ROYAL COMMISSION

ON

INDUSTRIAL TRAINING AND TECHNICAL EDUCATION

REPORT OF THE COMMISSIONERS

Volume II of Part III

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ROYAL COMMISSION ON INDUSTRIAL TRAINING AND TECHNICAL EDUCATION.

OTTAWA, 31st May, 1913.

The Honourable T. W. CROTHERS, K.C., M.P.,

Minister of Labour.

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

JAS. W. ROBERTSON,

Chairman.

THOS. BENGOUGH,

Secretary.

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CHAPTER XL: INTRODUCTORY.

The German Empire as created in June, 1871, is made up of 26 different States. The area of the Empire, exclusive of those parts covered by water, contains 208,510 square miles. According to the Census of 1910, the population was 64,903,423. The Kingdom of Prussia had 40,163,333, or 61.8 per cent of the population, and contained 64.5 per cent of the area. The smallest 20 States contain about 10 per cent of the population, and 9.6 per cent of the area. The density of population varies greatly in different districts; that for the whole Empire in 1910 was 310.4 per sq. mile, while in Prussia it was 224 and in Saxony 829.5 per sq. mile.

German is the mother tongue of 92 per cent of all the inhabitants.

Emigration, which at the beginning of the 80's amounted to over 200,000 persons per annum, has decreased to between 20,000 and 30,000 per annum during the last decade. In 1910 it was 25,531.

Occupations.

In 1900 there were fourteen towns with over 200,000 inhabitants each; seven with over 300,000; and five with over 400,000. In 1900, 54.3 per cent of the population lived in town communities with more than 2,000 inhabitants each, and 45.7 per cent lived in the country including places of less than 2,000 inhabitants. In 1871 when the German Empire was formed the figures were: town population, as above, 36.1 per cent; country population, 63.9 per cent.

The transition from an industrial minority in the population to an industrial majority was brought about between 1880 and 1900. In 1895, of the total population 35.7 per cent were occupied in agriculture; 39.1 in mining, manufactures and building; 11.5 in commerce and trade; 5.5 in the army, civil service and other professions; all others (without occupation or no occupation stated), 8.2.

The social grades in the various divisions of occupations have some bearing upon the system and method of education required.

In 1895 of the total 18.9 millions of persons earning a livelihood in the three principal divisions, viz.: Agriculture, Industries, Trade and Commerce, 28.9 per cent were their own masters; 3.3 per cent were employed principally in commercial and technical establishments; and 67.8 per cent were handworking wage-earners.

Industrial Groups.

There are two large groups in the domain of industrial activity; (1) those actually engaged in manufacturing and in the handicrafts, employing 78 per cent of all in industry; (2) those engaged in commerce, transportation, providing lodgings and inn-keeping, 21 per cent.

The largest number of persons are employed in the group for the manufacturing and cleaning of clothes, with 13.5 per cent. Next to that comes the commercial division with 13 per cent; then follow the building trades with 10.2 per cent; the manufacturing of foods and articles for consumption, 10 per cent; textile industries with 9.7 per cent; metal working trades with 6.2 per cent; wood industries, 5.8 per cent; instrument making industries 5.7 per cent; quarrying and brickmaking, 5.4 per cent; mining, foundries and salt works, 5.2 per cent; various other occupations each with a smaller per cent. There are reported to be 320 different kinds of industry, employing 10¼ millions of persons—7,930,000 men and 2,340,000 women.

Industrial production has kept pace with the increase in the use of mechanical power. Improvements in organization, in the application of science and in the technological qualifications of managers and workers have allowed a full application in the industries of the law of increasing returns.

Agriculture.

The climate and quality of soil are the most important factors which determine the agricultural possibilities of a country. Where these are widely different a corresponding variety may be expected in the nature of the agricultural pursuits followed and in the agricultural products of the country. The German Empire extends from the high level of the Alps to the low country lying about the North Sea and the Baltic. The coldest districts are those east of the Baltic, the mountain district of the Hartz, the Swabian and the Bavarian plateau, and the Alpine region which extends throughout Bavaria, Wurttemberg and Hohenzollern. In these parts the Spring can scarcely be said to begin before April and the early coming on of winter nips all vegetation in field and meadow. On the other hand in Silesia, which lies in the centre of the Empire, Thuringen and Saxony, the milder climate brings out the buds in March. The Rhine provinces, Rhinegau and the valley of the Rhine are among the warmest regions. There the vineyards ripen in abundant sunshine.

The rainfall varies in the different districts between 15.7 inches and 67 inches. Besides the differences in the conditions of climate there are even greater differences in the nature of the soil and in its productiveness.

Sizes of Holdings and Kinds of Farming.

The agricultural population is divided into large estate owners, small farmers and agricultural labourers. Of the total number of 5,558,317 holdings of farming land there are 25,061 farms and estates each with 100 'hectares' of

land and over; 281,767 large farms with from 20 to 100 'hectares' each; and 998,804 farms with from 5 to 20 'hectares.' Each of these three grades, in the aggregate, has about an equal area of land, and half as much land in the aggregate is held as small peasant farms and small holdings by 4, 252,685 persons. The 'hectare' is equal to about 2½ acres (2.47 acres).

One does not find in Germany large districts where one or the other system of farming is carried on exclusively. There are a number of localities where the conditions are so constant as to cause some particular branch of farming to be the prevailing one. The form of agriculture most generally followed at the present time is that of the simple or modified rotation of crops. Stock breeding in Germany is dependent upon the smaller farms. The agricultural industry of Germany has always been based upon field husbandry and the latter, therefore, plays an important part in the agricultural activity of the nation. Notwithstanding this Germany does not provide sufficient bread stuffs for her own population. Considerable quantities of wheat, rye, barley and oats are imported annually from abroad. The increase in crop production has been largely due to the discoveries in natural science and their application to methods of agriculture. Drainage has been applied to the general advantage of the German farm.

Areas and Yields of Crops.

48.6 per cent of the total area of land devoted to agriculture and forestry is under cultivation for field crops and market gardening. This area is divided according to the crops grown as follows:—

Cereal	61.1 per cent.
Hoed crops and vegetables	17.5 "
Fodder	10.1 "
Pasturage and fallow land	8.7 "
House and fruit gardens	1.9 "
Other crops	.7 "

Of the grain crops the total area is made up as follows:—

Rye	38 per cent.
Oats	26 "
Wheat	13 "
Barley	11 "
Legumes	11 "

Throughout Germany the average yield is as follows:

Wheat	27.2 bushels per acre.
Rye	27.72 " "
Spring Barley	33.54 " "
Oats	44.36 " "

The highest and lowest yields of crops reported for the several States are as follows:—

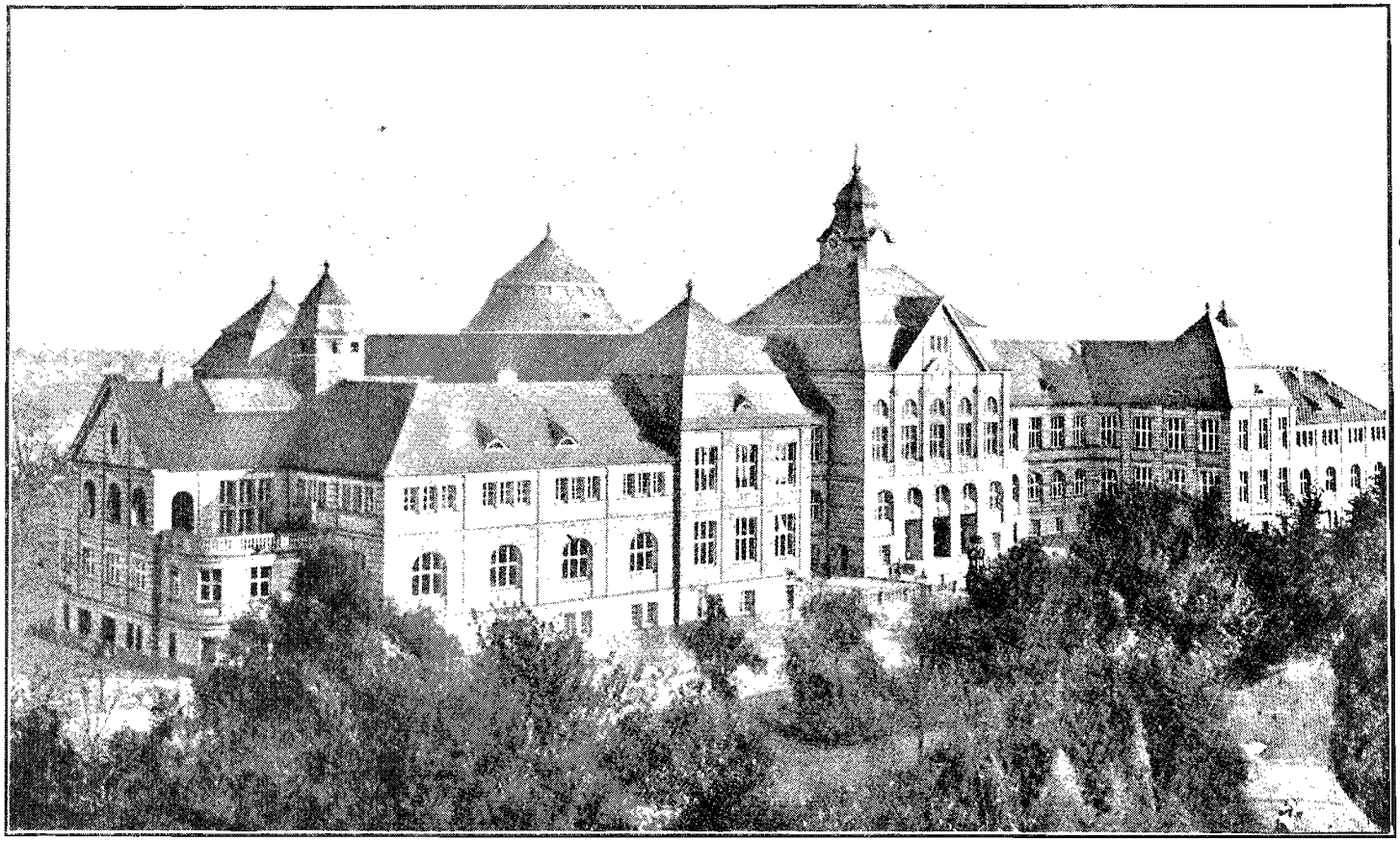
		Bushels per acre.	State or Province.
Wheat,	Highest,	37.92	Anhalt and Schleswig-Holstein.
	Lowest,	20.87	Wurttemberg.
Rye,	Highest,	33.39	Schaumburg-Lippe.
	Lowest,	18.11	West Prussia.
Barley,	Highest,	44.46	Anhalt.
	Lowest,	26.27	Westphalia.
Oats,	Highest,	59.66	Brunswick.
	Lowest,	34.76	Hohenzollern.

Conditions of Living.

No systematic investigation was made as to the cost of living. Observations were made of what might be termed standards of living, so far as these were evident in the physical development of the men and women, boys and girls, in the appearance of their dress and houses and in the apparent contentment or otherwise of the workers as discerned by rather superficial observation. This could not be taken as a serious or exhaustive study of conditions of living. A period of over a month was spent in going about among the people in the industrial and commercial centres and, by road as well as by train, through the country parts. That furnished some data for the formation of a general idea of the condition of the working people; and also shed light on the problems and matters which were being studied in their relation to Industrial Training and Technical Education.

The first impressions, that the pupils in the Industrial and Technical Schools were interested in their work and earnest about it, were confirmed by further observations. Evidently they liked their work and did it well because they understood the meaning of it. On all sides in schools and in civic affairs evidence was abundant of the characteristics of thoroughness and courteousness. The courteous demeanour was evidently the outflow of an attitude of mind towards life, of a robust and self-respecting people, rather than conventional formality to others, fellow-citizens or strangers.

From conversations and observations one concluded that the spirit of racial and community solidarity was deeply rooted and powerful. The maintenance and growth of that spirit were attributed in large measure to the association of the young men in Continuation Schools from 14 to 18 and afterwards in training in military service. Men who learn together, work together and play together are sure to develop many and strong bonds of mutual understanding.



COMMERCIAL HIGH SCHOOL AT COLOGNE. (See page 1182)

CHAPTER XLI: OUTLINE OF THE EDUCATIONAL SYSTEMS.

INTRODUCTORY.

There is no Imperial Ministry for public education; and no uniform school system prevails throughout all Germany. Each State of the Empire has its own system. These systems agree in essentials, but show many differences in detail. This is true of the ordinary academic schools, and still more true of the vocational schools that have sprung up during the last thirty years.

In general the school system is divided into: (I) Elementary or Lower Schools; (II) Secondary or Middle Schools; (III) High Schools.

I. The Elementary system consists of:—

A. Volksschulen and Burgerschulen, the latter being sometimes a higher grade of Elementary School and sometimes a kind of Elementary School at which higher fees are charged, with a tendency to segregate pupils according as their parents are more or less well off;

B. Lower Vocational Schools, including (1) Continuation Schools of various kinds; (2) Schools for Handicrafts.

II. The Secondary or Middle School system includes:—

A. (1) The Pro-Gymnasia; (2) The Pro-Realgymnasia; (3) The Realschulen; (4) The Gymnasia, which are classical schools with a nine years' course, pupils entering usually at 10 years of age, after 4 years in the Elementary School; (5) The Real-Gymnasia, which teach Latin but not Greek; length of course and preparation for admission as above; (6) The Ober-Realschulen, which are schools teaching modern languages instead of the classics; length of courses and preparation for admission as above;

Numbers 1, 2, and 3 are lower grade Secondary Schools. They have a course of six years, usually beginning at 10 years of age. They differ in the subjects taught, but they all grant to their graduates the coveted 'Einjahrigenschein' which allows one year of voluntary service in the German army to take the place of two.

Numbers 4, 5 and 6 are of equal rank legally, but the classical schools stand higher in the estimation of the scholastic world of Germany.

All these schools are for boys. Girls' schools are less thoroughly organized, and less thoroughly equipped, although marked developments are in progress.

B. Secondary Technical Schools for Industrial, Agricultural and Commercial Education; Schools of Art; Seminaries for Training Teachers; and Polytechnika. These schools and the schools indicated under I. B are the ones which are described more fully in the body of this Report.

III. The High School System includes:—

(A) Universities;

(B) Technical, Commercial and Agricultural Colleges;

(C) Academies for special purposes, such as Mining, Forestry, Commerce, Art, Agriculture, and Military Science;

(D) Other academic institutions.

SECTION I: ADMINISTRATION AND ORGANISATION OF THE SCHOOLS.

The control of all matters pertaining to general education in Prussia is lodged with the Ministry of Public Worship and Instruction and Board of Health, usually called the 'Kultus-Ministerium.' At the head of the Ministry stands the Kultus-Minister, who is the Minister of Education.

On the other hand the control of all affairs of industrial education is under the Ministry of Commerce and Industry.

The educational department of the 'Kultus-Ministerium' is divided into two sections, each under a director. One section controls the Universities, Scientific Institutions, Higher Boys' and Girls' Schools, Schools of Technical Art and Education; the other controls the Elementary and Normal Schools, Schools for Physical Training and Institutions for Idiots, the Deaf, the Dumb and the Blind.

The Kultus-Minister is the final authority on all matters pertaining to education. He, with his directors, after due deliberation and conference with experts, decides the policy which must be pursued. He interprets the existing laws and decides all questions which may arise in administering them.

Provincial Authorities.

Between the Ministry and the school stands the Provincial School Board, one of which is found in each of the twelve provinces into which the Kingdom of Prussia is divided. The head of the Board is the highest official in the province, the Ober-Präsident, who is assisted by four or five Counsellors (Schulrate). This Board has jurisdiction in the following matters:—

1. All subjects bearing on the educational aim of the school.
2. The organization of the school.
3. The examination of new, and revision and confirmation of already existing ordinances and regulations.
4. Provisions for the removal of abuses, which have crept into the school system.
5. Examination of text-books in use; decision as to which are to be dispensed with or what new ones are to be introduced.
6. The appointment of Commissions to hold leaving-examinations.
7. The supervision, direction and inspection of all schools which prepare for the University.
8. The appointment, promotion, discipline, suspension and dismissal of teachers in these institutions.
9. The control of financial affairs.

City School Boards.

All State Schools are directly responsible to the Provincial School Board. City schools, on the other hand, are only indirectly responsible to it. They are directly responsible to the local School Board, which usually consists of the mayor, members of the city council, and several directors of the higher schools. The members of the local Board must be confirmed by the Provincial School Board. The local Board elects the director of the school and the teachers, pays their salaries and pensions, and has jurisdiction in the external affairs of the school, but has no direct authority in matters of discipline or instruction.

All Public Schools are under the general control of the State and are subject at all times to inspection. The examination of the pupils is likewise a State matter.

The Ministry does not deal with the schools directly but through the Provincial School Board.

The administration and organization in other States of the Empire are said to be similar although not identical. It does not appear that any useful purpose would be served by presenting a statement of the differences and points of agreement.

SECTION 2: ELEMENTARY AND INTERMEDIATE SCHOOLS.

The Elementary School in Germany is not an Imperial institution; it is managed independently by each separate State.

The Elementary School system includes all institutions in country and city which every child is compelled to attend up to the age of fourteen or thereabouts, unless he can prove to the authorities that he is receiving a similar education elsewhere. School attendance is compulsory in Germany. The State Governments feel bound to provide a certain degree of training for all their people in order to enable them to co-operate in dealing with the problems of the State; and, therefore, reserve to themselves the inspection of the schools and the general control of the school system by laws and ordinances.

Although the schools are regulated, not by Imperial law, but by the ordinances of individual States, there is a general agreement throughout the Empire that no citizen shall be permitted to keep his children from school during the period required. Parents who fail to send their children to school are punished by fine or imprisonment, or both.

Unity But Not Uniformity.

The general character and aim of the schools, and the training and duties of the teachers are similar throughout Germany. In outward circumstances there are differences between the schools of the several federal States and also between parts of one and the same State. Uniformity in outward arrangement is not to be found. Indeed, dissimilarity is great between the village school with

its one class and the municipal school with its large buildings with all modern improvements and numerous classes in the larger towns.

The States exercise control over each sub-division of the system within their borders and they allow Local Authorities considerable latitude in the arrangement of the courses and in the management of the schools. Local Authorities have introduced inexpensive experiments and improvements in smaller limited districts which could never have been initiated by legislation applicable to all parts of the country; as for example the introduction of Sloyd, of housekeeping for girls, Supplementary Schools for backward children, sanitary regulations and medical control over all the pupils of the Elementary Schools.

Some Common Features.

Among some of the features which are common to all of the Elementary Schools are the following:—

1. In all these schools the teaching is exclusively entrusted to teachers educated for their profession on strictly methodical lines and certificated by the State. These teachers, except comparatively young probationary masters, hold permanent positions for life. They all have the right to a fixed salary, to superannuation and provision for their families after death. This security of position produces a class of teachers technically trained for their profession and otherwise qualified to maintain and improve the school methods.

2. Another important feature is the enforcement of compulsory school attendance—the age differs slightly in various German States, the limits being 6 and 14 years. The compulsory period usually includes eight years, from six to fourteen. In Bavaria, however, and for girls in Alsace-Lorraine, it is from six to thirteen. In Württemberg it is from seven to fourteen. In Alsace-Lorraine, Bavaria, and Württemberg, the pupil is released from the Elementary School when he has passed a satisfactory examination. A pupil doing unsatisfactory work may be kept in school from one to two years longer.

3. The demands made by the Elementary School on the bodily and mental capabilities both of pupils and teachers are generally severe. The aims of the school presuppose diligence, conscientiousness, performance of duty and earnestness on the part of both teachers and scholars .

The proportion of male to female teachers in public Elementary Schools in 1901 in Germany was 22,339 female teachers to 122,145 male teachers. In 1906 in Prussia the figures for all public schools were: in graded city and town schools 11,860 female teachers and 43,604 male teachers; in rural schools 5,924 female teachers and 59,160 male teachers.

Intermediate Schools.

The term 'Intermediate Schools' (Mittelschulen) indicates in Prussia and a few other North German States, a kind of school with aims beyond those of the Elementary School. It occupies a middle position between the Elementary School and the Secondary School such as Realsschule and Pro-Gymnasium. In the Kingdom of Saxony such schools go under the name of Intermediate or Higher

Elementary Schools; in Baden they are called the advanced division of Elementary Schools. In Hesse the 'expanded' Elementary Schools of some towns are in this class. Most of these schools have nine classes from 6 or 7 to 15 or 16 years of age. In their lower classes they parallel the Elementary School.

Girls' Schools.

The elementary teaching of girls in the Primary Schools is organised in exactly the same manner as that of the boys. For girls also compulsory education begins at the age of six and continues in most federal States to the age of fourteen, in some States only to the end of the thirteenth year. There are also for girls in many towns Higher Elementary Schools (so called Middle-Class Schools). There are also Higher Girls' Schools. The establishment and maintenance of these was for a long time left exclusively to private enterprise and in Roman Catholic parts of the country they were in the hands of prevailing conventual institutions.

Three quarters of the Higher Girls' Schools, that are not exclusively boarding schools, supply also Elementary Education. Children enter the lowest class of the preparatory school, at the sixth year and pass through a nine or ten years course. In Prussia the normal duration of the course is nine years but with the addition of an extra course with optional subjects. In the selection and treatment of the whole of the subjects of instruction, stress is laid on what is practical and stimulating, as for example: "Circumstances of the present time are to be considered particularly. Summaries of names and dates that have no personal or stimulating interest, and that can be received by the memory only in a mechanical way, are most strictly to be avoided, and this applies especially to the teaching of history."

In quite recent years Gymnasium and Real-gymnasium courses have been established in several towns enabling girls to obtain a leaving certificate that qualifies for the University.

The teaching of Domestic Economy and special branches of girls' education are provided for in the general extension course of the Elementary Schools. These are in addition to the technical, that is the commercial or industrial extended instruction. The extending of the education of girls in the Elementary Schools to include domestic subjects is obligatory in several federal States. In some cases a few evening or Sunday hours every week are devoted to it.

SECTION 3: SECONDARY SCHOOLS.

The name of "Higher Educational Institutions" (Higher not High) is, in Prussia, bestowed on those schools that form the connecting link between the Elementary Schools on the one hand and the Universities on the other. In the Southern German States these institutions are often called "Middle-class Schools" whereas in Prussia, by "Middle-class Schools" is understood Higher Elementary Schools. There are three kinds of complete higher educational institutions, viz:—Gymnasia, Real-gymnasia, and Higher (or Ober) Realschulen.

To these correspond three kinds of less complete institutions, viz—Pro-gymnasia, Real-pro-gymnasia and Realschulen. The complete institutions have nine classes each beginning with pupils about 10 years of age. In all the federal States these schools have preparatory classes from 6 or 7 to 10 years of age. In the Gymnasia the teaching is always with the main stress on the two classical languages, with attention to literature, history and mathematics.

Realschulen arose originally as Higher Burgher's Schools, not for the learned professions but for civil and commercial life, and the classical languages were replaced in them by French and English and special stress was laid on mathematics and natural science. In 1882 the Realschulen of the first order, with teaching of Latin, received generally in Prussia the name of Real-gymnasia, a designation which had already occurred in the other federal States. The Pro-gymnasia, Real-pro-gymnasia and Realschulen have six classes each, beginning with pupils about 10 years of age. Their curricula correspond to the six lower classes of the corresponding but more complete institutions. The courses are arranged in such a manner as to afford a reasonably well-rounded education for those who are to leave school at about 16 years of age.

SECTION 4: THE POSITION OF TEACHERS.

It may be laid down as a general principle in Germany that any person who is entrusted with a duty to perform must be trained for the performance of that duty. This principle is rigidly adhered to in the school. A German does not make use of the teaching profession as a stepping-stone to something different, but adopts it as his life's work. The several States provide well for the teacher. In return the State expects and demands that the teacher be qualified to teach.

We are in the habit of saying that the teacher is the all-important factor in the school but we do not exercise anything like the care taken in Germany to train the teacher. There they not only say that the teacher is the all-important element in the school, but they prove their faith in the statement by requiring every teacher from the highest to the lowest to go through a rigid course of training before he is allowed to experiment on the youth entrusted to his care.

The Elementary teachers receive their professional education in preparatory institutions and Seminaries. In some States there are only Seminaries without separate Preparatory Schools. The Seminary Course lasts, as a rule, six years. Pupils must have reached the age of 14 and have passed the prescribed time in the Elementary School. Instead of the Elementary School they may have attended an Intermediate School or the lower classes of a Secondary School.

Salaries and Pensions.

Salaries according to a scale are prescribed for teachers in State schools. No public school is allowed to pay less. As a matter of fact, many of the city schools pay more. As a servant of the State—and nearly all teachers in Germany are indirectly State servants—he knows that the State will provide for him when he is no longer able to provide for himself.

Every teacher in a school which is under State control has a right to a fixed salary, to superannuation, and, in case of death, to provision for the family. The amount of the pension and the conditions of its payment may be seen from the following conditions which prevail in Prussia:

Every teacher who is incapacitated is entitled to a pension after ten years of service. If he is incapacitated before he has served ten years, he may receive a pension, provided his incapacity is due to illness contracted in the performance of his duty; otherwise he receives a pension only by the express permission of the King. At the age of sixty-five every teacher is entitled to claim superannuation.

The amount of the pension is based on the entire income, including rent allowance, and is calculated as follows: Between the tenth and eleventh year the pension equals $\frac{20}{60}$ of the income, it is increased each year by $\frac{1}{60}$ till the thirtieth year; from this time on it is increased yearly by $\frac{1}{120}$ till the pension equals $\frac{40}{60}$ of the income, after which there is no further increase.

There is likewise a pension for widows and orphans. A widow receives $\frac{40}{100}$ of the pension to which the deceased would have been entitled if he had been retired at the time of his death. This sum ranges from 300 to 3500 marks.

Children, whose mother is living, and who at the death of the official is entitled to a widow's pension, receive each one-fifth of the widow's allowance. Children, whose mother is dead or who at the time of the official's death is not entitled to a widow's pension, receive each one-third of widow's allowance. The widow's and orphans' pension together must not exceed the amount to which the deceased would have been entitled if he had been retired at the time of his death.

SECTION 5: UNIVERSITIES.

The German Universities are exclusively State institutions. There is no prohibition or obstacle in the way of private foundation for Universities except that they would not have the prerogatives bestowed on the Universities by law of the States or Empire unless they acquired them by special concession. Revenues are obtained in some cases from endowments, subsidies from independent public funds devoted to special purposes, fees, and proceeds arising from the clinical hospitals; but in general by far the larger portion of the total University expenses is covered by direct State subsidies.

Rector, Faculties and Professors.

The chief representative of the University is the Rector, and in some Universities the Pro-rector—especially when the reigning Sovereign or a Prince of the Royal House occupies the honorary position of Rector Magnificentissimus. The Rector is elected, by processes differing in the various Universities, by the total number of ordinary Professors—in one University by a general meeting embracing also the Extraordinary Professors. He is chosen from their midst for one year. The Rector directs the current business and presides at the meetings of the Senate and the various committees.

The Universities are divided, according to the chief branches of learning cultivated in them, into Faculties. The Faculties in a narrower sense are composed of the Ordinary Professors that belong to them; but in the wider sense of the total number of teachers and students of the respective branches of learning. The Faculties superintend the instruction in their respective subjects and are responsible for its regular operation and completeness. In case of vacancy of a Chair they are allowed, partly by transmitted custom and partly by explicit regulations in the statutes, to propose to the Government persons fit and proper for the succession.

The Ordinary Professors are appointed by the reigning Sovereign on a motion of the Ministry, who as a rule take into consideration the proposals of the Faculty. They form the real permanent teaching staff of the University and, as a rule, they alone have the right to vote as occasion presents itself. From their midst also proceeds the Representative whom, according to the current constitutional regulations, the Universities delegate to the Diet of the State.

Qualifications of Students.

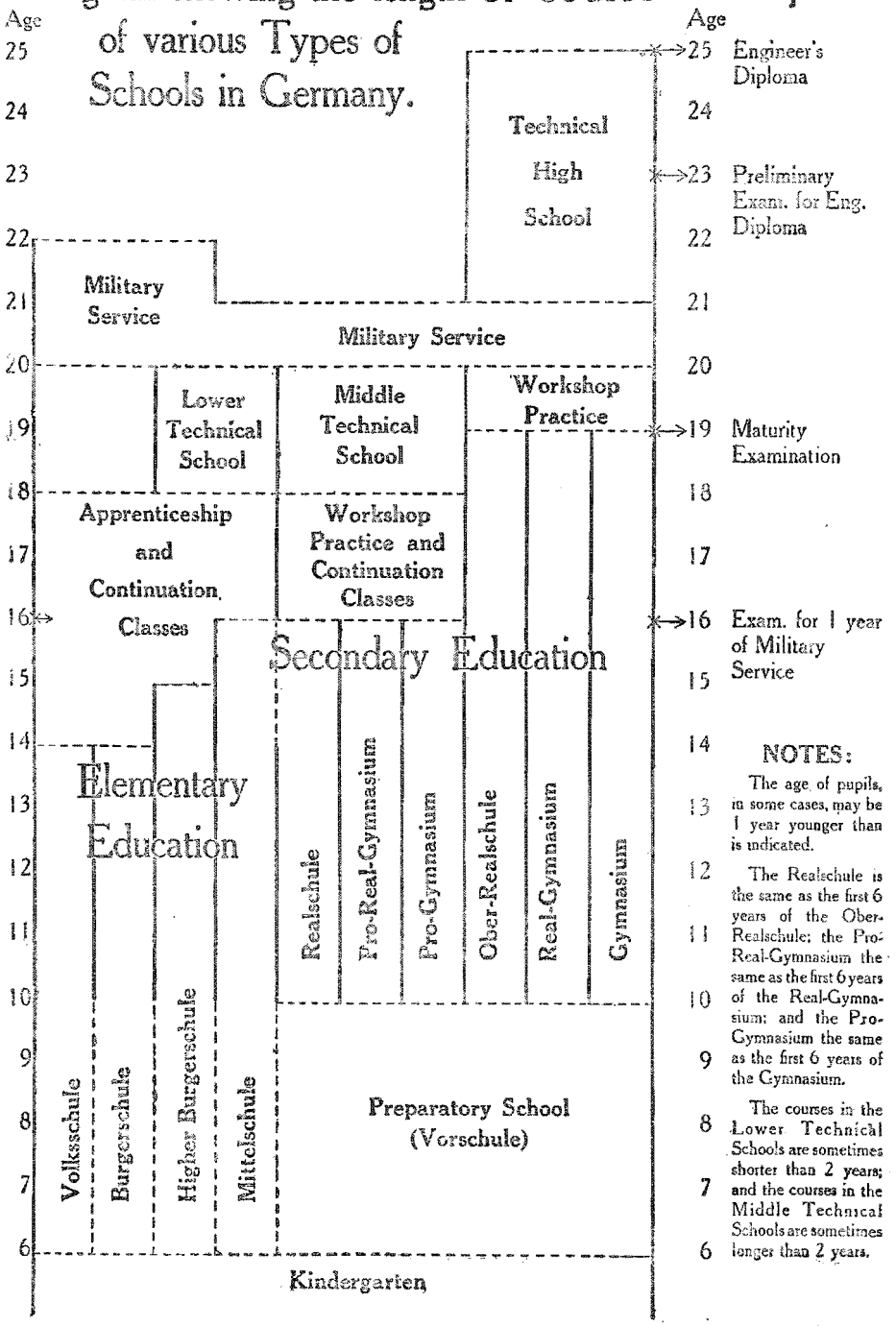
For admission to the University the normal qualification is the possession of the leaving certificate of a higher educational institution with nine classes. These nine classes follow the three or four classes which are common to all Elementary Schools. Formerly in most Universities only those who had obtained the leaving certificate of a Gymnasium (or classical Secondary School) were entitled to full Immatriculation. Since 1901 in Prussia, those with the leaving certificate of a German Realgymnasium and of a Prussian Higher Realschule, or of a German one that is on an equal footing with the latter, are admitted. Not only almost all Prussian Faculties but also most of the non-Prussian ones demand unconditionally the leaving certificate or certificate of *maturity* of a school with nine classes. In recent times the number of admissions from the Realgymnasium has continuously increased.

In addition to the full Immatriculation there is so called "Little" Immatriculation for which no leaving certificate is required but only some other kind of evidence of the existence of an education sufficient for following the lectures.

In order to encourage students to make scientific investigations of their own, prize essays are offered in all the Faculties. The prizes are provided partly by the Government and partly based on endowments. The direct influence of the University work on Technical Education comes through the fact that many of the professors and teachers of mathematics and science in the Technical High Schools are graduates of the Universities.

Many other details concerning the organization of the Universities have no direct bearing on the work of this Commission. Details can be found in publications devoted to that subject.

Diagram shewing the length of course and sequence of various Types of Schools in Germany.



NOTES:

The age of pupils, in some cases, may be 1 year younger than is indicated.

The Realschule is the same as the first 6 years of the Ober-Realschule; the Pro-Real-Gymnasium the same as the first 6 years of the Real-Gymnasium; and the Pro-Gymnasium the same as the first 6 years of the Gymnasium.

The courses in the Lower Technical Schools are sometimes shorter than 2 years; and the courses in the Middle Technical Schools are sometimes longer than 2 years.

SESSIONAL PAPER No. 191d

CHAPTER XLII: ORGANISATION AND ADMINISTRATION OF INDUSTRIAL TRAINING AND TECHNICAL EDUCATION.

SECTION 1: INTRODUCTORY.

The opinion prevails in Germany that the nation which has the best means of training individuals as workers, as citizens and as members of the race, is best prepared for winning in the industrial warfare and also in the competition for other places in the sun. Neither money nor personal effort seem to be grudged for the establishment and maintenance of institutions, schools, classes or other means which will accomplish these ends.

The development of Continuation and Technical Schools, if not the cause of the industrial and economic growth, has accompanied the progress of science and the applications of it to the activities of life. The advancement in all localities has not been equal. Wherever industrial life has been most highly developed, there one finds the most advanced and active industrial and technical schools. Probably each is in measure a contributing cause of the other, and also in part a result from it.

NOT UNDER IMPERIAL CONTROL.

Industrial training and technical education are not under Imperial control and are not carried on under Imperial laws. The Imperial Government touches it at practically only three points—(1) by means of the trade regulations of the Empire, which prescribe the qualification of persons who wish to carry on some particular industry or occupation; (2) by the laws which prescribe the powers and duties of the Guilds, and (3) through the laws which require apprentices and other young workers to attend Continuation Schools where such schools exist.

Under the Imperial authority the various Guilds and Associations have the right to organize and maintain schools for the training of handicraftsmen, and to adopt rules governing attendance by apprentices at these schools. The Guilds cannot compel apprentices to attend but can apply compulsion to masters who do not send their apprentices. Under the Imperial laws authority is given to the communities and to semi-public associations to require all male workers under 18 years, and all working girls of the same age who are employed in commerce, to attend a Continuation School. In general, therefore, while compulsory attendance at Continuation Schools is not directly a matter of Imperial legislation it receives the support of such legislation.

State Control with Local Liberty.

The systems of education in the several States have been developed separately and independently, so much so that they are in many cases different in both the content and the form of education; but on the whole the aims are similar.

Each State contributes about one half of the total cost of all education within its borders and exercises only moderate control and direction over the schools. A great deal is left to each Local Authority in determining the kind of education which shall be provided for the young people of its area. The general belief is that this policy has had a beneficial influence upon the educational attainment and attitude.

While there is no Central Authority, attempting to regulate or bring the different efforts throughout the Empire into harmony for efficient co-ordination and economy, the existence of three large Associations for the Promotion of Industrial Education tends to make what has been found best, and best suited to any one locality, known throughout the whole Empire. These Associations by means of their journals and papers, addresses and discussions at meetings held in every part of Germany, facilitate the exchange of ideas between individuals, localities and States.

Nearly all educational effort is under public control, although there are some privately controlled institutions which carry on education for profit. On the other hand there is a large measure of voluntary assistance in the way of contributions and service to institutions which are in the main supported by public funds. In general, the higher forms of institution for Technical Education, the Technical High Schools and Technical Universities, are supported by the State. The Secondary and lower schools are supported by the community, the district and the State. The proportion of control, and the proportion of the contribution for support from each, varies so greatly that no general rule or system would apply to them all.

Institutions Suited to Needs of Pupils.

The aims of the institutions maintained by public funds, which are engaged in Technical Education, differ according to the careers or positions for which their students are being prepared. The educational content or subject matter and the method of instruction and training also differ accordingly. The degree of preparation of the pupils determines the kind and amount of instruction and training which they can receive. That again is modified by the time the pupil is able to give to the work of the school. Sometimes the pupil may be able to give all of his time, and in other cases as little as a few hours per week. The effort is made to place as much opportunity as the student can avail himself of, considering his limitations of time, ability, preparation and object.

Two Plans of Organization.

There are two distinct plans according to which industrial training and technical education have been established and carried on..

1. Under the first plan, technical schools are separated from those in which general education is provided. Such technical schools devote their attention directly and chiefly to technical training. Each type of school offers courses of technical training of different grades, and each is complete in itself. Such technical schools are not preparatory schools for the Technical High Schools (Technical Universities). A few students advance to the Technical High School but this is not the ordinary route towards that goal.

2. The other system or plan combines the Middle and Lower Technical Schools with schools of general education, such as the Realschulen. Such technical schools may include two or more different kinds of technical training.

The first plan of the separate organization of the technical schools is general in Prussia. The second plan is more common in Bavaria. The Technical School system of Saxony follows in the main the first plan; but the Industrial Academy comes in between the Technical Middle School and the Technical High School or Technical College. A similar plan is followed in some of the other States, and special technical institutions are organized to serve the needs of different industries. Such an institution may contain a Middle and Lower Technical School under one direction. The usual name for these combination schools is Technikum.

Co-operation of Men Who Know Industries.

Experience has led to the conviction that the interests of commerce and industry are very much interwoven with the development of systems of Industrial and Commercial Education. The industrial schools play a very important part in advancing the industries of the various portions of the country. In every case the authorities seek to utilize the services of men who know education and men who know the industries. It is recognized that employers, workmen and school men should all have a share in the management of the industrial schools, as members of an Advisory Council or Board of Directors. A Technical Council of experienced men from the industries, employers and others is of special value in the lower grade of industrial schools. Such men are able to make suggestions for the content of the course of study, for its organization, and for the method in which the practical work shall be undertaken and conducted. The people engaged in industries as employers and employes take more interest in education and in the school, when they exercise an immediate influence and control upon its management.

SECTION 2: CONTROLLING AUTHORITIES.

At one time or other, the Ministry of Education has had charge of industrial and technical schools in every State in Germany. They have also been under the Ministry of Commerce and Industry, and sometimes under the Ministery of Interior; sometimes they are partly under one and partly under the other.

In Prussia, from 1879-1884, industrial and technical schools were under the Minister of Education. In 1884, while Prince Bismarck, Chancellor of the German Empire, was also Minister of Commerce and Industry for Prussia, they were transferred to the control of the Ministry of Commerce and Industry, where they still remain. A recent arrangement provides for a National Industrial Bureau to advise the Ministry and give technical and expert help. This is set forth at length under the organization of Industrial Training and Technical Education in Prussia.

THE PRUSSIAN SYSTEM.

The following information is taken from or based upon the Report of the State Industrial Office to October 1909. It contains a brief historical review. All the affairs of Industrial Education under the Prussian Government were transferred from the Minister of Religious, Educational and Medical affairs to the Minister of Commerce and Industry by an order issued on September 3rd. 1884. Prince Bismarck, Imperial Chancellor for the German Empire, was at the same time also Minister of Commerce and Industry in Prussia. On many occasions he had shown a warm interest in the trades and industries and their organization.

In the appropriation bills of Prussia for the following year a transfer of the funds relating to industrial schools was made from the funds for the general school system to that of the Ministry of Commerce and Industry. At that time when the budget was submitted to the House of Deputies, (the lower House of the Prussian Legislature) it was accompanied by a Memorial which pointed out the fact that the system of secondary industrial schools of Prussia, including the Institutions of Industrial Art and the Schools of Design, were not on a level with like systems of other German States and of foreign countries, and that in order to raise the system to a higher level of efficiency, much more support and careful aid for its promotion would be required in the future than it had received in the past. The following is a portion of that Memorial:—

The importance of the promotion and financial support of the industrial system left to each individual State has increased to a higher degree during recent years than formerly, owing to the course the development of the National economic life has taken; and the increased demands made upon this branch of the Royal Administration have shown that the latter stands in intimate relation to the lower and secondary industrial system of instruction as well as to the promotion of industrial art, and that it cannot satisfactorily perform its duty so long as these institutions belong to the administration of another department. In such questions as that of the steps to take for the economic uplift of certain parts of the State through the awakening of new, or the development of existing branches of industry, as that of the improvement of the condition of small trades in competition with large factory production, or that of the maintenance or promotion of the competitive capacity of native industries against encroaching foreign industries, the establishment and management of industrial vocational schools play so decisive a role that the Ministry of Commerce and Industry finds itself constantly hindered in its activity so long as it is denied the power of initiative and of authoritative influence upon the system of the schools, which in the nature of the case should be its prime sources of assistance. On the other hand, questions such as for what branches of industry, to what extent and at what places should mono-technical schools be established; what purposes they should keep in view, and others, can be solved with certainty and for longer periods of time, and in due relation to the entire interests of the State, only by the authorities created for the purpose of promoting the national industry, which authorities should also have the required means of acquainting themselves with the conditions of industrial development and of gaining a comprehensive view of its local needs, and at the same time should be able to keep in touch with all the various related agencies, such as chambers of commerce, guilds, and other industrial corporations, from which co-operation in the solution of such questions is to be expected.

POLICY DEFINED.

The programme for the further development of the new branch of service of the Ministry of Commerce and Industry was defined clearly and without the least ambiguity, as: Promotion of Industrial Continuation and Vocational Schools in the service of the interests of commerce, industry and handicraft, and the fostering of such a system of instruction as an inseparable part of the national economic policy.

The development of the past 25 years has made it more and more evident that the system of secondary technical instruction can flourish in accord with this programme only if the Ministry of Commerce and Industry seeks and maintains intimate connection with those agencies which are engaged in manufacture and other industrial pursuits, for which it is bound to provide skilled laborers; if the ever changing needs of commerce, trades, and factories find careful consideration and if it is remembered that industrial failure is threatened when the schools, instead of serving industry, merely serve their own purposes.

The peculiarity of the system of secondary technical schools and of the elementary industrial continuation schools is found in this, that their aim is to make the matter of instruction immediately applicable to industrial life. This is the essential difference between them and the schools belonging to the Ministry of Worship and Education. Despite this essential difference it should not be forgotten that the industrial continuation and vocational schools build upon the foundations laid by the general system of schools, and that the boundaries of the two administrations are contiguous throughout, that the teachers of the two systems are interchanged and that through this action very close relations are established.

ADMINISTRATION BY MINISTRY.

The Ministry of Commerce and Industry, faithful to the programme it had prepared beforehand, was determined to take no steps without securing the advice of authoritative experts from trades, factories and business firms in directing the local administration of the schools. First, a Commission for Vocational Schools was appointed whose special object it was to collect such advice. This Commission, however, was not homogeneous and too large for the purpose intended; consequently it met but seldom.

It has since been replaced by a number of Advisory Industrial Councillors, who periodically meet and offer suggestions to the Central Office and to the Minister concerning the exigencies arising in the various labor centres. As a result of these deliberations misunderstandings and uncertain orders have been prevented and the Central Administration has received many valuable suggestions.

In order to obtain the expert advice which is essential to this office, there are four permanent assistants in the Minister's Office, these being respectively a building official, a machine engineer, a schoolman, and an architect with special training in industrial art. In addition, the Director of the Central Bureau of the Textile Industry can be called in when matters affecting his industry come up. In addition, special technical experts are lent to the District Presidents as advisors in technical educational subjects.

NATIONAL INDUSTRIAL BUREAU.

Since 1909 further improvements in administration are in progress. The Minister has had the aforementioned five technical experts at his disposal, and these in the nature of things cannot be expected to cover all the branches of their respective professions. Since it is obviously impossible to multiply the number of experts indefinitely, it is therefore proposed to set up a "National Industrial Bureau," and to attach to this a standing Advisory Board of experts, at the same time discontinuing the present system. This arrangement has been successfully carried out in some of the Southern German States.

Whilst the National Industrial Bureau acts as a permanent advisory body to the Minister, and assists him in the inspection of technical organizations, the main object is to organize a body which will bring this Bureau into actual touch with practical life and its needs. The National Industrial Bureau has therefore permanent national duties to fulfil, in that it is a subordinate public body, directly under the Minister of Commerce and Industry, its members being appointed as officials. The Advisory Board, on the other hand, only meets at stated intervals as an organ of the Minister, to discuss definite questions put before it on the importance and development of industrial training. The Board, in addition to the members of the Bureau who act on it, also includes other experts, called in for a definite period as required.

The National Industrial Bureau has to see that the regulations and arrangements published by the Minister are carried out, to test the efficiency or otherwise of these regulations, etc., and to propose alterations where required. Its operations cover the whole field, including buildings, courses of study, equipment, teachers, and the encouragement of industrial training in whatever form is considered most suitable, by organizing advanced courses, exhibitions of machinery, models, etc., encouraging guilds, supervising apprentices, collecting and publishing printed matter from other countries on subjects connected with industrial education, and issuing periodical reports on the progress of industrial training and the development of industry.

Constitution of the Bureau.

This body consists of a President, vice-presidents, ordinary (life) members, and extraordinary members appointed for definite periods, for the purpose of advising on those subjects which would not provide for one member's whole time. It further ensures that those technical branches which are represented by life members shall not be governed entirely by the views of one member alone. As extraordinary members, specially competent men may be appointed from among Industrial School Directors, District and Industrial Advisers and other experts. The President and ordinary members are to be appointed by the King, the extraordinary members by the Minister.

In order to keep a close relation between the Minister and the National Industrial Bureau, the Presidency of the Bureau is to be given as a rule to the Director of that branch of the Minister's work which treats of Industrial School and labor matters, and in case of his inability, to some other high official of the Ministry of Commerce and Industry. For the same reason, representatives of the Minister are to take part in the sessions and vote at the same.

The ordinary members must be selected from among men fully conversant with the subjects to be taught in the schools, in order that they may adapt the courses to the requirements of practical life, decide upon textbooks, appliances and methods and select teachers. Hence they must have had experience in school work as well as thorough technical knowledge. Such men can only be secured and retained if suitable arrangements are made as to salary, status and title, etc. It is therefore proposed to give them a salary ranging from 5700 to

7500 marks in addition to lodging allowance of 900 marks and a bonus of 1800 marks after the first 5 years with the title of "National Industrial Adviser," and after 3 years more that of "Privy Councillor."

Constitution of the Advisory Board.

The Advisory Board is to be composed of the ordinary members of the previous body, together with experts selected by the Minister from the most varied number of industries and interests, whilst the Central Boards of industrial schools are to be invited to send representatives. This Advisory Board is to deal with all matters of fundamental and general importance, and is to be divided into "General" and "Special" sections, the latter dealing only with matters pertaining to a special class of technical school, whilst the former takes up subjects concerning several or all technical schools. The "General" section is to be formed at once, and called every 2 years, to discuss all important developments, and advise where necessary as to alterations in organization, etc. The "Special" sections are to be organized as soon as necessary. The meetings of both sections are to be presided over by the President of the Industrial Bureau, unless the Minister himself does so. Members of the Advisory Committees are appointed for 5 years, with the provision that in the General Section there must be at least one representative of each branch. The Minister is empowered to call in other experts to single sessions, where special cases require it, but the number of members must not be permanently increased. Members of this Advisory Board receive no payment beyond travelling expenses and daily allowances, as provided by law.

Local Industrial Advisers.

The local and Industrial School District Advisers have to advise the District Presidents, and to inspect the various technical schools in their district. They are responsible for seeing that the Government regulations and recommendations are carried out, and have to assist the people of the locality in developing the Industrial School system. One of their most important duties is the supervision of private schools, which frequently require very close inspection. The main part of their work is therefore in the Provinces, and they may only be called to headquarters in very exceptional cases, where this can be done without injury to their proper work.

It is regarded as especially important that the Local Boards and Trustees of the various schools should have members, as their articles of incorporation prescribe, who are expert industrialists representing the trades and occupations which the respective schools are to serve, so that the schools may duly consider the needs of practical life in their courses of study and methods of teaching.

Twenty Five Years of Growth.

Under the Ministry of Commerce and Industry the work of industrial education has been greatly extended. During the 25 years of development in na-

tional commerce and industry the need for the development of Secondary Technical Instruction and Continuation Classes has been recognized and the means placed at the disposal of the State and communities for that purpose have been largely increased. The following table represents the growth in numbers in towns and cities. The opinion is generally expressed that there has been a corresponding increase in efficiency.

Year.	Continuation Classes.	Students in Attendance.	Secondary Technical Schools.	Students in Attendance.
1884.....	664	58,400	56	8,000
1909.....	2,100	360,000	218	44,000

It is to be noted that of the 44,000 students enrolled in the Secondary Technical Schools 40,000 were following two year courses. In addition to the 218 Secondary Technical Schools mentioned above there are 35 Navigation Schools and 53 Schools of Mining.

The regular expenditure by the State of Prussia for the whole system of Industrial Instruction in 1884 was about $47,600; and by 1910 the expenditure had increased to $3,094,000. The Government expenditure is to be regarded as subsidies to bodies which carry on the schools and courses. Much larger sums are expended by grants from provinces, communities, corporations, guilds and private firms for the maintenance of a Technical School system.

The communities provide the school buildings for the Continuation Schools and also, aided by corporations, they erect the buildings for Secondary Technical Schools and with very few exceptions keep them in repair.

The report of the Prussian State Industrial Office continues:

However satisfactory the development during the last 25 years may appear, much remains to be done. An urgent necessity seems to be the further improvement of the Continuation Schools. The 410 000 pupils of such evening and secular Sunday Schools in Prussia (including about 50,000 pupils in rural or agricultural schools) represent in the course of three years about 140,000 new pupils a year. Yet the 6,400,000 pupils of the elementary and advanced, rural and city schools of the State have an army of recruits of 800,000 pupils a year. This proves that only 18 per cent of all the young folk of the ages for Continuation Schools (between the 14th and 17th years of age) are attending such schools. Another fact deserves attention, namely that the 300 graduates of mechanical engineering and machine building in the technological Universities this year will find only 875 graduates of the secondary or middle Machine Building Schools to assist them, while experience shows that at least ten times that number of young men, technically prepared in the Middle Schools, can be utilized in the labor market of the nation. The total number of male youth in the Elementary or Advanced Elementary Schools in eight yearly courses, viz., 3,200,000 if compared with the total number of students in Secondary Vocational Schools in two-yearly courses, viz., 40,000, and which in the eight yearly courses would at least be 160,000, shows plainly how necessary is the further development and extension of the Vocational School system.

WÜRTTEMBERG.

In Württemberg the control of Industrial Schools is divided between the two Ministries, the Minister of the Interior controlling the Textile Schools and the Schools for Mechanics, the Minister for Church and Educational Affairs

controlling the Schools for Builders, the Schools of Industrial Art and the Industrial Continuation Schools. The Ministries are aided by a subordinate body known as the Central Commission for Commerce and Industry. This Commission is composed of certain Government officials, several Industrial School Inspectors and a number of special advisers chosen by the Chambers of Commerce of Württemberg and by the Boards of Trade. It appears therefore that the directive control of the Industrial School is in the hands of a commission of practical men and expert schoolmen, headed by a Chairman, who represents the Minister of the Interior, while the Commission itself is responsible to the Minister of Education.

BADEN.

In the Grand Duchy of Baden the arrangement is somewhat similar to that of Württemberg. The administration of the Industrial Schools since 1893 has been vested in the Industrial School Council, which is subject to the Minister of Justice, Religion and Education. However, a member of the Ministry of the Interior, who is the adviser on industrial matters, acts as presiding officer of the Industrial School Council. The two Ministries are thus enabled to co-operate, one having to do chiefly with educational method, and the other chiefly with the aims of the Industrial Schools. When important questions of organization, of courses of study, or of the inspection of schools are brought before the Industrial School Council, this body has power to add special members as Extraordinary Advisers. The Industrial School Inspectors, whose duty it is to make at least annual tours of inspection of all Industrial Schools, are under the direction of the Industrial School Council.

BAVARIA.

In the Kingdom of Bavaria all the Industrial Continuation Schools and the Technical Schools are subject to the Minister for Church and Educational Affairs. The Industrial Museums, Industrial Exhibitions and the special Masters' Courses are under the control of the Minister of the Interior. The immediate inspection of the Industrial Continuation Schools is in the hands of the Rectors of the Realschulen and the district School Inspectors; and the special Trade and Technical Schools are inspected by teachers of the Technical Universities and certain other institutions of similar rank.

SECTION 3: FINANCIAL SUPPORT.

There is almost invariably some participation by the State in the support of schools which are primarily for local service and the immediate benefit of those who will be employed in the locality. Where a school purposely serves an area of population larger than the town where it is located, it is likely to have owed its establishment and a large part of its maintenance to the action of the State or some business, trade or philanthropic organization. When the State and city

combine in meeting the expenses of such institutions, the State usually takes the larger share of the burden particularly for the highest institutions. The benefits which come directly to the individual, to the city and to the State are not separable. Moreover, whatever is of direct and real benefit to the community is thereby of advantage to the State, and therefore to some extent the State is warranted in meeting part of the cost.

It is recognised that the lack of suitable training and of Technical Education has held back the economic development of entire districts and of considerable industries. It is also true that some communities which derive immediate and direct benefit from Technical Education are unable to assume or bear the whole burden of cost themselves. Rather than have the community go unserved in this way, the State comes to its assistance. No uniform rule is followed in settling the amount to be contributed respectively by the local community and the State.

The representatives of the industries of the place, either through a Guild or Association or otherwise, often contribute to the maintenance. The reason for this lies in the obvious and immediate advantage to the industry from a supply of thoroughly trained and competent workers.

As a rule, for all except the institutions of the highest grade which serve the State as a whole, the local communities provide the buildings and maintain them.

As compared with the expenses of general education, the costs are higher in the case of Industrial Training and Technical Education. The buildings and equipment are more expensive for the number of pupils they can accommodate, as is also the maintenance of the plant up to requirements. Competent teachers who are in touch with industry, and at the same time able to teach acceptably, although not scarce, command relatively high remuneration.

What is Done in Prussia.

All the German States are increasing their payments to the support of the Technical School systems and the sums paid from the public purse are higher every year. In Prussia, by far the largest state, as has been mentioned already, the State expenditure for Industrial Instruction in Continuation, Trade and Technical Schools amounted in the year 1884, in round figures, to $47,600; in 1893, to $552,000; in 1903, to $1,512,000; and attained in the year 1910 to the height of $3,094,000. The State expenditure represents only a portion of the total amount. The following tables show the comparative amounts paid by the State in 1903 for the four kinds of Schools indicated, and the amount contributed to those schools from other sources. The average cost per pupil might be calculated, but as a division of the expenditure between Day Scholars, and Sunday and Evening Scholars is not practicable, the calculation would not indicate the relative cost per pupil in the different kinds of institution. The cost per pupil in the institutions furnishing the highest grade of education is, of course, immensely higher than in the Continuation Schools.

Sources of Revenue.

A number of schools of different kinds have been selected to show the relative amounts for support received from different sources. They are representative of others in so far as one school can be representative when all differ in some respect.

City and Kind of School.	Number of Pupils.	Financial Support from		
		State.	City.	Fees.
Cologne—		*Marks.*	*Marks.*	*Marks.*
I. Continuation Schools—				
(A) Vocational.....	1,643 Summer.....	11,027	47,431	
	1,696 Winter.		(including fees).	
(B) Compulsory.....	3,308 Summer.....	23,086	75,049	Nil.
	3,454 Winter.		.....	
(C) Commercial.....	840 Summer.....	4,417	18,822	
(General)	780 Winter.		(including fees).	
(D) Higher Commercial	474 Summer.....	1,470	21,253	
	410 Winter.		(including fees).	
II. Handelsrealschule.....	500 Regular.....	Nil.	115,405	43,545
(Secondary School)	16 Commercial.			
III. Commercial High School.	470 Regular.....	Endowment.	Chamber of	
(University Grade).	316 Special.....	65,000	Comm.	120,000
	1,616 Evening.....		16,000	
			City	
			304,000	
IV. Royal United Engineering (Machine Construction) School.	250 Yearly.			
	340 Evening.....	150,000	30,000	40,000
	277 Special.			
Duisburg—				
Royal School of Machine Construction and Metallurgy.....	320	147,000	5,000	18,000
		Rhineland Prov.	10,000	
Aix-la-Chapelle—				
Vocational Day School.....	250.....	55,000	55,000	15,000
Royal Building Trades.....	150	70,800	11,700	37,500 (estimated)
Mining.....	83	Total cost paid by Mining Corporation.		
Crefeld—				
I. Continuation School....	3,320	26,000	56,000	17,900
II. Mechanics and Industrial Art.....	50 Day.....	28,000	23,000	8,000
	250 Evening.....			
III. Spinning and Weaving..	300	80,000	30,000	140,000
IV. Dyeing and Finishing..	90	80,000	40,000	35,000

City and Kind of School.	Number of Pupils.	Financial Support from		
		State.	City.	Fees.
		Marks.	*Marks.*	*Marks.*
Barmen-Elberfeld—				
Royal Building Trades.....	116 Summer..... 198 Winter.	110,000	24,000	24,000
Bremen—				
Industrial Continuation....	2,477	Nil.	114,000	30,000
Technikum.....	444 Summer..... 568 Winter.	Nil.	180,000	91,000

Summary Respecting Four Kinds of Schools.

Kinds of Schools.	No. of Schools.	State Allowance.	Allowance from Towns, Societies, etc.	School Fees.	Total Expenditure.*	No. of Students.
		in Dollars	in Dollars.	in Dollars.	in Dollars.	
Metal Trades and Engineering.....	19	203,230	60,894	59,509	326,024	2,102 Day 908 Evening and Sunday.
Building Trades.....	22	294,478	67,107	139,074	541,277	1,900 Summer 5,077 Winter.
Pottery, Artisans, Industrial Art.....	21	171,825	150,013	49,237	383,364	1,719 Day 10,126 Evening and Sunday.
Textile Industries.....	16	88,965	49,729	35,966	190,821	697 Day. 850 Evening and Sunday.
	78	758,498	327,743	283,786	1,441,486	

*It will be observed that the total expenditure does not agree with the three items of revenue, but that is doubtless accounted for by other sources of revenue such as endowments or gifts from individuals.

SESSIONAL PAPER No. 191d

CHAPTER XLIII: CLASSIFICATION OF SCHOOLS.

INTRODUCTORY.

Three groups of schools may be distinguished according to the grade of training which they provide. As one of the leaders says, "German industry and trade require, precisely like the German Army, a number of intellectually highly trained officers, a number of well trained subalterns and an army of efficient soldiers." In consequence provision is made for technical education for three distinct types or classes of occupations or careers, the lower, middle and higher. The preparation for the lower career is provided for in the Continuation Schools and the Improvers' Schools. Those intending to follow the middle career, such as foremen and the minor directive positions, have an opportunity in the Continuation Schools and also in the numerous institutions with many different names, such as "Werkmeister School", "Building Trades School", "Middle Trades School", "Technikum," etc. Those who look forward to the higher positions in technical careers, such as superintendents of works, or factories, professional engineers, etc., sometimes obtain qualification through the Middle Technical Schools. For admission to such schools the candidate requires a certificate qualifying for one year's service in the Army. That means ten years of successful attendance at school, from 6 to 16 years of age, the latter six of which would be in a Secondary School. A second requirement of qualification is one or two years of workshop practice. A considerable number of successful professional engineers have had only a Middle Technical School training.

For those preparing for the highest positions as Technical Engineers, Superintendents and Managers, opportunities are provided in the Technical High Schools. Qualification for admission to these schools is successful attendance at a Secondary School. That means thirteen years of attendance, of which the latter nine are in a Secondary School, either Gymnasium, Real-Gymnasium, or Ober-Realschule.

The institutions which provide in general for the three classes of careers may be considered in four main classes. While all the institutions in any one class are not necessarily alike they may be considered as doing work on substantially the same plane or level in the educational field.
These are:

I. The Industrial Continuation Schools;
II. The Lower Technical Schools;
III. The Middle Technical Schools;
IV. The Technical High Schools.

SECTION 1: INDUSTRIAL CONTINUATION SCHOOLS.

The aims of the several Industrial Continuation Schools are somewhat alike in so far as they all seek to give all the workers in the industries and handicrafts some further qualification in the way of knowledge and technical training for their occupation. In practically all of them a good deal of attention is paid to Drawing. In most of them, in addition to the special features of industry which are taken up, some attention is given to bookkeeping and business calculations. The worker in a large factory has less interest in these than the worker who is preparing for conducting a small business of his own in the handicrafts.

Schools of this class which might be designated as technical workmen's schools are spread all over Germany. They are known as Continuation Schools, factory schools, apprentices' schools, Sunday and evening schools. Their essential characteristic is that the attendance at school generally runs parallel with the training in practical work. In all large and most small towns of Germany, apprentices and other youthful workers are under the obligation of attending a Continuation School for from six to nine hours weekly during the working days. This Continuation School must as far as possible take the practical work of the apprentice as the basis of its teaching. In some few cases factories have established schools as part of their organization, in which every apprentice without exception receives higher instruction for from two to four hours daily.

Features Illustrated at Berlin.

Information in detail is given in the chapter devoted to Continuation Schools. In this connection only a few remarks are offered on what was observed on a visit to the Continuation Schools in the City of Berlin. Those maintained by the city are of two types. There are the Compulsory Continuation Schools for boys from 14 to 17 and optional or voluntary Continuation Schools for men and women. Besides these there are Continuation Schools maintained by societies and partly supported by the city. These are (a) for boys, Commercial Schools by the Trade Corporation of Berlin; (b) for girls, Industrial and Commercial Schools and (c) for boys and girls, Continuation School of the Berlin Hand-workers' Union.

In all cases the teachers' opinions were that compulsory attendance at Continuation Schools was desirable and necessary because young people did not know what was best for them. The workmen, as a rule, favor the application of compulsory attendance; on the part of the employers, the exceptions are among some of the larger manufacturers. The Director of Continuation Schools said he expected to see compulsory attendance required for girls also.

Very wide provision of courses and teaching material is made for young people following different trades. An example may be taken from the Shoemaking trade. There were specimens of leather showing all the stages and processes of leather making; a hide of leather was marked to show how it could be cut with the least waste of material; provision was made for giving

to students some practice in all the operations of making a shoe. It was said that probably none of the young people in the class would be permitted to make the whole shoe in the workshop in the employer's time. One of the objects of the school is to give the pupil an idea of the whole process. At the other extreme were models and teaching material showing the anatomy of normal feet and abnormal feet.

Similar equipment was provided for other classes suited to their trades such as glass work, saddlery and harness making, silver smithing, etc., etc. In all departments care was taken to acquaint the pupils with all the different materials employed in the trade; with the processes of their manufacture, or preparation, up to the time they were to be used in the trade; with their relative values and also their geographical origin. In addition to the particular studies for the special trade, all classes received some instruction in German, in literature, in citizenship, in personal hygiene and public health.

Emphasis on Drawing.

The recognition of Drawing as a cultural subject for industrial workers was noteworthy. If any group of artisans might without loss dispense with skill in Drawing, one would have supposed that shoemakers would constitute one such group. However, extended experience has shown that Drawing is a means of such good training, in observing, in estimating quantities and values of the materials handled and in controlling the hands for fine work, that one third of the whole time during the three years of the Continuation Classes for Shoemakers is devoted to Drawing.

SECTION 2: THE LOWER TECHNICAL SCHOOLS.

These are intended to provide education for middle and lower officials in industry, for the foremen of the larger industries and managers of independent works in the handicrafts or small industries.

The qualifications for admission require a good general education, as in the Elementary Schools, some technical training especially Drawing, as in the Continuation Classes, and several years of experience in a trade, or, at least, a completed apprenticeship in a trade.

The courses are sometines more on the practical side, and sometimes more on the theoretical side. In other cases, about equal time and attention are paid to each. In all cases attention is given to mathematics and science, to the technology of the industry concerned, and to Technical Drawing.

The length of the courses varies from a few months to two or even three years. Some of the Lower Technical Schools do work in their upper classes somewhat similar to that of the Middle Technical Schools, others have as their sole object the training of the artisans. The Lower Textile Schools are examples of these.

The Courses of Study include scientific subjects, by means of lectures and otherwise, class room work, laboratory and shop practice. Sometimes these schools are organized in separate buildings and with their own staff; other times they are united with general Technical Institutions. In this connection the Continuation Schools sometimes have the use of the physical equipment and teaching staffs of such a technical school or one of the Lower Technical Schools.

In both of the foregoing classes of education special schools provide for the different occupations in groups of trades or singly, as for example,—

Building Trades;
Metal Trades and Metal workers;
Woodworkers;
Textile Industries;
Printing and Lithography;
Other trades such as Bakers, Watchmaking, Leather-making, etc.

There are also,—

Industrial Art Schools;
Handwork Schools, specially for the art handicrafts;
Commercial Schools;
Agricultural Schools;
Schools of Navigation;
Schools for Fishermen;
Industrial and Housewifery Schools for Girls and Women.

Training of Foremen.

In addition to these schools there exist a great number of Lower Technical Schools for the training of foremen, engine-fitters, masters, or other lower officials for the constructive and business departments of works and factories. The conditions of admittance are graduation from the primary school (with 8 classes) followed by at least 4 years' practical work. In other words, only thoroughly trained workmen are received in these schools. The period of instruction varies from 1 to 2 years. Foremen proper, as required in industries, that is to say, workmen placed at the head of a group of other workmen in factories, are not as a rule qualified by training in any class of school at all. These men must be possessed not only of sufficient technical experience but also of special qualities of character, which are inborn and cannot be acquired in a 2 years' school curriculum. In the opinion of most German manufacturers it is best to take these foremen from the ranks of the most capable workmen. What they lack in technical training is supplied by the technical schools.

Most technical schools, even those which say they only aim to train working artizans, have men attending them who have had long experience in their handicraft, but come to the school to qualify themselves for higher positions.

Foremen vs. Office Men.

It is not devoid of interest to note the answers given by leaders in industry to enquiries lately made by the "German Committee for Technical Schools" with a view to more thorough organization. They point out that it matters little how far the pupil advances in the different subjects of instruction; but it matters a great deal whether he is thoroughly grounded in them; that it is not a question of increasing theoretical knowledge, but of enlarging practical experience; that these Lower Technical Schools train too many office men and too few foremen, fitters and masters; that their chief aim should be to develop readiness of apprehension, the ability to draw, business capacity, and interest in natural science; that men who have passed through the State schools have on an average a better general and technical education than the pupils of private schools and that it would therefore be in the interest of industry if all technical schools in Germany were exclusively in the hands of the State.

As illustrative of the work of some of these schools the following notes are taken from the visit to the Handworkers' School in Berlin.

Handwerker Schule (Hand Workers' School).

The aim is to give instruction to those engaged in trades, especially apprentices and assistants as a necessary supplement to workshop experience. Here, also there are students who are prospective teachers for Continuation Classes. There are various trade classes with full course of instruction in drawing and decorative painting, modeling, arithmetic, mathematics, physics, chemistry, mechanics, electrical technology, machinery, book-keeping. The school contains thirty or forty branches, all evening classes. The course for day classes continues for one year. Some of those who have taken two years in the Continuation Classes may come to this school.

A feature is made of calculations, these being produced and extended to include cost of materials and suitability of thing to be produced, to its fitting into conditions, and the purpose, considered economically, for which it is to be used. Special training in such calculations is given eight times a year. This school is attended by about 2,500 pupils, of whom 1,200 are day pupils.

A general class for young men, who have not yet chosen occupation or profession, is attended by them to discover what they are particularly fitted for. Parents come and talk over the matter with the teachers. Such pupils are from 17 to 18 years of age and some older.

Some pupils in day or evening classes may be those who are at the same time attending compulsory Continuation Classes. They come here for some special work. Some pupils who have special aptitude or talent may be excused from attending Continuation Classes, and give more attention to some subjects other than Continuation Classes provide for.

Some pupils attend day school seeking to improve themselves in their own occupation and to fit themselves for advancement, as for example into draughting rooms and other superior positions. Some of these day pupils who have for

a time given up occupations receive State and municipal scholarships, 600 marks per year. About two and a half per cent of day pupils have such scholarships. The nominations to scholarships originate with the Director and are awarded on diligence, talent, merit and worthiness. The scholarships are awarded by a committee of municipal authorities on the nomination of the Director. The Director did not know of any instance or tendency to obtain such scholarships by family, social, or political influence. The consideration of pupils for scholarships occurs as a rule when they are in evening classes.

Ceramic workers come here to extend their knowledge and improve their ability in art directions.

Teachers: The assistant teachers had been engaged in practical occupation, in industries. These at first gave a few hours to teaching and gradually developed into giving full time.

Drawing: Objects from nature, such as flowers, leaves, butterflies, are used for design, and then pupils go on to make full conventional designs from unit. Drawings were of high order, with complete specifications; as for instance for the installation of complete lighting plant at a house, ready to work from. Actual conditions for application of thing to be made and work to be done from drawings were always considered.

SECTION 3: THE MIDDLE TECHNICAL SCHOOLS.

These institutions are intended to give education to managing officers of the larger industries, who need to know how to follow independently any advance in technical processes. They give training to professional men whose qualifications in scholarship and academic knowledge are not regarded as being as high as those who have been trained at the Technical High Schools. They often require a large amount of practical acquaintance with and experience of industries and affairs.

In general, the qualifications for admission to the Middle Technical Schools require the possession of the certificate entitling the student to one year of voluntary service in the army, also some practical experience in a workshop, factory or occupation, varying from one to two years. In some cases the workshop experience may be obtained in the workshop of the technical school during the course. In other cases the practical experience is gained in especially selected workshops.

In Prussia from 1884 to 1909 the number of schools had grown from 56 to over 200, all of which are subsidized by the State. The number of students at these institutions increased during the same period from about 8,000 to 40,000. The State expenditure towards these schools, which was less than $100,000 in 1885, amounted to over $1,800,000 in 1909. This does not include any of the State expenditures on the Continuation Schools or the Technical High Schools.

In 1904 there were in Germany 536 public institutions of various types occupying this middle position between the Continuation Schools and the Technical High Schools.

Institutions and Professional Titles.

Graduates from the Middle Technical Schools as a rule adopt the title of Engineer. The title is not reserved by law or by custom. It is adopted also by the graduates from the Technical High Schools. Those who have received their technical education in the Continuation Schools, Workmasters' Schools and Institutions of similar grade are named Workmasters (Werkmeister), Machine Masters (Machinenmeister), Mechanics (Mechaniker). Some of the Middle Schools approach nearly to the Technical High Schools and contain several departments with a course extending to several years. This type of school is not represented in Prussia. The Industrial Academy at Chemnitz is a good example. It has departments of mechanical and chemical technology, and of architecture and electro-technology. Conditions of entrance are the possession of the qualification for one year's military service, and, with the exception of the chemical technology department, one or two years previous practical course.

Similar municipal or private institutions which call themselves "Technicum," with only a two years course are found in several other federal States to the number of thirteen altogether.

In Bavaria the "industrial schools" of Munich, Nuremberg, Augsburg and Kaiserslautern form a special type of higher technical institutions. They form a continuation of three years to the Realschulen, with its six classes from 10 to 16. At the close of the second year of the continuation course, the pupils from them may proceed to a Technical High School. Those who do not proceed to the High School can take in the third year a mechanical-technical, chemical-technical, architectural, or commercial course. These schools are government institutions.

Middle Technical School, Limberger Street, Berlin.

The following are notes of a visit to a Middle Technical School in Berlin:

Pupils spend two years here. They must have been three years in a factory. Only day instruction.

Place is divided into: 1st, machine construction; 2nd, operation of machines. Manual skill is not taught here. Age over twenty. This is a finishing school for the highly skilled mechanic. It is not preparatory for the Technical High School.

Scholarships: For a number of students. For others the fee is $20 per half year.

Most of the students have not much means except what they have managed to save. Some get help from home but most of them scrape enough together for themselves.

What Students do: Young men have gone to Elementary School, then to Continuation Classes while working at trade, have spent three years in practical work and then come here. About half of those have passed the examination for one year's service in the army.

A good deal of experimental work is carried on with tools on different kinds of material and also with different materials in the tools. They learn all the qualities of the various forms of steel for tools and for parts of machines.

Some students have been as long as fourteen years in practical work before attending this school. Teachers prefer those who have had a good deal of experience, saying the longer the experience the better they follow the course. Chemistry and physics are directly connected with the machine work following up an analysis of the different substances, including those for lubrication and those for keeping the point of the tool cool while cutting.

Students go from this school as officials of traffic or as foremen in construction establishments.

They enter into competition with the least capable and intelligent of those who graduate from the Technical High Schools. This school has been going one and a half years. Attendance 290 students—expect to have 300 or 400.

Teachers: Instructors in this school have been graduated or have been taught at the Technical High School. Some are University men. A few have not had that training and depend on their prestige from proven ability. Teachers have not only been educated academically but have generally been from two to six years in industrial practice.

Courses for Trade Masters.

In Prussia Master Courses are intended to raise small shop industries to a higher level of efficiency by the instruction of shop owners and factory superintendents in practical and theoretical branches. The main object is to offer opportunities to the students to acquaint themselves with novelties and new technical processes and methods within the limits of their own trades, to teach them model methods, for a business of medium extent, and improved technical and commercial organization.

For this purpose the Independent Master Courses are equipped with workshops for a number of trades, in which the latest and best tools are in working order. The instruction is divided into full courses of six to eight weeks, and partial or brief courses of two weeks, which may be arranged at intervals several times a year. The beginning of the course is advertised in the press. The number of participants in each course is usually limited to ten, so as to afford opportunity for individual instruction.

Conditions of Admission: Admission to the Master Courses is, as a rule, restricted to applicants not under 24 and not over 45 years of age who have served in the army. In selecting the participants, independent masters are preferred; of journeymen, those are preferred who intend to open shops of their own.

Release from Tuition Fees and Grant of Financial Aid: If a participant can prove that he is indigent, the Minister, upon application, may release him from paying the tuition fees and grant him, besides, means to defray his expenses. These grants differ for masters and journeymen, for natives and foreigners. If an indigent person has been admitted he may receive railroad fare, if he lives at a considerable distance from the locality where the courses are conducted.

Other Advantages: All utensils, tools and raw materials needed are furnished to the participants free of cost, except small drawing materials and stationery. A diploma of attendance is given to those who have completed the course; it contains a statement as to the result of attendance. An examination does not take place.

SECTION 4: THE TECHNICAL HIGH SCHOOLS.

At the head of the institutions for technical education in Germany are the Technical High Schools. These have in most respects an educational status equivalent to that of the Universities. In the Empire there are altogether eleven of these institutions and a number of other High Schools for special subjects with similar recognition of their place in the educational scale. As examples of these might be mentioned the three Royal Mining Academies, one at Berlin, one at Claustaul (Prussia), and one at Freiberg (Saxony). There are also Forestry Academies, Agricultural High Schools, Veterinary High Schools, Commercial High Schools and High Schools of Art. In addition to these there are five High Schools of the German Army and Navy administration.

The name Technical High School is given to the institutions which are known in other countries as Technical Colleges or Technical Universities. They are somewhat similar to the faculties of applied science in Canadian and American Universities. They came into active service in Germany about 30 or 40 years ago. Some of them were founded on former technical and art institutions which had existed in some cases for almost a century. In Prussia, the Technical High School at Charlottenburg celebrated its hundredth anniversary in 1899, though the present building with its equipment was opened in 1884. It was on the occasion in 1899 that the right was granted to all Technical High Schools in Prussia to confer the degree of Dipl. Ing., and Dr. Ing. The object was to place the Technical High Schools on a level with the Universities and to give the graduates a recognised social status in accordance therewith. Some authorities regard the degrees as being of doubtful usefulness except in so far as they may enhance the reputation of a profession and thereby induce or incline able men to go into it. Social ideals and social standings exercise considerable influence at the time when the choice is made of a course of training for a life work.

Social and State Recognitions.

Engineering demands the best men and that fact was not lost sight of in the attempt to enhance the social position of the academical engineer. To strengthen further the position of the Technical High Schools, His Majesty the Emperor, in his capacity as King of Prussia, appointed professors of Prussian Technical High Schools as life members of the Herrenhaus (House of Lords). Every University, as an independent institution, had the right to send a member to the Herrenhaus. The King by taking this step placed the Technical High Schools, politically, on a level with the Universities. The example of Prussia, in conferring the right on Technical High Schools to grant degrees of Dipl. Ing., and Dr. Ing., has been followed by all the other German States.

In this connection we may quote what was said by Emperor William in 1899, on the occasion of the hundredth anniversary of the founding of the institution which is now the Berlin Technical High School, at Charlottenburg. Insight, farsight and power of interpretation are not absent from the qualities, utterances and actions of this distinguished monarch. In the following manner he indicates the connection between and the aims and tasks which lie before the Universities on one hand and the Technical High Schools on the other:

"In the relation of the Technical High Schools to the other higher educational establishments there is no opposition of interests and no other competition than this, that each of them and every member of them for his own part should do full justice to the claims of life and science, mindful of the words of Goethe:

'Neither be like to the other; but each be like to the higher.'

"How is this to be done? Let each be complete in himself! If the Technical High Schools that have attained to so flourishing a condition in the century now nearly past remain faithful to this admonition, the coming age will find them well equipped also to do full justice to the problems of which the progressive development of the world's civilization expects in an increasing measure the solution from technical science."

The Place of Tools and Workshop Practice.

As has already been indicated, it is now accepted that the instruction in the Continuation Classes is most advantageous when grouped around the calling or occupation of the pupils. In those cities where the Continuation Schools are not provided with workshops, tools or machinery, there is less close connection with the trades and industries by means of expert advisers or committees, and there are fewer of the teachers who have had practical experience in the workshops and factories.

In the Continuation Schools and in the Lower Technical Schools the object of using materials, tools and machines is to prevent the pupils from becoming mechanical in doing their work. The practice and experience in school with tools and machines gives them an all round training so that they may know something of each of the processes relating to their trade and be ready to become experts in any one of these by long or short practice.

In the Middle Technical and Technical High Schools the work is chiefly of an intellectual character intended to fit men for positions of leadership. In but few cases does manual work in them occupy any considerable portion of the time. In the Technical High Schools the workshop practice is not intended to teach the students a trade or to make them expert machinists or experts in any handicraft or tool or machine operation. The purpose is to give the students an adequate knowledge of materials, tools, machines, working methods and to make them acquainted with the workmen, their point of view and the conditions under which they work. All this is for the purpose of giving them clear ideas as to the conditions, means and limitations of manufacturing and workmanship, of the workmen's attitude and capacity and of the management of a factory.

To Train Leaders for Industry.

The Technical High Schools are schools of technology and not schools of technique for manual work with machines or for handicrafts. They are the institutions of the highest grade and their aim is to train the students to independent thought and ability in their technical affairs. The students are taught and trained constantly to take a wide view in all their considerations and in all their doings. It is recognised that a failure in any undertaking shows that something had been overlooked or neglected. On the other hand if all the conditions have been taken into consideration according to their importance, successful plan and satisfactory accomplishment may be expected.

Dr. Kerschensteiner says:—

> The group of technical officers is almost exclusively recruited from the German Technical Colleges. These institutions are open only to students who have passed through the nine classes of the secondary school. They educate the technical leaders of industry and also the state and municipal officials who are entrusted with the execution of technical problems. They receive their pupils after a school course of twelve or thirteen years, including a primary and secondary school, running from the pupil's sixth to his nineteenth year. Frequently a year of practical work is thrown in between the secondary school and the technical college. These technical colleges supply us for the most part with the higher technical heads of factories, whose duty it is to strike out new paths and discover new tasks and methods.

Summary of their Evolution.

The present Technical High Schools are a gradual growth and outgrowth of the effort to provide schools which should embrace technical studies and industrial education, taking definite form in several states between 1820 and 1840, as for example: Munich, 1823; Dresden, 1828; Stuttgart, 1829–32; Karlsruhe, 1825; Darmstadt, 1826–36. Berlin Technical High School, at Charlottenburg, opened in 1884, is a continuation and extension of an institution which celebrated its hundredth anniversary in 1899. At different periods there was reorganization of most of the institutions. The mutual connection between the technical and the natural sciences naturally required a continued development of the schools, of their curriculum and methods. Progress in the discoveries of science and in the application of science to industrial accomplishment called for men with training to meet the needs of the altered conditions.

Before the Technical High Schools could be properly developed, institutions which furnished the necessary preparatory education had to be created and extended. The Secondary School, known as "Realschule," was in the first place organised to serve the spread of "generally useful knowledge." That was followed by the establishment of schools for the distinct and special branches of science.

Differentiation from Tenth Year of Age.

While the technical institutions at first included the training of craftsmen, mechanics and of professional engineers, experience revealed the fact that these classes of workers could not be advantageously trained in the same way. Further those who studied the question saw that the preparatory schooling necessary

for those who were to become craftsmen and mechanics was different from that required for those who were to become professional engineers. The education of the latter was required to be more comprehensive and thorough.

The existing organization of education in the various German States attempts to provide suitable training for different classes of workers. As between those who are to follow manual occupations and those who are to prepare for the higher professional positions it becomes necessary for the pupil to decide the direction of his education in the main, in his tenth year. Practically the first three (or four) years of all schools in Germany offer similar courses of instruction and training. Some hold that the practical or manipulative work in the form of manual training, and a general idea of natural science, now provided under the general term of nature study, are beneficial and necessary for the best all around development of all pupils whether they are to follow education through Secondary School and College or are to leave the Elementary School for work at the age of fourteen.

Advancement in Reputation and Progress in Co-Operation.

The Technical High Schools fill a place of their own. For a time a movement was pushed in the direction of the German Universities providing a scientific and technical training. Owing to the apathy and opposition of the classical interests little progress was made in that direction and in consequence Technical High Schools were developed to meet the situation. Since 1901 they have been given substantially the same recognition and rank as the Universities. The quotation from the words which the Emperor William used on the occasion of the celebration of the hundredth anniversary of the Technical High School at Charlottenburg indicates the aims and tasks that lie before the two kinds of institutions.

About 1890 there came about a closer connection of the eleven Technical High Schools among themselves. This connection resulted in permitting students wider liberty in selecting the particular school which they would attend, by giving them credit in one institution for the time of study passed in another, and by mutual validity of the examinations in each school. Appointments of teachers from one school to another promoted a closer bond of similar aims and labors, while the joint interests are materially furthered by meetings of representatives of the various Technical High Schools at which questions of importance to all are fully discussed.

Organization of Courses.

In the general organization of the Technical High Schools there are first of all four technical departments of training: for architects, for engineers, mechanical engineers and technical chemists. Two of the Technical High Schools have special departments for Electro-Technology. Berlin has a special department for Shipbuilding and Marine Engine Construction. Karlsruhe has a department for Forestry, Munich one for Agriculture and Brunswick for

Pharmacy. In all the High Schools the mathematical and physical subjects and those of general education have been combined into a general department.

The time of the student is divided between lectures and exercises. The number of weekly hours on the average for the Technical High Schools varies from 37 for civil engineers to 43 for architects. Mechanical engineers and electrical engineers each give 38. Architects give 17 hours weekly to lectures and 26 to exercises; civil engineers, 20 to lectures and 17 to exercises; mechanical engineers, 20 to lectures and 18 to exercises; electrical engineers give 19 to each.

Science, Practical Training, Political Economy.

Separate branches of instruction on separate subjects act and react upon one another and necessitate the systematic building up of the course of instruction as a whole. The various departments of mathematical sciences form the foundation of the whole system. From the beginning physics and chemistry have been in closest connection with technical teaching. In more recent years electro-technology has stood in the most intimate relation to physical research. Chemical research has also stood in the closest relation to practical purposes.

It is necessary that the High School should keep pace with the practical achievements of technical science. These for profit-making reasons are mostly kept from publicity. In order to provide that the research work and direct practical activity shall be harmoniously combined, in many cases the teacher or professor is also, or has been, engaged in practical business or in his profession apart from the educational institution.

Technical High Schools have taken a great part in the evolution of teaching by means of the laboratory. In the founding of mechanical technical laboratories the first aim was pure research. However it was soon found useful to make these laboratories accessible to students as for presenting single experiments or demonstrations and then also for independent work. Technical High Schools thus, by extending laboratories, have been able to keep a close connection between the constructive and theoretical departments of engineering.

In the next place increasing attention has been given to the problems of political economy. Because of the increasing importance of technical science to modern life with the great material value attached to it, it becomes necessary that leaders should be trained by exhaustive study not only to material problems but to social and judicial problems of political economy.

A point of importance is that students should receive practical training as well as theoretical and scientific training for a technical profession. It is now generally held that students should have at least one year of practical experience under shop or working conditions before taking a professional course at the High School. Where this requirement is not in force it is exacted as a condition from the candidate for the title of certificated engineer.

SECTION 5 : OTHER HIGH SCHOOLS.

Besides the Technical High Schools there are High Schools for special subjects dealing exclusively with the scientific teaching of separate technical subjects. Some of these subjects such as Mining, Engineering, Forestry, Science of Agriculture, are also represented in the Technical High Schools. Agriculture is also taught in several, and Forestry in a few, of the Universities. The special subject of Veterinary Science on the other hand is in the great majority of cases assigned to the Veterinary High Schools. There are also Commercial High Schools as independent establishments. One in Aix-la-Chapelle exists as a department of the Technical High School. The seven types of institutions which come under this qualification are (1) Mining Academies; (2) Forestry Academies; (3) Agricultural High Schools; (4) Veterinary High Schools; (5) Commercial High Schools; (6) High Schools of Art; (7) High Schools of the German Army and Navy Administration.

The institutions in this class are not reported upon with the exception of the brief statement *re* Forestry Academies which follows.

Forestry Academies.

The German Empire has an extent of forest ground covering about thirty-four and a quarter million acres of which about half are Government and Communal forests. For the intelligent management of these forests a considerable number of higher officials are required. These receive their training partly at the Universities and partly at special Forestry Academies. The conditions of admission to the Forestry Academies are practically the same as those to the Universities or Technical High Schools. The course for the Royal Forestry Academy at Eberswalde, Prussia, requires the leaving certificate of a school or schools with a twelve years' course. The candidate for the higher forestry service must then first pass through one year's practical preparation, then attend the Forestry Academy for at least two years successively, pass a first examination and then, as Forestry Referendar, follow a one year's course in law and political ecomony at a German University. After two more years of free practical preparation, the Forestry Referendar can present himself for the second examination and if successful obtain the title of Forestry Assessor and receive an appointment.

CHAPTER XLIV : TRAINING OF TEACHERS OF INDUSTRIAL AND TECHNICAL SCHOOLS.

SECTION 1 : INTRODUCTORY.

It was recognized throughout Germany that one of the most important, and at the same time most difficult, tasks in the development of State systems of Vocational Industrial Instruction was to procure suitable teachers. It was evident that means must first be provided to induce to accept teachers' positions, persons who were not only theoretically schooled, but were also familiar with the practical side of industrial life.

In Prussia, where official title and rank count for a great deal, the position of teachers in that respect is duly accorded. The Report says:—

> It is important for the standing of teachers of vocational schools and for the uplift of the teaching profession that, in consequence of a Royal order of January 27, 1898, the relations of title and rank have been regulated like those of similar officers of the State; naturally the order dealt first with the principals and teachers of State institutions. The principals of such schools received the official title of "Director" with the rank of councillors of the fifth class and the prospect of promotion to the fourth class on the motion of the Minister. Teachers with full university preparation received the title "Head-teacher" (Oberlehrer) with the rank of councillors of the fifth class. This order also provided that one-third of the total number of such teachers may receive the title of "Professor." After twelve years of service they may be proposed for the fourth class of councillors.
>
> By a Royal order of January 27, 1906, the titles and rank of the principals and teachers of trade schools and industrial art schools subsidized by the State, and those of the higher technical schools for the textile branches, were similarly regulated. According to that order the title of "Professor" may be conferred on such teachers without the pre-supposition of full university preparation. It was further decreed that henceforth one-half of the number of head teachers of the schools for the building and machine building trades may be promoted to the rank of Professor.

Courses in Industrial Art.

In Schools of Industrial Art and in Trade Schools the need of further education for the teachers has been most strongly felt. Here the teachers to be successful must preserve an aptitude for new accomplishments and keep in touch with artistic life. For that, however, opportunities are often lacking in small cities. Such teachers need to become familiar with new fields of activity in industrial art and design for which their work in school does not give them the required time. In order to meet this need a number of courses of instruction for teachers in different fields of industrial art were arranged during the last few years; thus, for instance, by Architect Riemerschmidt, in Munich, who dealt with designs of furniture and interior architecture; in flat ornamentation at the industrial art and trade school in Magdeburg; in lettering at the school of design in Dusseldorf under Professor Behrens; in mural painting and decorating for teachers of technical classes under direction of Professor Mohrbutter in Charlottenburg; and finally a course in mural decoration under Professor Hammel in Hanover.

This improvement of teachers was promoted further by stipends, granted by State and communities to schools of that kind, for teachers' journeys of study. Similar journeys were encouraged by stipends for the improvement of teachers of the textile branches.

Need of Better Training Recognized.

In Schools for the Building Trades and for Machine Building and Mechanical Engineering Schools in Prussia, special arrangements for the preparation of the teaching staff had not been made until the end of 1912. For some years it has been required that any teacher to be appointed should possess a higher education obtained either in a University or in a Technical High School and more especially that they should have had adequate experience in industrial practice. Opportunities have existed for some time by means of grants to enable teachers to take study trips to other cities; by grants of absences from duty with salary paid for the same purpose; and by permission to engage in private occupations or practice. Short courses have also been given and special lectures provided.

The training of teachers for Continuation Schools because of their large number is perhaps more important than for schools of any other class. In the early years of Continuation Class work, the schools were generally taught by teachers of Elementary Schools who were seldom industrially or technically prepared to give the proper instruction. Gradually men with adequate preparation have been found for these schools, more particularly those who are able to teach Drawing, Technology and the various trades represented.

Special professional Drawing Courses were provided at Berlin, Dusseldorf and Hanover. The total number of teachers employed in the Continuation Schools of Prussia is over 12,000. The Government authorities recognize the necessity that such teachers for these schools hereafter should be more thoroughly trained in both pedagogical and technical matters and have their qualification completed by industrial experience.

The Baden and Wurttemberg Plan.

The organized provision for the training of teachers for the trade side of Technical Schools has been carried furthest in the City of Karlsruhe. The Government of the State of Wurttemberg has availed itself of the provision made by the Government of Baden, at Karlsruhe, to the extent that selected teachers-in-training went from Wurttemberg to Baden and took courses in the Department of Training Teachers in the Technical Institution at Karlsruhe. The Commission had the advantage of conversations with Dr. Hartmann of Stuttgart and Dr. Mier of Karlsruhe.

From Dr. Hartmann it was learned that, for the State of Wurttemberg until a sufficient supply of competent teachers was available, teachers of Elementary Schools and Higher Elementary Schools had been given scholarship allowances of 1,000 marks per annum to take 3½ years of training, usually at Karlsruhe. That was a temporary expedient to secure enough competent teachers. It was

necessary for such teachers to follow practical work, in workshop or office for one year, usually at the end of the first year of training, in addition to two years of theoretical instruction and school experience at the institution at Karlsruhe.

Another plan which also was followed was to give students, who had shown ability at the Lower Technical Schools and the Industrial Art Schools, one year of special instruction in the principles and art of teaching.

Now that a sufficient number of teachers have been trained, and the positions are numerous enough and attractive enough to induce men to prepare for them, the scholarship allowance of 1,000 marks per annum has been discontinued. In most cases teachers for the Continuation Classes and for the Middle Technical Schools now come from the Technical High Schools.

Dr. Hartmann was of opinion that it was not desirable to employ as teachers those who were occupied in other work or business. He preferred a teacher who could take and did take with the pupils all the closely related subjects. He preferred that method to the one whereby a number of special teachers gave the pupil a few hours each.

Dr. Mier spoke of the difficulty of preventing the schools and the courses from becoming too theoretical. By keeping the instruction and experiences of the students in the schools more and more on practical lines the difficulty is being overcome. In his judgment the professors, on the staff of an institution which trained teachers for technical institutions, should have a qualification of at least ten years of practical experience of a business occupation. That had been the rule of the institution at Karlsruhe.

SECTION 2: THE TRAINING AT KARLSRUHE.

Since 1882 the Technical Institution in the City of Karlsruhe has had a department for the training of Industrial Teachers. The institution was visited and a brief statement of the main features of the Division for the Training of Industrial Teachers is submitted as published in the Annual Report of the Commissioner of Education for the United States (1911).

Division for the training of Industrial Teachers.—This division aims at preparing teachers to give the Industrial and Technical instruction prescribed by the laws of the country for the industrial schools, and is, of course, attended mainly by students who intend to devote themselves to the teaching profession. Candidates for positions as industrial teachers must attend the institution seven semesters, and then pass the regular State Teacher's examination.

Candidates who seek admission into the lower classes of the first four divisions of the Karlsruhe Building Trades School must have finished their sixteenth year. At the time of admission candidates must pass an examination in German, Arithmetic, and the Theory of Projection. Besides this, previous practical experience in the industries is demanded under all circumstances for admission into the lowest classes of any one of the four divisions. This practical experience must amount to at least two full years (24 months), in which service in an office is not to be counted. The experience must be obtained as follows: (1) for the Architectural Division, in actual building operations; (2) for the Road Building and Hydraulic Division, in actual work of this class; (3) for the Machine Engineer, in the machine shop; (4) for the Electrical Division, also in the machine shop in the following proportions: students with predominatingly Machine-Engineering training must take from the minimum requirements of two years' experience at least nine months in an electro-technical manufactory, in electro-technical business, or in fitting up electrical plants; students who attend this Division with predominatingly electro-technical experience must complete at least nine months' practice in general machine building trades.

Besides this two years' practice or apprenticeship the candidate for admission must produce proof that he has either attended an Industrial School or completed the fifth class of a Middle School. In exceptional cases only and on account of especially good work, students from an Industrial Continuation School may gain admission. It is important that pupils who possess the certificate for one year's military service or who have finished the classes of a Middle School, mentioned above, should receive instruction in an Industrial School in addition to their practical work before their entrance into the Building-Trades School.

* * * * * *

The division for the training of industrial teachers is open only to those who bring proof of having been accepted as Elementary School candidates or of having finished seven classes of a Middle School. The completion of the seventeenth year marks the earliest period for admission into this Division. Besides this, it is required that one entering this Division shall have finished at least three months' practical activity in some large building business, and that before attending the fourth class Elementary Schoolteachers shall undertake at least a year of further practice, while those coming from the seventh class of a Middle School must complete two years in practical work. It is recommended that students of the Middle School finish one year of this practice before they enter, instead of the minimum three months' practice.

During their vacations, or during the period of their absence from school, in order that they may advance in their education and increase their understanding of national methods of building, students of the Architectural Division are directed to prepare photographs and drawings of fine old buildings and their parts. This serves as a preparation for subjects of instruction which form the substance of the course in the next higher class. The examples chosen are sketched under the direction of the teacher.

The students of the Industrial Teachers' Division are required to make use of the autumn vacation for learning some of the industrial handwork mentioned above. The Easter holidays, on the other hand, are used for the taking of photographs of buildings and artistic objects of all kinds. State assistance is at the disposal of both Divisions to defray the expenses of visits to manufactories and the like, as well as to pay for well-prepared photographs.

Candidates in this division pay a matriculation fee of five marks ($1.19). The tuition fee is 40 marks ($9.52) for citizens of the Empire and 80 marks ($19.04) for foreigners.

At the opening of every semester, instruction in hygiene is given to the new students by the conductor of the so-called Samaritan course. This course covers the principal points a student should know in order to preserve health of body and mind.

Course of Study.

The course of study is arranged in six Semesters each lasting half a year.

First Class.

	Hrs. per week.
Mathematics	4
Physics	3
Mechanics	2
Geometrical Drawing	2
Descriptive Geometry	7
Grammar of form, with Sketches	2
Free-hand Drawing and Painting	22

Second Class.

Mathematics	3
Physics	4
Chemistry	3
Mechanics	2
Descriptive Geometry	6
Theory of Building Construction	11
Grammar of form and Mechanical Drawing	4
Free-hand Drawing and Painting	9

Third Class.

Mathematics	2
Chemistry	4
Theoretical Mechanics	2
Descriptive Geometry	2
Theory of Building Construction	9
Building Models	7
Elementary Mechanics	1
Grammar of form and Mechanical Drawing	4
Free-hand Drawing and Painting	9

Fourth and Fifth Classes.

Mechanics	1
Technology	2
Theory of Building Construction	7–9
Industrial Technical Models (building forms of wood and stone)	2
Industrial Technical Drawings (parts of buildings and furniture)	5
Practical Geometry	2
Knowledge of Machinery	1
Elementary Machines	2
Machine Drawing	3
Applied Free-hand Drawing and Painting	8
Bookkeeping	4
Political Economy	3
Introduction to Industrial Practice (visits to work-shops, etc.)	Time not fixed.
Introduction to Industrial School Practice	1

Sixth and Seventh Classes.

Technology	1
Theory of the Consumption of Fuel	1
Theory of Building Construction (with working drawing)	9
Theory of Construction in Iron	2
Industrial Technical Models of Metal, Clay, Glass and Textiles	3
Industrial Technical Sketches	9
Drawings of Machinery	3
Electro-technology	2
Applied Freehand Drawing and Painting	8–9
Knowledge of Baden (considering artistic buildings and monuments and their preservation)	1

Building Regulations of Baden, with consideration of its relation to Wurttemberg	1
Theory of Exchange	1
Legal Knowledge	1
Political Economy	3
Introduction to Industrial Practice	Time not fixed.
Introduction to Industrial School Practice	1

Courses in Industries.

In addition to the theoretical and intellectual instruction pursued at Karlsruhe, each of the teachers-in training must have courses of work in the industry itself, as for example those who have been accepted as candidates from Elementary Schools must take the following:—

	Months.
Masonry	2
Carpentry	1
Building and artistic iron work	1
Joinery and furniture making	1½
Tinsmithing	1½
Whitewashing and decorating	1½
Mechanical engineering	1½
Optional work	2
Total	12

For those who enter from the seventh class of a Middle School the work is as follows:—

	Months.
Masonry	4
Carpentry	2
Building and artistic iron work	2
Joinery and cabinet making	3
Tinsmithing	2
Whitewashing and decorating	2
Mechanical engineering	2½
Work in the graphic industries	1½
Optional work	5
Total	24

It is recommended that voluntary work be done in one ofthe following trades: stonecutting, glazing, plumbing, paper hanging, electro-work, lithographing, bookbinding. It is not expected that candidates will acquire great mechanical dexterity by means of this practical activity in industrial life, but it is hoped that a clear and comprehensive survey of the whole industrial field can be made, and attention be paid to the different processes of work. During the time of practical work in the industry, which is included in the preparation for the profession of industrial teacher, it is especially important that the candidates comply exactly with the same methods of business and times of work as the ordinary worker in the industry.

EXPENSE JUSTIFIED BY EFFICENCY.

The character and extent of this course of training and experience seem to be exacting and expensive. Those who know the history in these two States say that at first they experienced the weakness and unsatisfactory results from having classes taught, on the one hand, by mechanics who were not qualified as teachers, and on the other hand, by good teachers who had no technical or industrial experience for that part of the work. Now the leaders have come to the conclusion that the professional teachers must be trained technically and have industrial experience and that the mechanics must be given opportunities of learning the principles and of acquiring experience in the art of teaching.

They further encourage the teachers after their training is completed and they are in charge of classes, to keep in touch with actual business progress by frequent visits to industrial plants and in some cases by permitting and even encouraging them to carry on industrial and business occupations in addition to their teaching work. This practice was encouraged also in other places visited, more particularly in connection with the Art Schools. The high state of efficiency of the Vocational Schools in Wurttemberg and Baden are justification for all that has been attempted and done in the way of training those who have charge of the classes in the Continuation, Lower, and Middle Technical Schools.

SECTION 3: THE LATEST PROVISIONS IN PRUSSIA.

Since the visit of the Commission to Germany a circular has been issued, by the Ministry in the Kingdom of Prussia to the Presidents of all the Provinces, setting forth that it was intended to institute a course of training for teachers in Industrial Continuation Schools, beginning in 1913. The course is to be held in Berlin, will last one year and will be terminated with an examination.

The subjects taught will include pedagogy, with special reference to the organization and methods of instruction in Continuation Schools, knowledge of business methods, citizenship, and the elements of technical drawing. Admission to the course will be limited to:—

(1) Engineers and artisans who have received a good general education and have done at least three years' practical work. Preference will be given to those who have already taught in a Continuation School. A knowledge of foreign languages will not be required, but credit will be given for a thorough mastery of the German language, literature, and history, as well as some acqaintance with the economic and artistic questions of the day.

(2) Teachers who have already passed the second professional examination and who have studied some industrial or technical subject, and have had some experience in a Continuation School. This latter condition may be waived in special cases. Preference will be given to candidates who have had practical experience in some branch of industry.

(3) Other persons of a good general education who have already taught in a Continuation School and have done practical work.

Candidates for admission to the course must be not less than 24 nor more than 35 years of age. The fee for the course is 60 marks; this may be remitted in necessitous cases, or a scholarship may be granted where this has not already been done by the locality from which the candidate comes.

As the number of places for the course of training is limited, the passing of the entrance examination will not necessarily admit to the course, but candidates will be chosen according to the place taken by them and according to the date of application. Those who pass, but for whom there is not room, will be allowed to enter later without again taking the entrance examination.

SECTION 4: THE MODERN SYSTEM OF APPRENTICESHIP IN GERMANY.

The Commission had the advantage of being accompanied during part of its enquiries in Europe by Professor Frederic H. Sexton, Director of Technical Education and Principal of the Technical College of Nova Scotia. He has kindly placed at the disposal of the Commission a Memorandum which he prepared on the Modern System of Apprenticeship in Germany.

It is as follows:—

The extensive system of apprenticeship in Germany is one of the most characteristic and impressive features of industrial life in that country. The system runs hand in hand with the Continuation Schools all over the Empire. If one wishes to acquire an adequate comprehension of the latter, he must inform himself at the same time concerning the former. The industrial Continuation School would be shorn of a large part of its great efficiency if the custom of indenturing youths to a master for a term of years had not been persistently preserved and adapted to the evolution of industry. It is true that the system has been radically modified to meet modern industrial conditions, but it still retains a great many of the paternal features which characterized the older forms of indenture.

All contracts of apprenticeship call for the attendance of the apprentice at a Continuation School especially adapted to his vocation. In the workshop, the boy learns the practical methods of construction of the products in his line of work and gradually acquires manual dexterity and craft skill. In the school he is given mathematics, bookkeeping, languages, hygiene, civics, drawing and science, all applied to his special vocation in addition to the workshop practice necessary to make him a competent, skilled journeyman and intelligent citizen. He is also taught the finer and more delicate parts of his trade in the school workshop, if these refinements do not constitute a portion of his instruction in every -day work. In some cases the special tasks involving particular skill are set out in the school to be carried out in the master's shop or factory and brought back to the school for inspection. In such a manner the work of the school and the shop supplement each other.

In Germany, however, the trade school that is so common in France and Switzerland is very rarely met with. By trade school in this sense is meant a school which acts as a substitute for industrial apprenticeship, which

receives the boy at an early age (14-17), which occupies his whole time in lessons and shop work for practically the same number of years as the regular period of indenture in industrial establishments, and which turns him out as a competent journeyman. The German school authorities try to assist the parents in determining the vocation of the pupil while he is in the common schools and then co-operate with the municipal labour bureaus in placing him under a suitable employer when he leaves school.

Germany did not feel the effects of the factory system to a very great extent until after the consolidation of the separate States into the Empire and the industrial expansion after the war with France. Previous to 1871, most of the manufacturing in Germany had been on a handicraft basis, although the laws surrounding the old systems of guilds with their compulsory membership and strict regulations concerning apprenticeship had been very much loosened and had fallen into partial disuse prior to this date. In Germany there has been a persistent belief and continuous legislation to preserve the ancient handicraft guilds in as many particulars as could be adapted to modern industrial conditions. The principal motive for such action was the preservation of an effective apprenticeship system. There has been, therefore, a succession of enactments since the formation of the Empire which concern themselves with the maintenance of the prestige of the handicrafts and the granting to the guilds of continually widening powers. No other country except Austria has gone so far to provide adequate training and education for the apprentice and to strive to maintain the handicrafts in the face of the encroachments of the factory system. In 1897 all of the legislative enactments in Germany were gathered together, improved, added to and consolidated in the Industrial Code (Gewerbeordnung). This has been changed in some respects since then, but is essentially the same now as when passed. The radical advocates for the guild wished to make it compulsory for all men engaged in a trade to become members of it, but the government only went so far as to authorize the establishment of a guild in any district where the majority of persons interested are in favour of it. When established, the membership is compulsory upon all persons who, on their own account, carry on the trade to which the guild relates, except such employers as are at the head of large industrial establishments or those who do not employ either journeymen or apprentices. Such persons may become members if they wish to do so. Besides the two classes of people engaged in a trade which have just been mentioned, the guild membership is confined to those who are engaged in the trade on their own account, those who have ceased to work in the trade and have not taken up any other trade, and handicraftsmen working for wages in agricultural and industrial pursuits.

All applicants for membership have to pass such an examination as will properly test their ability to carry on their trades.

The guilds exist to regulate the trades and conditions of apprenticeship. They are the agents of the government in most matters that concern the handicrafts and all lines of industry in which skilled artisans are employed. The object of the guilds is sixfold, viz: (1) the detailed regulation of the conditions of indenture in all its phases, even to the echnical and moral education

of the apprentice; (2) the cultivation of an *esprit de corps* and professional pride and coherence among members of a trade; (3) the maintenance of good will between employers and employees; (4) the arbitration or the adjustment in other ways of disputes between master workmen and apprentices; (5) the creation of means to aid guild members and their families, journeymen, apprentices, and helpers in cases of sickness, invalidity, death, unemployment, etc.; (6) the formation of a general business organization for advancing the trades for which the guilds were created.

The main duty of a guild is to look after the welfare and education of apprentices. Germany firmly believes that the education of apprentices is too important a matter to be left to the hazard of a purely private contract. The Government did not wish to introduce a direct system of examination and regulation of apprentices, but delegates these powers and duties to the guilds.

The contract between a new apprentice and a master workman has to be carefully drawn up in due form and a copy must be submitted to the local guild within 15 days from the time it is signed. The contract provides that the apprentice shall be courteous, diligent, and loyal to his master, but also protects the former from exploitation, which latter condition is most to be guarded against. The employer is required to instruct the apprentice in all matters relating to the trade; to compel him to attend an industrial or trade Continuation School; to guard him against bad habits; and to protect him from bad treatment on the part of members of the household or companions. The employer must teach the apprentice himself or put him under the tutelage of a competent person who is directly responsible for his instruction. The apprentice must not be required to work beyond his strength and must be allowed time out of working hours to attend a Continuation School. He must also be allowed time to attend divine worship. Apprentices not living in the homes of their masters cannot be required to perform any household duties.

The conditions under which the indentured youth lives and works are carefully safeguarded. The officers of the guild visit the shops at least once a year and satisfy themselves that all of the provisions of the contract are being carried out, especially in regard to the instruction of the youth in all parts of the trade.

The guilds established a great many industrial Continuation Schools closely allied to the trade, at the same time including such general branches as civics, personal hygiene, etc. which are necessary for the making of an intelligent independent citizen. The teachers are usually members of the guild who are thoroughly conversant with the practical side of the trade and who are public-spirited enough to devote some of their time to the good of the apprentices. The communities usually furnish schoolrooms for these classes. The present tendency is, to eliminate the guild schools and for the community to supply the industrial instruction itself under close co-operation with the guild. The apprentice usually is required to attend these schools during the working hours in the daytime and the general attitude of employers is most favourable to this arrangement. It is a very general thing also for the guild to contribute toward the maintenance of the school either in apparatus or by an annual subscription or both.

The usual duration of the term of apprenticeship is three years, although it may be extended to four years. Upon the completion of the term of service, the apprentice is required to pass his examination as journeyman. He must submit a specimen of his own handiwork and pass certain theoretical examinations in drawing, science, book-keeping, etc. The examining boards consist of a president, appointed by the chamber of trades, and at least two other members, half of them elected by the guilds and half by the journeymen's commission.

When the journeyman has practised his trade a such for two years he may take another examination and if successful can receive the title of assistant or helper. As such he is employed as an artisan with proven skill and often is employed as foreman in minor capacities.

When the journeyman has practised his trade as such for three years, he is eligible for the examination of master workman. This examination is given by commission which consists of a president and four other members chosen by the superior administrative authority. The candidate for the title of master workman must show that he is able to value and execute the ordinary work of his trade and especially that he possesses full ability to keep books and accurate accounts, so that he may have ample capacity to carry on the trade in his own establishment. Master workmen are allowed to employ apprentices only after they have attained the age of 24 years and have completed the term of apprenticeship as prescribed by the chamber of trades, or after they have exercised their respective trades without interruption for five years, either on their own account or as foremen in an industrial establishment.

The number of apprentices which any employer has in his establishment may be limited by the lower administrative authorities, if it can be shown that there are more than the business warrants so that the instruction of the youths under indenture might be jeopardized.

It must not be supposed that all of the youths engaged in industry are regular apprentices under the conditions mentioned above. A great many are employed as factory hands who are learning to become skilled machine operators and who earn a much higher wage than the apprentices, but who do not receive nearly as thorough a training. The following scale of wages for apprentices in the firm of A. Borsig, a very large enterprise engaged in building locomotives and machine-construction near Berlin, will be illustrative.

During the 1st year, per hour	$1\frac{3}{4}$	cents.
" " 2nd " " "	$2\frac{1}{2}$	"
" " 3rd " " "	$3\frac{1}{4}$	"
" " 4th " " "	4	"

Twelve and a half cents is retained out of every week's wages by the firm, to be given as a bonus at the end of the apprenticeship.

The handicraft trades and regular indentured apprenticeship are more prevalent in Southern Germany, as in Bavaria, Wurttemberg, Baden, etc., than in the northern portion of the Empire.

In Prussia, however, the system exists to a very great extent, as is shown by the statistics for the year 1909, which are as follows;—

Number of apprentices	31,209
" who board and lodge with master	9,484
" apprenticed to their own fathers	1,730

Germany has provided for a perpetuation of the old guild and apprenticeship system because she believes that there was much of good in the old relation of master and apprentice. Along other lines the Germans have put forth strenous efforts to maintain the place of the handicrafts in the industrial system and raise the workmen in the small establishments. In a great many manufacturing centres there is a provision at the schools for short courses especially adapted to the needs of master workmen. These courses are of one, two, or three months' duration. The master workmen come in from the surrounding districts and from the community itself and are taught the special refinements of their trades and also any new developments that apply to their respective vocations. Thus we find at the School of Machine Construction in Cologne, courses for master workmen engaged in installations of gas, water or electrical apparatus, also fo those engaged in gas works, electrical power stations, autogenous welding plants, etc. The Rhenish Association for the Advancement of Industry also offers short courses in Cologne for master workmen in the vocations of ironsmith, tailor, cabinet maker, and shoemaker. These courses are of immense advantage in keeping the skilled workers in the handicrafts abreast of the times and also in assisting the handicrafts industries in their otherwise unequal struggles with the factory system of production.

One of the most patent advantages of developing and assisting the all-round training of craftsmen, through a careful system of recognized apprenticeship, is the standardization of the capacity of the mechanic to do the work that is expected of him. In America, where the apprenticeship system has been allowed to fall naturally into a decadent stage, the employer is compelled to take the word of the applicant for a position that he is a capable journeyman. Very often the employer only knows the misrepresentations of a new employee after some valuable work has been spoiled or an expensive machine damaged. In Germany a prospective employee has to produce his certificate of apprenticeship and his papers which describe him as a journeyman, assistant, or master workman, and then the employer may be sure of his capacity as a competent workman within the limits described on the respective certificates. One of the greatest drawbacks in industry on this continent to day would be removed if there were general provisions for the indenturing of youths under such safeguards as to welfare and thorough instruction as are provided for in the modernized system of apprenticeship which is in force in the German Empire at the present time. Too many of the young men in America are wasting valuable years of their own life in acquiring a thorough all-round knowledge of a trade by "stealing" it at a great expense to their employers. It is only the very largest American firms who seem to be able to carry out any effective system of apprenticeship adapted to modern conditions.

The apprenticeship system as carried out in Germany seems to be effective and also seems to meet with the general approbation of all parties concerned. The Government, through the guilds, does everything within its power to prevent the exploitation of youth in industry and also to secure a high class of skilled workmen for the manufacturing industries. The following quotation is from an official report of an expert from Belgium, Mr. Buyse, on the German apprenticeship system, "Thanks to the guilds, the apprentice is not exposed to the hazards of life and left to his own weakness. He is surrounded with safeguards, and his education is obtained under the most favourable conditions. From his entrance to industry the guild looks after him. It supervises the punctual execution of the work in which his employer instructs him, takes account at least once a year of the progress realized, and as a test of his studies makes him give a proof of his ability, and gives to him a certificate of apprenticeship. This certificate is a reliable document of influence throughout the Empire. The young journeymen finds a cordial reception among the federated guilds in all German cities. The master who employs him can judge of his ability and assign him work in accordance: because the declarations of the guilds are sincere and generally furnish a perfect guarantee that he has the necessary theoretical and practical knowledge."

CHAPTER XLV : ORGANISATION OF TECHNICAL EDUCATION IN TWO TYPICAL GERMAN CITIES.

SECTION 1 : BREMEN.

This is one of the cities of the old Hanseatic League, the second largest commercial centre in Germany, and a busy seaport, being the headquarters of the North German Lloyd Steamship Company. It has a population of 250,000, principally engaged in shipping, shipbuilding, marine-engineering, machine-construction, building and commerce.

THE VOCATIONAL CONTINUATION SCHOOL SYSTEM.

This provides the first step in Technical Education for those who have left the public Elementary Schools. It is maintained by the city, and controlled by the "School Chancellor" and the Education Committee of the City Senate. The fees charged cover only about one-fifth of the expense of maintenance, the city contributing the difference,. In 1909-10 the expenses amounted to 144,600 marks,of which 30,000 marks represented fees, while the remaining 114,600 marks was furnished by the city. Public School buildings are largely made use of for this work, but a new building, to include workshops, was being erected at the time of the Commission's visit. The equipment seen was very modest, except as regards drawing models, and there were no workshops.

The attendance at the winter Session of 1909-10 was as follows:—

Voluntary:—	
Vocational Continuation School	311
Industrial Drawing School	1211
Boys' Drawing School	173
	1695
Compulsory Continuation Students	782
	2477

The majority of the 83 teachers employed are technical or practical men, who have had some training in the art of teaching. The Director, Professor Dr. Koop, stated that he had found this class of man to be the most satisfactory teacher for Vocational Continuation Schools.

Information obtained in "Conversation" with PROFESSOR DR. KOOP, *Director of the Vocational Continuation Schools.*

Professor Koop considers that in vocational Continuation Classes the boys should be divided according to vocations and not according to years. The instruction is mainly individual.

He ascribes the general excellence of the German school system and the generosity towards education to the general belief in the efficacy of education. There is a general knowledge abroad in Germany that it is a poor country, and that they must educate every man for his job, in order that they may all work with great skill and efficiency.

He recommends strongly that Canada should make Continuation Schools compulsory from the start if possible; and if he had it in his power, he would start them as compulsory schools and then the people would recognize the good of them very shortly.

In Bremen a number of the Guilds have come to Professor Koop and asked him to take their classes over, when they would give up their classes and co-operate with the city Continuation Schools.

He thinks it is better for a boy to learn his trade in a regular shop, or industrial establishment as an apprentice, and get his theoretical and scientific training in a Continuation School, than to get both in a trade school, because he then works in a true industrial atmosphere, which no trade school can duplicate.

He thinks emphatically that the best kind of teacher for vocational Continuation Schools would be one who is a skilled master workman and has taken 6 months' or a year's training in pedagogy. He would compare favourably with the regular teacher who is given a somewhat extended training in practical work.

He says there have been too many technical men trained in Germany for the real demand, but this will correct itself and that the man from the Technikum, or school for foremen, is in more demand than the graduate from the Hochschule and can more easily find a position that suits him.

THE TECHNIKUM.

This institution is a splendid example of what a single city can do in the way of stimulating its principal industries by technical education. It consists of a large main building with a central court for administration, recitation rooms, lecture rooms, collections of models and drawing rooms, and a fine, large, separate engineering laboratory. It is not as elaborately equipped as some of the other schools visited, but the money appears to have been very carefully allocated among the various departments, in procuring the apparatus which was most necessary for instruction. The departments provided are those especially needed for the industries of Bremen, e.g., shipbuilding, marine engineering, courses for mechanics on board ship, and for electric, gas and water installators. It seems to be a carefully developed and well-rounded institution for Bremen, maintained

by the city, to which the Director, Dr. Lange, is responsible. Fees cover less than half of the expenditure, so that the city provides the greater part of the funds, the proportions in 1910–11 being: fees, 97,000 marks., city, 192,000 marks; total 289,000 marks. No extra fees are charged to non-residents or foreigners. In every department, practical experience in the trade is a necessary qualification for entrance. The departments are as follows:—

A. Building Trades (above-ground and underground section).
B. Higher Machine Construction School.
C. Higher Shipbuilding School.
D. Ship-Machine construction and Marine Engineering.
E. Gasmasters' Course.

The teachers are Technical High School graduates with practical experience of the trades.

A. Building Trades School.

Students must have completed the Elementary School work and have had not less than two seasons' practical building experience. For the underground section, 4 years' training in the railway shops, or as assistant in railway construction, water or drainage works; or 4 years as locksmiths or mechanics, etc. There are 5 terms of 20 weeks each, the fees being 200 marks yearly, plus a small contribution for accident insurance. The following subjects are taken:—

German, Arithmetic, Planimetry, Stereometry and Trignometry, Physics and Chemistry, Freehand Drawing, Descriptive Geometry, Building Construction, Building Materials, Estimates of Construction, Surveying, Estimating, Industrial Law, Building Laws, Book-keeping, Planning and Projecting.

In the *Underground Building* Department, additional subjects are: Bridges, Roads, Railways, Grading, Surveying, Water Systems, Hydraulics, Machinery, City Systems, Electro-technics.

43 hours weekly are taken in first 2 terms, 42 and 41 in 3rd term, 39 in 4th term, and 37 and 38 in 5th term.

B. Higher Machine Construction School.

This Department trains mechanics, general and marine machine-builders, electro-technicians, etc., qualifying them to take independent positions or enter the Government service. Candidates must possess the one year's military service certificate, and have had at least one year's practical experience, a longer period being preferred. The fees are 200 marks yearly, and the course covers 5 terms of 20 weeks each, 37 to 42 hours weekly. The following subjects are taken up:—

German, Arithmetic, Caligraphy, Commercial Geography, German History, English, Book-keeping, Political Economy, Arithmetic, Planimetry, Stereotomy, Trigonometry, Analytical Geometry, Mechanics, Statics, Hydraulics, Chemistry, Physics, Geometrical Drawing, Freehand Drawing, Drafting, Machine-parts, Machine-construction, Technology, Levers, Pumps, Boilers and

Steam Fittings, Steering Gear, Hydraulic Motors, Combustion Engines, Railway Machinery, Building Construction, Iron Construction, Electro-technics, Electric Signalling, Electric Measuring, Electric Lighting, Calculating Electric Instruments, Power Transmission, Electro-chemistry, Marine Engines, Classification, Harbour Works.

C. Higher Shipbuilding School.

The aim of this department is to train technical students of shipbuilding to acquire the theory which will enable them to manage a business or work in a shipbuilding office, also to qualify for positions in the Imperial Navy. Candidates are required to possess the one year's service certificate. The course covers 4 terms of 20 weeks each, and the fee is 200 marks, plus accident insurance. The subjects are the same as under A. and B. with the addition of Shipbuilding Science and Drafting.

D. Ship-Machine Construction and Marine Engineering.

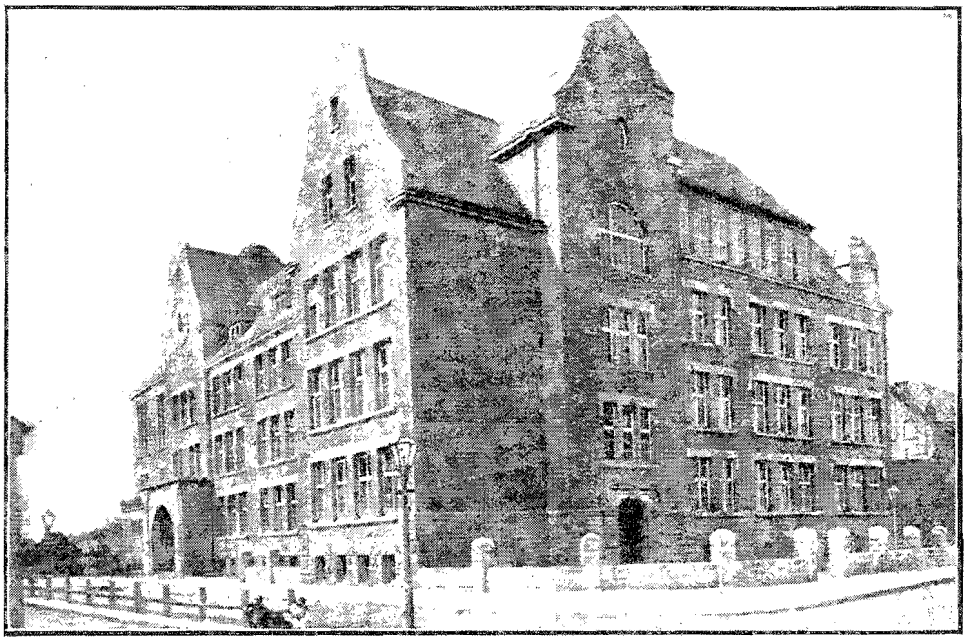
Students in this section are prepared for the examinations for Marine Engineers and Naval Mechanics. They must possess the one year's service certificate, or be able to pass an equivalent entrance examination, failing both of which, they may enter the Preparatory Class. To qualify for the lowest grade of Naval Mechanic (4th class) 5 years' practical experience at sea is required; for Marine Engineers, 5½year at sea and on shore; and for the higher grades, a proportionately longer term of service.

Courses for Engineers and 1st and 2nd Class Mechanics cover 1 year; for 3rd and 4th Class Mechanics, 16 weeks of evening classes. The fees are as follows:— Engineers, 300 marks yearly; Lower Engineers, 250 marks; 1st and 2nd Class Mechanics, 200 marks, 3rd Class Mechanics, 60 marks, 4th Class Mechanics, 50 marks. The subjects comprise:—

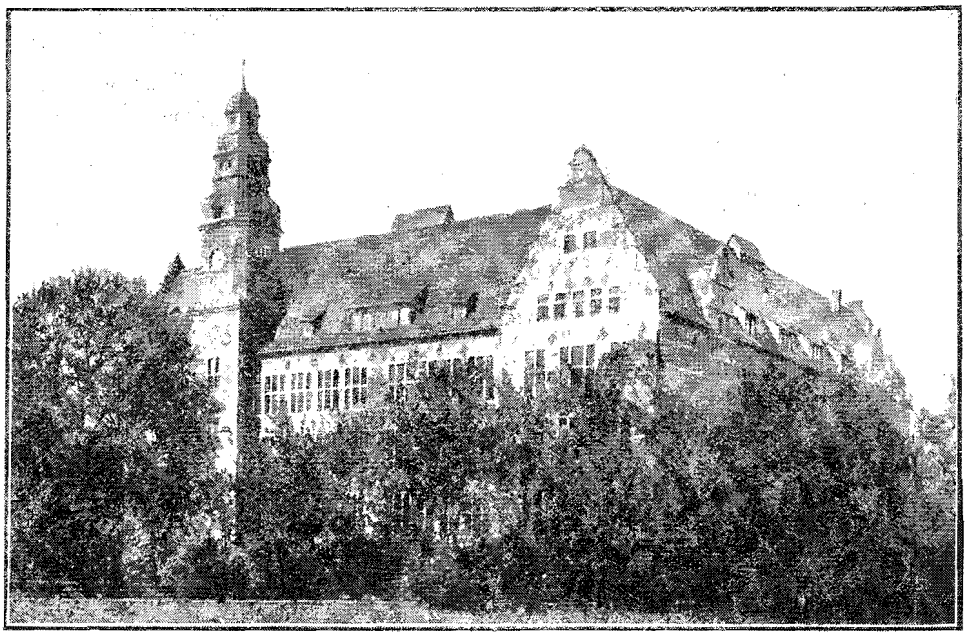
German, Arithmetic, Machinery and Electro-technics, Machine Sketching, English, Arithmetic, Planimetry, Stereometry, Trigonometry, Physics, Mechanics and Statics, Technology, Ship-building, Descriptive Geometry, Marine Engines, Chemistry.

E. Gasmasters' Course.

The aim of this course is to qualify students to conduct small businesses connected with the installation of water, gas and electricity in cities and private houses.



THE REALSCHULE : BREMEN.



THE TECHNIKUM : BREMEN.

Information obtained in "Conversation" with DR. WALTHER LANGE, *Director of the Bremen Technikum.*

Dr. Lange was at the head of the Vocational School in Lubeck when he was called to Bremen 17 years ago to take charge of the planning, organization and upbuilding of the new Technikum there. He had been working at the problems of technical education for 16 years previously, and has been in the movement for 33 years.

Dr. Lange is an author of wide reputation on Technical Schools in Germany, France and Austria, and is an authority on this subject.

He said that there was no distinct public sentiment in favor of technical or scientific education as against classical or general education. There was a strong general sentiment in favor of education itself, and the people felt that all branches must be generously supported. He had not had much difficulty in getting what money was needed for the development of his schemes in the Technikum. It was a little harder to get money now than in the early stages of the development of the Technikum.

The industrial firms in Bremen had done very little to help the Technikum, either in personal support or financially by gifts. The North German Lloyd SS. Co. had paid a small amount towards the support of the higher classes in ship-building, engineering, etc., for 10 years, but do nothing of this sort now.

Lately there had appeared some little opposition to the Technikum, from some economists who said that Bremen should not support such an expensive institution as the Technikum, but should give grants towards students who wanted such a course and send them to similar institutions in Prussia or elsewhere. This sentiment was not general or dangerous.

There was an instance of close co-operation between the school and a large industry in the case of the establishment of the Gasmasters' Course. A very large firm, Karl Fraenke, who manufacture apparatus for gas plants, water-works, etc., wanted men who could superintend the installation of such works and operate them. The firm came to the Technikum and asked that it train such men. The school consented and the firm gave apparatus, drawings, etc. and agreed to make up the deficit of such a course beyond the income from fees. There has been a very small deficit, so the firm have not been called on to any great extent. There has been a great demand for such men and now they come from all over Germany and get employment as soon as they leave the course. Other schools (such as Cologne) have established courses like it.

Dr. Lange said that there had been an excess of technical men trained for the opportunities in Germany, but not any more, (if as many in proportion to the demand), than for the professions of doctor, lawyer, etc. Now, a number of technical men went abroad, chiefly to the German colonies and to other places where German capital was interested, viz. Brazil and China. It was a most excellent thing for Germany that there were so many well-trained men for responsible positions even if it were a little hard on the individual.

He advised Canada, as a new country, to first establish Continuation Schools in every place, even down to the small village, to make them as nearly compul-

sory for all boys and girls from 14 to 17 years of age as possible, and then with the demand to establish special schools like the Building and Machinery Schools etc., in principal centres. These schools were much more important to the country and the national industries than Colleges for Engineers. The most necessary thing to do was to permeate and uplift the masses, and thus every apprentice should be trained, and men should have the opportunity to train themselves specially to be foremen. He was most emphatic on these points, and also on the point that Continuation Schools should be compulsory if possible, and that instruction should be given in the day time.

He also laid a good deal of stress on the fact that part of the instruction in the Continuation School should be devoted to general subjects, such as languages, civics and industrial history.

SECTION 2: CHEMNITZ.

This city of 290,000 inhabitants is situated in the Kingdom of Saxony, and is one of the most important manufacturing centres in the German Empire. Its principal industries are, the manufacture of locomotives and agricultural implements, cotton-spinning, glove-making and linen-weaving. It has an admirable organization of technical education, and may serve as a model for any city of similar size elsewhere. It has altogether 29 Technical Schools.

The general organization of technical education in Chemnitz is as follows:—

I Municipal Vocational and Continuation Schools supported by the City with grants from the State.

II. A Technical Institute with 5 Departments, provided and maintained by the Kingdom of Saxony.

III. A Higher Weaving School, with 7 Departments, a privately-managed institution, receiving a grant from the Kingdom of Saxony.

I. MUNICIPAL VOCATIONAL AND CONTINUATION SCHOOLS.

Since 1873, when it was made compulsory for all boys to attend Continuation School for not less than 2 hours a week from the age of 14 to 17, Chemnitz has required 4 hours a week, and 5 hours in some trades, the latter to be shortly extended to include all. Public opinion is now so strong on the subject that it is estimated that if the compulsory law were abrogated, attendance would remain at the same level.

Apprentices receive all their instruction in the day time, neither evening nor Sunday lessons being given, and the session is continuous, for 4 or 5 hours, instead of, as formerly, in two periods of 2 hours each per week. Boys usually come in the morning before going to work.

The Secretary expressed the opinion that the compulsory attendance at Continuation Schools since 1873 has increased public support of all education, through the contact of the workers with Continuation Schools. He cited an instance of some moulders who were on strike, spending their spare time in visiting an exhibition of work from the school, which convinced them of its value.

Voluntary evening classes are offered to journeymen.

The extension of the compulsory attendance limit is being considered, and employers, who were formerly hostile to the schools, are now strongly in favour of the idea. Owing to increased attendance it has been necessary to construct a new building, making three in all for Continuation Schools. These schools are supported by the city, but share in the general education grant made to the city as a w ole by the Kingdom of Saxony. The attendance at the time of the Commission's visit was 14,000 out of a population of 290,000; 4,000 pupils were accommodated in the building visited, their ages ranging from 14 to 17.

The aim of the Continuation Schools is:—

(1) To increase the knowledge and efficiency of the student as producer;

(2) To make him a better citizen.

This is done by means of supplementary education, without workshop practice, though the authorities would be glad of workshops if they could afford them.

All the staff have been elementary school teachers, with a year or more of practical experience in industry, and have the same status and privileges as elementary school teachers. They are required to give a minimum of 24 hours per week. It is proposed to establish a special course for vocational teachers, giving them a year after their elementary school normal training.

General Observations.

A class of Bakers' Apprentices in their white uniform presented a very neat and businesslike appearance. They were going straight from the class to night work.

In the new school there will be workshops for demonstration purposes, as in Frankfurt or Wurttemberg, but the authorities consider the Munich system the best to adopt, if possible.

The following courses are offered:—

Commercial—(6 hrs. weekly): German, Book-keeping, Arithmetic, Trade Instruction, Stenography, (compulsory), English, French, 2 hrs. weekly, (optional).

Clerks' Class—(6 hrs. weekly): for clerks in law and public offices:—German, Arithmetic, BusinessStenography, Book-keeping (compulsory), English and or French, 2 hrs, (optional).

Bakers' Class—(160 hrs. a term): German and Book-keeping, Arithmetic and Industrial History.

Confectioners' Class—(200 hrs. a term): German, Bookkeepin , Arithemtic, Business, Drawing, Practical Work.

Builders' workers—(200 hrs. a term): German, Arithmetic, Business, Drawing.

Pattern-Drawing—(160 hrs. a term): German, Arithmetic, Business, Drawing, especially for textile industry, Drawing given in the Higher Weaving School.

Metal workers—(200 hrs. a term): Same subjects, with Drawing as required.

Freehand Drawing.—(200 hrs. a term).

Unskilled Workers—Classes for unskilled workers, 4 hrs. weekly, comprising German, Arithmetic and Civics.

Information obtained in "Conversation" with PROFESSOR GOEPFERT, *Director of Continuation Schools, Chemnitz.*

Prof. Goepfert stated that Continuation Classes have resulted as much to the advantage of the social spirit as to the industries themselves. Graduates are encouraged to form social clubs, with the school as a meeting place.

Owing to the advance of specialization in factories, school workshops are becoming more necessary, and these will be included in the new building. The Guild Continuation Schools will also be taken over as part of the general scheme as soon as the new building is ready, and no contributions are expected from the Guilds for this purpose.

There is no special organization for securing employment for graduates from the elementary schools, beyond the personal interest of the teacher.

The Director prefers teachers, who have had practical experience and possess some pedagogical ability, to academic teachers with little or no practical training.

The trend in public schools nowadays is to include 'dexterity' work.

Continuation pupils usually have about 2 hours of homework.

It is expected the compulsory Continuation Schools for girls will soon be introduced throughout Saxony, and that they will include Domestic Science.

II. TECHNICAL INSTITUTE.

This is organized in 5 Departments, as follows:—

1. Industrial Academy,
2. Building Trades School.
3. Machine-construction School.
4. Dyeing School.
5. Industrial Drawing School (Evening Classes).

Under (3) is included an electro-technical Department for training men in management of weaving machinery.

It is a finishing school, but at the same time, 2 to 5 per cent in (1) go on to a Technical High School, of whom about half proceed to a diploma course. Graduates take positions as draughtsmen rather than as foremen.

The attendance in 1910 was 1253.

The equipment is modern and complete, but intended entirely for demonstration purposes. New buildings and equipment for electrical and steam engineering and for dyeing had been erected about 2 years before the Commission's visit at a cost of 1,250,000 marks. 3,000 marks annually is expended for magazines, ,000 marks for books and 1,000 marks for repairs. The library is open every school day and one evening a week to the general public.

(1) The Industrial Academy.

It began as an industrial school about 1830 for the training of factory workers and foremen, and does not profess to give higher scientific training. The highest class leads to the point where Dresden begins. There is a preparatory class for students needing it.

Divisions:

A. Machine-engineers, manufacturers, managers of machinery, weaving and spinning factories.

B. Chemical technical engineers, manufacturers and managers of chemical and allied trades.

C. Architects.

D. Electrical engineers, for manufacturers, etc. of electrical apparatus.

Courses. 7 terms in all departments. In C 6 months' practical work between first and second terms.

The entrance requirements are as follows:—

For A and D, 1 year military service certificate and one or two years' practical work in a machine factory or electro-technic works.

For C, at least 5 months practical building experience.

Entrance examination or equivalent test.

Leaving certificate entitles to entrance without examination at Dresden and Freiberg to study for degree of Doctor of Engineering and Diploma of Engineering. In B it entitles to course of "Foodstuff Chemist."

The fees are:—120 marks for Saxons, 180 marks for other Germans, and 300 marks for foreigners, plus laboratory fees and deposit for breakages, etc. Books and supplies amount to about 70 to 100 marks per annum.

Subjects: German and literature, English, technical freehand drawing, physics, chemistry, mathematics, building construction, drawing, measurement, chemical and mechanical technology, metallurgy, electro-technics (practical work), machine drawing and construction, lifting, pumps, steam machinery, boilers, water machinery (practical work). All the foregoing are compulsory.

The optional subjects are:—English, French, stenography, business arithmetic, book-keeping, fire-extinguishing, spinning, weaving and finishing, iron construction, first aid, water installations, patents, prevention of accidents and hygiene.

(2) Building Trades School.

The aim of this Department is to train men for the building trades, as middle-grade technical officials, and to prepare for the certificate of Head Builder.

The entrance requirements demand elementary education not below the 4th class of an elementary school, plus 3 summers' practical work as a mason or carpenter apprentice, and evidence of physical fitness. An entrance examination, including drawing, is held. The journeyman's certificate must be obtained before the second term. Practical work may be put in during the summer to make up the required time.

Fees are 50 marks for Saxons, 100 marks for other Germans, and 200 marks for foreigners, plus books and supplies, 50 marks.

The following subjects are taken:—

German, book-keeping, writing, mathematics, natural science (including chemistry), building mechanics, projections and shading, perspective; building science, including underground work, building materials, building regulations; planning and execution of buildings; heat and light installations; measuring; stone, wood, iron, mixed buildings; pipes, roofs, gutters, plans, freehand and architectural drawing; history of architecture; designing buildings, fire extinguishing.

The course covers 5 terms of 6 months each.

(3) Royal Machine Construction School.

This school has two Divisions, viz:
Machine-technical (tool and power machines).
Electro-technical.
The Aims: To train practical workers as foremen, etc.
The Course: 3 terms of 6 months each (Electro-technical, 4 terms).

The Entrance Requirements: Age 17, sufficient education, and not less than 3 years' practical experience. Only workshop practice is accepted, and the experience should preferably have been in a machine factory (with foundry), or electro-technical work in a mechanical workshop, telegraph supplies shop, etc. Installation of machinery or electric fittings is counted, but not drawing work. An entrance examination is held in general subjects.

The Fees: Saxons, 50 marks; other Germans, 100 marks; foreigners, 200 marks, plus books and supplies amounting to about 60 marks annually.

The Subjects include: German, book-keeping, political economy, drawing, projections, mathematics, physics, writing; technical subjects of selected course. Optional subjects are stenography, spinning, weaving, finishing, paper-making, water fittings, patents, workshop machinery, hygiene.

(4) Royal Dyeing School.

This Department of the Technical Institute gives theoretical and practical instruction to dyers and others interested to enable them to become dyeing experts. Practical laboratory work is given. Short-time students are accepted.

The course covers 3 terms of 6 months each, but those having the necessary training can shorten this, or take the time for special work.

The Entrance Requirements: Age 15, sufficient education, and (3) not less than 1½ yrs. practical work.

Certificates of school and industrial experience must be furnished on entrance and candidates must be able to read and write and know the first four rules of arithmetic, and an examination is held to test their knowledge. Students who have already worked one term in a laboratory may enter one term later.

The Fees: (a) Saxons, 50 marks; (b) other Germans, 100 marks; (c) foreigners, 500 marks, with remissions in deserving cases.

Courses are offered as follows:—

Experimental chemistry and laboratory work in dyeing laboratory; arithmetic, geometry, German, sketching and machine drawing; chemical technology; experimental dyeing and finishing; machinery, dyeing, bleaching, printing, finishing and chemical washing; business book-keeping, civics.

Optional:—Spinning and weaving, electrical and water installations, fire extinguishing and patents.

(5) Industrial Drawing School.

This is an Evening School, which aims to train young people of the industrial classes in drawing and modeling, giving them a sure hand and eye and cultivating their taste. About 300 students attend, most of them being journeymen. Courses are arranged as required in freehand drawing, modeling, geometrical drawing, projection drawing, machine drawing, and the fee is 5 marks per half year.

III. HIGHER WEAVING SCHOOL.

This school has 7 sections, as follows:—

1. Day school—1 yr.
2. Pattern drawing day-school—3 yrs.
3. Day preparatory department—as required.
4. Weaving school (evening and Sunday)—2 yrs.
5. Commercial (evening)—1 yr.
6. Pattern drawing (evening and Sunday)—as required.
7. Apprentice department (day school and 3 yrs. apprenticeship in weaving room).

Special Courses.

Teachers of Needlework and Evening School Teachers.
Plush Weaving.
Accounts in Weaving Business.

The attendance in 1910–11 was 510.

Special Features.

There is an employment bureau in connection with the school, the demand for graduates exceeding the supply.

A Botanical Garden is attached to the school for the use of pattern designers and drawing classes.

Models are borrowed for lectures on style, etc.

Students make trips to industrial centres and write reports.

A weaving collection with 2,047 varieties of textiles is on view for the use of students, and the Reading Room is well supplied with technical magazines. Exhibitions of work are held.

SESSIONAL PAPER No. 191d

CHAPTER XLVI: CONTINUATION SCHOOLS.

SECTION 1: CONTINUATION CLASSES IN PRUSSIA.

Courses of Study.

The rules and regulations formulated in 1897 for guidance in laying out local courses of study and prescribing the method of teaching dealt particularly with German and arithmetic. It was required that the subject matter should preferably be chosen from practical pursuits and everyday life; and that it should take into consideration the local industrial conditions and promote religious feeling and love of country. Such courses of study could be applied to all grades of schools.

The general Continuation School, which was not directly technical or vocational, had four grades, 2 for German, 2 for arithmetic, geometry, book-keeping and 2 for drawing.

In the carrying on of the classes much was left to voluntary initiative; and chiefly by that means development took the direction of making the courses of study centre more and more upon the interests arising from the occupations and daily lives of the pupils.

In the larger cities the number of students made it practicable to group them in classes according to occupations. This has made it necessary to appoint expert supervisors, principals and teachers, and to provide separate school buildings. The official report says that the former courses of study had become antiquated through this development and in consequence new courses were prepared and officially ordered for adoption in 1910.

In accordance with these, instruction in the mother tongue takes the form of compositions on vocations and lessons in civics, teaching intimately the actual relations of trades and occupations. In schools of smaller communities, in which for reasons of cost students cannot be grouped according to occupations, the subject matter is arranged to pay attention to local conditions and the special needs of the prominent trades of the towns.

Commercial Continuation Schools have also developed into Technical Schools which place in the centre of instruction Business Correspondence, Commercial Arithmetic and Geography, as well as Business Practice.

Drawing.

As a result of careful consideration, new principles for the subject of Drawing were approved by an order of January 28, 1907. These principles aim at a purely vocational evolution of that important branch. Drawing in the Continuation School has during the last decade dropped the former customary æsthetic

object and has become sketching and drafting as a practical aid to the various vocations. While formerly drawing of geometrical bodies and mathematical measuring were the centres of that branch of study, and, later, drawing of ornaments received more attention and time, and vocational Drawing (so-called working drawings) did not come in before the second half of the course, now, according to the new principles adopted, working drawings and sketches are the basis of the whole instruction in Drawing.

FOR BOYS IN UNSKILLED OCCUPATIONS.

New problems arise from the fact that unskilled labourers are brought into the sphere of school influence and attend the classes. The subjects of study for such persons are chosen chiefly from labor and transportation conditions of their locality and home province. There are lessons in hygiene and decorous deportment as well as information concerning civic duties and economic welfare.

Before dealing with the Continuation Classes for those employed in learning what are called skilled trades, a syllabus of a Berlin school for boys not in skilled occupations is presented. It will be observed that it also keeps close to the personal, local and daily interests of the pupils.

First Year.

The young workman and his personal circumstances.

A.—Knowledge relating to the calling and civics.

1. Entry into the industrial world.

(*a*) Choice of calling. Skilled and unskilled labor. Obtaining a situation. Meaning of labor.

(*b*) The Continuation School.

2. Place in the new community.

(*a*) Work-book and wages-book. Regulation of the work.

(*b*) Moral behaviour. Duties towards the employer. Attitude towards one's fellow-workers. Relation with others.

3. Hygiene.

(*a*) Personal Hygiene. Nutrition (temperance, alcohol). Clothing (care of the skin).

(*b*) Hygiene in the home and workshop. Ventilation, heating, lighting.

(*c*) First aid.

(*d*) Employment of leisure time for gymnastics, walking and games; for culture, instruction and conversation.

4. Insurance, measures to be taken in case of sickness, accident, etc.

(*a*) Insurance and sanitary measures in case of sickness.

(*b*) Insurance and sanitary measures in case of accident.

(*c*) Insurance and sanitary measures in case of disablement and old age.

B.—Written Work.

1. (*a*) Letters of application and replies. Notification to Police of change of situation.

(*b*) Correspondence and forms used in connection with Continuation School.

2. (*a*) Work-book and forms connected therewith. Correspondence with the employer. (Sickness, inability to attend to one's work, etc.)

(*b*) Letters to relatives, friends, and acquaintances.

3. Notes on hygiene.

4. Papers and forms in connection with the laws of insurance.

C.—Arithmetic.

The four fundamental rules and whole numbers and fractions. Calculations of percentage. (Money, weights and measures system in connection with decimal fractions.)

1. Exercise on entry into the industrial world, fees, advertisements, application for a situation.

2. Exercises on personal needs and on wages.

3. Exercises in connection with hygiene.

4. Exercises in connection with insurance laws, etc.

SECOND YEAR.

The young workmen in his employment.

A.—Knowledge relating to the calling and civics.

1. His activity in business (messenger).

(*a*) Transactions in the city.

(*b*) Transactions in connection with the railways.

(*c*) Transactions in connection with the post office.

(*d*) Transactions in connection with money matters.

2. His activity in the workshop (work boy).

(*a*) Important products of handwork and industry of Greater Berlin (so far as they have meaning for the young workman of the classes concerned).

(*b*) Regulations for the control of the workshop.

(*c*) Examples of work for independent and for joint performance.

GENERAL VIEW OF A HANDWORKERS' SCHOOL: BERLIN.

3. His wages.
   (*a*) Meaning and kind of wages. Protection of wages.
   (*b*) Reasonable use of wages.

4. His legal position.
   (*a*) Examples of contracts for employment.
   (*b*) Orders; commissions, and their fulfilment.

5. The meaning of work.

   (*a*) The value of work for the individual. Possibilities of advancement.
   (*b*) The value of work for State and society. Work formerly and to-day.

B.—Written Work.

In addition to the filling in of forms, letters, notes, etc., are regularly prepared.

1. Papers used in business.

   (*a*) Papers employed in the transactions of the city. Order forms, delivery and receipt forms, accompanying voucher.

   (*b*) Papers in connection with the railway. Consignment entry forms, addressing goods, etc.

   (*c*) Papers in connection with the post office. Addressing packages, telegrams.

   (*d*) Papers in connection with money matters. Invoice and receipt, draft, money order, cheque, postdated cheque.

2. Papers in the workshop. Delivery orders and messages.

3. Papers in connection with the calculation of wages.

4. Papers in connection with contracts for employment, with orders and commissions.

5. Notes, applications, letters.

C.—Arithmetic.

In addition to the application of the fundamental rules, the reckoning of percentage in all forms and applications to be considered.

1. Exercises from business
   (*a*) The city.
   (*b*) The railway.
   (*c*) The post office.
   (*d*) Money matters.

2. (*a*) Exercises on raw products and manufactured articles.
(*b*) Calculation of space.

3. Exercises on wages and their distribution. Saving and spending of wages.

4. Exercises in connection with buying and selling.

5. Exercises for further application of the materials.

THIRD YEAR.

The workman in the community.

A.—Knowledge in respect to the social and civic relationships.

1. The workman in the family.

(*a*) The family as basis for morality and well-being.

(*b*) The care of the parents for a livelihood and dwelling. Thrifty management and insurances.

(*c*) The most important facts in connection with the parental authority and the necessity to provide for maintenance. Inheritance and will. Guardianship and education provided by a trustee. Duties of Children.

2. The workman as member of clubs and unions.

(*a*) Associations—*e.g.*, rent and building society, savings and lending banks.

(*b*) Trade associations.

(*c*) Educational and social clubs.

3. The workman as member of the municipality.

(*a*) Provisions of the municipality for the well-being of the citizens. Public hygiene. Care of the poor and the orphans; provisions for education; taxes.

(*b*) The most important facts in connection with the administration.

(*c*) The most important facts *re* obtaining residence in case of relief.

4. The workman as a citizen of the State.

(*a*) Concerning Imperial arrangements and Imperial authorities: The Emperor; the Federal Council; the Reichstag; Imperial revenues; Army and Fleet.

(*b*) Concerning State arrangements and State authortities:—The King and the Parliament; State revenue and Justice.

B.—Written Work.

1. Papers and letters which concern the family. Rent, notice, loan, etc.
2. Invitations. Exercises. Composition of a simple report.
3. Applications in matters concerning the poor and orphans.
4. Applications to the authorities, particularly to the court.

C.—Arithmetic.

1. Exercises from domestic affairs. The savings bank, life and fire insurance, notes, bonds, etc.

2. Domestic book-keeping.

3. (*a*) Municipal taxes. Exercises in connection with the organization of the city.

(*b*) Book-keeping of a small business.

4. Taxes and customs.

FOR BOYS AND MEN IN SKILLED OCCUPATIONS.

The courses of study and time-tables for those differ from that which has been given for boys in unskilled occupations. Information on the courses of study for skilled workers and those learning skilled trades is given with great fulness under the headings Machine and Metal Trades Schools, Building Trades Schools, Textile Schools, Commercial Schools, Industrial Schools for Women, and Industrial Art Schools.

Schools for Apprentices.

In all the schools the Commission was impressed by the very high quality of the Drawing. In the Elementary Drawing, study and practice in form are taken first, then study in colors. As an example of how a design is built up by a pupil, the following was noted. The unit of a butterfly was first drawn; then the pupil made conventional designs from that unit, and afterwards combined those into a scheme for a decorative border.

For those in the Building Department, in the latter years of the course, drawings with complete specifications are required. If the project be the installation of a lighting plant in a house, the drawings and specifications must be such as a contractor and workmen could work from.

Practice in calculations was made a good deal of. These were introduced and extended to include the cost of materials, suitability of the project for the conditions into which it was to be fitted, and the purpose for which it was to bs used; all this considered in the light of local and existing market condition.e Students were trained in such calculations at least eight times a year. Book-keeping for each trade is taught carefully, including a system of cost accounting, etc.

As examples of the completeness and thoroughness of the provision made and the work done, the following are cited as typical of others. In the Upholstering Department one room was fitted with movable fixtures for experimenting in draping in materials of different kinds for various purposes.

For the shoe making trade there were specimens of leather showing the stages in all the processes of leathermaking. Hides were marked to show the method of cutting without waste of material. Students practised first in cutting cardboard and paper until they had some proficiency.

In the class in saddlery, Drawing was taught as carefully as in other departments. That was carried out to a much more advanced stage than would be considered necessary in Canada. This is mentioned as illustrative of the thoroughness of the work in the Continuation Schools.

In one school for the course in saddlery, 2 hours out of 6 every week for 3 years was devoted to Drawing.

In the Gold-and Silversmiths' Department there was full equipment for the making of fine jewelry and art objects.

In all departments care was taken to acquaint the pupils with all the different materials used in the trade, the processes of their manufacture, their relative values and their geographical origin. The impression was received that the teachers treated every subject allied with the one in hand in great detail, and that beyond the point that would seem practicable or necessary in Canada.

All classes receive some instruction in Hygiene, Public Health and Civics.

At this point a few of the notes are introduced from those taken while visiting a school (Gewerbesaal, Strassmannstrasse) for workmen past apprenticeship at Berlin.

School for Workmen Past Apprenticeship.

This School has Evening Classes for workmen in iron and wood who are past the apprenticeship stage. It is also attended by some apprentices who take Continuation Classes. Workmen take courses to make their 'master-pieces' and obtain their Master's Certificate.

The staff is appointed by a committee of the city authority and is paid by the hour. The head teachers give their whole time to the school. Some of the men of the highest attainments and reputation in manufacturing establishments are among the instructors. The staff is not represented on the examining committee for Masters' Certificates, which are awarded by the Guilds. There are both State and municipal inspection, although all the financial support comes from the city. The courses are ten weeks each. The workshop courses are arranged for 14 men in a class. The models are usually made by the instructor, and from them the 'master-pieces' are executed in iron or wood by the pupils.

The newest forms of iron and wood-working machines for particular trades are provided and used to give the students a knowledge of them which they cannot obtain in the workshop.

The pupils were making some fine instruments of precision for use in the school. Individual parts of instruments of precision were mounted so that each could be seen complete.

All work was fine in quality, revealing skill of a very high order. The Drawing was particularly good. The school is reported to exercise a leavening influence on standards of workmanship.

The attendance was 80 in Day Classes and 400 in Evening Classes. There are seven divisions and altogether 98 Evening and Sunday Classes.

SESSIONAL PAPER No. 191d

SECTION 2: THE MUNICH SYSTEM.

Information obtained in "Conversation" with DR. GEORG KERSCHENSTEINER, *Superintendent of the Munich Schools.*

GENERAL PRINCIPLES OF ORGANIZATION.

1. The aim of the public schools, which are supported from public funds, is the education of useful citizens, *e.g.*, such as will contribute directly or indirectly by their work to the development of the State as a civilised and cultured community. Thus the first object of the schools is to promote as far as possible the working capacity and at the same time the joy in work of the pupil. The second is, to accustom the pupils early in life to use this capacity and joy in work for the service of their companions and fellow-creatures. The third is, to combine this readiness for service, consideration and propriety, with an appreciation of the aims of the community of the State, as far as the pupils mind is sufficiently matured to appreciate it. Our present schools do not quite come up to this ideal, but where they are well organized, they at least aim at the solution of the first problem, training for personal capacity. They are not, however, schools of social service.

2. The schools for the great mass of our fellow-citizens, *i.e.*, the public schools, are not even sufficient to satisfactorily deal with the first point, and thus they can in no wise promote industrial efficiency and industrial satisfaction in work. On the other hand the conditions of industry for the apprentice of 14-18 either in industrial or handwork pursuits, commerce or agriculture, leave so much to be desired that the majority of our fellow-citizens during their introduction to a definite trade attain neither a right understanding of work nor industrial efficiency, let alone a productive joy in work. Further, all moral education is absent. It is therefore essential to extend the public school system in such a way as to bear directly on the industrial life of the boy, handle its problems as thoroughly as possible, deepen, widen and ennoble it, and thus produce in boys and girls efficiency and delight in work. For the education of the masses the present continuation school is the best agent; it accompanies the boys and girls during their industrial learning time, and at the same time it can handle the other problems mentioned, the training in consideration for others and devotion to common causes, as well as for social service in the community.

3. In order to fulfil the first aim, the training for efficiency and joy in work, the course of the continuation school must make the pupil's practical work the central point of its activity, and combine all teaching of a commercial, agricultural, scientific, moral or aesthetic kind closely with the practical work. Where possible, *e.g.* in all larger cities and all purely agricultural communities, pupils of both sexes are to be gathered according to pursuits, and to be led *through the trade instruction* to higher intellectual, moral and social education. This trade continuation school must be compulsory for all boys and girls to their 17th or 18th year, just like the public school. The hours per week should

not be less than 6, and should not be at night, but during the actual daily work of the boy or girl. Wherever possible, special teachers should be appointed, for only thus can they be expected to give their whole energies to this work. These schools should be free, like the public schools, and supported equally by the community (city or village) and the State.

4. In order that these schools may fulfil the second and third condition also, the instruction is to be organized as far as possible from the point of view of *work in common*, for only thus are the most important civic virtues cultivated, viz., consideration for others and devotion to outside objects. Even outside of lessons, pupils should be encouraged to form societies for various purposes. Where possible, an employers' association should be connected with the school in such a way as to give it considerable interest in the same; this will promote combination in work and extend the scope of the training. The training will thus gradually tend to instruction in patriotism and civics, as far as the pupil can grasp the subject, and this instruction is not to be in formal lessons, but rather training in duty towards the Constitution and prompted by the ethical conception of the State, founded as far as possible on the personal experience, original investigation and observation of the pupil. Such training of the masses, if properly carried out, will enable the modern federal States to develop themselves above all as cultured States by further extension of their public life. That such training is possible is shown by the results in Munich, a city of 580,000 inhabitants, and also in various small country communities. The extension of these principles of organization to the higher school system, will then be the best means, in conjunction with the lower school system, to convince all of the inseparable character of their interests, and to put them in the way of an equitable adjustment of those interests.

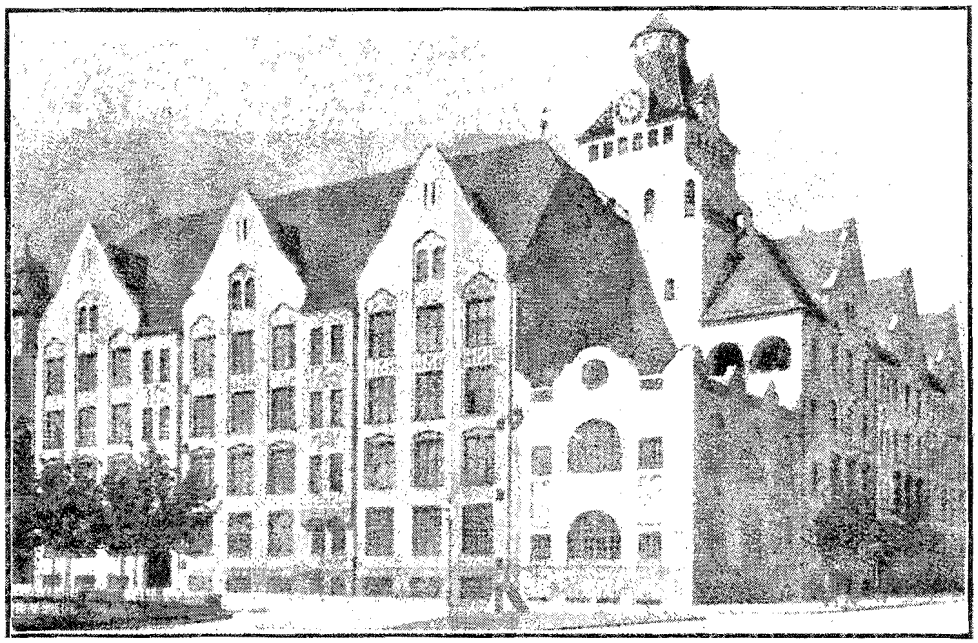
The City School System.

Before proceeding to describe the Munich organization, a short sketch is given of the entire school system of the town. The primary school is compulsory for boys from 6 to 14, for girls from 6 to 13. The number of primary school pupils is 70,000 in a population of 580,000. All children from the day laborer's up to the prime minister's attend these schools. No fees are paid.

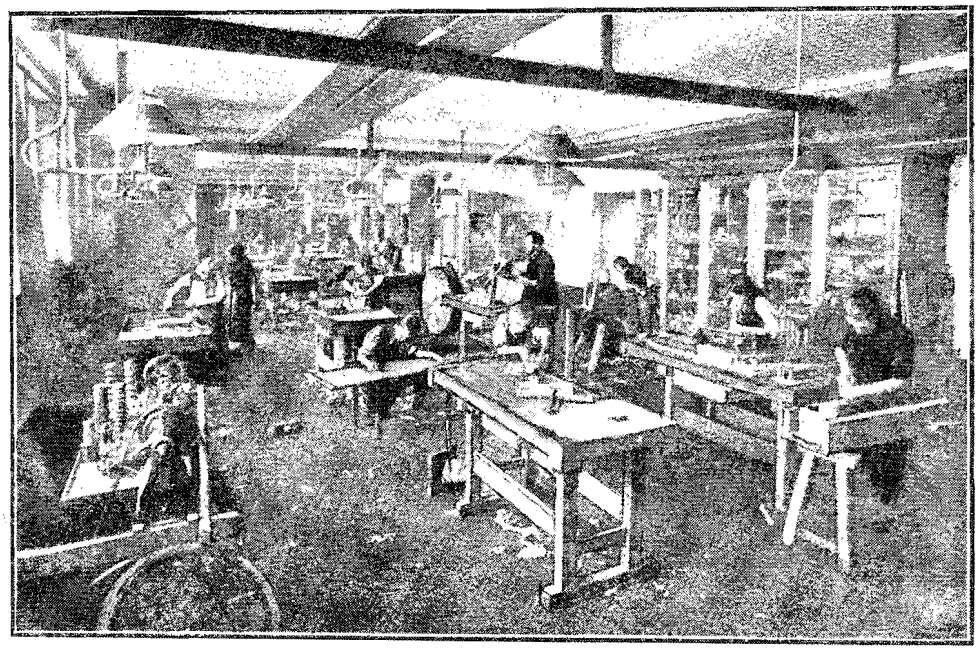
Kindergartens for children from the age of 3 to 6 are attached to most primary schools. Attendance is voluntary and not free of charge.

Girls and boys who pass up to higher schools to prepare for the professions of scholars, engineers, clergymen, higher state officials, etc., leave the primary school at the age of ten and attend a secondary school. There are 13 public and 14 private (secondary) schools for this purpose (Gymnasia, Realschulen, Oberrealschulen and Higher Girls' Schools). Attendance is not free of charge, but very cheap—about $1 a month.

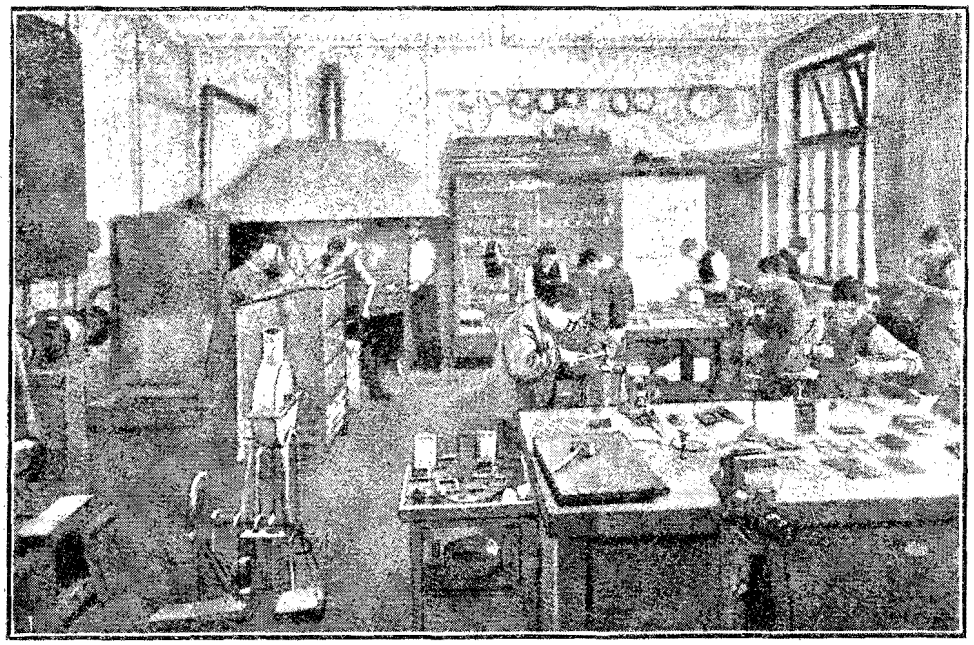
The compulsory primary school is followed by the compulsory continuation school for all boys and girls who do not attend a higher school. Attendance is compulsory for boys during the whole of their apprenticeship, but not beyond their 18th year; it is compulsory for all girls for 3 years. Attendance is free of



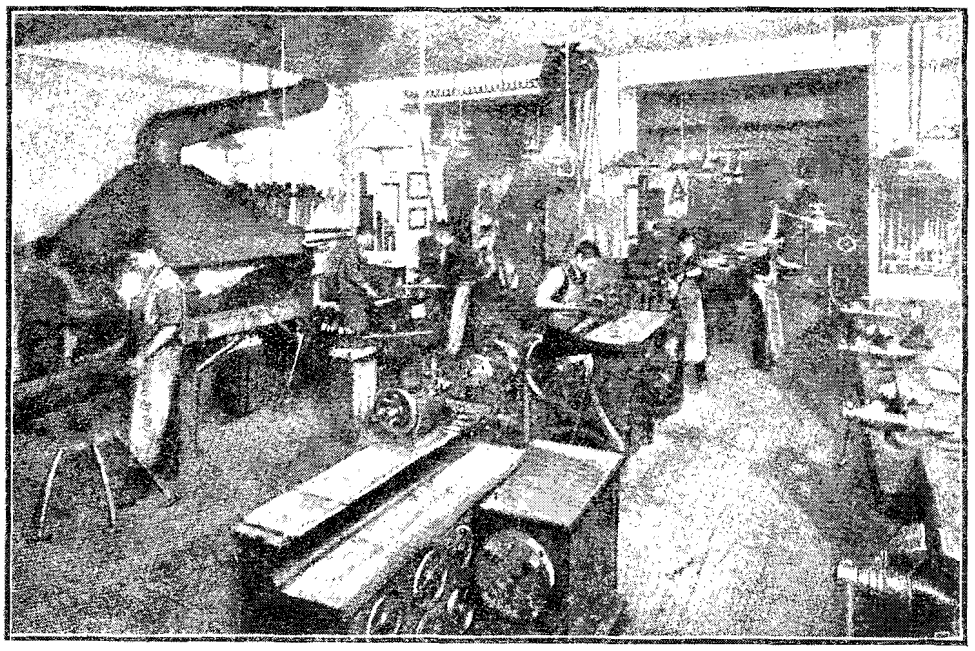
ELEMENTARY AND CONTINUATION SCHOOL FOR COPPERSMITHS, MACHINE FITTERS, MECHANICS, LOCKSMITHS AND IRON WORKERS, TAILORS, CARPENTERS AND JOINERS.



FOR CARPENTERS AND CABINET MAKERS.



FOR METAL CASTERS, BELT MAKERS, ENGRAVERS.



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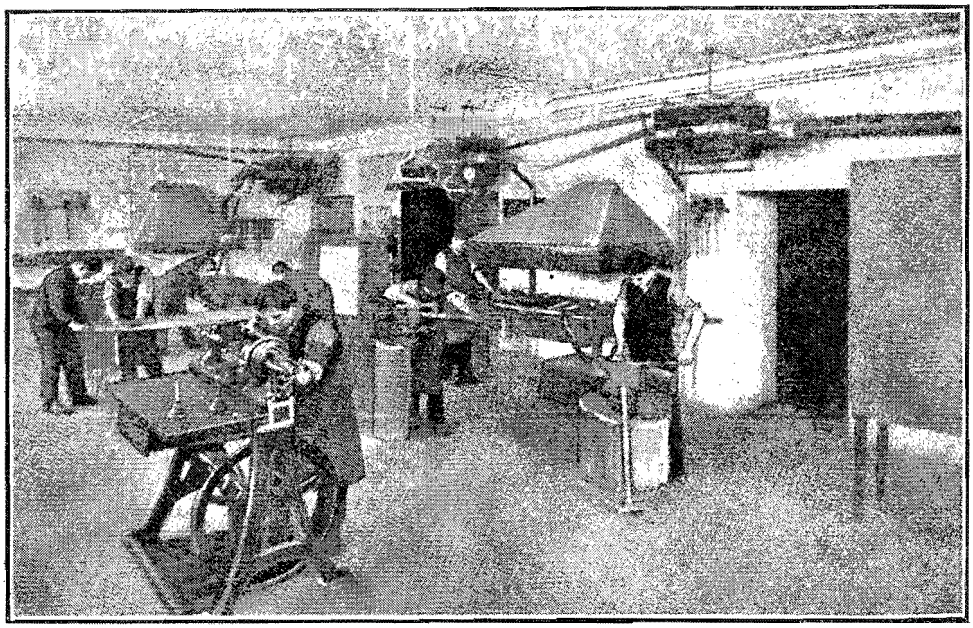
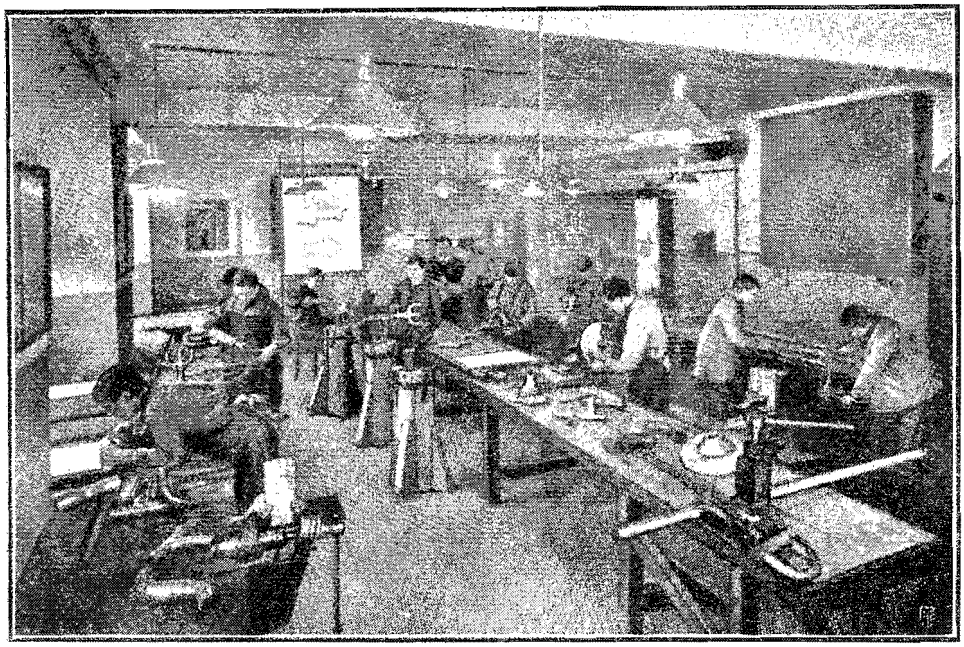


FOR SMITHS.



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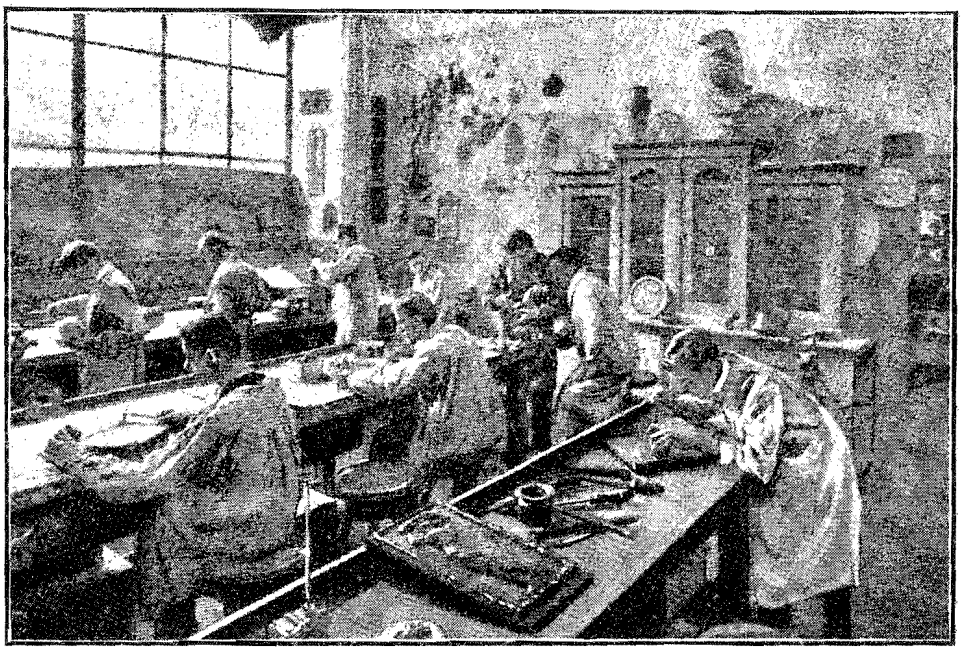
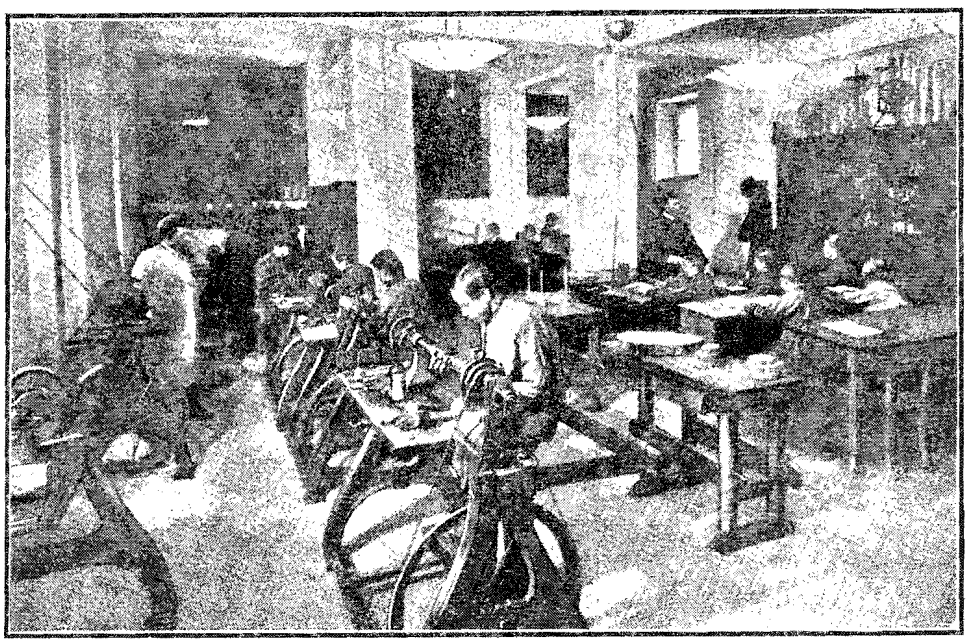
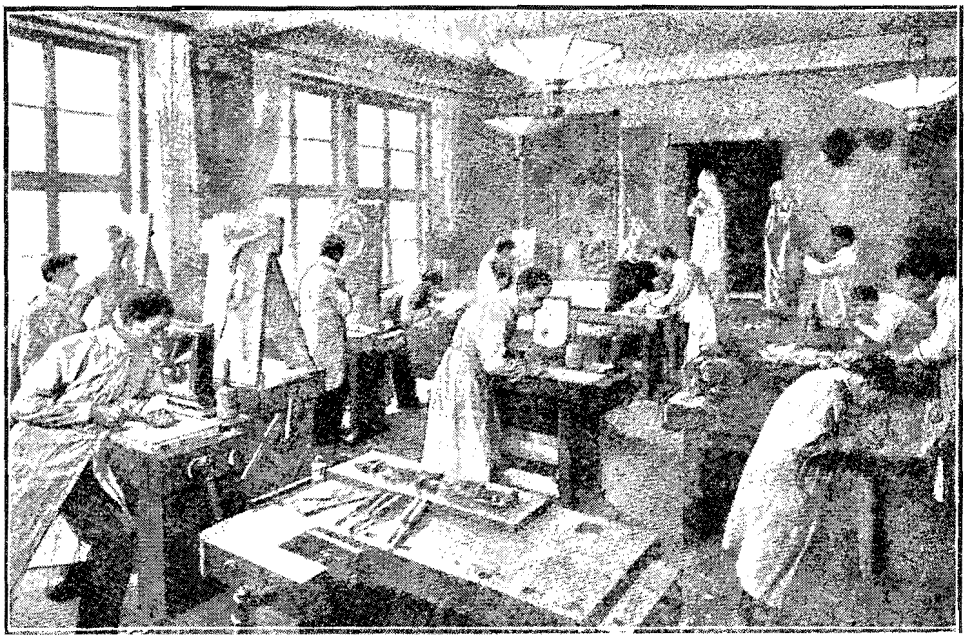


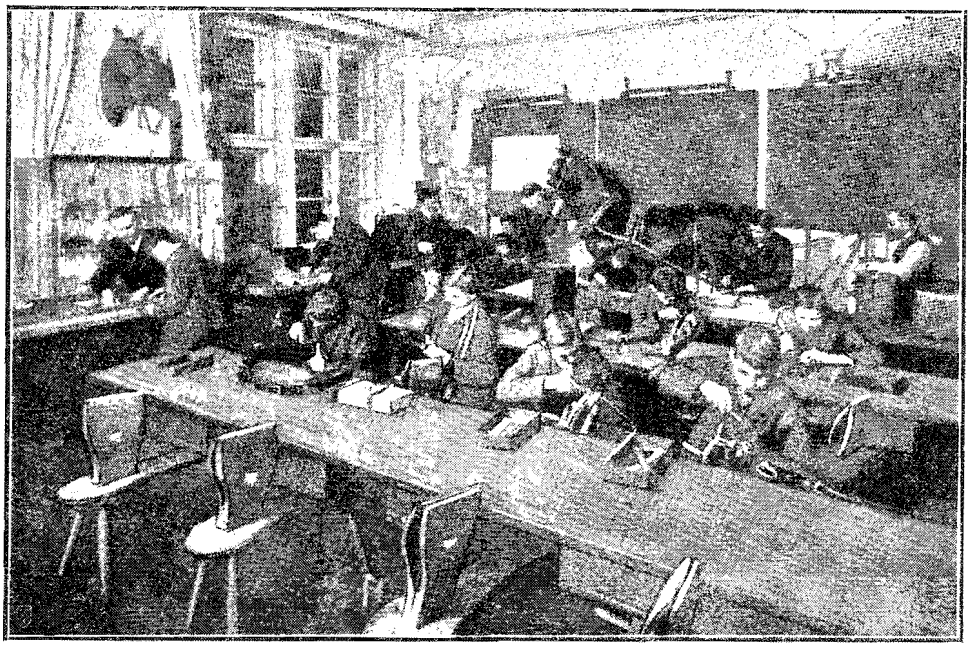
FOR JEWELERS, GOLD AND SILVERSMITHS.



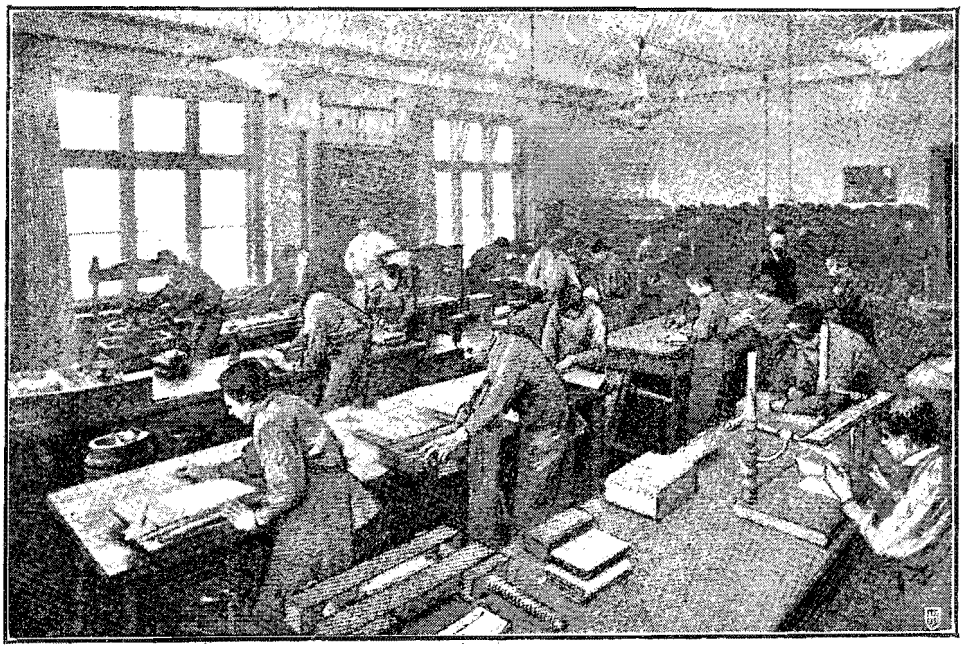
FOR TURNERS.



FOR WOOD CARVERS.



FOR SADDLERS AND LEATHER WORKERS.



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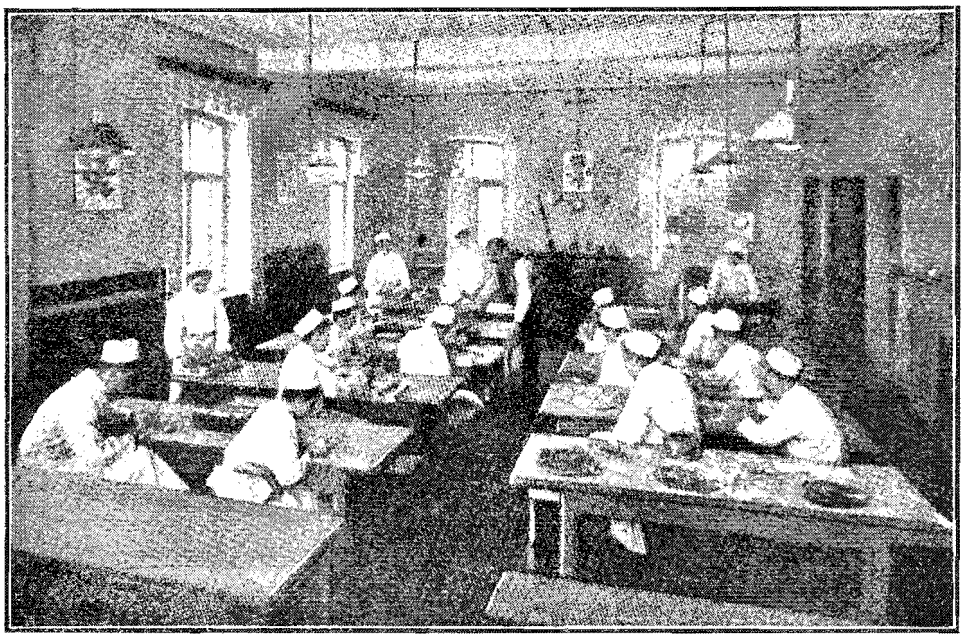

FOR CONFECTIONERS AND FANCY BAKERS.

charge. The compulsory continuation school for boys is again followed by an optional continuation school for persons over 18, which was attended last year by 2,600 pupils, and represented at least 12 hours' weekly instruction. Attendance is not free of charge, but also very cheap—50c. to $1 a month.

The compulsory continuation school for boys had 8 to 10 hours' instruction weekly. The compulsory continuation school for girls had only 3 hours' instruction weekly previous to 1912; now it has 6 hours. But side by side with this compulsory continuation school are a voluntary continuation school, with 6 to 12 hours' instruction weekly, and a voluntary 8th class in the primary school with 30 hours of instruction a week.

Extent of Attendance.

The compulsory continuation schools for boys contain in round numbers 9,400 pupils; the compulsory continuation schools for girls contain 7,500 pupils, the voluntary continuation schools for girls, including the 8th class, 3,700 pupils. All in all, therefore, there are about 20,000 pupils under 18 years of age in these continuation schools. In addition to these there are 10,000 pupils in the higher boys' and girls' schools of the town (7,000 boys and 3,000 girls).

Thus about 100,000 children, that is 18 per cent of the entire population and 93 per cent of all the boys and girls between 6 and 18 in Munich, attend the public schools of the town.

The 9,400 pupils of the compulsory continuation school for boys are distributed in 52 trade schools and 12 general schools. The trade schools are attended by all boys who are apprenticed to any trade, the general schools by unskilled workmen (about 1,100), day laborers, barrow men, errand boys, and servants. These general schools also receive the apprentices of trades that are too small to have special trade schools established for them.

The 7,500 girls in the girls' compulsory continuation school are distributed over 40 schools in the town. They receive without exception household teaching. 1,200 of the 3,700 pupils of the voluntary continuation school are in the voluntary 8th class, 1,300 in the household department of the continuation school for girls, 900 in the commercial, 300 in the trade department. The classes of the voluntary continuation school for girls are distributed in 21 schools.

External Organization.

A trade school (a continuation school) is established in Munich for every trade that has at least 25 apprentices. Trades with a great number of apprentices (such as machine-builders, mechanics, locksmiths, joiners, bakers, butchers, publicans) have at their disposal several trade schools in different parts of the town, in order to shorten the distance to school. The only exception is that the 1,200 commercial apprentices are housed in a single building in the centre of the town.

The apprentices' trade schools with their higher divisions for journeymen and masters, that is, with their voluntary continuation schools, are distributed

in 7 schoolhouses throughout the city. One of these schoolhouses contains only the commerical apprentices, a second principally the different branches of painters, a third the various building and arts trades, a fourth the printing and reproducing trades, fine mechanics and machine locksmiths, a fifth the different kinds of wood-workers. The butchers' trade school is combined with the town slaughter-house. The gardeners' trade school has its own grounds. Six of the 52 trade schools are still in the buildings of the primary schools.

All trade schools are under the direct supervision of 9 headmasters or directors, with sub-directors for each school.

To most trade schools is attached an association of employers, who bear the expense of school material, take part in the discussions on the plan of instruction, have the right of nominating technical teachers, assist in the supervision of the practical subjects, co-operate in the examination of apprentices, and help to increase interest in the school and to further its development. This intimate connection of an employers' association with the aims and tasks of a trade continuation school established by public money has in many cases proved an exceedingly useful arrangement. The interest of the employers in the education of the apprentices is considerably increased. And when this is achieved, the association naturally does not content itself with furthering the education of the apprentices in the school alone, but seeks to raise the standard of their calling in their own workshops as well. This is of course a process that takes place very gradually.

Each continuation school also possesses its own school board, consisting of a headmaster of the trade school, a member of the municipality, and three employers of the trade. It is the business of this board to manage the affairs of the school and especially to keep watch on the regularity of attendance.

Every apprentice spends one whole day or two half days of his working week in a trade school. As a rule this involves a reduction in wages. Some employers' associations, however, pay wages on both school and work days.

The yearly expenditure for the compulsory apprentices' trade school and for the voluntary journeymen's trade schools amounted last year, aside from the annual building expenses, in round figures to 900,000 marks. The individual continuation school pupil therefore costs about 80 marks, whereas each primary school pupil costs 93 marks and each pupil in the higher schools 200 marks. The expenses of the primary school are borne principally by the city, the expenses of the higher schools are with few exceptions borne by the State, and the expenses of the continuation school are borne by State and city together.

The annual net expenditure for the compulsory and voluntary continuation schools for girls amounts to about 400,000 marks, and is borne by the city alone.

Internal Organization.

So much for the external organization. When we turn to the internal organization of the compulsory continuation school, we find, as already pointed out, practical instruction in workshop, laboratory, shop and garden in the

centre of every apprentices' trade school. This instruction represents two to three hours a week.

Teaching in drawing and arithmetic is most intimately connected with this practical instruction. Nothing is drawn that has not been made in the workshop. And every process in work or construction is followed out in figures. By making out both preliminary estimates and bills the pupil learns the value not only of material and work, but also of the time that has been spent upon the work. It is particularly useful for the apprentice to recognize by these bills how much the time he has spent on the work—and this of course is very great with apprentices—increases the cost of production. Special care is taken in making out bills and estimates to let the pupil learn to calculate not only the cost of materials and time but also all other items of cost arising from the deterioration of machines and tools, the interest on capital, carriage and various other sources of expense.

Practical instruction is also intimately connected with the study of materials, tools and machines. The pupil makes acquaintance with these almost exclusively through his own practical work. He is especially familiarized with the mechanical laws under which machines and tools work.

Moreover, when the work in hand demands a knowledge of physics and chemistry to show the pupil the reasons for what he does, or teach him how to make new experiments with success, he receives instruction in special laboratories in the fundamental laws for well-considered work.

Civic instruction is generally planned as follows in the different trade schools: First, the historical development of the trade to which the pupil belongs is discussed. He is shown in the struggles of his fellow-workers the continually growing interdependence of interests among all citizens of a community. Concrete examples of devotion to a common cause are placed before him. Thus by degrees he recognizes how the problems arose which occupy city and nation today, and learns the duties and rights of the individual within the state.

This insight is strengthened into the will to consider others and to devote himself to common purposes by the association of pupils in working groups, especially in the last school year.

Hygienic training is given not only by special instruction in hygiene, but also by gymnastics and games on Sunday afternoons and during the school holidays. An association of young men of the cultivated classes, especially young army officers, places well-trained leaders at our disposal on Sundays, who take hundreds of apprentices for walks in the environs of the town.

The technical education of the apprentice is never planned with a view to letting him make masterpieces. On the contrary, the endeavor is to let him find pleasure in simple, careful, thorough, conscientious work in genuine materials, and also to encourage him to new attempts through the feeling of security in his own power.

Religious Differences not Recognized.

The pupils' moral insight is enlarged by German lessons. Good authors are read in class and a selection of good books from the school library placed at the pupils' disposal for reading at home. In addition to this the pupils have 1 lesson weekly in religion up to their 16th year.

Although the Primary Schools are separated for Catholics and Protestants, there is no such distinction in the Continuation or Technical Schools, there being but one organization of these schools for all.

Teachers from Different Sources.

In the 52 trade schools there are about 120 teachers entirely attached to the schools and about 300 who give lessons there in addition to other work. The teachers are recruited from all kinds of professions and vocations. Academic and normal school teachers co-operate with master workmen, journeymen, artisans and agriculturists, and they exert an excellent influence upon each other. The artisan, the master and the journeyman learn to respect the schoolmaster, and the schoolmaster learns to respect the workman, who is engaged with him on the same educational problem.

Compulsory Attendance Discussed.

The first fundamental principle of a rightly organized continuation school is that it must extend to the eighteenth year of every boy or girl who is not being educated in a higher school. It is of no advantage to a constitutional State to make its opportunities of culture accessible only to a small percentage. When all citizens of the State have the right to participate in its affairs and to exert influence on its executive through the suffrage, it is the business of the State to provide all with an education that will enable them to make a reasonable use of this right.

During several decades it was believed in Germany that it was sufficient to give opportunities for boys and girls to continue their education after quitting the primary school and to leave the use of such opportunities to their own free will. The United States, France, and especially England are still of this opinion. England points not without justifiable pride to the very large attendance at its night schools. The evening courses at the excellent School of Technology in Manchester were attended by twenty-five thousand pupils, while Munich, having four-fifths of the population of Manchester, had only about eighteen thousand pupils in its compulsory continuation schools in the same year. But it is not enough to count only the number of pupils. We must also ask, how many hours' instruction does each receive? And we then find that in Manchester the pupil received sixty-three hours a year, while in Munich he received three hundred and thirty hours in the year.

Attitude of Employers.

In Germany everybody is now convinced that the voluntary continuation school no longer suffices for the educational needs of modern States. As long as the continuation school remains optional, thousands of employers will prevent their youthful workmen from making use of its opportunities, except at the end of their day's work, when mind and body are fatigued. And even in cases in which some reasonable employers would be willing to grant their boys time for study they would probably do it only if the training in question were principally in the interest of their own trade. The number of employers who see farther and recognize that it is of the greatest importance, not only for business but also for the community at large, not to let the man disappear in the workman, but to take his moral and civic education in hand betimes, is too small to achieve any appreciable progress in the universal education of the people by means of purely voluntary continuation schools. We must remember that a voluntary continuation school will not reach those who need it most, that is to say, the innumerable boys and girls in our large towns who have a family only in name or no family at all. No one will voluntarily seek an opportunity of culture after the burden and heat of the day, unless he already possesses certain moral qualities that incite him to attend to his own education at the cost of trouble and inconvenience to himself.

There was great opposition to the compulsory requirement, in the early days, especially from the employers, but now they have learnt from experience that the time the boy spends in school is worth being given. Attendance on two half-days in different parts of the week is preferable to one whole day, but as employers prefer the latter plan, it is now arranged that first year apprentices come one day, second year apprentices the next, and so on. That leaves always two-thirds of the apprentices in the shop.

Influence of the Governments.

Most German States grant a subsidy only to towns that hold their continuation classes before seven o'clock in the evening. This is one of the cases in which sacrifices must be made by employers, by giving their apprentices the requisite time for school during the hours of work. The will to make this sacrifice was often extremely weak on the part of masters and manufacturers, but it received powerful support in the trade-regulation law of the German Empire issued in the year 1897. According to paragraph 120 of these regulations every employer is put under the obligation to dismiss his apprentices from work at the hours appointed by the town for school purposes, under penalty of a fine. I must add that the masters and manufacturers, especially of South Germany, are almost unanimously reconciled to this order of things. Indeed some employers and guilds in Munich have offered to send apprentices for longer instruction than the means at our disposal permitted us to provide.

Girls and Women Provided for.

It would be extremely one-sided to establish schools of this kind for men workers alone. The more the population of a country increases and the harder the struggle for existence consequently becomes, the more is the wife obliged to contribute to the support of the family and the more pressing is therefore the necessity of giving girls opportunities of training, not only in the household knowledge that helps to preserve a family from ruin, but also in the different branches of trade by which she may later earn a livelihood. Indeed in greatly overpopulated States the continuation school is even more important for the girls than for the boys.

In our great factory centres, where husband and wife go out to work, family life and family education are in innumerable cases well-nigh annihilated. Thus a new source of danger for the life of the State arises. If it were possible to develop a strong family feeling and to reinstate the family in old educational functions by training women to their duties as mothers and housewives and giving them the opportunity of performing these tasks, our anxiety for the education of growing lads would be considerably reduced.

The difficulty of organizing continuation schools for girls lies in the fact that these schools have to fulfil a twofold task. In the first place a girl must be trained for her vocation proper as mother and housewife, and in the second place, marriage being uncertain, for a calling by which she can support herself. It is therefore necessary for both elementary and continuation schools to keep these two objects in view. As long as the time at its disposal is too short, it will have to pay chief attention to the training of the housewife and mother and then turn to the training for a vocation.

Dr. Kerschensteiner's Conclusions.

The conclusion thus arrived at is that real scientific culture in union with that discipline of character which teaches thoroughness and devotion to aims lying outside of ourselves are of no less importance for the industrial development of a country than technical training. Technical capacity alone will not suffice. In my opinion, the German day trade schools suffer from the fact that they pay almost exclusive attention to technical training. I have already repeatedly remarked that the courses of instruction in our technical day trade schools differ undesirably from those of our eastern and western neighbours, in the small attention paid to civic education, which is to me identical with the formation of character.

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

"A far more important problem for the machine-builders' schools than the exact amount of instruction in the single branches is to develop the character and intelligence of the pupils. Teaching suited to the future calling must be regarded merely as a means to this end. We shall always be able to work

successfully with men of character and intelligence, whether their schooling has led them further in one branch of knowledge or another. Knowledge learnt at school can never be more than the simple rudiments of the knowledge gained by experience in special work."

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

SECTION 3: AIX-LA-CHAPELLE.

This city of 160,000 population, situated near the Belgian border, is an important coal-mining centre, and also has woollen mills and iron and steel works.

The general organization of technical education is as follows:—

1. Municipal Trade Continuation School (Compulsory).
2. Vocational Day School, including,
   (*a*) Voluntary Vocational Continuation School.
   (*b*) Voluntary Commercial Continuation School.
3. Vocational School For Boilermen and Machine-Minders.
4. Building–Trades School.
5. Machine Construction School.
6. Industrial Art School.
7. Textile School.
8. Mining School.

1. Municipal Trade Continuation School (Compulsory).

This was established in 1908, and has Commercial and Vocational Sections, of which the former is supported by the City, State and Chamber of Commerce equally, and the latter by the City and State. Fees are charged as follows:—Commercial Section, 24 marks per annum; Skilled Trades, 8 marks per annum; Unskilled Trades, 6 marks per annum, but necessitous pupils are received free of charge, and books are supplied in some cases. Attendance is compulsory up to 17 years of age. Of the 3000 pupils, 440 were taking commercial work, coming two half-days weekly, 8 hours in all. In the Vocational Section boys take one whole day weekly, working 8 hours. No evening work is done.

The Governing Body is composed of the mayor, representatives of the City, manufacturers, technical teachers, and a representative of the Chamber of Commerce.

2. Vocational Day School.

This school has been in existence for over 25 years as a Municipal Vocational School with a 2 years' course for pupils aged 14 to 16. It is supported equally by the City and State, after deducting fees, which amount to about 10,000 marks annually, the expenditure being 125,000 marks.

The school is intended for boys who have completed the elementary school course but do not want to go on to higher work, and yet wish to enter industry in some higher position than as mere craftsmen. Graduates enter business as clerks, stenographers, etc. and go on to a higher business school, or enter practical life for a year or two and then go forward to the Building Trades School or the Machine Construction School. Those entering trade as apprentices have no allowance made in length of apprenticeship. Completion of course exempts pupils from attendance at Compulsory Continuation School.

Building and equipment: The building, which cost 600,000 marks. was paid for by the City, and contains workshops (typewriting and electrotechnic), a splendid Library of 6,000 volumes, a fully-equipped Gymnasium and fine Drafting-room.

Remuneration of Teachers: 2,700 marks to 4,800 marks yearly, plus rent allowance of 920 marks according to ability and length of service. Also retiring pensions, maximum being two-thirds for 42 years' service.

Fees: 60 marks per annum.

COURSE OF STUDY.

Technical Department:

	Religion: Catholic. } 2 hrs. weekly.
	Religion: Protestant. }
Lower Class 37 hrs. weekly.	German and French.
	Arithmetic, Geometry, Algebra.
	Physics.
	Freehand Drawing.
	Workshop Training
Upper Class 38 hrs. weekly.	Same as Lower, with addition of Chemistry and Geometrical and Linear Drawing.

Commercial Department:

36-38 hrs. weekly.	German and Business Training.
	French.
	Gymnastics.
	English (in Upper Class)

(a) VOLUNTARY VOCATIONAL CONTINUATION SCHOOL.

This with the Industrial Drawing and Industrial Art Schools constitutes a regular Evening and Sunday Continuation School. Lessons are given on weekday evenings from 8 to 10 o'clock. There is also a Sunday morning class for outside pupils in arithmetic, business bookkeeping and writing, held between 7.30 and 9.30 a.m.

Subjects: German, business bookkeeping, practical arithmetic, elem. geometry, writing, physics, chemistry and electro-technics. The Study Plans of the Industrial Art School and Drawing School are so arranged that students can take both courses. In view of the fact that the syllabus of this Continuation School forms a necessary complement to the Drawing and Industrial Art School, the pupils of the latter may attend Continuation School free.

(b) VOLUNTARY COMMERCIAL CONTINUATION SCHOOL.

This offers opportunities to apprentices and assistants of the commercial classes to supplement the general knowledge gained in lower and higher schools, with special reference to their practical work, thus aiding and developing their industrial efficiency.

Choice of subjects is allowed as far as time table admits of it.

Course: 6 months. Classes are held on all weekdays except Saturday, from 8 to 10 p.m.

Subjects: German correspondence, French, English, Italian, Spanish, bookkeeping, commercial arithmetic, currency, shorthand, typewriting.

SECTION 4 : COLOGNE.

A city of 516,000 inhabitants, situated on the banks of the Rhine. The principal industries are machinery and metal, printing, and the manufacture of perfume.

The organization of the Continuation Schools is as follows:—Vocational; Compulsory; General Commercial; Higher Commercial.

VOCATIONAL CONTINUATION SCHOOL.

This is supplementary to apprenticeship, pupils entering after completion of elementary school. The course covers 3 years and special classes are arranged as required. The classes are held in various elementary school buildings, and are under the control of the directors of the latter in most cases. The supreme control is vested in the Director of the local Continuation Schools, and a Curatorium is responsible for the external arrangements of this school and the compulsory Vocational Continuation School.

The teachers are not exclusively employed in this school, as there is no day instruction. Remuneration is according to number of hours: for each

weekday hour 105 marks per year, more for drawing teachers.

Fees: For 4 hours instruction (unskilled and non-drawing) 4 marks yearly. For 7 hrs. instruction (drawing) 8 marks yearly.

There are about 70 free places.

The State gave 11,027 marks (1909–10) of the total cost, 58,478 marks.

Attendance: Two evenings a week for 2 hours, Drawing on Sunday morning.

The total attendance in the winter of 1909–10 was 1,643 pupils ; in the summer 1,696 pupils.

Compulsory Continuation School.

Organization: Erected 1903 by local statute. Attendance is compulsory for all workmen and apprentices in every branch of industry and commerce up to completion of 16th year, unless attending some other institution of a similar character.

Subjects: German, arithmetic and drawing, 2 hours each weekly. Drawing is not obligatory for those who do not require it in their business.

Attendance may be extended to 3 years at the discretion of the school authorities.

There are four Groups, and special classes as required:

1. Machine construction and metal work.
2. Building trade and allied trades.
3. Decorative and dress trades.
4. Non-drawing trades and unskilled workers.

Maintenance: The total cost in 1909–10 was 98,135 marks, of which the State contributed 23,086, the remainder being provided by the City. No fees are charged.

Attendance: Two evenings a week for 2 hours each. Drawing on Sunday. 6 hours a week is required of pupils taking drawing, 4 hours a week of others. The total number of students in the winter term of 1909–10 was 3,454, of whom 1,666 left at the close of the session.

The classes are held in various schools.

Materials are furnished free to necessitous and deserving students.

Special Features: No organized welfare work is undertaken owing to lack of funds, but some of the teachers make independent excursions with their pupils to various places in the neighbourhood, attendance being voluntary. Students are also encouraged to use the public and other libraries, and cultivate a taste for good literature.

SECTION 5 : CREFELD.

A manufacturing centre, having about 130,000 inhabitants. Chief seat of the manufacture of velvets and silks.

Industrial Education is provided by:—

(1) The ordinary Elementary and Secondary Education as a basis. (2) Industrial Continuation Schools, compulsory for boys between the ages of 14 and 17 who are compelled to leave school and enter the industries.

Continuation School.

Governing Body: The Board of Directors consists of 19 men, most of them members of the City council or selected by that body; 4 are expert schoolmen, 5 manufacturers, 7 master mechanics, 1 an architect and 1 a merchant.

Aim: To equip boys between 14 and 17 to meet the demands of the present economic life and to furnish them with general instruction, having regard to the young man, (1) as an individual, (2) as a member of a trade, (3) as a citizen of the State.

Instruction is theoretical and practical.

The theoretical provides for:—

A. The purely technical side in (1) Industrial Science, (2) Technical Drawing, (3) Technical Mathematics.

B. The business or economic side in (1) Book-keeping, (2) Calculation of cost of production, (3) Business Correspondence.

The practical provides for workshop instruction in some of the trades to supplement the daily work and thus, in the end, to turn out a better all-round workman.

In all trades the minimum numbers of hours weekly is 4, divided as follows:—

Industrial Science and Civics	2 hours
Technical Mathematics and Book-keeping	1 hour
Business Correspondence	1 hour.

with 2 to 4 hours additional special trade instruction in various trades. First Aid courses held for the older pupils. 69 per cent of the instruction hours are in the day time.

Attendance, 1910–1911:

Mechanics' Apprentices	1,410
Factory Apprentices	1,229
Unskilled	681
	3,320

These numbers are distributed over about 26 trades, together with apprentices in commercial houses.

Fees: 6 marks yearly, paid quarterly by parents or employers.

Teachers: In addition to the Director, there are 14 teachers employed exclusively in the Continuation School, and 38 part-time teachers, 12 of whom are elementary school teachers, 2 technical teachers from the Royal Weaving School, and 24 are mechanics or engineers, who have had some training in teaching.

Other Features: The School aims to work in co-operation with the employer, and apart from actual trade requirements to develop the pupil in other directions, as a good citizen, able to take an intelligent part in the life of his country and district. Conditions of industrial life offer frequent opportunities for moral lessons, for inculcating self-control and devotion to duty, etc. The student goes out to his mechanical work with a mind stocked with useful ideas, and better still, a definite bias.

The relations of the School with the Guilds and Unions are very friendly, the latter being represented on the Board, and taking a friendly interest in the pupils.

An Apprentices' Club is maintained, under the supervision of one of the teachers, to provide rational amusement and occupation for the boys, and keep them off the streets. Savings Banks are also a feature of the Continuation School.

The Day School.

This School is an excellent preparation for those who have chosen a vocation in which a thorough training in Drawing is necessary. It also enables the boy who has graduated from the Elementary School to attain the same degree of education in 1 year of 38 hours weekly as a boy attending the Continuation School attains in 3 years; and, by a local ordinance, any boy who has satisfactorily attended the Industrial Day School for 1 year is excused from attendance at the Continuation School. He may then enter practical life, or become a day pupil in the Industrial Art School.

This School is under the Director of the Industrial Continuation School, both institutions being in one building and using the same equipment.

THE COURSES.

Two Courses are provided:—
Class A. Technical Course.
Class B. Course for Decorative Trades.

No.	Subjects.	Number of Hours.	
		Class A — Technical Course	Class B Course for Decorative Trades
1	Religion and moral teaching	2	2
2	Industry and science	2	2
3	Industrial composition and correspondence	2	2
4	Industrial bookkeeping	1	1
5	Study of materials	2	2
6	Industrial arithmetic	3	5
7	Algebra	3	0
8	Geometry	4	4
9	Natural history	2	2
10	Linear and perspective drawing	8	4
11	Technical and special drawing	8	4
12	Ornamental special drawing	3	8
13	Perspective drawing after models and patterns	3	3
14	Workshop instruction	3	3
	Total	38	38

One good result of this School is in preventing boys from selecting unsuitable occupations, and giving them an opportunity of discovering their bent.

Fees: 60 marks per annum, payable half yearly.

SECTION 6: FRANKFURT.

The population of Frankfurt is 415,000, the principal industries being the machinery and printing trades.

1. Compulsory Continuation School.

This School, which takes boys and girls up to 17, is under the control of a Committee representing civic, educational, industrial and commercial interests. It is maintained jointly by the State and City. The attendance in 1909 was 5,543, distributed over 208 classes.

Buildings and equipment: The main building cost 650,000 marks and there are two other buildings devoted entirely to Continuation work; cost of each 400,000 marks. Another building is projected.

The main building is a fine structure, and seemed well equipped for the teaching. The Director was very emphatic on the principle that the boys should have no real workshop instruction other than their regular handiwork that they get in the process of their daily vocation, so that no real workshops are provided.

Correlation: All the boys and girls who attend the schools are occupied as apprentices in industrial concerns or in commercial life. There are a few who attend who have left school but are temporarily not occupied in industry or business.

There is an extremely close correlation between the small masters in a few trades, such as carpenters, locksmiths, electric workmen and one or two others, whereby the handwork that would normally be done in a school is done under the direction of the master in the shop. The method is this:—

In the school the boy is shown a model of some sort connected with some handwork in his trade. This is discussed by the teacher and then the boy makes a drawing. He takes the drawing to the shop and there the master teaches him how to make it outside of working hours. The master keeps track of the boy's time and then shows him how to reckon the cost of the work. Then this model is taken back to the school and inspected by the teacher, and again discussed in class. At the end of the year there is an exhibition of the handwork and a committee of the masters awards prizes on the work.

It is most difficult to get any such correlation with a factory, or with any other than the smaller employers.

After the apprentice completes his period of service, the Director believes that he should have higher workshop instruction in the more special parts of his trade in workshop or master courses.

The Director said that he had received a great deal of inspiration and assistance from the Continuation Schools in Munich.

No lessons are given after 7 p.m. Usually 2-3 hours daily in morning and afternoon, 6 hours being the weekly minimum.

The Commercial section: Both boys and girls attend, the subjects being German, commercial arithmetic, geography and law, book-keeping.

The Trades section offers courses for the following:—Locksmiths, Installators and Tinsmiths, Mechanics and Locksmiths, Electric Fitters, Metal Workers, Wood Workers, Glaziers, Building Laborers, Leather Workers, Painters and Paperhangers, Bookprinters, Typesetters, Bookbinders and Lithographers, Painters, Whitewashers and Varnishers, Bakers and Confectioners, Waiters and Cooks, Butchers, Tailors, Barbers, Hairdressers and Dental Mechanics, Gardeners, Industrial Arts, Unskilled Workers.

Subjects: German, trade arithmetic, trade drawing, bookkeeping. Preparatory Classes are arranged if required.

Total number of classes, 208 (and 10 separate Drawing classes)

Total number of students, 5,513.

Teachers: For the practical subjects they must have had practical experience. They may do outside work or follow outside vocations so long as the school work does not suffer.

2. Municipal Vocational School.

This school has been in existence for 25 years, and always under the same Director—Dr. Bach. It is supported jointly by the State and City, fees being charged. The proportionate contributions are as follows:—City, 116,000 marks; State, 16,000 marks; fees 18,000 marks. The controlling body is a Curatorium of Continuation and Technical Schools, under the Minister of Industry and Commerce.

The aim of the school is to increase the knowledge and skill of industrial workers to enable them to meet modern conditions.

Building and Equipment: The building, which cost 1,100,000 marks, was very carefully planned in all its details, and is splendidly arranged in almost every particular. It would be a good model in many respects. Workshops were about to be added for machinists, cabinet-makers, etc.

Entrance Requirements: Students may enter at the age of 13 if they have passed into the highest class of the elementary school. Attendance at this school exempts from compulsory Continuation School. The students come from about 40 different trades, many being allowed by their employers to attend day classes.

Teachers: These are mostly practical men, without college or Technical High School training. Part of the staff is permanent and part is drawn from men who are engaged in industries in the day time. There are 10 permanent teachers who teach a minimum of 26 hrs. weekly and receive 3,000 to 5,000 marks. The part-time teachers are paid on a basis of 42 one-hour periods and receive 120-130 marks, reaching the maximum in the third year of their teaching. The permanent teachers receive extra pay for time over 30 hours. The rate is 3, 3¼, 3½ marks per hour. The School has 3 Departments, viz. A. *Evening*, B. *Day*, C. *Boys*.

A. EVENING SCHOOL.

This gives general and special instruction to masters, assistants and apprentices, in drawing (general and vocational), modeling, German, penmanship, bookkeeping, mathematics, geometry, physics and chemistry. The fee is 12 marks per annum for residents of Frankfurt, 20 marks for others.

B. DAY SCHOOL.

In this school special technical training is given to those who wish to study painting and drawing, and also to those who wish to take up industrial work but are not yet apprenticed, though past school age. The majority of the pupils are printers and typesetters, or draftsmen in building and machine-construction shops. The fees are 6 marks monthly.

C. BOYS' DIVISION.

For boys of 12-14. The subjects are drawing (freehand, geometrical and projection) and modeling. The fee is 6 marks per annum.

The Day and Evening classes are open to all industrial workers, and lessons are arranged according to ability and time of attendance. Apprentices are only accepted if they have passed the 2nd class of a Middle School. The Day School is also open to those wishing to learn a trade or industry.

Women and girls are instructed with the male pupils, and the arrangement has been found to be advantageous to both sexes. The female pupils are preparing for practical work or for teaching.

Some special Features.

Drawing boards for each room are placed in the hall outside in a recess in the wall.

A very large and handsomely furnished Conference Room is provided for the use of the Staff—also a large space on the 2nd floor for an exhibit of the students' work.

There was an especially fine photographic studio and a garden for growing flowers for use as models. The arrangement for cloak-rooms was admirable. A very fine Library.

Industrial firms have contributed a great many specimens to the School Museum.

Work and interests outside school are encouraged. Students practice painting and modelling from nature at the Palm-garden and Zoological Gardens. For flower painting, visits are paid to Art Exhibitions, Museums, and to industrial exhibitions and businesses.

A splendid school, and one of the finest seen. It stands between the Volksschule and the other higher schools, like the Building Trades Schools and Machine Construction Schools. It parallels the Continuation School, and also in some classes, like printing, lithography, ornamental ironwork, etc., the Industrial Art School,—but not without some jealousy. The mode of instruction is altogether individual. Boys are divided into classes according to vocations and each one gets along as fast as he can.

SECTION 7; DRESDEN.

Capital of the Kingdom of Saxony, with a population of 547,000. A noted centre of Art, with a world-famous Picture Gallery. The principal industries are machinery, metals, and trades related to art industries.

Information obtained in "Conversation" with Dr. Lyon, *Superintendent of Vocational Schools, Dresden.*

Handwork in the elementary school is in process of development, and workshops have been established in some schools. The best method for apprentices has been found to be the day class closing at 7 p. m., apprentices being divided into sections, so that they need not all be absent from the factory at the same time. Half-day classes have been found to be more satisfactory than classes

for shorter periods, as regards the boys themselves, as it enables them to come to school direct from home.

The Continuation School work was initiated by the Guilds of the different trades, but the compulsory attendance was decreed by the Government. Employers at first were opposed to compulsion, but after about a year this opposition died down.

The Continuation Schools in Dresden have no workshops and very little equipment, but Dr. Lyon favors workshops in schools. The Head of the Continuation Schools, Dr. Hilbert, is entirely of the same opinion, and an ardent disciple of Dr. Kerschensteiner. He stated that school workshops were absolutely necessary to enable an apprentice to learn a whole trade, which, under the specialized conditions in modern factories, he cannot do at the shop.

In Munich, on the other hand, the Commission learnt that most of the manufacturing was done in small workshops. Workshops are therefore considered essential to either system. Dr. Hilbert thoroughly agreed with Dr. Kerschensteiner in his campaign for school workshops, but at the same time admitted that he had antagonized the employers by stating that the apprentices were given no chance in the workshops; and that this had hindered the movement in Saxony.

There are special classes for backward and dull pupils, with a special Continuation School for them up to age 17.

Regulations for Continuation Schools.

Staff: To receive the same remuneration as Volksschule teachers, with increases at stated intervals. Each teacher has to give 28 hours weekly. In addition to seminary-trained teachers, technical men may be employed. Each of the four schools has a Director and an assistant director chosen from the staff of the school, who receives a cash payment and a reduction of teaching hours, with the title "Oberlehrer".

Instruction is to be given between 7 a.m. and 7. p.m., only a small number of pupils being permitted to work after 8 p.m. in special circumstances. All students have to take 4 hrs. minimum; plus 2 hrs. drawing for drawing classes and 2 hrs. commercial for business pupils.

Classes: Where there are not sufficient pupils of one trade to form a class, they may be drafted to other schools. Classes may not exceed 35, or 30 in drawing classes. A class for backward pupils may not exceed 30.

Training Teachers: Courses are held at the municipal Industrial School or elsewhere as required.

Guild Schools are incorporated with the Continuation Schools, the Guild authorities retaining a place on the committee.

Attendance is compulsory for a minimum of 4 hrs. weekly for 3 years after leaving the elementary school.

COURSES.

I. *Drawing Classes.*

A. Trade classes with drawing.

II. *Non-Drawing Classes.*

B. Trades without drawing.
C. Commercial.
D. Officials and clerks.
E. Unskilled workers.
F. Defectives.

Subjects: Trade subjects, materials and tools, technical and commercial compositions, reading of poetry and biography, industrial or otherwise, instruction on the use and meaning of public libraries, trade arithmetic, book-keeping, currency, political economy, civics, commerce, hygiene, and special subjects for the various departments.

SALARIES OF TEACHERS.

Married teachers commence at 2,400 marks, rising every two years up to 5,100 marks after 27 years' service. This includes lodging allowance.

Unmarried teachers commence at 2,300 marks and rise to 5,000 marks at the end of 27 years' service. Lodging allowance included.

Temporary teachers (not on permanent staff) 2,000 marks.

MUNICIPAL TRADE SCHOOL.

Has *Day, Evening* and *Sunday* Sections.

Day Section: For those who have left day school and wish to learn a trade.

1. General subjects..... 2 classes.
2. Building trade..... 3 "
3. Metal and machinery..... 2 "

One year's satisfactory work exempts from attendance at Continuation School.

Evening and Sunday Section: For apprentices, assistants and masters.

1. General continuation classes.
2. Technical classes for special trades.

Courses: The day courses last one year, and boys who complete a course, being exempt from further Continuation School, are sought after by employers.

The evening classes are attended by apprentices and also by journeymen who have progressed as far in the Guild schools as these will take them, and wish to advance further.

The City and State also help the Guild schools and supervise their courses.

Attendance: 230 in day classes, 800 in evening and Sunday classes. 550 pupils are taking master courses.

The same teachers take day and evening and Sunday classes.

Boys attending this school in lieu of another Continuation School have to take 8 hours a week and pay more fees, but on the other hand, they have more apparatus here.

The Director stated that this school would not be united with the general Continuation School, as so many unskilled boys attend the latter.

In the *Building trades department*, boys can take three short winter courses and two long intermediate summer courses, and then go to a Building School.

Equipment: Very abundant for demonstration purposes and for teaching and in objects (parts of machines) for drawing.

Teachers have to take from 24 to 30 hours a week. In many cases they are practical men who have had pedagogical training.

Subjects and Trades Taught: In the *Evening* and *Sunday Section* classes are held for masons, carpenters, stonemasons, tinsmiths, machine-builders, electro-technicians.

In the *Day Classes* there are classes for bakers, butchers, waiters, cooks, etc., for the building trades, and for locksmiths, mechanics and machine builders.

Classes for *Girls* are held both day and evening, and include general subjects, languages, typewriting and shorthand, dressmaking, sewing and millinery.

In the Commercial Department the usual commercial subjects are given, together with French and English.

In the *Evening Classes* the same subjects are taken as in the day classes, both in general and commercial subjects.

Fees: Day Classes, per half year 36 marks for Dresden pupils. Sunday and Evening, half year 4.50 marks 2 hours weekly, to 15 marks 8 hrs. weekly.

All fees are considerably higher for outsiders.

Fees can be remitted in deserving cases, and free places are available.

Special Features: There is a course in calculation for different industries. It was found that this was the weak point in all industrial courses, pupils being unable to estimate working expenses. Geometrical problems, estimates of flat and solid bodies, weights, motor power for workshops, simple and difficult problems for metal and smith work, etc. are worked out. Many shop masters brought problems to be worked out, which were done by the whole class. This course was most popular and very well attended.

SECTION 8: STUTTGART.

This city, which is the Capital of the Kingdom of Württenberg, has a population of 285,600. The principal industries are furniture, pianos, chemicals, colors, chocolate, carriages and leather.

Information obtained in "Conversation" with PRESIDENT VON MOSTHOF, *Superintendent of Vocational Schools.*

Württemberg was one of the first places to avail itself of the provisions of an Imperial law in relation to Continuation Schools, in para. 120 of an Imperial Education Bill passed about 1850. This Bill gave to communities the power

to establish Industrial Continuation Schools. Some localities did avail themselves of this provision and established these schools. In these schools the instruction given was usually in the evenings and on Sundays. In 1895 Württemberg passed a law that Continuation Schools must be established giving at least 104 hours, instruction per annnum to boys between 14 and 18 who were engaged in industry. The teachers were for the most part drawn from the Volksschulen and were not as efficient to give instruction of a nature best adapted to a special vocation as was desired. There were a great number of teachers and the work was so much divided that no teacher felt especially responsible for the particular welfare of his students. The teachers were tired because they had had other teaching duties during the day, and the students were tired also.

In Stuttgart alone there were 400 teachers giving instruction in the Continuation Schools and the students were not getting as many hours a week instruction as they should, to profit by this system.

Schools Extended and Improved.

In 1906 a Bill was passed by the State Legislature of Württemberg to extend and improve the compulsory Continuation Schools. This Bill was due mainly to the efforts of President Von Mosthof, and it received the united support of Labor Unions, Chambers of Commerce and Employers' Associations. The only opposition came from the local Catholic body, because the Bill did not provide for any religious instruction in the Continuation Schools. The reason they did not include it was only for lack of time in the hours of instruction, which seemed to them only too short to accomplish the purpose of giving the apprentices all the general technical education they needed to give them the ability to become skilled workmen. In Munich, where the Catholics more largely prevail, religious instruction is included in the curriculum of the Continuation Schools. The Bill was passed, however, over the opposition of the Catholics, without religious instruction being included and came into force at once.

Compulsory Attendance.

This Bill provides that a Compulsory Continuation School must be established in every community that has more than 40 boys between the ages of 14 and 18 engaged in trade or commerce. This will be a commercial or industrial Continuation School if all the boys are in one occupation or the other, or will be one of these two schools with a department of instruction for the branch which does not predominate. The boys must attend this school for at least 7 hours a week from the age of 14 to 17, and the locality in which the school is established may compel the student to attend until 18 years of age if he does not attain a sufficiently high standard by the age of 17.

There is no real compulsion on the part of the State necessary to make the communities establish such schools for the most part, because there are communities which have such schools now where there are only 30 or 35 boys between the ages of 14 and 18 in trade and commerce. There has been special

dispensation given by the State to certain small communities, so that the whole provisions will not be in complete force until the year 1914. The chief difficulty was found to be the scarcity of suitable teachers.

Securing Supply of Teachers.

To meet the need of a supply of suitable teachers, two different methods were adopted:—

1st. A body of the most promising teachers was selected from the Volksschulen and sent for a period of 3½ years to the special Training School for Trade School Teachers at Karlsruhe, Baden. Württemberg made a reciprocal agreement with Baden that the latter could send men to the Agricultural Schools in the former, which they had not themselves. These teachers received scholarships, where necessary, of about 1,000 marks per year. Then they had to go into industry for a year. These teachers had to promise that they would come back to Württemberg to teach. At present there are about 120 of these.

2nd. A selected number of graduates of the Building School and the Machinery School were given 1¼ years of training in pedagogy at Stuttgart. Now they get only about 1 year of such training. There are about 70 of these now employed in the Continuation Schools of Württemberg. The authorities try to get the two different kinds of teachers into contact as much as possible—the more pedagogical and the more practical—so that each shall supplement the other's knowledge and efficiency.

The same method was applied to training teachers for the Commercial Continuation Schools. They drew teachers from the School of Commerce and Higher School of Commerce and also sent some selected elementary teachers to a Commercial Training School.

There was no lack of applications for teaching positions because the teachers, once appointed, get fair salaries, good social position, pensions for old age, and a pension for their widows and children. There are four applications for every vacancy. Salaries range from 3,000 marks to 5,200 marks for ordinary teachers (usually the increase is extended over a period of 3 years). Principals of ordinary schools get from 3,900 to 6,000 marks. Principals of larger schools get 7,100 to 7,400 marks. Pensions may rise to as much as 90% of salary and a widow's may rise to 50%; children get one-fifth. Should a teacher fall ill, his salary is continued for a year if necessary.

President von Mosthof says that he attributes the fine type of teachers they have been able to secure, to the fact that they get good salaries, and that the future is assured for themselves and their families.

Some General Matters.

The school fees must be paid by the employer, but he has the right to deduct the amount from the wages if he wishes to do so.

The community has to put up the buildings and supply the necessary school furniture. The community and the Kingdom of Württemberg share equally in providing equipment, teachers' salaries and other running expenses.

In the case of very small towns, the State has occasionally provided 10% of the cost of the buildings. The Kingdom of Württemberg also pays the teachers' pensions, etc. so that it is really the larger contributor.

The teaching method is to have the same teacher carry the boy through the whole course and to give him all the subjects, as far as possible, This is to create the close personal touch between boy and teacher.

In Stuttgart, before the present law came into force, there were 400 part-time teachers; now there are 36 constantly employed.

The classes are all held between 7 a.m. and 7 p.m.

President von Mosthof said that the compulsory method was in his opinion the only real way to get at the masses and to give them a practical education and make them more efficient in industry.

The general method of instruction in the Industrial Continuation Schools is different in one important point from those in Munich, in that they have workshops in the Württemberg schools for demonstration purposes only and not for workshop instruction. It is thought that pupils should get the workshop instruction under the eye of the master and not in the school.

There are about 100 compulsory Continuation Schools under the control of President von Mosthof, besides special Vocational Schools,which were provided for the training of men who wanted to get particular training for positions of responsibility. These are given below:—

1. The Textile School at Reutlingen. This is a general Textile School for all kinds of fabrics and also for dyeing, having about 200 pupils. Comparatively high fees. Most of the students are sons of manufacturers. There are also four other Textile Schools in Württemberg.

2. The Trade School for Fine Machine Work at Schwenigen. Here the boys learn to construct watches, theodolites, instruments of precision and have electro-technics. They have a 3 year course, and this is accepted as apprenticeship. 70 pupils. 6 full-time teachers.

3. The Trade School for Precious Metal Work. 3 years course. 100-150 pupils. 7 full-time teachers. Has a good Museum attached. School is at Gmund.

4. The small School for Leather and Tanning Industry at Metzingen is attached to a factory. 12 pupils.

5. Several other small Trade Schools.

6. Three special Trade Schools for Master Courses in building construction trades, intended to relieve the Building Schools of those who formerly went there and did not want the full course.