THE AMERICAN ARCHITECT

Vol. C. WEDNESDAY, DECEMBER 20, 1911 No. 1878

ARCHITECTURAL TERRA COTTA CONSTRUCTION

By EDWARD H. PUTNAM

PART III

IN Plate 9 is illustrated a simple and effective construction of the dome, First Church of Christ, Scientist, at Boston. The inner dome is very thin, of reinforced concrete. Outside of the inner dome extending from the base to the apex are four-inch by four-inch "T" irons, and horizontally around these are smaller "T's," bolted to the others. In the second series the "T's" act as shelves to bear the exterior shell of terra cotta. A dome unsupported, or self-sustaining, would have a tendency to buckle at about one-quarter of its height, but the construction illustrated resists this tendency. Although massive in appearance the dome is remarkably light because of the natural lightness of terra cotta, which in this instance is made much thinner than usual. (The recent development of a gold glazed terra cotta now makes it possible to erect a dome of gold in a permanently enduring form at a cost that is not commercially excessive.)

Concrete and terra cotta are frequently combined harmoniously. Often a building with concrete framework is entirely covered with terra cotta, for architectural effect in modeling and color, or other possible reasons. The construction varies from steel construction, but the anchors and iron work must be adjustable in the same way (Plate 10). Holes are made in the plank forms for the anchors, and when the concrete is poured the anchors become firmly embedded. Small rods are passed through holes in the ends of the terra cotta pieces, and the tops are cut away so that the workman can insert his hand and bend the anchor around the rod. The block is then filled with fine concrete or cement. A dowel on the bottom of the imposed piece fits in the top of the lower course. The long rod through the pieces permits the anchor to be fastened at any point and by filling the pieces with concrete the whole building is unified. Another,

DOME OF THE FIRST CHURCH OF CHRIST, SCIENTIST, BOSTON, MASS.

BRIGHAM, COVENEY & BISBEE, ARCHITECTS

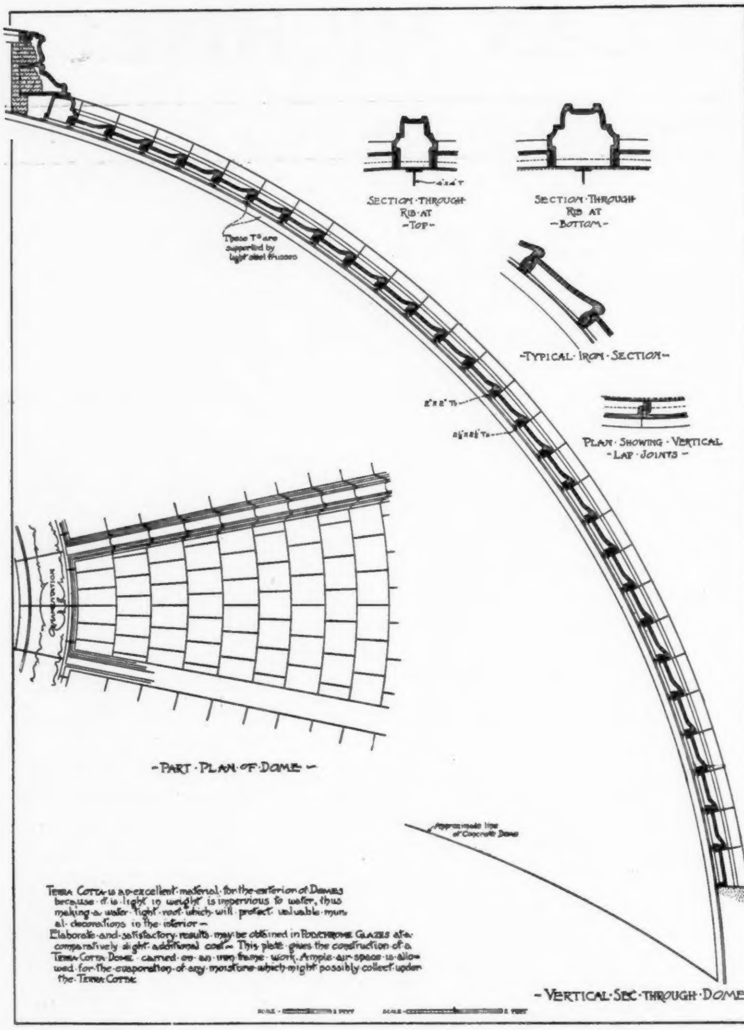


PLATE 9

particular cases only, but serve to show in a general way the *character* of terra cotta construction and in what way it differs from the construction of other materials. Plates 11 and 12, take up the individual points of construction that most frequently occur, showing the right and the wrong methods and should be of especial aid to the designer. They are self-explanatory.

Sometimes the advisability of using a material in which such care must be taken is questioned. The answer is that the manufacturer assumes all the care. Another answer is that the question arises simply because some of the builders are not accustomed to the use of terra cotta and do not understand it, and, therefore, the construction s e e m s more involved than it really is.

Perhaps in no other structural line does the manufacturer do more of the actual work. The only drawings the architects need supply in order to secure estimates are floor plans, elevations, sections showing projections and sketch details. From these drawings the manufacturer makes his bid. On receiving the contract he redraws the terra cotta in minute detail, showing the shape, size and location of every piece, the method of its attachment to the frame, and every anchor, rod and hanger.

When the architect's approval of these working drawings has been received the terra cotta manufacturer prepares a complete iron schedule from which the iron contractor makes his bid. If necessary

and perhaps better, form of construction is to fasten rods along the face of the concrete, by bending the anchors around them, place a short piece of rod in the hole provided in the end of each piece, and with copper wire fasten the short rod to the long one. By keeping the wire close to the terra cotta piece the short rod is made to support the adjacent end of the next piece, and the wire—in the joint between—supports both. This method obviates cutting away the top bed of the terra cotta, a process which is troublesome and expensive.

As remarked at the outset, it is impossible to make set rules for terra cotta construction. The foregoing designs refer to

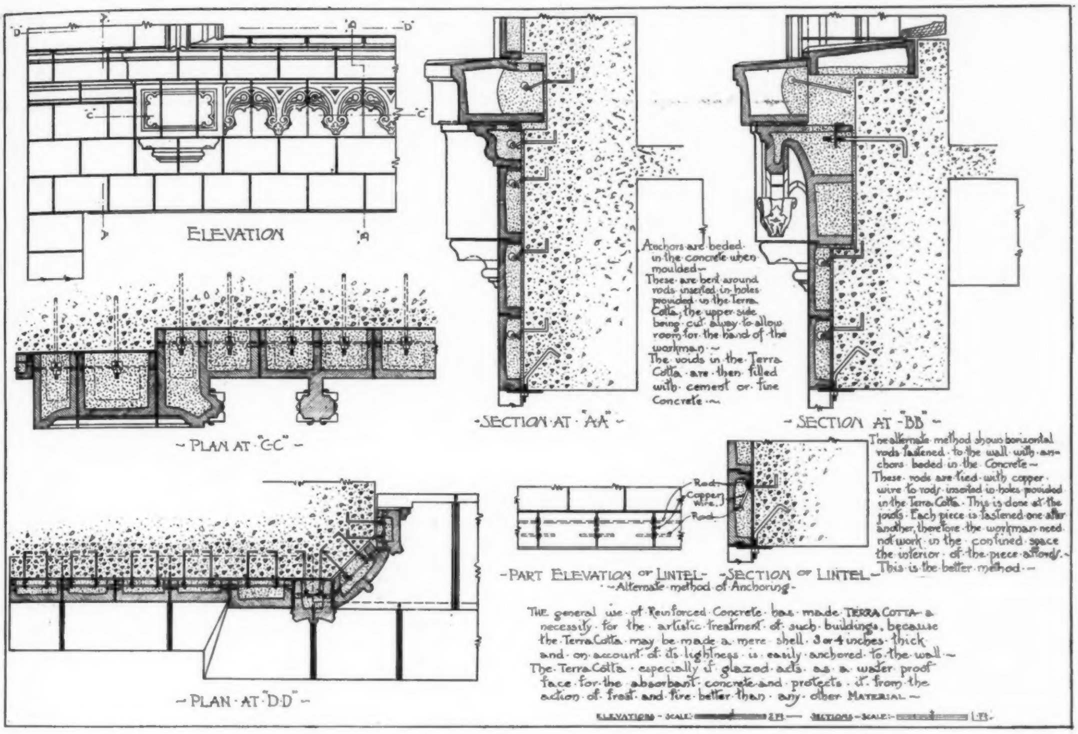


PLATE 10

the terra cotta manufacturer supplies the iron, but it is generally simpler, easier and less expensive to have an iron manufacturer furnish it.

The best class of manufacturers maintain modeling departments that are probably as good as many of the established shops for architectural design. They are made up of men who are not only familiar with terra cotta but thoroughly familiar with every style of architectural ornament, and in many cases contain men fully competent to execute figure work. The architect can inspect the models by photographs which the manufacturer prepares, or by personal inspection. He has the advantage of changing the models in a finished state.

All the manufacturer asks is that the material should receive proper treatment at the building. It seems almost incredible that terra cotta, frequently beautifully modeled and treated with several colors, should be taken from a carefully packed car, thrown into a cart and dumped on the ground as if it were common brick, but it often happens.

The mortar and concrete used in the setting and bedding of terra cotta should have careful inspection. Poor mortar made by careless builders admits water; water expands poor mortar, and expanding mortar—especially when aided by frost—exerts a force that is practically irresistible. A safe formula for mortar is: one volume of lime, *thoroughly slaked;* three of cement, and eight of sharp sand. For concrete filling the following mixture is satisfactory: one volume cement, two of sand and five of stone.

Cleaning the building down is a simple matter. Glazed terra cotta never needs anything stronger than water and a good abrasive soap or washing powder. In extreme cases the standard or limestone finish may be helped by a little acid—one part commercial muriatic to ten parts of water—not a half and half solution. If acid is used only wooden pails should be employed; if iron pails are used the acid will act upon the metal and become a yellow stain instead of a cleaning fluid.

The important place that architectural terra cotta occupies today means an even greater importance in the future. Its own individual advantages foretell this no less ciency and availability independently or in combination with other materials, and its

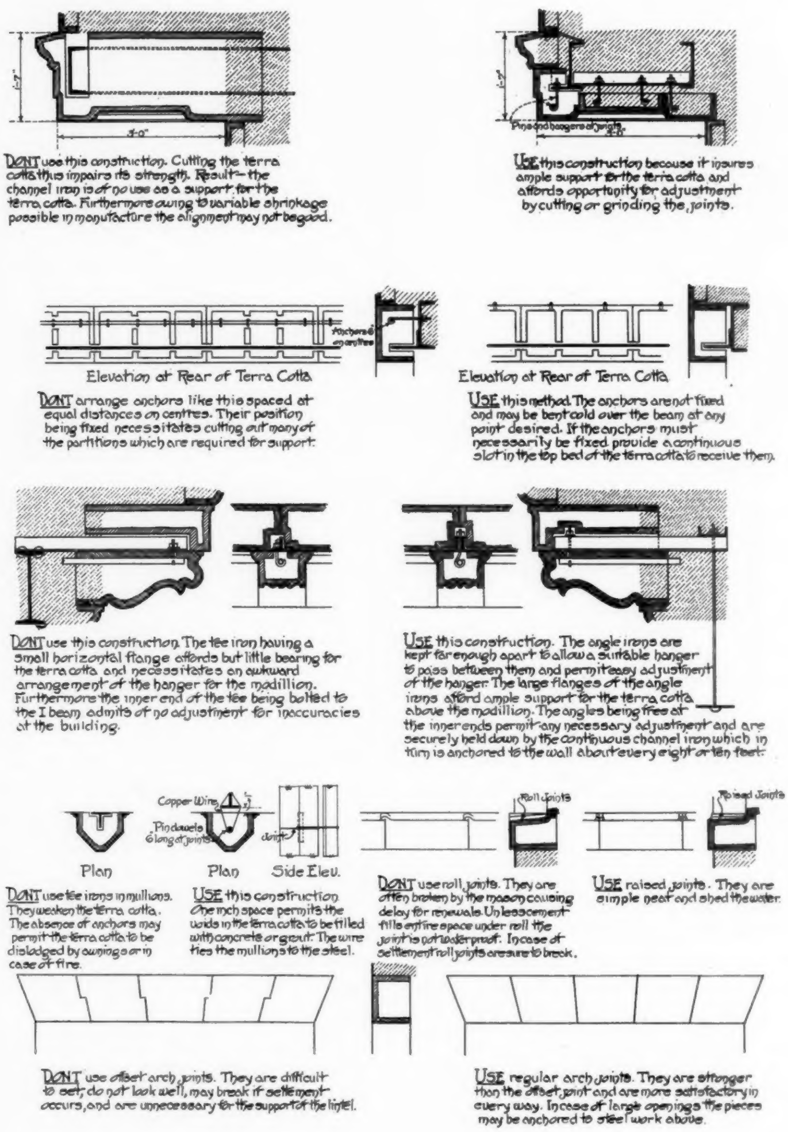


PLATE 11

than the higher cost of other high class materials. In brief these advantages are its fire and weather-proof qualities, its efficiency thoroughly distinctive property of polychromatic treatment in a permanently enduring form.

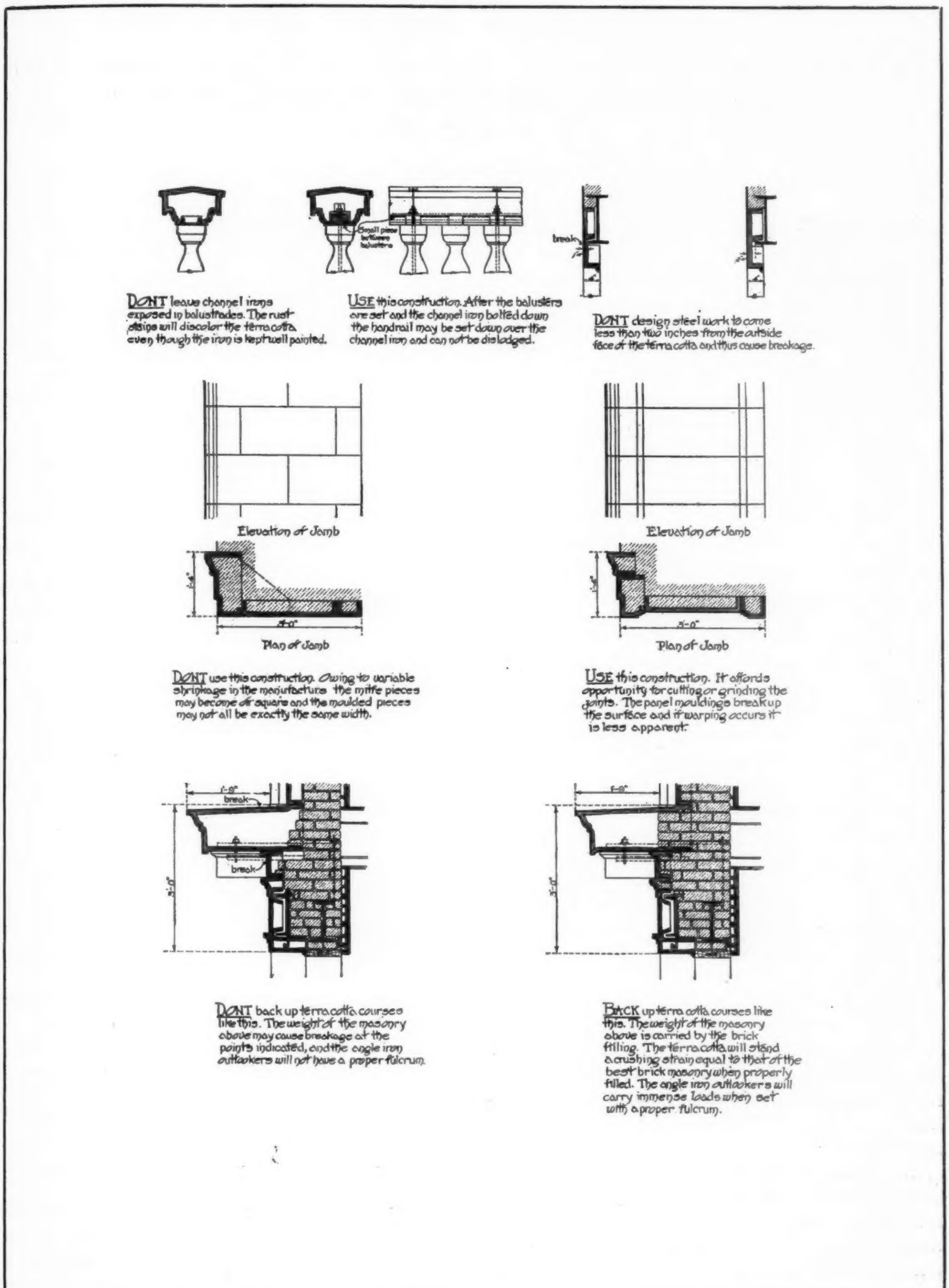

Small piece between balusters
break
DONT leave channel irons exposed in balustrades. The rust stains will discolor the terra cotta even though the iron is kept well painted.
USE this construction. After the balusters are set and the channel iron bolted down the handrail may be set down over the channel iron and can not be dislodged.
DONT design steel work to come less than two inches from the outside face of the terra cotta and thus cause breakage.
Elevation of Jamb
Elevation of Jamb
Plan of Jamb
3-0"
Plan of Jamb
DONT use this construction. Owing to variable shrinkage in the manufacture the mitre pieces may become off square and the moulded pieces may not all be exactly the same width.
USE this construction. It affords opportunity for cutting or grinding the joints. The panel mouldings break up the surface and if warping occurs it is less apparent.
1-0"
break
break
1-0"
DONT back up terra cotta courses like this. The weight of the masonry above may cause breakage at the points indicated, and the angle iron outlookers will not have a proper fulcrum.
BACK up terra cotta courses like this. The weight of the masonry above is carried by the brick filling. The terra cotta will stand a crushing strain equal to that of the best brick masonry when properly filled. The angle iron outlookers will carry immense loads when set with a proper fulcrum.

PLATE 12

LOCKER, DRESSING AND TOILET BUILDING FOR THE BROOKLYN ATHLETIC FIELD, DEPARTMENT OF EDUCATION

By C. B. J. SNYDER, Architect and Superintendent of School Buildings of the City of New York

THIS is the name now applied by the Department of Education to those structures which were formerly designated as grand stands, such as those that have been erected at the Athletic Fields at St. George, Staten Island, Crotona Park, The Bronx, and at Astoria, Queens, in each instance following the usual type of such affairs, with the exception, perhaps, that they are built of durable materials and the entire space beneath them is utilized for the purposes of locker, dressing and toilet rooms.

The Brooklyn Athletic Field is the largest of any field owned by the Board of Education, and since each school has its own field day, thus bringing from 1,500 to 3,500 contestants on the field at one time, it is necessary to make liberal provisions in the number of accommodations in the dressing rooms, etc.

In designing this stand it was endeavored to overcome the trouble and annoyance present in all stands that have been observed which are used for the observation of athletic games, through the tendency of the people in the first row to stand up during the contests, thus necessitating those behind them doing the same.

Careful investigation extending over quite a period of time seemed to point to the conclusion that it was not enthusiasm that brought the first row in the stand to their feet at any particular time during the games, but was due to the fact that there was another set of observers *whom the designers of the stand never took into account.* These seemed to consist of the worthy contestants and their friends, who almost invariably lined the outside of the fence between the track and the stand some three or four deep, thus obstructing the angle of vision of even those seated in the first row.

It was also found that no allowance was made in the shape of a stand placed on the flat side of a track for a view parallel therewith to observe contestants coming or going.

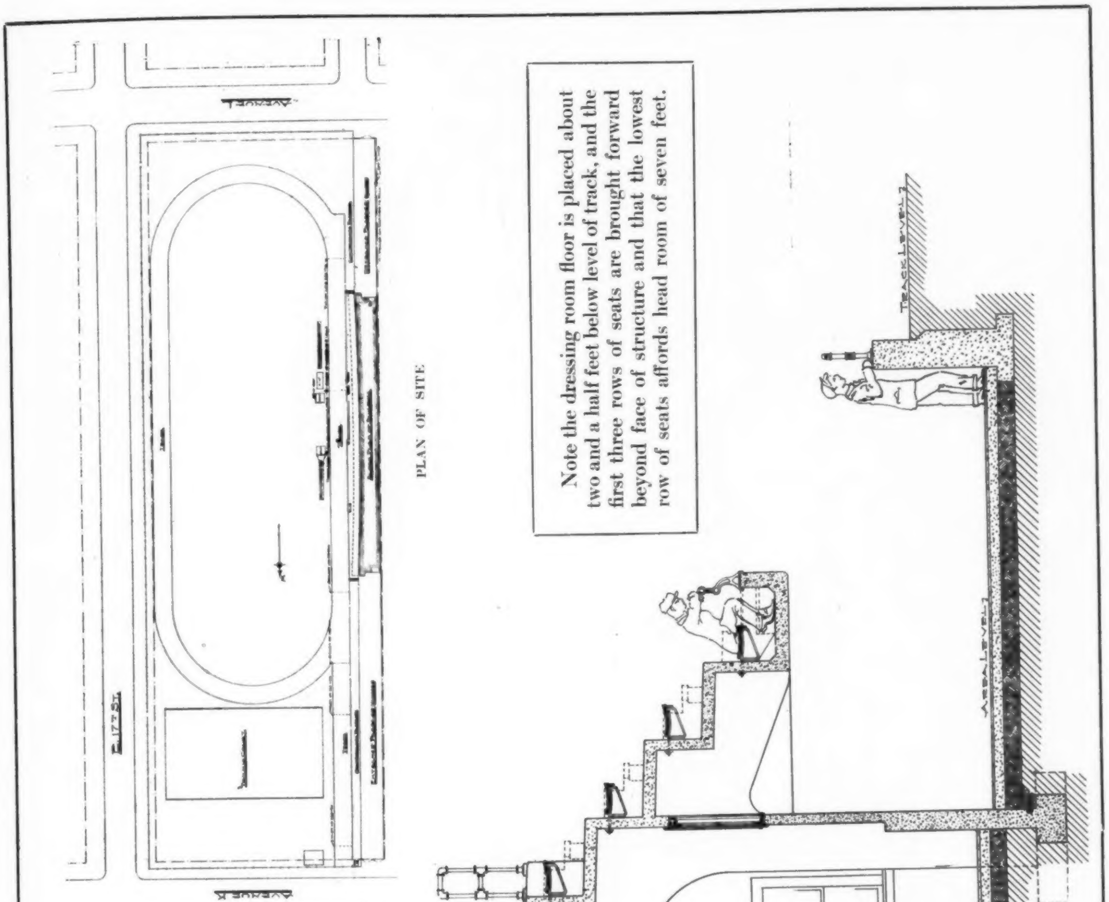
In the effort to settle these problems it appeared that the first thing to do was to get rid of the spectators who lined the track between the stand and the track enclosure. The mere enclosure was useless, since with such a large number of contestants, oftentimes numbering over 3,000, it was necessary to have ample circulating space between the track and the dressing, locker rooms and toilets.

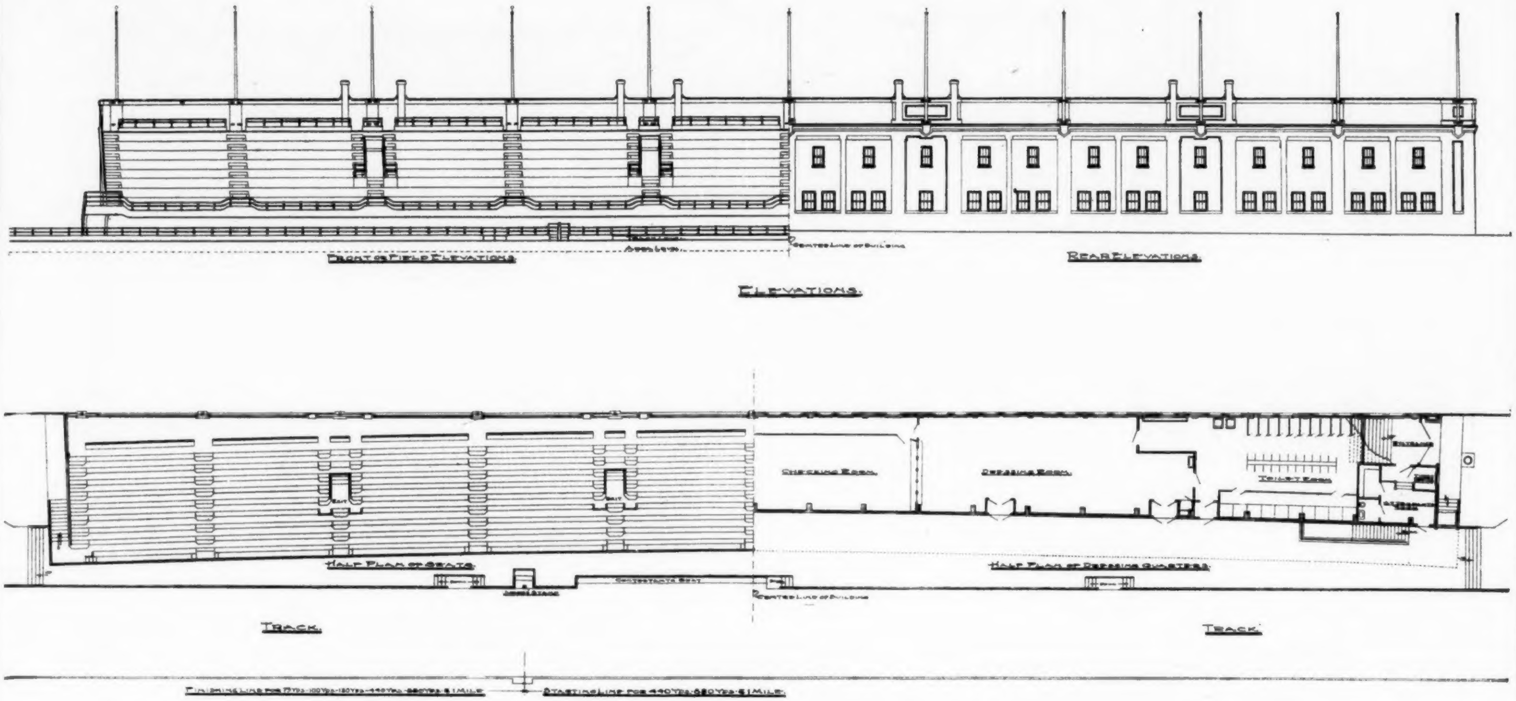
The raising of the stand seemed futile, since to obtain the desired line of sight over the heads of those at the railing would produce an exaggerated effect and cause discomfort in the use of the stand.

Moving it forward to the line of the track enclosure cut off all circulating space, and if a view of the contestants was to be had it would be necessary to drop the first row of seats to about eighteen inches or two feet above the level of the track.

The only solution of the difficulty was apparently to place the stand or structure so that the first or surface floor, affording toilet, dressing and locker room accommodations, would be some two feet six inches below the level of the track, while the first three rows of seats are brought forward beyond the face of the structure and kept at sufficient height to allow seven feet head room beneath same. This forms a circulating space of about fifteen feet in width, but with the first line of observers only about eight feet back from and above the track. A glance at the cross-section will show this quite clearly.

The obstruction of view up and down the track was first brought to my attention by the Hon. James E. Sullivan, through a chance remark that he did not see why grand stands erected on the flat side of a


Note the dressing room floor is placed about two and a half feet below level of track, and the first three rows of seats are brought forward beyond face of structure and that the lowest row of seats affords head room of seven feet.
PLAN OF SITE
TRANSVERSE SECTION
TRACK LEVEL
ARENA LEVEL
DRESSING ROOM LEVEL
CORRIDOR LEVEL



BROOKLYN ATHLETIC FIELD, 16TH TO 17TH STREETS, AVENUE K AND AVENUE L

The plan indicates entrances as at the ends through a ten-foot stairway leading to the gallery shown on the section, in which communication is had with the stand by short flights of steps, the openings of which are arranged so as to be covered in with doors during winter storms.

The layout is to afford facilities for boys and girls, the arrangement of each half being the same, with the exception of a difference in the toilet facilities. The boys and girls are separated by the checking room, behind which there is a passageway with a door at either end, so that if all the contestants are of one sex, these doors can be thrown open and they can have the run of the entire structure, or if there be boys and girls the doors at either end of the passage can be closed, so as to form a barrier some seventy feet in width between them.

track in this country were not built so that a person could get a side view without disturbing his neighbor; that he had noticed during the Olympic Games in Athens in 1906 (which he attended as Secretary of the Amateur Committee on Olympic Games), that the Stadium was so designed that although he was seated at the side, he was able to see perfectly the entrance of Dorando, the winner of the Marathon race, and that without standing up, as would be necessary in stands of other design.

From the information obtained as to the measurements of this Stadium supplemented by photographs loaned by Mr. Sullivan, it was found that the stadium was curved at the sides as well as the ends, and this curve bore a fixed relation to the width of the field. A glance at the plan will show this curve reproduced for the Brooklyn Locker Building.

The structure is to be built of reinforced concrete, contract therefor having been awarded on October 9, 1911, for $65,300.00.

There are one or two things, perhaps, which might prove interesting.

One is the method of access from the runway to the track by means of steps; the position of the contestants' bench and the provision for the judges.

This last arrangement provides for a white marble post with a slotted top at right angles to the plan of the track, through which the tape can be drawn, corresponding to one on the inside of the track, formed by a movable post.

The first judge stands on the level of the track, the second behind him and one step higher, and the third one step higher yet, so that all three will have an unobstructed view of the tape and at precisely the same line.

The usual way is for one judge to take the time while the second and third stand on either side of him, their angle of view being plus one side and minus the other: this insures the highest accuracy in judging.

It will be noted that the riser from the bottom of the stand is higher than the one immediately behind it. This was thought to be necessary as insuring against possible obstruction.

THE ANDOVER THEOLOGICAL SEMINARY BUILDINGS

ALLEN & COLLENS, ARCHITECTS

ON October 25th the new buildings for the Andover Theological Seminary were formally dedicated. These buildings replace the old Colonial Buildings of the Andover Seminary, which were formerly located at Andover, Mass.

The group as erected is complete, with the exception of the dormitory, which it is hoped will be constructed within a few years. This addition would be erected at the northerly end of the buildings in such a way as to balance the stack wing and effect a more symmetrical composition.

The buildings are constructed of a light brownish grey granite, quarried near Fitchburg. The seam face granite has been used so extensively in the neighborhood of Boston that the architects thought it wise to attempt a different material. The result has been most satisfactory. The light-colored granite has a softness, which blends harmoniously with the limestone trimmings, and with the slight variations in tone produces a most pleasing effect.

The grounds have been laid out carefully and when the shrubbery and ivy have grown, the building will set most naturally in its surroundings, and take in that appearance of age, which is so universally associated with collegiate Gothic.

The use of this architecture is a distinct departure from the general type of buildings at Harvard University, but the trustees of the Theological Seminary wished in this way to emphasize their individuality and publish the fact that although affiliated with Harvard they were in no sense a part of that institution.

The group is divided into four parts. The library, the administrative depart-

VIEW FROM NORTH EAST

ment, a chapel and a dormitory. The main feature of the library is the reference hall, located in the small connecting link between the administration building and the stack wing. This room is finished in dark oak with limestone mullions. In the windows are set leaded glass copies of old book marks. The stack wing of the building is entirely fireproof but is separated from the rest of the building by double fireproof doors at each opening. The stack itself is capable of housing 250,000 volumes, and has a special feature in the seminary rooms, which are erected directly in the middle of the stack.

In the main building is the chapel, which occupies the upper part of the southern pavilion. This chapel, like the reference hall, is finished in dark oak with oak ceiling. It has a seating capacity of about 200 students. There has been prepared a very beautiful scheme for all of the traceried windows. Only one of these windows has been installed, but it gives promise of a series of great beauty.

The lower part of the main building is occupied by class rooms all finished in ash. The second floor contains the President's and faculty rooms. The third floor, as well as the upper part of the tower is occupied at the present time by students, each student having a study and bedroom.

The small building at the north of the group, which in the future will form the connecting link between the administration building and the dormitory, is the Commons Hall. This building has been designed for the comfort of the students as a general meeting place and club room. At one end is a large fireplace surrounded by easy chairs and window seats. At the opposite end are book-shelves and a beautifully carved clock with soft-toned chimes.

All of the furniture has been especially designed for the building and although simple and inexpensive fits into its surroundings in the most appropriate manner.

The basement of the building contains a large museum, recreation hall, a suite for the janitor, boiler room and store rooms.

This building was erected at a cost of about twenty-five cents per cubic foot, which is reasonable considering the stone exterior, the modern heating and ventilating plant, the fireproof library construction, and the generally excellent character of the workmanship.

The working drawings and floor plans were shown in THE AMERICAN ARCHITECT, issue No. 1808, August 17, 1910.

THE AMERICAN ARCHITECT

Founded 1876

PUBLISHED EVERY WEDNESDAY BY

THE AMERICAN ARCHITECT (INC.)

239 West Thirty-ninth Street, New York

G. E. SLY, PRESIDENT

E. J. ROSENCRANS, SECRETARY AND TREASURER

Address all communications to "THE AMERICAN ARCHITECT"

SUBSCRIBERS' RATES:

In the United States and Possessions (Porto Rico, Hawaii, Philippine Islands and Canal Zone) Mexico and Cuba

TEN DOLLARS PER YEAR, POSTAGE PAID

ALL OTHER COUNTRIES . . . $12.00 PER YEAR

SINGLE COPIES (Regular Issues), 25 CENTS

Entered at the Post-office, New York, as Second-class Matter

VOL. C DECEMBER 20, 1911 No. 1878

CONTENTS

CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS

THE Forty-fifth Annual Convention of the American Institute of Architects, held in Washington December 12th, 13th and 14th, is notable by reason of the number and quality of reports presented by the various committees. Some comment by members of the Institute indicated a feeling that enthusiasm or interest was lacking from the proceedings, but after all the serious thoughtful work of the organization is done in committee and at leisure, the results only appearing in the annual reports presented to the convention. Judging from these, it would seem that greater interest or more intelligent study had never been devoted to questions of vital importance to the profession than has characterized the work of the committees during the past year.

Prominent among committee reports is that of the standing Committee on "Contracts and Specifications," Mr. Grosvenor Atterbury, Chairman. This committee has submitted with its report a set of standard documents of the American Institute of Architects as now published and for sale to members of the Institute and the general public. These forms are not intended to supplant the Uniform Agreement, but are to be regarded as a code of reference representing the judgment of the Institute in the matter of what constitutes the best practice of the profession. While they are designed primarily for use in connection with a single or general contract, nothing contained in them prevents their use for operations conducted under separate contracts. Copies of these documents can be had from the same source from which uniform contracts have been obtainable and it is suggested that all members of the profession familiarize themselves with the forms which represent the result of a number of years' study and deliberations.

The many advantages of standardized documents of this character, if they can be made to represent the best practice and by their clearness, equity and certainty of final interpretation in courts of law recommend themselves for general adoption by architects, owners and contractors, are too obvious to require comment.

Perhaps one of the most important features of the standard documents of the Institute and one that would merit the careful consideration of the profession is the revised attitude which they assume toward the builder. While of necessity he must bear the burden of responsibility, it has been felt by the committee that in many instances the general conditions of contracts as drawn by individual architects have been in certain respects unfair to the contractor, and even where conditions were clearly expressed and apparently binding on the face of the contracts they were not as a matter of equity enforceable in a court of law. Heretofore, in fact, it seems to have been assumed that all the stringency of the contract should be directed toward the contractor and that the architect and owner are necessarily honorable persons. The new documents, however, are distinctly more binding upon the owner than such documents have heretofore generally been, and correspondingly more liberal to the contractor. Nor do they assume that the architect's decisions will necessarily in all cases be equitable. As a consequence, instead of the very few matters which have formerly been left to possible arbitration, it is arranged that a number of classes of decisions made by the architect shall be subject to settlement by this means in case of dispute. Other reports of particular interest and value are printed in this issue or will follow in succeeding issues, as space permits. Representing as they do the result of much thought and study by members of the profession whose experience and knowledge of the subjects treated peculiarly fitted them for the work undertaken, their thoughtful perusal cannot be too strongly advised.

Recent Legal Decisions

In an important case recently decided, a contract provided that the building be completed by a certain day, providing the owner removed the present structure from the proposed site before a certain day four months previous. It was also provided that the contractor should pay the owner a certain sum as liquidated damages for each day's delay and that in case of delay caused by any act or default of the owner or other contractor, the time for completion should be extended for a period equivalent to the time lost; such period to be fixed by the architect upon written demand of the contractor. The architect did not extend the time. Owner was two days late in removing the old building and new one was two months late in being completed.

Held, contractor was liable for liquidated damages from the day four months after the old building was removed to the date of the building's completion. As the contract provided that no alteration, addition, deviation, or omission which affected the price or time for the completion of the work should be done without the architect's written order, approved in writing by the owner, there was no power in the architect to waive the provision.

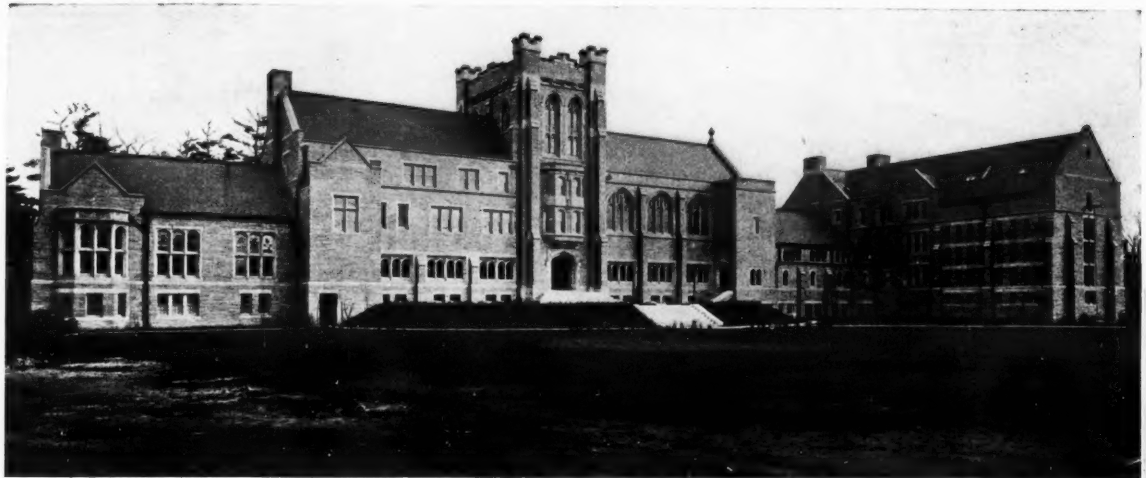
Van Buskirk *v.* Board Educ. 75 Atlantic (N. J.) 909. H.C.L.

A contractor may sue on a building contract when he can show a substantial compliance on his part. But where he has failed to perform or has performed in a different manner from that provided by the contract, the owner may refuse to accept it and insist upon performance before being liable on the contract or *quantum meruit.* The owner may by act or word or a failure to act or speak, accept the work and thereby waive strict performance.

Burnett Co. *v.* Art Wall Co., 51 Southern (Ala.) 263. H.C.L.

PEOPLE'S TRUST COMPANY PHILADELPHIA, PA.
SAUER & HAHN, ARCHITECTS

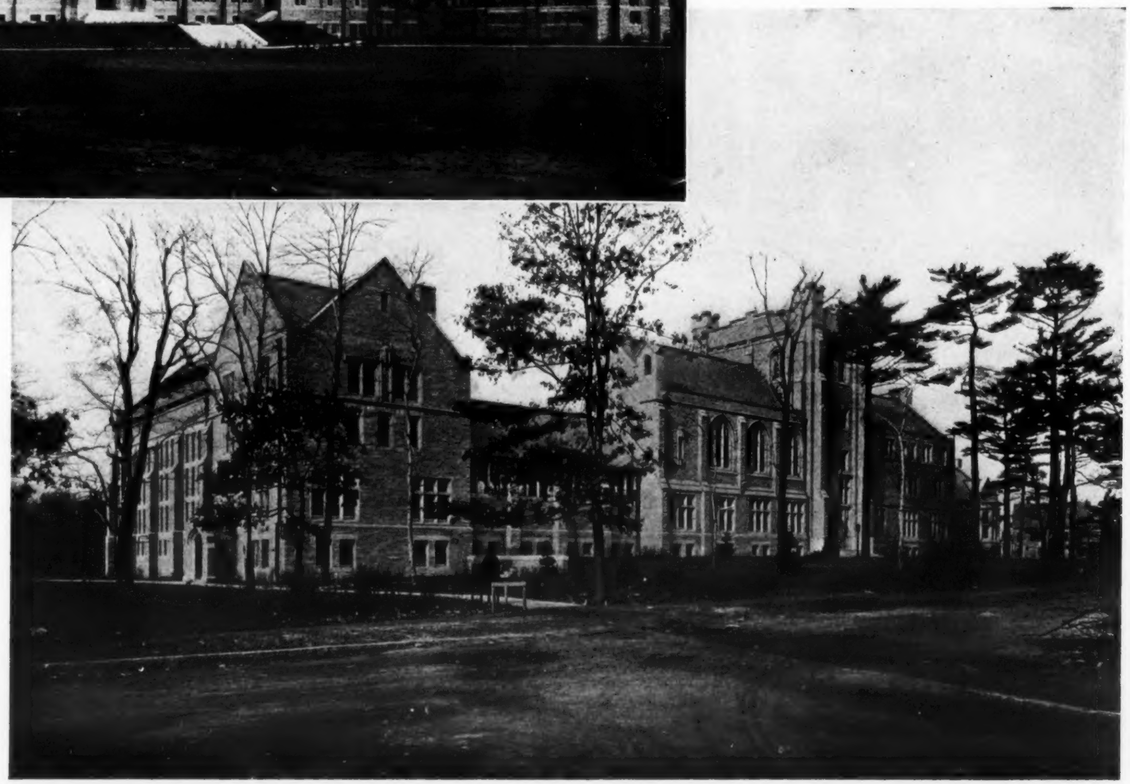
The framework is of reinforced concrete and masonry and is covered with a veneer of gray Terra Cotta. The main cornice and projecting sills are made according to the first method of concrete construction mentioned in the text. (See article on Architectural Terra Cotta Construction.)



THE WEST FRONT

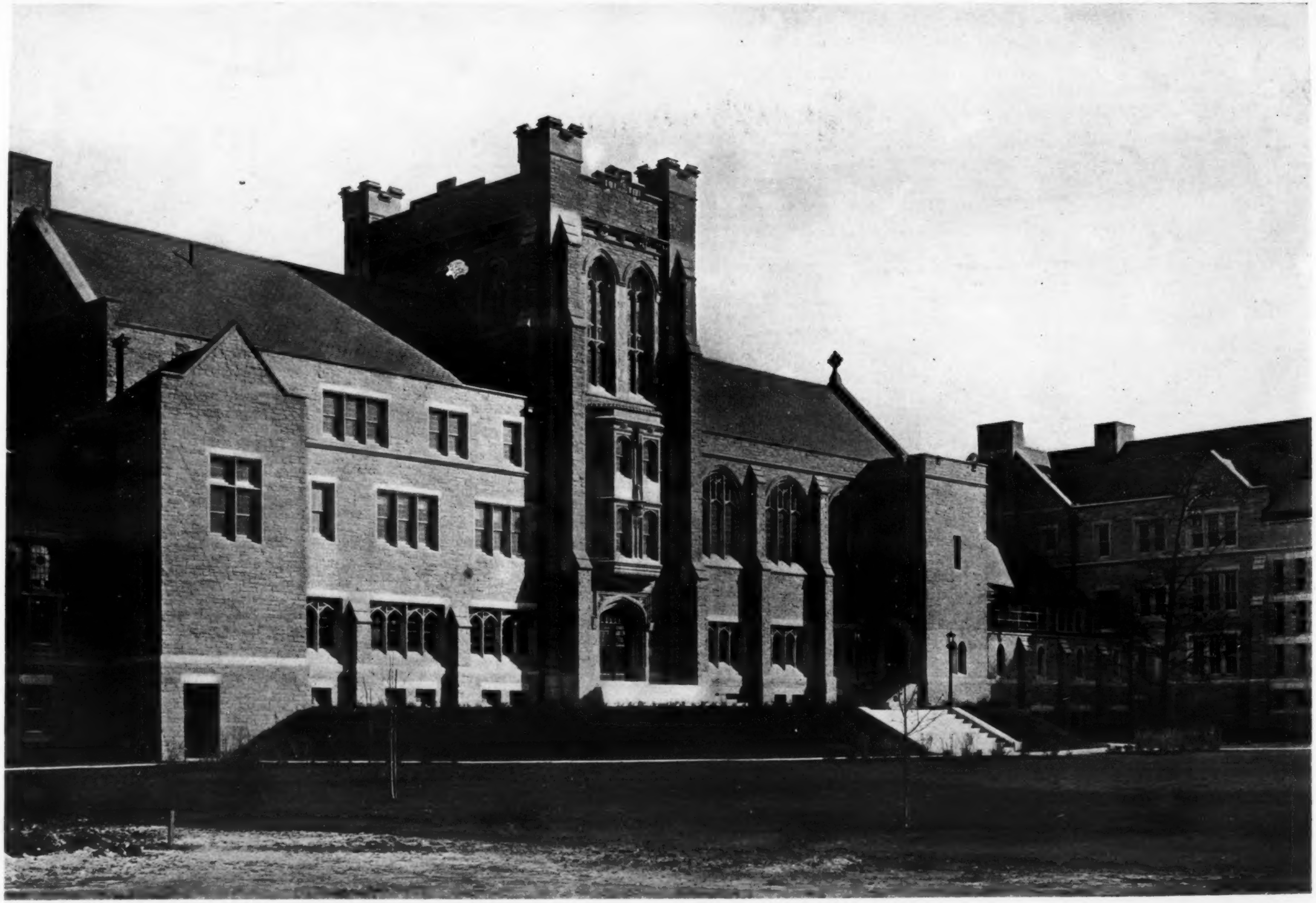
MESSRS. ALLEN & COLLENS
ARCHITECTS

THE EAST FRONT



ANDOVER
THEOLOGICAL SEMINARY
CAMBRIDGE, MASS.

For floor plans and working drawings, see issue No. 1808, August 17th, 1910



DETAIL OF WEST FRONT
ANDOVER THEOLOGICAL SEMINARY, CAMBRIDGE, MASS.
MESSRS. ALLEN & COLLENS, ARCHITECTS
For floor plans and working drawings, see issue No. 1808, August 17th, 1910

DETAIL OF EAST FRONT
ANDOVER THEOLOGICAL SEMINARY, CAMBRIDGE, MASS.
MESSRS. ALLEN & COLLENS, ARCHITECTS
For floor plans and working drawings, see issue No. 1808, August 17th, 1910

ABOVE IS A VIEW OF THE STAIRCASE HALL,
AT LEFT IS SHOWN THE INTERIOR OF THE CHAPEL

ANDOVER THEOLOGICAL SEMINARY
CAMBRIDGE, MASS.

MESSRS. ALLEN & COLLENS, ARCHITECTS

For floor plans and working drawings, see issue No. 1808, August 17th, 1910

THE LIBRARY, REFERENCE HALL

COMMONS HALL

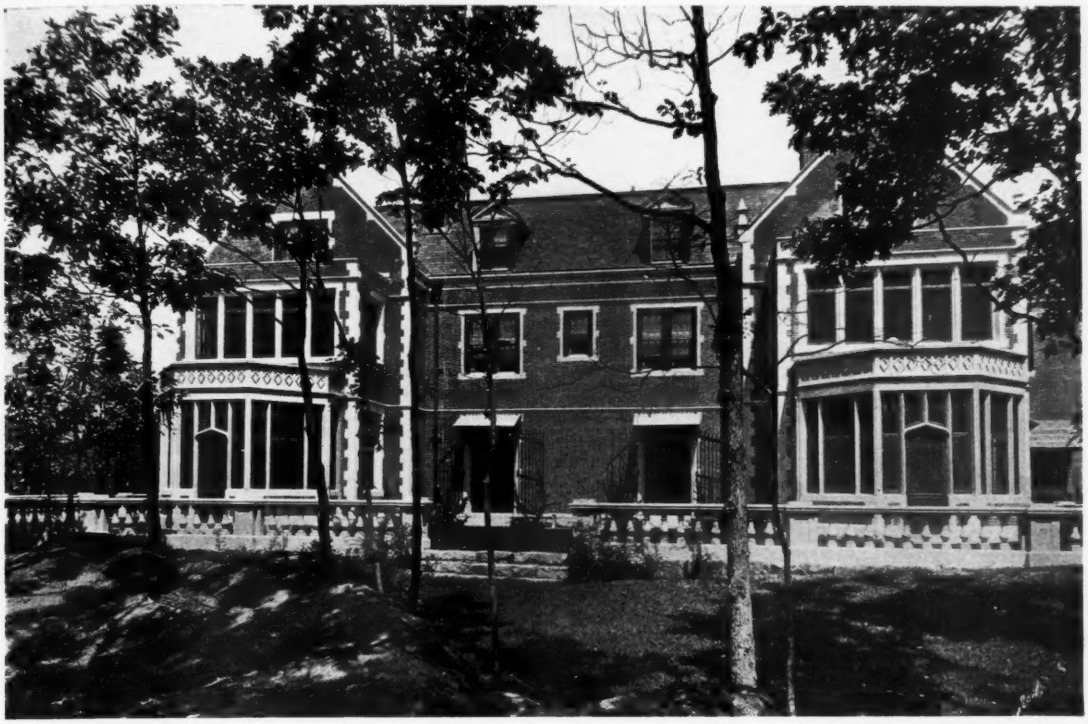
ANDOVER THEOLOGICAL SEMINARY, CAMBRIDGE, MASS.

MESSRS. ALLEN & COLLENS, ARCHITECTS

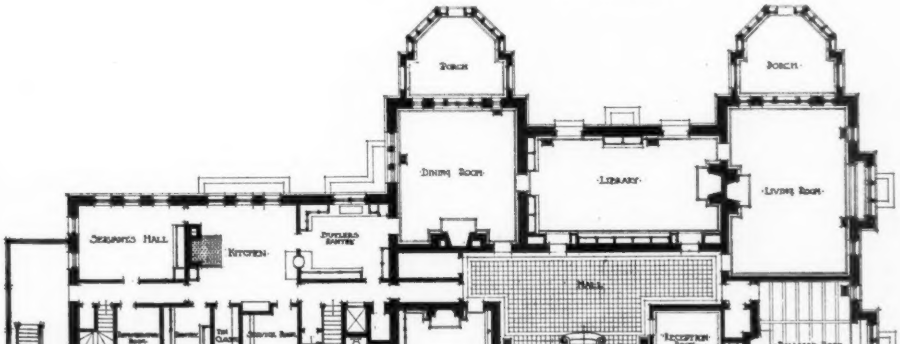
For floor plans and working drawings, see issue No. 1808, August 17th, 1910

HOUSE OF PHILIP DEXTER, ESQ., MANCHESTER, MASS.

MR. CHARLES N. COGSWELL, ARCHITECT



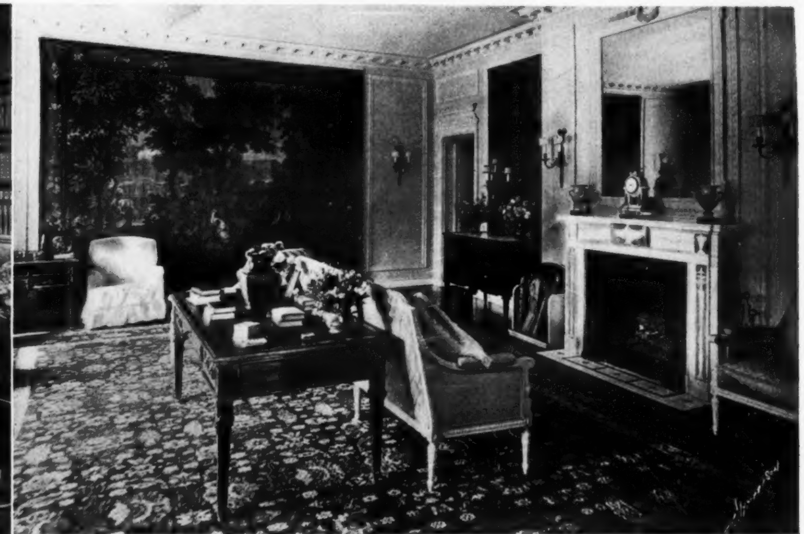
SECOND FLOOR PLAN

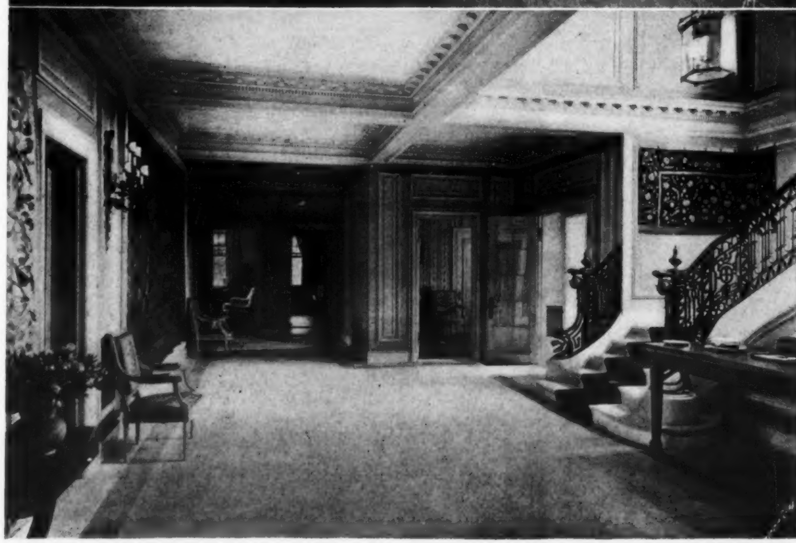


FIRST FLOOR PLAN

HOUSE OF PHILIP DEXTER, ESQ., MANCHESTER, MASS.

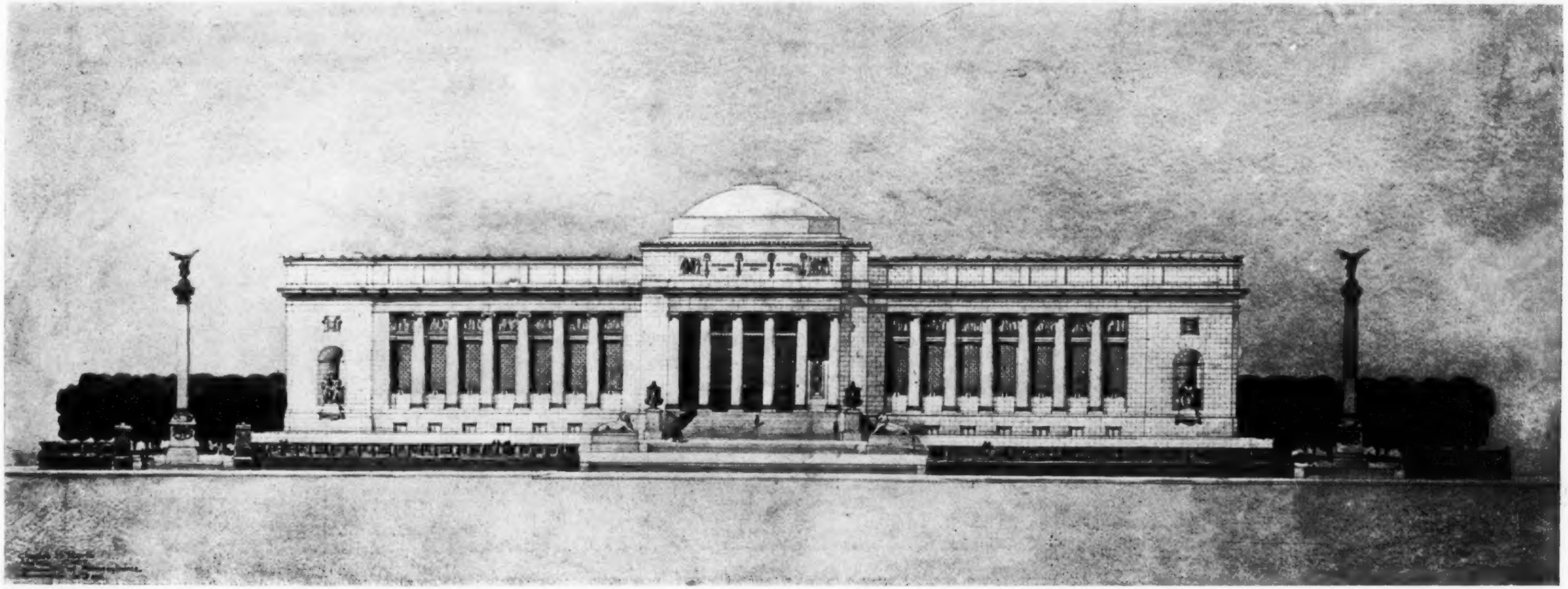
MR. CHARLES N. COGSWELL, ARCHITECT



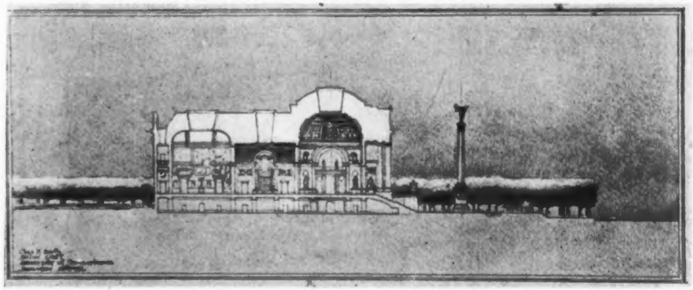


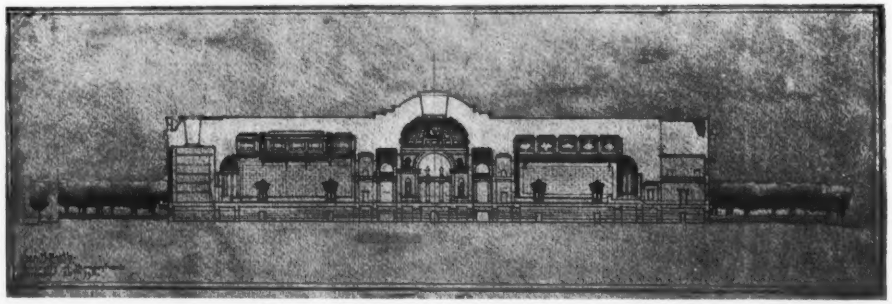
HOUSE OF PHILIP DEXTER, ESQ.,
MANCHESTER, MASS.

MR. CHARLES N. COGSWELL, ARCHITECT



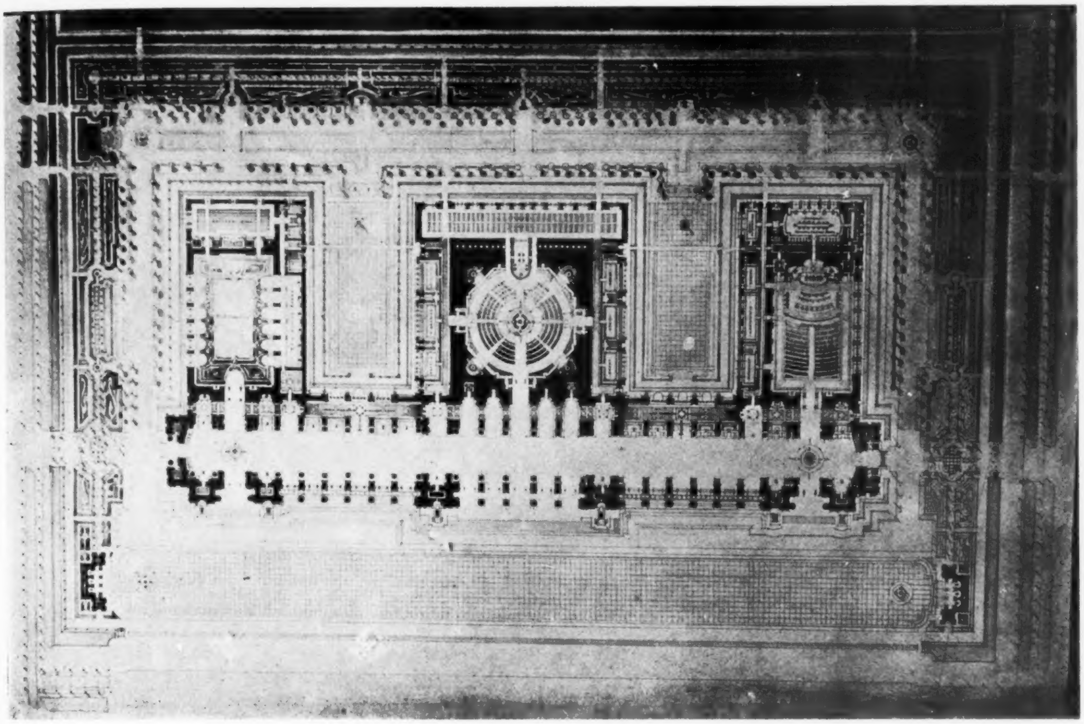
FIRST MEDAL, CHARLES H. NORTH, UNIVERSITY OF PENNSYLVANIA



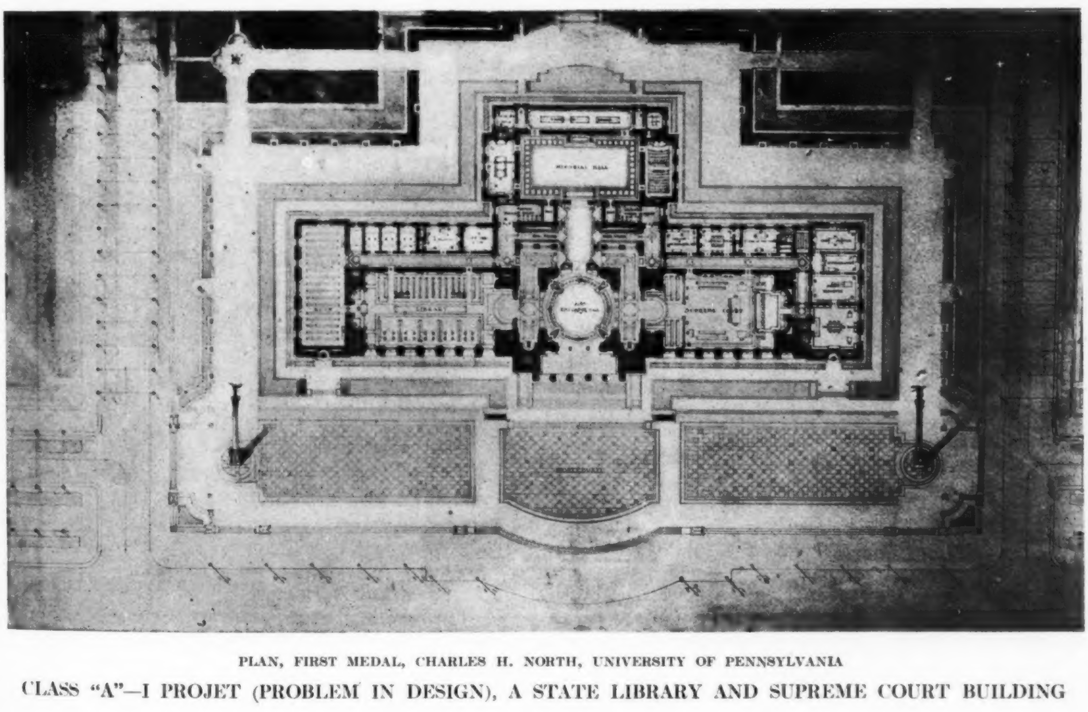


CLASS "A"—I PROJET (PROBLEM IN DESIGN) A STATE LIBRARY AND SUPREME COURT BUILDING

STUDENT WORK. SOCIETY OF BEAUX-ARTS ARCHITECTS



PLAN, SECOND MEDAL, A. E. FLANAGAN, ATELIER PREVOT

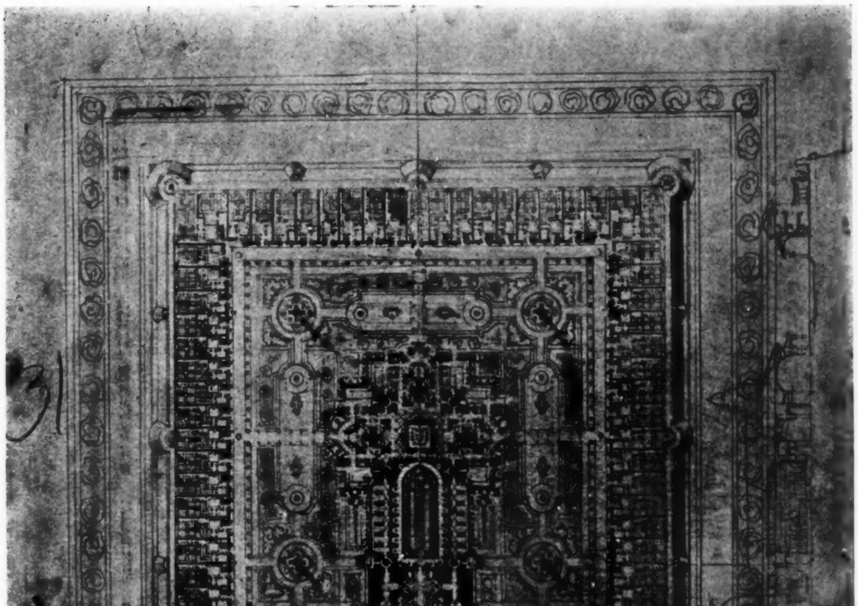


PLAN, FIRST MEDAL, CHARLES H. NORTH, UNIVERSITY OF PENNSYLVANIA

CLASS "A"—I PROJET (PROBLEM IN DESIGN), A STATE LIBRARY AND SUPREME COURT BUILDING

STUDENT WORK. SOCIETY OF BEAUX-ARTS ARCHITECTS

CLASS "A"—I PROJET, SECOND MEDAL, A. E. FLANAGAN, ATELIER PREVOT

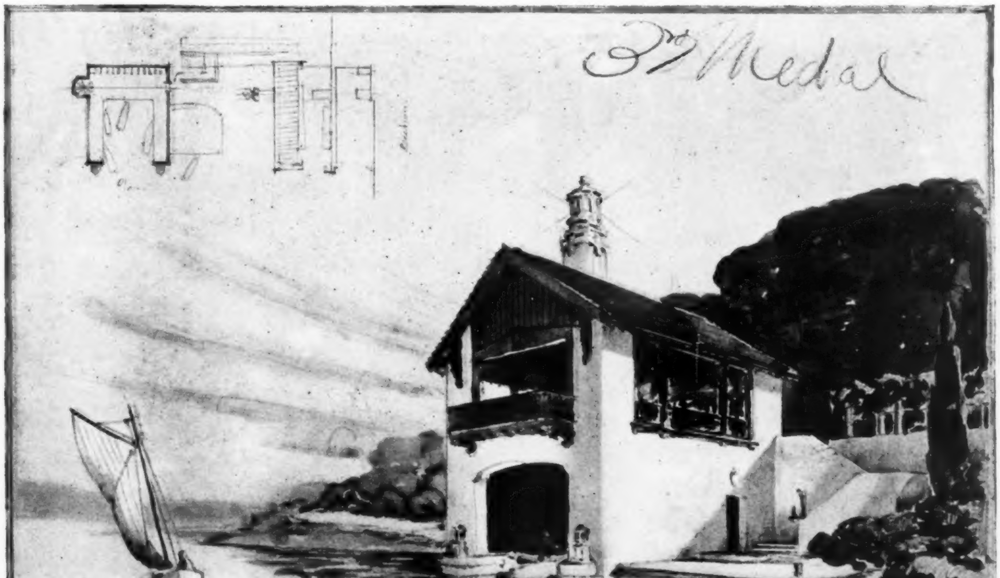


FIRST PLACE, WARREN PRIZE, B. HOYT, ATELIER WARE

CONCLAVE BUILDING FOR THE ELECTION OF A SOVEREIGN PONTIFF

STUDENT WORK. SOCIETY OF BEAUX-ARTS ARCHITECTS

THIRD MEDAL, CHARLES W. CONWAY, ATELIER HORNBOSTEL



THIRD MEDAL, WM. C. STANTON, UNIVERSITY OF PENNSYLVANIA

CLASS "A"—I ESQUISSE-ESQUISSE (RENDERED SKETCH) A BOAT HOUSE

STUDENT WORK. SOCIETY OF BEAUX-ARTS ARCHITECTS

MUNICIPAL PALACE, VICENZA, ITALY
ANDREA PALLADIO (1518–1580), ARCHITECT