THE AMERICAN ARCHITECT

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BRONZE GATES IN MARBLE CHANCEL RAIL IN ST. MARK'S CHURCH, PHILADELPHIA, CRAM, GOODHUE & FERGUSON (BOSTON OFFICE), *ARCHITECTS*

Bronze

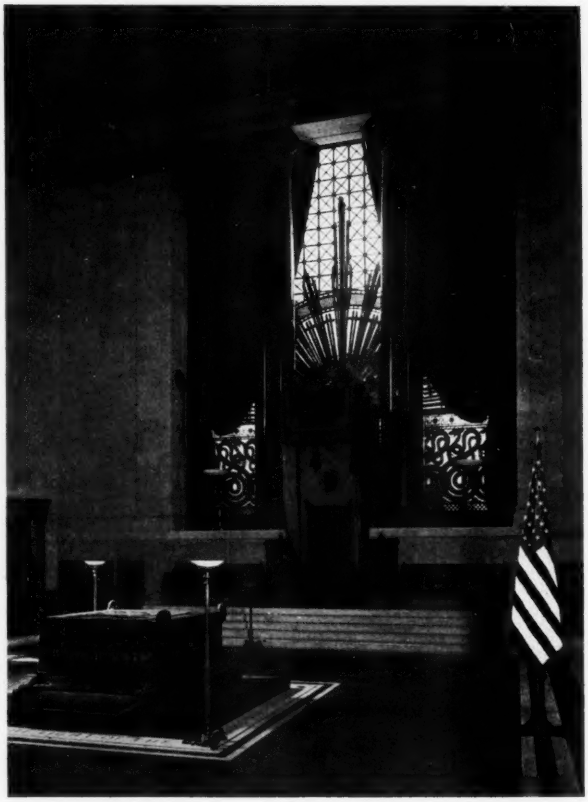
BY C. A. FULLERTON

Chairman Bureau of Technical Data Architectural Iron and Bronze Manufacturers.

IF the question, What is Bronze? be asked by one ignorant of the technical production of the metal, who only knows it as a material "from which statues are made," the answer might be readily given. Bronze is an alloy or mixture of metals in which copper forms the predominating portion. This definition will serve the present purpose as to what Bronze is, in the ordinary acceptance of the word. Later on—that we may as far as possible learn all we can of a metal that has from prehistoric times been used in countless forms for decorative and utilitarian purposes—we shall give a more careful and technical description of that class of alloys known under the general term of Bronze.

This metal is just now of more than passing moment, for the present very marked development of various crafts shows no branch of greater interest nor one that has a more marked influence in the artistic progress of the artist-craftsman than Bronze.

There is no substitute for this alloy called Bronze, no "just as good" or "equal to" metal that will lend itself to the many and intricate uses to which it is applied. It is a vehicle for esthetic expression that carries the widest range of adaptability. Its history, like that of some forms of burnt clay, is shrouded in the mystery of a period beginning with prehistoric man. There are even examples that are believed to be of an origin to which no age can be given—a part of the Promethean gift of fire. We are certain, however, we can with safety claim that Bronze, as a metal for decorations, weapons and utensils, has been known and used for more than forty centuries.



BRONZE SCREEN, GRAND COMMANDER'S THRONE, TEMPLE OF THE SCOTTISH RITE, WASHINGTON, D. C.
JOHN RUSSELL POPE, *ARCHITECT*

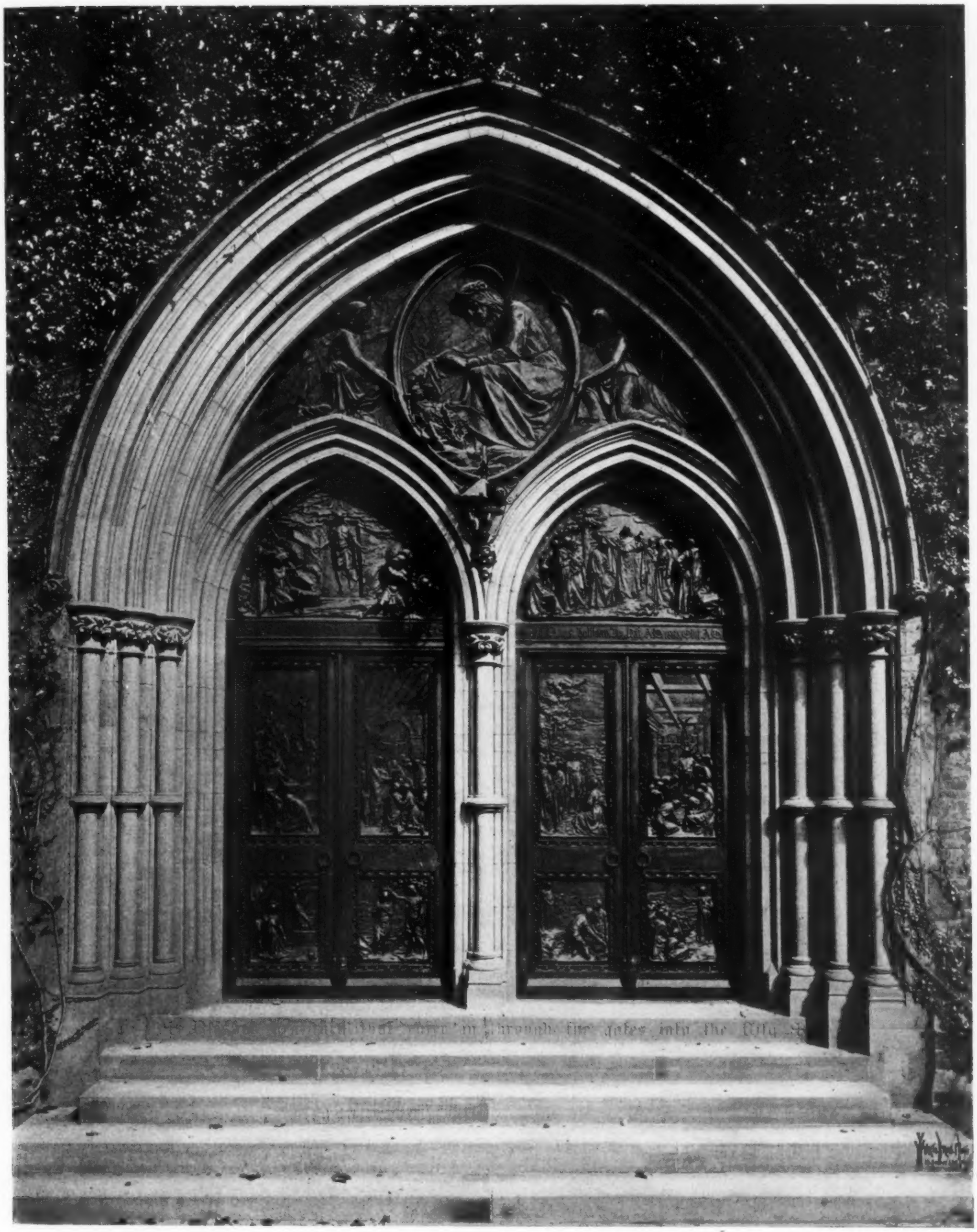
Probably no metal has been more closely identified with the history of nations than Bronze. Its most frequent use was in the fashioning of weapons, the making of armor and the artistic forming of cast and wrought trophies to adorn memorial works.

The earliest use of Bronze was in the form of solid castings, but at a later period—the date of which is not accurately known—hollow castings were made. Whether the origin of the hollow casting was in a desire to more economically work the metal or to promote a quick and even cooling in founding (thus imparting greater strength) is also uncertain. Coming down to a period as recent as the nineteenth century, we find that practically the only method for producing Bronze was by casting in moulds of sand or clay.

A brief reference to the history of Bronze in its artistic interpretation will be of interest. Such an account may be divided into the following periods: Ancient, Medieval and Renaissance, Baroque and Rococo, the Nineteenth Century and the Modern development of the Art.

That the Egyptians were well versed in the art of Bronze Casting is attested by the many examples of weapons, utensils and ornaments of many kinds excavated in ancient Assyria and Babylonia. The greatest excellence in the artistic interpretation of Bronze would seem to have been attained by the Greeks. As early as the Mycenean period, proficiency in casting showed a high degree of development. In fact, Bronze will be found to have been more generally used for decorative purposes on buildings than marble, the latter when carved being more commonly a replica, chiseled by inferior artists, from the original work in Bronze. The object in the creation of the original Bronze was the decoration of the many temples, while the marble replicas were used for the adornment of less important buildings and largely for garden ornaments. An authority states that as late as the reign of Vespasian there were 3000 bronze statues in Delphi after Nero had carried away some 500 to Rome.

Rome acquired her art of Bronze in the same way as many another thing for which she has become famous—by conquest. The pillage of Delphi by Nero was but one instance of many similar acts by Roman invaders. Not only were many articles of Bronze thus acquired by Rome, but the craftsmen,



CAST BRONZE DOOR, CHAPEL OF THE GENERAL THEOLOGICAL SEMINARY, NEW YORK
CHARLES C. HAIGHT, *ARCHITECT*

who in Greece had brought the art to such a high proficiency, were led as captives to Rome where they subsequently settled and pursued their art. Such examples as are extant are accredited to Rome and are hers, if right of conquest or forced possession gives validity to the claim. Many of these examples were undoubtedly lost while being transported to Rome; some few remain. The scarcity of the metal, due to its extended use, caused it to become of increasing value and many works of lesser importance as viewed by public opinion were broken up and cast into coin. The quick changes of parties in power made the hero of one hour the rejected of the next. The voice of popular clamor called for the obliteration of everything that would suggest the deposed party, and thus very many undoubtedly important statues and memorials, cast in Bronze, were recast in the coins that bore the effigies of the leader or leaders of the party in power.

The Greeks are known to have used Bronze decoratively in the accentuation of Architectural ornament. The volutes and eyes of the Ionic capitals on the Erecthium were inlaid with Bronze. There are other well authenticated examples of the use of Bronze during this period, and it has been claimed by certain archeologists that the leaves of the doors of the Parthenon and Pantheon were constructed of Bronze.

That Bronze was used largely in excess of sculptured marble has been claimed by many authorities. The proof of this contention is not so easily forthcoming. Marble when once carved is only lost by breakage, or disintegration, while Bronze can be reconverted to other uses. The ease with which this conversion can be attained has undoubtedly served to effect the loss of most of the examples of applied ornament to architectural design. In many instances there is evidence that some metal ornamentation had at one time been applied. But its ease of removal and, as stated, the ease by which it could be convert-

BRONZE SHOP FRONT, FIFTH AVENUE, NEW YORK
BERLINGER & MOSCOWITZ, *ARCHITECTS*

BRONZE ELEVATOR ENCLOSURE
FEDERAL BUILDING, CLEVELAND, O.
ARNOLD W. BRUNNER, *ARCHITECT*

ed to other purposes, has served to offer the looters of many wars an opportunity for spoil. That Bronze was a universally used metal for Architectural ornament is as conclusively shown as that the marble statues of this period were brilliantly colored.

Probably the most interesting examples of the Bronze of the ancient period that are known today are those excavated in Herculaneum, Pompeii and Boscoreale. These have served as examples for much of the work in decorative Bronze since they were brought to light during the excavations that were carried forward during the last century. Not only have they served as models for form and spirit of handling, but for color as well. Long centuries buried beneath the ashes, when unearthed these bronzes were found to have taken on colors that have after much experimentation been more or less successfully copied. There are many widely known examples of Bronze of this period and among the most important are the following: The Victory of Brescia, in a town of that name in Lombardy; the famous She-Wolf in the palace of the Conservatore in Rome; the Sleeping Faun, the Hermes, the busts of Apollo and Ptolemy, and the famous head of Plato. These are but a few of the most important extant examples of the ancient period of Bronze. Their special appeal is that they probably show how thoroughly the tenacious character of the metal has been allowed to influence the design.

Medieval and Renaissance Period

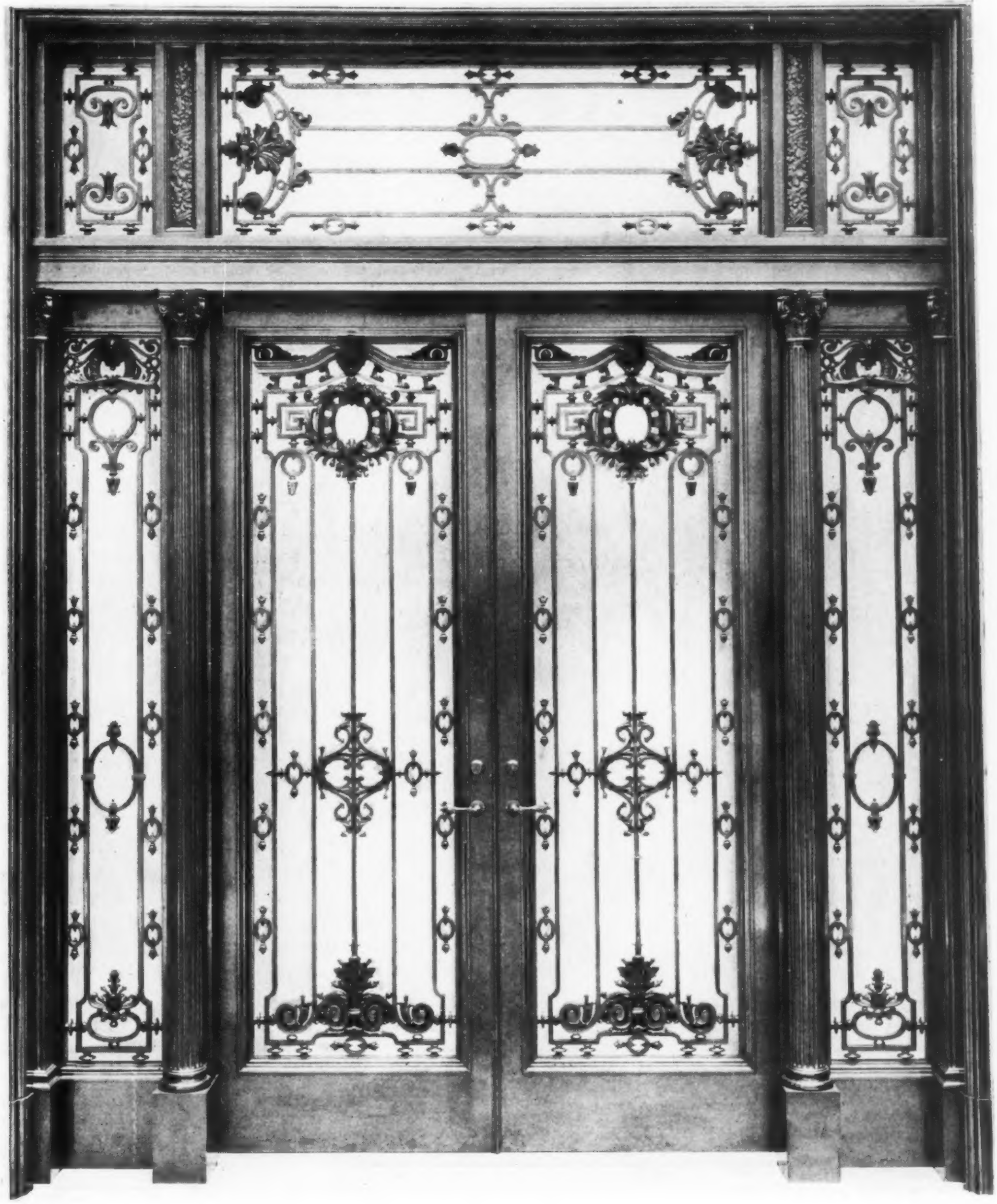
While the use of Bronze in the Medieval and Renaissance period was not entirely discontinued, it was probably less generally employed during the Middle Ages than at any period within its long history. The tendency in the Middle Ages would seem to have been to confine the use of metals mainly in the decoration of objects for civil and religious ceremony. There are, however, to be found some important examples where Bronze was employed during this period in that large Decorative and Architectural manner that marked its earlier use.

With the new birth of Art in Italy, the use of Bronze in the ancient manner was revived. The bronzes of this period are the masterpieces of the world. Not only did Bronze serve to take the place of marble in the statuary and larger works, but also in its decorative aspect in the form of bas-relief, busts and many decorative applications. We associate these great works in Bronze with the names of the men who modelled them, and there have sunk into comparative obscurity those of the craftsmen whose great skill accomplished the reproduction.

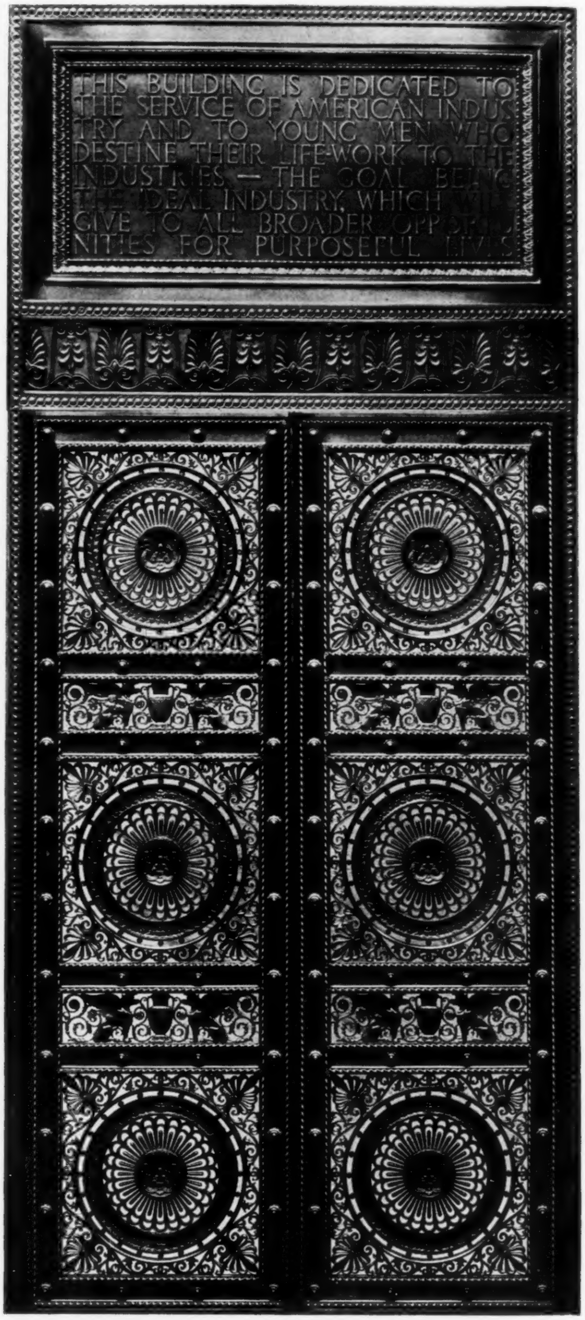
Probably the greatest founder of bronze during the period of the Renaissance was Peter Vischer, called "the Elder." He was born in Nuremberg in 1455, and up to the time of his death in 1529 he stood at the head of his craft. Every good example of Bronze cast in Germany during the period of his activity in the craft was either his own work or done through the influence of his methods. Vischer's fame traveled far abroad and many of his pupils practised the craft in Italy.

BRONZE DOORS
CASS GILBERT, *ARCHITECT*

It is doubtful if the Art of Bronze casting has at any time reached an equally high development. Referring to the more important or best known examples there are the so-called "Ghiberti Gates," or doors to the Baptistery at Florence, those of the Sacristy in the same city by Luca della Robbia, the



BRONZE ENTRANCE DOORS
HOWE & HOIT, *ARCHITECTS*



BRONZE ENTRANCE DOORS
J. H. GIESEY, *ARCHITECT*

David by Verrocchio and the Perseus of Cellini. Of equestrian statues made during this period, the best known are probably the matchless Colleoni in Venice by Verrocchio, a replica of which has recently been erected in Newark, N. J., and the Gattemalata in Padua by Donatello.

Reference has been made to the work as a founder of Bronze of Vischer, but no reference to the history of the work of Bronze would be complete without mention of the great achievement of Germany during the Renaissance. While the art as expressed in the finished metal may not have compared with that of the Italian artists whose work the metal has so wonderfully preserved, it is doubtful if the actual technical knowledge of the craftsman in Bronze was anywhere greater during this period than in Germany.

BAROQUE AND ROCOCO PERIOD

During this period Bronze was used in the making of smaller and more decorative objects than any other. Little of it is of such artistic moment as to warrant extended notice. The flamboyant and often vulgar tendency to over-ornamentation found many opportunities in Bronze. It tempted the craftsman, however, to a high expression of his technical skill, and many fine examples remain, but their true artistic value is a matter of serious doubt.

During the reign of Louis XIV and continuing through the Republic and the succeeding Empire, Bronze was used in a lavish manner, and it is believed that thin sheets of highly decorative hammered Bronze were during this period first used as ornaments to furniture.

THE NINETEENTH CENTURY

France, ever first in the appreciation of the Arts and Crafts, exerted a greater influence on the development of Bronze during the nineteenth century than any other nation. Every artistic purpose to which Bronze might be applied found expression in that country, and this has been a greater incentive to the development of the craft in the United States than any other influence that has been brought to bear, through the valuable efforts of Beaux-Arts men on the work of the craftsmen in Bronze. This development in France applies perhaps in a larger degree than any other to statuary. To speak of the majority of great Sculptors during the nineteenth century is practically to pronounce the names of the great Sculptors of France. Almost without exception there are from one to many examples of statues made by each famous French sculptor, all executed finally in Bronze. No city in the world has perhaps more Bronze statues in its public streets than Paris.

PLATE 66

LITTLE BUILDING, BOSTON, MASS.

BLACKALL, CLAPP & WHITTEMORE, *ARCHITECTS.* LITTLE & RUSSELL, *ASSOCIATE ARCHITECTS*

PLATE 67 DETAIL OF MAIN ENTRANCE

LITTLE BUILDING, BOSTON, MASS.

BLACKALL, CLAPP & WHITTEMORE, *ARCHITECTS.* LITTLE & RUSSELL, *ASSOCIATE ARCHITECTS*

PLATE 68

A CORNER SHOP FRONT

A SHOP FRONT

LITTLE BUILDING, BOSTON, MASS.

BLACKALL, CLAPP & WHITTEMORE, *ARCHITECTS*. LITTLE & RUSSELL, *ASSOCIATE ARCHITECTS*

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ENTRANCE HALL, TREMONT STREET

PLATE 69

STORE ARCADE

LITTLE BUILDING, BOSTON, MASS.

BLACKALL, CLAPP & WHITTEMORE, *ARCHITECTS.* LITTLE & RUSSELL, *ASSOCIATE ARCHITECTS*

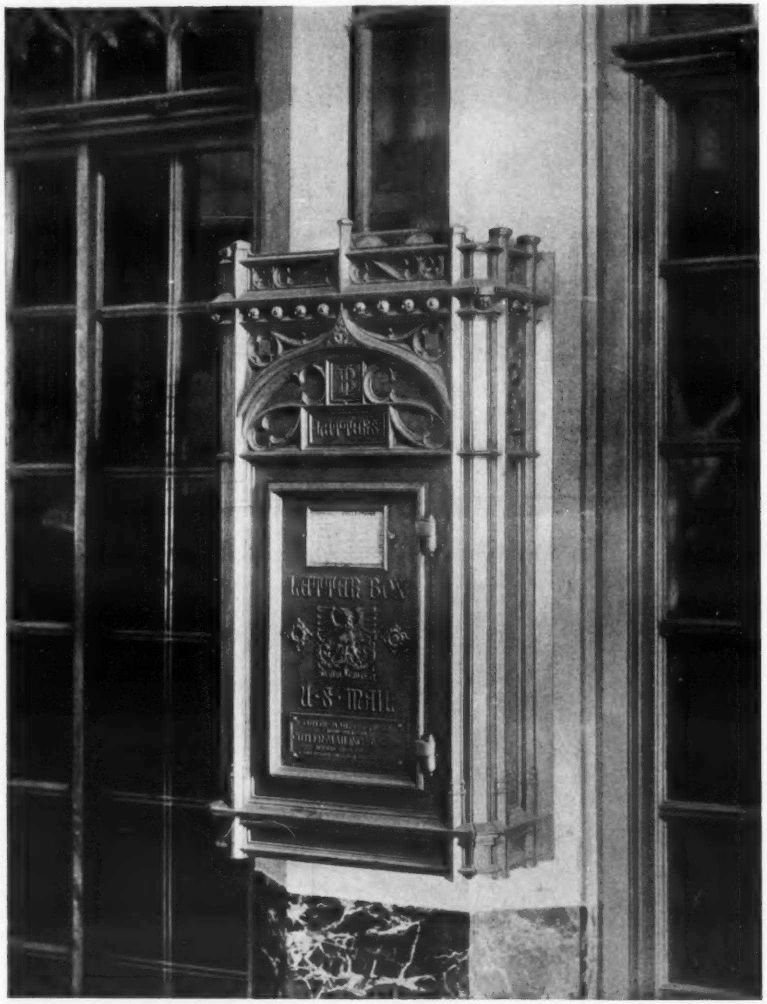
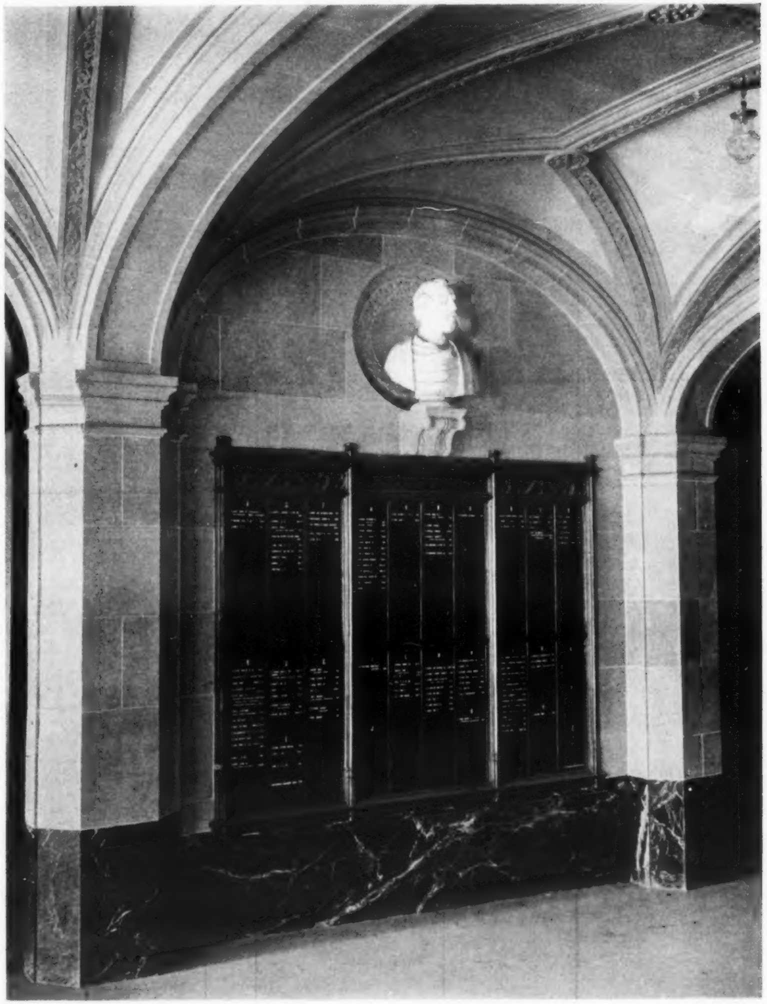


PLATE 70

DETAIL IN CORRIDOR



DETAIL IN CORRIDOR

LITTLE BUILDING, BOSTON, MASS.

BLACKALL, CLAPP & WHITTEMORE, *ARCHITECTS.* LITTLE & RUSSELL, *ASSOCIATE ARCHITECTS*

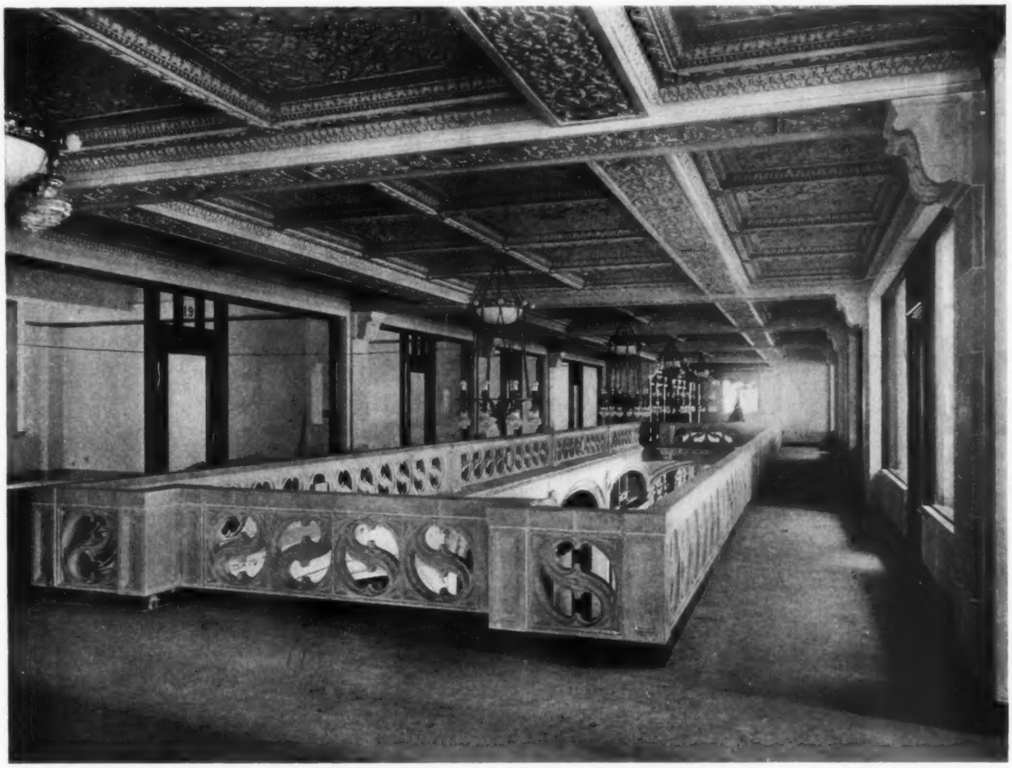
STORE IN THE ARCADE

Plate 71

ELEVATOR ENTRANCES

LITTLE BUILDING, BOSTON, MASS.

BLACKALL, CLAPP & WHITTEMORE, *ARCHITECTS.* LITTLE & RUSSELL, *ASSOCIATE ARCHITECTS*



SECOND STORY ARCADE

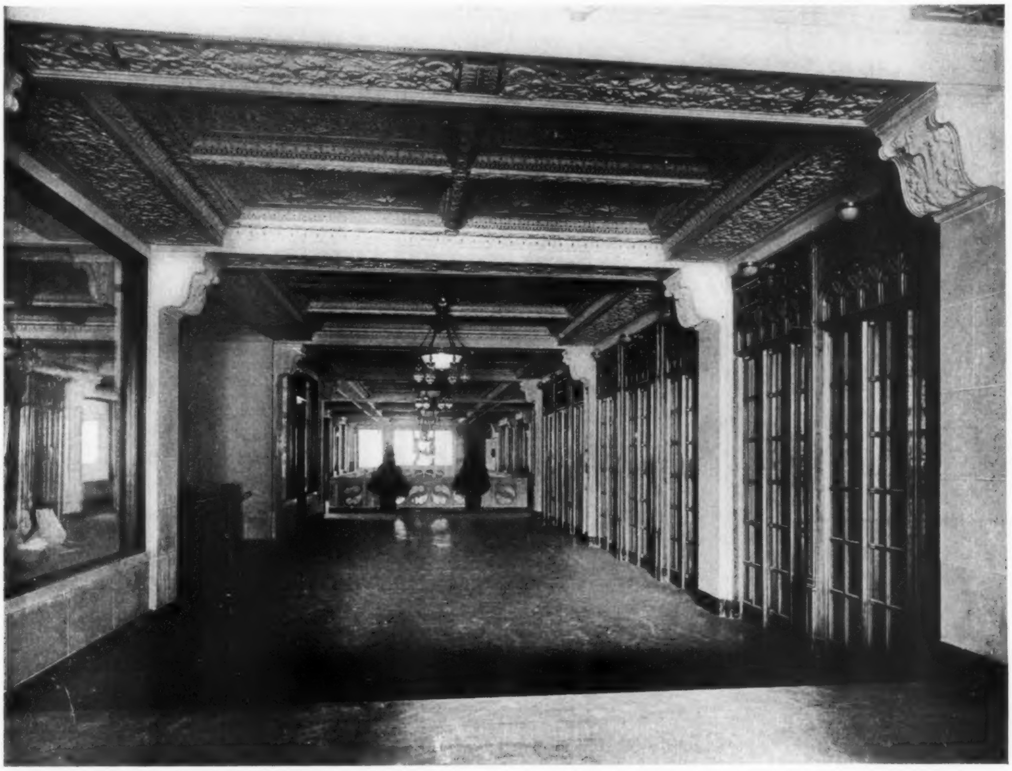


Plate 72

SECOND STORY ELEVATOR HALL

LITTLE BUILDING, BOSTON, MASS.

BLACKALL, CLAPP & WHITTEMORE, *ARCHITECTS.* LITTLE & RUSSELL, *ASSOCIATE ARCHITECTS*

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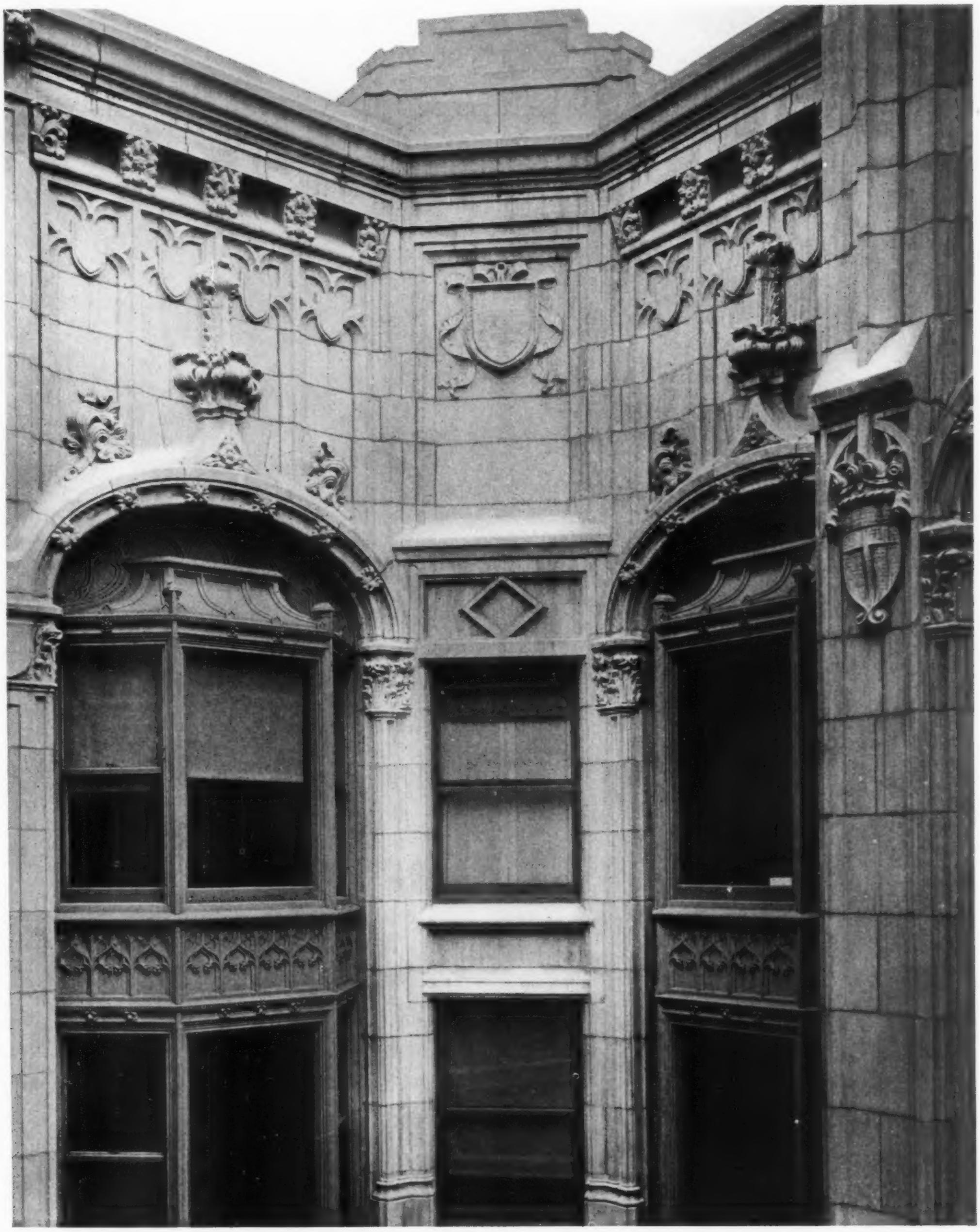
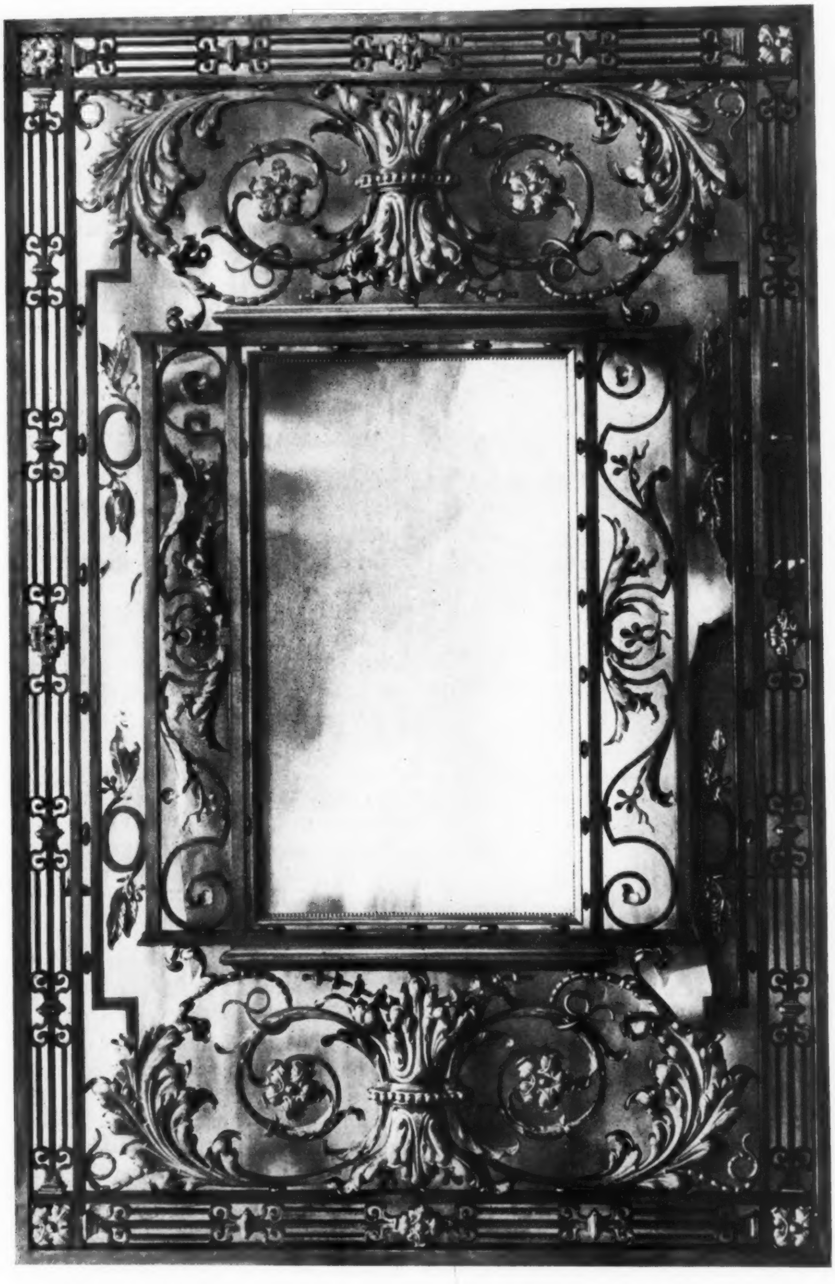


PLATE 73 EXTERIOR DETAIL, UPPER STORY

LITTLE BUILDING, BOSTON, MASS.

BLACKALL, CLAPP & WHITTEMORE, *ARCHITECTS.* LITTLE & RUSSELL, *ASSOCIATE ARCHITECTS*



BRONZE GRILLE IN HOUSE OF JOHN D. ROCKEFELLER, POCANTICO HILLS, N. Y.

WILLIAM WELLES BOSWORTH, *ARCHITECT*

Some may be open to criticism as to their artistic merit but many of the greatest creations of the sculptor's art since the Renaissance are to be found in that city. Other countries have produced great craftsmen in Bronze during the nineteenth century, notably the Japanese, while Austria, Russia and in fact almost every country in Europe has produced one or more Artist-Craftsmen whose work has served as models for other men of the period.

(To be continued)

BRONZE DOORS TO MEMORIAL CHAPEL, U. S. NAVAL ACADEMY, ANNAPOLIS, MD.
ERNST FLAGG, *ARCHITECT;* EVELYN LONGMAN, *SCULPTOR*

Real Estate Boards Favor City Planning

At the national convention of the Associated Real Estate Boards, held in Milwaukee, the committee on city planning reported as follows:

The committee believes that there is no subject more important for the consideration of real estate men in general than that of city planning. The committee proposed an act authorizing the creation of a city planning department for recommendation by the national body to the local boards. This act provides for an additional executive department in the government of cities, to be known as the city department of city planning, to be in charge of a city planning commission.

Demonstration Hospital for War Training

The Rockefeller Institute in New York announces that the demonstration hospital to be operated in connection with the institute will soon be formally opened. It will be under the direction of Dr. Alexis Carrel.

A striking feature of the hospital—a feature evolved after many years of experimentation—is its practical mobility. The entire base hospital unit may be taken down or put together in fourteen days. The purposes of the demonstration hospital are manifold. American surgeons enrolled for military service will be taught the latest methods of treatment of infected wounds, especially the Carrel-Dakin method. Physicians and surgeons in the United States also may be instructed in order that the mortality from industrial accidents will be reduced. Charles Butler is the architect.

Art Students' League of New York

The illustrated annual for 1917-18 of the Art Students' League of New York is now out and presents the prospectus of this very important art school for the coming season. The illustrations of student work show as usual a very high grade of proficiency in all the various classes. With a board of instructors that includes the names of many very celebrated artists, this long established school will no doubt continue in the future as in the past to present the very best opportunity for a finished education in the painter's art.

The Art Students' League is located in the Fine Arts Building on West Fifty-seventh Street in New York. Its annual "shows" are interesting features of each season's exhibitions.

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The Sunken Garden in Central Park

THAT certain class that seek to destroy the natural beauty of Central Park, and to convert it to uses other than those of a purely recreative area, are, as was expected, trying to cast discredit on the project as illustrated and described in our issue of August 8th.

The needs of the poorer class are being strongly urged by this group of obstructionists. Restricted bathing facilities in New York are pointed out, and in a deliberate effort to mislead the people the opponents of the Sunken Garden plan are maliciously referring to it as a creation purely in the interest of the richer or higher class of people that frequent the park.

The daily press is printing letters from correspondents, each with a suggestion for some utilization of the reservoir site. All of them would entail an expenditure of city money so far in excess of that proposed by the present admirably conceived plan as to be unworthy of consideration.

An ex-police commissioner of New York has addressed a long communication to the New York *Times* on this subject. He suggests that the reservoir site should be treated simply, according to the general landscape design of the park. In an admirable editorial and one that accurately reflects the best sentiment as to the Sunken Garden scheme, the *Times* replies, stating:

> "To do this, the site would have to be leveled. The masonry and water bed are now supported by an enormous mass of stone. To blast this away and level the ground sufficiently to produce a pleasantly diversified surface would cost the labor of years and an enormous amount of money. To make that large surface arable so that lawn grass and many flowers, trees and shrubs would thrive would require enough rich soil to cover thirty-four acres.
>
> "Without special inspiration to undertake such an enormous labor, without a specific cause for the improvement of the site, nothing would be done with it for many years to come. The occasion for the utilization of the site has presented itself in the demand for a memorial of the Catskill water system, the construction of which has constituted the greatest engineering feat in history. The reservoir site being obtainable, much thought and time were given to determine the simplest, most artistic and at the same time the least expensive means of adapting it to the purpose. Sculpture is assuredly appropriate in any public park. To be sure, much of the sculpture now in Central Park is of a poor quality. But the merit of the MacMonnies fountain is not in question. Its appropriateness as a memorial of the completion of the aqueduct is indisputable. And what measure of inappropriateness can the most severe critic of landscape architecture find in the construction of a sunken garden in Central Park? The natural walls are there. The depression is there. The needful improvements can be made quickly and at comparatively little cost to the city. The fountain and the band stand will be paid for by private subscription."

If the excellent plan of the Mayor's Committee is to be brought to successful conclusion, it will be necessary to refute the malicious and misleading arguments and statements of the would-be park destroyers.

Every citizen is aware that New York has failed to keep pace with its needs for public playgrounds. These should of course be provided. But it would seem to be the height of folly and extravagance to seek to divert Central Park, or any part of it, to any other purpose than was originally proposed when this large part of Manhattan Island was laid out for the recreation of all the people, as a highly developed landscape garden. The Sunken Garden plan is exactly in line with this original purpose. It can be constructed at a cost so comparatively insignificant as to create no burden on the taxpayers, while it will add a dignity to the park that will be very great and so imposing as probably for all time to prevent those who are trying to serve a selfish purpose from carrying out any schemes for encroachment.

The very fact that this plan of the Mayor's Committee will entail so small an expenditure of public funds is perhaps the reason for the attack upon it from certain quarters. Any scheme that contemplates a very large expenditure of money would probably receive the approval of a certain class who are now seeking to discredit this Sunken Garden scheme.

The Essentials in Art Education

PRACTICAL men in the field of art are accustomed to read the expression of the opinions of purely theoretical workers with more or less amusement, not unmingled at times with a sense of irritation. It is unfortunate that so much space should be allowed to unauthorized writers to exploit their views on vital matters pertaining to art, and particularly to those in the field of art education.

It is probably with this feeling that Carroll Beckwith, N.A., is moved to address a lengthy communication to a daily paper, protesting against the expression in a prospectus of a leading art school of the views of its faculty as to just how the early art education of students should be conducted.

Mr. Beckwith states:

> The reading of the prospectus for the coming season of one of our most important art schools, one in which I myself was an instructor during the first fourteen years of its existence, shows me more convincingly the dominant note of "Modernism" which is now pervading, and doing untold injury to, the art training of the youth of America. This note is illustrated by the phrase which I find emphasized, viz., the fostering of "individuality." It is covered in the prospectus by the following sentences: "Assist the student to cultivate that expression of self, as being the only path leading to great success." "The ultimate end of all study of art must be individuality." While it should be the deep and firm effort of all art education to keep that ultimate end in view, it is exceedingly perversive to implant that notion into the mind of the beginner, for you create a confusion of thought at the very beginning and undermine the discipline which is essential for the youthful training in laying wisely a firm foundation upon which to build the superstructure of an art education. It is undeniable that in art, as in everything else, one must creep before one can walk; gradual and periodic stages must be mastered. It is this unrestrained outpouring of individualism in the minds of students who have not been grounded in the rudiments of drawing that has engulfed our schools with this flow of paint upon canvas which displays neither reason nor order, and is incoherent both to the public and to the producer.

The "divine afflatus" in art is undoubtedly a much over-worked attribute. It is knowledge that gives value to a work of art and with this is to be added the highest obtainable skill in setting down that knowledge.

As Mr. Beckwith contends, such knowledge and skill is only obtainable by concentrated and orderly methods of education, and such methods are only to be found when conducted by men of the highest practical efficiency. Education in art under such teachers will certainly be along lines that will teach the hand to become the skilled servant of the mind and eye. A safe school would undoubtedly adopt such methods.

Mr. Beckwith makes a forcible point in his argument when he states that it is not possible for any pupil to acquire the expression of a temperament until he has acquired the language in which such temperament can be properly expressed. Most uninformed observers will accept as temperament what is purely eccentricity, and in no field of education is this misinterpretation to be found to a greater extent than in art.

Many schools teach art to any pupil that presents a fairly good evidence of an artistic tendency. Few schools take the responsibility of urging a pupil that has conclusively shown his lack of ability to give up the pursuit of an unattainable ideal.

In every profession there are to be found "misfits." Men and women who are but indifferently competent, but who would, if properly advised at the outset, have found fields of work that would have led to better results. Perhaps the ranks of the critics are largely recruited from this class.

Office Building for Federal Trade Commission

B. Stanley Simmons, *Architect*

THE City of Washington is the scene of much activity in the construction of office buildings for the use of various bureaus of the United States. The number of clerks has increased faster than the office accommodations, and, as Congress has been slow to appropriate money for new buildings, several have been erected by private capital and leased to the Government for a term of years. One of the latter type for the use of the Federal Trade Commission will soon be ready for occupancy. The building is on a corner lot, 35 feet by 103 feet, and has 12 floors and basement. The exterior finish is limestone up to the fourth floor, and red brick above. The walls are carried at each floor, and the brick facing is backed up with hollow tile. The structure is of reinforced concrete skeleton construction, and is fireproof throughout.

The reinforced concrete floors are of special interest to the architectural engineer, as a new idea is employed which reduces the dead weight. The columns and girders are of the usual design, but the floor joists are a series of closely spaced T-beams, poured monolithically with the supporting girders. These T-beam joists are formed by metal cores and spacers. Figure 1 shows a typical cross section of the finished floor construction. The open space between the edges of the T-beam flanges is covered over by the usual concrete fill, which is reinforced with 26 gauge expanded metal. In ordinary practice, a slab spans the distance between beams, but in this system a section of slab 16 in. wide is omitted, saving about 40 lbs. per linear foot of beam in dead weight.

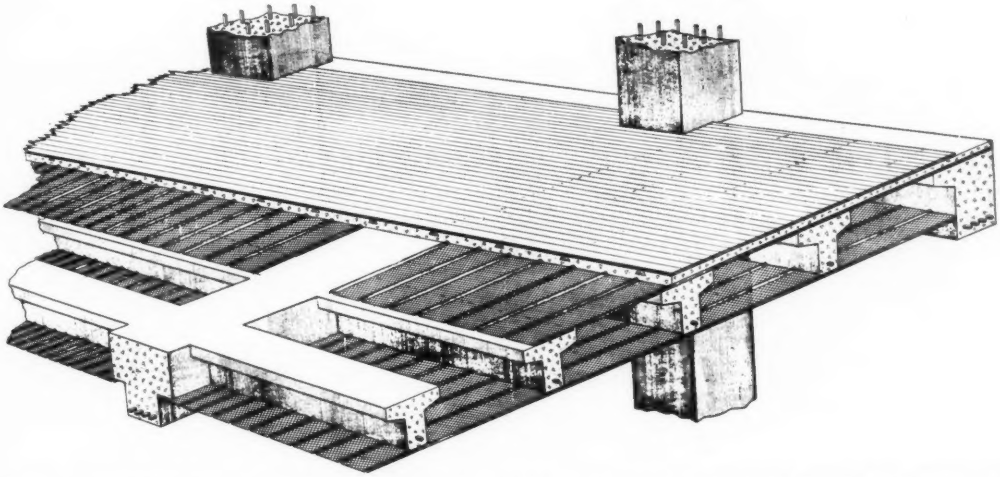


FIG. 1—PERSPECTIVE SECTION, SHOWING T-BEAMS, INTERIOR GIRDER AND WALL GIRDER

The forms for casting these T-beams are made of 24 gauge sheet steel, bent as shown in Figure 2. They are made in sections 8 ft. long, and may be telescoped to make any length of beam desired. These steel forms are held in the proper position by wood diaphragms made of rough boards, set at intervals of about 6 ft. Two boards nailed along the top of these spacers serve to keep them in place, and also to align the edge of the steel form. Plank may then be laid on top for the use of the concreting gang. With one set of forms both the width and depth of the T-beams may be varied to suit requirements of span and loading. By increasing the spacing of the forms, the stem may be widened to 6 in. or more, allowing room for several rods, and at the same time correspondingly increasing the width of the T-flange. The stem may be poured to any desired depth.

The method of procedure for each floor is as follows: False-work is erected upon the concrete joists of the last completed floor, and boards 8 in. wide are then laid corresponding to the spacing of the joists. If a flat ceiling is desired, stiffened metal lath is laid across these boards, and upon the lath are set the steel forms and wood spacers. The reinforcement for the girders and T-beam joists is then placed, and the concrete deposited. At the end of two or three days, during which the columns are carried up another story, the forms are removed upwardly and passed to the floor above. By this means the forms are quickly recovered without disturbing the supporting false-work.

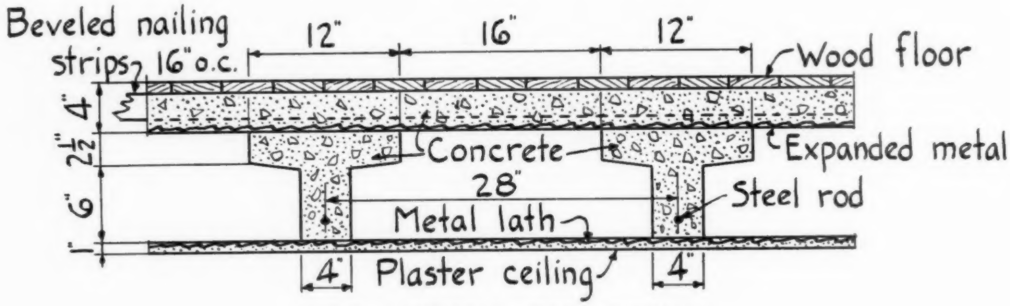


FIG. 2—TYPICAL CROSS SECTION

The standard principles of designing reinforced concrete are used throughout, as the proportioning of the floor joists is an application of the common theories. The sheet metal cores are bent on the ordinary tinsmith brake, and no complicated or expensive machinery is required in the process of manufacture. The forms are light and can be quickly placed in position. When they are removed, they are taken upward, instead of being dropped down to the floor below. The fact that no forms are left in place allows any defects in the concrete to be observed. The saving in dead weight previously mentioned reduces the sizes of beams, girders, columns and foundations, and consequently results in a large reduction in cost. Sixty working days were required from the time the basement columns were poured until the roof was completed; which is an average of less than five days for each floor.

From the foregoing remarks it will be observed that this building can claim these advantages: The structural design is simple; the erection is easy and rapid; the construction is fire-resisting; the floors are sound-proof; the ceilings are flat; and, most important of all, the cost is reduced to a minimum without detriment to strength or durability.

FIG. 4—CONCRETE POURED. FORMS NOT YET REMOVED

FIG. 5—VIEW OF FALSE-WORK, SHOWING METAL LATH ABOVE FOR FLAT CEILING

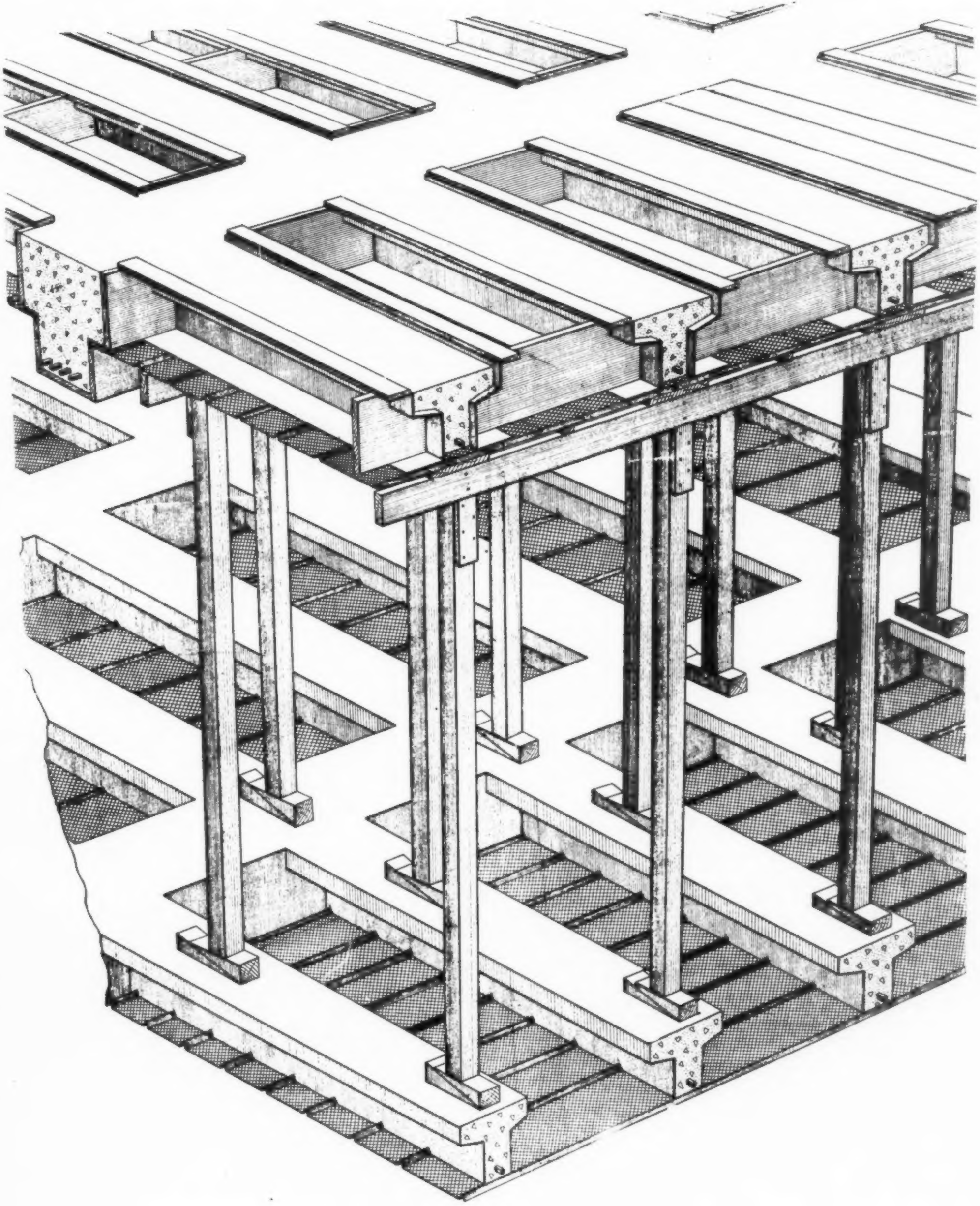


FIG. 3—FALSE-WORK CONSTRUCTION DETAILS

FIG. 6—FORMS REMOVED. EXPANDED METAL REINFORCEMENT FOR FLOOR FILL PARTIALLY LAID

The patents for this method of construction and the forms are owned and operated by the T-Beam Engineering Co., Washington, D. C. The architect was B. Stanley Simmons. The total cost of the building was about $150,000.

FIG. 7—FORMS AND SPACERS IN PLACE. NOTE STEEL FORMS ON TOP OF FLOOR

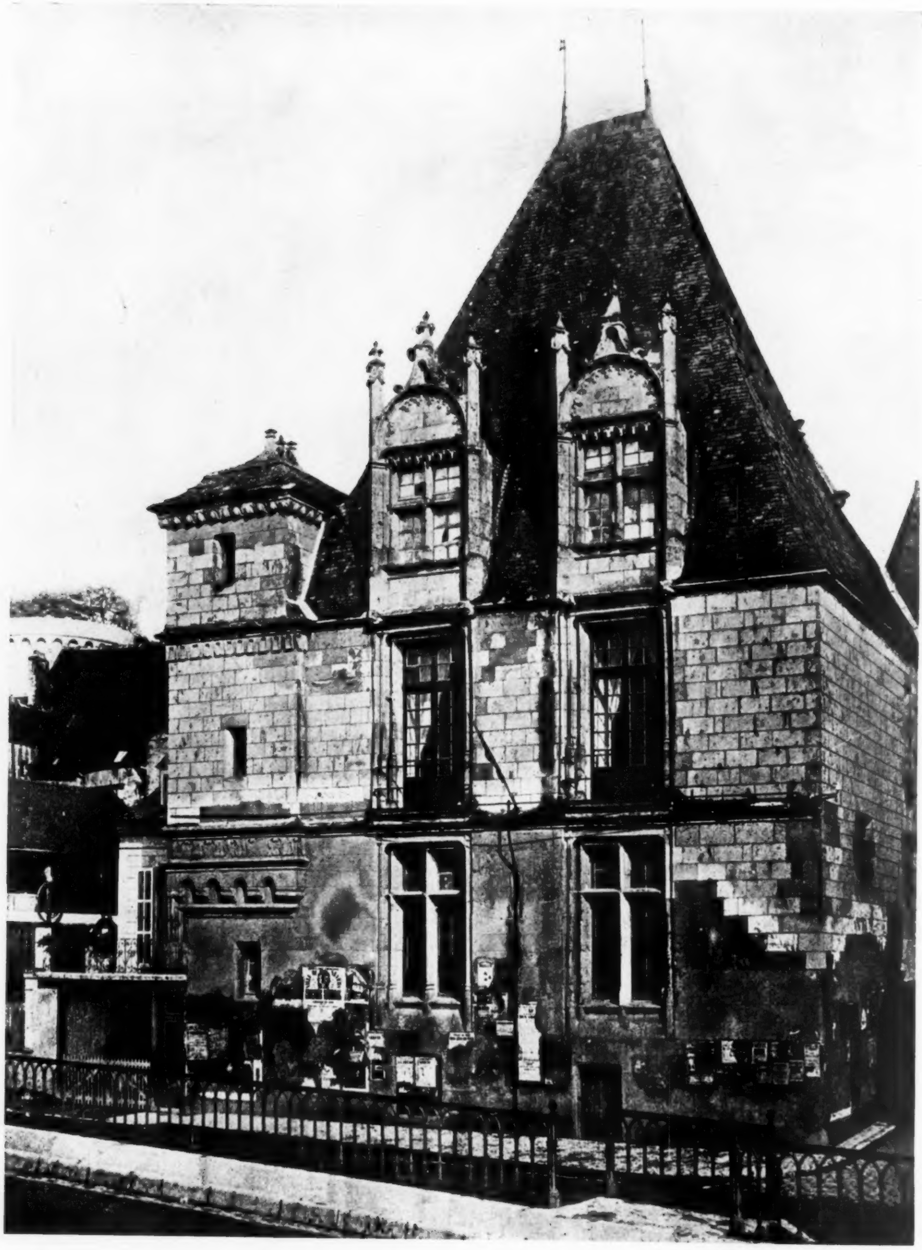
FIG. 8—EXTERIOR VIEW OF SKELETON FRAME

Warm Air Heating Rule Book

A publication which is a veritable text book on warm air heating has been issued by the National Warm Air Heating & Ventilating Association, Columbia Building, Columbus, Ohio. It is a pamphlet of the pages of rules and formulæ for installations, covering the questions of pipe diameters, register sizes, risers, wall pipe and fittings, the construction of a fresh air room and the area of chimney flues.

Solid Metal Window Approved by Fire Board

A solid metal window which has been approved by the National Board of Fire Underwriters, after official tests, for Label service, is that manufactured by the Harry E. Campbell Co., 8 West Fortieth Street, New York City. Boxes, head and sash are of No. 12 gage steel, the sill is of cast iron and all hardware is solid bronze. Permanent joints are electrically welded, while all working joints are lock joints, which remain weather-tight indefinitely. A folder setting forth the more important exclusive features of this window and an isometric sectional drawing showing construction are circulated by the company.



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