SESSIONAL PAPER No. 191d

FRANCE.

CHAPTER XXX: OUTLINE OF THE EDUCATIONAL SYSTEM.

SECTION 1: ORGANIZATION AND ADMINISTRATION.

Under Three Ministries.

The different kinds of schools in France are under the control of three different Ministries. The ordinary Primary, Secondary and Higher Schools, the Schools of Art, Normal Schools, Law Schools, Medical Schools and Universities belong to the Ministry of Public Instruction. The Commercial and Industrial Schools, including the General Technical Schools, are under the Ministry of Commerce and Industry. The Agricultural Schools are under the Ministry of Agriculture.

It is claimed that the Industrial, Commercial, Technical and Agricultural Schools gain much from their close relations with the Ministries of Agriculture and Commerce and Industry respectively, which are in touch with the great industrial employers, and find the practical side of their work recognized and appreciated by those who are most interested in it.

What appears to be an anomaly of the system lies in the circumstance that since University Education is under the Ministry of Public Instruction, the higher scientific branches of Industrial and Commercial Education have no organic or direct relation with the lower schools providing less advanced education of the same character. For example, the Agricultural Branch of the University of Nancy, and the Tannery School at Lyons in connection with the University there, are under the Ministry of Public Instruction and not under the Ministries of Agriculture and of Commerce and Industry respectively. In the actual working out of the system the disability of the anomaly is more apparent than real.

Duties of the District Rectors.

For administrative purposes France is divided into 16 School Districts. At the head of each District is a Council which supervises the method of teaching prescribed by the Minister of Public Instruction, acting as a Higher Council of Public Instruction. Each of these Districts is administered by an official known as Rector, assisted by as many inspectors as there are departments (provinces) in the district.

These rectors locally represent the Central Authority, and supervise the provision of education in the Districts which they respectively direct and in

which they reside. As their authority embraces all grades of education, their influence is excellent and effective in regard to such questions as overlapping on the one hand or deficiency in any particular grade on the other. They also furnish an effective medium for spreading the principles of the Government schemes throughout every District, at the same time adapting their application to local conditions.

Functions of the Inspectors.

Advantages accrue from the influence upon education, above the elementary stages, through the local knowledge and influence of the Rectors and the Inspectors.

As the Inspectors are freed from all duties of determining the grants, examining individual children for labor exemption, or passing candidates for any form of teacher's certificate, they are able to give full time and thought to the actual methods and working of the schools, and to criticising, offering suggestions and encouraging the various attempts to improve the education given.

The general Inspectors and Inspectresses of Public Instruction and their assistants have to inspect public schools which provide technical instruction of elementary and secondary grade, schools and courses of vocational instruction supported by the Ministry, and private technical schools of any kind recognized by the State. They may be placed at the disposal of the Ministry of Commerce and Industry for special journeys of inspection in certain schools and Districts.

Three Grades of Education.

In France there are 3 grades of education, each of them including gradations or variations:—

(1) *Primary Education*, to which the great majority of French people are limited, is given in the primary schools and in the lower classes of the lyceums, colleges, etc.;

(2) *Secondary Education*, which is suitable for the children of rich or well-to-do families, and also for talented children of the poorer classes who are able to win scholarships. This education is given in the lyceums, colleges, small seminaries, and in a large number of private institutions;

(3) *Higher Education*, which is given in the Universities and in some special establishments, for those who intend to be doctors, magistrates, lawyers, teachers in the secondary or higher grades, etc.

The teaching is called *public* when it is given by masters dependent directly upon the State, the departments or the communes; it is called *private* when organized by individuals or associations. Public instruction predominates in France, although private teaching also forms a prominent feature of education.

Examinations in all grades are set by the University. The programmes are decided on by the Higher Council of Public Instruction, and therefore all teaching must necessarily be dependent on it. These examinations lead to diplomas which are required when entering the majority of callings.

Education in all its grades has been considerably developed in France within the last 40 years. In 1870 the State spent 32 millions of francs for education; now it spends annually nearly 275 millions of francs ($55,000,000).

SECTION 2: PRIMARY INSTRUCTION.

Primary instruction is compulsory throughout France. This instruction has never been considered by the French authorities as an end, but rather as a means; something indispensable but insufficient; a rendezvous, so to speak, for all, from which each child is to start on his own proper course, a course determined by his taste, aptitude, family and social standing.

The Primary Schools of France correspond with our Elementary Schools, or, to be more definite, with our first seven or eight grades, those which hold the children from their fifth to twelfth or thirteenth year. The French educators discovered that, at the end of this period of training, "some children being better endowed intellectually, and belonging to families of moderate means, in easy circumstances, entered the Superior Schools to complete their instruction there, or the Lyceums or Colleges to prepare themselves for the liberal professions or the Universities. Others (and they form a very large majority), were hardly out of the Primary Schools before they were struggling with the difficulties and exigencies of life. Among this class a few continued their studies in the supplementary courses, but most of them, since they were poor or unwilling to ask their parents to make any greater sacrifices to keep them in school, entered a workshop that they might begin to earn a livelihood at once."

In 1881 primary instruction was made free in all the public schools. In 1882 it was made compulsory for fathers to send their children to school until they had obtained the "certificate of primary studies" or attained the age of 13. Thanks to these measures, the proportion of illiterates considerably diminished. In 1854 it was 21.6% for men and 47.4% for women; in 1870 it reached 25% for men and 37.7% for women; but in 1908 it was hardly 11%.

Public Primary Schools.

The obligatory school age is from 6 to 13 years under the law of 1882. The total enrolment in Primary Schools in 1906–07 was 5,585,025 (divided almost equally between the sexes) of which 4,583,053 were in public schools and 1,011,072 in private schools. In addition to these totals, there were 651,955 pupils in Infant Schools, the establishment of which is optional with the communes, these children being below the obligatory school age.

Children are admitted from the ages of 6 to 14. Outside of these limits the admission of pupils is subject to the authorization of the Academy Inspector.

In communes where there is no kindergarten, the age-limit for admission is lowered to 5 years.

The classes are held 3 hours in forenoon from 8.30; and 3 hours in afternoon from 1 o'clock.

Thursdays, Sundays and feast days are observed as holidays.

Primary education comprises the following:

Moral and civic instruction; reading and writing; French; calculations and metric system; history and geography, with special reference to France; object lessons and primary rudiments of science; elements of drawing, of singing, and of manual work, especially in their application to agriculture; (needlework is taught in the girls' schools); and gymnastics and military exercises.

Education in the primary schools is divided into three courses—Elementary, Intermediate, and Superior In the infant section the course is for one or two years, depending on the age of the child upon entering being 6 or 5 years. The Elementary course is two years, ages from 7 to 9; Intermediate course, 2 years, ages from 9 to 11; Superior course, 2 years, ages from 11 to 13.

Each Primary School is under the care of a School Committee, which looks after the welfare of the children, provides shoes and winter clothing when needed and a warm meal at noon.

Though Higher Primary Education is free, it is not furnished everywhere. For this reason scholarships have been founded for those who are willing to go some distance from home in order to get this instruction, but who cannot afford their living expenses.

On leaving the Higher Primary School those who intend to go into business and who have a taste for the study of modern languages can compete for a scholarship to enable them to reside abroad; and those who intend to go into the manufacturing industries may compete for a travelling scholarship. The secondary teaching scholarships are of old standing and their benefits have been extended to girls. The number of scholarship holders is no longer restricted to the military and naval schools, and lack of means is now a sufficient qualification.

The gates of higher education also have been thrown wide open by means of financial aid to a large number of young persons.

SECTION 3: HIGHER PRIMARY SCHOOLS AND SUPPLEMENTARY COURSES.

Higher primary education was inaugurated in 1882, and to-day there are about 370 Higher Primary Schools and over 600 Supplementary. The Higher Primary Schools were reorganized by a decree and an enactment of January 21, 1893.

The Minister of Public Instruction at that time, Mr. Charles Dupuy, sent a circular to the Rectors on that occasion, of which the following passage is an extract:

What school population do our higher primary schools cater for? Not for young persons who are intended for professional careers, who have an indefinite amount of time at their disposal and who have come to receive high intellectual culture, but rather the children of the laboring classes who will soon have to support themselves by working, and in most cases by manual labor. They do not aspire to classical studies. Their ambition and probable destiny is to fill one of those numerous employments of a medium order which agriculture, commerce, and industry offer to workers, with the prospect of attaining to more and more easy circumstances; but nevertheless only moderately so.

This being the case, the higher primary school must direct the attention of its pupils, from the first day to the last, to the necessities of the practical life which awaits them, and therefore their minds are never distracted for a moment from the pursuit of a calling; and the school carefully avoids giving them standards, habits or ideas which would divert them from the kind of life and work for which they are nearly all intended. And whilst reminding them that democracy has removed the barriers which formerly held the individual tightly imprisoned, it seeks rather to make him love and honor his calling than to dream of means for escaping from it.

In this way, we might mention that higher primary instruction is clearly distinguished from secondary instruction, ancient or even modern, with which it has been confused.

Higher primary instruction (and one of my honorable predecessors has already said so even at the very time when he was reorganising it) must not be by any means a sorry counterfeit of secondary teaching; the higher primary school is not a degenerated college, but a perfected school. Nothing, then, is more necessary and more simple than to prevent any confusion or any ill-ordered rivalry between two orders of establishments which has each its reason for existing.

Higher primary instruction is at once recognized by its absolutely practical and utilitarian character; and in this general sense it is professional (vocational).

But it is none the less real instruction, and is not to be confounded with apprenticeship. It is a school and not a workshop, and those who attend it are pupils and not apprentices. The work of education will be continued there which was commenced at the primary school. Even for workmen (or should we not rather say, particularly for workmen) this culture of the mind it not a misplaced luxury; it forms the judgment, the heart, the will and the character; that is to say, the strength which he more than any one else will need in the struggle for existence.

Therefore our higher primary schools have had this double object in view from the very start: they combine intimately a supplementary general education with the rudiments of a professional (vocational) education.

Distinctions between Higher Primary and Supplementary.

The institutions for higher primary instruction are called *Supplementary Courses* if they are annexed to an elementary primary school under the same management.

They are called *Higher Primary Schools* if located in separate premises and under a different management from that of the elementary school.

The duration of the studies in the Supplementary Courses is one year. The Higher Primary School comprises at least 2 years of study; it is called a complete course if it comprises 3 or more.

In 1906-1907 the higher primary instruction included 87,668 pupils, distributed as follows.

	Public Institutions.		Private Institutions.	
	Boys.	Girls.	Boys.	Girls.
Higher Primary Schools	26,947	18,518	220	203
Supplementary Courses	16,523	13,508	2,781	8,875
	43,470	32,026	3,001	9,168
	75,496		12,172	

In 1891-92 the same instruction had been given to only 45,599 pupils.

No pupil can be received into either a Higher Primary School or a Supplementary Course unless he holds the certificate of elementary primary studies, and also proves by certificate signed by the Primary Inspector that he has attended during at least 1 year the higher course of an Elementary Primary School. Nevertheless pupils who have not prosecuted their studies in a primary public school, if they hold the certificate of elementary primary studies, may be admitted into a Higher Primary School or a SupplementaryCourse on proving that they studied the subjects comprised in the program of the higher course in the primary public schools. This Supplementary examination is undergone before a commission composed of the teaching staff of the Higher Primary School under the chairmanship of the Primary Inspector.

Higher Primary Instruction.

Higher primary instruction comprises:—moral education; civic instruction; the French language and the elements of French literature, French history and the elements of general history, with special reference to modern times; the geography of France and its colonies, and the elements of general geography, with special reference to commercial and industrial geography; modern languages; elements of common law and of political economy; elements of arithmetic and its principal commercial applications; elements of algebra and geometry; the rules of ordinary accounting and bookkeeping; elements of the physical and natural sciences, with special reference to their application to agriculture, commerce and manufacturing; geometrical drawing; ornamental drawing and modeling; gymnastics; wood and iron working for boys; needlework, cutting, and dressmaking for girls.

Technical Sections.

In the schools for complete training, in which there are a considerable number of pupils, there are generally special sections from the 2d or the 3rd year onwards:—agricultural, industrial or commercial.

In all the other Higher Primary Schools, as also in the Supplementary Courses, additional courses may be established for the vocational preparation of pupils who intend to go into farming, industries or business.

Time Tables.

The regulation time tables of the Higher Primary Schools are as follows:—

PROGRAMS OF HIGHER PRIMARY PUBLIC SCHOOLS IN FULL OPERATION.

BOYS

Subjects of instruction and No. of Hours to each (total 30 per week).	General Instruction.			Industrial Section.		Business Section.		Agricultural Section.	
	1st	2nd	3rd	2nd	3rd	2nd	3rd	2nd	3rd
Ethics	1	1	1	1	1	1	1	1	1
French Language	5	5	4	2	2	2	2	2	2
Writing	1	1	1	1	1	1	1	1	1
History and Civic Instruction	1	1	2	1	1	1	1	1	1
Geography	1	1	1	1	1	2	2	1	1
Modern Languages	3	3	2	.....	.....	4	4	.....	.....
Mathematics	4	3	3	3	3	2	2	2	2
Accounting and Bookkeeping	.....	1	1	2	2	3	3	1	1
Physics and Chemistry	2	2	2	2	2	2	2	2	2
Natural History and Hygiene	1	1	1	1	1	1	1	2	2
Agriculture and Horticulture	1	1	1	.....	.....	.....	.....	3	3
Common Law, Political Economy	.....	.....	1	.....	1	.....	1	.....	1
Drawing and Modeling	3	3	3	4½	4½	1½	1½	1½	1½
Manual & Agricultural Work	4	4	4	6	6	2	2	6	6
Gymnastics	2	2	2	2	2	2	2	2	2
Singing	1	1	1	1	1	1	1	1	1
Hours to be distributed according to special requirements				2½	1½	4½	3½	3½	2½

The figures in the columns give the number of hours per week of each subject. The ordinal numbers (1st, 2nd, 3rd) refer to the year of the course.

GIRLS.

(*Total 24 hours per week*)	General Instruction.		
	1st	2d	3d
Moral Education	1	1	1
French Language	4	4	4
Writing	1	1	1
History and Civic Instruction	1	1	1
Geography	1	1	1
Modern Languages	3	3	3
Arithmetic & Elements of Geometry	2	1	1
Accounting and Bookkeeping	.....	1	1
Physical and Natural Sciences & Hygiene	2	2	2
Common Law and Political Economy	.....	.....	1
Drawing	3	3	3
Manual Work and Domestic Economy	4	4	4
Gymnastics	1	1	1
Singing	1	1	1

DETAILS OF SCHOOL WORK.

In the first three years of higher primary instruction there is an average of 6 hours of class work daily (Sundays and Thursdays excepted). The maximum time on any subject does not exceed 1½ hours daily, distributed weekly approximately as follows: literary instruction 9 hours, scientific instruction 9 hours, modern languages 3 hours, drawing 3 hours, manual work 4 hours, music 1 hour.

Gymnastic and military exercises are carried on outside of the regular class hours.

In the 4th and higher years the time devoted to manual work and vocational instruction is increased; but at least 10 hours are reserved every week for the other subjects of instruction.

The instruction in the Supplementary Courses aims to revise and supplement the subjects taught in the higher course of the Primary Schools. Teachers are authorized to select from the programmes of the Higher Primary Schools, and especially those of the 1st year, whatever they may consider to be of special utility for the pupils attending the Supplementary Course.

A Welfare Committee has been established in every Higher Primary school which watches the material interests of the pupils and the school property, takes the pupils under its protection, obtains situations for those who merit it on completing their studies, and takes especial care of the scholarship holders.

SECTION 4: PRIMARY TECHNICAL INSTRUCTION.

The State organization of primary technical instruction in France dates from 1878, when the display of French Industry at the Paris Exhibition in that year was held to be unsatisfactory, and the matter was discussed in the Chamber of Deputies, leading manufacturers and Chambers of Commerce having directed the attention of the Government to the question. Propositions leading to the creation of an independent system of primary technical instruction were submitted, but rejected, and it was finally agreed that it should be annexed to the existing Primary Schools. As a result, the law of December 11, 1880, was passed providing for Schools of Manual Apprenticeship, these to be assimilated, as regards support and regulations, to the Higher Primary Schools having a distinctly technical character.

In the same year the Legislature authorized the creation of another order of schools, called National Professional (Vocational) Schools, which were intended to illustrate the kind of primary education that might replace in society the decaying apprenticeship system by an effort beginning with the infant school and following the child to the adolescent period, giving, at each stage, "technical instruction which, commencing from the earliest age, when it is of little importance, continues up to the very end of the course, when it becomes of the first moment. When he has arrived at this final stage the apprentice, who now only needs the practice of his trade to become a workman, leaves the National School and goes either into a workshop or into a technical school in the proper sense of the term." It was believed that such schools would

"lead a youth to the threshold of the factory or the engineering school, armed not alone with general and with special knowledge, but with the aptitudes and habits of work which would enable him after a few months of practice in a particular calling to become a finished workman."

Three schools of this character were established in 1886-87, and liberally supported by the State.

Primary Training Strictly Vocational.

Primary technical training in France is distinctly vocational, is carried out with marvellous system and thoroughness, and everywhere it tends to specialization. The endeavour has been made at times to engraft the training upon the general system of primary education—an endeavour which would appear to be comparatively easy in France, where primary education is Pestalozzian in spirit and method and where the Higher Primary Schools all give more or less technical instruction.

At other times the endeavour has been made to emphasize general instruction in schools of the technical type. This was notably the case in the Ecole de la Martiniere, the most famous of the primary technical schools of Lyons, which was established in 1830 by private initiative and is managed under a trust deed by trustees acting conjointly with the Minister of Commerce. The purpose of the school was "to give a sound, practical training to those who are to enter industrial or commercial life at a comparatively early age." For more than half a century it was educative in the general sense, preparing boys for industrial life, but not training them for the exercise of any particular calling. This policy was modified in 1895 by providing for technical specialties in the third year of the course. By this action, says an English authority, "the most important stronghold of a system of generalization in French primary technical instruction may be said to have fallen."

Although primary technical instruction in France arose from conditions of life and industry peculiar to that country, yet in purpose and methods it is a type of what vocational schools incline to be everywhere.

Technical Instruction Defined.

At the Universal Exhibition held in Paris in 1889 the most notable of the series of Congresses accessory thereto was one which discussed technical education and decided that "technical instruction in its broadest sense has for its object the study of the arts and sciences, in view of their application to a definite trade or profession. The training must be as varied as the trades and professions, its degrees being determined in each case by the end in view." It was decided that the term "technical instruction," without a modifying word, should be held to include both industrial and commercial training.

The Congress defined Primary Technical Instruction in France as that given in Schools of Manual Apprenticeship and in the Higher Primary Schools (that is, schools for pupils over 12 years old); Secondary Technical as instruction given in the Schools of Arts and Trades; Higher Technical as that

given in the Central School of Arts and Manufactures, and institutions of the same high order. This classification agreed in the main with the conditions under which technical instruction was carried on in France at that time.

Specialization was definitely adopted as the government policy by the law of 1892, which placed the Practical Schools of Commerce and Industry under the sole charge of the Minister of Commerce and Industry, thus removing them entirely from the system of general primary instruction. At that time a Department of Technical Instruction was created in the Ministry named, and appropriations covering salaries and many other expenses were offered through this Ministry for schools giving instruction in commerce and industry to pupils from the Primary Schools. Subsequently the National Vocational Schools were transferred to the same Ministry.

Intensive Specialization Approved.

In respect to the present policy it may be said that the principle of intensive specialization is generally approved by French authorities; but as regards the age at which specialization should be encouraged there is a conflict of opinion. The policy of the separate and not always harmonious administrations of the two types of primary education, general and special, by the different Ministries under whose care they are, prevents placid stagnation. This conflict increases as the need of professionally trained teachers for the Primary Technical Schools becomes more and more evident. Temporary provision has been made for meeting this necessity by the institution of Normal sections in several of the Higher Technical Schools; but this action threatens to introduce social distinctions among the laboring classes of France at the very time when an effort is being made to break down the long-standing distinctions between the lower and upper classes of society. On these two phases of the general problem of primary technical education—early specialization and dual administration of the two types of primary education—finality of judgment does not appear to have been reached.

SECTION 5: SCHOOLS FOR TEACHERS.

Primary Normal Schools.

These train male and female teachers for the Primary Schools, private schools and Kindergartens. When the great primary education laws were passed, each Department had to have Normal Schools for male and female teachers separately, and these were established wherever they had been lacking, except that the Department of Constantine has no schools for girls, and that of Oran none for boys. The number of masters to be trained having diminished considerably, and it being costly to maintain two Normal Schools with but few pupils and a large number of professors, some Departments grouped themselves into pairs and shared in the expense of these two schools.

Pupils are admitted by competitive examination held yearly in each Department. With the application for enrolment, the candidate must furnish a list of the schools he has attended since 12 years of age; his birth certificate, proving his age to be at least 16 and not over 18 on October 1st; primary certificate, and an undertaking to serve for ten years in the public teaching profession. Candidates must be free from all infirmities or ailments which would unfit them for teaching.

Age exemptions, not to exceed six months, may be granted by the principal. Candidates who do not hold a primary certificate may be enrolled temporarily, their admission taking effect only if they obtain it at the October session. No one may enter for the examination more than twice unless specially authorized by the principal.

EXAMINATIONS FOR ADMISSION.

The competition comprises two series of examinations, the first for selection of those eligible, the second for definite admission. The first comprises:

(1) Dictation of about twenty lines, followed by not more than 5 questions on the text, explanation of the meaning of a word, expression or phrase, analysis of one or more words, etc.

(2) Writing examination—one line each in large slanting, large round, and running style; 2 long lines; 2 medium and 4 fine; the value of the writing handed in at the orthographic composition being also taken into account.

(3) French composition, consisting of a story or letter of a simple nature, the explanation of a moral or educational precept, proverb, maxim, or question in moral and civic education.

(4) Arithmetic, comprising, in addition to the solution of one or two problems, the explanation of a rule, with reasons.

(5) Drawing, consisting of an exercise in simple sight drawing.

Examinations of the second series comprise questions on the French language, arithmetic and the metric system, history and geography of France, and on rudiments of physical and natural sciences; a summary of 2 lessons given by professors of the school, both on literary and scientific subjects; examinations in the elements of singing and music; gymnastic exercises; military exercises for male candidates, and sewing for female candidates.

After the competition a list of pupils definitely admitted is prepared for each school, with a supplementary list in order of merit like the first, from which the director fills vacancies as they arise, and which also serves to furnish neighboring academies with pupils when their numbers are incomplete.

Students at Normal Schools are called pupil-teachers. All have uniforms which they wear for holidays and outings.

COURSE OF INSTRUCTION.

The course of instruction occupies 3 years and comprises the following subjects:—

For both sexes:—psychology and ethics; pedagogics and school management, French language and elements of French literature, civic history and education,

geography, arithmetic and bookkeeping, physics, chemistry and natural sciences, modern languages, writing. drawing, singing and music, and gymnastics.

For young men:—geometry, surveying and leveling, agriculture and horticulture, agricultural and manual work, and military exercises. Since 1909, three lectures on the army and military service are given by officers.

For young women:—domestic economy, sewing, cooking, washing and ironing, and gardening. (In the schools at d'Alençon, Arras, Caen, Chambéry and LePuy, vocational instruction in hand-made lace has been organised.)

The general course of instruction is given during the first and second years, the practical and vocational in the third. Courses bearing on educational subjects which require the greatest amount of intellectual effort are held in the forenoon, the afternoon being reserved for manual work, drawing, singing, etc. During the third year pupil-teachers receive at least two months' practical instruction at the Primary School annexed to the Normal School, and each week in turn they give a lecture before the director and professors.

All pupils are required to undergo the examinations for the superior certificate at the end of the second year. At the end of the third year they must present themselves for final examination on normal studies, comprising a written exercise on a question in pedagogics, a lesson given to the pupils of the annexed school or the practice school, questions on the organization of a class, on school programmes, methods, etc. This final examination was introduced by the decree of August 4, 1905, which modified the form of education at the Normal Schools in a practical and professional sense. This decree has been applied in its entirety only since 1907.

Pupils who leave the school after three years of study are entitled, according to their capacity, to the first vacancies occurring in the Department.

Fourth year scholarships may be granted to those pupils who are preparing for the Higher Normal Schools.

Higher Normal Schools.

The Higher Primary Normal Schools (at St. Cloud for boys and at Fontenay-aux-Roses for girls) prepare students for teaching in the Normal Schools and Higher Primary Schools. The Higher Normal School (at Paris) furnishes professors for the secondary teaching of boys. The Normal School at Sèvres is the nursery for the secondary education of girls.

All the above Normal Schools prepare their pupils for a professional examination, at which they may obtain the necessary diploma for teaching. These Normal Schools are not exclusive, and the same examinations may be undertaken by all persons who fulfil the required conditions as to age, previous grades, etc. The pupils are boarders, supported and instructed free of charge, and have only to furnish their outfit. A certain number of day-scholars are also received. The pupils bind themselves to devote ten years to public instruction. Those who give up teaching before the expiration of this ten-year period must refund the State the sums expended for their support at the Normal School.

SECTION 6: SECONDARY INSTRUCTION.

Less has been done for secondary instruction than for primary education. A large number of new and spacious buildings have been erected here and there for the lyceums, complying with the requirements of health and well-being. The organization of the instruction of boys has adjusted the courses to meet present-day requirements. Later efforts have been directed principally to the organization and extension of the secondary instruction of girls.

Secondary Schools.

The Lyceums are the typical Secondary Schools, and are established and maintained by the State. The local or communal Colleges are established by local authorities, the State contributing to their maintenance. Although the Colleges follow the same official programmes as the Lyceums, few of them offer the full secondary course of instruction, and hence form a sort of lower order of Secondary Schools, or a preparatory stage to the upper section of the lyceums. The modern courses of instruction in the colleges are co-ordinated. This movement is fostered by Government bursaries open to competition, enabling promising youths whose parents cannot afford the expense of college education to meet the tuition fees and cost of living. The Secondary Schools are not free schools, and this fact has determined their social distinction; hence the gradual co-ordination of primary and secondary systems is significant for social as well as educational reasons.

The Secondary Schools comprise the whole scheme of liberal education up to specialized University faculties and higher special schools such as the Polytechnic, the National Conservatory of Arts and Trades, etc. The University faculties of Science, with their recent equipment and laboratories and technical institutes, are attracting young men destined to become directors of large industrial enterprises, while the faculties of Letters are becoming the resort of students interested in the economic and social reorganizations of the time, and also of young men and women preparing to be school inspectors and professors at Normal Schools.

Attendance and Grants.

The increased attendance at Higher Primary Schools and Practical Schools of Commerce and Industry accounts partly for the decline in the total enrolment in Secondary Schools for boys as between 187,402 in 1901 and 161,388 in 1909 the whole of this decline of 26,000, with the exception of 8,000, being in private schools. The State Lyceums and Colleges increased during that period from 88,202 to 96,830.

The total appropriations by the Government for the maintenance of Secondary Schools for Boys in 1909 was $4,157,900. In the five years (1906 to) the total increase in the appropriations for Secondary Schools for Boys was $557,100, which was used chiefly for increases in salaries of professors and assistants.

Public Secondary Schools for Girls are administered separately and are under different regulations as regards programmes and standards. The total enrolment of girls in 1908 in public secondary institutions was 34,671. The appropriation for these institutions in 1909 was $671,115.

The total amount allowed by the State for Secondary Schools for both boys and girls, including the additional appropriation applicable to both, or else intended for special purposes, was $5,993,235. The State appropriation for current expenses of Universities in 1909 was $2,897,888. The Higher Normal School, which has been consolidated with the University of Paris, received a separate appropriation in that year of $53,720.

SECTION 7: HIGHER EDUCATION.

The greatest progress has been made in the domain of Higher Education. Everywhere faculties were poor and in a most wretchedly neglected condition; the sciences and medicine especially lacked laboratories for study and research. The equipment, particularly at Paris, was in such a deplorable state that in 1873 Mr. Jules Simon, then Minister of Public Instruction, acknowledged before the learned societies that he did not venture to show to foreign visitors either the Sorbonne (University) or the School of Medicine, because they made him so ashamed of France. Transformations have been wrought since that time, and many edifices constructed. They are all roomy and abundantly equipped with up-to-date apparatus in all branches. About 84,000,000 francs have been devoted to the improvement of Higher Education, and it is estimated that a further sum of one half this amount will be required to complete its equipment.

In 1876 there were 625 professorships of higher instruction; now there are over 1,200. The number of students in 1875 was 9,963; now there are 40,767.

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CHAPTER XXXI: ELEMENTARY TECHNICAL INSTRUCTION.

Provision is made for instruction and training in three types or kinds of schools.—

1. National Vocational Schools coming under the law of 1880. (Schools of Manual Apprenticeship);

2. Practical Schools of Commerce and Industry;

3. Free (Private) Schools of Technical Instruction, not classified under the preceding categories.

SECTION 1: NATIONAL VOCATIONAL SCHOOLS OR SCHOOLS OF MANUAL APPRENTICESHIP.

The law of December 11, 1880, conferred the name "Schools of Manual Apprenticeship" on the public or private schools which were founded with a view to developing the necessary dexterity and technical knowledge among young persons who intend to enter manual trades.

It places these schools on a similar basis to the Supplementary Courses, the Higher Primary Schools, and the private schools, both primary and vocational.

The promoters of this law were prompted by the well founded statement that in France the economic value of workmen in almost all the trade bodies had a downward tendency. This regrettable state of affairs, which might have been productive of the most serious consequences to the national industries, was due in great part to the fact that apprenticeship had practically ceased to exist in France.

Efforts were made to remedy this state of affairs by promoting in industrial centres the establishment, for each branch of industry, of special vocational schools that might replace and even improve upon the old-time apprenticeship system. The usefulness of such establishments was no longer in doubt, and many manufacturing towns, recognizing this fact, had taken a praiseworthy initiative in this direction.

The State on its part founded on July 9, 1886, at Vierzon (Cher) a "National School of Higher Primary Education and of Vocational Instruction Preparatory to Apprenticeship." This was intended to serve as a model for institutions of the same kind to be founded under the law of 1880. The following year the National Schools of d'Armentieres (Nord) and Voiron (Isere) were founded upon the same model. Finally, in 1898, the State bought the Livet institution at Nantes, in order to turn it into a fourth National Vocational School.

NEW TYPES OF SCHOOLS.

At the outset, under the law of 1880, the vocational public schools were dependent for their general instruction on the Department of Public Instruction, and for the technical instruction on the Department of Commerce and Industry. A special provision was inserted into the finance bill of 1882 modifying this, and deciding that Higher Primary Schools whose teaching is mainly industrial or commercial should be placed under the exclusive control of the Minister of Commerce. These schools received the name of "Practical Schools of Commerce and Industry."

In order to classify the vocational schools, a commission composed of representatives of the two Ministries received instructions to arrange a basis for legislation as to their position. There has been a tendency, which appears to be productive of good results, for the number of vocational schools coming under the jurisdiction of the Department of Commerce to increase from year to year, and only a few schools now remain subject to the law of 1880.

As they were at first placed under the provisions of this law, it seemed as if, from the nature of their teaching, the National Professional (Vocational) Schools should come under the category provided for by the law of 1892. But the opposition of the higher officials of the Department of Public Instruction had first to be overcome, and it was only in 1900 (by the budget of April 13) that the credits for the maintenance of these schools were transferred from the budget of Public Instruction to that of Commerce and Industry.

ATTITUDE OF GOVERNMENT.

The 25th anniversary of the National Professional (Vocational) School at Vierzon was celebrated at the time of the visit of a section of our Commission, and the following extract from an address on that occasion by Mr. Coubya, Minister of Commerce and Industry, will give a good idea of the attitude of the Government:—

In a country like ours, where the distinctive feature of production is taste and elegance, it is indispensable to have good artisans. Hence it is necessary that from adolescence onwards our future workers shall receive a training which will enable them to maintain and extend the renown of French industry.

Does it not also serve the interests of the worker himself to put him in the way of improving his social position by the skilful practice of his trade? Hitherto only the elite have been able to benefit by the advantages of technical education, which must be extended more and more to the requirements of the most varying trades and districts. The Minister of Commerce purposes, with the concurrence of the Government, to direct it in this decentralizing spirit, whilst subordinating it to the higher principle of the unity of national education.

This great problem is occupying the attention of the Minister of Public Instruction and the Minister of Commerce, and they are co-operating in its solution.

Whilst it is the duty of the Minister of Public Instruction to see that those children of the people who show special aptitude for theoretical studies should be afforded the opportunity of the highest grade of secondary and higher education, the Minister of Commerce must see especially to those children who show aptitude for practical work. For these, the supplementary courses and practical and professional schools will give instruction in the synthesis of the subjects learnt at the common school, and put into their hands that indispensable tool, a trade, one of those beautiful and simple French trades which, in their ingenious technique, are as noble as a profession, and which, elevated by the perfecting of science and art, will be in the future, as in the past, the pride of our artisans and the enrichment of our country.

Practical Aim of Courses.

The school at Vierzon was opened in 1886; those at Voiron and Armentieres in 1887; and that at Nantes (Livet school) in 1898.

These schools aim to turn out educated workmen, qualified to become overseers and especially foremen. They also prepare students for the examination for admission into the Schools of Arts and Trades and for other technical schools. For instance, the school at Voiron prepares some students for the Central School at Lyons.

The instruction is free, but in addition to day scholars each school receives full boarders and day boarders.

The usual course of study is four years, but only three for those who intend to enter other technical schools.

The instruction is theoretical and practical. The former comprises moral and civic instruction, writing, French, history, geography, elements of hygiene, arithmetic, algebra, geometry, trigonometry, accounting, general and industrial chemistry, mechanics, technology, ornamental drawing, and geometrical industrial drawing. Foreign languages are optional. Practical instruction comprises iron and woodworking, with special instruction adapted to local industries; at Vierzon iron and ceramic industries; at Voiron weaving, linen and silk industries; at Armentieres iron, molding, and weaving. Free students may be admitted to the courses in professional weaving at these two latter schools, which possess experimental laboratories for textiles available for the public.

A preparatory section was established in 1906 at the school at Voiron; entrance by competitive examination. Since 1908 this school has possessed an experimental laboratory and special workshops for electrotechnics.

The school at Nantes, now installed in old buildings, will soon take possession of premises expropriated from the grand seminary.

Councils and Committees.

At each National School there are: (1) a governing council which regulates all questions relating to welfare of pupils, satisfies itself by monthly visits that the establishment is well kept, and makes suggestions to the Minister as to any improvements to be made; (2) a welfare committee, composed of leading men of the locality chosen from among manufacturers or merchants, which helps to find positions for the most deserving pupils on completion of their studies, and takes particular care of the holders of scholarships; also investigates methods of bringing the instruction into harmony with the requirements of the various industries of the locality; (3) a council of professors, presided over by the director of the institution, which attends to classifying the pupils, enrolling names on the roll of honor, and admitting pupils into the higher division; proposes additions or exclusions when occasion requires; draws up (in order of merit) a list of candidates for State scholarships; gives advice about prolongations, promotions and suspensions; and in case of serious misconduct of pupils sits as a disciplinary council and suggests penalties.

Entrance Examination.

Admission into these schools is by competition. Candidates must be French citizens, at least 12 and not over 15 years of age on October 1st of that year; and must be enrolled at the prefecture of their Department before July 10th. No exception is made as to age. Candidates must furnish certificate of birth, medical certificate that they have no disease, especially of a scrofulous or contagious nature, and that they can safely devote themselves to manual work; certificate of revaccination; statement of their conduct marks and work during the previous academic year; and a note showing the school which they wish to attend.

The examinations, which are identical for the whole of France, are held in July on the same days and at the same hours, in the chief towns of the Departments and at the headquarters of each school. They consist of written compositions only, e. g.; (1) dictation of 15 lines, followed by some questions in grammar; (2) French composition on a simple subject; (3) a page of writing; (4) an arithmetical problem within the limits of the program of the higher course of the elementary primary schools; (5) questions on the history of France since 1610, and on geography.

The examinations are marked from 0 to 20, and candidates must obtain at least 2/5 of the maximum in order to appear on the list from which nominations are made until the available vacancies are filled.

The number of pupils admitted in 1908 was as follows:

Schools.	Full Boarders.	Day Scholars.	Total.
Armentieres.....	82	15	97
Nantes.....	50	43	93
Vierzon.....	80	25	105
Voiron.....	75	17	92

Studies, Examinations and Final Diploma.

The studies are divided between theoretical instruction and shop work. The manual work is limited to 3 hours daily in the first year, 4 in the second, and 5 in the third and fourth.

Parents receive at the end of each month a statement of marks for the courses and practical work, and also a quarterly bulletin.

Classification of students in each division and on the roll of honor takes place quarterly. The final classification is made at the end of the year according to the promotion examinations, and pupils may be admitted to higher division, or compelled to remain two years in the same class, or may be excluded.

Admission in 3rd year to the special section, preparatory to the National Schools of Arts and Trades and other technical schools of the same grade, requires an average of 10 marks for drawing and shop work, no individual mark being less than 6.

Towards the end of the third year a certificate of fitness to receive the certificate of practical industrial studies is given to those pupils who, after a special examination, are preparing for the competition for admission to the Schools of Arts and Trades.

Final examinations for 4th year pupils, held at each school before a special commission, bear on all subjects of the program. Written examinations consist of a French composition, one paper each in mathematics, mechanics, physics, chemistry; oral examinations comprise mathematics, mechanics, physical sciences, the questions being drawn by lot, and fifteen minutes preparation allowed for each. The professional examination consists of drawing, technology and manual work.

Those pupils are admitted who have obtained at the examinations a general average equal to at least 11 out of 20, no individual average being less than 6; but for drawing and manual work the average must not be less than 10. A diploma is granted by the Minister to those pupils who have passed the final examinations. Within two years after leaving school those who failed to obtain the diploma may be admitted to another examination for diplomas.

In 1908 diplomas were granted as follows: Armentieres 36, Nantes 19, Vierzon 24, Voiron 16.

Fees, Scholarships, Expenses,

The price of board in these schools is fixed as follows: (figures denote francs, the first being for full boarders, the second for half boarders):—1st year, 500,250; 2nd year, 550,275; 3rd and 4th years, normal section, 550,275; 3rd and 4th years, special sections, 600,300. Reduction is made from above rates of 1|8th for two students from same family, and 1|6th for three.

Complete outfit to the value of 200 francs must be supplied when the pupil enters, and renewed by the family, cost of renewal for the 2nd and 3rd years being estimated at 50 francs a year. In exceptional cases the Minister may grant reductions in the cost of the outfit.

The school fee at Armentieres, for lectures in weaving, is 200 francs a year, but on request, young persons in poor circumstances may be excused all fees other than those for academic supplies, estimated at 25 francs.

A certain number of full or partial scholarships, maintained by the State, are conferred every year on enrolled candidates, after the entrance examination in the first half of the list; others are reserved for pupils who have finished their first or their second year studies, and the position of whose families justifies assistance from the State. Applications must be accompanied by the tax papers of the petitioner, as well as a statement of information certified by the mayor as being honest and correct, showing the resources and expenses of the family. Scholarships are granted after consultation with the council of professors. Every scholarship pupil who at the end of the school year falls below the first half of his division loses the benefits of his scholarship.

Various Departments maintain scholarships in the National Vocational Schools, which they confer on candidates who have passed satisfactory examinations but have been unable to win national scholarships.

SECTION 2: PRACTICAL SCHOOLS OF COMMERCE AND INDUSTRY.

The essential object of these schools is to train recruits for industrial and commercial undertakings, and is the same as that of National Vocational Schools. They fit young persons for commercial pursuits or industries, enabling them in a short time to become overseers or foremen of workshops, and also prepare students for the entrance examinations of the Schools of Art and Trades; but they are not to sacrifice their apprenticeship properly so called.

The instruction is free. Pupils cannot be admitted before the full age of 12. Those under 13 must produce certificate of primary studies or prove compliance with the requirements of the school by passing an entrance examination. When candidates outnumber vacancies, admission is by competition.

How Established and Managed.

The following is a summary of the law of 1893:—

These schools may be established by a Department or Commune, or combination of both. A general or municipal council wishing to establish such a school must prepare a special estimate of expense of opening and maintaining it, at the charge of the Department or Commune, and the available resources, and must undertake to support it for 5 years, in accordance with the law of 1889. The establishment of the school must be approved by the Minister of Commerce and Industry, to whom plans in detail of its construction, equipment and furnishing must be submitted, and he may grant funds up to one-fourth of total cost.

The staff shall comprise a director not under 25 years of age, and an adequate number of assistants and practical instructors not under 21. All must be French and hold certificates recognized by the Ministry for their respective positions. All appointments are made by the Minister, assisted by an Advisory Board from a list of 3 persons submitted by the Mayor of the Commune or Prefect of the Department, as the case may be.

There shall be a certain number of Superintendents of Apprenticeship on the staff, as required, these being appointed by the Prefect or the Mayor, and their salary fixed by the municipal or departmental council, in consultation with the director. These teachers are not entitled to pensions, except under specified conditions.

The Staff is divided into 4 classes:—directors or directresses, receiving from 2,500 to 4,000 francs; professors, practical instructors and workshop-superintendents, receiving from 1,500 to 3,000 francs; and assistants (male and female) from 1,200 to 2,400 francs per annum, together with lodging allowance according to the local conditions.

Expenses of maintenance are borne by the State, the Departments, or the Communes, according to the law of 1889. The Ministry of Commerce

and Industry may make grants to Departments or Communes, as prescribed, for the purchase and maintenance of equipment, furniture and appliances.

Scholarships to cover boarding are awarded by the Ministry on competitive examination. The course includes (1) commercial and industrial training, both theoretical and practical; (2) supplementary primary education. Proportion of time allotted to each is decided according to local requirements, the time-table being fixed by the Council of Improvement of each school. If the school has both industrial and commercial sections a special program must be drawn up for each in subjects peculiar to that section, and for the two sections together in common subjects. Certificates are awarded on graduation.

Councils of Improvement.

Each school has a Council of Improvement, consisting of the Prefect or Mayor; the Inspector of Commercial or Industrial Education (or both if the school has both sections); 4 members nominated by the general (departmental) or municipal council, at least two of whom must be or must have been engaged in industry or commerce; and one member appointed by the Ministry of Commerce (or two in the case of two sections). In the latter case the two members must be or must have been engaged in commerce and in industry respectively. In the case of Girls' Schools, two of the four nominated members must be women.

The Director or Directress attends all meetings of the Council, except when the annual report is being discussed.

The Council's duties are to give advice on expenditure, visit the school at least once a month to see that everything is in order, attend the graduation exercises, and compose the annual report to be submitted to the Minister through the Prefect.

In the case of municipal schools, mayors are instructed to interest themselves in placing pupils, especially scholarship holders, on leaving school, and to give advice on matters submitted to them by the Minister or Prefect.

Such schools are inspected by the Inspector-General of Technical Instruction, the Departmental Inspector of commercial or industrial education, or by the Departmental Inspectress.

The entrance requirement for *Normal Sections* comprises mathematics and geometry, French literature, French history, geography, and one foreign language. In the *Industrial Section*, drawing and manual training are required.

School Programs for the Sections.

The teaching programs in these schools are very extensive documents which can scarcely be summarized, hence only the subjects taught and time allotted to each will be mentioned. These typical programs are not compulsory but are only intended to guide controlling boards in the preparation of the special programs at each school, which should be adapted to the needs of local trades and industries.

COMMERCIAL SECTION (Boys).

	Class Hours Per Week.		
	1st year.	2nd year.	3rd year.
Ethics	½	½	½
History	1	1	..
Hygiene	..	..	1*
Drawing	1	2	..
French	6	3	2†
Physics and Chemistry	3	1½	..
Arithmetic and Algebra and Calculation	3	3	..
Commercial Legislation	..	1	1
Elements of Commercial Economy	..	..	1
Geography	1	1	3
Merchandise	1½	3	3
Accounting and Commerce	6	3	3
Practical Exercises (Monography and Commercial Office Work)	..	6	6
Penmanship and Typewriting	3	2	2
English or German	6	6	6
Another language	3	3	3
Supplementary Professional Instruction for the pupils' future calling or for the commercial needs of the locality	..	..	5½
Inspected Studies	9	9	9

*During the last three months.

†During the last three months one hour of French is replaced by one hour of hygiene.

This time table was made up by taking as a basis the one-hour class, except as regards the teaching of Physics, Chemistry and Industrial Electricity, which may necessitate experiments of a certain duration and for which the one and a half hour class has been arranged.

The Workshop or Drawing sessions are of at least 2 hours' duration.

Commercial Section (Girls.)

	Class Hours Per Week.		
	1st year.	2nd year.	3rd year.
I. Commercial Instruction:			
Commerce, Accounting and Bookkeeping	4½	4½	4½
Foreign Language	4½	4½	4½
Arithmetic and Algebra	3	3	3
Geography	1½	3	3
Writing and Penmanship	3	1½	1½
Chemistry and Merchandise	..	1½	1½
Legislation	..	..	3
Commercial Economy	..	..	1½
Total hours	16½	18	22½
II. General Instruction:			
Ethics	..	1½	1½
French Language	4½	3	3
Drawing	1½	1½	1½
History	1½	1½	1½
Natural History and Hygiene	..	1½	..
Geometry	..	1½	1½
Rudiments of Physics	1½	..	..
Domestic Economy	..	..	1½
Plain Sewing and Cutting out	3	3	3
Total hours	12	13½	13½
III. Studies	4½	4½	3
Grand totals	33	36	39

INDUSTRIAL SECTION (Boys).

Class Hours Per Week.

	1st year.	2nd year.	3rd year. 1st period.	3rd year. 3 last months.
Ethics	½	½	½	..
French	3	2	1	..
History and Geography	2	1	..	..
Rudiments of Industrial Economy and legislation for the working classes	..	..	1	..
Arithmetic and Algebraic Calculus	3	2	..	..
Geometry	3	2	..	..
Physics and Chemistry	3	1½	..	..
Rudiments of Mechanics	..	..	2	..
Rudiments of Industrial Electricity	..	..	1½	..
Supplementary theoretical instruction applied according to the trades	..	..	2	3
Drawings and descriptive rudiments	6	7	7	7
Practical work	20	23½	28½	38
Technology	1½	1½	1½	
Supervised studies	6	6	6	2
Total hours	48	48	51	51

This table was prepared by taking as a basis the one-hour class except as regards the teaching of physics, chemistry and mechanics, which may necessitate experiments or manipulations of a certain duration and for which the class of one and a half hours was arranged.

INDUSTRIAL SECTION (Girls).

Class Hours Per Week.

	1st year.	2nd year.	3rd year.
I. Industrial Instruction.			
Workshops	24	27	30
Drawing	6	3	3
Total hours	30	30	33

II. General Instruction.

French Language	3	3	1½
History	1½	1½	..
Geography	1½	1½	..
Natural History and Hygiene	..	1½	1½
Domestic Economy	..	..	1½
Physics	1½	1½	..
Chemistry	..	..	1½
Arithmetic	1½	1½	..
Geometry	..	1½	1½
Accounting	..	..	1½
Ethics	..	1	1
Writing	1	..	..
Plain Sewing and Cutting out	3	1½	1½
Total hours	13	14½	11½
III. Studies.	6	6	6
Grand totals	49	50½	50½

CHAPTER XXXII: TYPICAL SCHOOLS OUTSIDE PARIS.

SECTION 1: VAUCANSON SCHOOL, GRENOBLE.

This Practical School of Commerce and Industry for Boys was visited by a section of our Commission. It is an important school, situated near the beautiful promenade of Ile Verte. Its course of study is 4 years; or 5 years for pupils in the division of industrial electricity and chemistry established in 1899.

The Preparatory Year comprises four divisions, pupils being admitted who hold the certificate of studies or have passed an equivalent examination.

The subjects of instruction are French, history, geography, writing, mathematics, physics and chemistry, natural history, linear drawing, ornamental drawing, and modern languages (9 hours a week of English, German or Italian, at choice.)

After this first year pupils are sent to one of the two following divisions according to their tastes, the occupation for which they are intended, and the wishes of parents.

The Industrial Section.

The Industrial Section prepares especially for immediate entrance into technical occupations. There is a special division to prepare pupils for the schools of arts and trades.

Subjects of instruction:—French language, history, geography, mathematics, physics and chemistry, natural history and hygiene, modern languages (English, German or Italian, at choice), industrial drawing, mechanics, industrial electricity, chemical manipulations, industrial economy, land surveying, levelling, topographic drawing, and work in the workshop.

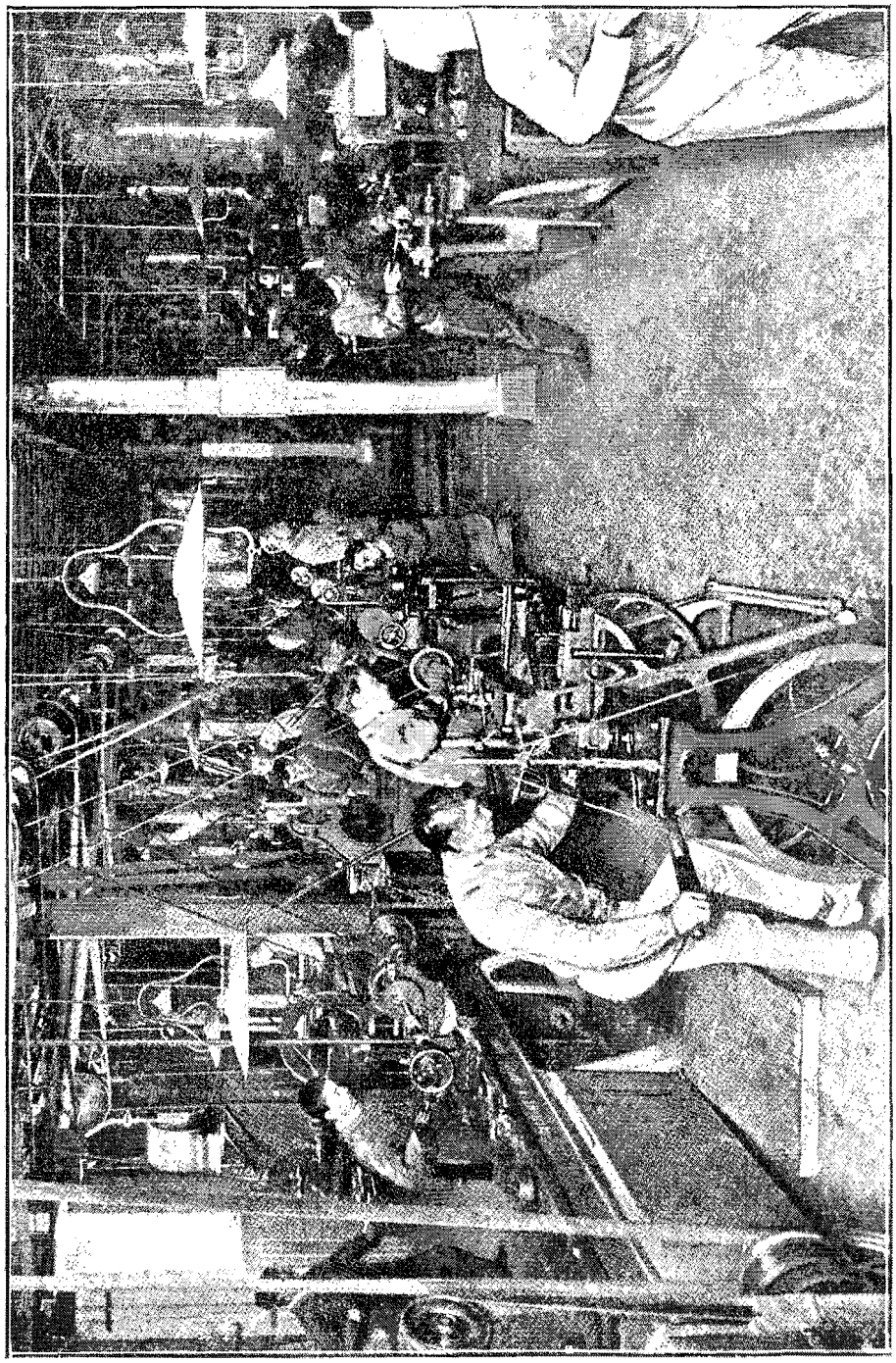
The vast workshops comprise:—forging, adjusting, metal turning, wood turning, electricity and machines.

When the pupils have acquired a sufficient general technical education they may be trained in the operation of the principal machines and motors employed in manufacturing (the steam engine, gas motor, turbine, etc). They devote themselves specially to the construction and management of electrical machines.

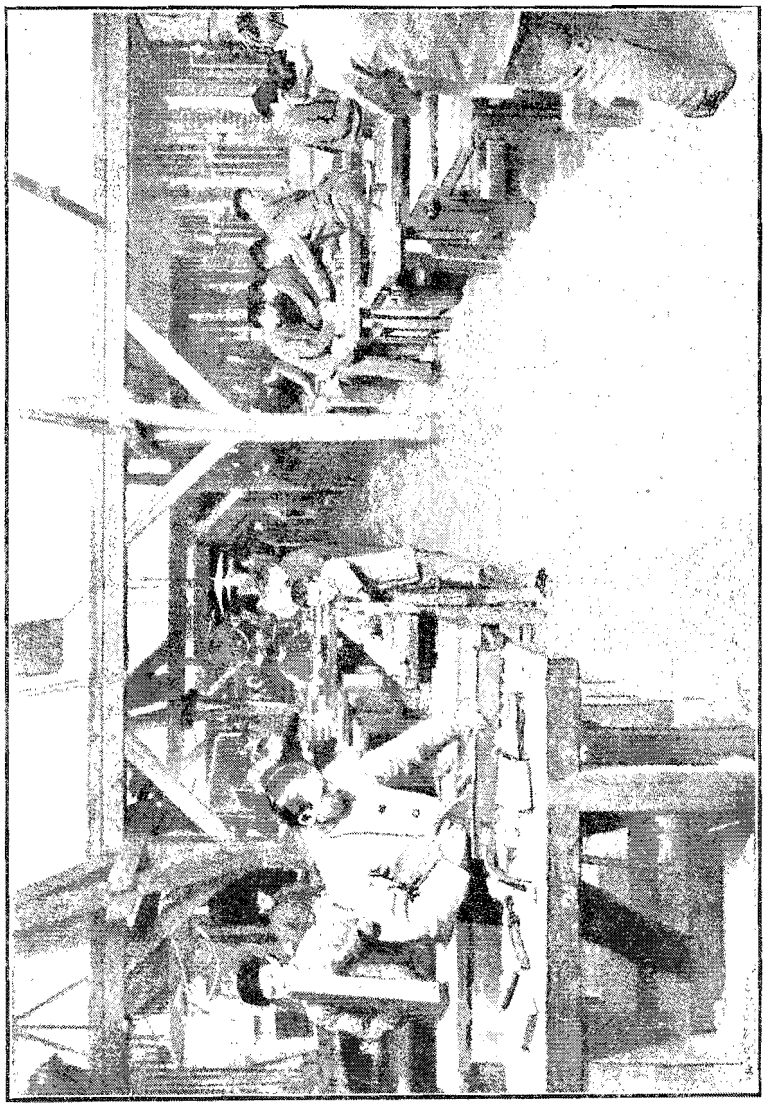
Certificate of industrial studies is awarded on completion of course.

The Commercial Section.

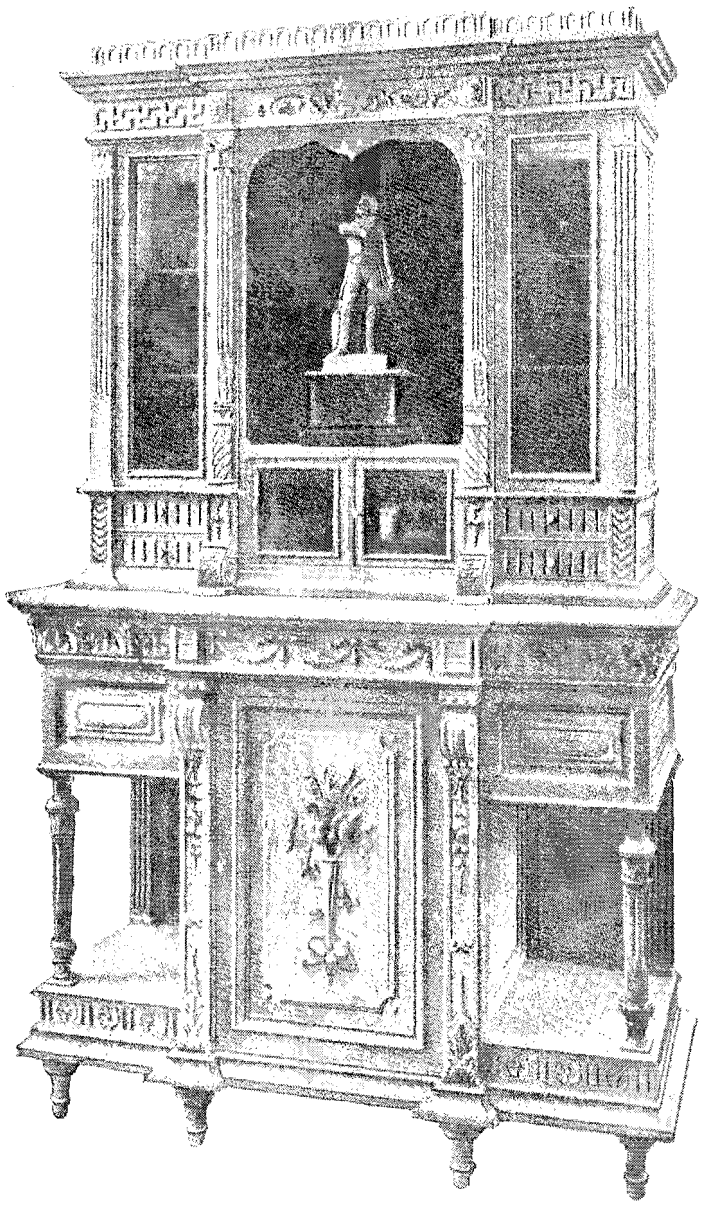
The Commercial section provides instruction in French language, history, commercial geography, legislation, commercial economy, commerce,



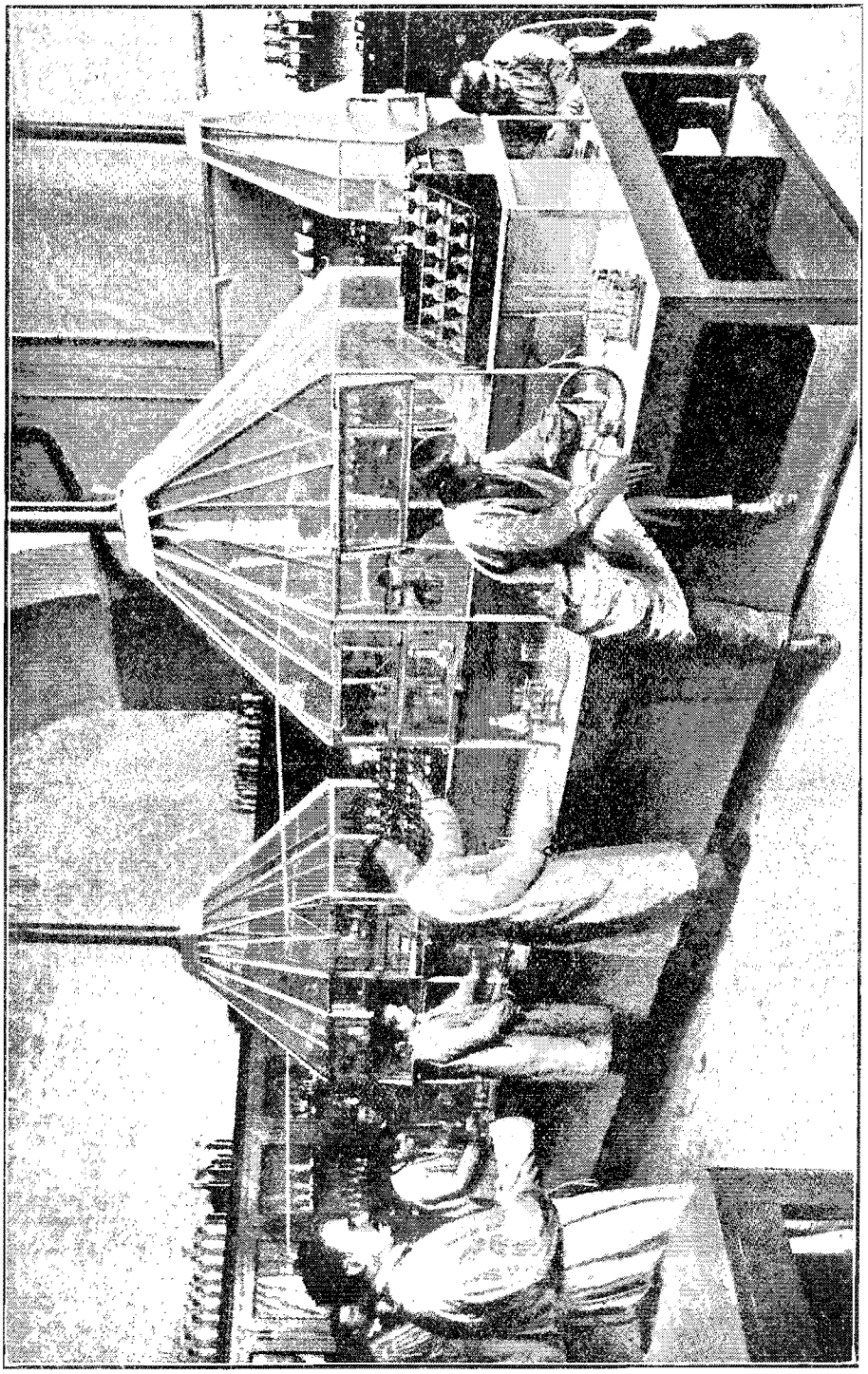
FITTERS' WORKSHOP: VAUCANSON SCHOOL, GRENOBLE.



CARPENTERS' WORKSHOP: VAUCANSON SCHOOL.



SPECIMEN OF CABINETWORK BY STUDENTS OF VAUCANSON SCHOOL.



CHEMICAL LABORATORY: VAUCANSON SCHOOL, GRENOBLE.

accounting, bookkeeping, commercial office work, penmanship, typewriting, shorthand, two modern languages, (English, German or Italian, at choice), mathematics, physics, chemistry, merchandise, natural history and hygiene, and ornamental drawing.

Certificate of commercial studies is awarded on completion of course.

The Chemistry Section.

In the Electrical and Industrial Chemistry section the instruction comprises:—(1) a course on all matters concerning the industrial production and utilization of electric energy; (2) practical work in the laboratory and workshop with reference to the ordinary electric measures, and including the handling and laying of electric current apparatus; (3) exercises in preparing plans and estimates of electric installations of all kinds; (4) visits to factories and electric installations; (5) exercises in machine management; (6) chemical manipulations and analyses. This section prepares students for the Electrotechnic Institute of Grenoble and for the Higher School of Electricity at Paris.

The Association of ex-pupils, in conjunction with the Council of Improvement, helps to find positions for pupils, and also grants scholarships to the school. The State, the Department and the City also maintain numerous scholarships. A committee of patronage grants redeemable subsidies to the best students on the completion of their studies to enable them to remain one year abroad.

Fees: with board, 580 francs; half board 290 francs.

GLOVE-MAKING SECTION.

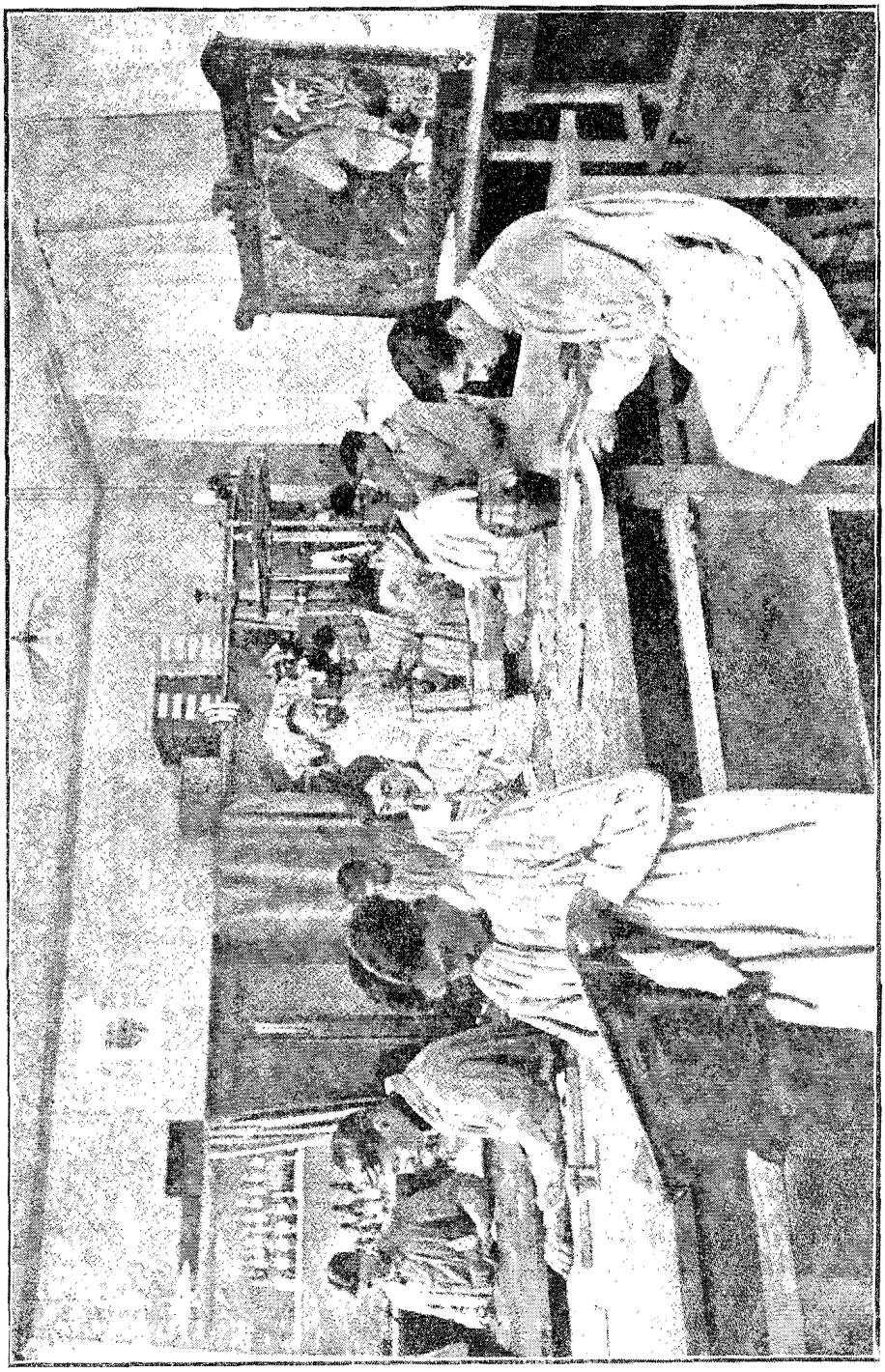
In 1910 the Syndical Board of Glove Manufacturers of Grenoble, distressed by the stationary condition of the glove industry, established a glove-making school, with the object of increasing the value of the product by raising the intellectual and practical standard of the agents of production.

The aim of this school is to discover practical means of training workers for the glove-making industry and allied trades, qualified by their general education, for the management of factories; competent to become salesmen or travellers by the development of their commercial talents; and by their knowledge of the details of their trade to be utilized in the technical part of manufacturing.

In order to accomplish this triple object the instruction must bear on general commercial and technical subjects.

The school is a manufactory which buys and sells, possessing the permanency of method of any commercial organization, and not treated merely as an accessory. From this results the circumstance that the school is in competition with the manufacturers who supply it with its necessary working funds.

This section is managed by a technical and administrative committee, composed of the mayor or his delegate; president, departmental inspector of technical commercial instruction; director of the school; president or one delegate



GLOVE-MAKING SECTION: VAUCANSON SCHOOL, GRENOBLE.

of the Syndical Board of Glove Manufacturers; one glove manufacturer and one glove workman nominated by the Prefect; and one glove manufacturer and one glove workman nominated by the Mayor.

The Course and Time Table.

The certificate of primary studies is necessary to enter the Vaucanson school. During the preparatory year, the first year, and the first quarter of the second year, the future pupils of the glove-making section must take the courses common to all young men who are aiming at commercial professions.

The course is four years, from 12 to 16 years of age, graded thus:—(1) *Preparatory year*,—predominance of general instruction; modern languages an important feature. (2) *First year*,—predominance of commercial instruction; considerable time left for general instruction. (3) *Second year*,—commercial instruction and practical technical instruction. (4) *Third year*,—predominance of practical exercises; continuation of commercial instruction.

The following is a time-table per week for each year:

General Instruction.	Preparatory year	1st Year	2nd Year 1st quarter	2nd and 3rd quarter	3rd Year
	hrs.	hrs.	hrs.	hrs.	
French	7	6	4½	1½	
History	1½	1	1	—	
Geography	1½	—	—	—	
Arithmetic	4½	—	—	—	
Geometry	1½	1	1	—	
Sciences	3	2	2	—	
Drawing	4½	1½	1½	—	
Writing	1	—	—	—	
Commercial Instruction.					
1st Language (English or German)	6	6	6	6	6
2nd " " "	3	3	3	3	3
Commercial Arithmetic	—	3	3	3	1½
Commercial Geography	—	1½	3	3	—
Merchandise	—	1½	—	—	—
Commerce and Accounting	—	6	6	3	3
Caligraphy	—	1	1	—	—
Stenography and Typewriting	—	2	2	2	—
Technical Instruction.					
Technology and Chemical Manipulations / Practical Exercises	—	—	—	20	30
Studies	14½	14	12½	8	6
Total hours	48	49½	49½	49½	49½

SECTION 2: HIGHER PRIMARY COMMERCIAL AND INDUSTRIAL SCHOOL FOR BOYS, NANCY.

This school at 64 Grande rue, founded by the City in 1835, has 430 pupils. It furnishes higher and vocational primary instruction to young persons who are going to be apprentices or follow administrative, industrial, or commercial pursuits; or who are preparing for government schools, for which a knowledge of the ancient languages is not necessary. Nearly all the pupils belong to the laboring classes, who know how to appreciate the advantages of supplementary instruction, and deny themselves for the sake of educating their children.

Pupils are taken at about the age of 13. Nearly all have first been through the Primary School, and having obtained their certificate of studies, have taken a higher course of one year in their first school, from which they received a special diploma.

The course comprises 4 years. There is first general teaching, which has for its object to prepare young men for social life.

The first year consists of four parallel classes comprising general instruction as follows:—morals; French language; lectures on fine literary works; history and geography; civic instruction and elements of social economy; applied arithmetic; algebra and geometry; rapid calculation; physics and natural sciences; hygiene; geometrical drawing and art drawing; singing and gymnastics. A few hours only are given to trade teaching, modelling, manual training and accounting.

Differentiation of Courses.

From the second year the program differentiates according to sections, and becomes more preparatory for future trades.

1. *Sections* of *general instruction*, which take candidates for secondary studies, Normal Schools and various offices (post-office, railway, army, etc.), develop and complete the general program of the first year.

2. *Commercial Sections*, where the future employees of commerce are grouped together, add to the general program a more complete study of German and English, commercial geography, correspondence, accounting, book-keeping, stenography, typewriting, elements of commercial and industrial law, and a course in political economy.

3. *Industrial sections*, subdivided into two groups, accept: (1) future apprentices first in the school and then in the workshops; and (2) those young men who wish to continue their studies in secondary or superior technical schools (arts and trade, master miners, electro-technical institutes, mechanical, chemical, dental, etc.) or even others, who are preparing themselves for professions where mathematics and drawing are especially needed (bridges and roadways, draughtsmen in railway offices, etc.) In the industrial sections the principal subjects are mathematics, mechanics, industrial electricity, drawing, technology, industrial chemistry and manual work.

The large workshops with electric plants and machine tools permit of great development in industrial education.

The budget of the schools in 1909 was 75,160 francs, of which about 43,000 came from the State and 36,000 from the City.

PART-TIME SCHOOL: The school has a course for improvement (part-time school) of two sections, industrial and commercial, organized for apprentices and employees of commerce and industry. The industrial classes are more particularly attended by superintendents, workmen and designers from mechanical and electrical industries.

The courses are three years in both sections. They are open all the year round, three mornings a week, November to July, from 6.30 to 7.45 a.m. Time is taken partly from the working day, which is supposed to begin at 7 a. m.

In the part-time school there are 158 students—75 in the industrial course and 85 in the commercial. It is partly supported by donations from industrial houses, banking establishments and large stores in the City. The total amount in 1909-10 from these sources was 4,700 francs, the expenses being 4,000 francs.

SECTION 3: EASTERN VOCATIONAL SCHOOL FOR BOYS, NANCY,

This is a very important free (private) school, at 29 rue des Jardinières, with an attendance of about 450 pupils, whom it prepares for all callings that do not entail the study of the classic languages. There are primary classes and a vocational school proper. The lower primary course is under the care of a female teacher.

The qualifications for admission are,—age 13, and the possession of the certificate of the primary studies, or an equivalent preparation as revealed by an entrance examination.

The vocational course is ordinarily 4 years, but there is a 5th for pupils who wish to complete their technical education and take the courses of the Electro-technic Institute and of the Chemical Institute of the faculty of sciences.

Besides general instruction the pupils learn forging, fitting of iron, modelling, and foundry and electrical molding. They are trained to operate machine tools, steam engines, and the dynamo-electrical engines which light the school. A cupola and a bronze furnace have been installed in the establishment. Five dynamos of from 25 to 50 ampères, and also a battery of accumulators operate in the workshops. The work done in the shops is partly intended for manufacturing.

A distinct class is devoted to preparation for the Schools of Arts and Trades.

MECHANICAL, COMMERCIAL AND OTHER SECTIONS.

1. *A 2 years' Course for Mechanics* is designed to train quartermasters, pupil-mechanics for the crews of the fleet, machinists and fitters for private industries. It is intended especially for young persons who are unable or do not wish to enter the Schools of Arts and Trades.

2. *In the Commercial Section* the course is 2 years, and the program is the same as the 1st year of the Higher Commercial Schools. This school of commerce comprises real commercial counting-houses where pupils learn accounting.

The section is subsidized by the Department of Commerce, and has courses in accounts current, commercial correspondence, technology, industrial accounting, exchange and arbitration, and finance. Diplomas are granted at the end of the course for the Higher Commercial School at Nancy.

3. *In the Electrical Section* there are courses in applied mechanics and resistance of materials, machine tools, boilers, industrial physics, and industrial accounting; and pupils take the course in industrial electricity of the University with practical work.

4. *In the Section of Spinning and Weaving* the Course comprises applied mechanics and resistance of materials; industrial electricity (University Course); machine tools; boilers; industrial physics; practical work in spinning and weaving, adjusting and mechanics, industrial drawing and sketching; a course in dyeing and dressing (that of the Chemical Institute); course in decorative composition applied to the textile industry.

Expenses, Scholarships, Etc.

Board is 800 francs for pupils of the 5th year; 700 for 4th year, and for 2nd year of commercial section; 620 for pupils in other classes; half board 350 francs. Washing costs 35 francs. Day school annual fee is 80, 100, 120, 150, 180, or 200 francs according to the class; for Supervised Day-School 30 francs additional.

Annual fees for working in the shops, 30 francs; for chemical manipulations 50 francs. The manipulations and workshop are optional for the four first years. Special terms are made for teachers' sons.

The Eastern Railway Company gives 15 scholarships for sons of employees; 4 are given by the Department, and from 20 to 30 by the State. Subsidies to pupils have been contributed by various societies of Alsace-Lorraine and by the Association of former pupils.

SECTION 4: PRACTICAL INDUSTRIAL SCHOOL FOR BOYS, ST. ETIENNE.

This is a well organized day school, well equipped with tools. During the last 5 years it attained its maximum number of pupils, 460. The following trades are taught:— Adjusting, industrial electricity, gunsmithery, forging, joinery and patternmaking, weaving and textile fibres, modelling and sculpture.

The qualifications for admission are,—age 13, and the possession of the certificate of primary studies, or an equivalent preparation as revealed by an entrance examination.

The course of studies occupies 4 years, a considerable portion of this time being spent in the drawing room. All pupils work from sketches or drawings executed by themselves. In the third year they make out estimates of their principal work.

In the preparatory year pupils attend all the workshops, and specialize from the beginning of the first year.

The machinists go in turn to the forge workshop to learn how to forge their own tools, and also do a little molding with the pupil modellers.

In the third year the pupils take a course in industrial electricity.

Those in the Mechanical Section who wish to follow the trade of electrician take a fourth year of studies devoted exclusively to electricity following a special elementary but sufficiently complete course, and construct various kinds of apparatus and machines in the workshops after having first drawn the plans from data furnished by the professor. They are also trained in the laboratory in the measurement of electrical quantities, and in the mounting and management of the commonest forms of apparatus, and also make many machine tests.

Pupils in the Weaving Section receive special lessons in accounting, legislation and commercial geography, and also study one modern language.

Preparation is given for the School of Arts and Trades.

Since 1900 the Syndical Board of the St. Etienne gun manufacturers has granted, to each third year pupil in the gunsmithery division, a prize varying from 50 to 100 francs at the end of the school year, as an encouragement.

SECTION 5: PRACTICAL COMMERCIAL AND INDUSTRIAL SCHOOL FOR GIRLS, ST. ETIENNE.

Girls holding primary education certificate enter here at the age of 12, otherwise at 13, when they must pass the entrance examination. Besides general education in the two divisions the programs comprise:—

Commercial Division:—accounting and book-keeping, commercial correspondence and writing, merchandise, commercial geography, legislation, political economy, English, shorthand, typewriting.

Industrial Division:—technical and practical instruction in manual work. Workshop pupils devote the first year to the study of sewing proper and are not specialized. They are trained to assist in all practical ways, for they know how to sew thoroughly well. They specialize in the second year, choosing (1) cutting, assembling, and making up women's clothing; (2) millinery; (3) the care of linen; (4) embroidery, white and for furniture; (5) ironing, starching and cloth cleaning.

There are 400 pupils, about 200 in each section, with 12 workshop instructresses, and 13 professors for other branches.

The course is generally three years, but when girls are rather young they may stay another year. On leaving they are likely to go into workshops and businesses. Young girls from the commercial section are very easily placed as assistant book-keepers or stenographers and typists. They spend 8 hours daily in class.

Course in Industrial Drawing.

All pupils take a course in industrial drawing adapted to their chosen specialty, having in public schools learned the rudiments of drawing and designing.

There is a general competition in drawing amongst girls from all the schools in France, under the direction of the Minister of Commerce and Industry, and all the drawings are sent to Paris, where special mention is given to those that are good.

Drawing begins with straight lines, curves and angles, then passes on to composition and drawing from natural objects; geometric composition, rectangular, circular, loops and straight lines. The work is original; nothing is copied. Pupils do perspective, object drawing, and geometrical lines from nature. As crayon work is quicker than brush, always uniform, and utilizes very pretty colours, crayons are used.

In the second year there is a course in designing, which does not include clay modelling, as it is not thought practical. There is also composition and execution of embroidery, eyelet work, and braiding.

In the third year they specialise in actual flowers and composition from flowers, flowers conventionalised into elaborate designs; application to furniture, tapestries; Egyptian, Greek, and other styles of decoration; application to garments; designs on dresses made to scale; study of anemone and application to collars of ladies' dresses.

In the fourth year they study the history of costume,—Egyptian, Greek and Roman—and its development during various centuries, with illustrations. Students have to originate every part of the design the subject being a tailored serge suit.

Laundry and Sewing.

In the laundry the girls are taught washing and ironing as part of their home education, bringing articles from home, the work being done by groups of six.

Sewing in the first year comprises elementary exercises in coloured thread; straight and curved lines; then the application of the various stitches in the elementary lesson in composition. They mix colours according to their own taste, and when wrong are criticised and told what colours would match.

Shop Work, Exhibitions, etc.

In the first year they go to the shops, so as to be able to select when they want to specialise. For instance, those who specialise in embroidery have 25 hours of shop work in both the second and third years; in the first year only 22 hours.

All the compositions are made by the students themselves, and the articles are made from their own drawing. The teacher confers with the professor of drawing, so that what they do in the drawing class is executed in the workshop. After the year is over they exhibit their work, which is sold to the public, the proceeds being distributed among the pupils.

We saw fine special embroidery made with narrow crimped ribbon manufactured at the silk works in the town. There are preparatory exercises for this kind of embroidery, which produces beautiful effects in raised work by rolling the narrow ribbon.

Extension Work.

The school has an outline of the course for the dressmaking and hat-trimming sections, as furnished to all the schools in France under the direction of the Minister of Commerce and Industry. This outline is sent to the professors, and the pupils have to work from sealed orders.

The third year students prepare their competition articles to be judged for the certificate. The subject of composition is given by a furnisher of St. Etienne, a member of the committee. The subject is worked out in thin cheap gauze, and the finished work in serge. The dresses are given to the girls when they leave school.

The Commercial Department conducts correspondence with various towns in France, England, Ireland and Holland through business houses conducted by students of other schools, the transactions involving trial balances, balance sheets, etc.

The correspondence is in longhand and typewriting; copies of all letters are kept on file; cheques and postal orders are issued, etc. Four of the girls go to England to stay for a year and return to situations.

SECTION 6: LA MARTINIÈRE SCHOOL FOR BOYS, LYONS.

This school, at 9 rue des Augustins, was founded through a legacy left by Major-General Martin, who was born at Lyons in 1735 and died at Lucknow, British India, in 1800. The legacy, originally 700,000 francs, remained untouched until 1826, when the capitalized interest had reached 1,700,000 francs. Later on 515,000 francs were realized. Including the boys' and girls' schools, La Martinière has an estate and collections valued at from 1,200,000 francs to 1,500,000 francs, and an income of about 280,000 francs.

The school, opened in 1826, has been installed since 1833 in its present quarters, a former monastery of the Augustin Friars. It was organised by Mr. Tabareau, a former pupil of the Polytechnic School, aided afterwards by Mr. Dupasquier, a professor of drawing, who invented for this school special methods of teaching. These were the cause of its prosperity, and still constitute its originality.

It is administered under the authority and oversight of the Prefect by a free (private) commission whose members are nominated by the municipal council and definitely appointed by the Minister of Commerce.

La Martinière is a vocational school devoted to the study of the sciences and arts applied to industry and commerce. Whilst specialising pupils during the latter years of their studies, it aims especially to fit them to succeed in any

profession, and to confer on them the advantages of a developed intellect, habits of scientific reasoning, a comparatively wide education, and particularly enthusiasm for their work. This latter quality and the abolition of the "foot of the class" are the result of the special methods of teaching here, especially of Mr. Tabareau's method, of which the Commission witnessed an exhibition.

Courses of Studies.

The school is free, and receives only day-scholars at least 13 years of age. The entrance examinations comprise:—*Mathematics*: enumeration, the four rules applied to whole numbers, to decimal fractions, and to ordinary fractions, the metric system, problems. *Grammar*: dictation chosen from a good author, which serves also to test the writing and orthography of the pupils. *History and Geography of France.*

La Martinière has 600 pupils. Every year it receives about 300 aged 13 from the Primary School. There is also a preparatory year for pupils who enter at 12 years of age. The duration of the course is 3 years after preparatory year.

The Preparatory year:—Reading with explanation, grammar, history and geography, writing, arithmetic, mathematics, drawing and manual work.

First year:—The instruction is general, comprising grammar, history and geography, writing, mathematics, physics, chemistry, drawing, manual work.

Second year:—French, history and geography, writing, mathematics, land-surveying, accounting, physics, chemistry, and drawing. English and weaving for the commercial section; and workshops for the section on civil engineering.

At the beginning of the second year the pupils choose the section to which they wish to belong, and are slightly specialised in preparation for the third year, when they are divided into two distinct sections (1) on commerce and weaving, (2) on civil engineering and electricity.

Third year (commerce and weaving):—French and commercial correspondence, accounting, office work, penmanship, weaving, English, commercial geography, the study of merchandise, chemistry, commercial legislation, and political economy.

Third year (civil engineering and electricity):—pure mathematics, descriptive geometry, industrial mechanics, civil construction, electricity, manipulations of electricity, machine design, design of civil constructions, chemistry, industrial legislation, manual workshops, visits to workshops.

Badge of "Corporal," Diplomas, etc.

After the general closing, the badges and functions of "Corporal" are bestowed on the first pupils of each section. At the end of the third year of studies diplomas of the 1st and 2nd class are awarded to those pupils who have obtained sufficient marks, from 50 to 60 diplomas being granted every year.

The final examinations are conducted by boards of examiners composed of persons not connected with the school—merchants, industrial employers, artists, and professors chosen from amongst the most competent persons in each specialty. The 1st class diploma in the section on civil engineering assists its possessor to enter the competition of the National Schools of Arts and Trades.

Pupils on leaving La Martinière generally obtain situations in business or at industrial work. There are always more positions offered by the employers on the school board than there are available pupils.

The heads of nearly all the large dyeing establishments at Lyons are former pupils of La Martinière, as are also a considerable portion of the large mechanical builders, and a great number of employers in business houses, in the silk trade or elsewhere.

For the last 80 years the school has rendered signal services to the commerce and industries of the south-eastern part of France.

SECTION 7: LA MARTINIÈRE SCHOOL FOR GIRLS, LYONS.

This school, at 20 rue Royale, founded in 1879, is under the same administration and management as the school for boys. It is governed directly by a sub-directress; is free, and receives only day-scholars at 12 years of age, on leaving the Primary School It is a vocational school, intended to train girls of the working classes at Lyons, giving them at the same time a manual trade. The instruction is composed of one part theory, for all pupils, and each one must be apprenticed to a trade chosen by her parents from amongst those taught at the school.

For apprenticeship the pupils of the same division are divided into as many sections as there are different trades taught at the school. The trades taught are:—commerce, industrial drawing, placing of cards for silk manufacture, embroidery, sewing (gowns and ready-made clothes), stenography and typewriting. The manual workshops, where the apprenticeship is carried out, are organized industrially. All pupils, whichever trade they choose, learn sewing and ironing.

The ordinary course of general studies and apprenticeship is 3 years, but pupils who have completed 3 regular years of studies are admitted to the school workshops to perfect their apprenticeship, and under the direction of the professors execute work which has been ordered by private business houses; such pupils receive the entire pay for such work.

Diplomas are awarded to the best pupils in the various sections of apprenticeship after 3 years of study.

Satisfactory pupils are placed in positions as far as possible, through the school, and find positions very readily.

SECTION 8: COURSES FOR APPRENTICES AND ADULTS.

How Courses may be Established.

It is not considered right that youths should receive no intellectual training between their leaving school at about 12 years of age and entrance into the army. It was suggested that popular instruction in the form of courses might with advantage in many cases be replaced by instruction in the form of lectures, which are more vivid and are rendered more interesting accompanied by lantern views; hence the State by the edict of January 11, 1895, endeavoured to revive learning among adults by encouraging, through subsidies, the formation of courses and lectures. This edict provides,—

(1) That courses may be established by the Prefect at the request of the Municipal Council and on the advice of the Inspector of the Academy;

(2) That in classes for adults or apprentices the instruction may bear on the subjects of elementary and higher education as established by the rules and regulations, or may comprise theoretical and practical courses specially adapted to local needs;

(3) That adult courses may comprise classes for the illiterate, special courses for young persons who wish to complete their education, and lectures and readings for all;

(4) That two or more distinct sections may be established, according to the age and degree of education of the pupils;

(5) That no public schoolmaster can be compelled to conduct a class for adults;

(6) That the courses and lectures may be entrusted to any person who desires on the proposal of the Mayor, approved by the Prefect, and on the advice of the Inspector of the Academy;

(7) That the program of such courses and lectures be submitted to said inspector when the request is made;

(8) That the commune assume the expenses of heating and lighting;

(9) That the State subsidy, granted on the proposal of the Prefect, shall not exceed one half of the cost which these courses entail;

(10) That not only State subsidies, but grants of books and educational apparatus, may be allowed to educational associations established to organize such courses for adults;

(11) That when the commune assumes the expenses of the course, the terms of remuneration be arranged by agreement between the commune and the Director of the course.

Campaign of Agitation.

Since 1895 popular opinion in favor of undertakings intended to assure the future of public education had produced a salutary agitation throughout the country. Several educational congresses took up the question, that at Havre being particularly impressive, both from the number of delegates and the fulness of the

debates. Its Secretary was Mr. Edouard Petit, a man of action, who always fought stubbornly for the education of youth, for which he laid the foundation in a successful pamphlet entitled "From the School to the Regiment". When he became Inspector-General of Public Instruction he continued his propaganda in favour of post-academic work, the inspection of which had been given into his charge. Every year he travels all over France arousing the apathetic, awakening enthusiasm, and communicating to all some of the fine flame which animates him in favor of public education.

THE INSPECTOR-GENERAL'S REPORT.

In his report on public education in 1907–8 Mr. Petit shows that the work is progressing but that, as in the day-school, the evening school is worth only what the teacher is worth, and that attendance is secured only if useful and interesting lessons are given. He notes the following developments among others:—

(1) The establishment, through the initiative of the Prefect, of elementary courses for the illiterate in the Canton of Rochechouart held in 7 isolated farms during 5 months, attended by 200 male and female peasants from 14 to 50 years of age;

(2) Multiplication of courses for illiterate soldiers;

(3) Increasing success of public reading;

(4) Development of good fellowship;

(5) Ever increasing activity of Associations of former pupils who have found their bearings—those for boys towards preparatory military education and rifle shooting; those for girls towards household education;

(6) Increase in the number of friendly associations for young girls.

Mr. Petit notes that the courses for adults are still growing. Since 1894–5, the period when they began to rise from their long term of decadence, their number has rapidly increased. From the original, 8,288 courses they reached the figure of 48,565 in 1907–8—30,271 being for boys and 18,294 for girls. The above refers only to public courses given by male and female teachers; but to make it complete there must be added about 6,000 courses given by the great educational societies, boards of trade, committees of employers and workmen, etc. In large cities the courses for adults are numerous, but they appeal less to the illiterate than to those who need supplementary and especially vocational education.

Mr. Petit lays particular stress upon the subject of school attendance. He would like to see the curriculum extended to the 15th year as in Switzerland, and also to have continuation instruction made compulsory.

He argues, from the crisis through which apprenticeship is passing, that the school must be the necessary complement of the workshop, and that it is a matter of urgency to impose upon the heads of business enterprises the legal obligation of sending their apprentices to attend the supplementary classes.

CHAPTER XXXIII: THE VOCATIONAL SCHOOLS OF PARIS.

SECTION 1: INTRODUCTORY.*

The Vocational Schools in Paris are a part of that complex and comprehensive organism, the French educational system, which directs or influences every grade of instruction and every kind of educational agency from the primary school to the University, and from the free lecture to the Prix-de-Rome. Their origin may be traced to conditions in the social and industrial life of the French people.

The characteristic feature of the trade-organizations under the old regime of the eighteenth century was the Corporation. It comprised (1) masters or master-workmen, who could open a shop, or work on their own account, (2) journeymen, and (3) apprentices. The latter were compelled to pass a most laborious novitiate of four or five years, but at the end of it they possessed all the secrets of the trade. The master was allowed but one apprentice at a time, to whom he was bound by obligations from which he could not free himself, and which, as a rule, he was anxious to fulfil.

At the head of each Corporation was a Board of Control, composed of four or six members selected from among the masters, which exercised a very strict and often despotic supervision over everything pertaining to the Corporation. Such an organization had its defects. The initiative of the artisan was paralyzed by a set of regulations that extended to the minutest details of his work. Moreover, not every one who wished was allowed to work. Work itself was a privilege. But on the other hand, the Corporation maintained a high standard in the craft. Before being able to obtain the right and title of a journeyman, the apprentice had to prove that he was fully acquainted with every detail of his profession.

In 1776 Turgot, a minister fond of reforms, suppressed the Wardenships of Boards of Control, and the charters of the Corporations, and proclaimed absolute freedom of work. The Corporations reappeared after his day, but only for a short time, for the National Constituent Assembly put Turgot's decree again in force. The law of 1791 read:

> From the first of April next, every citizen shall be at liberty to take up any profession, art or trade that he likes. He merely has to secure a license and comply with the regulations.

Equal Rights for All.

This law substituted equal rights for all in place of privilege for the few, but it dealt a blow to craftsmanship, from which it has never recovered. There

*Condensed from Henry Turner Bailey, Editor "School Arts Magazine", Boston, supplemented by the observations of the Commission.

were many who foresaw the consequences of the law and raised their voices in protest. Even Marat, in his newspaper "The Friend of the People" passionately defended the Corporations.

At various times under the Consulate, the Empire and the Restoration there was something like a reaction in favor of the Corporations, but all movements towards re-establishment were unsuccessful. Turgot's doctrine prevailed.

A return to the medieval system would be impossible to-day, although many thoughtful Frenchmen still regret the passing of the Corporations. An impartial student of the history of French craftsmanship must admit that from the time of the Revolution there was a steady decline in the industries of France. French products no longer held undisputed supremacy. Manufacturers had to reckon with foreign competition. Rival industries beyond the borders of France began to encroach upon home industries. It became necessary to produce a great deal, quickly and cheaply, lest the markets should be closed to the products of French industry. This ushered in the division of labour to an extreme degree. The workman became a specialist. He knew but a small part of his trade. Of every process but one he was ignorant. His hand, instinctively and with a purely mechanical effort, made always one and the same detail. Ingenuity was not required, invention was at a discount, research was dead. While this unfortunate condition may have resulted in part from general economic causes, many of the keenest French thinkers attributed it to the decay of the apprenticeship system.

Better Training Demanded.

From all quarters an irresistible movement of opinion began to assert itself in favour of better training for craftmanship. In Paris a society was formed to establish apprenticeships in the manufacture of opera glasses, and another society attempted to improve the manufacture of wall paper. Wealthy individuals established private vocational schools, and others gave scholarships in them. Every thoughtful patriot felt that something must be done to rehabilitate French industries.

Meanwhile the City Government awakened to the need of discovering something to fill the educational void left by the disappearance of the Corporations. Its first expedient, in 1845, was the bank-book plan, providing for free instruction in certain approved private institutions. This plan proved to be unsatisfactory and in 1855 it was abolished and a system of scholarships was substituted, but this plan proved hardly more satisfactory than the first.

As a further encouragement to better vocational training, the City of Paris founded evening classes devoted especially to drawing.

But all these were mere palliatives. The remedy was still to be found. After the fall of the Empire, the question of vocational instruction in Paris was one of the first considered by the newly elected Municipal Assembly.

A Bill prepared by M. Greard, Director of Primary Instruction, was laid before this Municipal Assembly in 1872, calling for the creation of a school of apprentices in the iron and woodworking trades. M. Greard claimed that the

placing of the child with manufacturers upon his leaving the primary schools—a placing made hurriedly, without discrimination, and merely with a view toward immdeiate wage-earning—was disastrous in its outcome. He described the life at the workshop; the distrust of the workman who sees in the apprentice of today the workman who will crowd him out tomorrow; the indifference of the foreman whose mind is absorbed in affairs of his own. He called it an intermittent apprenticeship without guidance or method, limited to acquiring a knowledge of some fragment of a profession or trade. He described vividly the errands out-of-doors forced upon the young boy, the dangers of the street, and those not less formidable of the shop, and concludes with these words:

Need for Vocational Schools.

Thus, from whatever point of view the general conditions of an apprenticeship in Paris are considered, it does not meet the needs of the child. Want of foresight on the part of the boy's parents, indifference on the part of the patrons or masters, impotence of the law, everything, seems to conspire against the apprentice. Even the development of commercial competition and the progress of industrial mechanics turn out to be to his detriment. Every one agrees that generally the shop, that ought to serve to develop all the forces of the child, wears out his body before nature has finished the making of it, puts his mind to sleep just as the school had begun to awaken it, stains his imagination, corrupts his heart, and poisons whatever spirit of craftsmanship or love of his trade he may have had. This deplorable school in individual morals dwarfs the man in the apprentice, the citizen in the workman, and does not even produce a good mechanic.

This is an authoritative statement as to the character of apprenticeship in Paris, before the establishment of the Vocational Schools.

A vote was secured to establish, as an experiment and possibly as a type, a school of apprenticeship for the iron-working and wood-working trades. "This act," says M. Lavergne, 'was of the utmost importance; it meant a new standpoint, a new starting-point for professional instruction in the municipality of Paris. It was a step into the unknown, the unexplored. It was a venture involving some risk." The future of French industries would be determined by the outcome.

Primarily Trade Schools.

As soon as the project had been agreed upon, work was commenced. The result was the establishment of the famous Diderot School, the object of which was the training of well-instructed and skilful workmen, capable of earning their living on leaving the school. Thus began the era of municipal activity in regard to technical instruction, which spread to Lyons and many other cities.

The Professional (Vocational) School is therefore primarily a trade school, a school designed as a substitute for the old apprenticeship system. Since 1880 various sorts of these schools after the plan of the Diderot School have been established by the city of Paris. These now number 15—7 for boys and 8 for girls.

Management.

Each of the Professional (Vocational) Schools is supervised by a Committee of Inspection nominated by the municipal council. It is composed of members of that assembly, manufacturers, merchants of recognized professional ability, a representative of the Ministry of Commerce, and a representative of the Ministry of Instruction.

The powers of the Committee are not inexorably fixed by law. Their duties are primarily administrative and financial, but inevitably they become advisory as well, for upon each Committee are men who are able to give valuable advice on technical matters. Each has therefore all the liberty possible. Its power extends even to the modifying of school programs in accordance with new needs, or the fluctuations of taste and fashion. It prepares the annual budget, audits the accounts, and in short has charge of everything pertaining to the organization and management of the school.

But the Administration does not divest itself of all powers of control. It sometimes moderates the enthusiasm of the Committee, asserts its authority if rules are ignored or broken, and calls the Committee to account if expenses exceed appropriations.

The Committee of Inspection, by virtue of the very manner in which it is made up, is worthy of all confidence. In its zeal for the success of its school it may try to push ahead too rapidly, but its boldness is a corrective of the tendencies of the Administration towards conservatism and procrastination. The combined action of the two results in bringing about a healthy normal growth in every vocational school in the city.

Each school is organized with Officers of Administration and a Staff of Instructors.

In the schools for boys, the Officers of Administration are a director, a general superintendent, supervisors in varying numbers, and an accountant. In the schools for girls, the Officers of Administration are a lady director, who must be present at every session of the school, and an accountant.

Two Groups of Instructors.

The Staff of Instructors includes two groups: one giving general instruction, and another giving technical instruction. General instruction is entrusted to teachers of the standing of those employed in the Higher Elementary Schools of the city. But each school employs a specialist in literature and science.

The technical instruction is in the hands of thoroughly trained men and women of recognized ability, each in his own craft or trade, and holding a municipal certificate to teach, won through competitive examinations.

As a rule, the mornings are devoted largely to the general courses, and the afternoons to the technical courses, or the mornings to lectures, and the afternoons to studio work.

The walls of the rooms are hung with the most successful works of graduates of the school, as well as with photographs and casts of masterpieces. In some cases the walls and windows have permanent decorations made by the pupils.

Interesting Teaching Methods.

The methods of instruction are as direct and as thoroughly correlated as possible. In the History of Art, for example, the instructor while lecturing draws from memory upon the board the illustrations he requires, no matter how complex. The pupils take notes in pencil (which are afterwards corrected and

copied in ink) and copy his drawings as he makes them. The board is of gro und glass, in some cases, and of a middle grey colour. Upon this the instructor draws first in outline, indicating the geometric and perspective construction; upon these constructional lines he completes the drawing, using white chalk in the lights, charcoal in the darks, and coloured chalk wherever it will help to delineate the original object. The pupils have notebooks with leaves of grey paper upon which they work with black, white, and coloured pencils, following always the instructor step by step. The pupils thus receive instruction in the history of art, in the method of teaching, in the method of drawing, and have practice in drawing at the same time. The instructors are thoroughly trained masters, with the history of art, perspective, anatomy, costume, or whatever they teach, not only at their tongues' ends but at their fingers' ends. Their blackboard drawings are models.

The work required of the pupils may be characterized as disciplinary and practical. Drawing with the point precedes water colour; water colour on dry paper with the utmost precision of touch precedes water colour on moist paper with blended hues. Truthful perspective, correct proportions, detailed graphic description, faithful colouring—these are the requirements, these are the essentials. Originality, artistic effect, clever technique—these may come later if the pupil has genius. The applications are ever in the realm of the immediately useful. In an exhibit of the Bernard Palissy School there were original designs for program covers, book-plates, letter-paper stamps, hand mirrors, dressing tables and their furnishings, desks, inkstands, penholders, blotter-pads, cups and saucers, flower-pots, bowls, utensils for the fireplace, folding screens, etc. In the girls' school, Rue d'Abbeville, designs for fans, for the decoration of cups, saucers, plates, vases, for doilies, towels, embroideries of all sorts, cuffs, collars, silk things of many kinds, miniatures on ivory and glass.

Pupils' Work Judged by Experts.

Pupils are promoted from year to year upon the recommendation of teachers, and the attainment of excellence in work. At the end of the course, however, certificates are granted not upon the testimony of teachers, nor according to the judgment of any group of school officials, but according to the decision of a competent jury of professional people not connected with the school, engaged in business, artists, printers, potters, milliners, decorators, dressmakers, manufacturers, whose judgment is recognized everywhere as authoritative. For example, the successful pupil must produce a brooch acceptable to the best jewellers in the city, or a costume approved by the best modistes, in workmanship the equal of the goods sold in the best shops.

The City awards not only certificates and diplomas but prizes for excellence in results, and these prizes are often in the form of appropriate books, beautifully bound in red morocco, and stamped with the seal of the city and an inscription beginning with the valued words "From the City of Paris."

The maintenance of these 15 Vocational Schools costs the City of Paris annually over 1,750,000 francs, or $350,000.

SESSIONAL PAPER No. 191d

Mr. Lavergne's Answer to Critics.

Of course there are critics who doubt the real utility of these establishments built and maintained at such expense, and who declare that the results do not justify the outlay. M. Lavergne says:—

There is nothing in the present situation that would justify these fears or explain these discouragements.

The Estienne School, the School of Physics and Chemistry, the Schools of Drawing, Germain Pilon, and Bernard Palissy, the Diderot School, and the Boulle School are excellent nurseries from which a great number of artists, physicists, chemists and workmen come forth, capable of earning a livelihood immediately, well acquainted with all parts of their trade or craft. Having come in contact with the real and practical work of the shop, they are able in a short time to become themselves foremen and directors.

Among the pupils terminating their studies in this establishment every year, there are some who go elsewhere to complete their professional education; others enter the school of Fine Arts, where they are speedily classified among the best students. In 1898 the first and second great prizes offered by the Government were obtained by former students of the Estienne school, It is true these are instances of exceptional success obtained by choice students endowed with remarkable aptitudes, but they nevertheless bear witness to the great value of the instruction given in that establishment.

As to the pupils in physics and chemistry, they easily find positions properly remunerative in private industries. Some find employment as chemists to the Government, in the department of Railroads, or in the Custom House.

It is proper to add, that the situation shows everywhere a tendency to improve from year to year, as any one may discover for himself by reading the reports of the Committee of Inspection, accompanying their annual estimates for appropriations. The most confirmed of pessimists will find therein reasons for believing in the vitality and usefulness of the professional (vocational) schools for boys. There is just as much confidence in the future of the professional (vocational) schools for girls, although at first sight the results seem less favourable.

The proportion of young girls practising (after leaving the school) the trade in which they have been apprentices, is not very high. On the other hand, there are many girls whose situation is not known, or who go back to their families. Those who find a position in the workshops have in the beginning only a very moderate salary. But the facts are that well-trained girls after a short time have their salaries increased. Their work speedily becomes remunerative. Most pupils leave the school when they are 18 years old. At that age one is not supposed to have 'arrived." The statistics of the last year are (everything considered) rather satisfactory. Without doubt, in the professional schools for girls, as well as in those for boys, quite a number of students do not go to the end of their studies. They withdraw after their second year of apprenticeship, sometimes even after the first year. The reason for this state of things is complex. But usually the cause is the impossibility of the family making any farther sacrifice. The children must work. The city of Paris, it is true, maintains scholarships, but they are few in number, and the amount of each is small. In many cases the scholarships provide but an insufficient relief for the families. The scholarships ought to be increased in amount to meet the needs of young girls whose parents are in straitened circumstances.

Moreover, the girls at the end of their apprenticeship sometimes find difficulty in getting a position. They need advice and protection. The guardianship of the school must extend beyond the school. The Committee of Inspection, and the lady directors, do not lose sight of the young girls when they leave the school, but endeavour to make easy their first steps, and to assist them in every way possible.

But let us not fail to notice that if a certain number of pupils, after once finishing their apprenticeship, simply go back to their families, they nevertheless derive an advantage from what they learned during the three or four years spent in the vocational schools. They have acquired manual dexterity and taste. They know how to sew, embroider, make a dress, a hat, in fact they can do everything that is necessary in a well-to-do household.

We are convinced that the condition of our Parisian vocational schools (already good) will be but improved in the future. At all events the contingency of retrogression cannot be thought of.

Let us not touch what exists, except to amend or complete what needs to be amended or completed. Everywhere these schools are respected; they are appreciated by the common people. They are helping to solve the very grave question of adequate apprenticeship. They have had a strong influence in restoring to France her prestige in the artistic handicrafts.

SECTION 2: EXTENT OF THE PROVISIONS.

While the Paris Vocational Schools are nominally included in the State system of public instruction, they are in fact under the supervision and control of the Municipality, which jealously guards its independence. The schools are practically supported by the City, and so far from being subject to Ministerial regulations, furnish the model for national procedure.

In Paris a child enters the Infant School at about 3 years of age, and the Primary School at 6. Here begins a regular course of manual training, which in the case of boys is generally conducted in a school workshop, and in the case of girls comprises sewing and cutting of garments, milllinery and other feminine industries.

The city possesses 19 Primary Schools for boys which give supplementary general or commercial courses, 11 in which there are Supplementary Schools of vocational instruction (in iron and wood); 29 Primary Schools for girls with supplementary general courses; 16 for instruction in domestic economy and manual training; and 7 for commercial instruction.

The first Manual Training School in Paris was opened during the siege of Paris in 1872, to provide for the numerous children left without occupation, as well as for teachers who had to withdraw from the suburbs of the city. This school survived the siege, and under the advice of Mr. Salicis, then Inspector of Public Instruction, whose name it bears, it was taken over by the city as an experimental Manual Training School. It offers the most complete illustration of Manual Training in elementary grades, although this has now become a common feature of the elementary schools of the capital.

Higher Primary Schools.

As soon as the Certificate of Primary Studies is gained, at about 12 years of age (sometimes 11), the pupil is eligible for a Higher Primary School or a "Professional" (Vocational) School, or may leave school altogether.

Higher Primary education is represented by 5 important schools for boys and 2 for girls.

For Boys.

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

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

Pupils enter on an examination open to pupils of private as well as public schools. Candidates must have been within the following age limits on October

1 of the year of examination: 1st year, 12 to 15; 2nd year, 13 to 16; 3rd year, 14 to 17. There is no exception as to age limit. The ordinary course is 3 years; then the pupils must be examined for final certificate of Higher Primary studies.

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

The 3rd year class has two sections: commercial and industrial. In the latter, greater importance is attached to mathematics, physics, and drawing; in the former, to the applications of arithmetic and algebra to commercial and banking operations, modern languages, commercial geography, penmanship, accounting, stenography, and typewriting.

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

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

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

For Girls.

These schools are 2 in number: the Sophie-Germain school, which was opened in 1882; and the Edgar-Quinet school, which was opened in 1892.

The duration of the general studies is 3 years; but there is a 4th year, in which the pupils are prepared according to the object they have in view.

Candidates may compete for entrance, either in the 1st, the 2nd, or the 3rd year of studies. All that has been mentioned with reference to the competition for boys (enrolments, date and nature of tests, etc.), maintenance scholarships, and students from the suburbs, applies to the girls.

The instruction is free. Only day scholars are received. The pupils remain at school from 8.30 to 11.30 a.m., and from 1.30 to 4.30 p.m. They may bring their breakfast. At the Edgar-Quinet school there is a pupils' canteen where the pupils may procure, at reasonable rates, all or part of their meal. At the Sophie-Germain school the pupils may prepare their meal in the school kitchen.

Free optional supervised studies are held from 4.30 to 6 p.m.

Primary Technical Schools.

Admission to the Primary Technical Schools for boys and Technical and Domestic Schools for girls is by competition. Instruction, apprenticeship-material

and all other requirements for study or work are free to candidates who are French and actually live in Paris or in the Department of the Seine; but students from suburban communes cannot be admitted by rank obtained in competition unless their communes agree to reimburse Paris 200 francs for each pupil.

Pupils spend the whole day at school. Those who can pay are furnished the noon meal and luncheon for a trifling sum; others receive them free. The general council grants breakfast scholarships to poor suburban children.

Pupils who have completed the full course (3 or 4 years, according to the school) receive a certificate of apprenticeship; but none is granted to those who leave school before the end of the apprenticeship. The most deserving pupils who have passed the final examinations may obtain prizes varying from 50 to 300 francs.

FOR BOYS.

Among the 7 Technical Schools for Boys in Paris, in addition to the Ecole Diderot, is the Ecole Estienne (bookmaking) called after a family of printers and publishers dating back to the commencement of the 16th century, its object being "to create artistic workmen qualified not only to carry out the work of ordinary typographers but also that of allied arts". The 5 remaining Technical Schools for Boys in Paris belonging to the primary class are the Ecole Bernard Palissy—virtually a School of Fine Arts applied to Industry; the Germaine-Pilon School of Practical Drawing; Ecole Dorian, a municipal orphanage which gives extended training in iron and woodwork; the School of Physics and Chemistry; and the Ecole Boulle, distinguished for furniture and cabinet-making.

The courses in these schools cover 3 to 4 years.

FOR GIRLS.

The 8 Municipal Technical Schools for Girls in Paris are devoted to what are commonly recognized as trades for women, such as tailoring, millinery, flower making, fine lingerie, etc. Girls over 12 are admitted after examination. These schools originated in 1856 with a philanthropic lady, Elisa Lamonnier, who founded a Society which carried them on until 1907, when they were taken over by the municipality of Paris. They are now continued upon the lines originally marked out, but with regard to the later developments of the industries to which the training is directed, in all of which decorative drawing and design form an essential feature. The training is elaborate and thorough on the art side, and also in the manipulation of the material which enters into the final product, such as tapestries, lace, ivory, precious metals, leather, copper, ceramics, etc.

CHAPTER XXXIV: TYPICAL SCHOOLS IN PARIS.

SECTION 1: BOULLE SCHOOL.

This School, for instruction in the arts and sciences applied to furniture industries, at 57 rue de Reuilly, was founded in 1882. It is intended to train skilful and educated artisans, capable of maintaining the traditions of taste and the superiority of French industry. Here the pupils serve an apprenticeship, and at the same time receive higher primary instruction suitable to their chosen trade. There are about 300 students.

The furniture produced in this School is so good that the furniture manufacturers of France have been able to secure legislation prohibiting its sale.

The competitive entrance examination comprises:—dictation, two arithmetical problems, and drawing at sight from a plaster cast, special stress being laid upon drawing.

Furniture Making and Metal Work.

There are two divisions—furniture-making and metal-work; 102 pupils are admitted yearly—60 in furniture, 42 in metal work.

In the *Furniture Section* are taught cabinet work, furniture, art joinery, elementary marquetry, upholstery, trimming and cutting, wood and stone carving applicable to ornament, to flowers and to the face, seat joinery for fancy seats with imitation wood and for wall brackets.

In the *Metal Section* the subjects are carving applicable to art bronzes, goldsmithing, jewelry, ironmongery, etc., mounting in the same applications, engraving of dies and matrices, on plate, jewelry, etc. (except that used in book work).

Turning of metals, plaster, ivory, etc, moulding and repairing are taught in both sections.

The theoretical instruction comprises geometry, technology, industrial economy, history of art, art drawing, modelling, painting in water colours, industrial drawing (cutting, assembling, mounting, and estimates) and composition in its most varied applications.

Candidates from the Department of the Seine are given the preference, provided they reach the required standard at the examinations. Pupils from the Provinces pay $100 per year, and find their board and lodging. Lunch is furnished at school for 10 cents.

Candidates must be at least 13 and not over 16 on 1st October of year of enrollment; entrance examination is in June.

Work of Pupils.

Apprenticeship at the school lasts 4 years, and all pupils spend a certain time in each workshop connected with their calling. Pupils passing final apprenticeship examination receive diplomas, tool outfits being given as final prizes to those most successful. To supplement their studies, pupils visit museums, palaces, factories, etc., for information of an esthetic or industrial character.

The equipment includes a collection of busts, casts and models; a forge for tempering; lathes for turning brass ornaments, etc. In the large workshop at the time of the Commission's visit were tables, sideboards, buffets, etc., in process, including a large table with marble top and beautifully carved legs representing human figures made entirely by the pupils. Pupils specialize; one boy may make chairs and nothing else. This is necessary in these days, as the trade has come to such a fine point. Some boys in the woodwork department were making door mouldings, and frames to hold ornamental panels, to be exhibited for competition. Marquetry is studied in various woods, involving different grains and colours. There is a show-room for fine finished work by the pupils, and some fine ornamental work by 4th year boys was exhibited.

Pupils have to make drawings of all articles before starting them in the workshop. In repoussé and raised metal work they make the design and clay model, then a plaster cast. The foundry work is done outside. Some boys were building up a model in clay on a wooden picture frame, so as to save deep wood-carving; they would have cast made from this. A clock frame in brass, composed and executed by pupils, was shown. The City of Paris presented one of these to a Grand Duchess who visited the school, and she in return presented a Russian stove made of tiles.

Stone carving is done in several kinds of stone as ornaments for decoration. This is for apprentices, and complementary to wood-carving, for exercise in the different materials.

For engraving, jewelry, etc., steel dies are made with which to stamp out key-hole frames, etc.

The boys work in models from 1st to 4th year. Carving in brass is the same as in wood. A portrait of Voltaire was being carved; ornamental pieces; gouging of brass; brazing and soldering brass for ornaments, made out of sheet metal. In the designing room the 4th year boys were making large designs of furniture and tapestry.

Special Rooms and Features.

A special room was set aside for specimens of furniture made by the students in the "Art Nouveau" to contrast with conventional styles.

Pupils in the upholstery section were cutting out material, stuffing sofas, chairs, etc. Various designs are prepared on a movable frame, which is raised or lowered to show the artistic effect of the design.

Drawing is done in water colours to show effect of colour. Drapery is first studied by geometrical drawing, which is then imitated in the goods. There is a special professor for drapery.

There is a lecture room for physics, projections, etc., and a Library.

A special feature is the study of Louis XIV and XV furniture. The pupils had made furniture in Louis XV style for the Turin Exhibition, and this is put up in the entrance to the school. In the industrial drawing class, pupils were studying tapestries in projects for a salon in the style of Louis XIV, to show the style of that epoch—about 1516.

Goods made in the school are not generally sold, though in the 1st and 2nd year pupils sometimes sell to parents or others the pieces they make. As a rule these are presented to the city authorities, museums, etc., so that strangers may see them.

In the Woodworking Department there was a special class for *Chairs*. Photographs of work of great masters are shown to familiarize pupils with the best styles, the specialty of this school being style.

There are free public evening courses for adults, in which the subjects are:—Art drawing (drawing at sight, ornament, plants, the living model, decorative arrangements and industrial applications); modelling; technical drawing or study and sketching the construction of furniture, with estimates of materials and net cost; jewelry applied to manufacturing, etc.

There is a Sunday morning course from October to May in water-colour painting applied to various industries.

SECTION 2: DIDEROT SCHOOL (BOYS).

Arts of Metal and Wood Working.

This school, at 60 Boulevard de la Villette, is intended to train educated workmen skilled in the art of metal and wood working. It gives vocational instruction to apprentices for one of the following trades: forging, metal turning, adjusting, locksmithery, precise mechanics, modelling, cabinet making, joinery boiler making, plumbing and electricity.

Competitors for admission must be at least 13 years of age and not over 17; must have certificate of primary studies; certificate of birth, residence and health; and must prove that they are of French nationality.

The competition consists of dictation, 3 problems in arithmetic, a problem in plane geometry, a composition on a technical subject of the program of primary teaching, and a free-hand sketch.

At the competition of 1908, 560 candidates offered themselves for the 120 places available.

The course of instruction lasts 3 years.

Pupils remain at school from 7.45 a.m. to 6 p.m. from November 1 to February 28; and from 6.45 a.m. to 6 p.m. from March 1 to October 31.

During the two first years the day consists of 5½ hours in the workshop and 3 hours of class; and in the 3rd year, 6 or 7 hours in the workshop and 2 hours of class. The two kinds of exercises are divided by intervals of rest devoted to meals and recreation. Many breakfast scholarships are granted to deserving pupils.

Parents of the candidates received must furnish at their own expense a uniform school cap and working costume.

Pupils receive both vocational and theoretical instruction. Workshops for vocational instruction comprises: forge, metal lathe, adjusting, instruments of precision, electricity, modelling, boiler making, joinery, locksmithery and plumbing. Subjects of theoretical instruction are: French language, history, geography, accounting, mathematics, technology, mechanics, physics, electricity, industrial and art drawing.

A certificate of apprenticeship is given after examination to the pupils who have completed their third year. Prizes are awarded to the best students.

SECTION 3: ESTIENNE SCHOOL.

Printing and Bookmaking.

This School, at 18 Boulevard Auguste-Blanqui, is intended to train skilful workmen in book arts and industries.

Competitors for admission must be at least 13 years of age and not over 16, and must also have their certificates of studies. The competition in June comprises dictation, 2 problems in arithmetic (simple applications of the 4 rules for whole numbers, decimals, vulgar fractions, and the metric system), drawing at sight (simple ornament). From 70 to 80 pupils may be admitted every year by competition. The school also receives outside pupils at a fee ranging from $80 to $120, according to the year; $200 being charged for pupils of foreign nationality.

The duration of studies is 4 years.

The pupils enter school at 8.30 a.m. and leave at 6 p.m. They may either bring their breakfast or have their breakfast and luncheon served by the canteen for 10c. Breakfast scholarships are granted to needy pupils.

Theoretical instruction is given in the forenoon, and technical from 1 to 6 p.m.

During the first four months of the 1st year, pupils pass in succession through all the school workshops; they are then distributed through the workshops where they are to serve their apprenticeship, and at the end of their 4th year certificates of apprenticeship are given, besides premiums, in order of merit, to pupils who have passed all the tests of the final examinations.

The Theoretical Instruction comprises: French language, history and geography, elements of mathematics, physical and natural sciences applied to the book industry, history of art, modelling, drawing at sight, decorative composition and industrial drawing, writing, gymnastic and military exercises.

The Technical Instruction includes:—typography, 4 trades, viz. type founding, composition and correction, printing by hand and by machine, stereotyping and electrotyping; lithography, 4 trades, viz. lithographic drawing and chromolithography, lithographic writing, stone engraving, lithographic printing. A supplementary course is given in reading and typographic composition from Greek, Russian and Arabic.

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SECTION 4: PRE-APPRENTICE SCHOOL IN SHEET METAL WORK.

This is a workshop of the Society for the Development of Apprenticeship, for work in tin, sheet metal, etc. The section of our Commission which visited this school had an interesting conversation with Charles Kula, originator and director, who acted as guide.

This school does not aim to turn out specialists, but rather to make good artisans in all lines, and to give boys workshop discipline. They must be on hand punctually, must attend regularly, work diligently, and keep themselves clean both in body and mind. Every Saturday they must take a shower bath, and every day, summer and winter, a warm douche. There is proper provision for cleanliness in all parts of the shop. If they do not follow the regulations strictly they are expelled.

About 70 boys aged 12 or 13 are fitted to become workmen of any kind. They prepare work from drawings; everything must first be drawn. They work in tin because the material is cheap and can be thrown away if the work is not good. "There is an enormous waste; the question of apprentices is a question of waste."

Mr. Kula claims that after two years they are in a position to go to any workshop, even to that of a watchmaker. Some have gone to watchmakers and started with 30 cents a day, and some of the young men not 16 years of age can earn $1.20 to $1.40 a day. Everything is made by hand, no machinery, except ordinary tools, being used. This is to exercise their hands and train the pupils for manual work. They also work in wood, in iron and other metals.

Mr. Kula Deplores Street Influences.

The younger they come to the school the better for them, because they are taken from the Primary School. If allowed to run the streets after leaving the Primary School they are spoiled for all time to come, because after the Primary School they are not fitted for anything, being too small and too young to go to a regular workshop, for the shops do not want them at that age.

At the Primary School the boys have been sitting at a desk; here they are made to work in a standing position, because it enables them to breathe freely and prevents consumption. They sit only at work which can be done as well in that position as standing.

In winter they work 8 hours a day, in summer 9 hours. They are thus kept off the streets. There are no holidays whatever; but if they want to go to the country they may ask permission, and are then allowed to go for three or four weeks. They must go to the country, and must not hang around the streets, where they would lose the benefits gained at the shop. The boys all belong to workmen's families only—poorly paid persons like porters, door-keepers, and servants.

Work in Tin as Basis.

Every morning the pupils have 1½ hours of drawing, the rest of the day being devoted to manual labor. The pupils make drawings of natural size, designs of grates and brass finishings. Pupils enter whenever they wish, and generally take a two years' course.

The tinsmith trade is the most typical trade, in Mr. Kula's opinion, and he calls it the standard trade. It is a type; that is, it is the basis of everything. In the tinsmith's course the boys make coffee filters, watering-cans, etc.

Dishes were shown with bottoms hammered, rounded, etc. Mr. Kula holds that if a tinsmith can make a bevel of his tin he is on the way to become a good tracer; he can then trace in gold, copper, silver, etc., as it is done on exactly the same principle. When a young boy has learned this work and is able to do it in tin he can do it in any kind of metal, and metal working is the foundation of many trades.

Relation to Apprenticeship.

Apprenticeship consists of learning a special trade, but here there is no special trade. The preparation of apprentices corresponds to about four-fifths of the apprenticeship itself, because what the pupils learn here is the most difficult part of apprenticeship.

Every boy makes his own tools, and learns to forge and temper all tools as well. All machines are worked by hand; Mr. Kula believes that all machines moved by electricity or steam are against apprentices. In the meantime, they get physical exercise by blowing the bellows. They work in wood merely to show the adjustment to work benches, but the sheet metal is the important part. They are taught to solder. The workshop must be kept clean. There are individual lockers and a washroom with brass finishing, highly polished.

The term of apprenticeship is not officially fixed at 2, 3, 4 or 5 years; it all depends on the masters who are training the boys. The school cannot take more than about 70 pupils in all; it is a question of money. One foreman cannot look after the work of more than 35 boys.

Specimens From All-round Workmen.

In the large hall there were specimens of work in tin, iron, brass and wood; pipes beaten out, showing how a boy could become a boilermaker; brass beaten out, preparing a boy for plumbing; wooden frames assembled and adjusted, showing that a boy has practically all there is in carpentry. Pupils made the woodwork separating the drafting-room from the workshop. Boys can go from one workshop to another, and from one branch to another. When a boy has been through this school for two years he is a little workman. He knows how to use his hands. In the provinces they have to make their own tools, and he will be in a position to make them. They earn more in employment, because the masters appreciate them. Moreover, they cannot be imposed upon by being sent on messages and becoming personal servants of masters, because they can be used for something else.

Wider Use of the School Plant.

Ex-pupils may come to the school and work for themselves, for their own purposes. They have the use of the shops on Sundays. Specimens of work were shown, such as coffee-pots and filters, which the boys are allowed to take home. One boy was seen adjusting the joints of a coffee-pot, putting the wire in the top edge, which requires skill only to be acquired by training in this way. Another boy was seen inserting a piece of wire into a zinc edge, which is more expensive material, and which more advanced boys are allowed to use, though tin is the metal generally used. This work gives strength and dexterity to the hand, and when the boy goes into the workshop he knows how to handle things. These little pieces of work are very interesting to the boys, hence they never lose their hour in the workshop.

Various objects are made by hand in metal that costs very little; but it would not be any more difficult to make the articles of material that costs a great deal.

Boy's Mentality Transformed.

Mr. Kula claims that here the mentality of the boy is transformed, and he is made into a little workman. Moreover, the mentality of the parents is transformed. They begin to reason thus:—"I am decidedly not more stupid than my boy, yet my boy earns a good living, whereas I can hardly earn mine. That is certainly because he has been trained." The boys can come at any time. They work up. It is possible for a boy, at the end of 15 to 18 months, to be in a position to go into a workshop and earn a good living. A two or three years period is the maximum.

They have had young boys here 14½ years of age, one of whom wanted to be a tinsmith, and a master in clockwork took him and gave him immediately $3 a week to work in his trade.

The following samples of work were shown: a lantern of iron and glass; brass lantern; tin cash drawer; coal scuttle of sheet iron, with ribs beaten out and wire inserted in the top; a large zinc iron-handled pail with a top, coffee-pots with strainers inside, the tops of the pots having been curved with hammer. These articles are given to the pupils' parents. The rule is, "Never use your scissors except after making a very good tracing, or else you will spoil your goods."

SECTION 5: SUPPLEMENTARY COURSES IN PARIS.

In Paris two-year courses of technical instruction (manual work) for adults are held in 13 boys' schools. These courses are free and are intended for young persons, who having completed their primary studies desire to finish their education by acquiring the scientific knowledge necessary for workmen. They comprise geometry applicable to work in shops and to tracing out material

for work; graphic executions and sketches on panels; elementary lessons in technology or industrial electricity; work in wood or iron in the shop to apply the elements of geometry learned, and to execute pieces of work from their own drawings. The courses are held daily from 8.30 to 10 p.m., except on Saturdays, and work in the shops on Sundays from 8 to 11 a.m.

Pupils must establish their French nationality and be fully 12 years old, possessing the certificate of primary studies; otherwise they must be fully 13.

Whatever knowledge a person may have acquired already in any branch whatever, he can find a course to develop or perfect it. The graded courses are held once a week each from November to Easter.

There are several large popular educational societies in Paris. The Society of Elementary Education organized courses for women and girls (admission by card) and their educational activity is still exercised in other forms. Courses for both sexes, entirely free, are given by the French Young People's Union, the Society of Modern Education, the Polytechnic, Philotechnic, the Philomathic and Polymathic Associations. The only restriction is an age limit of 14 or 15 years; nevertheless there are exceptions, especially in the musical courses.

SECTION 6: VOCATIONAL COURSES OF THE SYNDICATES.

Some 60 courses have been organized in Paris by Syndicates of employers such as Jewelers and Goldsmiths, Bleaching Houses and Laundries, Bakers, the Company of Bronze Manufactures, Association of Herbalists, Grocers' Syndicate, etc.; also 70 courses have been established by Syndicates of employees such as the Syndicates of Journeymen Bakers, of Female Cashiers, of Journeymen Carpenters, and various labour exchanges in connection with the workmens' Syndicates. In addition to these, mixed Syndicates of employers and workmen, such as the Union of Female Professors and Composers of Music, Professional Hairdressing Association, Professional Association of Horticulturists, Gardeners and Agriculturists, etc., have also organized various vocational courses.

Courses for Apprentices and Workmen.

Jewelry: The Vocational School of Drawing and Modelling was established by the Syndicate of Jewelers and Goldsmiths, at the rue de la Jussienne. The evening courses take four years: 1st year, elements of geometrical and ornamental drawing, linear drawing; 2nd year, elements of geometrical and ornamental drawing, elements of architecture; 3rd year, ornamental drawing, figures, modelling ornaments and figures; 4th year, ornamental drawing, figures, study of styles, elements of modern composition, modelling and composition.

Schools of modelling, drawing and engraving of fancy articles of all kinds, are carried on at 22 rue Chapon.

Bronze: Schools of drawing, modelling and chasing of the Corporation of Manufacturers of Bronzes and of the cast iron, zinc, silver and plastic art trades at 8 rue St. Claude.

Coach-building: Vocational and artistic courses in coach building, established under the patronage of the Syndicate of Coach builders (employers) at 24 rue Laugier.

Stoker-machinists: The general trade federation of Electrical Stoker-Machinists of railways and manufactories has established courses, for stoker-machinists and electricians, treating of steam boilers; steam engines; gas, petroleum, alcohol, and compressed air motors; legislation on steam apparatus, industrial electricity, and industrial drawing. The courses are held in 21 sections.

The Syndicate has also organised vocational courses at Nantes, Chantenay, Le Faouet (Morbihan), St. Nazaire, Saintes, Epinal, Sens, Héricourt, Luxeuil, Le Havre, Evreux.

Pupils are enrolled in each of the above courses.

Stokers, conductors, machinists and automobilists.—The Central Federation of stoker-conductor-machinists of all trades has organised courses to develop knowledge necessary for running steam apparatus, dynamos, automobiles, etc. These courses are held at four divisions in Paris, and also at five places in the suburbs.

There are vocational courses at the Central Union of the stoker-conductor-machinists of manufactures and navigation of the Department of the Seine (Labor Exchange).

Roofing and plumbing.—Theoretical and practical courses of the Syndicate of roofing, plumbing, sanitary, and hygienic contractors of the city of Paris and of the Department of the Seine, 8 rue des Poitevins.

Cabinet-work.—School of professional drawing, 10 rue St. Nicholas. Founded by the industrial patronage of the Children of Cabinet-work. Professional courses of the Syndicate of cabinetmakers of the Department of the Seine (Labor Exchange).

Flowers and feathers.—The Society for paternal aid to children employed in the flower and feather industries has organised courses which are held every Sunday morning at 10 rue de Lancry. All workwomen and apprentices in the artificial flower making and feather dressing trades are admitted by request. The elementary course is given from 9 to 10.30 a.m., and the course in drawing from 10.30 a.m. to noon.

The Society has established family or boarding groups, intended to facilitate apprenticeship.

Joinery and wood flooring.—Schools of drawing and modeling were established at the end of the year 1891 by the Syndicate of contractors of joinery and wood flooring. The courses are held from 8 to 10 p.m. at 3 rue de Lutece, 20 rue Falguiére, 236 Faubourg St. Martin, and 105 rue Lemercier. They comprise 4 years of study; 1st year, plane geometry, linear drawing, ordinary joinery sketching, assembling, sale of woods, elements of diseases of trees, defects of woods, etc.: 2nd year, geometry in space, placing of joinery and wooden floors,

measuring, ornamental drawing, and history of joinery; 3rd year, descriptive geometry; 4th year, applied descriptive geometry. Modelling workshops will be opened soon near the schools.

Paper-makers and pasteboard-makers.—A professional school established by the Syndicate of paper and paper-transforming industries, for apprentices and young employees of both sexes in the industries which form the various committees of the syndical paper group, 10 rue de Lancry; separate courses for paper-making apprentices and pasteboard-making apprentices; competitions and prizes.

Upholsterers.—Courses organised by the Syndicate of decorative upholsterers, 3 rue de Lutece. Theoretical and applied courses in geometry, drawing, and cutting of materials.

Carriages.—Technical courses of the Syndicate of carriage makers, 11 avenue des Ternes. Two courses in drawing, viz., drawing of the carriage body and drawing of the mounting.

SECTION 7: VOCATIONAL AND DOMESTIC SCHOOLS FOR GIRLS.

These schools were established with a view to enabling girls to serve both theoretical and practical apprenticeship to a trade whilst completing their primary education. They replace outside apprenticeship, which is always insufficient and often disastrous. The nature and number of the trades taught depends on the district where the schools are situated.

Pupils competing must be at least 13 and not over 15 years of age, but all who hold the certificate of primary studies are permitted to compete from 12 years of age. Girls who have attended for a year the Supplementary Courses of the Primary Schools may be excused from the age limit.

The competitive examinations vary slightly at the various schools. They generally consist of dictation, two problems in arithmetic, a composition of simple kind, an ornamental drawing, and an exercise in ordinary sewing.

The apprenticeship lasts three years, except for those who are learning painting or industrial drawing, which studies require 4 years.

During the entire apprenticeship the pupils are practised in turn on ordinary sewing, and kitchen and household work. They are thus prepared to fulfil the home duties which await them later on.

In all the schools the pupils arrive at 8.30 a.m. and leave at 5.30 p.m. The morning is devoted to general instruction, and the afternoon to vocational instruction.

Besides maintenance scholarships, these are sometimes granted for breakfast and clothing.

Jacquard School.

This School, at 2 rue Bouret, is for girls aged 13 to 15 years on admission. Course three years.

General Courses.—Primary instruction, elements of accounting, drawing, domestic economy, cutting and assembling, cooking and household work, and mending clothes.

Vocational Courses.—Sewing dresses and dressmaking, corsets, underwear, millinery and dress, vests and children's costumes, ladies' jackets, embroidery for furniture and costumes, fancy flowers and feathers, and straw hats.

Breakfast scholarships are granted to a considerable number of pupils.

Our Commission secured some excellent drawings by girls of this School—one of them a portrait in colors, taken from life, exhibiting a recent creation in Parisian gown and hat.

Girls' School at 7 Rue De Poitou.

General Courses.—ethics and civic instruction, French language, arithmetic, elementary principles of the sciences, history and geography, linear and ornamental drawing, ordinary sewing, cutting and assembling, accounting and domestic economy.

Vocational Courses.—commercial studies: writing, accounting, elements of commercial law, English language, stenography, and typewriting; dress and furniture embroidery; embroidery on cloth, cashmere, velvet, satin, etc.; also fancy embroidery; millinery; dressmaking; cutting and making up robes and mantles; industrial drawing; drawing from the cast and from common objects; drawing from nature, flowers, and plants; geometrical drawing (projections, shading, perspective); decorative composition, water color and fans; also painting on earthenware, porcelain, and enamel.

CHAPTER XXXV: SECONDARY TECHNICAL INSTRUCTION.

Before the present Republic was created, technical institutions of the highest order had been established in France, and numerous specialist trade schools were in vigorous operation. These had been created by private enterprise. The following dates may be of interest:—Foundation of Museum of National History, 1793; National Conservatory and Polytechnic, 1794; School of Commerce and Industry, Paris, founded by two merchants in 1820; Central School of Arts and Manufactures, 1829; Philotechnic Association for social improvement as well as industrial training, 1848. Branches of the two latter institutions had been formed in all the chief cities of France, later on being recognized by public decrees.

Trades Unions or Syndicates of workmen increased rapidly after 1830, and worked to raise the standard of arts and crafts which they represented.

The commercial importance of all this activity and improvement of the working classes was shown at the International Exhibition in London in 1851, which drew the attention of the world to the superiority of French manufactures. Progress during the period of the Republic has been marked by the controlling influence of municipalities and the National Government, it being recognized that only these authorities could adequately provide for industrial training of the masses.

SECTION 1: NATIONAL SCHOOLS OF ARTS AND TRADES.

The great body of Arts and Trades Schools belonging to the secondary class were established by corporate bodies—Chambers of Commerce, Trade Syndicates, associations such as the Philotechnic, or private individuals. They are distinguished from the schools of the primary class by many features, of which the most important are:—(1) their narrow specialization; (2) the maturer age of their pupils, who as a rule are persons already working at their trades; (3) the general absence of entrance requirements; (4) their origin and sources of support.

The names of the individual trade schools are a sufficient index of their character, e. g., the technical schools for masons, established by Paris societies of masons and stone cutters; courses for tailors, maintained by the incorporated body of tailors; schools for jewelry manufacture maintained by the jewelry Syndicate. The purpose of all such schools and courses is to perfect workmen in their craft. The instruction is almost always free; indeed, liberality is the impressive feature of this enormous effort on the part of manufacturers, employers of labor, chambers of commerce, and trades unions to maintain the standard of French industrial art and its commercial prestige.

Highly Specialized Technical Schools.

The National Schools of Arts and Trades are highly specialized technical schools with elaborate equipment for workshop practice. Situated respectively at Aix, Angers, Chalons-sur-Marne, Lille and Cluny, each one is easy of access to all the Departments of a large geographical section. A law of 1906 authorized the establishment of a sixth school of this class at Paris, which was opened in 1910. The Government appropriation for the current expenses of these schools amounted in 1910 to $374,696, or 23% of the total appropriation for technical and commercial education.

The schools themselves are under the jurisdiction of the Minister of Commerce and Industry, and under the immediate supervision of the Prefect of the Department in which they are situated.

For some 300 places offered for competition each year, there are no fewer than 1,200 or 1,300 candidates. These schools have all the prestige of government institutions, by which the French parent sets such store. An even more potent source of attraction is the prospect they hold out to all fairly industrious and well-educated students of escaping two years of military service, such dispensation being granted by law to four-fifths of the number of students who at the leaving examination obtain 65% of the total possible marks.

Terms of Admission.

Admission to these schools requires French citizenship, and candidates must be above 15 and below 17 at the time of the competitive examination (1st October of each year). Two examinations are required; one before a jury sitting in the principal town of the Department, the other before a Government Commission appointed by the Minister of Commerce. Admission requirements comprise written composition and oral examinations in orthography, arithmetic, elements of geometry, linear and ornamental drawing, and the four elementary operations of algebra.

Since 1903 it has been obligatory for candidates to possess one of the following: (a) certificate of practical industrial studies; (b) certificate of higher primary studies; (c) 1st class diploma of the Civil Engineering section of La Martiniere School; (d) certificate of secondary studies, bestowed at the end of the first period; (e) diploma granted to third year pupils in the Industrial section of the Eastern Professional School of Nancy.

The candidates must undergo a manual test before the Commission, working, at their option, a piece of iron or wood to conform to a given drawing which is handed to them. The iron test consists, at the choice of the candidate, in adjusting or forging work. A candidate may request to have a test in founding substituted for this work; he must mould his piece in green sand and put it into lead.

In order to be definitely declared admitted, that is to say, fit to follow the theoretical and practical courses of these schools, it is necessary (1) to have received no lower mark than 6 at oral tests; (2) to have obtained for the total

written tests, manual and oral, at least 348 points (three-fifths of maximum). But as each school has only 100 places at its disposal annually, only the first 100 successful candidates can be admitted. These are sent to the school of their Department, but exceptions may be authorized.

Most of the pupils are from the public schools, and belong to the working classes or are the sons of small shopkeepers or Government officials. They are all boarders. The pupil pays $120 annually for full education, board and lodging. For the three years' course $60 more are required for the outfit. In general, however, at least three-fourths of the pupils are in receipt of Government Scholarships, which cover the cost of tuition and living, hence the schools are practically free.

All Manual Preparatory Industrial Schools of Apprenticeship and all other Vocational Higher Primary Schools prepare for these Schools of Arts and Trades, either in a regular way or when the candidates present themselves.

Plan of the Courses.

The school day comprises 3 hours class, 3 hours study, 3 hours in workshop.

1st year: French reading with explanations and French composition; mathematics; advanced algebra; advanced geometry; surveying and levelling; trigonometry, differential calculus; descriptive geometry; physics; chemistry; metalloids; moral and civic education.

2nd year: Geography; French and exercises in composition; elements of industrial accounting; elements of industrial legislation; mathematics; elements of analytic geometry; elements of integral calculus; descriptive geometry and theoretical and applied cinematics; chemistry; metals; metallurgy and elements of organic chemistry.

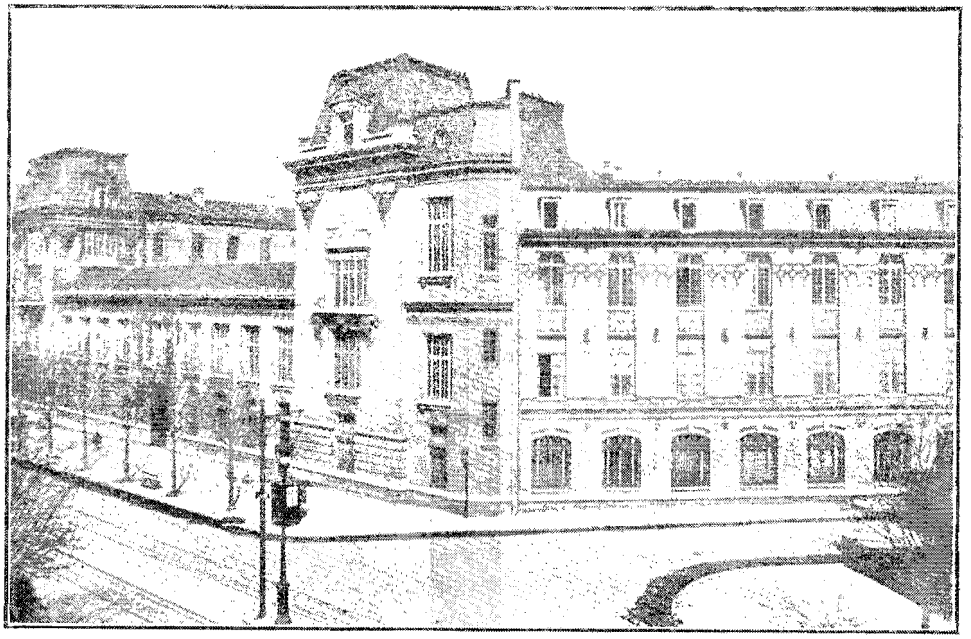
3rd year: History; French; exercises in composition; general mechanics; applied mechanics; machines and motors; industrial physics; electricity; heating and ventilation; lectures on hygiene.

Pupils when leaving may obtain the title of "Engineer of the National Schools of Arts and Trades," established by decree of October 22, 1907, or the diploma of ex-pupil.

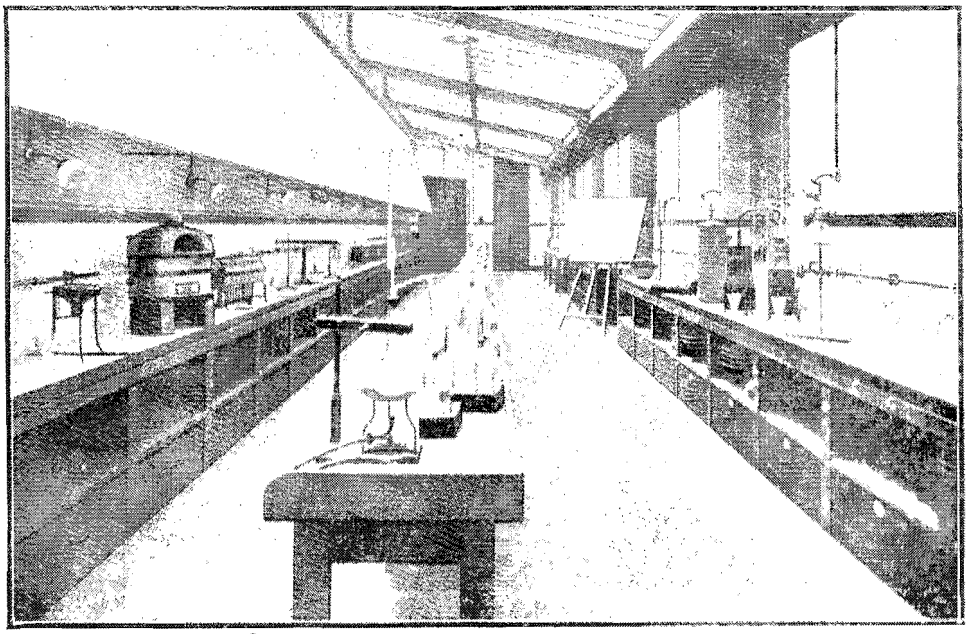
Although these schools have been specially designed to train manufacturers, a large number of other careers are open to ex-pupils, among others railroading, bridge and road building, military engineering and mechanical employment for the Navy, etc. Those who are very good general draftsmen have opportunities of entering the service of large industrial corporations as draftsmen.

SECTION 2: HIGHER PRACTICAL SCHOOL OF COMMERCE AND INDUSTRY.

This School, at 79 Avenue de la République, Paris, is the oldest commercial school in France, founded 1820. It is maintained by the Paris Board of Trade (600,000 francs), the city of Paris (50,000 francs) and students' fees; 170 live



HIGHER PRACTICAL SCHOOL OF COMMERCE AND INDUSTRY, RUE DE LA REPUBLIQUE, PARIS.



LABORATORY.

at the school and pay from 1,200 to 1,400 francs a year; there are also half-boarders who pay 700 francs; others pay 300 francs. Half-boarders arrive at 8 a.m. and leave at 5 p.m. They get breakfast. Any deficit is made up by the Board of Trade. The Directorate is made up of 40 prominent business men and industrial leaders who have been or still are in business. Those in business must belong to the Board of Trade, which has an income of 700,000 francs derived from the various business men who are members, and who are entitled to elect the 40 Directors.

The building cost the Board of Trade 3,000,000 francs, and is now too small.

The School of Commerce.

Boys are admitted from the age of 12. The first stage (3 years) is for boys between 12 and 16, and those who wish to go then into business receive certificates. The second stage (2 years) is for boys of 16 or 17 who wish to get higher commercial training. At the end of the two years they compete for a higher diploma awarded by the Minister of Commerce in person. They may be a little over 18, and are generally 19. Some exceptionally clever boys receive the diploma at 14, but this practice is not encouraged, as it is not considered that their minds have sufficiently matured at that age.

There are 530 pupils, 300 in the first section, 230 in the other. About half of the boys who start at 12 years continue till 16, and the others till 18. The majority of them are certificated Primary School pupils. There is, of course, a special examination in the school.

Second grade pupils generally come from the State Lyceums, where they follow a classical course, but not wishing to complete their studies at the university they come to this commercial school.

The Maritime School.

This school also includes a special superior State School of Maritime Shipping, established six years ago under the auspices of the Minister of Commerce. 20 pupils are admitted annually by special examination, being selected out of 60 or 80 candidates. The school prepares future lieutenants and captains of the commercial marine for deep sea sailing.

The Board of Trade has a sort of proprietary port at D'Ivry on the Seine and derives a revenue from the shipping, like harbour commissioners. They have machinery for loading, unloading and handling goods, also freight shed, etc.

They have also laboratories for testing silk, wine and similar goods, for which a fee is charged. It is a kind of official service, but the duty is assumed by the Board of Trade, whose budget must be laid before the Government, which has authorized the transaction but does not control it.

The School of Navigation.

As the only one of this standing in France, the school has a special grant from the State, which pays the special staff of professors, composed of ex-sea-

captains, engineers, etc. The class-rooms are at their disposal. Young men who attend this school are generally State scholarship holders. Out of 20 pupils, 5 or 6 pay fees. The National State Departments of Commerce and Industry and of Posts and Telegraphs regulate this.

On graduation, pupils are required to spend 5 years in navigation, and then pass another examination before they can command a boat and assume duties as navigators. Their certificate must state that they have been to the school and also served 5 years, and this must be obtained before they are 25 years of age.

The School of Hydrography trains seamen for short fishing voyages to Ireland, Newfoundland, etc.

The Maritime School professors are appointed by the State, and those in the Commercial School are nominated by the Board of Trade on the proposal of the director approved by the Minister.

Evening Classes.

There is a fourth department, consisting of evening classes, founded and maintained by the Board of Trade, for young clerks who desire to improve their knowledge of their own special branch. Students must be at least 15, but the age runs up to 40. These classes are attended by 450 young men and 220 girls.

After one or two years, a special prize is awarded, in the form of a travelling scholarship, entitling the holder to go to England, Germany or Russia. The only condition is that students must go into a distinct line of business of their own speciality; and then when they return they must make a report of what they have seen. For instance, one student in the fur business in Paris went to Russia and studied conditions in a fur house there, and returned with a full report.

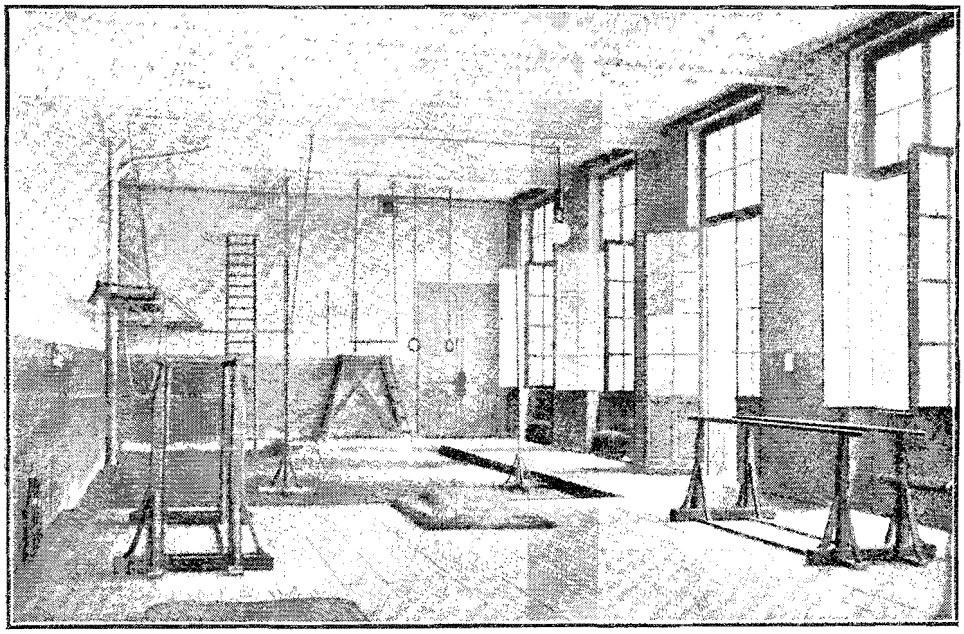
The same system is offered to the second-stage pupils in the commercial school from 16 up. The scholarship comes from different sources; it may come from the State, or from the Council Chamber of the Seine, or from different corporations. Many kinds of scholarships are given to the school in the same way as in the evening classes.

Instruction in the evening is about the same as in the daytime; French, English, German, Spanish, typewriting, stenography, bookkeeping. No comparison can be made between evening students and day students, as the former attend only three times a week.

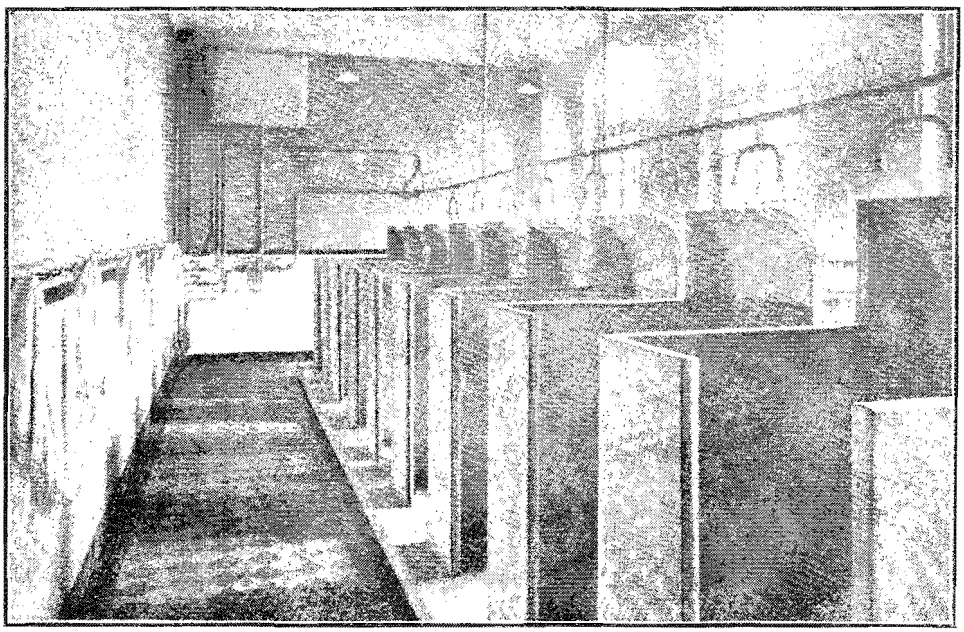
Day pupils are practically boarders in this school. A talented boy attending an evening class for a certain time could acquire about the same amount of instruction as a young man of 16. Of course they have an advantage over day students in that they have practical experience.

Experts as Teachers.

There are two classes of professors:—(1) those who teach geography, etc.; (2) business men who teach their specialty for an hour or two; also expert accountants, railway men, etc., and the government textile inspector, etc. Transporta-



GYMNASIUM.



SHOWER BATHS.

tion problems, for instance, are dealt with by an engineer of a leading railway who lectures for 3 or 4 hours a week. In this way the students are kept in touch with industry.

There are complete physical and chemical laboratories.

The drafting room is well finished, with plaster casts arranged around the walls, and well lighted from sides and above.

The dormitories are furnished very plainly, and there is running water in all the rooms, which are divided by partitions extending part of the way up.

Dinner is at noon. 350 eat at each table, these being of marble with plain benches at either side. Billiards, checkers, chess and dominoes are played in the small adjoining room.

There is a preparatory chemical laboratory; gymnasium, etc.

In Paris there are 3 commercial schools like this one, and 15 more are distributed over France. Pupils in all are entitled to pass an examination for bursary, and are selected in competition from all those schools in France; two or three may be chosen in this school and one or two in another place. These scholarships vary from 1,000 francs to 3,000 francs, and run from one to two years.

Visits to Foreign Countries.

During Whitsuntide foreign vacation trips are taken annually by the best students on the list as a reward for special merit. The Director accompanies them and they stay eight days. Last Whitsuntide 18 students went to Belgium and studied business customs.

Students visit different establishments in Paris and make reports.

These visits are made by all the students.

The school has a bureau and permanent secretary for permanently placing students, the expenses being borne by an association of ex-pupils, founded for mutual help. As a general rule all the good pupils are placed in that way.

CHAPTER XXXVI: HIGHEST TECHNICAL INSTRUCTION.

The highest grade of scientific and technical instruction in France is given in special schools, such as the National Conservatory of Arts and Trades, the Polytechnic School, etc. These schools are intended to prepare men for the technical service of the State, or to become directors of enterprises which require both scientific and technical knowledge.

The Higher Technical Schools are under different ministries, viz., the Ministry of Commerce, of Agriculture, of War, etc., according to their courses.

The principal schools of this high order under the Ministry of Commerce and Industry are the following, all situated in Paris:—Central School of Arts and Manufactures, 700 students; National Conservatory of Arts and Trades, 100 pupils; Superior School of Navigation (number of pupils not stated).

Other technical schools, such as the Polytechnic, the Agronomic Institute, etc., are under the Ministries who have charge of their special courses.

A significant fact in the recent history of higher education in France is the multiplication of chairs for scientific branches in the University faculties, and the equipment of laboratories and institutes for the promotion of scientific research and experimentation. As a result of this activity, provision for the highest order of technical training, formerly confined to the special schools located at Paris, is now made, to some extent at least, in all the University centres of the country. For example, at the University of Marseilles there is a Chair of Industrial Physics and another of Industrial Chemistry, and similar Chairs at both the University of Bordeaux and of Nancy. At the University of Lille there is a Chair of Applied Chemistry, and at Lyons, Chairs in Chemistry applied to Industry and to Agriculture. Through this extension of University activities, extreme specialization in the province of Higher Technical Education in France is giving place to the principle of co-ordination and philosophic unity.

SECTION 1: CENTRAL SCHOOL OF ARTS AND MANUFACTURES.

This School, at 1 rue Montgolfier, Paris, is especially intended to train engineers for all branches of industry and for those public works and services whose management does not necessarily come under the charge of the State engineers. It gives a very general course of education, comprising all branches of science connected with the art of engineering, but only as much time is devoted to theory as is necessary for its practical application.

Admission is by examination (fee 20 francs) held annually at Paris in June; candidates must be 17 years of age on the 1st January of the year of competition.

There is no upper age-limit. Foreigners are admitted on the same footing as Frenchmen. No diploma is required. The examination is both written and oral, and comprises the following subjects, the values of which are stated:

Written Compositions.		*Oral Examinations.*	
Trigonometry and Logarithmic Calculus.....	3	Analytic and Mechanical Geometry.....	5
Mathematics.....	5	Arithmetic, Algebra and Trigonometry..	5
Physics.....	2		
Chemistry.....	2	Elementary and Descriptive Geometry..	5
Draft.....	3	Physics.....	5
Architectural Drawing.....	4	Chemistry.....	5
Machine Drawing.....	2		
Machine Sketching.....	2		

Candidates who produce bachelors' diplomas or certificates relating to the first part of the baccalaureate examinations, or diplomas of the National Schools of Arts and Trades, receive a bonus of 15 marks.

Intending students must be well used to machine and architectural drawing and aquatint, and in studying drawing must apply themselves equally to the attainment of rapidity of execution, exactitude of form and purity of touch. They are advised to practise reproduction of drawings given at previous entrance examinations of this school, and machine drawings given at the School of Arts and Trades, as many candidates fail at shadow tracing. When presenting himself for examination, each candidate must hand in collections of drafts, machine and architectural drawings, and freehand sketches.

The number of pupils admitted annually averages from 230 to 250.

Discipline, Fees, etc.

This school accepts day scholars only, and does not exercise any supervision over them outside of school hours; but this does not militate against their satisfactory progress, the importance and frequency of examinations and competitions being sufficient to insure discipline and prevent pupils from neglecting their lessons. The course runs for three years, during which time those not profiting by instruction are expelled.

The tuition fee, including cost of experiments, is 900 francs for first year, 1,000 for each following year. The entire cost of supplies and drawing material must be defrayed by pupils. Tuition and maintenance expenses are estimated at 3,000 francs a year, and parents are advised to allow their sons more. French pupils who cannot meet these expenses, and who are among the first 120 on the list, may obtain subsidies from State funds; these are originally granted for one year, and may be renewed and combined with those allowed by Departments and Communes, which are often given. Notably the City of Paris assists a large number of pupils. The Department of the Seine has voted a subsidy of 3,000 francs, available only to pupils domiciled in the Department and outside of Paris.

The State subsidies distributed among the pupils in 1908 were 50,000 francs; these usually equal half the tuition fee; the allowance may be a little

larger in the second and third years if the pupil has gained a place. In 1908-9 9 scholarships were given at 200 francs, 24 at 300, 20 at 400, 30 at 500, 12 at 600, 12 at 700, and 3 at 800.

The State also grants for graduates of the National Schools of Arts and Trades a subsidy of 30,000 francs, divided equally between preparation of pupils for the Central School and the maintenance of those admitted.

Course.

The course of instruction is as follows:

1st year.—Analysis (differential calculus and integral calculus), general mechanics, thermo-dynamics, descriptive geometry and its applications (shadows, stonecutting and timber-work), general physics and chemistry, mineralogy and geology, elementary and civil construction, and hygiene and applied natural sciences.

2nd year.—Theoretical and applied resistance of materials, construction and erection of machines, metallic constructions, industrial physics, applications of electricity and light, steam engines, analytic chemistry, chemical technology, architectural and civil constructions, and industrial legislation and economy.

3rd year.—Applied mechanics (hydraulics), construction and erection of machines, industrial chemistry, general metallurgy and metallurgy of iron, mining, public works, and railways.

These varied studies are completed by exercises and manipulations carried on at the school, by operations on the ground, and by visits to the factories and workshops. The pupils must make numerous plans, with documentary memoranda, of the following objects: metal bridges, steam engines, civil constructions, machine-tools, etc. (2d year). Manufactories of chemical products, machine construction workshops, locomotives, blowing machines, hydraulic establishments, etc. (3d year).

At the end of the 2d year the pupils specialise in one of the 4 following branches: machinists, constructors, metallurgical miners, and chemists. The courses are open to all the pupils, only the work and practical exercises and the plans to be made differing according to the specialties; but since 1900 the diploma no longer bears the mark of a specialty.

Building and Equipment.

The building has been admirably laid out to answer all the requirements of such a varied curriculum. It comprises 60 study halls, 3 amphitheatres, laboratories, galleries of collections (drawings, models and apparatus), and an extensive library. It distributes among the pupils of each division the school Portfolio, an album lithographed every year containing the most notable drawings brought in by the pupils from their vacation trips. This vacation work is obligatory, and note is taken of it in the graduation classification.

A system of weekly examinations serves to keep pupils always on the alert, and makes it possible to ascertain their progress at any time. The marks obtained

at these examinations, as well as those for plans, vacation work, general examinations and the final competition, serve to make up the graduation classification. The final competition consists in the execution of a general plan and the composition of a memorandum in support of it. The pupil has 30 days in which to compose this plan, and is obliged to present it and discuss his work personally before the examining jury.

The diploma of Engineer of Arts and Manufactures is granted to those pupils who obtain a total average of 14.

To obtain the diploma pupils must pay 100 francs, 50 of which are refunded in case of failure. Those who so fail, but prove that they are adequately instructed (the average required being 13) receive a "certificate of capacity," and they may compete a second time for the diploma within 5 years. In 1908 graduating pupils received 224 diplomas and 14 certificates; ex-pupils re-admitted to the examination, 6 diplomas.

The careers open to graduates are as numerous as their acquirements are varied. Besides the openings which they find in business, as engineers, superintendents of mills, heads of works and factories, constructors, etc., they may become professors of applied science, etc. Pupils who pass out high are in demand in business, and many have positions guaranteed to them in advance by relatives or others; those who have neither fortune nor relatives, though sometimes finding difficulty at the outset, always succeed in finding positions eventually.

A certificated pupil, unless he has exceedingly bad luck, always finds a good position. Salaries of 4000, 5000 and even 10,000 francs are quite frequently obtained by graduate engineers of a certain standing, and much more brilliant positions are by no means rare.

The State, which has so many employments at its disposal which Engineers of Arts and Manufactures would be quite well fitted to fill, does not definitely place any of them at the disposal of graduates.

SECTION 2: NATIONAL CONSERVATORY OF ARTS AND TRADES.

This is both an industrial museum and an educational institution under the Department of Commerce and Industry at 292 rue St. Martin, Paris. It is of the greatest service as a museum and high school of science applied to industry, and contributes in a great measure to the progress and popularisation of industrial questions.

The financial law of April 13, 1900, invested it with a civil character, and gave it an administrative council. The law of July 9, 1901, and various decrees reorganised and completed it by the establishment of (1) laboratory for mechanical, physical, chemical, and machinery experiments; (2) a "national office of industrial property," patents of invention and trade marks; (3) a museum of industrial hygiene, and for the prevention of accidents among workmen.

These new institutions are productive of excellent results in the industrial world.

The administrative council and the director are assisted by an advisory council of instruction and by three technical committees for the departments named.

The Experimental Laboratory undertakes for manufacturers, merchants and private individuals, all kinds of tests and standardizing with reference to physics (except electricity and magnetism), metals, building materials, machines, and new or insufficiently known vegetable raw materials. There is a charge for these tests, the results of which are entered in reports or certificates of standardizing which are sent to the public.

The Museum contains full and valuable collections of scientific instruments, models of machines and objects of art given by inventors or manufacturers, or purchased by the institution. All arts and sciences applied to industry are liberally represented; physics and mechanics, geometry, weights and measures, geodesy, topography, clock-making and astronomy, building arts, hygiene, social economy, agriculture and country engineering, apparatus for transportation and railways, mine working, metallurgy and metal working, lighting and heating, chemical products, glassware, pottery, spinning and weaving, printing, engraving, photography, etc. The public is admitted to the exhibition galleries of the Conservatory every day except Mondays and Fridays.

The Library contains a fine collection of over 40,000 volumes and 2,000 maps relating to the sciences, the arts, agriculture and industry. It is open during the week, Mondays excepted.

Instruction.

The Conservatory gives oral as well as visual instruction. There are 22 professorships, all filled by celebrated men. In 15 of these are taught the sciences applied to the arts, and art applied to the trades; in the others, political and industrial economy, social economy, social insurance and provision, commercial law, industrial and commercial geography, industrial hygiene and the regulation of workmen's associations.

These courses are to the industrial sciences what those at the College of France are to pure science. The professors keep track of all the latest industrial changes, and explain the most recent improvements. The courses run from two to three years.

The instruction, although of a scientific and advanced character, is none the less entirely practical, and adapted to the various classes of students.

The instruction can be followed, with the same advantage although not at the same level, in a class attended principally by constructors of bridges and roadways who intend to become engineers, or at a course attended by numerous foremen or workmen sent by their employers, as well as by heads of factories in Paris and the suburbs, and also by engineers. The course in agriculture may be followed by a great number of agricultural proprietors spending the winter in Paris, whilst that in agricultural chemistry is by its nature accessible only to a very small number of those admitted.

As the instruction is intended especially for those engaged in business or industrial pursuits during the day, the lessons are given in evenings from Novem-

ber till April. All courses are held twice a week, excepting those in commercial law, industrial and commercial geography, and social economy and hygiene, which are held only once a week. Classes are free to the public.

Certificates are given at the end of the year, the standing of candidates being ascertained by estimating the marks earned on the sheets, the drawings and designs executed, and work done in the professor's laboratory, the total marks required being 14.

Candidates for all the annual certificates, relating to the full period of at least two courses which are complementary and have the same industrial or professional aim in view, may obtain the diploma of studies of the Conservatory by passing another general examination.

In 1907-1908 the courses were attended by 1,695 persons. Of this number 224 asked permission to take the examination. Some of them already held as many as five certificates.

Public Lectures are given on Sunday afternoons during the winter by scholars or eminent men in any branch of the sciences or applied arts, whom the public are interested in hearing in order to keep themselves informed of present day matters and of questions which cannot be treated in detail in the Conservatory courses.

The National Office of Industrial Property was instituted by the law of July 9, 1901, which transferred to the Conservatory the industrial property service formerly located at the Department of Commerce. This office, established to meet the desire of the International Convention of March 20, 1883, for protection of industrial property, groups together in the central business district the offices of unexpired and lapsed patents and the central trade-mark depot. The connecting halls of French and foreign patents of invention, and also that of trade-marks, are open daily, except Sundays and holidays.

The Museum of Industrial Hygiene, and for the Prevention of Accidents among Workmen was established at the request of the Association of French Manufacturers by decree of September 24, 1904. It is destined to be of great service to the working classes by diminishing the number of accidents, and by aiding the labor inspectors in the accomplishment of their useful mission.

The museum constitutes a permanent exhibition, which is continually being renewed, and presents to the public as complete a collection as possible of protective apparatus and of the most practical and most improved devices for safety and industrial hygiene.

SECTION 3: SCHOOL OF INDUSTRIAL CHEMISTRY OF LYONS.

(Chemical Institute of the University.)

This school, founded in 1883 as an annex of the faculty of sciences, is patronized by the Board of Trade and is intended to train, for industrial arts, young men who have experience in the theory and practice of chemistry.

Pupils are admitted by competition held in November. Candidates must be of the full age of 16 years and possess the general attainments necessary to enable them to profit by serious chemical studies, but holders of bachelor's degrees are admitted without competition in proportion of one-half of the places available.

The competition consists of a French composition; written examination in elementary mathematics (arithmetic, algebra and geometry); written examination in elementary physics and chemistry; questions in mathematics, physics and chemistry. All the above subjects are obligatory. Candidates may also take sciences and modern languages as optional subjects, and thus increase the number of their marks by one-quarter of the maximum given for obligatory subjects. Those who possess qualifications or diplomas receive also an advantage in marks.

The school also admits outside pupils who take part in all the exercises and may be permitted to compete for the title of Engineering Chemist of the School.

Course of studies is 3 years, beginning annually in November and ending in July, and comprises both theoretical courses and laboratory work.

Courses and Laboratory Work.

Theoretical Courses:—

1st year: Mineral, organic and industrial chemistry, mineralogy or industrial physics, photography, German.

2nd year: Organic, industrial and electro-chemistry, industrial physics or mineralogy, German.

3rd year: Organic and industrial chemistry, chemical technology, German.

The German course is intended to train pupils to translate German scientific works.

Laboratory Work:—

1st year: Mineral chemistry.

2nd year: Organic chemistry and electro-chemistry.

3rd year: Applied chemistry, textiles, coloring materials, essences and perfumes, oleaginous bodies, chemical metallurgy, and alimentary substances.

The pupils work in the laboratory from 35 to 40 hours a week. Analyses and preparations alternate from week to week, and are held under the direction of experienced masters, who train the pupils to work with care and precision.

The pupils are students of the faculty of sciences, and as such are registered at the faculty. They must be at school from 8 to 11-30 a.m. and 1-30 to 6 p.m.

The annual fee is 800 francs. Students must also deposit 100 francs as security against loss or breakage. The Department of the Rhone, the City, and the Lyons Board of Trade grant a certain number of studentships for the benefit of poor students.

DIPLOMAS AND PROMOTIONS.

At the end of the third year, after a final examination, students receive the diploma of Engineering Chemist or a certificate of studies. Since 1907 this diploma has only been granted to those who obtained the certificate of higher studies or the diploma of technical studies in industrial chemistry before the faculty.

Pupils who have distinguished themselves in these three years of studies may receive permission to spend two more years at the school as private tutors or pupils, and to continue their work under the direction of the head professor and his assistants, and make original investigations of problems of pure science or industrial chemistry in private laboratories.

All graduates up to the present have found positions without difficulty in various industries in France and elsewhere in connection with storage batteries, dressings, rubber, limes and cements, glue and gelatine, distilleries, cyanides, electricity, electro-chemistry, fertilizers and agricultural chemistry, purification of water, explosives, tinctorial and tanning extracts, illuminating gas, oils and soaps, printing on stuffs, coloring matters, tanneries, curriers' shops, patent leathers, metallurgy, paper, pasteboard, chemical products, photographic products, pharmaceutic products, fireproof products, sugar refineries, sugar houses, stearin factories, dyeing, oilcloths, varnish, vinegar, and the laboratories of industrial analysis, agriculture, customs, railways, State, municipal, etc.

SECTION 4: CENTRAL SCHOOL OF LYONS.

This school at 16 rue Chevreul is under the patronage of the Board of Trade, and is designed to train technicians as civil engineers and factory superintendents. The course takes three years, with an optional fourth year for those who desire to specialize either in electro-technics and applied mechanics or in civil construction and public works.

The entrance examinations are held in July and October. Candidates must be of full age of 16, and file certificates of birth and good conduct. There are three written examinations:—mathematics, physics and chemistry, drawing. The oral examinations bear on elementary arithmetic, geometry and algebra, descriptive geometry, rectilineal trigonometry, elements of physics and of chemistry. Candidates who hold a degree of Bachelor of Science are examined in drawing only, and must obtain 11 marks. Candidates may be admitted direct to the second year of studies; then they undergo an examination bearing on the subjects of the first year.

The students are half boarders, taking their midday meal at the school. The annual school fee is 700 francs, besides 10 francs for use of library, from 80 to 90 francs for school supplies, and cost of breakfast about 150 francs. Pupils from outside Lyons are placed in desirable private houses. Full or partial scholarships may be granted by the Board of Trade, the Department, and the City.

Courses.

The education is divided as follows:—

First year: Mathematics (algebra, analytic geometry, statics, surveying, descriptive geometry), physics, mineral chemistry, mineralogy, elements of technology.

Second Year: Differential and integral calculus, rational and applied mechanics, descriptive geometry, industrial physics, electricity, organic chemistry, geology, metallurgy of iron and steel, graphic statics, technology.

Third Year: Machine construction, hydraulics, resistance of materials, steam engines, civil construction, chemical analysis, public works, railways (construction and operation), general electro-technics, electric measurements, industrial legislation, industrial hygiene.

There are special studies in drawing, comprising:—1st year, freehand sketching executed at the workshops, aquatint, projections, architectural and topographic drawing; 2d year, drawing from plans, sketches to scale, etc.; 3d year, designs of machines, of factories and of various constructions.

In the fourth year the pupils are divided into two sections and follow the courses common to both sections, together with advanced special courses.

Training in Manual Work.

All pupils are trained in manual work, consisting of joinery, forging, adjusting, and machine-tools in the school workshops. They make frequent visits to factories, and thus become initiated more directly into industrial matters by studying the machines and by contact with the workshops.

A system of weekly examinations is in vogue, and the marks obtained thereat added to those obtained at the examinations at the end of the year and at the final examinations, serve for promotion to the higher division, and also for classification when graduating.

A first-class diploma is granted to pupils who obtain a total average of at least 15; second-class diploma to those who obtain 13. Such diplomas confer the title of "probationary engineers."

Former pupils who hold a diploma of the school may, after a certain time, obtain another conferring the title of "Engineer of the Central School of Lyons" by fulfilling certain conditions.

Graduates find positions without difficulty in industrial establishments, especially local ones; and this is facilitated by the good offices of ex-pupils, who have formed themselves into a friendly society.

By agreement between the school and Board of Trade, pupils who during their 4th year make a specialty of the study of civil construction and public works may at the same time attend the colonial courses founded by the Board, and upon graduation readily find situations either in the Far East or in Arabic-speaking countries.

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SECTION 5: ELECTRO-TECHNICAL INSTITUTE OF GRENOBLE.

The Electro-technical Institute of the University of Grenoble was organized so as to be (1) an electro-technical school where all grades of theoretical and practical instruction in industrial electricity are given; (2) a testing bureau for verification and control of all ordinary electrical apparatus; and (3) an investigating laboratory, fitted for the advancement of electric science.

By its advantageous situation in the "white coal country", close to the most numerous and important French electric installations, this Institute offers students the advantage of being a centre of information and practical studies of the highest order, especially in what concerns hydro-electrical stations with high and low falls, the electric conveyance of energy from very high tensions, and electro-chemistry.

Courses.

The instruction given comprises: (1) courses and lectures on all subjects relating to the industrial production and utilization of electric energy, chemistry, electro-chemistry, electro-metallurgy, and industrial mechanics and physics; (2) practical workshop and laboratory work with reference to ordinary electric measurements, comprising the handling and placing of all ordinary electric apparatus; (3) exercises in making out plans and specifications of electric installations of all kinds; (4) visits to electric works and installations at Grenoble and vicinity; (5) exercises in running machines and serving part-time in the electric stations.

Admission to the lectures and practical work is reserved for students of industrial electricity proper, who must pass an examination of fitness consisting of:—(1) questions in arithmetic, algebra, geometry, trigonometry, ordinary mechanics, general physics, electricity and magnetism, chemistry, according to the educational programme given in the classes of higher mathematics in the lyceums to prepare for the Central School; (2) a test in industrial drawing and in a numerical calculation. The student must also be entered in the registers of the faculty of sciences and pay the fees for practical work.

Annual Expense to Students.

The estimated annual expenses of students of industrial electricity are:—University fees: enrolment 30 francs, practical work 300 francs, examination 30 francs; school material and cost of electro-technic excursions 150 francs; cost of stay at Grenoble (9 months at 90 francs) 810 francs; total 1,320 francs. The problem of living is very much simplified for the students by the good offices of the Committee of Patronage of foreign students which acts as intermediary for several hundreds of students of various nationalities every year.

The studies at the Institute last two years; one year (A) being devoted to a study of the industrial production and utilization of electric energy by

continuous currents, hydraulic machines, and related problems; and one year (B) to a study of the production and utilization of electric energy by *alternating currents*, steam engines, and related problems..

Each year ends with an examination which includes:—(1) a written test (duration 10 hours) comprising the composition of a draft of an electric installation, with plans and specifications; (2) a practical test (duration 10 hours) comprising the execution of laboratory w rk; and (3) an oral test (duration 1 hour) consisting of questions on the fundamental elements of industrial electro-technics, mechanics, chemistry, and physics.

Candidates who are put off in July may present themselves in November.

Students who have successfully passed the two final examinations at the end of (A) and (B) receive the diploma of *Electrical Engineer* or a *Certificate of Electro-technical Studies*, according as the average of their examination and study marks is between 15 and 20 or between 10 and 15.

Students who matriculate and have followed with advantage the instruction given at the Institute may easily obtain the certificates of higher studies in industrial physics and electro-chemistry, which, when added to another certificate of higher studies, entitles to the degree of Licentiate.

Diploma of Electrical Engineers.

Engineers who hold diplomas of the large French or foreign schools, and technicians whose acquirements are considered sufficient, may be admitted by the dean as candidates for the diploma of Electrical Engineer on the proposal of the director of the Institute, after an examination of their claims and within the limit of places available at the laboratory. For the students in this category the curriculum comprises only two half-years of supplementary studies at the Institute (from November 15 to July 14 following).

The final examination comprises: (1) a written test consisting of a draft of an electric installation, with plans and specification; (2) a practical test consisting of personal researches made in a subject given beforehand; and (3) an oral test in theoretical and practical electro-technics.

The fees are:—registration 20 francs; library 10; laboratory 125 per quarter; examination 30; total 560 francs.

A special section is reserved for ex-pupils who hold diplomas from the Schools of Arts and Trades.

An elementary division, for which the entrance examination corresponds to the instruction given in the Higher Primary Schools, in the Practical Schools of Commerce and Industry, or in the 4th B class in the Lyceums, enables young persons under 16 years of age who are candidates for ordinary electrical *engineer's certificates*, to acquire in one year knowledge corresponding to this first degree of practical electric science. The fees for practical work in this elementary division are 200 francs.

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CHAPTER XXXVII: DRAWING DESIGN AND ART.

Instruction in Drawing in France.

Instruction in drawing of some sort is commenced even at the Kindergarten, where it precedes instruction in writing. It is completed in the elementary Primary Schools, and reaches a rather considerable development in the Higher Primary Schools.

As the Higher Primary School is open to only a small number of selected pupils, the city of Paris, which appreciates the fact that drawing is the basis of all vocational instruction, has opened in a certain number of public schools free evening classes in drawing and modelling, intended for apprentices and male adults.

Geometrical drawing in all its applications is taught in these classes, also machine drawing, architectural drawing, cutting of material and tinting; drawing at sight (ornamental and figure) executed from high and low relief, plants, and the living model; also modelling and sculpture.

The courses are open every evening except Saturday, from 8 to 10 p.m., from October 1st to June 30 at 40 different schools.

What Paris is Doing.

Up to the present time the city of Paris has established only five courses in drawing for girls. Other classes are in contemplation; but in the meantime the city subsidizes 10 private schools of drawing, on the understanding that they receive a certain number of pupils free of charge. As the instruction in drawing given in these establishments is of a rather general and theoretical character, the city thought proper to complete it by instruction that had more especially in view the applications of the arts of drawing. For this purpose, Paris founded in 1883, two new schools, one for preparatory practical drawing, the other for the application of the arts of drawing to a certain number of industries, of which mention is made further on.

At the same time it founded 5 evening courses where drawing applied to art and industries is taught. These courses are held every evening except Saturday.

Modelling, anatomy, decorative composition and geometrical drawing are taught. Pupils are admitted only after having passed an entrance examination.

SECTION 1: SCHOOLS OF DRAWING.

The study of drawing, formerly considered only from the purely artistic point of view, has considerably widened its scope, so that a knowledge of drawing is of the utmost importance in many occupations. The artist must of course be

a most skilful draftsman, and the architect or engineer, whose art is essentially mathematical, must have constant recourse to drawing. But in order to appreciate the full importance of drawing we must bear in mind that departments such as railways, surveying, forests, bridges and roadways, mines, military engineering, etc., require vast numbers of draftsmen, and that numerous industries, such as calicoes, painted paper, material for hangings, printing on cloth, porcelain, goldsmiths' ware, etc., are continually in need of special draftsmen and skilled artists and designers.

Special Schools Essential.

In order to satisfy such numerous requirements, it was found necessary to establish special schools devoted to drawing; and even in the programs both of primary and secondary education a rather prominent place had to be given to the teaching of elementary drawing, preparatory to the more extensive study of the art. It is found to be an excellent subject, and of great practical utility even for the pupil who does not intend to follow the draftsman's occupation.

The rudiments of drawing which pupils acquire are extended and completed when they reach the larger schools —the Central School, the Polytechnic School, the School of Bridges and Roadways, the School of Mines, etc.

In the School of Arts and Trades the teaching of drawing is very comprehensive, and has special reference to its applications to arts and manufactures, and particularly to mechanical manufacturing. In the schools of Industrial Drawing, which resemble those of Arts and Trades, draftsmen are trained specially for the various industries, especially for art industries.

Finally, advanced instruction in drawing and in all branches related to it is given in special schools devoted to Fine Arts and Decorative Arts.

State Subsidies for Drawing and Art.

There are numerous schools of drawing in France, the majority of which are subsidized by the State; but although the State exercises control over the teaching, it is far from being uniform, and the programs vary according to the needs of the particular locality or the requirements of the local industries. They admit of applications of drawing to fine arts, to decorative art, or to industrial art.

The instruction is divided into three classes, and comprises generally:

(1) Elementary class,—freehand drawing at the blackboard and on paper, and linear drawing.

(2) Intermediate class,—ornamental drawing and drawing of portions of figures, the practical study of projections (sketches, elevations of plans, levelling, etc.)

(3) Advanced class,—drawing from the figure; general history of art; study of the orders and laws; decorative composition; the application of projections to carpentry, locksmithery, stone-cutting, etc.

There are local and municipal Schools of Fine Arts which are subsidized by the State. Their programs, though of the same nature as those of the National

Schools of Fine Arts, are usually less complete. In each of them one part is devoted to the industrial application of art, and particularly to decorative art. These modifications in the programs of the National Schools are dictated only by the needs of the local industries.

Local schools of Fine Arts are established at Amiens, Clermont-Ferrand, Montpellier, Nancy, Rennes, Rouen, St. Etienne and Tours. The municipal schools are those of Angers, Avignon, Caen, Grenoble, LeHavre, Lille and Poitiers.

Some of these local and municipal schools are more important than the majority of the National Schools, this difference being due to the fact that the income is administered in the National Schools by the State, but in the others by the cities under the control of the State.

The School of Fine Arts at Toulouse, which was formerly administered by the city, has become a National School.

Local and National Schools.

In addition to these Schools of Fine Arts supported or subsidized by the State, there are others, such as those at Bordeaux, Besançon and Marseilles, where the instruction is of the same character, and those at Dunkerque and Tourcoing (with a course in architecture) and at Toulon (studio of fine arts), which are sufficiently prosperous to do without the aid of the State. The same remark applies to the School of Sculpture at Grenoble.

The organization and teaching at the Schools of Decorative Art in the Departments (Provinces) have been copied from the National School of Decorative Arts at Paris, the artistic training of which has profoundly affected French industries. These schools have the common object of cultivating the taste and completing the industrial education of workmen and artisans by teaching drawing and the allied arts. Each school covers special instruction adapted to the occupations of the pupils. They are for day scholars. Pupils who are minors, and are introduced by their parents or employers, must know reading writing and arithmetic. Foreigners may be admitted by special permission. The instruction is free, and pupils of both sexes are received.

National Schools of Fine Arts.

The National Schools of Fine Arts of the Departments, five in number, situated at Lyons, Algiers, Bourges, Dijon and Toulouse, impart a knowledge of drawing and the kindred arts of painting, sculpture, engraving, architecture, etc. At all these schools the instruction is free; the pupils are day scholars, and must be introduced by parents or employers, if minors, and be able to read, write and figure. Maintenance scholarships may be granted to pupils who have not sufficient means. These scholarships, which may be divided, are furnished either by the Departments (Provinces) or the communes (city or village).

In the Departments (Provinces) there is very little difference between the schools of fine arts, of decorative arts, and of industrial arts. This is not so at Paris, where the National School of Fine Arts aims to give the highest artistic

instruction possible, and this is imparted by the greatest artists of France. The exceptional importance of the School of Fine Arts (the famous Ecole des Beaux Arts) at Paris requires separate mention.

MUNICIPAL SCHOOLS OF DRAWING.

Examples of this class of school may be given by referring to those at Lyons. These schools were organized under the same law of December 2, 1876, which established the Ecole des Beaux Arts. There are 4 evening schools for male adults, situated in different parts of the city, in which classes are held usually on three evenings weekly, the fee being 3 francs.

In the *Petit-College School* the program comprises: (a) elementary courses covering the principles of geometrical drawing, perspective, casts and ornaments; (b) industrial linear drawing applied to constructions and machines, architecture, and elements of geometry and perspective; (c) higher course from casts, heads and classical subjects; (d) modelling; (f) drawing of flowers from nature, and conventionalizing; (g) decorative art applied to industry.

In the *De la Guillotiere School* the teaching comprises; (a) higher course of figure drawing from the cast; (b) higher course of ornamental drawing from the cast, with application to decorative arts; (c) higher course of modeling, figure and ornament, with applications to decorative arts; (d) drawing in its various applications—first section, linear industrial drawing, perspective, shading, water colors from relief models; second section, application of decorative art to architecture and various industries; (e) preparatory course to the preceding courses, comprising geometrical drawing, perspective, shading and water color, linear and ornamental drawing.

Des Brotteaux School,—The program comprises: (a) course of drawing from the cast, and modeling; (b) linear drawing, geometry, stone-cutting and water colors; elements of architecture, industrial drawing applied to construc- drawn from nature; (e) art composition applied to Industry.

De la Croix-Rousse Schools,—The program comprises: (a) course on principles; (b) drawing from the cast, classical; (c) flowers from nature; (d) conventionalizing and application to industry; (e) higher course of ornamental drawing; (f) decorative art, composition and study of styles; (g) linear and mechanical drawing; drawing applied to various industries.

There are two schools for women and girls, as follows:—

Rue de l'Hotel de Ville School,—a drawing school whose program comprises: (a) drawing from the figure (head); (b) ornament from the cast; application of ornament to decoration of objects; (c) special flower course—study of flowers from nature in crayon and water color, with application to industrial arts; (d) elementary composition and style; (e) course on principles; (f) special drawing course on Thursdays; (g) preparatory courses, optional, for examinations as professors or for the Ecole des Beaux Arts. Classes meet in the afternoons for three or four hours; preparatory courses one or two hours.

Municipal Course in Embroidery (artistic hand embroidery); The course lasts 4 years, and comprises the study of various stitches and embroideries of different periods and their applications. Girls of over 14 are admitted who are attending or have attended the Municipal School of Drawing, or who have the necessary knowledge of drawing. The courses are held in the afternoons.

MUNICIPAL PREPARATORY SCHOOL OF PRACTICAL DRAWING, PARIS.

(Germain Pilon School, 12 rue Ste. Elizabeth.)

This school prepares young men to become draftsmen or industrial modelers.

It instructs pupils in drawing, modeling, and molding, not only from the theoretical but also from the practical point of view, with reference to the following specialties: jewelry, goldsmith's art, furniture, painted papers, ceramics, embroidery, lace, lace-making, mosaic, and ironmongery.

The program comprises drawing and modeling from the cast and the living model, watercolor from nature, geometrical drawing, tinting and the theory of shading, perspective, elementary architecture, analysis of styles and decorative composition, anatomy, history of art, designing stuffs and furniture, embroidery and lace making, technological lectures, and practical exercises in molding.

The course takes three years. Instruction is free. Maintenance scholarships may be granted, beginning with the second year. The classes are held from 8 to 11 a.m. and 1 to 5 p.m. Candidates are admitted by competition in June. Candidates must be French, living at Paris or in the Department of the Seine, 13 years of age, if provided with the certificate of studies; otherwise 14.

The competition comprises: drawing an ordinary object of a simple shape, geometrically and in perspective; also French composition.

Evening classes bearing on the program of the school are held during the school year, from October to June 30, from 8 to 10 p.m. daily (except Saturdays and Sundays).

Evening pupils must be at least 15 years of age.

SECTION 2: OTHER SCHOOLS OF DRAWING AND ARTS.

(1) ST. ETIENNE DISTRICT SCHOOL OF INDUSTRIAL ARTS.

This school was established in 1804. It is under the direction of the Minister of Public Instruction and Fine Arts, and is subject to the inspection of his delegates. The staff is appointed by the Prefect of the Department (Loire), on the nomination of the mayor, subject to the approval of the Ministry of Fine Arts. The school is a municipal institution, deriving the great part of its funds from the city. It is under the authority of a director, who receives instructions from a special Council of Improvement.

Students must be not under 12 years old, and of French nationality. Foreigners can be admitted only by special permission of the Prefect.

Some former students have gone to the Ecole des Beaux Arts at Paris, others to the Ecole des Beaux Arts at Lyons, and to the Preparatory School of Architecture at Lyons.

The average number of pupils is 450. There is no definite limit to the course, which sometimes extends over five years.

Evening courses in drawing applied to industry are largely attended by apprentices and others.

Pupils wishing to take up art as a profession go on to the schools at Lyons or Paris after a few years here.

Courses Related to Local Industries.

There are 25 Courses, viz.: 6 in drawing; 6 special courses in elementary and descriptive geometry, perspective, anatomy, history of art, mechanics and geometrical drawing; 13 applied courses covering decorative composition, modeling, architecture, engraving of weapons, incrustation, carving and repoussé, engraving with the hammer, chisel and liquid, mounting on cards and weaving.

The school devotes much of its work to two very old and important industries carried on in St. Etienne, viz. fire-arms and ribbons. Working drawings of ribbon patterns designed from plants are composed by pupils. The fire-arms are engraved, some of the work being executed on the weapons themselves, while others are designed separately. Sometimes the metal is decorated, sometimes the wood.

Few of the pupils turn out full-fledged artists, but they are good engravers on wood and metal, and could be sent to Paris to finish their training.

(2) SCHOOL OF DRAWING AND ART APPLIED TO THE INDUSTRIES, PARIS.

This is a free day school at 24 rue Duperre, intended to train not only skilful industrial draftsmen, but also art workers in the special lines which can be carried on by women.

It comprises elementary and advanced divisions, the instruction in each being both theoretical and vocational. The course is three years. The sessions are held from 8.30 to 11.30 a.m. and 1 to 5.30 p.m.

Elementary Division.—Theoretical instruction comprises: the French language, moral and common law, history and general geography, arithmetic, ordinary geometry, elements of the physical and natural sciences (physics, chemistry, botany, zoology, and physiology); elements of hygiene, of domestic economy, of technology, of art history, and of ornamental composition; and application of geometrical drawing. Vocational instruction comprises: drawing at sight and modeling; geometrical drawing in its applications to the industries; ornamental composition, execution of the compositions given in the theoretical course;

elements of water-color drawing and wash drawing; elementary work of application, and reproduction of models given at the course in ornamental composition.

Advanced Division.—Theoretical instruction is given by oral courses or lectures bearing on ornamental composition, architecture, history of art, comparative anatomy, applied hygiene, political economy, and labor legislation; also courses in technology in connection with the composition and making of lace, embroidery, upholstery, jewelry, goldsmiths' work, cabinet work, furniture, art ironmongery, ceramics, stained glass, enamels, leathers, ivory, the utilization of the processes of stencilling, batik, photography, etc. Vocational instruction comprises: ornamental composition (realization of the programs laid down by the various art industries); drawing at sight and modeling from the antique and from nature; architectural or geometrical drawing in its industrial applications (panelling, doors, windows, ceilings, interior decoration, adaptation of furniture to its objects, etc.); drawing for laces and various embroideries; drawing for jewelry, goldsmiths' work, and art ironmongery; drawing for painted papers, hangings, silks, printed stuffs, etc.

Work in Art Industries.

The practical work covers applications to works of art and to the making of the following: lace, various embroideries (costumes, furniture, linen drapery, etc.), painting and water-color drawing on paper, linen cloth, skins, velvet, silk, cloth, wood, glass, ceramics, etc.; applications to works of art which utilise the processes of modeling, molding, stamping, etc., to molding leather, to working in metal, horn, ivory, mother-of pearl, valuable woods, etc.; to tinting stuffs by the processes of batik or pochoir, engraving, miniature figures for styles, etc.; and photography (enlargement, projection, and retouching).

Conditions of Admission.

Pupils are admitted into each of the divisions of the school by annual competition, usually held in June. Those domiciled outside of the Department of the Seine must pay from 100 to 200 francs annually according to the courses of instruction taken.

For the elementary division candidates must be not less than 13 or over 15 years, but the certificate of primary studies admits at 12 years to the competition, comprising dictation in orthography, which serves also as an examination in writing; a composition; drawing at sight an ordinary object or a cast; elementary geometry and arithemetic; sewing.

For the higher division candidates must be not less than 15 or over 20 on October 1st of year of competition, which comprises graphic examinations, viz., perspective drawing at sight; drawing from the bust; drawing from memory on a reduced scale, examination in perspective and geometrical abstract, and ornamental composition. Oral examinations consist of questions on general history and general geography, on the physical and natural sciences, on

ordinary geography, and projections and linear perspective. An optional examination bearing on all the subjects taught in the higher division.

The following are excused from the competition in the higher division, on fulfilling the conditions as to age and residence: pupils of the elementary division who have obtained the certificate of completed studies; pupils of the "professional" (vocational) schools at Paris who have obtained the certificate of apprenticeship or the diploma of completed professional studies; persons who hold one of the professional diplomas for drawing at sight in the National or municipal schools.

After consultation with the committee of patronage, outside pupils may be admitted to one course or more in the higher division for a fee of from 100 to 250 francs.

(3) NATIONAL SCHOOL OF DECORATIVE ARTS, PARIS.

This School was founded in 1767 under the name of The Royal Free School of Drawing, and was given its new name in 1877. It trains decorative artists and draftsmen for art industries, also constructive and decorative architects. The instruction is free.

The school comprises two sections: one for young men, at 5 rue de l'Ecole-de-Médécine; and one for girls, at 10 bis rue de Seine. Entrance examinations are held twice a year, in October and March. Candidates must be at least 13 and not over 30 in the case of men or 25 in the case of women. They must produce a birth certificate or other document to prove identity and nationality, and must be introduced by their parents or other responsible parties. Foreigners can only be enrolled on the application of the representative of their nation.

The entrance examination for male candidates comprises drawing and modeling from the cast, or architectural composition, according to the section they intend to enter; for girls it consists of drawing from the cast only. The examination extends over five periods of 2 hours each.

Regular attendance is insisted on, and pupils absenting themselves without cause are struck off the list.

YOUNG MEN'S SECTION.

The section for young men is open from 8.30 a. m. to 5 p. m., and from 8 to 10 p.m. The courses comprise; drawing from the antique, figure, ornament, and living model; sketching; course in ornamental composition—theory of composition, exercises on programs given weekly; study of classic styles; study of decoration—plants and natural or manufactured objects suitable for decorative purposes; study of industrial art—practice in composition with a view to its application to various artistic industries, and observations as to technical conditions of wood, furniture, various metals, textile fabrics, papers, printing, binding, glass, stained glass windows, ceramics, etc.; abstract and analysis of classic models; decoration—composition for painted architectural decoration, pasteboard for upholstery, stained glass windows, with use of the

diagram; modeling—figure and ornament, living model; sculpture—practice in composition with a view to reproduction in wood, bronze, stone, wax, etc., for industrial purposes, also architectural decoration; architecture—special courses for decorators and architects, the latter based upon courses in mathematics, descriptive and analytic geometry, stereotomy, and resistance of materials, thus supplying the necessary scientific knowledge; architectural drawing—study and exercises in composition; architectural composition—theory of composition from the point of view of structure and decoration; study of ancient monuments; exercises in composition on plans and sketches.

In the architectural studio compositions are developed according to program. Special courses in comparative anatomy are open to all students of perspective and art history. Technical lectures are given by artists and the leaders or foremen of manufacturing industries. The pupils are thus initiated into practical methods of execution. Visits to workshops complete this instruction. A course in pedagogics is given to prepare candidates for professorships of drawing under the State or City, by familiarizing them with the various examinations.

Section for Girls.

In the section for girls the courses are open from 9.30 a.m. to 4 p.m., with a holiday on Thursday, except for certain lectures which are held on Thursday morning. The instruction is identical with that given to young men, and the same subjects are taken, comprising drawing, classical studies, ornamental composition, architecture, including analysis of the properties of the various materials used, decoration, and composition. In the decorative studios compositions are studied from the point of view of industrial art. Modeling is also studied, and there are special courses in perspective, comparative anatomy and history of art, as well as technical lectures and a course of pedagogy in preparation for examinations.

Competitions are constantly held in both sections, pupils passing through successive divisions according to their progress. Medals and money prizes are awarded to the most successful pupils, and certificates of studies on graduation. As the school receives pupils of varied degrees of attainment, there is no time limit, the length of the course varying according to the pupil's proficiency on admission. In general, however, a pupil needs to remain 3 or 4 years in order to profit by the instruction, while a decorator who has already been trained in another place may not require more than 1 or 2 years.

There are about 820 pupils in attendance, of whom 120 are girls. The present premises are insufficient, and it is proposed to unite both sections in one building.

(4) LOCAL SCHOOLS OF ARCHITECTURE.

To practise as an architect no diploma is required, but since 1877 the School of Fine Arts, Paris, has granted an architectural diploma which is much sought after. It is quite evident that architects who possess diplomas, that is, who have followed a complete and methodical course of instruction and have

passed difficult examinations, offer to the public a higher standard of competency than others; yet there are scarcely 600 of these in the whole of France, the majority of architects having been trained haphazard through an apprenticeship.

Local schools of architecture, instituted to furnish young men desirous of entering this profession with facilities for study hitherto lacking, have been established in university cities, where there are more educational facilities than elsewhere. Since the enactment of the law of 1903, under which these schools operate, they have been opened at Lyons, Rouen, Rennes, Marseilles and Lille, and it is intended to establish schools at Bordeaux, Nancy and Toulouse. They are organized on the plan of the architectural section of the School of Fine Arts and lead up to the same diploma, for which examinations are held twice a year in Paris. The programs and studies are the same, except that there is no studio at the school itself, and the pupils choose whichever outside master they prefer.

The Training of Architects.

The instruction comprises: ornamental drawing, perspective, general history, mathematics and mechanics, descriptive geometry, stereotomy and surveying, physics and chemistry, construction, building legislation, general history of architecture, history of French architecture, decorative composition, theory of architecture, literature, history of art and archaeology, figure drawing, modeling; simultaneous instruction in the three arts—Painting, Sculpture and Architecture.

The examinations, exercises and compositions of the candidates and pupils are decided by boards of examiners of the School of Fine Arts, and conducted by an architect delegated by each local school.

The students are divided into two classes, young men between 15 and 30 being received into the 2nd class by competition, the examinations for which are held twice a year in each school. This examination is open to foreigners. Candidates for the schools of architecture, and visitors, may be authorised to attend the lecture courses.

For promotion to the 1st class, pupils must have obtained medals or distinction in the competition, and worked through the 2nd class. Pupils in the 1st class who have obtained medals or distinctions may obtain a certificate of studies without further examinations.

(5) SCHOOL OF DRAWING AND BUILDING ART.

This school, at 11 rue St. Benoit, Paris, founded in 1901, is intended (1) for young men preparing for the National School of Fine Arts (architectural section), for schools of architecture, or for municipal or departmental government posts (1st division); (2) for candidates for professorships of drawing in lyceums, colleges, normal schools, primary higher schools, and schools and courses of the city of Paris (2nd division). The course is begun by correspondence, and completed at the special studio, where the number of pupils is limited.

Correspondence Course.

The school sends lessons and corrected papers to pupils of the 1st division. Every week the pupils receive written lessons on architecture, construction, and stereotomy or geometrical tracing, of which they have to make a graphic application on a synoptic program. In this way they are practised in architectural composition. In their 1st year they study the principles of architecture, perspective outline, stereotomy and construction. In their 2nd, private or public architecture, according to whether they intend to engage in private practice or under the Government. In their 3rd, they make a complete design with all the details of execution.

In the 2nd division, pupils are prepared for the official examinations admitting to professorships. The lessons deal with perspective, shading, history of art, decorative composition, etc. In their 1st year they study drawing, perspective, history of art, appliedgeometry, and anatomy; in the 2nd, pedagogics and the practice of teaching, passing the first grade or normal school examinations; in their 3rd, they take decorative composition, styles and stylisation, passing the higher grade examination in decorative composition, or those of the city of Paris.

There is a preparatory year for young men who need to perfect themselves in outline drawing, geometrical figures, and descriptive geometry and shading before taking up the special studies.

The cost varies from 8 to 40 francs per month, according to the courses.

Course in Special Studio.

This comprises the same subjects as are taught by correspondence. The weekly division of time is as follows:—

1st Division: (1) study of architecture, comprising graphic documents with corrections, on a synoptic program; 6 lessons of 4 hours each; (2) an outline of architecture, pupil's original work, to be studied and delivered under the conditions of the competition, in 12 hours; (3) a drawing from the cast, model or diagram of descriptive geometry, in 8 hours; (4) questions in mathematics, general geometry and descriptive geometry, algebra and arithmetic; (5) papers in mathematics and history.

2nd Division: (1) a lesson in perspective and a diagram, 8 hours; (2) a lesson on the history of art; (3) a lesson in pedagogics; (4) graphic work in drawing and applied geometry, to be done in the time allotted for the examination test; (5) questions and practice in blackboard drawing.

The studio is open from 8 a. m. to 6 p.m. The monthly enrolment and school fee is 10½ francs, inclusive.

Normal Class.

Shortly before the examinations, a normal session of pedagogical preparation is arranged, comprising collective questions, lessons in drawing, and graphic tests.

All the teachers in the school hold either State or Paris diplomas.

(6) SCHOOL OF CERAMICS, SEVRES.

This School, annexed to the National Factory at Sevres, is intended to train ceramists.

Pupils are admitted by examination held every July at the factory. Scholarships of 800 francs each, which may be augmented by 100 francs annually, are awarded to poor students.

Candidates must be French, and not under 16 or over 19 at the time of the examination. Applications must be sent to the manager of the factory, with certificates of birth, of primary education, of good conduct and habits, and a memorandum of previous studies and work. The subjects of the examination are as follows:—

Eliminatory Examination: (1) linear and geometrical drawing (abstract and projections); geometrical abstract; plan, elevation and section, if any, of a simple object in relief on a sheet of half size; time 4 hours; (2) arithmetical and geometrical problems, time 3 hours; (3) drawing from the cast on a drawing sheet Ingres size, time 4 hours; (4) freehand drawing of a plant or simple object on a sheet of half great eagle, time 4 hours.

Final Examination: questions in arithmetic, geometry, principles of geometrical drawing, algebra, chemistry and physics.

Physical fitness of candidates for the workshop must be proved by a certificate from the physician at the factory, before the final examination.

The course is 4 years. There is a post-graduate course of 1 year, for which pupils are allowed 1200 francs, and during which they devote themselves to work, the program of which they make up for themselves, but which is subject to the approval of the council of the school.

Course of Instruction.

The instruction comprises the following courses:

Methods of geometrical drawing, imitative and water-colour drawing, modeling, decorative composition, history of styles and of ceramics, chemistry and ceramic technology, anatomy, turning, molding, repairing and manufacture of molds, study of the various ceramic processes for the decoration of porcelain, laboratory work, technical designs, decorative designs, composition, manufacture and decoration of pieces of pottery, and studies in cooking, muffles and ovens.

3d year.—Turning, molding repairing, manufacture of molds, etc.; application of the various ceramic processes to the decoration of porcelain; general studies in decorative composition; imitative drawing; water-colour drawing; studies at the museum (sketching); geometrical drawing, and modeling.

4th year.—Studies in ceramic painting and decorative composition; imitative drawing, studies from the antique and from nature, and studies in anatomy; composition of designs and application of practical work to execute them; methodical and developed course in decorative composition; modeling; studies at the ceramic museum (sketching); geometrical drawing (designs);

general manufacturing, practical studies; work in the chemical laboratory; ornamental drawing, and water-colour drawing.

At the end of the course, pupils who maintain the general average of 13 marks are granted the diploma.

SECTION 3: INFORMATION FROM HIGHEST AUTHORITIES.

Information obtained in "Conversation" with MR. LOUIS GUEBIN, *Principal Inspector of Drawing in the Schools of the City of Paris.*

Drawing in France is compulsory in all primary schools from ages 6 to 12. It is treated like any other subject —like the French language, or arithmetic, or geometry. In the Higher Primary public schools both boys and girls have 3 hours drawing out of a total of 30 hours per week in their general course, while boys in the industrial course have 4½ hours weekly, and in the business and agriculture courses 1½ hours. In the industrial section of the Practical Schools of Commerce and Industry both sexes get 6 hours drawing per week in the first year, while in the second and third years girls get 3 and boys get 7 hours weekly.

All over France drawing is taught by the teachers themselves just as they teach geometry, but large cities have special professors for drawing. In Paris there are about 200 schools for boys and 200 for girls where special professors of drawing come (about 11) to the scholars in the last years of their study at the primary school, to prepare their minds more especially for industrial purposes. These professors are artists in drawing, sculpture, etc. and are chosen after competition.

After taking a primary obligatory course, pupils can go to a supplementary course, then to a special school for drawing, then to a professional school for wood, iron and book-binding. From the special school of design they can go to the School of Fine Arts; after that they do as they like.

There are scholarships of 500 francs given to pupils. After travelling, students return and produce a different quality of work.

DRAWING CONGRESS "COMPETITIONS".

Mr. Guebin was one of the organizers of the International Congress on Drawing and Art at the Paris Exposition in 1900. He explained that so much of importance had been found in this branch of teaching that it was decided to meet every fourth year. Meetings were held at Berne in 1904, London in 1908, and Dresden in 1912. The latter was attended by about 2,000 delegates from all parts of the world. A permanent international federation has been formed to carry on the work.

Mr. Guebin claims that the new method of teaching, adopted in the present French programme, came from the special study made of the question by the International Congress, followed by their suggestions and work. Formerly

this teaching used to be a kind of copying work, based completely on geometrical forms; now pupils study more from Nature, the geometrical forms coming only as a help to enable them to draw the object.

The Commission, in company with Mr. Guebin visited a large hall in the Place de la Concorde, where we found between 200 and 300 girl students of Paris schools, aged about 12 or 13, some 50 of whom were from the continuation courses, in competition for promotion to higher classes. They were making art "compositions" direct from natural flowers, and conventionalizing designs; for this work they are allowed four hours. A similar number of boys were in another part of the building in charge of male teachers. One of the subjects was the decoration of a bon-bon box octagonal in shape. Competitors must furnish a design for the top of the box, then make a drawing for the lateral face of the box.

The first competition (in ordinary drawing) was held the previous week, among 600 students; then out of that number these selected were allowed to compete further in composition, having gained that right by obtaining "special mention" in the ordinary drawing competition. These competitions were instituted ten years ago.

Mr. Guebin's Principles and Methods.

The Commission visited the Normal School of Drawing, a special school established in 1896 for teaching the pedagogy of drawing. Teachers from the primary Normal Schools who wish to teach drawing as a specialty come here to perfect themselves. Principal Guebin and his colleagues give special lectures. The teachers' course is given only on Thursdays throughout one year, equivalent to 25 lessons.

Teachers do not teach drawing as a special subject unrelated to any other, but their general teaching is done by the aid of drawing. The aim is to teach children at from 8 to 10 years so that as soon as form can be understood the children draw that form. Specimens of pre-historic man living in grottos were illustrated by drawings in color.

The vertical line is not treated by Mr. Guebin as an abstraction, but is illustrated by examining the vertical lines on a tree, a telegraph pole, a picket fence, etc. Horizontal lines are illustrated by diagrams of steps, table, boat, water, etc. Oblique lines are represented by drawing a latticed fence, etc.

Drawing is used for teaching language, geography, technical terms, etc. such as desert, plain, etc. and at the same time giving graphic representations of objects.

The three principles underlying M. Guebin's method are:—(1) That the students have liberty of sentiment and even of interpretation—of course comprised within certain limits of correction, gradually becoming more severe. That the master have liberty of action, and encouragement to initiative according to his appropriate temperament. (2) Drawing is studied less for itself than as a means of general education. Everything that will incorporate the matter of the primary studies, and mix with it the intellectual life of the school, shall answer this purpose. Drawing shall be used not as a pleasing art but

as a general instrument of culture and as a further enforcement of the normal play of the imagination, the sensibility and memory. (3) Nature is taken as a basis; it is loved for itself, and translated directly and naively. Nature is concrete; the drawing must not be abstract. In nature as we see it and as we try to copy it geometry does not exist.

Drawing Correlated with Language, etc.

M. Guebin uses drawing for lessons on language. He showed us several illustrations of homonyms—French words for similar objects, e.g., suspended bodies—lamps, bell, etc; bodies resting—tree, wardrobe, etc. Teachers ask scholars for names of suspended objects; for bodies bent against the wall; bodies that appear to have nothing to suspend them, such as aeroplanes. Drawing is used in history teaching, e.g., scenes in connection with the siege of Paris. In geography, ideas were given of Switzerland by a general view in colors of lake and mountains, tunnel, watch, cheese, etc. Three states of water were shown; rain, steam, ice; glass carafe broken by the ice bursting. The history of a river was shown by drawings of bridge, embrochure, another river tumbling into it, springs from which it starts, etc. In physics, the ideas of atmospheric disturbance were shown by drawings representing atmospheric electricity, lightning, trolley cars, electric tramway. Chemistry was illustrated by a volcano emitting sulphur, the spraying of vines, flowers in a bottle, flame of a candle, sulphurous gas. A lesson is given on sulphur and the children are asked to give an account of it by means of illustrations. Three different parts of France were illustrated by special features—pasture, paper-making, etc. Different types of habitation were shown—hut, cottage, tent, chateau, farm, ordinary city house. In one of the children's drawings a stable and chickenhouse were added. Habitations of animals—dog's house, bird's nests, cage for birds, bee-hive, ground mice under a tree. Family life was represented by pot à feu, dishes, vegetables used in making soup, cook skimming from the pot, family at table eating.

How Children are Trained to Draw.

The above drawings are made without regard to accuracy, the object being to get the expression of the personality of the child. Concurrently with this, however, he gives drawings in which he insists on accuracy. He will say to a child, "The object about which I am speaking to you has a round form." The teacher would go to the board and draw a round form and show that it is round. It is instruction by drawing. They leave the child at liberty as far as the execution is concerned, but he is too young to be allowed to choose the object, as he would always select the same thing. When a child is left to choose his own subject he makes a figure from his own idea, whereas by requiring the child to observe an object he makes the idea more definite. Specimens of children's work were produced by M. Guebin showing results under both these conditions. In the first case the eyes and nose were grotesque, while in the other they became quite human.

To train the hand for brush work, simple designs are first cut in paper marked out in dry colors, so that when the pupil starts a similar design in water colors, the colors will not run beyond the line, but will be clear and definite like those cut in paper. Crayons or water colors are used at the option of pupils. Drawing is one thing, and coloring is another. You must not look for form when you color. The theory of colors is taught by showing the different colors.

Nature and geometry are combined by taking a leaf and turning it at different angles, showing the difference in width by means of perspective.

French and German Methods Compared.

Young children, having no sense of comparison, always make their drawings too small. To develop the sense of comparison of sizes there were sheets representing an eyelet and different sizes of circles, rings, etc. up to a large circle, so that children would know about what size to draw a pearl or a ring. Another device used to represent relation of sizes was a sheet showing heads and hats, pots and covers, letters and envelopes, keys and key-holes, etc.

To illustrate places and positions there were drawings of things on top, at the side, inverse, behind, etc. To show perspective he has pictures representing scenes at different angles—similar ones being pasted on the same sheet so as to impress the point. Thus to represent the idea of convergence he gives a view of birds (side view); also bodies in a circle.

M. Guebin has carefully worked out his pedagogical plan, covering analysis, synthesis, applications of art, etc. He gave us an analysis of the German method of drawing. The elements are initiation, presentation, direction, quantity, distance. Fig. 1 was drawn from nature to the best of the pupil's knowledge. Fig. 2 simplifies the object of his drawing. He puts his first drawing away and he returns to the object, drawing it in a different position. In Fig. 3 he simplifies again. Then from memory he makes Fig. 4, showing the object in that new position which he has taken. Then in the fifth exercise he takes back the model and puts it in the same position as his fourth drawing, and draws it there finally.

"Conversation" with an Engineer.

Information obtained in "Conversation" with Mr. M. L. Francken, *Engineer, Professor in the schools of the city of Paris, Officer of Public Instruction, Author of "The Teaching of Drawing and its Professional Applications."*

The first principles of drawing should be taught to every person from an early age, so as to put the child into a position to express himself with its aid. A child of two or three years old draws naturally, and all the teacher has to do is to develop and direct this natural faculty. If we go the right way and develop this natural instinct of the child we have no effort to teach him how to draw. Look at the future, and see what enormous advantages this boy will have in later life if he knows drawing.

When a child first comes to school we teach him how to write, without reference to his special future occupation. We do not tell him, "You shall be a poet; you shall be a romancer, a great writer," etc. It should be the same with

drawing. After this starting point there will of course be some branching out in different professions, those who want to go to workshops, or to higher courses of arts, or to engineering, etc., being directed in that way.

Mr. Francken claims that every profession should know how to draw, for this skill is as useful to a litterateur as to a mariner. Drawing helps every trade in the world; every station in life will take a young man if he knows drawing. Ordinary commerce, selling goods, would not seem to require any notion of drawing; but such men sometimes have to compile statistics, and if they can do so by graphic methods, these are more telling and more exact than ordinary figures. Again, a man who sells dry goods will be interested in coloring, and would be glad to know how to mix colors so as to produce a good effect instead of a bad one.

Development of Popular Taste.

If a clever workman who knows drawing produces a fine piece of workmanship, how can he sell his work to a rich man who has no notion of what is artistic and pretty? Hence all classes should know drawing. The teaching of teachers of drawing must be continued, and taste must be developed. To be able to draw, even to be an artist, is quite different from being prepared to teach drawing properly, for a man cannot be a good teacher of drawing simply because he is an artist; he must make a special study in order to teach drawing.

Mr. Francken claims that drawing does not interfere with general school instruction, but on the contrary if taught properly may be a means of reducing the time now spent in teaching geography, history, natural history, and other subjects.

Before 1865 France practically did not teach drawing universally in the schools, but it received confirmation in 1867 when a great Commission investigated the matter at the time the Exhibition was held in Paris. It was only in 1900 that this instruction was generalized in primary schools, but drawing was then only optional, not compulsory, in the certificate of primary schools, at the age of 12. It was made compulsory only in 1907. Of course drawing was practised in France for a very long time, but to generalize it they had to get the sanction of the law, which was passed only about four or five years ago. Now drawing is compulsory. The International Congress as well as the National Congress had considerable influence in that direction. The latter Congress means a great deal more in influence from the fact that it is National.

"Conversation" with Sub-Inspector of Drawing.

Information obtained in "Conversation" with M'lle de Montille, *Inspector of Drawing for a section of Paris.*

In France the fundamental principle is that every child should know how to draw. We give plaster-casts and work from new objects, and make the children draw those things as seriously as though they were all to be great artists. But we do not make it turn to the technical side at once; we do not teach it right away for any certain trade or craft; whereas in Germany the child, from the very

minute it starts, begins to learn a craft alongside the drawing; therefore German children know the craft better, but never become such good draughtsmen as do the French. We make them do something practical at the same time as we teach them to draw; but while they are doing something that will be useful for a craft, they are not learning the craft itself.

In our examinations one day we will give the children a wall-paper to design, and the next day a table service. Our children know very much less technique than the Germans, but they become better artists.

Children Study Artistic Models.

M'lle de Montille attended the Art Congress in London in 1908, and observed that the French art was more artistic than any shown there, while the German was stronger in technique. She thinks the reason France gets its artistic taste is that the French children are made to study artistic things; they are accustomed from the very beginning to go to the museums and study the beautiful things there, and are sent on certain days to all the temporary exhibitions that are held.

As an illustration of how good artistic taste permeates France, M'lle de Montille said that sometimes, while copying at the Louvre at lunch hour, workmen would come in and stop and look at the pictures, and the observations they would make on them were such as she would not have believed if she had not personally heard them. It is the appreciation of everybody—more like the judgment of the whole people.

Teachers always choose the most beautiful things for teaching. The Greek works are the most beautiful that exist. In regard to the use of the brush for flowers, Paris teachers let the child do pretty much as it likes.

No matter how little, everything must have a reasonable line. The scholars should correct each other. They are sometimes asked to judge which is the best drawing in the class, and they select the best and give the reasons. The children very often do ugly things because they do not know any better.

SECTION 4: SCHOOLS OF FINE ARTS.

NATIONAL SCHOOL OF FINE ARTS, LYONS.

In its organization and teaching this school approaches most nearly that of Paris.

Pupils are admitted from 14 years of age, on proving that they have the necessary education to profit by the courses.

The entrance examination comprises oral examination and competitions. Young people are received from 13 years of age in the preparatory school, where special instruction is given to enable them to pass the entrance examination.

For other candidates there is a session for examination and competition before the re-opening of the school.

The instruction given to pupils of the preparatory school comprises: geometry; free-hand drawing, study of figure ornament, geometrical drawing, and tinting.

Art Applied to Industries.

All pupils, on their entrance to the School of Fine Arts proper, unless they prove that they possess special knowledge, pass successively through the classes of relief and the living model. It is only after they have passed the competitions and promotion examinations that they can enter one of the following practical classes: painting, sculpture, architecture, floral and decorative art, and modeling applied to industry, putting on card, and composition applied to textile fabrics.

Class in relief: Descriptive and perspective geometry; study of the human figure and ornament from the bust; and history of art.

Living model class: Drawing from the living model; and the pupils who aspire to the various applied classes take the following courses: perspective, history of art, and archeology.

Those in the classes in painting, sculpture, and engraving follow a course in anatomy; those in the architectural classes follow courses in stereotomy; and those in the floral and decorative art classes study the industrial applications. A course in modeling is attached to this teaching.

At the end of the school year a competition is held for each of the practical classes; to the 1st prize there is attached 100 francs, and to the 2nd 50 francs.

The Parisian prize is granted every year, after a special competition, in two sections, to the pupil, painter, sculptor, or engraver who is adjudged to be the most capable to follow with profit the courses of the School of Fine Arts at Paris. This prize consists of an annual allowance of 1,800 francs during three years.

NATIONAL SCHOOL OF FINE ARTS, PARIS.

This, the well known "Ecole des Beaux Arts", at 14 rue Bonaparte, Paris, established under the law of Dec. 2, 1876, is devoted to the teaching of painting, sculpture, architecture, copper-plate engraving, engraving on metals and fine stones, engraving with aqua fortis, wood engraving and lithography. The instruction is free and is given:

(1) By oral public courses in the different branches of art;

(2) By competitions in the school which for this purpose is divided into three sections—(*a*) Painting (including copper-plate engraving, engraving with aqua fortis, wood engraving and lithography); (*b*) Sculpture (including engraving on metals and fine stones); and (*c*) Architecture;

(3) By studios to the number of 17—4 for painting; 4 for sculpture; 3 for architecture, and one each for copper-plate engraving, engraving on metals and fine stones, engraving with aqua fortis, wood engraving, lithography and practical sculpture. Each of these studios is conducted by an artist;

(4) By access to museums, galleries, and school library.

The pupils are all day scholars, and are divided into three groups according to the nature of their work and studies—1st group, pupils in painting and sculpture; 2nd group, pupils in architecture; 3rd group, outside pupils authorized to work in the galleries and to follow the oral courses, but who do not take part in the work of the school proper.

Terms of Admission, Courses, etc.

Pupils of the first two groups are admitted after examination: they must be at least 15 and not over 30 years; must present their birth certificates; also a document from a well-known artist, a director of an art school, etc., certifying that they are able to pass the entrance examination and to follow the instruction given in the school. Foreigners must also present a letter of introduction from the ambassador, minister or consul-general of their nation, stating the date and place of their birth. While candidates are admitted up to the age of 30, in practice this extreme limit cannot be taken advantage of, as all pupils cease to form part of the school on reaching the age of 30.

Entrance examinations take place twice a year, viz., for painters and sculptors in October and April; and for architects in July and December. They constitute for painters, sculptors and engravers what is called the competition for places. For architects these examinations admit to the second class. Enrolments close five days before the date of the first examination.

The pupils of the third group (candidates), when introduced by an artist, obtain a card of admission permitting them to follow the oral courses, to have access to the collections and to the library, and to draw in the galleries, where they receive the advice of their professors.

Since 1897 women have been admitted to this school under the same conditions as men.

The oral courses and instruction by means of the collections and the library are attended by the first and second groups of pupils of the school proper and any other persons (candidates or others) who have obtained cards of admission.

The oral courses comprise: In the sections of painting and sculpture—Anatomy, history, archeology, perspective, esthetics and art history. In the section of architecture—Mathematics, descriptive geometry, stereotomy and laying out plans, physics, chemistry and geology, perspective, construction, building legislation, general history of architecture, French architecture and theory of architecture. Courses common to all above sections are general history and literature.

Courses Outside of the Studios.

In the sections of Painting and Sculpture, under the name of *evening school*, practical courses in Drawing and Sculpture are given daily from 4 to 6 p.m. Pupil-painters, sculptors and engravers who succeeded at the previous competition for places alone are admitted. Every week a new model is given as a subject for study, alternating between antique and nature. For sculptors only, a course is

given in sculpture on stone and marble, intended to train practical sculptors. Ten professors (five painters and five sculptors) chosen from among the leading French artists, each conduct the evening school during one month.

In the section of Architecture a special course in ornamental drawing has been opened for pupil-architects.

Under the name of simultaneous instruction in the three arts, courses are given in modeling, elementary architecture and decorative composition, open to the pupils admitted to all the sections.

The School Proper and the Studios.

The pupils of the school proper participate in the practical studies and in the competitions, may obtain rewards and qualifications, and may also be admitted to the studios of the school, though many, if not the majority of the pupils of the school, attend private studios. These have the same rights of competition, duties, privileges and rewards as those who attend the school studios. The competitions in the three sections are very numerous, being held quarterly, semi-annually or annually. After these competitions "mentions", third medals, second medals and first medals are granted. Sums of money are attached to some of the principal rewards. In order to take part in certain competitions the pupil must have obtained distinctions in previous competitions. To each reward there is assigned a definite number of marks or values, from ½ up to 5. The total value obtained by a pupil is the figure he retains during his whole stay at the school, and which decides his rank as well as his right to take part in certain competitions.

In the section of Painting and Sculpture there are competitions in which the pupils of the school proper alone can take part, and others which are common to the pupils who have been admitted and to those who have not been admitted to the school proper. Pupils who are successful at these competitions may be excused from entrance examinations to the school proper.

The studios of the school are open (1) to the pupils of the school proper, who choose, in order of seniority and according to their rank o admission, one of the studios in their section in which they desire to study; (2) to young persons who have not been admitted to the school proper, but who are accepted by the professor. Each of the private studios is under whatever regulations the chief of the studio imposes.

Competitions in Painting and Sculpture.

In the sections of Painting and Sculpture the entrance examinations are called competitions for places.

In the section of Painting, comprising also copper-plate engraving, the preliminary (eliminato y) examination comprises a face drawn from nature, at one of the sessions, and from the antique at the other session. The entrance examinations comprise: 1st, anatomical drawing (osteology); 2nd, perspective drawing; 3rd, fragment of face drawn from the antique; 4th, elementary study

of architecture; 5th, examination (written or oral at the choice of the candidate) on general elements of history.

In the section of Sculpture (comprising also engraving on metals and fine stones) the preliminary examination (eliminatory) comprises a face modelled from nature, at one of the sessions, and from the antique at the other session. The entrance examination is identical with those in the section of Painting, but omitting perspective drawing.

Admission holds good only for six months, or rather till the session of the following examinations. In order to continue to form part of the school proper the pupil must after that time undergo new entrance examinations unless he has obtained certain rewards after the competitions.

Work Done in Studios.

The following is a summary of the work in the studios:

Painters: Exercises in drawing and painting from nature and from the antique. Exercises in composition. Exercises in decorative composition.

Engravers in Copper-plate: Elementary exercises in engraving. Exercises in engraving either from the prints of the masters or from drawings executed by the pupil. Faces drawn from the engraving and from the antique. Exercises in decorative composition.

Sculptors: Exercises in modelling from nature and from the antique, either in high relief or in low relief. Exercises in decorative composition.

Engravers on metals and fine stones: Elementary exercises in engraving. Exercises in engraving, either from metals or the antique, engraved stones or models executed by the pupil. Figures drawn or modelled in bas relief from nature and from the antique. Exercises in composition on metals and cameos.

Section of Architecture.

This section comprises two divisions, the second and the first class.

The entrance examinations to the 2nd class consist of an architectural composition executed in a separate room in 12 hours. Only candidates who pass this examination are authorized to enter for the following examinations: (1) drawing of a head or of an ornament from the plaster, to be executed in 8 hours.

The 90 Frenchmen who obtain the greatest number of marks and the thirty foreigners (comprising the proportion who are admissible) are alone authorised to enter for the following examinations: (1) exercises (done in separate room) in calculus, one being in logarithmic calculus; also an examination in arithmetic, algebra and elementary geometry; (2) descriptive geometry applied to an architectural projection (done in a separate room in 8 hours); (3) an oral examination and written composition on the elements of general history.

The number of admissions after examination is limited to 45 Frenchmen and 15 foreigners.

When once a pupil has been admitted to the Architectural Section of the school it is final, at least for those pupils who fulfil the conditions imposed by the school regulations, whereas pupils of the section of Painting and Sculpture are admitted for only six months.

For students of architecture the work of the studio consists in scientific exercises and exercises in composition. The pupils pass from the second class to the first class as soon as they have obtained a certain number of marks after the periodical competitions. The duration of the stay in the first class is variable, depending on the pupil's merits. The studies which lead to the architectural diploma last six years on the average, though some pupils have obtained it after four years of study after entering the second class.

Pupil architects may obtain the diploma of Architecture by final competition to which are admitted only those who have obtained a sufficient number of marks at the previous competitions. The subject matter consists of an architectural plan conceived and developed as if it were to be executed. To this is added an oral examination on the different parts of the plan, on the theoretical and practical parts of the construction, on physics and chemistry, on building legislation, and on the history of architecture.

Simultaneous Teaching of the Three Arts.

The pupils in each section are initiated into the elements of the arts of the other sections. These studies are limited as follows:—

Section of Painting: Figures, modelled alternately from nature and from the antique, and elementary exercises in architecture.

Section of Sculpture: Figures, drawn alternately from nature and the antique, and elementary exercises in architecture.

Section of Architecture: Ornamental drawing. Drawing of figures from nature or from plaster. Ornamental modelling, and occasionally figure modelling from plaster.

The Roman Prize. ("Prix de Rome.")

The dream indulged in by many artists and by all the brilliant scholars of the School of Fine Arts is to obtain the great Roman prize, the principal advantage connected with which is a four years' residence in Italy at the expense of the State. The competition, which is absolutely public, is under the direction of the Academy of Fine Arts. The examinations take place at the School of Fine Arts, which alone has quarters suitable for a competition of this magnitude. In order to be admitted to this competition it is necessary to be French, to be over 15 and not less than 30 years of age, to be unmarried, and to be furnished with a certificate of capacity from a professor or a well-known artist.

The competition for the grand prizes in Painting, Sculpture and Architecture is held every year; for the grand prize in copper-plate engraving every second year only; and for the grand prize for engraving on metals and fine stones every third year. In 1905 for the first time a young lady was admitted to the final competition for the Roman prize in Painting.

Every competition is divided into trial and final competitions. The former take place in March or April. The competitors execute their final work in a separate room, and cannot communicate among themselves or receive any outsiders except the models. The duration of the stay in a separate room is: for painters and sculptors 72 days; copper-plate engravers 90 days; engravers on fine stones 96 days; architects 110 days.

For each competition three prizes are given, to which pecuniary rewards are attached. The winners of the first grand prizes are called boarders of the French Academy at Rome, and are lodged at the Villa Medicis. The work they send in is exhibited publicly at the School of Fine Arts in Paris. Every boarder receives 600 francs for the expenses of his journey from Paris to Rome, and the same amount for the return trip. The yearly salary is 2,310 francs, besides the boarding indemnity of 200 francs. Moreover at the end of each year the students are reimbursed for the cost of their studies. During the first year of their board they travel in Italy; the second year they may travel in Italy and Sicily. The pupil painters of the third year may be authorized to execute the usual copy in a foreign museum outside of Italy. When they travel their salary is paid to them at the rate of 267½ francs per month.

The architects spend their fourth year in Greece, and when starting out they receive an indemnity of 800 francs. They may even go beyond Greece and extend their studies as far as Egypt or Asia Minor.

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CHAPTER XXXVIII: SCHOOLS FOR SPECIAL INDUSTRIES.*

SECTION 1: NATIONAL SCHOOL OF WATERS AND FORESTS, NANCY.

This school is intended to insure the recruitment of the superior staff of the administration of Waters and Forests, both in France and in the French colonies. All the pupils have been recruited from amongst graduates of the Agronomic Institute. Graduates of the Polytechnic School also may be admitted without competition.

Graduates of the Agronomic Institute who are candidates for the School of Forestry must be under 23 years of age on January 1st of the year in which they present themselves, and must obtain an average of at least 15 marks in mathematics and in special acquirements in German or English. To this end, when leaving the Institute, they undergo a special final examination on a modern language, which comprises an exercise at the board, the explanation of a text from the open book, and questions in German or English.

The number of pupils admitted to the school annually must not exceed 18, 2 of these being intended for Algeria under decree of July, 1909.

The pupils follow a two-years' course at the school, during which they receive a salary of 1200 francs. This salary is swallowed up by the cost of food and quartering in barracks. When pupils first enter the school the parents must also expend 1200 francs for equipment and uniforms, besides 600 francs annually to defray cost of journeys, riding lessons, etc.

Military Service.

In pursuance of the law of March 21, 1905, those pupils, who have been admitted and declared fit for military service, contract a military engagement for 4 years. They complete one year's service before entering the school; the two school years count as if passed in the army; then having passed the final examinations they complete their military service by passing a 4th year as sub-lieutenants of the reserves. The school may accept pupils who have not yet been recognised as fit for military service, in case this disability is the result of constitutional weakness only, and appears to be capable of improvement in time; but pupils who, on graduating, do not possess the physique required for military service, and those who have not fulfilled the requisite conditions for appointment as sub-lieutenants of the reserves, are, under decree of 1909, removed from the list of the personnel of Waters and Forests.

*Reports on Schools for Miners, Schools for Fishermen, Schools of Navigation, and Schools for the Tanning and Leather Industries are to be found at the end of Part III.

The instruction given at the school embraces a thorough study of the scientific and economical management of forests.

Subjects of Study.

(1) *The forestry sciences*, viz., sylviculture, forestry technology, dendrometry, forestry economy, pastoral economy, forestry statistics, the valuation of forestry properties, and history of forestry sciences (150 lessons of 1½ hours);

(2) *Natural applied sciences*, consisting of the applications to forestry of botany, mineralogy, geology, zoology, and especially of pisciculture and entomology (150 lessons of 1½ hours);

(3) *Forestry legislation*, which extends far beyond the limits of the forestry code of 1827, and embraces the important portions of civil law, administrative and penal law, legislation on public works applied to the restoration of mountains, also fishing, hunting, and the destruction of noxious animals (100 lessons of 1½ hours.);

(4) *Applied mathematics* in relation to topography, means of transportation in forests (routes, railways, etc.), rudiments of applied mechanics, bridge construction, sawmills and forestry buildings, and the correction of streams and agricultural hydraulics (100 lessons of 1½ hours);

(5) *Modern languages* (German and English), in relation to the reading and explanation of German and English authors on forestry (60 lessons of 1 hour);

(6) *Military art*, comprising all matters necessary for officers who must take their place in the national army in time of war.

Since the decree of December 30, 1897, which widens the powers of the administration of Waters and Forests as regards pastoral improvements, fishing and pisciculture, all these subjects have been developed extensively in most of the branches of instruction.

School Year; How Arranged.

Each school year is divided into two parts, the winter term of 6½ months being devoted to theoretical and practical studies, and the summer term of 2½ months to applying these studies to the land, and to preparing for the examinations which occupy one month at the end of the year.

During the winter term, one day every week is devoted to practical education, the other days being taken up by courses and studies. The school contains large collections of natural history objects, woods and forestry products, which are utilised under the direction of the professors. There is also a library of considerable extent, which includes the majority of French and foreign works on forestry subjects.

Country excursions take place, either in the neighborhood of Nancy or in other parts of France. In this way, the 2nd year division prepares plans for the management of foliaged and resinous forests, and then prepares studies in the Alps with relation to the correction of streams. Likewise, the 1st year pupils visit the Vosges, Jura, or the Paris basin, the oak forests of the west, and the pine forests of the Landes.

Although this is a boarding school, the pupils enjoy a fair amount of liberty similar to that of pupil-officers at the school of Fontainebleau. Their meals ar served by the school outside the establishment, and after these meals they ma take their recreations in the city. They have also their evenings free. The are compelled to wear the uniform and carry a sword.

Classification of Pupils.

The pupils are classified according to the marks obtained at the examination and the practical work. Two classifications are made every year: one at the en of the winter term, and the other after the excursions and the general examina tion. At this latter examination the results of the classification at the end o the term are counted as one-half. Any pupil who has not secured a total numbe of marks equal to half of the maximum total number belonging to the correspond ing year is suspended. The same applies to those who have not obtained 8 (out of 20), in forestry or natural sciences, and 6 in the other subjects of instruc tion. At the end of the second year, or during that year, when a course is com pleted, the pupils are examined by a jury of 3 professors, presided over by th director. They are likewise examined from the point of view of military educa tion by a commission presided over by a superior officer. According to thei final standing they are permitted to choose their probationary residence from a lis prepared by the administration; and those who obtain a general average of 15 out of the total number of marks, immediately receive the rank and salary o third-class general guards.

Young men who have graduated from this school attain the rank of inspector at 4,000 francs, at about the age of 42; nearly all become first-class inspectors at a salary of 6,000 francs; the most favored ones attain the rank of commissioner with salaries of from 8,000 to 12,000 francs.

The service comprises 300 general guards and 215 deputy inspectors, whc perform the same duties under the orders of 300 inspectors and 32 commissioners

Outside Students.

The school also receives pupils who do not intend to enter the employ of the administration of Waters and Forests. They may be of either French or foreign nationality. Both are admitted free to the courses and the practical work, without undergoing an entrance examination.

The education given by the French School of Waters and Forests is highly esteemed throughout the entire world, and the courses have always been attended by a large number of foreigners.

Certain governments have special agreements with France which determine the courses for which attendance shall be required. The admission of these foreigners does not entitle them to the receipt of any salary. In this way, from 1868 to 1886, England sent to Nancy young men who were intended for the Forestry Service of India; Belgium likewise has for a long time past sent to Nancy its forestry candidates who have graduated from the agricultural institutes at

Gembloux and Louvain. By virtue of similar agreements, foreigners may be admitted to the school as boarders. The education they receive at Nancy is perfectly suited to future managers of private forests or to young men who will have to administer rural estates.

For some years past the course in forestry sciences taught at the school has comprised a series of lessons with special reference to the forests of the French colonies. This course is attached to the division of colonial studies organised at the university of Nancy. The whole constitutes the best preparation for young men who are intended for the colonial administration or for colonisation.

Station of Forestry Investigation and Experiments.

There is attached to this school at Nancy a station for investigations and experiments, with a staff of two forestry agents, carried on with the collaboration of the school professors, and intended to aid theoretical instruction by experiments and by operations in which the students can participate. To this end, the station has the technical control of about 3000 hectares of forests, the majority of these being situated in the neighborhood of Nancy, and some in the resinous district of the Vosges. In these places various methods of treatment and cultivation are carried out, whilst conforming to the arrangements approved by the administration.

Besides these, the station manages, under similar conditions, an arboretum and a piscicultural establishment in the neighborhood of Nancy.

Besides the management proper, the experiments carried out in this field of studies comprise observations on forestry meteorology, which have been continued during the last 25 years and have yielded valuable results; and also a very varied mass of investigations, the program of which is decided on by the director of the school, and which regards a great number of important points in sylviculture and forestry physiology.

SECTION 2 : MUNICIPAL SCHOOL OF SILK WEAVING OF LYONS.

This school was begun as an apprentices' workshop, was then transformed into a regular school, and became a municipal school in 1884.

Its aim is to give young men complete theoretical and practical instruction on silk weaving, in order to enable them to enter the trade or to perfect themselves in the silk weaving industry.

It has now 340 students, both day and evening; some also attend on Sunday mornings.

The school has 14 looms. As far as possible, it prefers to get machines of different construction from all parts of the world, and, if possible, built on different principles, so as to give pupils experience in all kinds.

Students come at the age of 15; but a few exceptions may be made. The evening and Sunday morning courses are for apprentices, and include practical work. The evening course lasts three years. Day pupils take a one-year course, but they have 8 hours every day, and 14 hours of theory every week, besides practice in using the machines and making plans.

When these day pupils leave the school they have merely a foundation for their future work. They then go into stores where they sell silk, and gradually become more expert in the work; and they might become heads of factories, but are not competent workmen.

Teachers are generally taken from the trade, by means of a competition which is open to everybody. The city spends 40,000 francs annually to support the school. The income from the sale of certain goods made by the pupils is between 3000 and 4000 francs. The fee for Frenchmen is 125 francs and for foreigners 300 francs. Poor students pay only the registration fee of 3 francs. There are also scholarships. Evening school pupils pay only the registration fee of 3 francs.

There is an examination every three months, and when a pupil has passed this and the final examination at the end of the year he gets a diploma.

The students do not make designs; these are furnished by the school. They are taught to assemble machines and to take them apart, and spend some weeks doing that work, but they are unable to repair a machine.

In the Superior School.

In the Superior School of Commerce, Lyons, there is a silk weaving department, attended chiefly by sons of owners of silk works. The students buy silk and prepare it; take machines down and put them together again.

The boys make the larger drawing of patterns, but the original one is made by the professor. In the local school of Fine Arts there is a special class for teaching drawing for fabrics. These designs come down here, and from them the boys make the larger working drawings. The boys know whether the design is workable on a machine, because they have to make a working drawing.

In the first year the students have to do hand work. The finer qualities of work have to be done by hand. One student took an idea from a pattern on a calendar and worked it up.

The school contains cases showing silk made by silk-worms from mulberry and oak; also showing the various processes for the production of silk: the primary process showing the silk unrolled from the cocoon in hot water.

The Silk Museum in connection with the Lyons Chamber of Commerce was visited. This museum is used by students for copying patterns and getting suggestions for designs. The collection of rare fabrics is extremely valuable, one small square with unique pattern and history being insured for 800,000 francs (about $160,000).

SECTION 3: FRENCH SCHOOL OF PAPER-MAKING.

(Annex of the Electro-technical Institute of Grenoble.)

This school, which was established on the initiative and under the patronage of the Union of French Paper Manufacturers, is intended to train paper-mill engineers, future directors of factories (higher division), and paper-mill managers, who can finally attain the position of heads of factories (elementary division).

The higher division, which was established on November 1, 1907, comprises two years of study. The first, called the year of general studies, presupposes the same acquirements as for the program of the class in mathematics. The second year, called the year of special studies or of paper-making proper, besides receiving first-year pupils, may receive directly former pupils of the great French and foreign schools (polytechnic, central, arts and trades, mines, etc.). A successful course in the higher division is rewarded by the diploma of Engineer Paper-maker of the University of Grenoble.

The program of first-year studies comprises: elements of physics, chemistry, mathematics, electricity, mechanics, and industrial drawing required by engineer paper-makers. The second year is devoted entirely to the study of paper-making and the allied sciences. The pupils attend both the courses in commercial and industrial law and those of a financial nature.

The duration of the studies in the elementary division is one year, and successful students receive the degree of Manager Paper-maker of the University of Grenoble.

Fees.—Higher division, 1st year, 260 francs; 2d year, 560 francs; elementary division, 360 francs.

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CHAPTER XXXIX: AGRICULTURAL EDUCATION IN FRANCE.

INTRODUCTORY.

According to the provisions of the law of March 28, 1882, the system of agricultural education in France has been carefully organized in elementary schools and in normal schools, and many higher primary and modern secondary schools include a special section of agriculture. Apart from the provision for agricultural instruction as an integral part of general education, France is supplied with special Schools of Agriculture—schools that are models of organization, equipment and method. The reorganized Universities are zealously turning their resources to the service of agriculture.

With the exception of a few private schools, agricultural education is under the control of the State, which pays the expenses, in whole or in part, of such instruction, either through the Ministry of Agriculture alone, or conjointly through this Ministry, the Departments and the Communes.

Agricultural education may be said to be of two kinds: that which is chiefly academic, being given in certain primary, secondary and normal schools under the Minister of Public Instruction by teachers appointed by the Minister of Agriculture; and the technical instruction given in the various Schools of Agriculture.

Notwithstanding these provisions, complaint is made that they have failed to stop the exodus of young men from the farms under the alluring attractions of city life. There is evidently a distinction between the development of agriculture and the uplift of rural life. For the development of agriculture two conditions are fully supplied in France—one of practical education by the District Schools of Agriculture, which rank with the secondary schools of Commerce and of Arts and Trades: and the other by provision for scientific instruction and research by the University laboratories and Experimental Stations.

For the uplift of rural life many agencies are working. But here as in other countries, it is beyond one's power to separate these from the field of education. This field is cultivated for more than the improvement of agriculture as a business; particular attention is given to the development of the workers as citizens and the betterment of their opportunities.

SPECIAL TEACHING IN ORDINARY SCHOOLS.

This consists of lessons in agriculture and horticulture, given either by the Departmental Professors under the Minister of Agriculture, or by the special Professors of Agriculture selected for this work by the same Minister.

The instruction is quite elementary, and is given as one of the usual subjects in the school, in every class, without regard to the future occupation of the pupils.

The course is generally a series of "object lessons," the principal aim being to give an elementary idea of Agricultural Science, and in the primary schools to awaken in the pupils the love of country life, in order to prepare the peasant's son to follow the occupation of his father. In a certain number of schools there is also more practical work, with a garden or experimental plot attached.

In the majority of schools, agriculture is the only subject taught, but where the needs of the district call for it, lessons are given in horticulture, viticulture and arboriculture. The teachers are paid by the Minister of Agriculture, whose servants they are, and the Department and Communes pay a part of the expenses of the experimental plots and the cost of preparing them.

It is admitted that the teaching of agriculture in the elementary schools has proved of little advantage. The general inspector of the branch, M. Leblanc, complains that the lesson is too often a mere repetition of memorized rules; occasionally a teacher is found who turns the plot of ground, belonging to the school or the teacher's house, into a garden for practical instruction and experimentation. Various causes are assigned for this unsatisfactory condition, such as the crowded program and the brief period of school life, disabilities which can be overcome by prolonging the ordinary period of school attendance. The law of January 11, 1890, raised the minimum age at which pupils may enter the examination for the certificate of primary studies from 11 to 12 years.

In the French Normal Schools, the aim of the special lessons is to familiarize the future rural school teacher with the daily life of his pupils and to enable him to give a practical direction to his teaching.

This special instruction is given in 87 Normal Schools for primary teachers by the Departmental Professors, and in 186 Primary and Secondary schools (except in Paris, where 8 teachers divide this work) by the Special Professors of Agriculture.

With a view to its encouragement, prizes are offered to those teachers who show the best results from their instruction. These prizes consist of silver medals together with cash ranging from 100 to 300 francs, and are awarded by the Minister of Public Instruction. The Minister of Agriculture also awards medals to those teachers who are not eligible for the previous medal, but who have nevertheless shown zeal in organizing agricultural instruction.

SECTION 1: FOUR KINDS OF SCHOOLS.

Technical agricultural education, under Government direction, is organized in 4 stages, corresponding roughly to the grades of ordinary instruction, these being as follows:

I. Farm Schools, 10 in number, corresponding to primary instruction;

II. Practical Schools of Agriculture, 38 in number, corresponding to higher primary schools;

III. National Schools of Agriculture, numbering 3, corresponding to secondary schools;

IV. The National Agronomic Institute, corresponding to University education.

In addition, there are 4 Special Schools of the rank of National Schools, 11 schools of the class of the Practical Schools, for dairying, agriculture, agricultural industries and stock-keeping, and 8 others, of the farm-school grade, for cheese-making and apple-culture. A few schools are for girls only.

Schools of Horticulture.

There is the National School of Horticulture at Versailles and the Municipal School of Horticulture at Paris, the latter, however, not under the Department of Agriculture. Horticulture is also one of the subjects in almost all the agricultural schools.

Farm Schools.

These are the most elementary of the agricultural schools, and aim to prepare their pupils by practical training for the lower grades of agricultural labor—small farmers working their own farms, foremen, farm-bailiffs, etc. Pupils are required to have the leaving certificate of the elementary school, or to pass the entrance examination, their ages being from 14 to 16. The course covers 2 or 3 years, the pupils living all the time on the farm, where they are boarded, lodged and taught free of charge. They also receive a cash bonus on completion of their studies, of the maximum amount of 300 francs. Their families only have to supply their outfit, which costs from 220 to 250 francs. The boys have to work on the farm about ten hours a day, with additional class work. Each Farm School takes from 20 to 40 pupils, the principal being usually the farmer who often owns and always manages the farm on practical and commercial lines, with a view to making profits for himself. He buys on his own responsibility all the material and stock, and has to pay all the expenses for the keep and instruction of the pupils. On the other hand he retains all the revenue from sales, and receives certain allowances from the Minister of Agriculture—(a) salary for himself and other teachers, (b) 270 francs per annum for each pupil, (c) a general grant for teaching expenses. The total amount of the grant comes on the average to about 15,000 francs per school, exclusive of the cash prizes given to pupils on leaving, which are paid by the Minister.

Certificates from the Minister of Agriculture are awarded on completion of the course and on passing the final examination before a committee on which the Ministry is represented. The schools are inspected by the Department of Agriculture, and the principals have to report regularly. The day of the Farm Schools is evidently past, the tendency being to replace them by Practical Schools which give more instruction and have less apprentice manual work.

Practical Schools of Agriculture.

These are intended for a higher class of pupils, and give more advanced instruction, leading to higher positions. At the same time they only require the same entrance standard as the Farm Schools, and are gradually replacing the latter. The age of admission ranges from 13 to 21. The course extends over

2, 2½ or 3 years. The pupils are usually boarders, the fee being 450 to 600 francs, but as this sum barely covers the cost of board and lodging, it may be said that the instruction is free. The total annual expenses of a pupil are from $158 to $200, which includes board and lodging. In the case of necessitous pupils these are met by scholarships or allowances, State grants, and grants from the departments and communes.

The programs of these schools vary considerably, the aim being to adapt the instruction and work to the agricultural conditions of the neighborhood. Consequently some devote themselves to dairying, others to horticulture, viticulture, sylviculture or pisciculture. As a rule half the time is devoted to theoretical teaching and the other half to practical work, the pupils putting in not less than 12 hours a day. There are 50 or more pupils in each school. The subjects are more advanced and varied than in the Farm Schools, and there is less manual labor.

The regulations for examinations and certificates are practically the same as in the Farm Schools and the organization is on the same lines, the principal being the farmer, who farms for his own profit. The State gives similar financial aid to these schools, paying salaries of director and teachers, and making a grant for teaching and bursaries. The total amount of grants from the State made to each school varies from 19,600 francs to 20,750 francs.

National Schools of Agriculture.

These are owned and maintained by the State. They are of a higher grade than the Practical School and have a different aim, which is to give much more general or national instruction than either of the other two classes mentioned.

A higher standard of general education is required and the entrance examination is more difficult, a certain number of marks being allowed to holders of certificates from the Practical Schools of Agriculture and other places. The minimum age for admission is 17. The course is one of 2 or 2½ years. The fee comes to 1,250 or 1,500 francs for boarders, day pupils paying 500 francs a year. There are a certain number of bursaries and scholarships for boarders and day-boys respectively. Their courses deal with cultures of every kind which may be met with in any part of France or in the colonies. The instruction is scientific and technical, and the work on the farm is not heavy, consisting chiefly in helping the staff, supervising, visiting other farms or observing important features of agricultural life. They are designed for young men who intend to manage properties in the country either on their own account or for someone else, or to engage in the work of agricultural instruction.

The Grignon and Montpellier Schools receive boarders, half boarders and day scholars. The Rennes school receives only day scholars. Pupils are admitted by competition and, according to their order on the list, choose the school they wish to enter. The boarders' places especially, which are limited in number, are allotted according to the order of merit.

All three schools receive without examination outside students, who attend the courses to suit their convenience,but who are not admitted either to the study

halls or to the laboratories, though they may exceptionally be authorized to attend all or part of the practical exercises on payment of a special monthly fee of 25 francs.

Foreigners are admitted as day scholars or outside students. If there are no French candidates, the places available for boarders and half boarders may be allotted to foreign pupils.

The courses begin at Grignon and Montpellier on the second Monday in October, and last for two years and a half. The pupils finish at the end of March in the third year. At Rennes the courses last two years.

QUALIFICATIONS FOR ENTRANCE.

Candidates must be at least 17 years of age on April 1st of the year they are admitted, and must apply to the Minister of Agriculture before June 5th. The written examinations are held on the last Monday and Tuesday in June in eleven cities.

These tests, which are elementary, comprise: (1) a French composition; (2) a paper in mathematics (solution of a problem in arithmetic and of one or two in geometry); (3) a paper in mathematics (solution of a problem in mechanics and of one in algebra or trigonometry); (4) a paper in physics and chemistry; (5) a paper in natural sciences; and (6) a given sketch.

The written compositions are marked by coefficients.

The oral tests bear on mathematics, physics and chemistry, and natural sciences. They can be taken in any one of the four following cities: Paris, Angers, Toulouse or Lyons.

The instruction is given by regular courses and lectures, with application and practical work on the school lands and in the laboratories; and trips are made to agricultural and industrial establishments.

The pupils, while taking part in the various labors and duties of agriculture, get an insight into the details of superintending, carrying out, and managing the work of the farm.

During the vacations (from the end of July to the second Monday in October), the pupils must work on a farm and must draw up a detailed report of what they have observed. For this report they are allowed a mark, which is taken into account in the annual classification.

THE GRIGNON SCHOOL.

Cultivation in its widest sense is studied in this school: sowing meadows with grass, cultivation of cereals, forage plants and industrial plants, investigation of live stock and the agricultural and viticultural industries of Northern France.

The school possesses 125 hectares (368 acres) of arable lands, natural meadows and copses; also a field for work and experiments, kitchen gardens, botanical and sylvicultural gardens, a cow-house, a sheepfold, and a piggery for breeding and for experiments. These and the agricultural station complete the equipment for theoretical and practical instruction. The grounds of the school extend over 300 hectares.

Professorships.—agriculture; zoology and animal husbandry; physics, meteorology, and technology; agricultural mineralogy and geology; agricultural engineering, mechanics, machinery, hydraulics, and building; general chemistry and agricultural chemistry; agricultural economics and legislation; botany; sylviculture; viticulture and pomology; horticulture; arboriculture; and entomology.

The instruction by the professors, in certain special or secondary branches, is supplemented by lectures given by scholars or agriculturists, or by assistant professors. The subjects of the lectures are the following: entomology, human hygiene, horticulture and market-gardening, dairying, book-keeping, arithmetic, geometry, algebra and trigonometry (subjects preparatory to the course in agricultural engineering), practical agriculture, work in zootechny, analytic chemistry, vegetable pathology, etc.

Every year at the Easter holidays there is an agricultural excursion throughout France or abroad, during which the pupils, accompanied by their professors, visit large agricultural establishments selected from those which are best conducted.

The National Institute.

The National Agronomic Institute represents the highest grade of agricultural instruction, corresponding to that given in the Faculties of the Universities in other sciences. It is situated at Paris, with experimental farms and gardens in the suburbs. Pupils must be at least 17, and the entrance requirements are higher than any of the other agricultural schools. The course is two years and all pupils are day scholars, the cost being 625 francs. Twenty bursaries are awarded annually, and two travelling scholarships for three years of 375 francs a month. There is a third year limited to 20 students, who each receive 100 francs a month for its duration. The aim of the Institute is to train farmers and proprietors with a real scientific knowledge of agriculture, for the scientific staff of the Department of Agriculture, teachers of agriculture, directors of experimental stations, agricultural engineers and Government agricultural employés. The instruction is entirely scientific and experimental, the practical work consisting of visiting farms and estates, and working on a specified farm during the summer holidays. There are 160 students, 80 in each year, and about 200 candidates for the 80 vacancies.

Relations of the Schools and the State.

The National Schools and the Agronomic Institute are the property of the State, and are maintained by it. The members of the staff are employés of the Department of Agriculture. This also applies to some other schools. In other cases, the school building and grounds belong either to the State, the provincial authorities, the commune, or to the principal himself. Sometimes the principal is the tenant, renting the land at his own risk, with the assistance and under the inspection of the Minister of Agriculture. Sometimes he is only financed by the latter: in other cases he also receives help from the provincial authorities. As

a rule, in the Farm Schools and Practical Schools the principal is also the farmer and manages the farm for his own profit like any other farmer. As the allowance from the Department for educational work leaves no profit, provided he does his duty by the pupils, the principal must count on his own farming ability to supplement the salary paid him by the State. The salary of a principal varies from 4,000 to 6,000 francs, and that of a teacher from 2,700 to 4,000 francs.

The number of pupils in agricultural schools of all kinds in France is approximately as follows: Farm Schools and Practical Schools, 2,200 pupils in 48 schools; National Schools, 400 to 500 pupils in 3 schools; Agronomic Institute, 160 pupils.

SECTION 2: DOMESTIC SCHOOLS OF FARMING AND DAIRYING.

These schools for girls are situated at Cöetlogon (Ile-et-Vilaine), Kerliver, commune of Hanvec (Finisterre) and Le Monastier (Haute-Loire). They were established with the aid of the Department of Agriculture, which controls them and maintains scholarships.

Beside these fixed schools, there exist in certain departments (Nord and Pas-de-Calais) Itinerant Schools of Dairying which were established and are maintained by the departments.

Below is a sketch of one each of these two categories of schools.

CÖETLOGON SCHOOL.

This school, established in 1886, with the aid of the department of Ile-et-Vilaine, of the city of Rennes, and of the Chamber of Commerce, is situated two kilometres north of Rennes in one of the healthiest districts. The pupils are boarders.

Its object is: (1) to propagate and develop dairying by training pupils able to apply and spread a knowledge of the best processes and to furnish all useful information on the management of dairies; (2) to give to girls who intend to live in the country such knowledge as is necessary for a farmer's wife, viz.: taking care of the house, attending to tillage, the cow-house, the dairy, the piggery, and the garden; and to enable those who cannot utilize this knowledge at home to get good positions for themselves.

Girls are admitted at the full age of 14 years. They must make request to the directress before July 1st, and hand in certificates of birth, vaccination, good conduct (from the mayor), and a copy of their diplomas or certificates of studies. Those of foreign nationality may be admitted upon authorisation of the Minister of Agriculture. Besides regular pupils, the school receives probationers who come to spend only a few months.

Board is 125 francs a quarter.

Scholarships are maintained by the State and the department. Applicants must, during the first half of August, pass an examination comprising questions on elementary instruction, the French language, orthography, arithmetic and metric system, history and geography of France.

COURSES OF INSTRUCTION.

The instruction lasts for one year, beginning from October. Theoretical instruction embraces household economy, domestic hygiene, technology of milk, elements of animal husbandry, market-gardening and fruit arboriculture; and, lastly, supplementary lessons in French and arithmetic, and especially farm book-keeping. Practical instruction comprises butter and cheese making, care of the poultry yard, some gardening, housekeeping, particularly kitchen work, cutting, sewing and washing.

Pupils who have passed the final examination receive a certificate. Medals may be granted to those most deserving.

Since its foundation the school has received several hundreds of young girls from all parts of France and abroad—Belgium, Russia, England, Germany, Austria, Roumania, Norway and Haiti. Those who did not return to their families to continue to work for their parents have been placed to good advantage by the directress, and over 40 are now directing schools of dairying.

The Kerliver and Monastier schools were organized on the same basis as that of Cöetlogon. They receive boarders, half-boarders and day-scholars. Full board at Kerliver is 400 francs a year, half board 250 (at Monastier 200).

ITINERANT SCHOOL OF DAIRYING AT PAS-DE-CALAIS.

This school was founded by the general council in August, 1906, at the suggestion of M. Tribondeau, departmental professor of agriculture. It is intended to give to young girls the necessary agricultural instruction to enable them to make the most of the products of the farm. It holds sessions of three months in those communes which ask for it and submit to certain definite conditions.

The instruction is both theoretical and practical. Pupils are initiated into the best methods of skimming milk, as well as rational buttermaking and the making of cheese of various kinds. They practise judging the quality of milk, and proportioning the cream by the best processes in use. They are taught farm book-keeping, domestic economy, family hygiene and care of children, and the care of animals, as well as the best conditions under which to feed them. They have lessons on the part which the earth plays in the nourishment of the plant, the importance of ordinary manuring, and the use and composition of the principal chemical manures; the poultry-yard receives special attention. Thus it is seen that this school is a real economic school of farming.

The working plant, furnished by the departments, comprises:—centrifugal cream separators, churns, and a rotary kneader; the necessary articles for the reception, control and analysis of milk and cream; molds and various utensils required for cheesemaking; heating apparatus, kitchen utensils and dishes; articles required for washing and ironing linen; school furniture, tables, chairs, wall pictures and bookcase.

The communes where the school is to be held are bound to furnish suitable premises for its installation. The farmers must undertake to procure the milk

required for the practical work, 200 litres daily at most. The butter, cheese and by-products are all sent to those interested.

The school is under the authority of the departmental professor of agriculture, who takes charge of the courses in agriculture, animal husbandry, poultry keeping and gardening, and gives the pupils three lectures on agricultural associations. There is also a directress, who takes particular charge of the dairying instruction and work, and a lady teacher to whom is entrusted the instruction in economy.

The tuition is free. Pupils are received from 15 years of age upwards. To have a school opened in a commune there must be at least 15 entries, and if the number is above 20 an entrance examination is held.

COURSES, DIPLOMAS, ETC.

The courses are held daily, except Saturdays, Sundays and holidays. The practical work is done from 8.30 a.m. till noon, and two hours in the afternoon are reserved for theoretical instruction. On two days in the week the pupils prepare the mid-day meal, which they take at joint expense with the teachers.

At the end of the session final examinations are held, and a diploma of fitness is given to those who have obtained at least one-half of the maximum marks attached to the tests.

The school is open to the public on one day in the week, and the farmers and their wives can then assist at all the practical work and note the advantages of the processes employed.

The itinerant school does not turn out pupils as handy and well instructed as do stationary schools; but it has the advantage of reaching families at very little expense to them, and as the pupils live at home they are able to assist their parents both before and after courses. The school also diffuses vocational agricultural instruction wherever necessary. Thus, according to one authority, it is not only "a technical school of apprenticeship, but is a real social work, which is contributing in a large measure to introduce comforts among our rural democracy."

Itinerant schools are in process of organization in other departments, especially in the Somme and the Deux-Sèvres.

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