools the finer handiwork required in tailoring, dressmaking, and millinery. It has been usual, but not universal, for the vocational teacher of the industry to qualify first as a teacher of women's handiwork and household arts, and then build upon this for the higher position of a teacher of an industry.

Finally, the training in methods of instruction can be successfully pursued only when a candidate is both trained in theory and has had experience in the industry itself. To sum up, the entire training consists of three stages: Theoretical instruction in the Training School, practical experience in the industry, and probationary teaching.

The Government permits the experience in the industry to be gained there before or after attendance at the training school. On the contrary, the probationary year must follow the instruction in the school, and in no case can the probationary year be used for ordinary teaching; it must be reserved for the vocational training of the young teacher. For this reason only a small number of probationary students are sent to any one school.

Several different kinds of certificates are given to teachers, depending upon the specialty they select. As has been stated, an industrial teacher is qualified to teach a class in handwork or in household arts. A teacher of millinery must be able to give instruction in other vocational subjects. In order to accustom themselves to the various types and sizes of schools, every teacher must be able to handle more than one vocational subject.

(1) ROYAL SCHOOL OF COMMERCE AND INDUSTRY FOR GIRLS,  
POTSDAM.

This School, which is one of the three State institutions already referred to, offers two courses in Domestic Science, one being for simple housekeeping, extending over 1 year, and the other for professional housekeepers, the courses covering from 6 months to 2 years, according to the subjects elected.

In the 1-year course, which aims at preparing girls for ordinary household management, the subjects are:—Housekeeping and Instruction in Housework; Washing and Ironing; Plain Needlework; Mending, Plain white Embroidery; Machine Sewing; Cookery and Food Values, including Invalid Cookery, Baking and Preserving; Hygiene, Care of Children and Invalids, Arithmetic, Household Book-keeping, German, Drawing, Singing, Physical Training.

Pupils desiring to proceed further, on completion of this course, may take any subjects in the following (Professional) course.

The Professional Housekeepers' Course consists of Housekeeping and Housework, Washing and Ironing (plain and fancy), Cooking and Baking, Plain Needlework, Machine Sewing and Whitewear, Dressmaking, Millinery, Fancy Needlework and Drawing, Drawing and Painting.

Pupils are not obliged to take more than 6 months of any one course, even if the course covers longer; but they are recommended to take the complete course, in order to attain to practical industrial efficiency.

Pupils taking Needlework, Dressmaking and Millinery have to take 2 hours weekly of Drawing.

The fee for the Plain Housekeeping Course (30 lessons weekly for 1 year) is 75 marks; for the Professional Courses it varies according to the subject, ranging from 15 marks per six months course to 75 marks.

There is a boarding house in connection with the school for girls coming from a distance. Rates 1200 marks for Germans, 1500 marks for foreigners.

Teachers are trained in the Seminary Department of this School for teaching Domestic Science in Elementary and Middle Schools, and Needlework in Elementary, Middle and Higher Girls' Schools. Candidates must be 18 years of age, and have the usual certificates.

*Domestic Science Teachers for Elementary Schools.* These students are preparing to teach Domestic Science subjects in the upper classes of the Elementary Schools, viz.: plain cookery, and ordinary housework as required in a working-class home. The subjects taken comprise Cookery, Housework, including Washing and Ironing, Needlework, Elementary Science as applied to foodstuffs,

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Housekeeping, Arithmetic, Pedagogy, Teaching Practice and Method, Hygiene, German and Civics, Arithmetic, Drawing, with 4 hours a week Physical Training and Singing.

*Teachers of Needlework.* The aim of this course is to qualify teachers of ordinary household needlework, together with simple dressmaking and mending, for elementary, middle and higher grade schools. The subjects taken include Needlework, Machine Sewing, Cutting out and making Simple Garments; Materials; Drawing, Pedagogy, Practice and Method; Hygiene, German and Civics; Arithmetic; with 4 hours a week Singing and Physical Training.

*Teachers for Continuation, Housewifery and Industrial Schools.* Courses are held in Cookery and Housewifery, Plain and Fancy Needlework and Machine Sewing; Dressmaking, Millinery, Fancy Work. These courses extend over 1 year, of 40 hours weekly.

## (2) WOMEN'S WORK SCHOOL AND WORK TEACHERS' SEMINARY: MUNICH.

This is a Middle School founded by a Popular Education Society. It gives theoretical and practical instruction in women's work for home and industries. It was opened in 1873, and was one of the pioneers on which other schools have been modelled.

It is controlled by a Committee of 15, appointed partly by the Government, partly by the City, and partly by the Popular Education Society.

The subjects taught comprise all kinds of Needlework, Tapestry, Lace, Dressmaking, Fitting, Fine Laundering and Ironing, Millinery, Freehand and Geometrical Drawing, Physical Training, Games, Singing, Book-keeping and Shorthand.

There are whole-day and half-day courses. In the Continuation Classes the studies comprise Religion, Housewifery, Hygiene, German, Arithmetic, Household and Business Book-keeping, and optional French.

The entrance requirement is 7 years' completed attendance at a public day school. Fees are charged, one morning class costing 45 marks half-yearly; one afternoon class 40 marks half-yearly.

There is a special department devoted to training *Teachers of Design*. All pupils make original designs, which are drawn and then criticised as to workableness, material, arrangement of threads, etc. This applies especially to embroidery. Most of the pupils are doing work for their homes or for their own satisfaction. Graduates of the school are eagerly sought for by employers, but only about 3 in every 20 required can be supplied. This school trains women for their homes, with refined tastes and standards in art and needlework, and is doing more in the way of training leaders of society than teachers for schools.

### HOUSEWIFERY LESSONS IN ELEMENTARY SCHOOLS.

The first housewifery lessons are given in the eighth class of the Elementary Schools. The study plan for one of these schools sets forth that the main objects

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to be kept in view are general education and development of intelligence and economy, the latter especially in cookery and housewifery classes. Instruction is given in the school kitchen. Very full information is given under 35 headings on foods and cookery, with minute details, and similar information is given in regard to dress and the home. Extended detailed information of a similar character is given regarding each of the main subjects dealt with in the schools.

### (3) CONTINUATION CLASSES FOR GIRLS AND WOMEN: MUNICH.

There are compulsory Continuation Schools for girls of 14 to 17 years of age, where instruction is given in housewifery; also optional Continuation Schools which give housewifery and commercial and industrial training.

The aim of these classes is to train girls for ordinary middle-class house-keeping. A year's theoretical and practical course dealing with samples, preparations, experiments and pictures, simple experiments in chemistry, use of various cookers, is given, lessons being held once a week. A fee of 6 marks half yearly is charged. The ground covered deals with foodstuffs, their sources, qualities, and preparation, health and nutrition, and first aid. Practical instruction is given in the use and care of the house and its equipment.

#### OPTIONAL OR VOLUNTARY GIRLS' CONTINUATION SCHOOL.

In the dressmaking class, the girls make models in small size before making the actual article for use. Instruction is given in art as applied to dress. Geometry is included in drawing from measurements of the person, and the drawings are to prepare for cutting blouses and skirts. The measurements are taken, drawings made from these, and materials cut from the drawings.

Many samples of materials and fabrics are kept at hand, in order to give the girls a knowledge of qualities and prices.

The courses cover 6 months each. The girls are drilled in analyzing the proportions of income to be devoted to the various items of expenditure, such as rent, fuel, food, clothing, amusements, etc. At one school visited the unit used was 120 marks (\$30) per month. The teacher examined the girls, answers being given orally. It was observed that the girls spoke clearly and enunciated with more force and precision than is common in Canadian schools. They looked healthy, interested and animated at their class work.

This school occupied a building used also for a Primary School and and in the afternoons for gymnastics and singing. This voluntary Girls' Continuation School has the use of all the equipment in the afternoons and evenings. The attendance is about 700 in winter, and 630 in summer.

Scholarships are available to girls whose parents are in poor circumstances—about 10 per cent of the total number of pupils occupying these free places.

There was evidence that the dignity and importance of the position of the teachers were recognized. That was the impression received from the personality and general manner of teachers and pupils.

## SECTION 4: WOMEN'S SOCIETIES WHICH PROVIDE CLASSES.

There is in Germany, as elsewhere, a rural uplift movement at the present time, supported largely by women's clubs. Through the instrumentality of these associations itinerant or peripatetic Housekeeping Schools have been maintained for the service of rural communities with occasional aid from public funds.

### SWABIAN WOMEN'S SOCIETY.

The *Swabian Women's Society*, which has been in existence for forty years, has for its object the training of young women and the improvement of their social and economic position by making them independent; the opening out of new fields for them, thereby securing for woman her proper place. The need for such work is more pressing than ever before.

At Stuttgart there are two Women's Schools under the auspices of the Swabian Women's Society, viz., a Women's Work School, established about 40 years ago, and a Cooking School. The former was taken over after 5 years by the City, which administers it under State aid, President von Mosthof being the Director. The Cooking School is solely under the Women's Society, receiving no outside support. It makes a small profit out of sales and fees.

The Women's Work School trains for the home, for teaching, business management, industry and industrial art occupations. The instruction is adapted to the requirements of the pupils, the aim being to turn out competent and reliable workers. New courses are introduced as needed, such as a course in merchandise, relating to the origin and preparation of materials, especially textiles; an advanced freehand drawing course for middle-school teachers, where embroidery designs are originated; and a mending and sewing class for girls over 14, which is greatly appreciated, girls coming long distances to attend it. The Industrial Art section does well, and the directress and teachers visited the Brussels Exhibition, making notes of what they saw.

A kindergarten and teachers' training school are attached, where teachers can study the physical care of children.

Other departments of the Society's work include itinerant cooking schools, (including care of children), with course in landscape gardening and nature study, as well as courses in singing, dancing, millinery and common law.

The *Commercial School* offers a 1 year's general and special course, including thorough training in commercial subjects.

An *Employment Bureau*, in connection with the Society's work, checks the output of incompetent help, while finding positions for those who are qualified.

Social evenings are held by the students of the various institutions.

There is a library for the Domestic Science students.

A fund has been raised by voluntary subscription to enable poor students to attend the schools free of charge.

## COURSES IN THE WOMEN'S WORK SCHOOL.

1. Sewing and pattern designing, mending, etc.
2. Machine sewing and pattern drawing—more elaborate linen.
3. Dressmaking and pattern drawing—more elaborate dresses, etc.
4. Embroidery, designing and pattern drawing—industrial, artistic.
5. Seminary for needlework and drawing teachers.
6. Dancing and deportment.

Instruction in geometrical and freehand drawing compulsory in all courses except 6.

## IN THE COOKING SCHOOL.

The Cooking School gives thorough training in all branches of cooking, both for home and teaching purposes, beginning with plain, simple meals, and going on to high-class cooking—cakes, tarts, fancy cakes, decorating dishes, preserving fruit and vegetables, together with instruction on nutritive values of foods, effects of cooking on same, the purchase and storing of raw materials. A course on dishing-up, laying table and waiting is given with the cookery course. In order to arouse a feeling of responsibility and make the pupils independent, the various dishes are prepared by the pupils in pairs, and recipes given for a small party only. Dinners can be had at the school at small cost, and orders are taken for hot and cold dishes. The dining-room is available for receptions, etc.

The course lasts three months. There are 32 pupils in a course, in two sections; 5 lessons weekly are given. Fees are 100 marks for the course, plus 3 marks for service.

## PREPARE TEACHERS AND HOUSEKEEPERS.

The Women's Work School and the Cooking School prepare Volksschule teachers of sewing and handiwork, manageresses of business, and a small proportion who enter dressmaking shops. Girls from these schools get good places in domestic service as housekeepers, etc., but most stay in their own homes, being daughters of merchants, manufacturers, etc.

Teachers must have a certificate from the school, or an equivalent, plus at least 6 months in an industrial establishment. The teachers in this school, and those prepared in it, get the following salaries:—begin at 1,168 marks per year during probationary period, increasing, after 3 years, to 1,340 marks, and then to 1,640 marks, and when permanently appointed, 2,220 marks per annum. The usual pension system applies without any deduction from the teacher's salary.

In the Women's Work School the classes are small—14 to 16 in each.

A great deal of attention is paid to drawing, especially in relation to drafting patterns and embroidery work. In embroidery design, they first made a charcoal or crayon drawing of a natural object, then a water-colour adaptation, which could be accomplished with the materials to be used in the embroidery.



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## AT FRANKFURT.

A series of educational institutions are conducted by the Women's Society for the benefit of the women and girls of the district. Their object is to impart theoretical and practical instruction in all matters relating to housewifery, to girls and young women over 18 years of age. The various departments of the work are as follows:—

- A. A Continuation School.
- B. Special Industrial Art Classes.
- C. Various Normal Classes.
- D. Homes for Girls.
- E. A Kindergarten.

In A, girls are taught German, English, French, Drawing, Dressmaking, Millinery, Art Embroidery, Machine and Hand Sewing, Cooking, Ironing, etc.

In B, girls receive instruction for 3 years of 24 hours a week in the following subjects:—Freehand Drawing, Perspective Drawing, Designing, Modeling, Wood and Linoleum Carving, Drawing from Life, Plastic Anatomy, etc.

In C, teachers are trained for the Kindergarten only, as children's nurses, etc., teachers of female handiwork, cooking and housewifery, as well as gymnastics.

D. These Homes are intended for girls taking a whole year's instruction in the Continuation Classes. Board and lodging ranges from 900 to 1,200 marks per year. The attendance is:—Kindergarten, 104; Seminary, 30; Housewifery, 20; other classes, 200.

There is sharp supervision from Berlin, especially in regard to the qualifications of teachers.

The School in Housewifery was in a nice neighbourhood and the building well adapted for the work, although it had originally been meant for another purpose. The girls live in the school and do all the work of the house. Fees are 30 marks per month.

The Cooking School gives thorough theoretical and practical instruction in plain and high-class Cookery by qualified teachers. Previous to practical work, a lesson is given in which recipes are discussed and taken down, buying of materials is explained and correct measurements shown. The pupils, two together, prepare all dishes, learn carving, decorating of dishes, baking and preserving, special stress being laid upon cleanliness, care and economy. The course covers three months, the fee being 70 marks for each cooking course, 15 marks for the preserving course. Classes for Invalid Cookery are arranged if sufficient numbers apply. Waitresses' course of 1 year costs 250 marks. There is a special course in House-work, Cleaning, etc.

## CHAPTER LIII: AGRICULTURAL INSTRUCTION.

### GENERAL CLASSIFICATION.

The provisions for special instruction in Agriculture, Horticulture and industries belonging to them, may be roughly classified as,—Elementary, Secondary and Advanced.

*Elementary:* In addition to the instruction given at Rural Continuation Classes there are, (1) Farming Schools; (2) Agricultural Winter Schools; (3) Special Courses of Lectures.

*Secondary Agricultural Schools.*

*Advanced:* (1) Agricultural High Schools corresponding to the Technical High Schools; (2) Agricultural Institutes or Departments at Universities; (3) Other Higher Agricultural Institutes; (4) Lecture Courses for owners, managers and farmers of large estates.

The foregoing classification represents only in a general way the character of the schools.

In addition to the general agricultural schools, there are others for special branches. Such are the Schools for Meadow Cultivation, Dairying, Bee-keeping, Farriers, etc. These special schools are partly independent institutions, in some cases connected with a general agricultural school. In Prussia they are attended by about 10,000 pupils. They are maintained by grants from the State, from provincial, district and communal funds, from societies, endowments, etc. No uniform policy or plan as to the proportion of contribution from these sources appears to be followed. For example in the case of five Schools for Meadow Cultivation the State contributes about one-fifth of the cost of maintenance, for 64 for Dairying about one half, for 2 for Beekeeping about two-thirds and for 3 Pomological Institutions and Schools for Gardeners the State pays practically the whole cost.

### LESSONS FOR CANADA.

Since it is not considered that details of the organization of the courses in Agricultural Schools would be useful in Canada, only an outline is presented. The features of importance are the general adhesion of the rural population to the belief that education is advantageous to agriculture, and the working out of their salvation by making that belief vital in the affairs of the locality.

As a rule, except in Saxony, the farmers live in villages and not on isolated farmsteadings as in Canada, and almost every village has its Agricultural Club or Association in touch with a Provincial Chamber of Agriculture.

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There is a lesson in those matters for Canada. The policy of village settlements rather than isolated homesteads is well worth considering, and recommending for the unsettled districts; and even where surveys have been made, and settlement effected, the question need not be looked upon as finally settled. Contented women, good chances for the education of the children, and a reasonably richly developed social life are in the long run of immensely more consequence than conveniences for growing crops. The place of the latter is to minister to the former. What shall it profit a country to be called, or to be, the Granary of the Empire if it loses the soul of happy rural life?

The particular lessons for Canada, from the advanced agricultural instruction for the training of teachers, are discussed in Chapter IX of Part II on Education for Rural Communities.

## SECTION 1 : ELEMENTARY INSTRUCTION.

### CONTINUATION SCHOOLS.

The Agricultural Continuation Schools are intended chiefly to strengthen and extend the elementary education of the rural population, but in some of them technical agricultural instruction is given. They are conducted usually in winter during two or three evenings of each week and on Sunday afternoons. In Prussia there are over 1,500 of these Rural Continuation Schools. In some of the other States there are larger numbers in proportion to the population.

In Saxony the Continuation School, in the country districts, is for one hundred hours per year. The classes are held in the evening in the Winter time. The instruction is of a general nature in German, arithmetic, etc., with as much application to the industry of agriculture as the teacher can impart. Two teachers who were seen said the boys were very keen to get the education offered in the Continuation Classes. Although the attendance in Saxony was compulsory they never had a case where a boy had had to be compelled to attend. In one of these cases the school was in a village of about 950 population. The salary of the teacher was paid, as is usual, by both parish and State. These payments are equal in amount up to a point where each gives 1,500 marks per year. From that point the parish may give more salary, and often does, but the State does not give more than 1,500 marks. This refers to the ordinary Elementary School work. The school-master had a wholesome pride in his school-house and in the work he was doing in educating the young people of the community.

### FARMING SCHOOLS.

In the Farming Schools, in addition to the theoretical instruction, the pupils are largely occupied with practical farm work. In the Winter and Lower Agricultural Schools only theoretical instruction is given. The Farming Schools are intended for the directly practical training of farmers. The pupils are of the age of 15 to 20 and are mostly the sons of farm owners or tenants.

The schools are established partly by individual farmers, partly by agricultural societies, and partly by endowments. All are under State control and nearly all of them receive grants from the State or from public corporations. They are situated in connection with a small or middle sized estate or farm. The head of the estate or farm, whether owner, tenant or manager, is at the same time Director of the School. The pupils are full boarders, and, in return for this and the teaching, they have to pay boarding and school fees. Some of the Farming Schools admit pupils without payment or with half payment. The instruction is both practical and theoretical, the former chiefly in Summer and the latter in Winter. The practical teaching extends to all kinds of agricultural labor, which every pupil must learn to perform by continued personal application. Theoretical teaching is given in the elementary subjects in Rural Economy, in Nature Science, in Horticulture and Fruit-growing and in Veterinary Science, frequently also in portions of National Economy and Agricultural Law. The complete course lasts two years. Admission is conditional on previous elementary education and a knowledge of simple agricultural practice.

Practically all the German States provide schools or instruction through special courses with reference to the particular needs of each State and district. An illustration is presented of the organization and the aims of the Farming Schools and Lower Agricultural Winter Schools existing in Württemberg. In considering them it should be remembered that the Kingdom of Wurttemberg contains about 3.9 per cent of the total German population and about 3.6 per cent of the total area of the German Empire.

\*The Württemberg Agricultural Winter Schools, of which there are eight, are only open, as their names imply, during the winter months, the course of instruction commencing in November and terminating about the end of March. They are intended for peasants' sons who have left school and wish to become farm workmen or for small farmers, and the various courses are carefully framed with a view to consolidating and extending the education acquired at school, and to instructing them so far in agricultural work as to enable them to understand the principal agricultural processes on small peasant farms.

Intending pupils must have attained their fifteenth year, and show a satisfactory degree of educational ability.

Two courses are held annually, and it is desirable that both should be attended; should this, however, not be feasible, the first course is so arranged as to give a certain amount of complete agricultural elementary instruction. The fees are moderate, amounting to about £1 5s. per course, for which instruction is given in the following subjects: German language; Caligraphy; Arithmetic; Geometry and Surveying; Drawing; Physics; Elementary Veterinary Surgery; Agriculture; Breeding of Domestic Animals; Farm Management and Bookkeeping. The schools are under the supervision of the Ministry of Education and Royal Bureau of Trade and Commerce; the expenditure is borne principally by the State, but the communities in which the schools exist are required to stock them with furniture and to light and heat the schoolrooms.

\* \* \* \* \*

In concluding this brief account of the Wurttemberg Agricultural Schools, the work done by travelling lecturers and experts must be taken into consideration. At the instigation of the Royal Bureau of Trade and Commerce courses of lectures were held in various places on the following subjects: Cultivation of fruit, vines and tobacco; breeding of domestic animals, poultry and fish; field, meadow and garden products; drainage and artificial manures.

\*NOTE—For the extracts which appear in small type the Commission is indebted to a report by Dr. Frederick Rose, British Consul at Stuttgart, and published as number 594 of Diplomatic and Consular Reports (1903). The Commission was indebted to other reports by Dr. Rose which proved very helpful in planning and carrying out investigations in Germany.

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These travelling lecturers are of course not only to be found in Wurttemberg but in the whole of Germany. In many cases they are the masters of lower agricultural winter schools, who are employed in this manner during the summer months, in other cases they are appointed by agricultural associations for certain fixed branches of agricultural knowledge. It is their duty to disseminate useful agricultural knowledge in all directions, even in the most inaccessible quarters, to induce the peasants and small farmers to make agricultural experiments on a small scale, and to assist them in doing so in every manner. Some of the travelling lecturers are delegates or officials of the Chambers of Agriculture or of the larger agricultural societies, from which quarters their remuneration is drawn.

## SECTION 2: SECONDARY INSTRUCTION.

Secondary agricultural instruction in Germany is given in the agricultural schools, of which Prussia possesses the largest number. The organization of the Prussian schools was determined by the law of 1875, and has been followed to a more or less greater extent by the agricultural schools of the other German States. The course of instruction is arranged for a period of six years, and the leaving certificate entitles the holder to the one year military service; in all respects these agricultural schools rank with public State schools, with the same number of classes and duration of instruction. They are principally intended for the sons of farmers, managers and owners of estates who wish to acquire at the same time the qualification for the one year military service and a knowledge of practical agriculture. The schools are managed by a "curatorium," and are under the supervision of the Ministers for Agriculture and for Education. They are not State but semi-private schools, which receive pecuniary support from the State and various public and private sources, and the masters occupy exactly the same position as those at the public State schools with six classes. The agricultural instruction is given in the upper classes according to a certain normal plan, whilst the instruction in the lower classes is similar to that of the corresponding classes of the "real" schools.

To the subjects of the Realschule is added as a special subject Rural Economy, to which from four to six hours weekly are devoted. Natural Science occupies a comparatively important position—from eight to ten hours weekly. This restricts the teaching in other subjects in the Realschule such as German, foreign languages, history, geography, and mathematics.

Among the ordinary teachers there is at least one who has passed the State examination for teachers of Agriculture in Agricultural Schools and who is consequently in possession of the leaving certificate of a Gymnasium, Realgymnasium or higher Realschule. These schools frequently have the use of experimental fields and fruit and vegetable gardens; moreover excursions are made to neighbouring estates and to agricultural exhibitions. These Agricultural Schools in Prussia are attended by about 2,000 pupils.

### A SCHOOL AT WURZEN.

A visit was paid to one of these Agricultural Schools at Wurzen, in the Kingdom of Saxony. Wurzen is a manufacturing town of about 20,000 population, in the midst of an agricultural district. The District Agricultural School is one of twelve such schools in the Kingdom of Saxony. This one is reputed to be of the highest standard because it gives a full two years' course of instruction, Winter and Summer. At the other schools the regular course consists of two terms of six months each in Winter. The town of Wurzen provided the School Building and Experimental field. The school is under the control of an Agricultural Association. The town and State both give grants towards its support. Out of the fifty students who finished the year's course at the time of the visit, forty were going directly back to the farms and the other ten were going into places as managers or country bailiffs.

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## NUMBER OF SCHOOLS.

Exact statistics of the Farming Schools, Winter Schools, Lower and Secondary Agricultural Schools and Special Schools for the whole of Germany were not found. However there are, altogether, over 500 which provide secondary agricultural education as already indicated. A careful English authority, the late Mr. T. G. Rooper, one of H. M. Inspectors of Schools, who aided Canada very materially in the starting of the School Gardens under the Macdonald Rural Schools Fund, reported in 1901, that "In Prussia, as in other States, local Agricultural Societies exist in many villages by whose means instruction in agriculture and horticulture is provided and maintained in some 1,620 schools of various descriptions."

## SECTION 3: INSTRUCTION OF COLLEGE GRADE.

The principal objects aimed at by the Agricultural High Schools and institutes are as follows:

(1) The instruction of future owners, tenants, farmers, or managers of large or small estates in all branches of theoretical and practical agricultural science; (2) the theoretical and practical instruction of future professors, lecturers and teachers of agricultural subjects; (3) theoretical and practical instruction in surveying and agricultural civil engineering; (4) the training of future officials of the land administrative departments; (5) scientific research for the furtherance of agricultural progress and knowledge.

For the study of agricultural-technical science in Germany, from four to six terms of one-half year each are generally considered necessary. Students who only study a few terms receive certificates showing that they have passed the simple examinations held at the conclusion of each term, and students who have passed through the full course of three years' instruction may enter for the examination for the diploma of agricultural-technical science. A further and more difficult examination is considered necessary for those who wish to qualify for positions on the staff of agricultural schools.

As a rule the standard of preliminary educational qualification exacted from students of agriculture is lower than that for students at technical and veterinary high schools and at mining and forestry academies. This may be explained by the fact that students from rural districts have either not had the time or opportunity of acquiring a high standard of preliminary education. It is feared that if a higher standard of preliminary education were exacted, students would remain longer at school and thus shorten the valuable period of practical agricultural work which is necessary before commencing to study.

For the majority of students the educational qualifications necessary for the one year military service are considered to be the lowest necessary minimum.

In several Universities (Breslau, Gottingen, Halle, Königsberg, Leipzig, Jena, Giessen) there are Agricultural Institutes, the aims of which are the same as those of the Agricultural High Schools. In the Technical High School of Munich there is a special Department for Agriculture.

## AGRICULTURAL HIGH SCHOOL AT BERLIN.

The Berlin Agricultural High School was founded in 1860 as an agricultural institute, and was raised in 1881 to the rank of an Agricultural High School. As regards scope of instruction, number of professorial staff and students, it is the largest and most important in Germany.

The facilities afforded provide for scientific and practical instruction and investigation in agriculture, geodetics and agricultural civil engineering, as well as in all industries intimately connected with agriculture and their allied branches of scientific instruction.

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It is under the direct supervision of the Minister of Agriculture, State Domains and Forests and is managed by a rector, assisted by a curatorium, and the upper and lower professorial councils. The rector is elected for a period of two years by the upper professorial council, and his election is sanctioned by the King. The members of the "curatorium," generally two, are charged with the supervision of the scientific interests of the school and are nominated by the Minister of Agriculture. The upper professorial council consists of all fully qualified professors, and a certain number of other not fully qualified professors, specially nominated by the Minister for this purpose. It serves as a general advisory board to the rector, and assists him in general matters of management. The lower professorial council consists of all professors, lecturers and assistants, and takes part in the determination of the courses of instruction for each half year; it is also empowered to propose general resolutions concerning the present condition, aims and future of the school.

There are, further, three departmental councils for each of the three principal departments for agriculture, for geodetics and agricultural civil engineering, and for agricultural-technical industries. They are composed of the principal professors of each department, and their duty is to foster the development of their special departments to the best of their ability, and to apply to the rector or upper council for any further facilities they may deem necessary in the interests of instruction.

The usual agricultural course lasts from four to six terms (two to three years) and generally commences in the autumn. The course in geodetics lasts from four to five terms (two to two and a half years) and commences after Easter; students of this latter course must produce leaving certificates of a nine-class higher preparatory school (classical or "real" gymnasium, upper "real" school), and proof of at least one year's practical work.

A special advantage afforded by the Berlin agricultural high school, and one which materially broadens the scope of instruction, consists in its intimate relations to other high schools situated in Berlin. Thus, for example, students of the agricultural high school may attend lectures and practical work at the university, technical and veterinary high schools and mining academy, without any further entrance formalities; they can also take a degree in the philosophical faculty of the university in agricultural science, with philosophy and two other natural or State science branches as subordinate subjects.

The full plan of instruction, which is arranged for a period of six terms (three years), is also intended for students who take the shorter course of two years (four terms). The considerations which have been instrumental in inducing the management of the school to arrange the plan of instruction are interesting, and show how careful the authorities are to impress upon the students the necessity of commencing their studies with a definite object in view and of terminating them with the acquisition of a certain definite amount of sound theoretical and practical knowledge. It is urged that success in the pursuit of agriculture at the present day requires not only great circumspection and practical talent, but an equal measure of theoretical knowledge, and that the latter requirement is increasing in proportion as agricultural undertakings are becoming more extensive and complicated. That, therefore, a complete course of instruction upon a broad and liberal basis requires the full period of three years. As, however, the majority of agricultural students possess neither the time nor means for the completion of the longer course, the shorter course has been so arranged as to include the most necessary subjects, but it does not and cannot give the thorough finish afforded by the three-year course.

A shorter period of study than two years is discouraged as productive of imperfect and faulty results, and is only permissible with the intention of refreshing or increasing the knowledge of certain special subjects hitherto neglected or imperfectly acquired. Students are especially warned not to attempt to acquire in the course of two or three terms a smattering of all the subjects taught in the six, as such superficial knowledge can only produce disastrous results later when applied to practical purposes.

The Agricultural High Schools form no exception to the general rule in Germany that higher schools require substantial aid from the State which is liberally and ungrudgingly afforded. The proportion of professorial staff to students is necessarily high in institutions of this grade. At the Agricultural High School, at Berlin, with 636 students it was one professor to ten students; at Hohenheim, with 105 students, it was one to four; at Poppelsdorf, with 233 students, it was one to seven.

## TEACHERS FOR AGRICULTURAL SCHOOLS.

Those students who wish to qualify for positions on the staff of agricultural schools and, further, students of surveying and agricultural civil engineering,

must produce certificates showing that they have passed through the full courses of a classical gymnasium, a semi-classical (real) gymnasium, or an upper "real" (modern) school. Persons not possessing the necessary preliminary educational qualifications for fully qualified students may enter as extraordinary, or not fully qualified, students; they are, as a rule, not admitted to the diploma and other examinations for positions in the State service or as future lecturers on agricultural subjects.

Intending students must further be at least 18 years old and prove that they have been engaged for at least one or two years in practical agricultural or surveying work. A longer period of practical agricultural work is considered highly desirable.

Masters for agricultural science at Prussian agricultural schools at which the normal plan of agricultural instruction is in force, must produce proof of the following qualifications:—(1) that they have completed the full courses of a gymnasium or upper "real" school; (2) that they have studied agriculture at an agricultural high school or university institute for a period of not less than three years; (3) that they have been engaged in practical agriculture for a period of not less than two years; (4) that they have completed a probationary period of one year as master of agricultural science at an agricultural school with favourable results.

\* \* \* \* \*

The above examination only applies to masters of agricultural science at agricultural schools and not to professors, extraordinary professors, lecturers, etc., at agricultural high schools and university institutes. The latter are mostly university graduates, in some cases eminent agriculturists, who have commenced their careers by being assistant to some professor and have gradually risen by means of special pedagogic ability and scientific agricultural research to the higher academic positions.



## SWITZERLAND.

### CHAPTER LIV: OUTLINE OF THE EDUCATIONAL SYSTEMS.

#### INTRODUCTORY.

The Republic of Switzerland, with a population of 3,741,971, in 1910, is made up of 25 Cantons organized into a Federal State. The Federal Legislature has two chambers, the *Standesrath* (State Council) with a membership of 44; and the *Nationalrath* (National Council) with 167 representatives elected for 3 years. The executive authority is deputed to the *Bundesrath* (Federal Council) with 7 members elected by the Assembly for 3 years. In respect to the administration of Government, the Cantons have somewhat similar relations to each other, and to the Federal Authority, to those which obtain in the case of the several provinces of Canada.

The language of the people is German to the extent of 71 per cent of the population; French of 21 per cent; Italian of 7 per cent. The Cantonal divisions do not coincide with those of language.

The area of the country is 15,976 square miles, of which about fifty per cent is under cultivation and twenty per cent under forest. The remainder is unproductive.

The occupations of the people have changed during the last thirty or forty years from being mainly agricultural to being predominantly manufacturing. The chief industries are the making of iron and wood-working machinery; water power and electric machinery; textiles in silk, cotton and embroideries; clocks and watches. The tourist trade is one of immense magnitude, entitling Switzerland to renown as the playground of Europe. The qualities of diligence, intelligence, frugality and sturdy independence were the characteristics of the people which were most obvious.

#### ELEMENTARY EDUCATION.

Under the Constitution of 1874, Elementary Education is obligatory, free and under the supervision of the Canton. Each Canton has its own educational system and its own separate organization for the administration of education. The supreme educational authority is the Canton, and the Local Authority for the administration is the Commune.

Attendance is required from about the age of 6 to 14; but the requirements as to age vary in the different Cantons and Communes to suit the conditions and occupations of the people.

Much attention is given to handwork in the elementary courses. Cardboard instruction, sewing and drawing are taken from 9 to 12 years of age.

There are Higher Elementary Schools with the pupils from 12 to 14 years of age. In these manual work for boys consists of wood-working, modeling and drawing, and occupies about 6 hours per week. The hand-work for girls is in sewing, mending, darning, crocheting and drawing.

There are also Vocational (Intermediate) Schools with a course of 2 years. These prepare pupils for occupations and for admission to the Secondary Vocational Schools. They receive pupils of 13 years of age and upwards who have completed 6 years of the Primary School.

#### HOUSEKEEPING SUBJECTS.

Elementary Housewifery, Hygiene and Domestic Economy for girls are taught in the Primary, Supplementary and Rural Secondary Schools. The object is to train girls for their future duties. The Supplementary School begins after the age of 12.

In looking over the specimens of syllabuses one finds a wide range of subjects covered. In one of them the list includes the following: Duty—the duties of a girl at home, at school, as apprentice; idleness, conscientiousness, deportment, manners, expression, order, neatness, economy of time, etc. Others deal with the details of the home; others with plants; others with food stuffs; still others with hygiene and the care of children—physical, moral and intellectual.

Sewing is taught in all the Elementary Schools and, with the exception of only parts of the Forest Cantons, it is everywhere a compulsory subject. The course includes all kinds of knitting, stitching, mending and cutting out. The time given to it varies from a minimum of 2 hours to a maximum of 8 hours per week. Usually it occupies from 3 to 5 hours per week during six years.

#### CONTINUATION SCHOOLS AND SECONDARY SCHOOLS.

Elementary Education is followed by Continuation or Improvement Schools. In some Cantons attendance at these is compulsory and in others it is optional. The classes are usually held in the winter months and provide about 6 hours of instruction per week. Sometimes they are held in the evenings and sometimes during the day hours.

For pupils who desire a more thorough education, and can afford the longer period of attendance, there are Secondary Schools somewhat similar to the Secondary Schools of Germany. In some cases these schools take in pupils who have the qualification gained by only four years at the Elementary School. In the Gymnasias—the literary department for classics and modern subjects—pupils who have the qualification of six years of the Elementary School are accepted.

The Secondary Schools also accept pupils of the age of 14 from the Elementary and Higher Elementary Schools, but the courses of the latter are arranged to serve those who intend to go to work at about 14 years of age and not to prepare for admission to the Secondary Schools.

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Those who enter the Secondary School at 10, after four years at the Elementary School, are expected to continue during  $6\frac{1}{2}$  years, and those who enter at 12 go on with the courses during  $4\frac{1}{2}$  years. Some of the Secondary Schools have further courses of 2 years which prepare pupils for admission to the Universities and the Polytechnic School.

## RURAL SECONDARY SCHOOLS.

The Rural Secondary Schools receive pupils after 6 years of the Primary Schools. Attendance is obligatory from 13 to 16 years of age, unless equivalent instruction is being received. The character of these schools is essentially practical and directly related to agriculture. The course is two years, but a third year may be taken provided sufficient pupils offer themselves. The subjects include fruit culture, vegetable gardening, viticulture, animals and bees. These schools and their courses are prominently advertised on posters.

In connection with many of the larger Secondary Schools the Cantonal or Local Authorities provide what are called "Scholars' Homes." These provide good board and lodging for pupils whose homes are at a distance from the school, and the cost is so moderate that practically no suitable pupils are prevented from attending by the circumstances of their parents.

In the Elementary and Secondary Schools of the Canton of Zurich, which in this respect may be taken as representative, there were 84 per cent of male teachers to 16 per cent of female teachers.

## THE UNIVERSITIES AND POLYTECHNIC SCHOOL.

The Universities, for general education of the highest grades, are maintained by the Cantons. The exception is the Federal Polytechnic School at Zurich, which carries on work in scientific and technical departments up to the highest standards.

The recognition of the value and importance of theoretical scientific knowledge prevails throughout the whole of all the systems of Industrial Training and Technical Education. The courses are arranged to lead to the formation of habits of scientific orderly thinking, to impart sufficient knowledge to enable the students to have clear concepts as to the laws of the physical sciences and to train them in mathematics and geometry.

## SOURCES OF FINANCIAL SUPPORT.

The support for education comes from four sources:—

The Communes;

The District (that is the combination of all Communes within a certain area);

The Canton;

The Federation or Bund.

The latter is taking an increasing share of the burdens of educational expenditure, but usually without exercising any direct control. The very highest form of scientific and technical professional training, which always is the most costly form of instruction, is provided wholly by the Federation or Bund.

One point, in which all agree, is in making the main portion of the State grants-in-aid take the form of payment to the Local Authorities of a proportion of the teachers' salaries.

The methods of calculating central grants-in-aid are different in the several Cantons. In some of the Cantons, the main factor in determining the proportion of expense to be borne by the Canton comes from the degree of local necessity.

The plan whereby the local community bears a share of the financial burden and has the direct management and responsibility for the school tends to an increase of economy without lowering the general standard of excellence. The Cantonal Authority has power, by means of its grants and otherwise, to insist upon a high level of work in every locality.

The Federal grants to Industrial and Technical Schools amount, on the average, to one third of the total cost of maintenance. These grants are separate from, and in addition to, the maintenance of the Federal Polytechnic School at Zurich.

#### VARIABLE CONTRIBUTIONS AT FIRST.

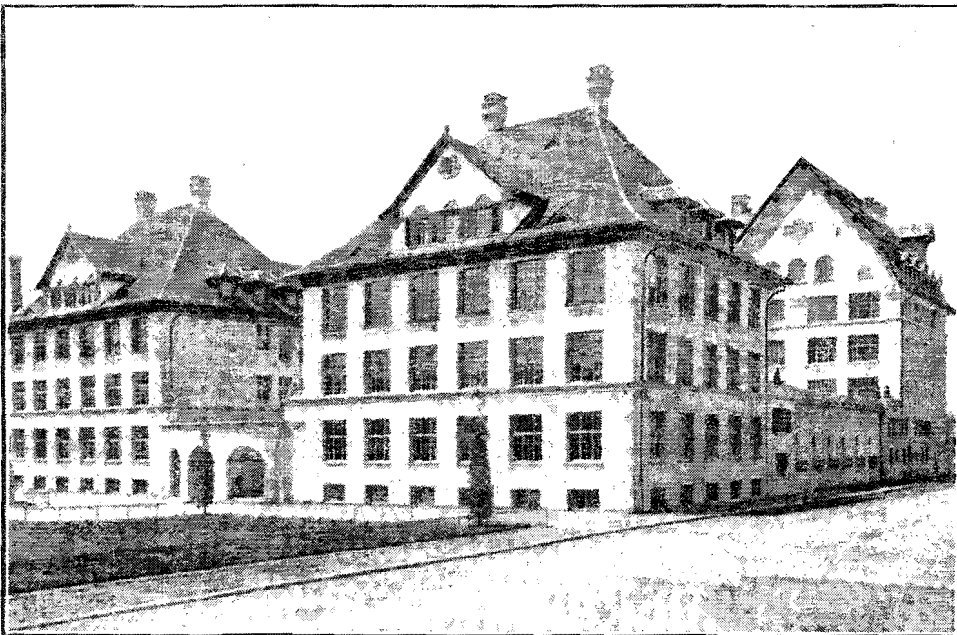
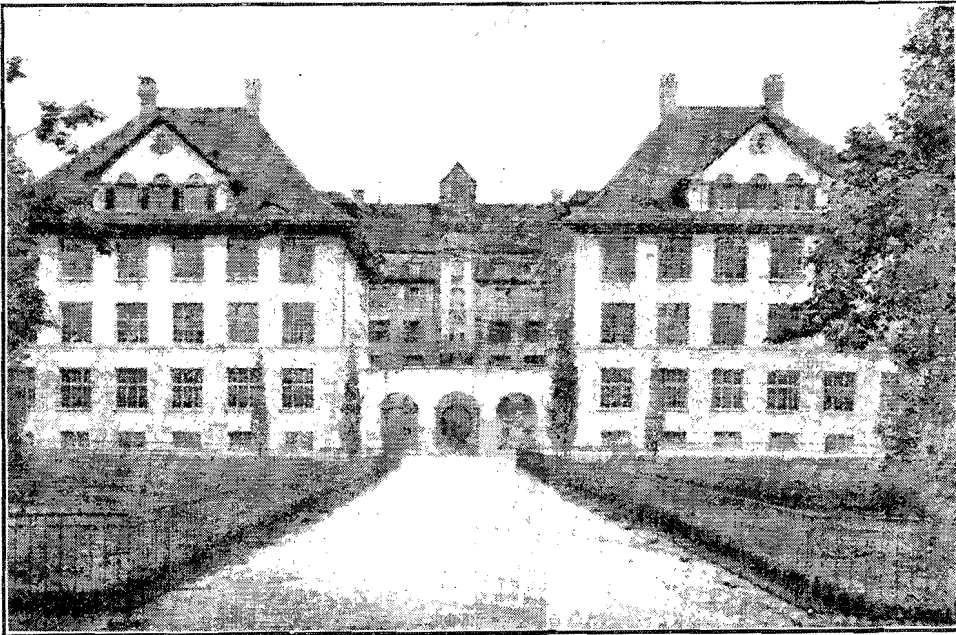
After the Bund began to assist the Cantons and the Communes to maintain vocational education, and before the present law providing for grants to the extent of one third of the cost of maintenance was enacted, the relative amounts spent by the Communes, the Canton and the Bund upon technical education varied very much. In 1895 for the whole of Switzerland, whereas the Communes and Cantons spent altogether upon technical education \$257,145 the Bund contributed \$464,899. That included industrial, technical, agricultural and commercial education, the Federal Polytechnic School at Zurich, and various miscellaneous disbursements.

As examples of the variation in the relative amount spent in three of the Cantons on technical education of all grades it may be mentioned that in 1895, in the Canton of Berne, the amount by Communes and Canton was \$108,979, and the amount by the Bund was \$23,587. In the Canton of Zurich these figures were respectively \$71,500 by the Communes and Canton, and \$28,790 by the Bund. In the Canton of Geneva the sums were \$21,412 by the Communes and Canton, and \$14,616 by the Bund.

#### SCHOOL BUILDINGS.

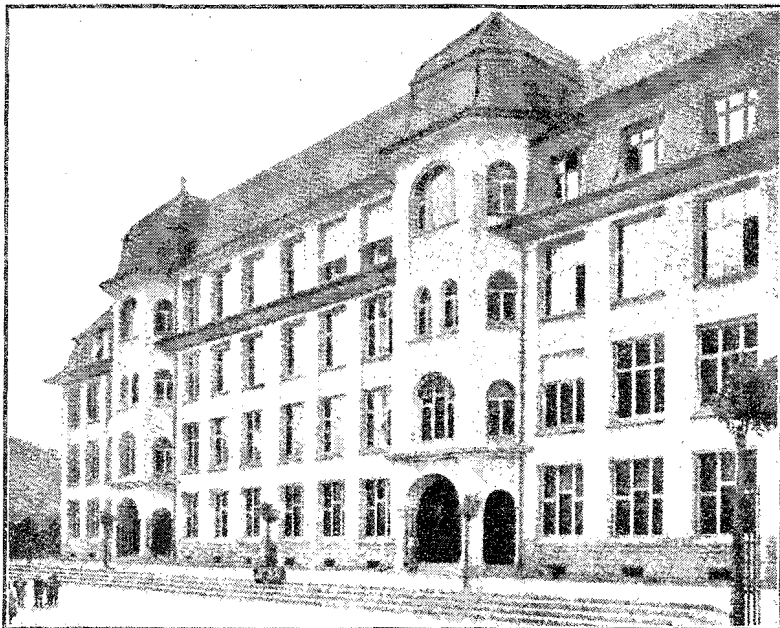
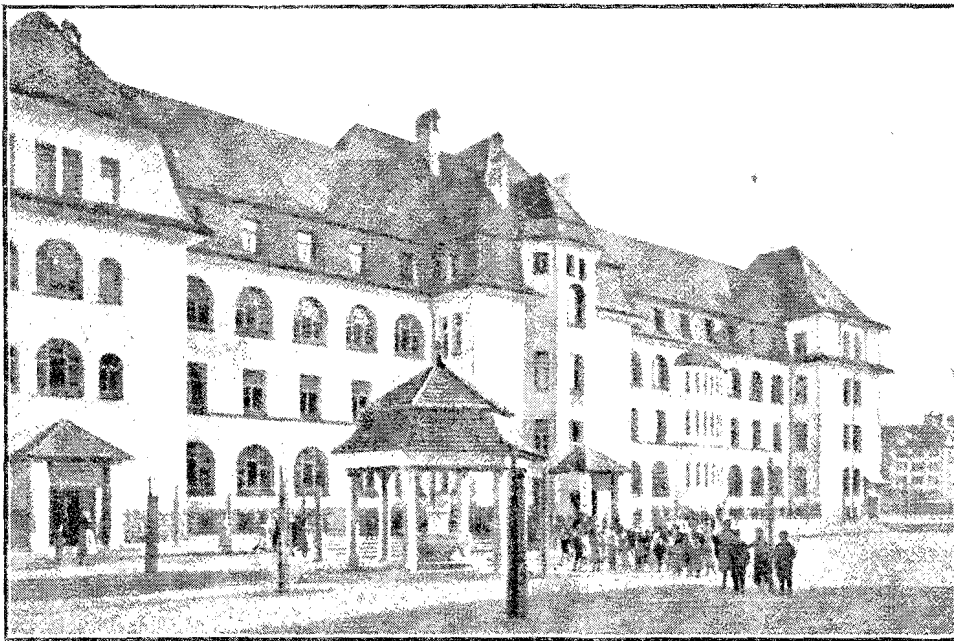
From the appearance of the school buildings and from what was learnt from various sources, it was apparent that during the last 7 or 8 years there had been great activity in providing new school buildings and keen rivalry between different communities as to which could have the best. The buildings were admirably arranged for light, with spacious corridors and reception halls. All the

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schools visited had fine gymnasiums for physical culture, in some cases large separate gymnasiums for boys and girls. Frequently children were observed at athletic drill in the open air on the school grounds.

### RELATION OF THE FEDERAL AUTHORITY.

Since 1903, subventions have been given to the Cantons to help them to fulfil their obligations concerning elementary education. The Canton decides to what particular object the Federal subvention shall be applied, and if it hands over all or part of the amount to a Commune it (the Canton) determines how it shall be spent. The Canton is responsible to the Federal Government for the legal spending of the money by the Commune.

By Federal law instruction in military drill and exercises is made a part of the compulsory school programme for all youths between 10 and 15 years of age, and a Federal contribution is made towards the expense of its provision.

The Federal Government exercises an influence upon general education by means of its legislation dealing with the employment of children. That stipulates that children shall not be employed in factories under 15 years of age, and that children under 16 years of age shall not be employed in factory and school work combined more than eleven hours per day.

### FEDERAL GRANTS ARE CONDITIONAL.

When the Federal Authority decided that it was desirable to give assistance to the development and maintenance of Industrial and Technical Education, and Commercial Education in the higher grades, it resolved that it could best render assistance by simply granting financial aid without adding as a condition of the aid any control of the classes, courses, or standards. No establishment of schools was undertaken by the Bund.

These Federal grants for the development of Industrial and Technical Education may, subject to the decision of the Federal Council, reach a maximum of one-half of the total annual expenditure for those purposes by the Canton, Communes, Corporations and private individuals. Thus the Federal grants to the Industrial and Technical Schools amount, on the average, to a third of the total cost of maintenance. These grants are separate from and in addition to the maintenance of the Polytechnic School at Zurich, which is wholly maintained by the Federal Government. The grants to the schools maintained by the Communes and Cantons are "conditional on suitable premises and class rooms, satisfactory organization and results, satisfactory programme of study, submission of financial statements to the Federal Government, and both Cantonal and Federal inspection." (Seath).

### THE FEATURES REPORTED UPON.

Switzerland has been called the educational laboratory of Europe. The political constitutions allow great freedom in local action; and in the absence of

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absorbing external interests, the administrative talents of the able men and women have been given to education.

The features which appeared to the Commission to shed most light on the problems of Canada are the only ones which are dealt with in this Report. These have been arranged as follows:—

Chapter LV: Information from Three Authorities—Dr. Fr. Fritschi, Sir Robert L. Morant, and Dr. John Seath.

Chapter LVI: Elementary Education for Industrial Purposes.

Section 1. Primary School Course in the Canton of Vaud.

Section 2. Manual Training in Switzerland.

Section 3. A Typical Vocational School at Geneva.

Section 4. Continuation Schools.

Section 5. Schools for Teaching Trades to Apprentices.

Chapter LVII: Regarding Apprenticeship.

Section 1. Apprenticeship Law of the Canton of Zurich.

Section 2. Copy of Apprenticeship Agreement.

Section 3. Programme of Examination for Carpenters and Joiners.

Section 4. Programme of Course and Apprenticeship Examination for Milliners.

Chapter LVIII: Secondary Education for Industrial Purposes.

Section 1. A Typical Cantonal Secondary School at Zurich.

Section 2. Industrial Art School at Zurich.

Section 3. Industrial Art School at Geneva.

Section 4. Technikum at Winterthur.

Section 5. Technikum at Bienne.

Section 6. Federal Polytechnic School at Zurich.



## CHAPTER LV: INFORMATION FROM THREE AUTHORITIES.

### SECTION I: FROM "CONVERSATIONS" WITH DR. FR. FRITSCHI.

The Commission had the advantage of "Conversations" with Dr. Fr. Fritschi, who is a member of the National Parliament. He has won for himself more than national renown through his interest in and knowledge of Education.

Among other questions upon which Dr. Fritschi gave the Commission information, of immediate value in helping the members to understand the educational situation in Switzerland, were the following.

#### MORE PRACTICAL TRAINING.

During the past three or four years there has been a marked improvement in favor of more handwork in the Primary Schools. Formerly the boys had optional handwork on Saturday afternoons. During the past 10 years, any Commune that wished to do so could make Manual Training compulsory for the 7th and 8th years in the Elementary Schools. More and more the teachers are endeavoring to put this handwork into correlation with the ordinary subjects of instruction from the very beginning of the school experiences.

In Dr. Fritschi's opinion the chief further need in Switzerland, in the matter of education, is that of better Continuation Schools.

#### HEALTH AND WELFARE.

The school authorities take care that the eyes and teeth of the children are looked after. Every child attending school is examined by a medical officer. Any who are found to have defective hearing or sight are examined by a specialist, who then indicates how the child should be treated. In the case of a family being too poor to provide the treatment recommended, that is provided by the school authorities. When asked whether there was any tendency on the part of the people to impose on the school authorities on account of this, Dr. Fritschi said that perhaps one or two in a hundred might abuse the opportunity and privilege, but as a rule they did not.

#### SUPERVISION AND INSPECTION BY FEDERAL AUTHORITIES.

The Federal Government grants considerable sums to the Communes to assist them in the provision and maintenance of Primary Education. The only supervision it exercises in that respect is to examine the accounts to make sure that the money was spent for the purpose for which it was granted.

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In connection with the Federal grants to Commercial, Industrial and Technical Schools, the Federal authorities go further. They send an inspector to examine the school and the quality of the work which is being done. If they are not then satisfied, they send a communication to the Local Authority, and if there be occasion to send a second communication, it practically says, "If you do not show some improvement in the matter reported upon, we shall be compelled to withhold the grant."

They do not exercise any control in the appointment of the staff, and do not set any standard of qualifications for the teachers. They consider that the Local Authorities, who engage the teachers for vocational work, will do their best to obtain the best men. However, if any instructor is found to be inferior, the Federal Inspector would doubtless say to the Local Authority "If there is not improvement you must change your instructor, or your standard, or your regulations."

#### CONDITIONS OF LIVING.

Dr. Fritschi attaches a good deal of importance to the advantages to the State, as well as to the individuals, from having workmen live where they can have gardens and places of their own for suitable recreation and rest. The best conditions prevail in those parts of Switzerland where the workingmen live in their own homes and have gardens to look after and care for. The nearer the conditions of town life can approach to those of the agricultural people, the better, in his opinion, would it be for the State as well as for the individual citizens. In that way the development of small industrial towns, and the provision of easy and cheap transportation to suburbs would minister to permanent industrial success.

### SECTION 2: FROM SIR ROBERT L. MORANT'S REPORT.

The following extracts are quoted from the report by Sir Robert L. Morant, formerly Secretary of the Board of Education in England, on "The Complete Organization of National Education of all Grades as Practised in Switzerland":—

#### SERVICE OF THE BEST MEN.

Thus it has happened under these Swiss conditions that for some half a century every Canton has kept its best men engaged in thinking out on the spot and working out, for his own benefit as much as for his neighbors', a Cantonal supply of schools of *every grade* forming an organized scheme of public education, complete in every stage, adequate for the needs of the whole Canton, and within the reach of every corner of the Canton—a scheme which shall be really complete and really organic in every point of structure, material and design, and of a character and a scope directly suitable to and complete in itself for the requirements of his Canton.

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## LOCAL FREEDOM AND CENTRAL CONTROL.

Two points then have specially to be realized in the Swiss system of authorities, (a) *the complete freedom of every locality*, even of every parish and commune, to rate itself and to spend *its own money* as freely as it pleases on educational provision of all kinds (an arrangement which is only what one would expect in a thoroughly democratic country, where the commune has for so long been the centre, the energy point, of all social development), but at the same time (b) *the absolute control by the Central Authority* as regards the general educational lines which every State-aided School (and practically every school is State-aided) shall follow. This control is considered in Switzerland to be of the very essence of rational democratic government; it is recognized as a political and social axiom in every Canton, and finds expression in the general conditions as to curriculum, age limits, etc., which attach to all Central grants (other than Federal). As these grants are made in varying proportions to each and every grade of the public schools, and alone render their prosperity, sometimes their very existence, possible, they at once provide an absolutely effectual leverage for Central control, and for securing the due observance of those general conditions under which the school is established, maintained and recognized.

## CONTROL BY KNOWLEDGE.

The Swiss, in fact, feel very strongly that this Central control is the very first essential to the permanent existence of a democratic state in competition with the highly organized and skilfully directed forces of the more despotically governed countries; and that, without this 'control by knowledge' in the sphere of public education *of all grades* just as in other spheres of national life, a democratic state must inevitably be beaten in the international struggle for existence, conquered from without by the force of the concentrated directing brain power of competing nations, and shattered from within by the centrifugal forces of her own people's unrestrained individualism.

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In every respect, in fact, both local initiative and central guidance and control are alike preserved, and one certainly feels in every part of the Canton how the educational experience of the whole as concentrated in the Central Authority, and the needs of the whole as therein interpreted and safeguarded continually permeate through every portion of the system as locally administered.

## SECTION 3: FROM DR. JOHN SEATH'S REPORT.

The following information is quoted from the Report on *Education for Industrial Purposes* by Dr. John Seath:—

## LOCAL CONTROL.

The committees in charge of the trade schools are composed of the chairman or some other member of the local school committee and representatives of the various trades—employers and workmen—and of those who understand and take an interest in trade education.

## ATTITUDE OF LABOR ORGANIZATIONS.

The labor organizations generally look with great favor upon the trade schools. They are continually asking for them, and desire that they shall be free. Indeed, so well disposed have they been that, recognizing the effects of unskilled competition with the skilled workmen of France and Germany, some of the trade unions have established such schools themselves, and maintain them out of their own funds, with the aid of a cantonal grant.

## QUALIFICATION OF TEACHERS.

More and more the expert (the engineer, the architect, the gardener, the painter, etc.), has charge of the industrial subjects. In the smaller centres of population where no trade teachers are available, the elementary or secondary school teachers still go on teaching arithmetic, technical drawing, mechanics, physics, etc.; but such teachers are fast being replaced by experts. At present also the State is endeavoring to give the men with practical experience some training in pedagogical method. In 1885, the Department of Industry and Agriculture established special classes for teachers in the Technicum at Winterthur to prepare them to teach technical work, especially drawing. Diplomas are granted each year on an examination. One-third of the expenditure is defrayed by the Federal Government and the classes receive encouragement in other ways. The professional training is of two kinds: practical men (engineers, architects, etc.) are trained as teachers, and teachers are taught the practical work of the various trades.

## CLASSES OF SCHOOLS.

The special provision for industrial and technical education is as follows:

Industrial Drawing Schools, Industrial Continuation Schools, Handicraft Schools and Trade Courses, Housekeeping and Domestic Science Schools, Trade and Apprentice Schools, Industrial Art Schools, Secondary Technical Schools, Technical Colleges, Industrial Museums.

*Industrial Drawing Schools.*—The Industrial Drawing Schools provide, for the smaller towns, classes in freehand and mechanical drawing, and in color-work and designing.

*Industrial Continuation Schools.*—Of the Industrial Continuation Schools about 200 are for both men and women; they are a special class of the continuation schools already described. They provide for the different handicrafts and trades, and are compulsory in some cantons, optional in others. At first they were held in the evenings; but, since the new law for apprentices, they have been held generally in the daytime.

*Handicraft Schools and Trade Courses.*—The Handicraft Schools and Trade Courses are of a higher grade than the preceding, and aim at extending the knowledge of those engaged in trade. The courses, which include work-shop training, cover from two to three years. The Arts and Crafts Schools at Zurich and Berne are examples.

*Housekeeping and Domestic Science Schools.*—The Domestic Science Schools provide instruction for domestic servants as well as for future house mistresses. For the purpose of training teachers for these courses the Federal Government assists with grants three schools with courses of from six to eighteen months.

*Trade and Apprentice Schools.*—The Trade and Apprentice Schools provide a thorough training in trades for ambitious workmen, and are of a higher class than the Handicraft Schools and Trade Courses. The Silk Weaving School at Zurich and the Watch-making School at Bienne are examples.

*Industrial Art Schools.*—The object of the Industrial Art Schools, which are of a higher type than the Industrial Drawing Courses of the smaller towns, is to improve industrial workers, and especially designers on the art side of their crafts. Of these there are only a few special schools—at Zurich, Berne, Geneva, and Bâle. Instruction in Applied Art is also a regular part of the course in the other industrial schools.

*Secondary Technical Schools.*—The Secondary Technical Schools are of a higher grade than any of the preceding and are intermediate between the ordinary trade school and the polytechnic. They are often called Technicums and correspond to the German institutions of the same name. The first Technicum in Switzerland was founded at Winterthur, near Berne. There are also Technicums at Geneva, Bienne, Burgdorf, and Fribourg, and a movement is on foot to establish one at Lucerne. The Technicum I saw was at Bienne.

*Technical Colleges.*—The chief of the Technical Colleges, and a famous college it is, is the Polytechnic at Zurich, maintained by the Federal Government.

*Industrial Museums.*—Industrial Museums are provided in a few of the larger towns; as, for example, in Berne and Zurich. Such museums appear to me to be a most commendable feature of the system. They are intended to acquaint the teacher and general public with the suggestive features of the progress of industry and industrial education. They contain plans for school buildings, specimens of school furniture and other equipment, samples of industrial work, and a large collection of educational literature.

*Entrance tests.*—The minimum age for admission to the industrial schools is fourteen. In some schools no examination is required, but the applicant must show that he possesses at least an elementary education, and that, after a period of trial, he is able to go on with the work. For admission to a Technicum two years' or more previous practical trade work is usually required.

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## ATTENDANCE AT INDUSTRIAL SCHOOLS.

Besides 2,470 compulsory and 237 voluntary Continuation Schools, providing for a general education and attended by both boys and girls, there were in 1908 special vocational schools, as follows:

*I. For Primary Education—*

- 328 Industrial and Drawing Schools, with 19,884 boys and 4,829 girls.
- 95 Commercial Schools, with 10,981 boys and 2,195 girls.
- 11 Agricultural Schools, with 221 pupils.
- 496 Schools for Domestic Science, with 12,704 girls.

*II. For Secondary Education—*

- 5 Technical Schools, with 2,010 pupils.
- 17 Industrial Schools, with 4,952 pupils.
- 16 Watchmakers' and Mechanics' Schools, with 1,236 pupils.
- 9 Textile Schools, with 546 pupils.
- 6 Woodworkers' and allied trade schools, with 155 pupils.
- 32 Commercial High Schools, with 4,610 pupils.
- 13 Agricultural Schools, with 1,131 pupils.
- 47 Domestic Science Schools for women, with 7,466 students.

*III. For Higher Education—*

- The Polytechnicum at Zurich has 2,519 students, 515 of whom are foreigners.
- Five Cantonal Universities, three with four academic faculties and two with three.

## CHAPTER LVI: ELEMENTARY EDUCATION FOR INDUSTRIAL PURPOSES.

### SECTION 1: INSTRUCTIONS TO TEACHERS REGARD- ING PRIMARY SCHOOL COURSE IN CANTON VAUD.

The principle of concentration is to be followed in primary teaching, and lessons related to each other should be so taught. Thus, if history has been taught to the children through local geography, this branch can easily be begun in the intermediate grade. If geometry has been prepared for by drawing, civics by history, these subjects will not prove so difficult. Whilst the unity of each branch is to be preserved, that of the entire programme is not to be overlooked. The Committee is of opinion that this is the best means of counter-acting the accumulation of subjects and the overcrowding of programmes.

Starting from the principle that the knowledge of *things* precedes the knowledge of words, natural groups have been formed of the subjects. First come the branches which study *Nature*, such as geography, object lessons and natural science. Man lives in an environment of phenomena and natural things which meet his eye every day; thus he should study and understand this Nature which surrounds him everywhere. Then he should be interested in his own existence and that of his fellows; history and civics teach him to know *man* in all ages. After this, arithmetic, geometry, drawing and manual training acquaint him with *form* and *number*. His mother tongue teaches him by writing, the *names* of things; he learns to speak, to read and to write. Then follow the *artistic* branches, singing and gymnastics, and finally, Bible history, which speaks to the child of God. Thus are the different groups formed among the subjects deemed indispensable.

Now, all these branches can be correlated; all that have any relation among themselves should be mutually helpful. Thus arithmetic will take many of its problems from history, geography and natural science; drawing models can be chosen from Nature; the mother tongue will be related to all branches. This method is the most successful for attaining the end aimed at.

The order of the lesson is on psychological lines, from the concrete to the abstract. The primary school, in fact, should be purely educative, that is to say, it must not consider the communication of knowledge as its first duty. Instruction is only a part of education, an essential part, no doubt, but not the whole. The teacher should aim at the formation of character and sterling moral qualities. He should also be careful to adapt his lesson to the capacities of his pupils, so that they may derive the greatest benefit from it.

## INFANT SCHOOLS.

The aim of the infant school is to prepare the children for the primary school course, and not to give it to them prematurely. The child should be taught to observe, compare, judge, to love work and neatness, to cultivate good habits, to open his heart to all good feelings; this is the true programme and sole *raison d'être* of the infant school.

As to *method*, the only suitable method is the intuitive one, and lessons must be in the form of talks or games. The infant school should be a gentle transition from the family to the school.

*Object Lessons* are given to develop the sense and spirit of observation, and should be designed to attract the child's attention to the world about him, animals, plants, natural phenomena, common objects, etc. The *manual exercises* of Fröbel take a large place in the course, and serve to train the hand and eye.

*Drawing*.—This subject, carefully prepared for by most of the foregoing exercises, especially those with sticks, consists in combinations of straight lines on lined paper, producing either small ornamental motifs, ordinary objects, or even attempts to draw from nature. These efforts will often be very immature; but the aim of the infant school is to not produce artists but rather to teach the child to appreciate the significance and value of lines, and enable him to recognize them in the object, and to exert himself to reproduce what he sees. Thus the inclusion of *inventive drawing* on the programme is not so pretentious or impossible as some suppose. This comprises ornamental subjects—borders, rosettes, stars, etc.—carried out with the sticks, square, triangle, etc., or directly on paper with pencil. In all the Fröbel exercises the child is left free, for he can early be taught, and should be so taught, to realise his own ideas and use his own initiative. All that the teacher has to do is to guide the children's imaginations and initiate them gradually into the law of symmetry and harmonious combinations. Here we have the means of educating the senses, of exercising the power of observation and reasoning, both subjects which have been too much neglected. The modern infant school does not exclude the old subjects of reading and arithmetic, but they are not its principal subjects, and are only introduced as a *means of development*.

*Language*.—In the lower division, the teaching of language cannot be a set subject, but all the lessons should aim at helping the child to express itself clearly. Reading should not be begun until the child has learnt to distinguish *words* in speech, and that each represents a particular idea; then to dissect these words into their phonetic elements—syllables, sounds and articulation. The teacher must miss no chance of making this study attractive, for she is dealing here with abstract things and conventional signs which have in themselves no interest for the child. It is wiser to delay this instruction until the child has developed sufficiently to allow him to find some pleasure in this kind of mental gymnastics.

*Writing*, prepared for by drawing, should run parallel with reading as far as possible.

*Arithmetic* does not offer as many difficulties as reading. The child has an innate tendency to count objects. Also, number plays a great part in the Frœbelian exercises, and these exercises can easily be combined so as to teach the first six numbers. When a child *knows* a number, he can be made to do exercises—with objects in front of him—in dividing and reconstituting, and finally calculations of the four first rules with these numbers. Here, as with reading, it is necessary to go slowly. Written work will never be anything but the reproduction of oral arithmetic, and figures should not be written till nearly the end of the second year.

### FIRST GROUP—GENERAL PRINCIPLES.

The three Rs, together with religious instruction, long comprised the whole primary programmè, but as social needs increased, new branches were added—such as geography, history and natural science, and the artistic branches were included. Undoubtedly the mother tongue and arithmetic are subjects of which no one could dispute the value, but there are things even more important, viz., the formation of mind and heart, habits, intelligence and morality, which every child must acquire, and which every good teacher should give him. With the growth of this conviction, education has displaced instruction; instead of furnishing the mind, it aims to form it. Thus the change of aim has involved a change of means; memory no longer is the first faculty, because observation, reasoning, personal activity, are needed. The mind of the child is rather to be transformed by personal work than formed by carefully arranged instruction.

In order to have personal work on the part of the pupil, he must be impelled to it by some interest; without interest there is no free activity, no self-education, no development of will. Thus the things presented to the child must awaken in him an interest sufficient to impel him to work himself, without compulsion, and all teachers know well enough that it is not letters or figures which interest the child at first; it is what he sees around him—animals and people. He likes to talk and think about what he sees at school, at home, in the town or village where he lives, of what he has noticed in his walks or travels, of the actions of people amongst whom he lives or whom he has learnt to know through stories. All that teaching has to do is to develop these tendencies, to guide his first observations, to excite comparisons, to present historical or fictitious stories by means of which the child can become acquainted with characters and actions which he afterwards has to judge.

It is not language or arithmetic which should occupy the first place in elementary teaching, but rather the branches which aim to give the child ideas about the people amongst whom he lives; geography (local and general), natural science, national and Bible history. This does not mean, however, that these subjects are to be taken to the exclusion or detriment of the other, more difficult ones, whose acquisition is equally valuable, as language, drawing and arithmetic. It merely means that those subjects which furnish the ideas should come before those which only serve to give expression to those ideas; that is to say, that in reading, composition, arithmetic, drawing, the notions already acquired by the child are put in action.



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## GEOGRAPHY.

This is above all a concrete science, the processes of which are based entirely on intuition; that is why it is the first which we present to the child. From the moment he begins to observe objects around him, he begins to learn local geography. This is made the basis for the first two years, and furnishes the subjects of object lessons, language exercises and arithmetic and drawing models. But in order to do this it must be physical geography, not political. Geography must work outwards, from the near to the distant, from the village to the canton, to Switzerland, and finally in the 3rd year to the surrounding countries. In a primary school, emphasis should be given to home geography, and there will not be time to give more than a general outline of other countries.

## OBJECT LESSONS AND NATURAL SCIENCE.

This should be placed along with geography, and include simple object lessons and elementary chemistry and physics. These two subjects both aim to show nature to the child, and therefore should not be separated. This lesson should keep within the scope of the child's home, and teach him to know and love the people and places among which he lives. The study of nature develops observation and judgment and encourages the growth of moral sentiment, besides giving the child a certain amount of practical knowledge which will be useful to him later on, either as a means of preserving health, choosing a vocation, or directing his conduct on given occasions. Further, it excites keen interest, so that all this development is quite painless, through the free and happy activity of the pupil. Few subjects have a greater educative value, and yet they have been very much neglected, being always considered as accessories, and it has been suggested to omit them or combine them with the language lesson.

Whilst on the one hand the natural science lessons were curtailed, object lessons were brought to the front, which are nothing but elementary natural history lessons, and agriculture and manual training were demanded for country schools, in order, it was said, to better prepare the children for their future occupations, to give them more practical science, to bring the school and home into closer relation. But these two branches are nothing but a form of natural science, and better still would be an elementary form of nature study, rationally organized, to give children the knowledge of ordinary things which they now lack. As a matter of fact, natural history had not been banished from the programme as it appeared, and the time had come to extend the scope of this subject.

In the 2nd half of the 19th century science made wonderful progress. Teachers of zoology and botany had to revise their methods, and the results have been such that the human spirit has had to readjust itself. The discoveries in physics and chemistry, whilst completely changing industrial processes, had a similar result. The naturalists of last century and the beginning of this aimed above all at a rational classification of creatures according to their morphological characteristics; nowadays, we strive to find the laws of life. Classification takes the second place today, and gives way to the influence of environment, nourishment and heredity. It is not possible to take an individual and study him separately; he must be studied in connection with his environment and development.

The present programme is for groups, not for individual subjects, and the study-plan must take this into account. Thus it gives for each year a certain number of general subjects—the field, forest, etc., which are to be studied by the pupils in excursions and subsequently discussed in class. From these general subjects, types will be selected for more detailed treatment, to complete the general idea in the child's mind from his personal observations. Subjects may be selected to suit local requirements, the important point being not the subject, but the method of study.

The subjects named will do for lower and middle grades. In the higher grade the subject should be treated in a more utilitarian manner, for the child will soon go into active life, and we do not want him to feel too strange; thus the same subjects are taken over again from an essentially agricultural standpoint with country pupils, and in an elementary manner.

During this period, town children will take up the subjects that concern them most, viz., industries. The lessons will consist of visits to workshops, and talks on what has been seen, rather than in abstract dissertations on the industries. Some subjects, such as physiology, hygiene and ordinary chemistry, are given to both classes of children, and only the most elementary notions, such as are required in everyday life, are to be touched upon in an elementary course. In the third year, a certain number of subjects are arranged; such as food, drink, clothing, etc., which have more bearing on domestic economy than on natural history, but from the hygienic point of view they are important for all boys and girls, and must be treated by the teacher as he thinks best for local requirements.

#### HISTORY AND CIVICS.

Whilst geography and science essentially consist in the knowledge of *things*, history deals with *people*. In a primary course there is not time for more than an outline sketch, and the more important events. The history lessons should be the school of civics, and the child should learn from his own observation, and reasoning from past to present.

#### SECOND GROUP—ARITHMETIC, GEOMETRY AND ACCOUNTING.

*Aim and Importance.*—Arithmetic is valuable for everyday life, but also as an *educative factor*, developing attention, judgment, reasoning, habits of order and precision. One has said:—"By good teaching in arithmetic one learns prompt observation, principles judiciously ordered, punctuality, order and accuracy. The pupil's will is strengthened, for he learns to base his activity on well-defined rules, and must use energy and perseverance to find the solution of problems. The teaching of arithmetic therefore has a high moral influence."

*Arrangement.*—The programme of the lower grade is based on the importance of the numbers from 1 to 10. Some may think the first year's work too restricted and not varied enough, but those who know that it takes time to give young children clear and definite notions of the first numbers will not agree with that. They must become so familiar with the elements that their replies are always prompt and correct. Once a pupil is sure of 1 to 10, and then 10 to 20, future

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work becomes easy. But this basis will not be safe unless it is founded on intuition. We must distinguish between what is comprised in the child's knowledge and the material adopted to facilitate the transition from concrete to abstract. Every lesson must begin with something familiar to the child; pens, pencil, boxes, books, etc. Calculations made on these concrete subjects are reproduced with the aid of the balls or similar apparatus. At first, the written work will consist in representing the quantities studied by easy signs, such as dots, crosses, circles, etc. Not until the child has attained a certain degree of facility in writing should he be taught the figures.

The first exercises can be done with the material to hand, ruler, box, pencils, books. Then we take the school furniture. It is as well to prepare sticks of various lengths from  $\frac{1}{2}$  to  $2\frac{1}{2}$  decimetres, which can be used for a great many exercises and contribute largely to the development of the eye.

Multiplication and division are not taken till the second year, and it is here that the multiplication table is learnt. This is done by making the series in the order indicated on the programme, and always beginning with concrete numbers. For division, in this year, we confine ourselves to measuring.

Written work is but a reproduction of the oral work in this grade, and simply means that the child has acquired the habit of arranging the numbers belonging to each problem on the same line. Not until the intermediate grade do we begin special processes of written arithmetic. The pupil should be taught to use simplifications as soon as he is sufficiently familiar with each new rule. Above all, sums must not be worked with numbers of which the pupil does not know the meaning. His own environment is an inexhaustible mine for elementary quantities. It suffices to mention:—objects belonging to the child, distance walked, distance between two points, dimensions of familiar houses and places, price of goods used daily, etc. It is important to remember that a perfect knowledge of the four first rules within the numbers 1 to 100 is absolutely necessary in teaching arithmetic, for it is thus that a familiar knowledge of the properties of numbers is gained; besides which, the products of these numbers are the most commonly met with.

The first lessons on decimal fractions present few difficulties if taught on the basis of the litre, decilitre, franc and centime, metre and millimetre, etc., for numbers of one to three decimals. Elementary fractions are begun from the first year of the intermediate grade. As arithmetic should bear only on ordinary fractions, pupils can soon be taught these same quantities, a knowledge which will be most useful in helping them on with other problems.

*Geometry and Accounting.*—These are to be incorporated with arithmetic. They are the branches to which the trunk supplies strength and life. Their extension must depend on local conditions and the organization of the class. In mixed schools, for example, the boys will have more difficult problems while the girls do needlework. The chief aim should be to increase their skill and aptitude for careful work. Not until the higher grade will special problems be given, such as calculation of cubes, levels, and practical exercises. But the distinction must not be carried too far, for some knowledge of geometry is very useful to girls also.

*Method.*—From the concrete to the abstract. Begin with oral work, followed naturally by written. When the child has arrived at the first stage, when he can use common numbers with certainty and rapidity, our arithmetic lesson will have fulfilled its object. For it may be truly said that while a child easily learns arithmetic, our people are not arithmeticians. Above all, exercises must be practical, according to local conditions, and correlated with the home life, and with other lessons. This does not mean—as has been supposed—that arithmetic is to be considered as a means to instil into the child's mind certain information on domestic economy, agriculture or industry, but rather to impress on the memory useful applications.

*Directions and general principles.*

1. Every lesson based on intuition.
2. Rules not given by teacher, but found by pupils with the help of concrete and abstract graded exercises.
3. Oral arithmetic to prepare for written. Not until the intermediate grade should special processes of written arithmetic be begun.
4. In all grades, arithmetic is to be an exercise of intelligence and not of mechanical application of rules or principles. Pupils are to be practised in rapidly finding simplifications which can be used, according to the nature of the numbers to be related.
5. As far as possible, arithmetic is to be correlated with the other subjects of the curriculum.

DRAWING.

It is admitted to-day that Drawing is the oldest manifestation of human thought and expression. Humanity expressed itself in Drawing before evolving the marvellous and complicated procedure of writing. The child obeys the same instinct; his drawing is but a kind of language by means of which he tries to make his impressions known by schematic lines having all the characteristics of symbol. It is thus a necessity common to all. Man finds manifold advantages in translating his impressions thus; not only does he preserve the picture of what strikes him and communicate it to others, but he develops in himself by the use of Drawing the most noble faculties of art and taste. Drawing should thus be considered a kind of sixth sense, which must not be atrophied, in view of the place held in the labors of humanity by the professions of Drawing and Arts. Unfortunately the methods in use do not always take sufficiently into account child psychology; they do not develop taste or initiative, and do not impress upon the general public, indifferent or hostile, the immense importance of Drawing, the universality of its applications, and its important part in the general work of education.

*Drawing Method in Infant Schools.*—

The real scientific teaching of Drawing cannot be begun till 10 or 12 years of age, when a certain maturity of mind permits the child to grasp the abstractions of geometry and measurement; but it often happens that at this stage of its

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school life the child loses interest in this lesson, and *endures* it rather than profits from it. Therefore the previous preparation is most important, as it assumes responsibility for the future. It is important that the tiniest children should preserve their joy in what they do; the education of this period should stimulate growth and develop the graphic power of the child. Finally, it is most important that the child, having retained all his love of Drawing, should embark resolutely, eager for novelty and knowledge, on the more serious lessons of the primary school. From the very beginning children should be given artistic culture, elementary and proper to their age, but integral. This develops all the essential qualities at the same time. It is in the infant school that the child's mind and taste are formed; it is the nursery from which we gather young plants ready to develop and bear fruit in the hands of understanding and observant teachers. The infant school should let the child speak its natural idiom, freely, without constraint, in all its naïveté. Pedagogy only intervenes to guide discreetly, by appropriate but always varied and attractive exercises; the education of hand and eye. Models must be taken direct from nature, from things and sights familiar to the child—in fact, anything that excites initiative and spontaneous activity. If the sphere of the child is play, as the old philosopher said, let us guide nature to science by instruction which amuses, interests and makes him love Drawing. It is by taking the child as he is, not as we would like him to be, that we can build up a rational education, fruitful in its result.

*Drawing in Primary Schools.—*

Bring the child in contact with nature, teach him early to know and love the beautiful flower world, where so many simple forms are within his capacity; put familiar objects before him which can, if logically executed, furnish him with fascinating models—that is the first aim of the teacher, and that also is the synthesis of the programme of the primary school, so that the child's Drawing may "reflect in its effects the world in which we live". Flowers and vegetables in themselves can furnish a whole course, and the smaller and humbler ones are by no means the worst models. To these can be added insects indigenous to our country, and then all animate and inanimate nature. In all these exercises the pupil is to seek the physiognomy and measure of things, which is the basis of all copying from nature. We do not go much into the æsthetic side in primary schools. It is not necessary to state that Drawing does not only lead to becoming an artist. Do not let us go back to our grandfathers' ideas that Drawing is an *accomplishment*, whereas it is really the surest means and prime process for teaching observation, inspiring reflection and exercising the analytic spirit.

About the middle of the higher grade, perspective should be introduced. This new study, also based on observation, should be accessible to all. The study of angles previously made will help towards the appreciation of the receding lines of a geometrical solid or simple box. The proportions of the object-model do the rest. But some elementary laws are necessary for the means of control to strengthen the work of the pupil and make it easier for him.

Do not let us forget *color* or *memory drawing*, or *decorative composition*, and let us give a place to *muscular exercises*. Finally, the utilitarian side of geometry and linear Drawing takes its place towards the end of the primary school. A

pupil destined for a trade where he absolutely needs to trace plans or elevations or rough sketches, makes his first attempts in that line with scale drawings of familiar objects in the school room, and scientific drawing is allied with plastic design, but without excluding the former. General education requires both modes of teaching.

*General Directions for Teaching Drawing.*—

In the primary school the teaching of Drawing should be collective in all grades, as regards the instructions given by the teacher. The models can be varied to suit individual cases. The same model can be used for a whole class, to be treated individually according to capacity. There should be no restriction of materials, and no compulsion in nature-copying; convention does not really exist, and is only required for geometrical Drawing. Higher grade pupils should do sketches. Drawing requires a sure eye, and this is not acquired quickly, but can be attained by truthfulness of analysis. Dividing lines by means of strips of paper should be forbidden. On the other hand, in *decorative composition*, which is primarily an exercise of *taste*, the processes used in the industrial arts may be employed, e.g. geometrical aids to accuracy such as compasses, square, etc. The aim being to obtain a satisfactory arrangement, this should be helped by every possible means.

MANUAL WORK.

The law of public instruction includes manual work, and orders it to be taught by the regular teacher. It cannot therefore be classified in a syllabus. In spite of opposition, manual work continues to make progress, and wherever it has been introduced, the results have been excellent. It fulfils a double aim;—(a) to give scope in a rational manner to the love of movement; (b) to furnish a concrete foundation for certain subjects. Up to the present, the book has monopolized the school and instruction has been too theoretical. The social questions of our times are different to those of half a century ago, and those who make up the time tables of today have to think more than their predecessors of the future of the child. For the prosperity of a country does not only depend on those who are able to clearly and correctly express their views, or on those who are able to buy and sell successfully, but rather on those who convert raw materials into produce of all kinds. Now, it is most important that the intelligence of the workman should not be annihilated by mechanical work. Even better organised apprenticeship will not achieve an adequate result if the school, by its educative influence, does not lead the child not only by words, but by actions, to appreciate the beauty, the joy and the salutary effect of manual labor.

Complaint is made of the number of hours given to gymnastics, and rightly so. Well, manual work is gymnastics. It even corresponds perfectly with the modern idea regarding the teaching of the latter, that the child must not resemble an automaton, but preserve a liberty of movement within the limits of necessary order. To alternate physical and mental work can only have a favorable effect upon the latter; besides which, if we really want to travel from the con.

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crete to the abstract, manual work furnishes the most useful material, for example, for arithmetic and drawing. The pupil who has constructed a cube—which does not take very long—will have a better idea of the measurement of volume; he will speak of it with more assurance than if he just had to look at the same geometrical body with the whole class. And in holding it and turning it round he will acquire an elementary idea of perspective, and will be better able to make a good job of copying the larger model in the drawing lesson. The eye is developed, the use of technical terms becomes easier, the hand, as the old philosopher has it, is really put at the service of the mind.

It is feared that manual work will encroach on the other subjects, and no doubt this is a real danger, and the teacher must be careful to keep it within proper bounds. One thing must be kept in mind, even in the cities, and that is, that manual work cannot be really profitable at school unless taught by the same man as the other branches. Otherwise, it becomes a preliminary apprenticeship training, and in such case should be excluded from the programme of the primary school.

In the country, the establishment of a school garden is of great importance, not so much to initiate pupils into agricultural work which, is already familiar to them, but rather to make them understand the phenomena of vegetation, which they so often regard indifferently, and to have within reach of the school a source of useful information for all the pupils.

## READING.

In the lower grade, intuition is the basis of language lessons. The Reading course does not begin until a preparatory study has been gone through which exercises the child in distinguishing rapidly and correctly the phonetic elements of words and terms. With the Reading is combined Writing, which here is pure imitation. It is important that the child should read nothing which he does not understand nor write anything which he cannot read. Composition is so complicated that we cannot demand it of young children. In the lower grade, it should be of a very simple character, beginning with lists of words from a previous lesson. Later on, exercises should be based on analogy rather than reasoning.

The Reading lesson aims not only at accustoming the child to correct and good diction, but above all at teaching him to think of what he is reading. He will learn to look for the leading idea of a subject, and to develop it. He is also to be asked to express opinions, which may be written down. Pieces for recitation should be short. Not until the intermediate grade do we begin the methodical study of the sentence. From this point on, intuition becomes less prominent and the book takes a larger place. The foregoing is the progressive and natural method, by which the language is really taught.

## WRITING.

Although the vertical style is now approved by doctors, the result of experiments has been that it was found best to return to the slanting style,  
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but with due regard to health. For the two lower classes we approve the vertical style, because it makes children form the letters more clearly and legibly. After that, it is left to the individual child.

#### SINGING.

This can be correlated with other lessons—language, science, national history and religious instruction. The ideas most easily assimilated by the children are just those which are found in a song which they know, and the song can be used to refresh and vivify the lesson.

#### NEEDLEWORK.

Collective and intuitive method. All the pupils of one class are to do the same work. General preliminary explanation of materials, dimensions, proportions, etc., by means of blackboard sketches, work done by the teachers before the class, patterns cut by children, large needles and coarse wool for knitting, knitted articles to show darning, etc., etc.

A model of the object to be made should always be before the pupils. Theory will be applied to useful objects, simply and tastefully made. After a while pupils may prepare their own work. Their power of observation is to be developed, also order, neatness, economy, dexterity and taste. Pupils must learn to find and repair their own mistakes, only accidents being adjusted by the teacher. In three-grade classes, groups may be formed, working in rotation. For the cutting-out lesson of the final year, the teacher will take one of the girls, take her measure, and draw the pattern on the blackboard, for the girls to reproduce on their paper—this is the pattern from which the garment is cut, and is to be copied into a book, with notes of measurements, etc. Each girl is to have a second piece of work for odd moments, which may be recreative as well as instructive, and easy enough not to require the teacher's help. In the lower grade it can be a piece of stuff on which the girls can practise stitches learnt, button-holes, etc.; in the upper classes pieces for trimmings, lace crochet, etc., or stocking-knitting.

#### DOMESTIC ECONOMY.

This course only includes the subjects specially related to women's activities, the others being included in the natural science lesson. It must be taught by a lady, either a special teacher or the needlework teacher, but not combined with the needlework lesson, so that it must have a special place on the time-table.

## SECTION 2: MANUAL TRAINING IN SWITZERLAND.\*

#### NEED AND VALUE OF MANUAL TRAINING.

Manual Training is the oldest means of education—for centuries it was the only means. It is recognised that all children under school age get training by means of play and occupations, but as soon as they go to school their physical

\*Translated from "Guide to Manual Training Teachers", published by Zurich Society for Boys' Handwork.



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development is subordinated to mental. 2 hours drill a week is not enough outlet for the child's innate love of movement, and only the introduction of Manual Training in the curriculum of primary schools provides a natural method. Clay modeling, folding and cutting paper and cardboard, working wood and metal, are exercises which appeal to the child's inmost self, and not until these exercises are introduced into the school will the education of youth be harmonious in method.

The special value of Manual Training is its influence on the formation of character. Educative Manual Training for boys has no connection with any intention of preparing for a trade; hence no machinery is used; only the ordinary tools of the manual worker may be employed. The mere fact of learning to use the tools which are found in every household gives a certainty of hand which is useful to everybody, whatever his occupation. The handling of the principal raw materials such as wood, iron, clay and paper, leads to a number of technical and verbal conceptions. The combinations of colored paper, the decoration of simple objects, and the adaptation of form to purpose, cultivate the sense of *beauty*. Such work in itself is a training in *order* and *exactness*, and careful observation; and these are acquirements which are of the greatest value.

## DEVELOPMENT OF POWER.

The crown of the work, however, is the inner satisfaction, a pure, moral joy, known to every boy who takes Manual Training. The consciousness: "I made that, and can make it again" gives him moral force; for he notices that there is a power in his hand which is useful to him and which will help him through life. Purely mental development can never call out this power; in fact, it leads to the conception that mental work only is worthy of man; it takes no account of manual work. That is wrong. Technical work should be put on the same plane with mental, and receive the same recognition. Manual work, as well as mental work, ennobles the soul, and each supplements the other and deserves equal honor.

## THE KEY TO CHILDREN'S SOULS.

But further—though it may seem strange to some that handwork develops the mind, this is so. It may even be said that only handwork is the key to some children's souls. As long as the child's body is growing, purely abstract thinking is hard for it, indeed, for many it is impossible; so that these children are not 'stupid' as is supposed, but are only being overtaxed or wrongly managed. As soon as they are put to work, they show from a new side. Many of the elementary subjects are useful to some children all through life; others, whose strong point is a good memory, lose it all. But if the instruction were based on handwork, if abstract truths in arithmetic, geometry and science subjects were learnt through practical work, the appeal to the mind would be far stronger than by words and explanations. Thus, for example, the comprehension of a scale or a right angle is far more easily acquired through practical work than through explanations.

## COMPLETES THE CURRICULUM.

In another direction Manual Training is a completion of the school curriculum. To-day we teach arithmetic, geometry, drawing, but we leave the boy in ignorance as to the use of these things. Handwork shows him how a knowledge of these subjects helps the success of the work, indeed, how necessary it is to it. Incorrect drawings, false calculations, result in bad work. Thus the work is correlated with the lesson and with practical life, pupils being encouraged to apply the knowledge acquired in school by making useful articles, and the practical sense is exercised. Their interest in school work itself is increased, as well as in the manual work. The youth learns that he is gaining knowledge not for the school, but for life, and that what is learnt in school must be applied in life for the good of the community.

To sum up, it is evident that neither more nor less must be demanded for boys than is already given to girls. The old idea that a boy's hand needs less training than a girl's, must go. Communities must see to it when school houses are built, that rooms are provided for boys' handwork, teachers prepared for it, and means for its general introduction encouraged.

The whole aim of handwork demands that it shall have a beneficial effect on health. Therefore all precautions must be taken to ensure this.

The Departments of Manual Training are Cardboard, Carpentering, Metal work, Modeling and Carving, in methodical order and adapted to the pupil's strength.

## CARDBOARD, CARPENTERING AND IRON WORK.

Undoubtedly those departments of handwork are to be emphasized in which the pupil has to actually work on the raw material, *e.g.*, where the raw material offers a real resistance to his physical strength, and has to be formed into a particular shape with the aid of tools. These conditions are fulfilled by paper and cardboard work in the lower, and carpentering and iron work in the upper classes.

In all these departments, the neat and exact model should be the beginning of the lesson. This is discussed as regards its form, object and material, instructions being given as to how the shape can be adapted to its purpose. From this model a *working drawing* is made, the necessary measurements being indicated. Where this is omitted, the main object of Manual Training is missed, *viz.*, the correlation of school learning with practical life, or the translation of knowing into doing. The sketch as a rule should only take up a short time, and it is enough if it is sufficiently clear to enable the pupil to construct the article from it. Where time allows, it is recommended to have the object drawn in natural size or to scale on a drawing board, and use this as a working drawing.

Now comes the actual work. First the material must be prepared—then the drawing, which must be exact and careful, if correct work is to result. The teacher should therefore check the drawing and make any suggestions for correction. Incorrect drawings are to be returned, thus accustoming the boys to correct work. Above all things, the use of stencils is to be forbidden. In the

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first place, the drawing is incorrect; in the second, it prevents the boy from learning the use of certain tools, and instead of exercising his hand and eye, he becomes the slave of the stencil.

The actual work should be taken in short sections, each one being *shown* by the teacher separately. Mere words or suggestions are not sufficient—let him show a little at a time, so that he can keep a check on the work. The work will advance slowly, but the result will be all the better. It is also a good thing to let the pupils repeat the directions given by the teacher, and thus any errors can be explained at once. The pupils will thus learn to set their own work, and execute it satisfactorily. The final aim is not the article as such, but the careful, thoughtful execution of the work which its construction requires.

## THE USE OF TOOLS.

Tools are an important factor in satisfactory results. Pupils are to be taught their uses and importance, and constantly enjoined to handle them carefully. Especial emphasis is to be laid on the use of the tools and the proper position for holding them, etc. But all this is no use unless the tools are kept in full working order during the whole time, so that good work becomes possible.

Where there are some pupils who get on faster than the rest, the teacher is to insist upon better work, rather than let them do more than the others; and in large classes the teacher may even let them help him in inspecting the work of the other pupils.

## PROGRAMME OF MANUAL TRAINING INSTRUCTION.

## A. CARDBOARD.

## Grade 1. Age 10.

1. Sewing books.
2. Folding—hat, bag, envelope.
3. Folding and cutting—envelopes and bookmarks.
4. Cutting with knife—flat models, square basket, hexagonal ditto.
5. Cardboard work—label, plain and covered, map, calendar or picture, frame for picture.

## Grade 2. Age 11.

1. Paper work—folder, envelope.
2. Half-cardboard—flat models.
3. Cardboard—time-table, portfolio, prismatic box, box and lid, wall-basket, bag, letter-case, frame for postcards.

## Grade 3. Age 12.

1. Paper work—free cutting (picture).
2. Cardboard work—writing pad, book, arms, portfolio, frames.

## B. CARPENTER'S BENCH.

## Grade 1. Age 13

1. Plain cutting with saw, planing wood, prismatic and round stave, boring, clothes-hanger, key-holder, bench for flowers, washing board, garden stool, bookshelf, simple box.

## Grade 2. Age 14.

Table, food-house, cross slats, tool box, key-box, tray.

## C. METAL WORK.

## Grade 1. Age 14.

1. Filing—prism, pointed staff.
2. Boring.
3. Riveting—cross, square, key-holder, photograph holder.
4. Bending—right and obtuse angle; hammer-holder, iron-holder, clothes-horse or hanger.

Grade 2. Age 15.

1. Square in sheet-iron. Key-shield; practice in punching, riveted box, shove fire-irons, tin circle, chased shell, candle-stick.

#### D. CARVING.

Grade 1. Age 13.

1. Trace-cutting; practice board (both sides), block-holder, mat, towel-holder, block pad, card stand, cabinet frame.
2. Flat cutting—key-holder, hat-holder, pen-tray, dress-hanger.

Grade 2. Age 14.

1. Flat carving—brush-board, frame, box, letter-holder.
2. Relief carving (flat)—letter weight, frame, etc.
3. Chip-carving (straight line)—various articles.

#### THE PRINCIPLE OF TEACHING.

##### *Lower Grade.*

Articles must be taken from familiar objects, either already known or learnt in class. In discussing the kitchen, show a pot, then dwell on various kinds of pots (flower, milk, etc.).

The sense of number, *i.e.* arithmetic, is combined in the first school year with Manual Training, by the use of counters, buttons, rings, etc.

For cultivating technical dexterity of hand and æsthetic sense for form and color, special exercises must be given, especially with colored paper and flat forms.

##### *Middle Grade.*

4th to 6th school year (age 8-10)—the scope of activity and the field of observation for the perception of new forms are extended. Here a School Garden is introduced, excursions are made, collections are brought, and handwork in the narrower sense is practised. The School Garden is a class one, consisting of a bed about 1 metre square. Plants are chosen which will be treated in the course of the year (four). The children watch the plants in development and fruition, and give their observations verbally. The educational excursion introduces the child to his home, from the natural history and geographical point of view. The result is seen in pictures exhibited, as "Home Science", "Excursion in the Woods", etc. After the elements of graphic representation have been grasped, relief maps may be made. The innate love of collecting things is utilised by making the children cut out pictures at home, mount them, and then write a few explanatory sentences or impressions on them. The didactic use of handwork is shown in squares, triangles, the æsthetic use in color and form studies; the picture in Manual Training by collections. As to Manual Training and Drawing, only the Manual Training school can show the use of systematized Drawing, for only this gives the opportunity to apply what has been learnt. The pedagogical truth that a child is always asking the why and wherefore can be met to some extent in this work.

##### *Upper Grade.*

The same method continued. The experimental garden is dropped; the collections go on, and the excursions include industrial establishments. The actual handwork is extended to wood and iron. A feature is added in the explanatory letters written by the boys. They illustrate their visits to a glass-factory, pottery works, (Swiss minerals), illustrating the course of their development by colored bands (action of water); showing how the Swiss central country grew out of the washing of the Alps, and how the men who lived there learnt to make use of the material in the ground by burning to utilise it (cement, clay, glass, chalk, aluminum, etc.). The boys want to learn about the raw materials and their manufacture, hence the picture, "Iron, its Origin and Manufacture". Further, the cardboard, wood and metal work has been closely correlated with technical drawing; also with geometry, and lastly with freehand drawing, showing how the knowledge acquired in the drawing lesson can be applied in the Manual Training lesson.

## SECTION 3: A TYPICAL VOCATIONAL SCHOOL. (Geneva).

#### ORGANIZATION.

The school is intended for pupils of 13 years of age and upward who have completed the 6th year of the primary school, and wish to take up industrial or commercial pursuits. It prepares particularly for the technical and pedagogic departments of College, the Technikum, the School of Mechanics, the School of Industrial Arts, the School of Watchmaking and the School of Commerce.

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The course covers two years and includes:—French and German—composition and correspondence; commercial arithmetic and accounting; elementary mathematics; physical and natural sciences, which are frequently required in industrial work; commercial geography; history and civics; drawing and manual work.

The school year covers 40 to 46 weeks, of 30 to 35 hours weekly.

The school is under the control of the Director of Vocational Instruction.

## STAFF.

Each class is in charge of a class-master, who takes part of the classes, others being taken by special teachers.

The staff of the school have periodical conferences, presided over by the Director. Attendance is compulsory. The subjects discussed are proposed by the Department, the Director, or one of the members of the staff. Programmes, text-books and rules are discussed before being put into force, decisions made regarding admission by examination, promotions, etc.; and the Director forwards to the Department as soon as possible a copy of the minutes of each meeting.

## METHODS OF INSTRUCTION.

Teachers are expected to conform to the programme laid down by the Department, and all instructions annexed thereto. They may not use or introduce any other books than those stated on the programme. During class-hours, the teachers must take an active part in the lesson, instruction as a rule being oral. In parallel classes, teachers taking the same subjects must agree as to the order of the subjects taught. Teachers are to meet at least once a year to discuss their methods and the subjects already treated. Different teachers taking the same class are to so arrange that home work is not more than one hour a day for average pupils. Written or oral examinations, comprising general revision of subjects studied, are to be held every two months, and teachers are to take care that pupils do not have to prepare simultaneously for several examinations. At the end of each term, the teachers will submit to the Director a report of work done during the term, and at the end of the year a more detailed report on progress, order of merit, promotions, certificates, etc.

## ENTRANCE EXAMINATIONS.

Pupils desiring to enter the 1st year of the School must be at least 13 years of age. Exceptions may only be made by the Department of Public Instruction, on the recommendation of the Director. Examinations are held twice a year, and pupils are not admitted at other times, except in special cases. Candidates for the 1st year must show that they are up to the standard of the 6th year of a primary school, and are especially examined in French, German, geometry, arithmetic and drawing.

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To be admitted to the 2nd year, pupils have to pass an examination on the subjects covered in the 1st year. Pupils leaving the elementary school at the close of the 6th year are admitted on presentation of certificate covering the specified subjects, signed by a Primary Inspector.

#### PROMOTION EXAMINATIONS.

Examinations are held not less than twice a year, and promotions made on the results of these, combined with class work. Examinations may be written or oral. A committee is appointed for each subject, the master teaching this subject being on the committee. Oral examinations may be conducted by the teacher and the committee, by arrangement. Questions are drawn by lot, and a second draw may be permitted, but marks are lost if this is done. In order to be promoted, pupils must obtain two-thirds of possible marks on the year's work, and one-third on the examination, at least. Pupils not passing in all subjects, but whose general average is good, may take the single subjects later.

Pupils graduating from the 2nd year with a promotion certificate are admitted to the 4th class of the Technical and Pedagogical sections of the College, on presentation of the certificate. Those wishing to enter the Classical Section or Real Section must take a supplementary examination in Latin.

### SECTION 4: CONTINUATION SCHOOLS.

#### (1) IN THE CANTON OF ZURICH.

In the Canton of Zurich, with a population of 459,269 in 1905, there are 247 Continuation Schools having 23,832 pupils in attendance, or more than 5 per cent of the total population. These schools may be classed as (a) General Continuation Schools; (b) Industrial Continuation Schools and (c) Commercial Continuation Schools. 14 schools have apprentice departments for girls; and 16 schools have school kitchens for Domestic Science Classes. The Federal Government gives grants for Domestic Science Classes in both Primary and Continuation Schools.

Of the 247 Continuation Schools only 38 are compulsory Industrial Continuation Schools for Apprentices. Many of these 38 Industrial Schools were started by Guilds or Labor Unions, which had an interest in raising the technical skill of their youthful members, especially in drawing and sketching; in fact the whole system of Industrial Schools in Switzerland is morally supported and substantially aided by the trades—that is, by the manufacturers and their employees. Hence it is that skilled workmen are elected by the people or appointed by the civil authorities as members of the local boards governing this class of schools.

#### COMPULSORY ATTENDANCE.

In the Canton of Zurich the law making attendance at Continuation Classes obligatory on all industrial and commercial apprentices came into force in 1896-7

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From that time the number of students in attendance grew rapidly. During the first year after the passage of the law the number of students increased from 4,644 to 5,116, or 10 per cent; but while the increase among the boys was 13.8 per cent, it was only 2.3 per cent among the girls between 14 and 17 years of age. The customary apprentice examinations soon revealed the families that had neglected attendance at schools for apprentices, and fines were inflicted. In consequence of this the total attendance rose to 6,361, an increase of 23.4 per cent, or 24.3 among the boys and 26.7 among the girls. In 1909 the increase was only 121 students, or 1.9 per cent, showing that the law was generally obeyed.

In the Continuation Classes visited in Winterthur, youths from the factories were gathered from 4-30 to 7 p.m. It is compulsory on the employer to let the pupils go as well as on the pupils to attend. They go twice a week. No practical manipulative work was done by the pupils in these Continuation Classes.

In one class of 10 boys, eight occupations were represented. In another class of 11 boys, when asked how many would attend voluntarily if the compulsory requirement were removed, all of them indicated that they would attend voluntarily. In still another class of 31 pupils who had attended during two years, the teacher was requested to ask the pupils to vote on the proposition: "The law requires apprentices to attend Continuation Classes; if the compulsory law were now withdrawn, would you continue to attend voluntarily?" Thirty voted that they would attend. An inquiry was made from the teachers as to how many of the 31 pupils would likely have attended the Continuation School if there had been no compulsory law. The teachers said in their opinion only about one-third of those who were then present.

## LESSONS, TEACHERS AND APPROPRIATIONS.

The number of lesson hours to be provided for in these schools grew with the attendance in almost the same proportion, so that a large number of parallel classes had to be arranged for. But while years ago the number of hours in summer was greatly reduced, there is now, according to the report, no appreciable difference between winter and summer sessions. The number of teachers has increased from 275 to 381, or 37 per cent in four years.

The teaching staff consists of elementary school teachers (men and women), technical teachers for vocational instruction, and teachers for women's hand work and other domestic work. The proportion of teachers for general culture studies and for technical branches is 2 to 1.

The most important point in connection with Industrial Schools in Zurich, as elsewhere at present, is the necessity of preparing suitable teachers, especially teachers for vocational studies. Not every skilled workman is also a successful teacher, nor can every skilful teacher be also a teacher of technical branches with the same success with which he teaches the ordinary school subjects.

The Cantonal government appropriated \$16,400 exclusively for these apprentices' schools in 1909; the local school districts aided by Federal subsidies paid the remainder of the costs, the exact amount not being ascertainable owing to the fact that in the general accounting the various kinds of Continuation Schools are not separated.

## (2) IN THE CANTON OF ZUG.

## ELEMENTARY CONTINUATION SCHOOLS.

The scope of the general elementary Continuation School is shown by the following programme of work issued by the Canton of Zug:—

*Reading and Writing*, one hour per week. The subjects are chosen from patriotic literature, natural history, and reports on agriculture or industry. The object is to ensure a clear understanding of the text. Questions on the context and reproduction of the subject matter, orally and on paper, are freely employed. The pupils are given essays and letters to write, and are taught how to make out receipts and invoices. Patriotic songs are taught.

*Arithmetic and Simple Book-keeping*, one hour per week. The syllabus includes vulgar and decimal fractions, simple proportion, interest and elementary mensuration. Book-keeping deals with the day-book, ledger and balance-sheet.

*Knowledge of the Constitution*, one hour per week. The political and physical condition of Switzerland; history of the Federation; the political organization of parish, canton and Federation.

The civil and commercial relations of the cantons (speech, commerce, religion, climate and trade routes).

The State:—poor-law, registration, mortgage law, finance, agriculture, the licensing acts, taxes.

The Citizen:—liberty of the subject, protection of property, the franchise, the "law of association" (Vereinsrecht), freedom of religion, of thought and of the press, military duties and obedience.

## (3) IN THE CANTON OF NEUCHÂTEL.

The Neuchâtel schools are a good illustration of Cantonal organization. The population of Neuchâtel in 1904 was 131,304. The Canton has an area of 312 square miles. About 2½ per cent of the total population attend the vocational classes, without reckoning the attendance at the compulsory Supplementary Courses.

## (I.) IMPROVEMENT SCHOOLS.

## (Ecoles de perfectionnement.)

(a) Supplementary Courses (Ecoles complémentaires): recruits' school. Compulsory attendance for four months in winter for two sessions from 7.30 to 9.30 p.m. twice a week.

(b) Vocational Schools (Ecoles professionnelles): held from 7.30 to 9.30 p.m. for boys and girls. Five schools, 750 pupils.

(c) Domestic Economy Schools: day courses of 13 weeks' duration. Two schools, 410 pupils.



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## (II.) APPRENTICES' SCHOOLS.

(Ecoles d'apprentissage.)

Three Commercial Schools at Neuchâtel, Le Locle and La Chaux de Fonds;  
480 boys, 100 girls.

Holiday Commercial Course at Neuchâtel; 280 boys, 60 girls.

Two Watchmaking Schools, 72 pupils.

Three Technical Schools, 133 pupils.

Instrument Makers' Schools, 80 pupils.

School of Industrial Art, 235 boys, 40 girls.

Agricultural School, 32 pupils.

Viticultural School, 9 pupils.

Courses for adults at Le Locle, 30 courses, 520 pupils.

## SECTION 5: SCHOOLS FOR TEACHING TRADES TO APPRENTICES.

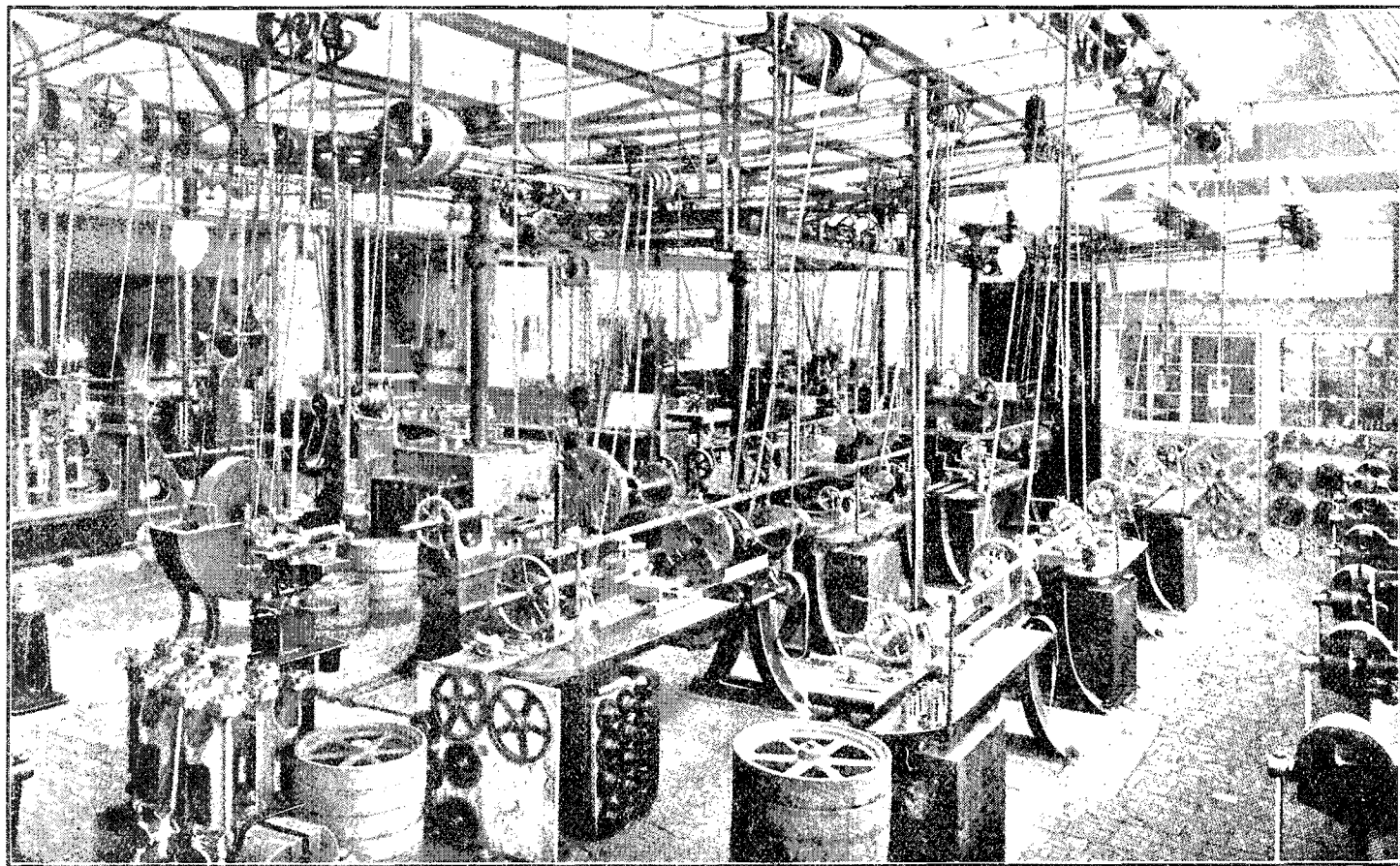
Several schools were found, maintained generally by the Commune and Canton, at which trades were fully taught to apprentices. Three typical institutions are reported upon briefly: the Metal-working School at Winterthur, the Carpenters' and Joiners' School at Zurich, and the Trade School for Ladies' Tailoring and Whitewear, Zurich. The Industrial Art School at Geneva also teaches trades fully and provides Secondary Technical Instruction. It is reported upon in Section 3 of Chapter LVIII.

### A—METAL WORKERS' SCHOOL AT WINTERTHUR.

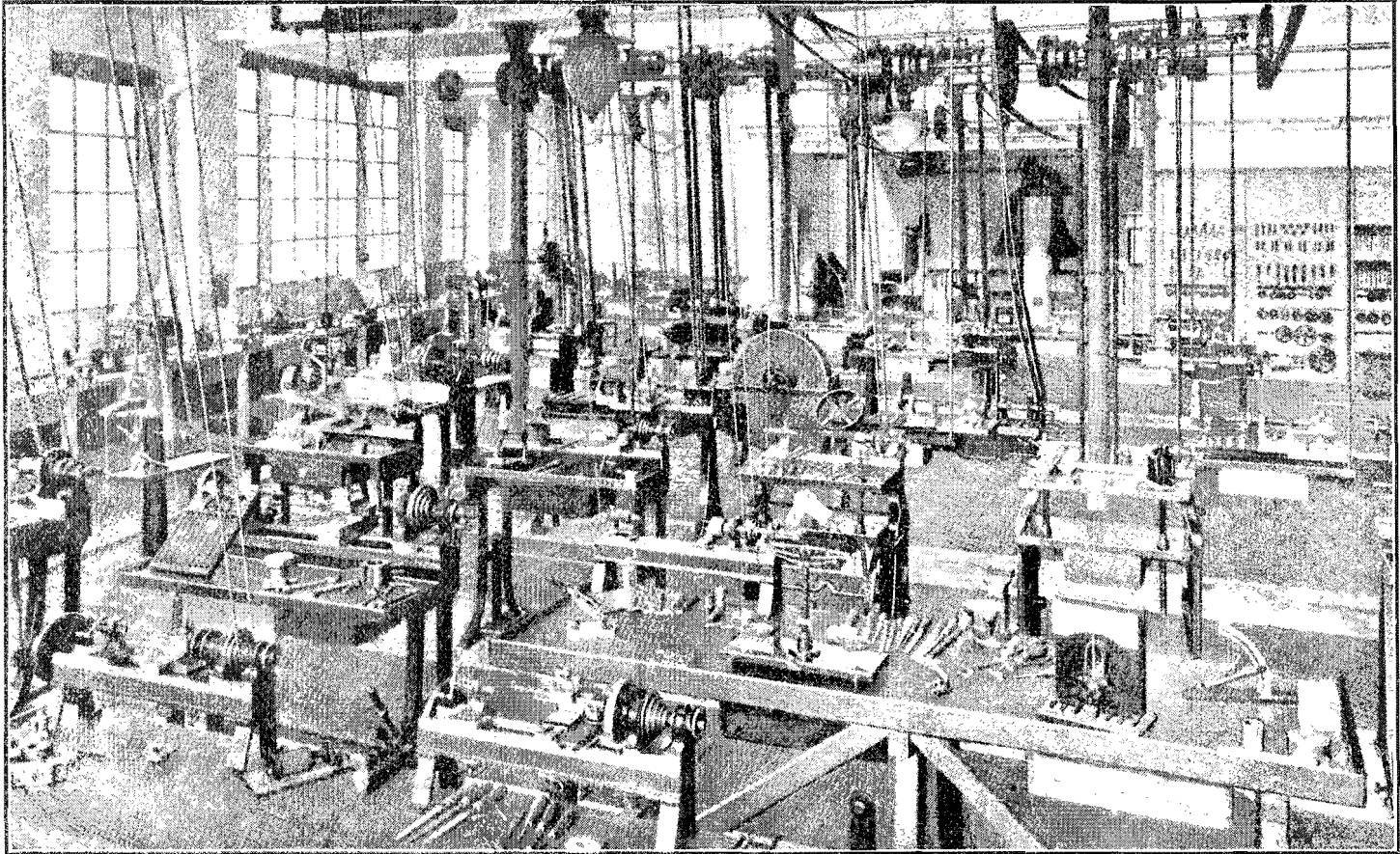
The courses are of  $2\frac{1}{2}$  or 3 years. They take the place of apprenticeship, and the students are taught their respective trades thoroughly. Workmen who have been trained at this school are regarded as among the best in the country, and are in great demand.

There are six departments, as follows:—Locksmiths, Mechanics, Fine Mechanics and Electro-technicians, Metal Casters, Special Pupils, Continuation Course for locksmiths and machinists. The first three cover 3 years of theoretical and practical work. The course for Special Pupils is intended for those who have had or who intend to take a Technical Middle or High School Course, and only require practical work here. The Continuation Course is for metal workers who have qualified as masters, and want further training in theory and practice. The course covers from 20 weeks to one year.

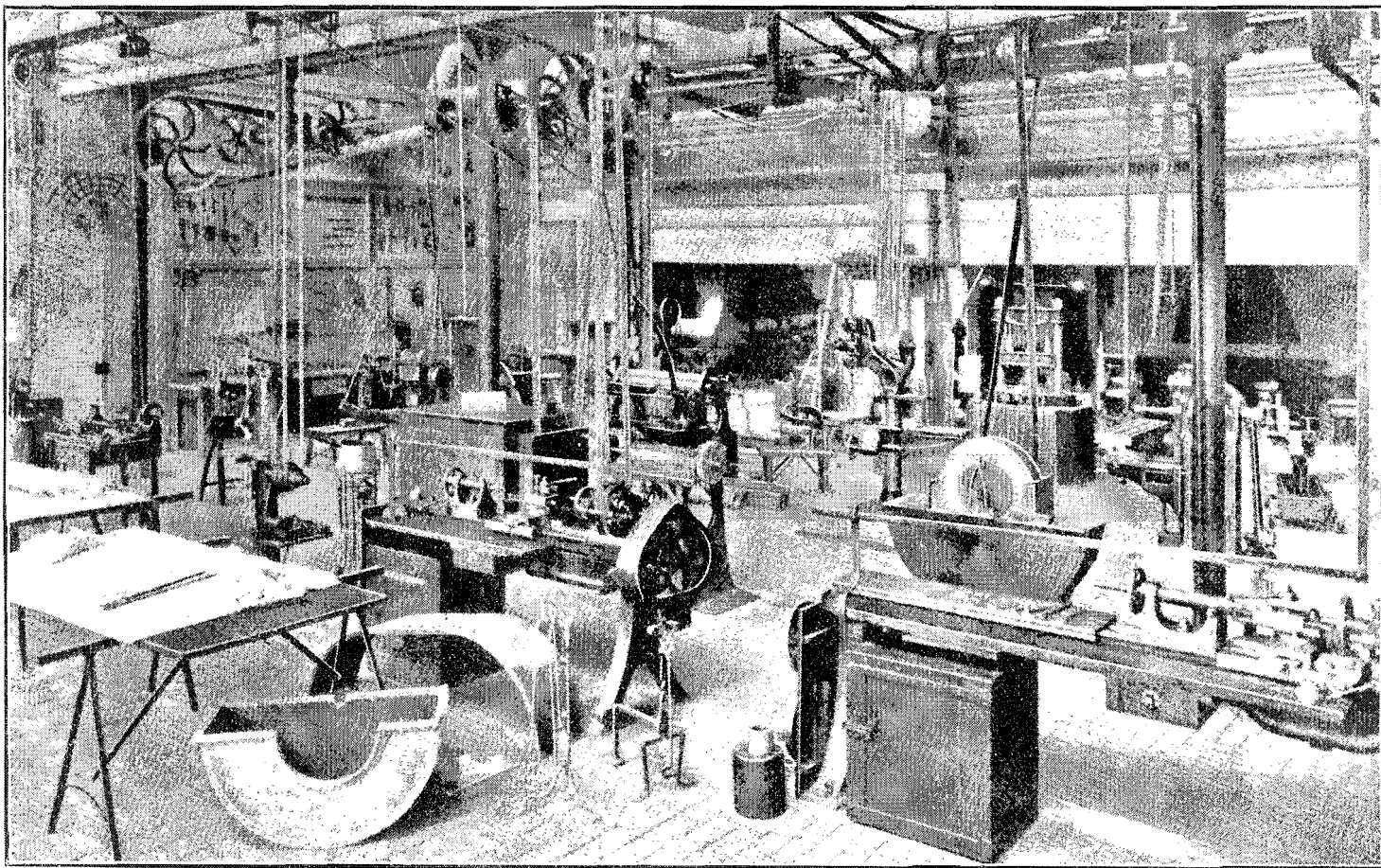
Pupils must be 15 years of age, and have had three years at a Secondary School, besides being physically fit for the work. Foreigners are accepted only if there is room for them after applicants from Switzerland have been accommodated.



MECHANICS DEPARTMENT: METAL WORKERS' SCHOOL AT WINTERTHUR.

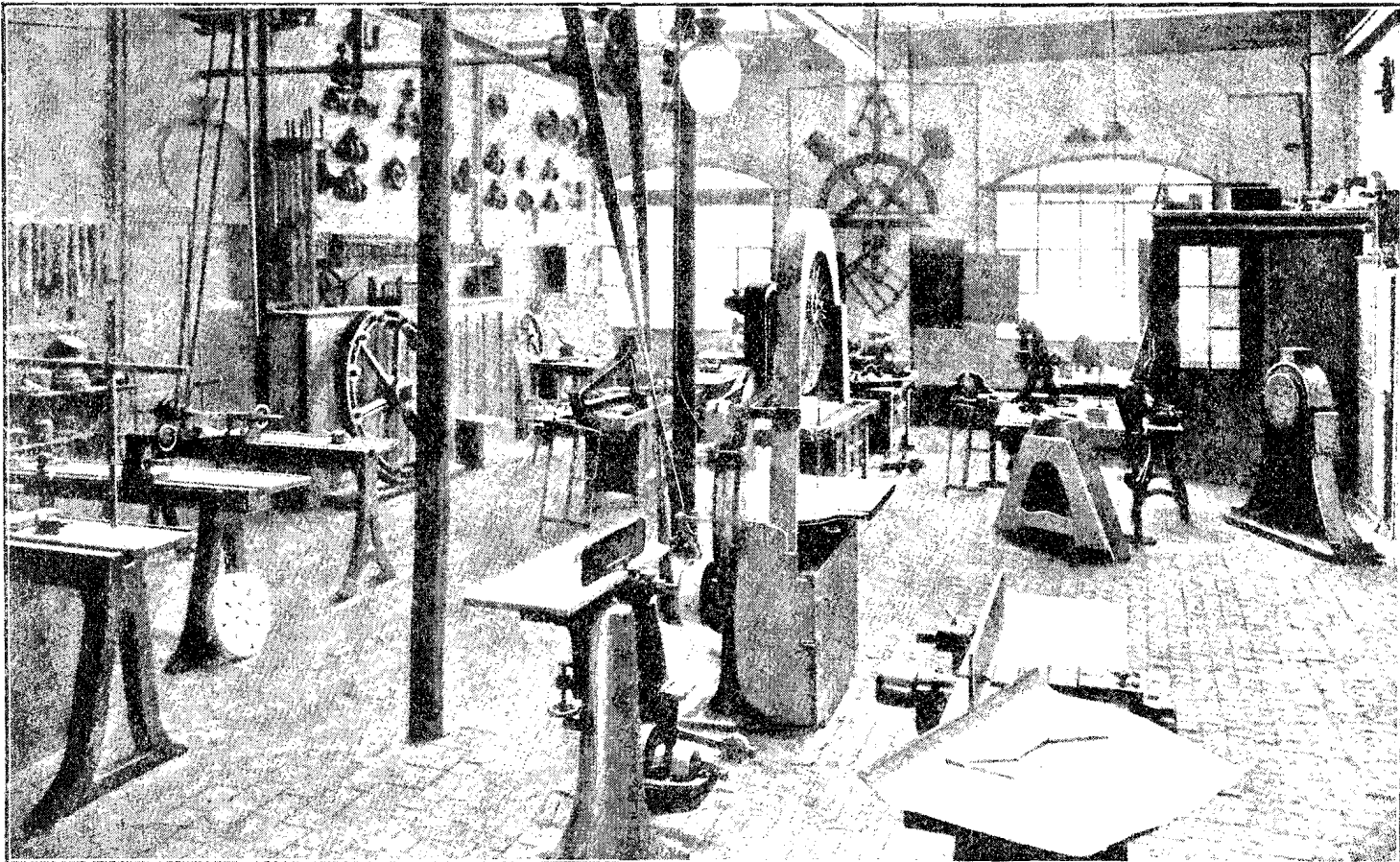


FINE MECHANICS AND ELECTRO-TECNICS DEPARTMENT: METAL WORKERS' SCHOOL AT WINTERTHUR.



IRON WORKERS AND LOCKSMITHS DEPARTMENT: METAL WORKERS' SCHOOL AT WINTERTHUR.





CASTERS AND WHEELWRIGHTS DEPARTMENT: METAL WORKERS' SCHOOL AT WINTERTHUR.

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The fees are as follows:—Ordinary 3-year course \$10 per year, (foreigners double.). Special Pupils:—Locksmiths, Mechanics and Electro-technicians, 1st year \$60, 2nd year \$20; Metal Casters, \$30. (foreigners from  $1\frac{1}{2}$  times to twice as much). Continuation Course,  $\frac{1}{2}$  year \$12, 1 year \$20, Machinists' course, 10 weeks, \$6.

## STUDY PLAN.

1st year.—	Hours per week.	
	Theory.	Workshop.
Locksmiths.....	18	34
Mechanics.....	18	34
Fine mechanics.....	18	34
Metal casters.....	16	36

The subjects are German, arithmetic, algebra, geometry, projections, sketching, physics, freehand drawing and workshop practice.

2nd year.—	Hours per week.	
	Theory.	Workshop.
Locksmiths.....	19	33
Mechanics.....	17	35
Fine mechanics.....	17	35
Casters.....	15	37

The subjects are the same as in the 1st year, with the addition of technical drawing and strength of materials.

3rd year.—	Hours per week.	
	Theory.	Workshop.
Locksmiths.....	13	39
Mechanics.....	13	39
Fine Mechanics.....	13	39
Casters.....	2	50

The subjects are the same as 1st and 2nd years, plus construction, statics and modeling for locksmiths, electro-technics for the electro-technical section, with book-keeping, drawing and workshop practice for all students.

Special pupils take 52 hours per week in the workshop.

## CONTINUATION COURSES.

*Locksmiths.*—The course covers 6 or 12 months, and  $9\frac{1}{2}$  hours a day. Pupils must have served 3 years' apprenticeship and attended an Industrial Continuation School. The subjects are book-keeping, statics, drawing, modeling and workshop practice. The fees are \$12 per half year, \$20 per year, double rates being charged to foreigners.

*Machinists.*—Two courses of 10 weeks each,  $9\frac{1}{2}$  hours per day. Pupils must have been 3 years at a Secondary School or Industrial School, and have served 3 years' apprenticeship, besides having 3 years' practical experience. The fee is \$6 a course, foreigners paying double.

In the first course the subjects taken comprise construction, materials, electro-technics, projection drawing, technical drawing, workshop practice. 14 hours weekly are given to theory, and 38 to workshop practice.

In the second course the subjects are construction, tools, division of labor, time and estimating, technical drawing and workshop practice. The same proportion of time as before is given to theory and practice.

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## WORK IS ACCORDING TO COMMERCIAL STANDARDS.

Power machines as well as hand machines are used, for the combined purpose of training the pupils and turning out products which can be sold to advantage. Articles and products which have been made are sold, and no trouble with labor unions or other manufacturers has been created by this practice. A rather higher price is charged than that of other manufacturers for the same things. The guide said that was due to the fact that a better finish was given to the work of the school, because the time of the students was not grudged on the work. The work is all done under the supervision of competent foremen, and is inspected according to commercial standards. Orders for work come to the school from all parts of Switzerland.

When pupils have finished the 3 years' course at the school they are in great request, and are accepted as fully qualified workmen without any further apprenticeship. At the close of the school course they pass the State examination for apprentices.

## B—CARPENTERS' AND JOINERS' SCHOOL AT ZURICH.

This is a comparatively small school for the training of carpenters and joiners. Its courses of work take the place of apprenticeship. The course continues three years. 7 hours per week are given to theoretical instruction out of the working hours. In addition to that the pupils have 4 hours a week in the Continuation Schools, where they take German, arithmetic and book-keeping. The remainder of the time is given to practical training in the use of tools and materials, and in the making of products which are sold in the open market. The furniture which is made in the school is usually ordered by customers. In 1909 the school sold \$4,000 worth of furniture, the work of 16 pupils. The school has always plenty of orders to keep the pupils in full work.

The pupils receive no remuneration during the first six months. In the following 6 months they receive \$1 per month, in the 3rd half-year \$2 per month, in the 4th \$3 per month, in the 5th \$4 per month, and in the 6th half-year \$5 per month. At the end of the course pupils go up for the State examination for apprentices.

The trades unions are reported as being favorable to the school and its work. The pupils of the school may join the union if and when they please. When the pupils leave the school, they do not at once claim the full wages which the trades unions appoint. A reason given for the maintenance of the school by public funds was that the students have much better opportunities for being well trained as good all-round mechanics than they would have if they were apprenticed in big shops. In the latter case they would likely be given special work to do without opportunities for all-round training.

## SCHOOL OF LADIES' TAILORING AND WHITEWEAR AT ZURICH.

This school is administered jointly by the Canton and City of Zurich through a Committee appointed by the cantonal and municipal authorities. Its aim is to train competent workers for the ladies' clothing branch, and to afford women who are already engaged in this work an opportunity of improving themselves in cutting out and making up garments. Since 1909 there has also been a department for training teachers of these subjects. Special courses are also held for those who wish to take up this work for home use, or to prepare for the Cantonal Needlework Teachers' diploma.

The courses are as follows:—

## A. Vocational Training:

- (1) Ladies' Tailoring and Dressmaking,
- (2) Whitewear.

## B. Training of Vocational Teachers.

## C. Courses for Home Use:

- (1) Whitewear,
- (2) Dressmaking,
- (3) Mending and Patching.

## D. Needlework Teachers' Course.

In all the courses the class limit for one teacher is 16 pupils.

## A. VOCATIONAL TRAINING.

Girls entering this department must be at least 14 years of age, and are usually 15. Older girls of good education may be admitted to higher classes by special arrangement.

## I. Ladies' Tailoring and Dressmaking.—

(a) Workshop and custom practice. Period of training 3 years; wages paid in the last half year. 44 hours weekly, of which 4 to 6 hours are devoted to German, French, book-keeping, drawing and physical training. No fees to Swiss subjects.

(b) Pattern Drawing for Dressmakers. Course of 5 weeks, 38 hours weekly. Courses are held three times yearly. Fee \$6 (foreigners \$10). The subjects taken include construction of patterns for normal and abnormal figures, for children's clothing, for coats, jackets, etc., and for "Reform" and sport costumes, and making up models with trimmings from fashion papers.

If enough names are sent in, an evening course in these subjects will be arranged, covering 10 to 12 weeks, 2 evenings weekly of 2 hours each, the fee being \$1.75.

(c) Special Course for Dressmakers in drawing and making up jackets, mantles, tailored dresses, etc. This is a day course of 4 weeks, 44 hours weekly, held twice yearly. An evening course of about 20 weeks is also held twice yearly. Fee \$3 for Swiss, \$5 for foreigners.

## II. Whitewear.—

(a) Workshop with custom work. Time of training 2½ years; wages paid in the last half year. 44 hours weekly, of which 4 to 6 are devoted to German, French, drawing, book-keeping and physical training. No fee to Swiss girls.

(b) Cutting-out for Whitewear sewing. 12 weeks of 36 hours, held twice yearly. In the first 6 weeks ladies' underwear is studied, in the second 6 weeks men's underwear. Either half of the course may be taken separately, if desired. Fees \$20 for the whole course or \$12 for half course (foreigners \$30 and \$18). Students draft patterns in normal sizes and to special measurements for all kinds of underwear for ladies and gentlemen. Patterns are designed for fashion papers, designs for trimming are worked out, and models made up.

If there are sufficient applications, evening courses will be arranged, covering 10 to 12 weeks, 2 evenings weekly of 2 hours each. Fees \$1.75. Courses may be held three times yearly.



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## B. TRAINING OF VOCATIONAL TEACHERS.

### *I. Teachers already in Teaching Service.—*

These attend at the workshops, or classes as required. Technique as well as method is considered. Those teachers who remain 3 months may take an examination and receive a certificate. Admission and fees by arrangement.

### *II. Training of Dressmakers and Whitewear Workers as Vocational Teachers.—*

This course covers 1 year. Candidates must be 19 years of age, have served an apprenticeship and have had practical experience, as well as an adequate education. Fees are \$20 for Swiss subjects, \$40 for foreigners. An examination for diplomas is held at the end of the course. The subjects taken are practical sewing, pattern drafting, pedagogics, method, hygiene, German, book-keeping, drawing and study of materials. Students work in the shop, in class, and attend the courses for Needlework Teachers, or take private classes if required.

## C. COURSE FOR HOME USE.

These classes are arranged according to requirements. Pupils work for themselves or their friends, and their wishes are considered as far as possible in regard to the articles made.

### *I. White sewing.—*

A 15 weeks' course is held 4 times yearly.

(a) All-day course, 7 hours daily, except Wednesday and Saturday. Fee \$9 (foreigners \$13).

(b) Morning course, 4 hours daily. Fee \$7 (foreigners \$10). On taking the course a second time, fees are \$6 and \$8 respectively.

(c) Afternoon course, 4 times a week, 4 hours each session. Fee \$6 for Swiss pupils and \$9 for foreigners. If taking the course a second time, fees are \$5 and \$7 respectively.

The half-day courses are less complete, and two courses should be attended consecutively in order to cover the ground. The subjects taken are practice in hand and machine sewing, cutting out and making up aprons, chemises, drawers, men's shirts, measuring; construction and drafting of patterns for the articles named; and freehand drawing.

### *II. Dressmaking.—*

This course covers 11 weeks, and is held 4 times yearly.

(a) All-day course, 7 to 8 hours daily, except Wednesday and Saturday afternoons. Fee \$10 for Swiss pupils, \$15 for foreigners.

(b) Morning course, 4 hours daily. Fee \$7 for Swiss pupils and \$10 for foreigners.

(c) Afternoon course, 4 afternoons a week, 4 hours each session. Fee \$5 for Swiss pupils and \$8 for foreigners.

The subjects include cutting out and making up of underskirt, underwaist, skirt, blouse, dress, child's dress; mending and making over garments, measuring and drafting patterns for articles to be made, and freehand drawing. The half-day courses are not so varied, but include pattern drafting, making up and mending, as well as drawing.

### *III. Mending and Patching.—*

Course of 10 weeks, 2 half-days weekly. Fee \$3, or \$2 if the course is taken a second time. The aim of this course is to teach repairing of every kind of linen or knitted article, with especial attention to fine mending. As a rule, two courses should be taken to cover the whole ground.

## D. COURSE FOR NEEDLEWORK TEACHERS.

These courses are arranged as required, and last 15 months. The Zurich Educational Committee decides when they shall be held, and makes all arrangements as may be necessary from time to time.

Bursaries and free places are available in all departments to needy and deserving pupils.

### THE PRODUCTS ARE SOLD.

A good dressmaker earns \$1.25 a day, but ordinary apprentices get no pay for 2½ years. Girls taking their training in the school have a great advantage,

as there is not time in a workshop to teach them all that they learn in the school. The instructress in the school at the time of the Commission's visit was a practical dressmaker, who had been there only one month, but said that she could see the advantage of the school training for the trade. Public opinion is very favorable to the school, and there is no objection from dressmakers and shopkeepers. Everything that is made is sold, and orders are taken from customers. The prices are about the same as outside, but customers have to wait longer for their goods than if ordered in a commercial dressmaking establishment. Material may be furnished by the customer or by the school. A drawing is made for each article before it is cut out. Most of the work done in the school is of medium grade, but sometimes they make evening dresses and more elaborate garments.

#### THE GIRLS LEARN FROM EACH OTHER.

About 100 girls are received for the full course of instruction for 3 years, and about 100 girls are accepted for each of the Short Courses of 11 weeks. These short courses are held four times a year.

In this school, after several years of experience, it was found desirable to have some of the pupils from each of the three years working in the same room. After the pupils have been about 6 weeks in the school, it is observed that they learn a great deal incidentally and indirectly from observing what the girls in the more advanced parts of the course are doing. This arrangement of having part of the pupils of all three years in one room was made after the school had experimented in both ways—(a) mixing the pupils from the several years and (b) keeping them in separate rooms according to the year they were taking.