

ARCHITECTURE
CIRCULAR

UNDATED

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

DEPARTMENT OF ARCHITECTURE.

THE studies and exercises of the four-years' course in Architecture in the Massachusetts Institute of Technology have been selected and arranged with reference to three objects:—

First. The general education and mental training of the pupil. In the case of students beginning this course, generally between the ages of seventeen and nineteen, it has been assumed to be neither for their highest professional success, nor for their happiness and usefulness in life, that their further course of study should comprise only those things which can be shown to have a strictly professional bearing. Studies and exercises have, therefore, been freely introduced into the curriculum of this department which are of a more general nature, directed toward the mental development of the pupil, and toward his accomplishment in letters, language, and political knowledge. The nature of these studies and exercises will be seen by reference to the detailed scheme of instruction appended to this circular. The most important elements are German, through two years; French, through two years (following up the requirement of an ability to read French on admission); General Chemistry, through one year; Composition and English Literature and Political Economy, with brief courses in Physical Geography and Geology.

Second. The acquisition and mastery by the student of the principles underlying construction. The Faculty of the Institute are not willing to graduate any one, with the Degree of the Institute, who has not taken, with distinct success, a course of instruction which embraces all the principles which are needed to solve any problem which can present itself in the erection of any building, under whatever conditions as to foundation or superstructure, and who has not been sufficiently versed in practical applications of these principles to typical problems, in the drawing-room and laboratory of Applied

Mechanics, and in the examination of works actually in course of construction, to enable him to deal intelligently and conclusively with any such problem occurring in the course of architectural practice.

This may seem a large claim to those who do not know the past work of the Institute, but the statement is amply justified by facts; such, for example, as that the entire working out of the design and constructive details of the iron roof of the Cincinnati Chamber of Commerce, which carries the interior walls and floors of this immense building, in addition to its own weight, was committed to two graduates of the Institute of Technology, during the first year of their professional work, and was accomplished with complete success.

Third. The cultivation of the student's taste, in color and in form; the practice of the art of design, through the working out of numerous and varied problems; acquaintance with the history of architecture and the details of style; a mastery of the technicalities of architectural draughting, and the equipment of the prospective practitioner with a knowledge of professional duties, and a familiarity with constructive details which shall save many initial errors, and diminish the cost at which experience shall be acquired.

All three of the foregoing objects have been held in view in selecting and arranging the exercises of this department. The proportion in which the time of the student shall be divided between studies and exercises adapted to one or another of these objects is a matter to which the best judgment of the Faculty of the Institute has been directed. In general, it may be said, first, that the proportion of the time allotted to general, or non-professional, studies diminishes with the progress of the student through the several years of the course; and, secondly, that, after the first year, the time devoted to studies and exercises having for their object to cultivate taste, and give skill in design, amounts to somewhat more than one-third of the whole.

Confining our further attention to those studies and exercises which have a distinct professional bearing, we have, in the first year of the course, Algebra, Solid Geometry, and Plane Trigonometry, requiring four and one-half hours a week in recitation, and about nine hours a week for preparation, and Mechanical and Freehand Drawing, extending over seven hours a week throughout the year. The remainder of the time is given up to studies of a general nature.

Only those students of the first year who obtain a high rank in drawing, in addition to good standing in all their other studies, are admitted to the second year, in which the strictly professional work of the architectural course begins.

The studies and exercises of this year embrace Analytic and Descriptive Geometry, the Differential Calculus, and Physics; Architectural History is taught by text-book and lectures, and instruction in Materials and Common Constructions is given by lectures, text-books, and visits to buildings in progress. During the first term a series of plates is drawn, and explained by lectures, to familiarize the students with the forms of roofs, domes, spires, arcades, balustrades, and other architectural details, and the proportions and correct use of the classic orders. In the second half-year, the knowledge thus accumulated is put to use in making original designs from a series of given programmes.

During the third year the general training becomes somewhat less conspicuous, and the professional work more so than before. The mathematical course is continued with Integral Calculus, followed by Theoretical and Applied Mechanics; the study of Physics is completed, and enough Surveying is taught to enable the student to handle a transit and level intelligently. The work in Design of the previous term is resumed, with programmes of increased difficulty, while practical instruction is carried on by lectures and exercises in making the framing plans and working drawings of various sorts necessary for actual practice; this is followed, in the second term, by exercises in Applied Stereotomy, with a course in Iron Construction, including the various details of the cast and wrought iron work used in building.

The instruction in Design of this, as well as of the previous and succeeding years, is arranged as carefully as possible to occupy the time allotted to it to the best advantage. Two problems are assigned for each month in each class, one being a sketch problem, which must be worked out, rendered effectively, and handed in within one week. The other problem is a more difficult one, and the entire month is allowed for working it out thoroughly in detail, and presenting finished drawings. To accustom the students to concentrate their minds upon the development of a single idea, instead of wasting their energy in the successive adoption and abandonment of different solutions of the given problem, two days are allowed after the posting of the programme for the month, within which each student must fix upon some general scheme for his design, and hand it in, shown in plan and elevation at a small scale; and these rough sketches are retained until the end of the month. The finished drawings are then brought in for judgment. The preliminary sketches are attached to the completed designs; the drawings are hung around the room, and a jury selected, usually from among the principal Boston architects. All finished

designs which vary materially from the original sketches are thrown out; the others are criticised in the presence of the students of the department, and a few of the designs, which the judges consider most deserving, are indicated by cards of honorable mention affixed to them. The others are marked according to their merit by the instructors, and returns are made twice yearly to the parents of the students, and recorded on the books of the school.

During the fourth year the general or non-professional studies are mainly confined to Advanced French. The instruction in Applied Mechanics, under Professor Lanza, now takes a special direction, including investigations into the stability of structures and resistance of materials; and each successive class participates in that remarkable series of original determinations of the strength of various materials and frames, the results of which have already so greatly modified the formulæ used by architects and engineers all over the world. A collateral course of problems in Construction, such as occur in practice, gives facility in applying the knowledge already gained, and accustoms the students to take into account the complex conditions which actual cases involve. Lectures on Specifications and Contracts, continued throughout the year, carry out into detail the general impressions of building work gained in the preceding years, and prepare for the approaching responsibilities of practice. A long and highly technical course is given in Heating and Ventilation, illustrated by the study of the principal public buildings in the city. During this year, also, the instruction in Design is continued in the same way as before. The degree of skill obtained by two years of previous practice is found so considerable that programmes of an important character are generally treated creditably, and often with distinct success. Opportunity is taken to enlarge the students' resources in work of this character by a course of lectures on Planning, and another on Schools, Theatres, Churches, Hospitals and other special classes of buildings, while the careful study required for the final thesis serves to fix some good example permanently in the memory.

The long drill in Original Design, thorough as it is intended to be, would be somewhat barren if means were not taken to supply the mind with ample stores of fresh material, and to cultivate the taste. For this purpose the valuable library of the department is used with all possible freedom. As soon as a programme for design in any class is posted, the instructors take care to direct the students of that class to the books, photographs, and drawings from which examples of the solution of similar problems, or suggestions as to treatment, detail, or

decoration, may be obtained; and an effort is made to collate as many examples as possible, to increase the resources, and promote the originality of students in their work. Besides this, facility in rendering is taught, and new sources of pleasure and refined taste opened, by a long course of instruction in Water-Color Sketching, extending over the last two years, and comprising one hundred and twenty regular lessons under one of the most distinguished water-colorists in the country, to which the students may add as many hours of practice as they have time for. A course of lectures and exercises in Color Decoration, extending through the fourth year, is given by Mr. C. Howard Walker. Four hours' work is allotted to each of these exercises, by which not only is a view gained of the historical sequence of styles of ornament, but a tolerably thorough training is given in the general treatment of color in decoration, and in the characteristics of different styles. As a further equipment of the student for office work and future improvement, an independent series of lessons in Pen-and-Ink Sketching, arranged to extend through one year, is given by a special instructor; and, besides Theoretical Perspective, which is taught, with Shades and Shadows, in the second year, practice is given in the fourth year in what may be called architects' perspective, involving the consideration of the selection of points of view, foregrounds, composition, treatment of interiors, and so on.

All the above work is required, but opportunity is given for improvement in a similar direction during the leisure hours of the day. An evening Life Class, for drawing from the figure, is maintained, at the expense of the Institute, during the greater part of the school year, under the charge of the officers of the department, and with the best instruction to be obtained; and sketching, both in and out of doors, is encouraged on Saturdays and holidays. Much benefit is derived also from the kindness of the Trustees of the Boston Museum of Fine Arts, by whose liberality the admirable collections of the Museum are always open, free of expense, to students of the department.

In providing for so large a proportion of strictly artistic training in the curriculum of the course in Architecture, the Faculty have been guided by the consideration that the students of the course, in their future professional career, are likely to need scientific knowledge in the conduct of constructions, and skill in disposition and design, in about equal proportion; and the scheme of studies is based upon the belief that the possession, in a high degree, of both these qualifications is quite within the capacity of intelligent young men, pursuing a four-years' course of study with diligence and fidelity, and they consider

that an architectural school should prepare its pupils, not only for their years of work as subordinates, when rapidity and taste in drawing and design, with knowledge of detail, will be the qualifications most profitable to them, but also for their independent career to follow, when the value of solid technical knowledge will become most conspicuous.

For the benefit of those who are contented with a limited acquaintance with the subject, or who have acquired elsewhere the necessary mathematical and physical knowledge, a partial course in Architecture is arranged, occupying two years.

The first year of this course includes the instruction in Mechanical and Freehand Drawing of the regular first year, taken in connection with the second-year exercises in architectural forms, and the Designing of the second term, and the lectures on Materials and Common Constructions, together with a special elementary course in Plane Trigonometry and Graphical Statics. During their second year, the students in the partial course take Working Drawings, Iron Construction and Designing with the third-year regular students; and are admitted to the fourth-year lectures on Planning, Schools, Theatres, etc., and to the Problems in Construction. In addition to these studies, all students in the two-years' course may take such work in Water-Color Sketching and the History of Ornament as they may be found qualified for. While making this short course as useful as possible to those who are obliged by circumstances to be content with it, the Faculty strongly advise students to take, in preference, the four-years' regular course. To say nothing of the advantage of the additional year of strictly professional work, the regular course alone affords that thorough training in mathematics and physics which experience shows to be not only almost indispensable for one who must assume the great responsibilities of an architect in considerable practice, but, if possible, even more useful for the mental power which it gives through the formation of the habit of concentrating the attention upon a problem of any kind.

No student is admitted to the department of Architecture except as a member of one of these courses, taking all the work of the course to which he belongs; but a student who has honorably completed the partial course of two years may rejoin the department for a third year of study, taking such of the fourth-year work of the regular course as he is qualified for, and adding to this a certain amount of optional work, under the direction of the Faculty.

COURSE IN ARCHITECTURE.

FIRST YEAR.

FIRST TERM.

Algebra.
 Solid Geometry.
 General Chemistry: Lectures and
 Laboratory Work.
 History of the English Language.
 English Composition.
 French.
 Mechanical and Freehand Drawing.
 Military Drill.

SECOND TERM.

Algebra.
 Plane Trigonometry.
 General Chemistry: Lectures and
 Laboratory Work.
 Political History since 1815.
 French.
 Mechanical and Freehand Drawing.
 Military Drill.

SECOND YEAR.

FIRST TERM.

Materials.
 Greek and Roman Architectural
 History.
 The Orders.
 Analytic Geometry.
 Physics.
 Descriptive Geometry.
 Political Economy.
 German.

SECOND TERM

Common Constructions.
 Mediæval and Modern Architectural
 History.
 Shades, Shadows, and Perspective.
 Differential Calculus.
 Physics.
 English Prose.
 German.
 Original Design.

THIRD YEAR.

FIRST TERM.

Original Design.
 Sketching and Water Color.
 Lectures on Fine Art.
 Working-Drawings and Framing.
 Integral Calculus.
 General Statics.
 Structural Geology.
 Physics: Lectures and Laboratory
 Work.
 German.

SECOND TERM.

Original Design
 Sketching and Water Color.
 Lectures on Fine Art.
 Surveying.
 Iron Construction.
 Kinematics and Dynamics.
 Strength of Materials.
 Stereotomy.
 European History.
 Acoustics.
 German.

FOURTH YEAR.

FIRST TERM.

Advanced Original Design.
 History of Ornament.
 Sketching and Water Color.
 Problems in Construction.
 Specifications.
 Strength of Materials.
 Lectures on Fine Art.
 Ventilation and Heating.
 Advanced French.

SECOND TERM.

Advanced Original Design.
 History of Ornament.
 Sketching and Water Color.
 Planning
 Schools, Theatres, and Churches.
 Problems in Construction.
 Specifications and Contracts.
 Lectures on Fine Art.
 Constitutional History.
 Ventilation and Heating.
 Advanced French.
 Thesis Work.

 INSTRUCTORS HAVING SPECIAL CHARGE OF THE
 COURSE IN ARCHITECTURE.

THEODORE M. CLARK, A. B., Professor of Architecture. In general charge of the Department, and Lecturer on
Materials, Construction, Planning, and Special Classes of Buildings.

EUGÈNE LÉTANG, Associate Professor of Architecture.
Design.

ELEAZAR B. HOMER, S. B., Senior Instructor in Architecture.
History of Architecture, Orders and Architectural Forms, Elementary Mechanics (in the Partial Course).

DWIGHT H. PERKINS, Junior Instructor in Architecture.
Assistant in the Drawing Room, and Custodian of the Library.

ROSS TURNER.
Instructor in Sketching and Water Colors.

C. HOWARD WALKER.
Instructor in the History of Ornament.

CHARLES E. MILLS.
In charge of the Life Class.