THE CONSTRUCTION OF CHEMICAL LABORATORIES

By Augustus H. Gill, Professor of Technical Chemical Analysis, M. I. T.

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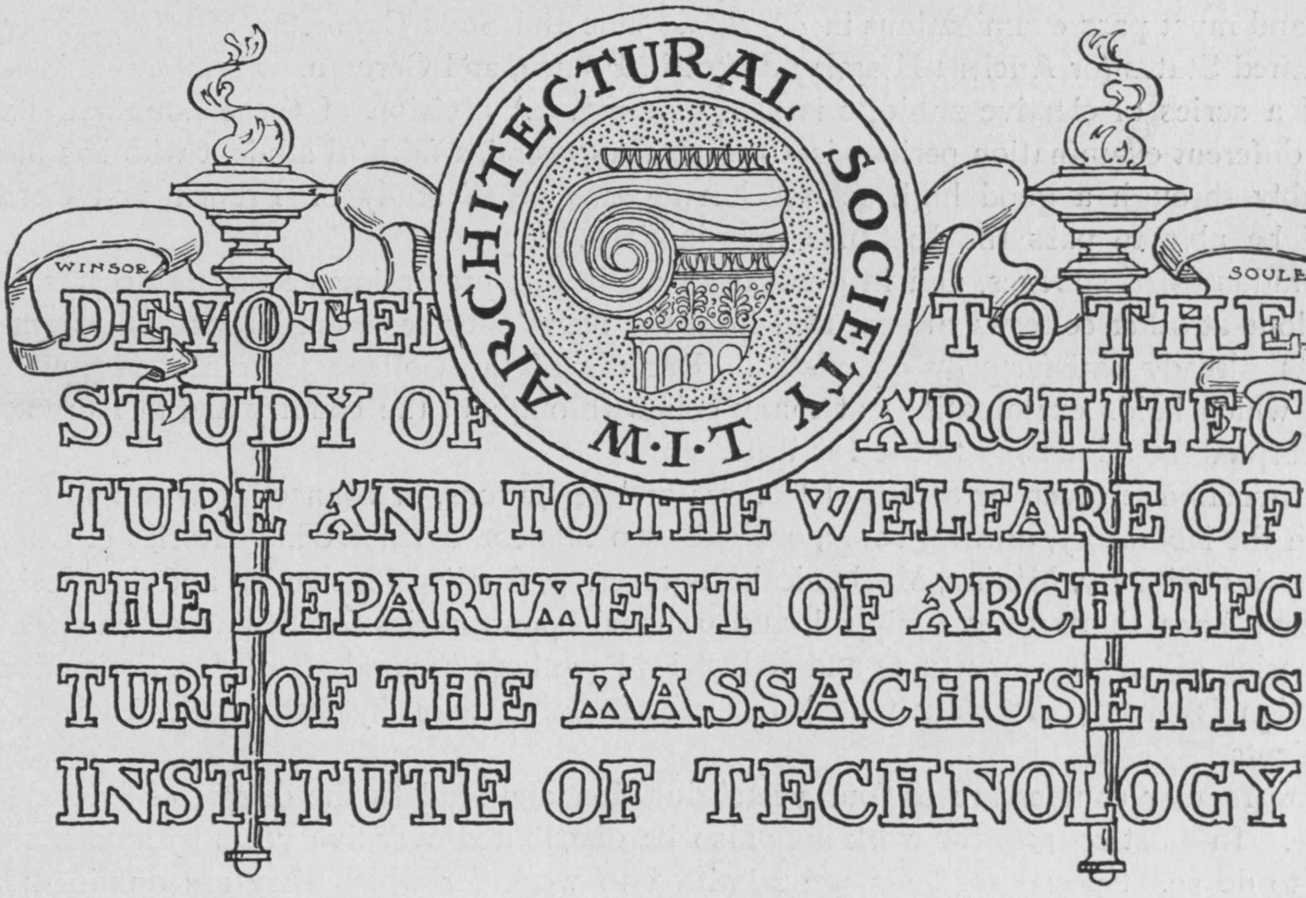

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IN THE NEXT ISSUE

CORROSION OF STEEL IN REINFORCED CONCRETE

Investigations by the Research Laboratory of Applied Chemistry, M. I. T.

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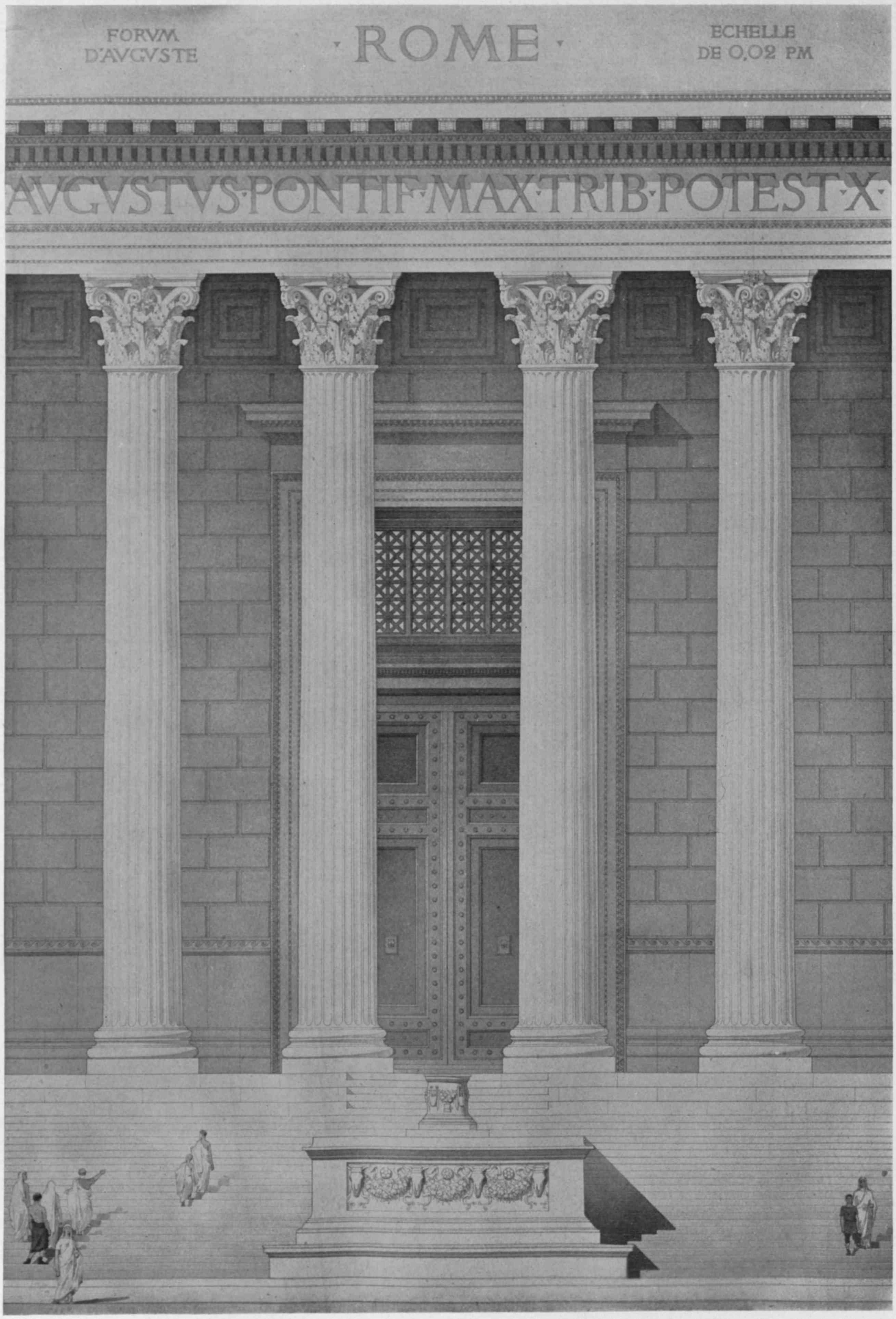

TEMPLE OF MARS VENGEUR, BY B. CHAUSSEMICHE, Grand Prix de Rome

The original of this plate is in the
Gallery of the Department of Architecture

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FORMER students of the Department will be glad of the assurance, which the following quotation from the Boston *Evening Transcript* gives, that the new President of the Institute takes a keen and appreciative interest in the work of their profession and is well aware of the many-sided training which it demands:

"President Maclaurin of the Massachusetts Institute of Technology, in an address last evening at a dinner of the Boston Society of Architects, at the Parker House, spoke of the high degree of technical knowledge an architect of to-day must possess, and called his profession the one branch of art which makes an appeal to everybody. He also spoke with pleasure of the annual prizes offered by Boston architects, and other evidences of their concern for the Institute.

"'When the Institute opened,' he said, 'it served mainly as a protest against the neglect of science. Its far-seeing founder recognized that natural science and its methods were changing everything; and that it behooved men to prepare for the coming of a new era. Science is the most effective influence in modifying the conditions of modern life. Certainly it has profoundly changed the profession of the architect. He has always needed to have some knowledge of science, but in these latter days an altogether new load is placed upon his shoulders. He has to design buildings for new purposes; he has to employ new materials; he has to work under new conditions; and the thousand and one new problems can scarcely be solved without much knowledge of the various branches of science. It will not do, at least in any great work, for him to rely wholly on help from other experts. A great work of art must be a unity; it cannot be made piecemeal.

"'An architect must be an artist, however; he must have the artistic sense, and he must breathe the artistic spirit. And after all, there is no real antithesis between science and art. The fact is being very slowly learned; but the leading men of science are becoming conscious that science is after all a great work of art.

"'Architecture is the one branch of art that makes its appeal to everybody. Men and women may go through life hearing little of music, seeing scarcely anything of painting or of sculpture, and reading no literature at all; but they cannot well escape the influence of architecture. That influence is none the less potent because the appeal that architecture makes is silent and the response is rarely articulate.'"

Last year the Boston Architectural Club, with commendable zeal and much effort, got together the first exhibition in Boston devoted wholly to student work of the leading architectural schools. It was successful far beyond the club's greatest anticipations. It created much interest, and must have had a beneficial influence on all students of architecture who took advantage of the opportunity it offered of "seeing the way other men do it."

This year the club, in coöperation with the Architectural Society of the Institute, proposes to hold a similar exhibition. To afford a better display the drawings will be shown in the Exhibition Room of the Department at the Institute. The exhibition will be limited strictly to the work of the two seasons 1908–09 and 1909–10; and is intended to cover the entire field of architectural training. To this end there will be included work in architectural design, architectural engineering, freehand drawing, water-color sketching, rendering in all modes, modeling, decorating, and painting. Fifteen schools of architecture, including the Society of Beaux-Arts Architects, have been invited to take part. The exhibition will open at 30 Trinity Place, Wednesday, March 16, and close Saturday, March 26.

The invitation to exhibit sent to the various schools closes with the suggestion that this coming collection of students' work shall be sent from one school to another, thus constituting an intercollegiate architectural exhibition. It seems, however, impracticable to do this for all the schools, owing to the expense involved. The Architectural Society of the Institute previously had contemplated a similar intercollegiate exhibition, limited for this season to three schools; in the hope that if the attempt was successful it might in subsequent years be extended to include the principal schools giving instruction in architecture. When it was found that the Boston Architectural Club was planning the exhibition outlined above it seemed better to coöperate with them. But what is good for the students of Boston and its vicinity would also be of benefit to students in other schools, and we look forward hopefully to the time when it will be possible for an intercollegiate architectural exhibition to be an annual affair at all of the greater schools.

Professor Chandler has been given leave of absence for the second term of the school year. He sailed on February 3 for Italy, where he will remain until early summer, returning home by way of Paris. In place of his course on Business Relations, a series of lectures on various topics of professional interest has been arranged. Professor Despradelle will give some of these, and others are to be given by prominent outside architects. Mr. Guy Lowell will speak on "Landscape Architecture;" Mr. C. A. MacClure, of MacClure & Spahr, Pittsburgh, on "Office Buildings;" Mr. H. C. Dunham, on "Interior Decoration;" Mr. G. P. Stevens, of the office of McKim, Mead & White, on the new Municipal Building for New York. Other speakers and subjects will be announced later.

The Department will offer, as usual, its summer courses in Second and Third Year Design and Shades and Shadows. They will begin July 5, and be of eight weeks' duration. A six weeks' course in Mechanical Drawing and Descriptive Geometry will also be given. Circulars giving more complete information can be obtained by addressing Professor A. L. Merrill, Secretary of the Institute.

Architectural Engineering

Construction of Chemical Laboratories

By AUGUSTUS H. GILL

Professor of Technical Chemical Analysis, M. I. T.

[*Reprinted from "Science"*]

GENERAL CONSTRUCTION. For a chemical laboratory there is probably nothing better than the so-called slow burning or mill construction. While lath and plaster may be handsomer from an artistic point of view, yet it suffers from the serious disadvantage that the ceiling becomes disintegrated from the acid fumes, with the inevitable result that it drops into the quantitative determinations, to their ruin, or hangs in festoons or fragments that are anything but artistic.

WALLS. The walls should, if possible, be faced with white glazed brick; if this be prohibitive on account of cost, at least where they are exposed to view. In place of this, possibly pressed yellow brick, white "silica" brick, or ordinary red brick painted white may be employed. The paint employed should contain no "white lead," but may be sublimed lead ($PbSO_4$), barytes, or zinc white, or preferably a mixture of these in about equal proportions, or lithopone. Some of the so-called cold-water paints have been used with fairly good success. They may turn black in damp weather, but usually return to their white color when dry.

FLOORS. If care be taken to keep the joints tight between the walls and floors there is probably nothing better for a laboratory floor than asphalt. The writer knows of some laid twenty-five years ago that have required no outlay for repairs and are apparently good for another quarter-century. Laboratory desks and heavy apparatus should be supported on a broad framework to prevent them from sinking too deeply into it. The asphalt, as wood floors, should be laid upon a heavy grooved and tongued wooden floor with paper between. These floors can be supported upon double wooden beams or upon iron beams kept well painted with a metal varnish coating. Rift hard pine, birch, or maple, when carefully selected and laid, makes a good floor, particularly if kept well oiled. This has the disadvantage of making it slippery. It is of course not as tight as an asphalt floor.

CEILINGS. Too much attention cannot be paid to their construction, as the writer knows of three large new laboratory buildings in which a more or less constant precipitation of sawdust, paint, and plaster is taking place upon the floor below, because of an oversight in this particular. This, in one case, is due to the application of a cold-water paint, which is scaling off from the ceiling when the floor above is walked upon. In the other two cases sufficient care was not taken to sweep clean the first layer of floor boards before laying the second. All this can be obviated by putting in a ceiling of matched boards *after all floors have been laid*. It should be finished with shellac or coach varnish. Something of a pitchy or resinous nature should be used (and yet contain no common rosin, as that is far from durable), rather than a paint which can peel or flake off. This should be borne in mind in all overhead construction. As has been said, plaster of any kind is inadmissible in a ceiling on account of its disintegration by acid fumes. Cement is no better, as in one laboratory of which the writer knows a cement ceiling began to flake off within about six weeks after occupation.

FIRE WALLS AND PROTECTION. The building should be subdivided into areas of suitable size by fire-walls extending from top to bottom; all apertures in these walls should be guarded by automatic fire-doors. The library, if there be a departmental one, should be housed in a fire-proof room and also be protected from being flooded by leaks on the floor above. The more dangerous laboratories — the organic, the oil-testing, and those below or adjacent to the library — should be rendered safer by the installation of sprinklers. Somewhere in the building there should be a fire-proof room for the distillation of inflammable substances. In addition to fire-proof stairways, a sufficient quantity of outside iron fire-escapes should be provided and the exits thereto carefully indicated and kept unfastened. Inch rubber fire-hose with nozzle should be provided in each laboratory. Rubber is better than linen or any other collapsible type of hose, in that it does not kink and thus can be taken through doorways when there are self-closing doors without checking the stream of water. A number of small hose are better than large hose in the hallway, in that they are more accessible and, if used, do not deliver such a torrent of water as to occasion a greater loss from water than from the fire itself. Pails of sand with scoops are very efficient and should be found in every laboratory. No money, however, should be wasted on the purchase of "dry-powder fire-extinguishers," of which Dr. Freeman says, "We recommend that they be thrown into the rubbish-heap."[1] If these are wanted they can be easily made by filling tin tubes with two or three pounds of "anchor dust" or waste bicarbonate of soda. In the organic and oil-testing laboratories, or any other where the fire risk is unusual, in addition to these safeguards above mentioned, and automatic sprinklers, some type of portable chemical fire-extinguisher should be included. This, as is well known, employs carbonic acid generated by the action of sulphuric acid upon baking-soda to throw a stream of carbonated water about, which is especially effective in tar and chemical fires.

A large douche bath with quick opening valve has been found very convenient in extinguishing fire on a student's clothing. This is merely a rose, or, better, a flat hollow disk a foot in diameter with concentric slits in it, through which the water issues in a shower; it is set seven feet from the floor.

HEATING AND VENTILATION. The so-called "plenum system" for the general heating and ventilating of a laboratory building may be said to work fairly well, but it must be supplemented by steam radiators and by independent fans, one or more for each laboratory, drawing upon the hoods. These can be placed in the laboratory, or, better, on the roof. The hoods, in addition to having the usual outlets at the top, should be provided with an outlet at the bottom, as most of the gases and vapors of which the chemist wishes to be rid are heavier than air. Besides the fan draft in the hood the flue should be so arranged that a

[1] "On the Safeguarding of Life in Theaters," p. 87.

good-sized Bunsen burner can be kept burning in it for use when the fans are not running.

HOODS. These can in general be disposed of about the laboratory walls, and be constructed of wood, pine, white wood, cypress or "asbestos wood," or "asbestolith," with wooden or asbestolith sashes. Where the material is exposed to steam, hot air, or unusually corrosive agents, they perhaps can be made of glass, wired glass, admitting of large panes set in lead-covered sashes.

Iron settings for the glass, unless kept well painted, are not to be recommended. Possibly these sashes may be omitted, and the hoods built after the manner of show-cases of plate-glass show-windows, by drilling and holding the glass plates in position by angle irons kept well painted with a pitchy "paint." The backs and tops of the hoods can be lined with the same material, where wood is inadmissible and it is desired to secure freedom from scaling from the brick walls. The use of hoods extending over each desk, as in Edinburgh, is of doubtful expediency and renders the laboratory dark and fills the ceiling up with their exit-pipes. The use of small, low hoods at each desk would seem to render the piping system complicated and expensive. Except in very special cases, the necessity of an individual hood close at hand is not very great. The bottoms can be made of concrete or wire lath, tile or soapstone, and the hoods should not be more than eighteen inches deep. The ducts from the hoods can be made square or rectangular, of the wood or the asbestos compositions mentioned. If of wood they can be grooved and tongued, glued and nailed together, and varnished. If made of iron they should be painted with an asphalt or pitchy paint, as "chrysolite" (Solvay Process Co.). Aluminum paint is not found to protect iron as well as has been claimed for it.

LABORATORY DESKS AND LOCKERS. So far as the writer's experience goes, the responsibility for their selection lies usually with the architect, and it is common experience that architecture and chemistry do not "mix;" that is, good architectural students are oftentimes deficient in chemistry.

Quartered-oak desks and alberene stone tops seem almost as much out of place amid the fumes and acids of a chemical laboratory as dress suits for the students. Even a casual visitor cannot help having a pang of regret to see a fine quartered-oak panel ruined by the attack of sulphuric acid or caustic soda. Speaking from wide observation and the experience of others, the writer is convinced there is no better (and in the long run cheaper) material for the tops of ordinary laboratory desks than wood. Tiling is always uneven, lead is untidy and expands but does not contract when heated, glass cracks, and all are cold to the touch. For the tops of laboratory desks or tables the following woods have been found to give good satisfaction: Northern pine, whitewood, cedar, and California redwood. These may be finished with equal parts of linseed oil and turpentine, or, better, filled with aniline black made in the pores of the wood, according to the following procedure. Apply to the wood Solution 1; and after it has dried in, Solution 2:

Solution 1.

Aniline hydrochloride	100 grams
Salammoniac	40 "
Dissolved in	
Water	650 c.c.

Solution 2.

Copper sulphate	100 grams
Potassium chlorate	50 "
Dissolved in	
Water	650 c.c.

Oak, ash, or cypress cannot be recommended, the former two because they shrink too much and the last because it is very splintery. If the tops are made of two-inch stuff they can be planed down from time to time, and even turned over when one surface is too far gone for planing. Such tops have been known to last with constant usage in an organic and analytical laboratory for nearly thirty years. These plank tops should be made of lumber as wide as possible and be carefully jointed and well glued together. When properly done it is rare that the glued joint starts. From some laboratories which the writer has seen it would not seem advisable to build the tops of narrow seven-eighths-inch floor-boards even when fastened to a second seven-eighths-inch top; the joints open and the boards warp and curl, making a very undesirable, uneven surface.

DESK HARDWARE. For locking the desks, iron hasps and screw-eyes and heavy padlocks have given excellent satisfaction, even with Freshmen, for twenty-five years' constant use. These locks[1] are bronze throughout, with brass or bronze springs and six secure levers, master-keyed, with changes permitting at least four hundred in a series; they are circular, except for the shackle, and about two and one-fourth inches in diameter, and cost about a dollar each. They should be oiled annually with a light non-gumming petroleum spindle-oil. Padlocks have the advantage over mortise locks, keyed or keyless, in that if they fail to open the screw-eye can be cut with a blacksmith's bolt-cutter, the padlock removed, and the cut screw-eye replaced by another. The damage to the desk is nothing compared with that incident to forcing a drawer or hammering the lock loose or off by a punch on the round key-hole standard. They have the additional advantage that they, being laid on their side in the drawer when not in use, are not exposed to the corrosive action of chemicals spilt upon them. These run down the mortise lock around the bolt and levers and stick them fast. Their sole disadvantage, as against combination locks, lies in the loss of the key. The losing of keys can be largely prevented by requiring the use of key-chains attached to the bunch of keys, and also by informing the student that they are charged one dollar each if lost. They have the advantage that they are much more easily opened, while if the combination be forgotten the instructor has to search it up in the records. Unless the combination on each lock be changed annually, an elder student, a Sophomore for example, would have access to the desk which he used as a Freshman, which is now occupied by another student, a serious disadvantage. The changing of several hundred combinations annually is no trifling task. Hard-wood knobs are to be preferred to metal knobs or handles. The Fogg adjustable ball-catch with the ball on the *standing* part of the desk has given excellent service. Iron hinges are apparently as good as brass, and are cheaper.

PIPING AND DRAINAGE. All pipes and drains should be arranged so that every foot can be easily rendered accessible for inspection and repairs. This can be brought about by the "top system" of pipes and drains on the desks, and these connected with the main system under platforms

[1] Made by the Miller Lock Co., Philadelphia, Penn.

(*Continued on page 55*)

The Architectural Society

1909–1910

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MR. LUCIAN C. SMITH, holder of the McKim Traveling Fellowship of Columbia University, gave a smoke talk on Monday evening, November 22, on the aims of the American Academy in Rome and on life at the Academy. Mr. Smith had but recently returned from two years' study abroad, having spent a large part of his time in Rome, and was enthusiastic in his admiration of the work of the Academy and of the wonderful opportunities offered to the architectural students of this country by the founders of the Academy. A full description of the Academy having been already published in a previous issue of The Record, and owing to lack of space in this number, we give here only a portion of Mr. Smith's interesting talk. He said in part:

"It is very difficult for architects in this workaday world to leave to posterity anything in the way of a monument; for we find that the daily problems of life are enough to keep us occupied, without thinking of posterity. There is one man, however, who has left behind him the greatest monument, I think, that an architect could leave. The American Academy in Rome was a monument to Mr. McKim from its very inception. In its development there have been a great many names linked with his, names of men prominent in financial circles, architecture, sculpture, and painting, but Mr. McKim was the one moving spirit.

"Up to the year 1907 there were no scholarships given by the Academy itself, as there was no fund to provide for them. The students were those who had gained scholarships from colleges or from other sources. All these students were accredited at the institution, and were allowed to live and work at the Academy; and in each case they were entirely at liberty to travel where they liked. Furthermore, any student of architecture traveling in Rome was offered the hospitality of the institution. The Academy fellowships are now, however, an assured thing. There are fellowships in architecture, painting, and sculpture, and it is hoped to have one in music.

"I wish to eradicate from any man's mind the idea that there is any antagonism between the work of the American Academy in Rome and the work done elsewhere. And there is another point I should like to mention, and it is this: I think a mistake has been made by the Academy in trying to study French architecture in Rome. It is impossible to do it. Rome is the place where you can see and study at the fountainhead the architecture from which the French have drawn their inspiration.

"While you are in Rome you are doing work with painters and sculptors, and that is a liberal education in itself. When I was there some of my friends were painters, and I gained considerable benefit from getting their points of view in the working out of their problems."

Mr. Henry Hornbostel, of New York, gave a smoke talk to the Society Thursday evening, December 9, at the Union. He announced his subject as "Gothic Architecture," but used that style merely as a base on which to build the point of speech; that is, "to avoid foolish masquerade and rules in designing, and to strive for beauty and charm and modernism." Mr. Hornbostel said in part:

"It is good to start with some rule, with a basis of some kind, in whatever you are doing; but if you start designing by rules only you will make all architecture ridiculous. To get good architecture you must practically disobey or disregard all rules except possibly some rules for beauty and charm. Let us take for a view-point that of expression, for instance. A man can take an architectural problem and give it any expression he sees fit; and whatever expression the structure has it will impress different people differently. If you decide that a building ought to express ugliness, and that is what you want, nobody can gainsay you. A man builds a church and you say to him, 'Why, that does n't look like a church; it looks like a circus.' And he says, 'My idea of a church is a circus.' Another man's church looks like a stable. 'That is all right.' His idea is that humanity is like cattle. But he will not build many churches.

"The expressions and the ideas of the individual produce fashions, just as the ideas of the big masters did. The ideas of a community produce styles. Gothic architecture expresses the idea and culture of a number of generations of people of one powerful faith. Their inspiration being Christian religion, that architecture was the expression of a religious idea. It does not give the impression of being the work of one or two individuals; it gives the impression of being the result of thousands of individuals. It is the product of a whole people. They thought the same, did the same, and the accomplished architectural creations, as presented by their cathedrals, are an expression of those people. Their idea of religion was all-absorbing, unadulterated faith; and the Gothic cathedrals were produced, not by a complex civilization, but by one with a dominant idea.

"To say that we to-day can do things like those people did is to say that we can live as they did, or as the Greeks did, or as the Hottentots do. Our civilization is so complex! Our ideas are so different; our life, so absorbing! We have politics, religion, and education, all mixed together. Our progress has an entirely different tendency. We are concerned with thousands of things daily, not with faith alone; and to say that we can settle down to the life of the Gothic builders is preposterous. In ancient Greece religion was not dominant; commerce consisted mostly of piracy; education was not general. The Greeks gave most of their time to the culture of their bodies and to speculative philosophy. Their sense of the beautiful impelled them to apply all their energy to its fullest development. This produced a culture of a wonderful kind, one that established the only real standard of beauty. So Faith produced Gothic architecture, and so genteel Intellectuality gave rise to the eighteenth-century or modern style. This shows that we can never build like the Greeks, can never work like the mediæval builders; nor can we execute like the Renaissance architects. Artistic enthusiasm in the Renaissance period was of a different kind from that of the Greeks.

"We cannot have these periods now, and we never shall have them again. There is a new one in existence. Our buildings are of all styles, just as individualism varies. We find Gothic architecture used for all kinds of buildings, — churches, houses, clubs, stores, stables. We see other styles in all sorts of buildings; and to say that each building should have a certain sort of architecture is ridiculous. We see feminine beauties on the streets of every type, of delightful variety, and it would be ridiculous to say that they should all be dressed alike.

"The church to-day is not like the mediæval church. Now each religion — and there are many — builds its own temples. The Christians of the Middle Ages built temples for but one. A whole town would give up plowing and manufacturing, and instead would cut stone and make mortar and build a cathedral. In two or three years the town was rendered destitute, and it took many years before it regained its normal condition after such an architectural orgy. To-day one man designs a church, the contractor gets his ten per cent, and the architect gets what he can get. To build churches like the Gothic cathedrals we should have to live like the mediæval builders. We ought to laugh at a person who says that a certain building should have a certain style. Why should a school of learning in this country mimic the Gothic in preference to the Greek? A Gothic champion will say that Gothic architecture has the serene, serious atmosphere of a college. A Greek champion will maintain that a college is not serious, that it is all athletics, fraternities, and summer girls; and that such an atmosphere is like the old Greek atmosphere, and so on. The old Egyptian temples were planned magnificently. They constructed a series of architectural climaxes, ending in the holy of holies, and all surrounded by an impressive architecture. There is nothing more theatrical, more elaborate, and more effective for a real religious ceremony. To-day that gorgeous religious architecture is used for disreputable cafés. When you see it in a room you know you are in a place where you may cut high jinks. Think of carrying masquerading to that extent!

"A Gothic church is an expression that is not exactly in accord with the modern spirit of religion. We do not want to build the faults that produce the charm and atmosphere of Gothic buildings. To-day we want a church that is practical. In no mediæval sense is the modern church a sacrifice. We have all these documents of former times in our hands, and should make use of them only for the study of beauty — and of that kind of beauty disassociated with sentiment or mentality; for real beauty is physical, not mental.

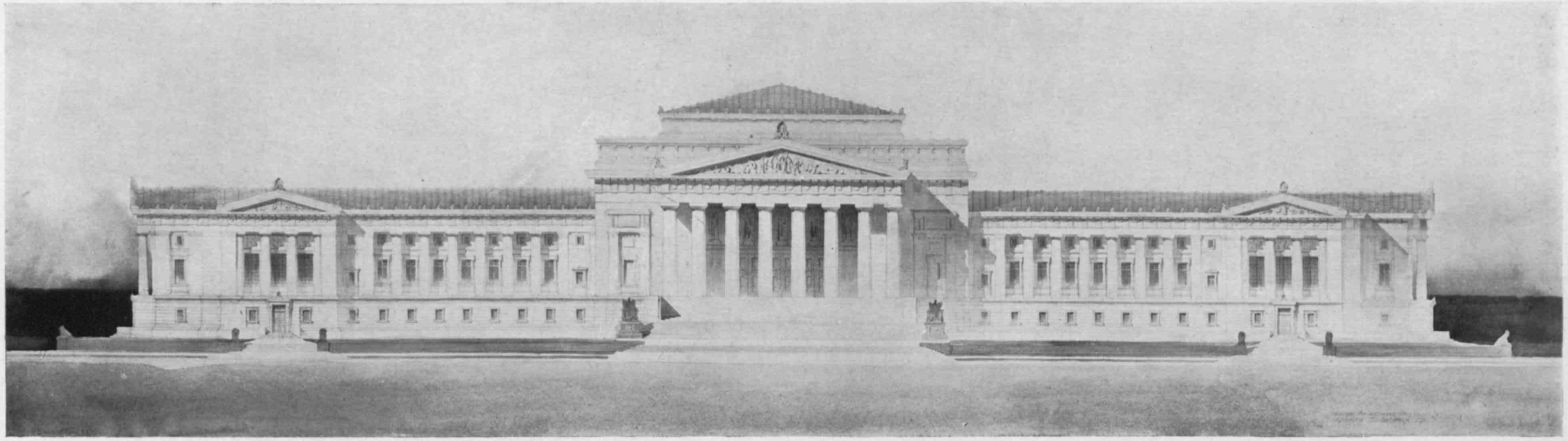
"To exactly copy the architecture of an early period is ridiculous, but we can adapt the elements of beauty of an architectural style to the necessities of a modern structure. Architecture that is a masquerade is as tawdry and cheap as the princess or the gipsy king at a masque ball. When a man does a modern thing, and a masterpiece, everybody says, 'It is interesting and peculiar, but where have we seen it before?' If they find an example they say, 'Oh, yes; that is all right.' If they do not, they call the building original and amusing. If they see a building which is an exact copy of an older one they say that it is fine, and that we must have more of the same thing. This really happens, and is going on. Many of our architects, by the way, are governed in their work by the ladies of the bridge tables, and by the men that make one European trip.

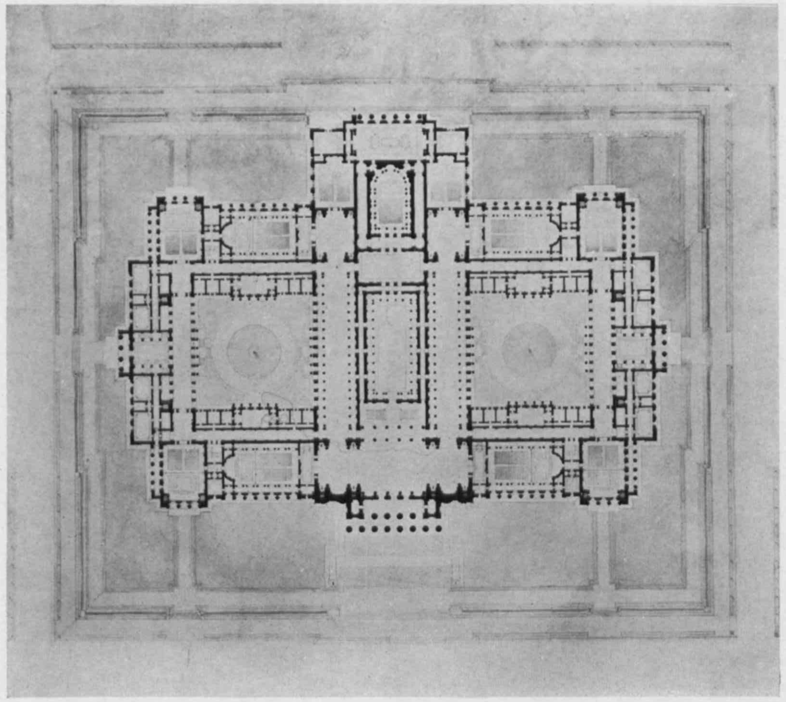
"Now if I wanted to do so I could start in and argue just the opposite point of view, and convince myself and you that just the opposite of these views is true. To talk of pure beauty and of subtleties of mass is all right. A man can talk about it all he pleases if he is a wonderful hot-air artist. The value of this kind of talk is stimulating, but confusing. You can imagine yourself anything you want, providing you have the materials and the enthusiasm and the ability of a good actor. If you could twist yourself inside out and imagine yourself an individual of the Middle Ages you might produce a Gothic church and do it well, but it requires a terrible twist. If you can think like a Greek and act like a modern, which is impossible, you might design modern Greek architecture. You may accomplish this feat when you are young and don't care a hang; but when you have read and traveled, studied expressions and styles, you will discover how impossible it is.

"Now to come back to Gothic architecture, which we have shamefully neglected: it is an architecture which requires the least amount of logic in its designing, because it was created by a people who did not reason much. People argue that they had a great sense of design, of construction, etc., and that a Gothic cathedral is logic from one end to another. That may be; but the logic is a savage logic, unlike the Greek logic, a logic of religious fanaticism and a logic that can never be modern. It is not the scientific logic of modern times. To-day religion is more of a duty than a faith. Gothic architecture, moreover, is not an individual architecture. Our own masters, like Richardson and McKim, did things which had no logic. Their plans were sometimes poor, their elevations logically foolish; but everything they did is charming and good because it is beautiful and modern. For instance, what is more modern than the use of 'Rock Face' on Romanesque architecture? And we forgive much in a building if it is beautiful, just as we forgive a woman everything if she is well dressed. So I urge you to avoid all foolish rules and regulations regarding styles and fashions, to avoid all foolish masquerade, and to strive only for beauty and charm; and by all means be modern."

The evening of January 3 Mr. G. B. Dexter spent with the Society, telling of his recent trip through Northern Africa. From Algiers he led his hearers through the desert to Tunis, telling of the habits and architecture of this interesting and picturesque land. The life of these African Arabs was brought out vividly; the narrow, winding streets filled with brightly dressed people passing to and fro; the gayly colored sloops; merchants awaiting a chance customer; place after place thronging with the picturesquely idle life of the tropical orient. From Biska and Constantine his hearers passed to Timgad, the buried Roman city of the desert. Mr. Dexter, after sketching the history of this city, showed its remaining examples of Roman architecture and engineering,— a coliseum but six feet shorter than the great one at Rome; a triumphal arch to Trajan, who spent the latter part of his life there; and fountains playing unconcernedly after 1,300 years of silence and neglect.

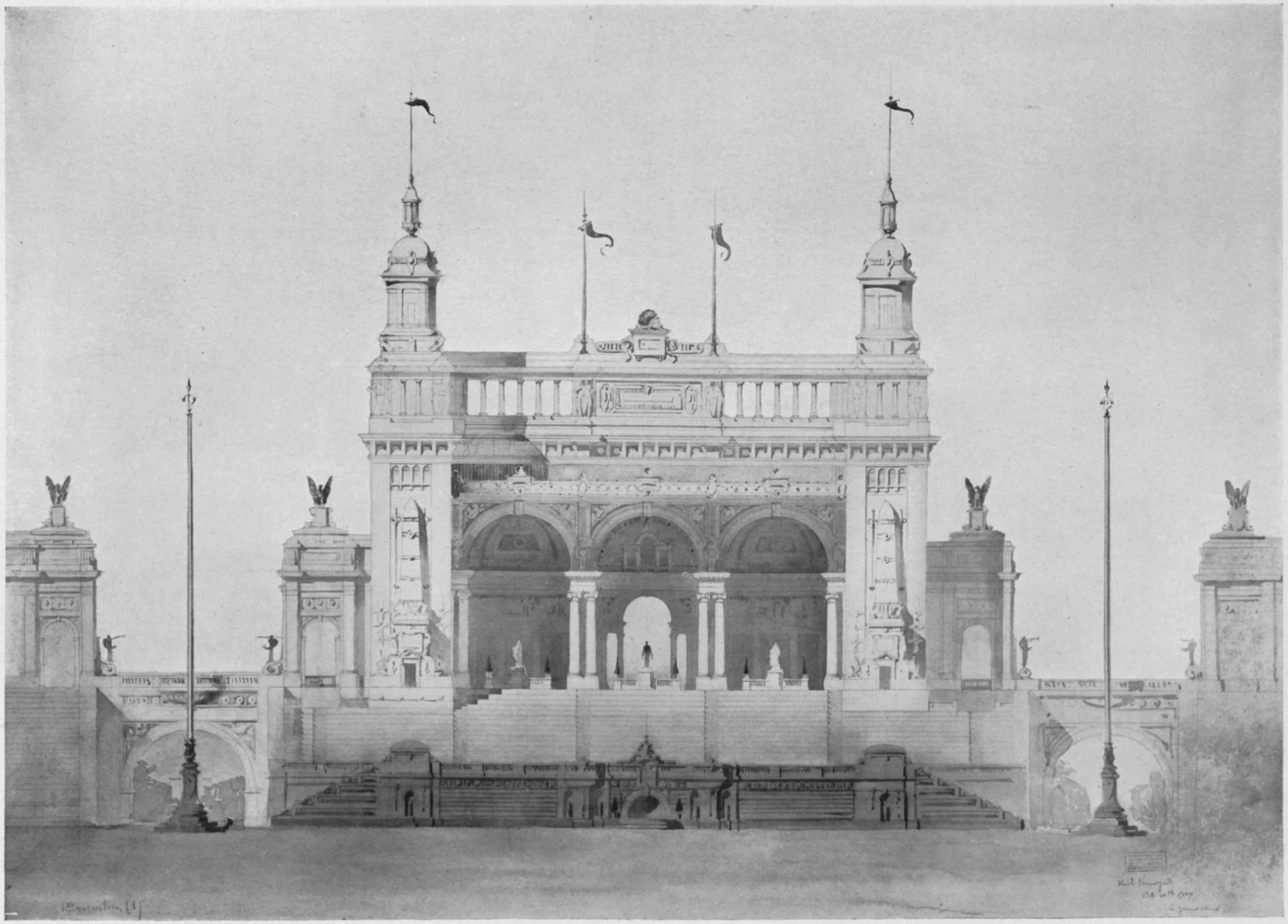
Mr. Dexter is to present the Department with a complete set of his lantern-slides, which were colored by himself.





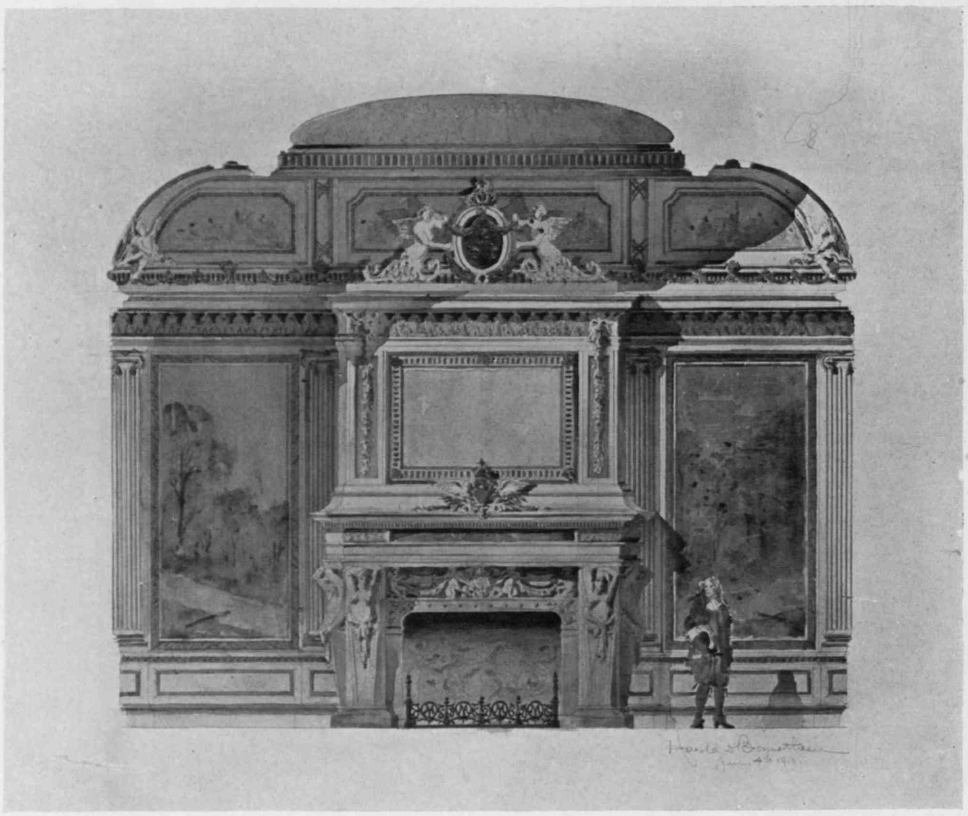
ADVANCED DESIGN, COURT-HOUSE FOR A LARGE AMERICAN CITY

FIRST MENTION, K. E. CARPENTER



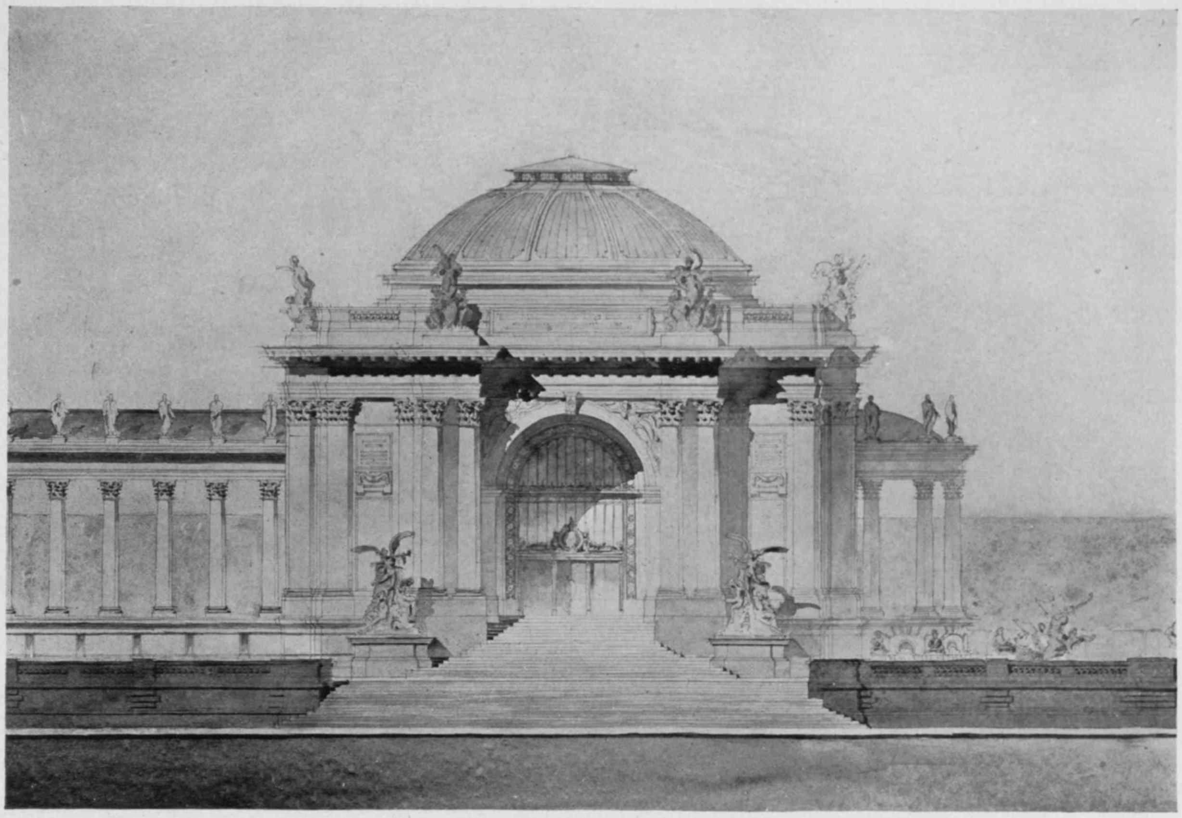
ADVANCED DESIGN, TRIBUNE OF HONOR OF A GRAND-STAND FOR AN AERODROME FIRST FIRST MENTION, K. VONNEGUT

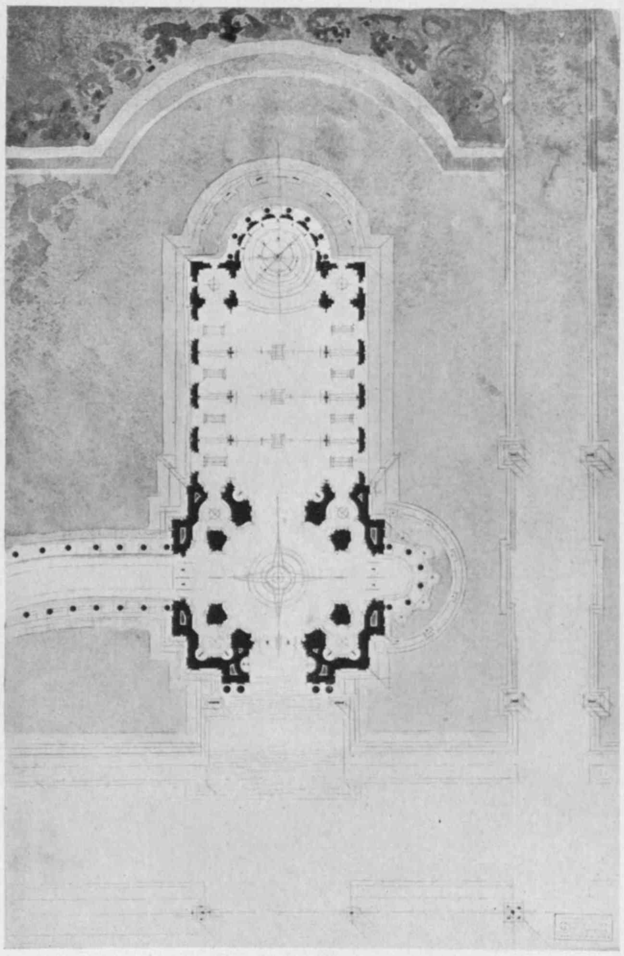
FIRST FIRST MENTION, G. FOX



SECOND FIRST MENTION, H. D. BOUNETHEAU

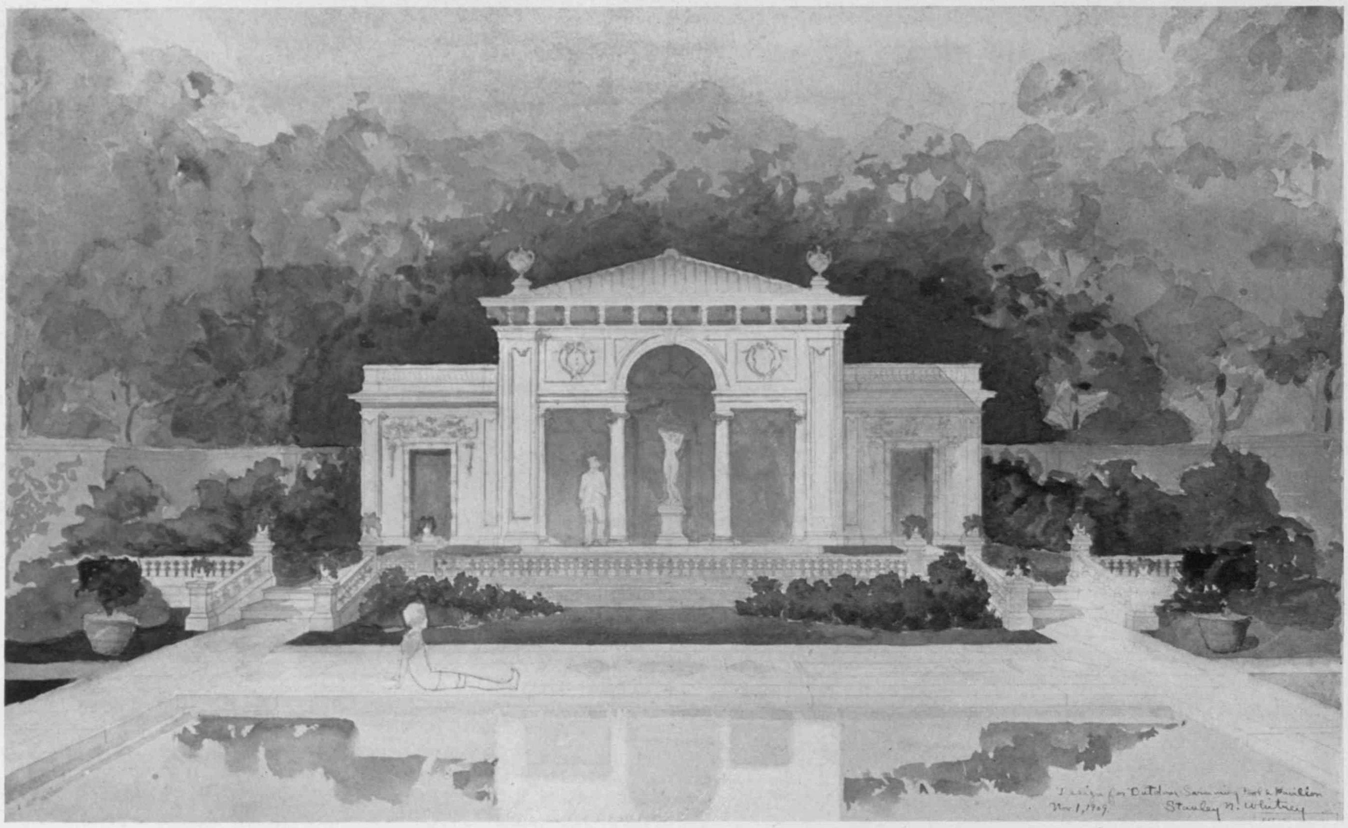
ADVANCED DESIGN, THE INTERIOR DECORATION OF A GRAND RECEPTION-ROOM IN THE MINISTRY OF FOREIGN AFFAIRS AT WASHINGTON

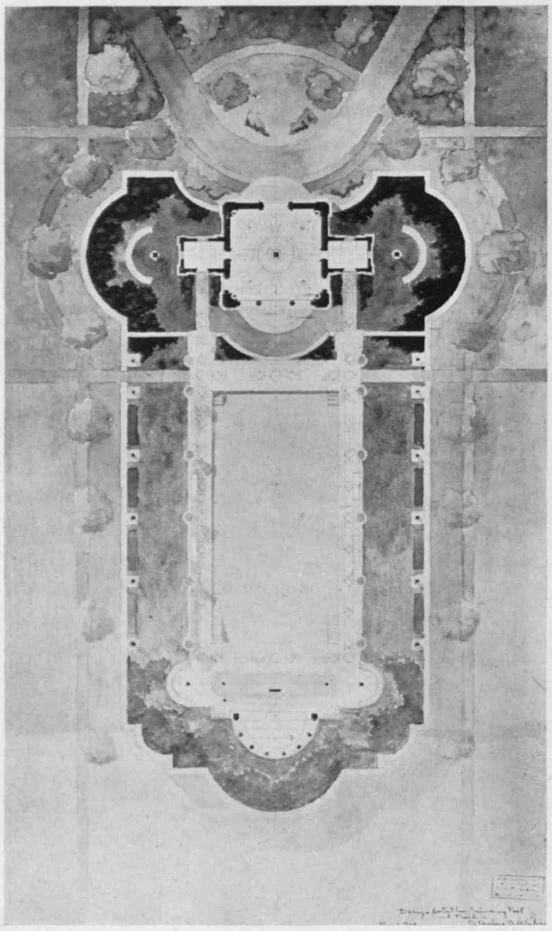




A MUSEUM OF AEROPLANES FIRST MENTION, C. C. CLARK

THIRD YEAR OF DESIGN

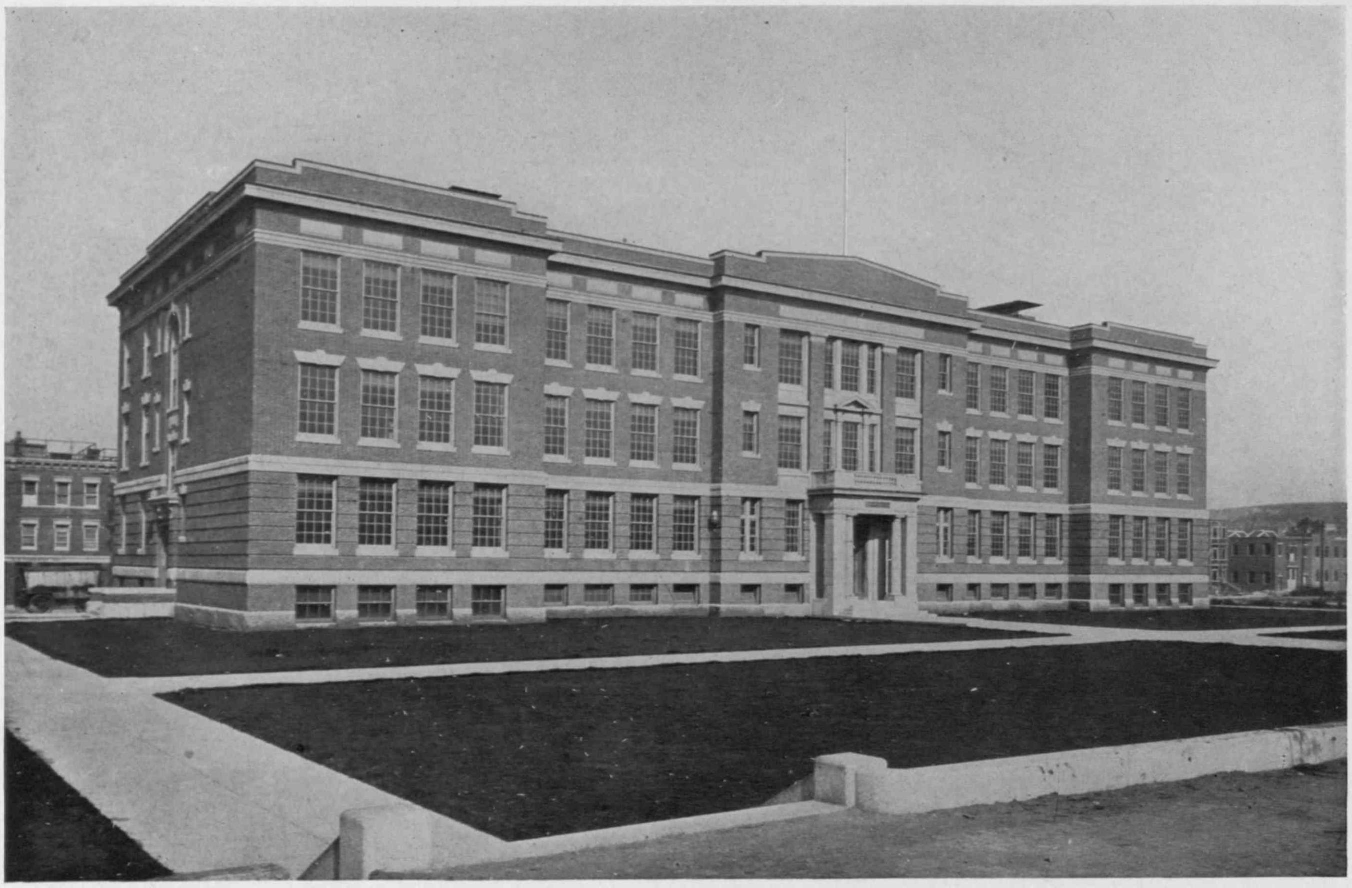




A PRIVATE SWIMMING-POOL AND PAVILION

FIRST FIRST MENTION, S. N. WHITNEY

SECOND YEAR OF DESIGN



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SHURTLEFF SCHOOL, CHELSEA, MASS. KILHAM ('89) & HOPKINS ('96), ARCHITECTS

FIREPLACE IN DINING-ROOM

HOUSE OF E. F. WHITNEY, ESQ., NEW YORK RICHARDSON ('98), BAROTT & RICHARDSON ('03), ARCHITECTS

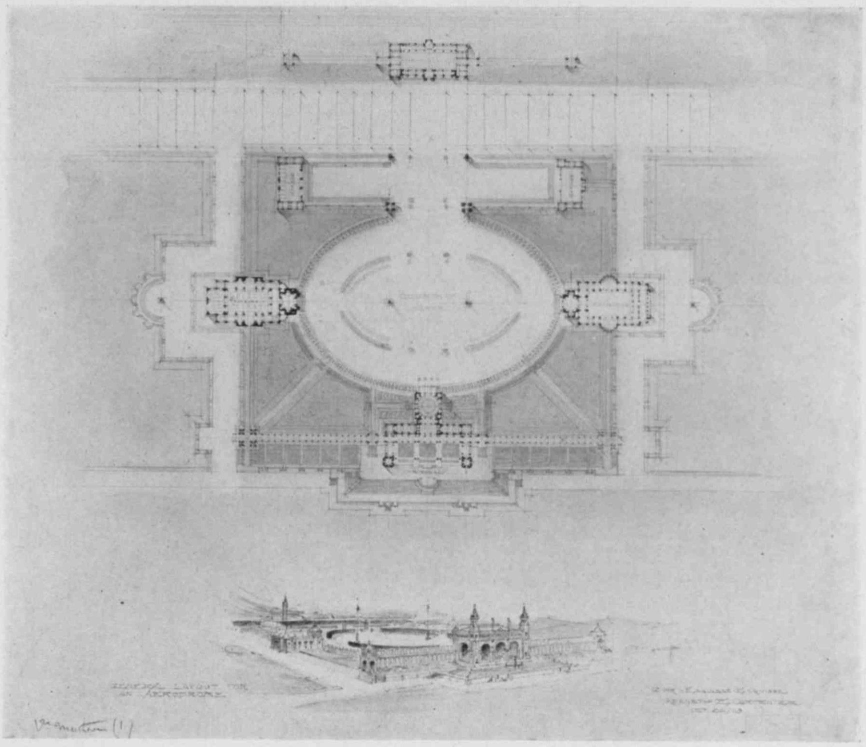
STAIRWAY IN ENTRANCE-HALL

FIREPLACE AND FOUNTAIN IN ENTRANCE-HALL

HOUSE OF E. F. WHITNEY, ESQ., NEW YORK RICHARDSON ('98), BAROTT & RICHARDSON ('03), ARCHITECTS

HOUSE AT RIVERSIDE, ILL. TALLMADGE ('98) & WATSON, ARCHITECTS

HOUSE AT EVANSTON, ILL. TALLMADGE ('98) & WATSON, ARCHITECTS

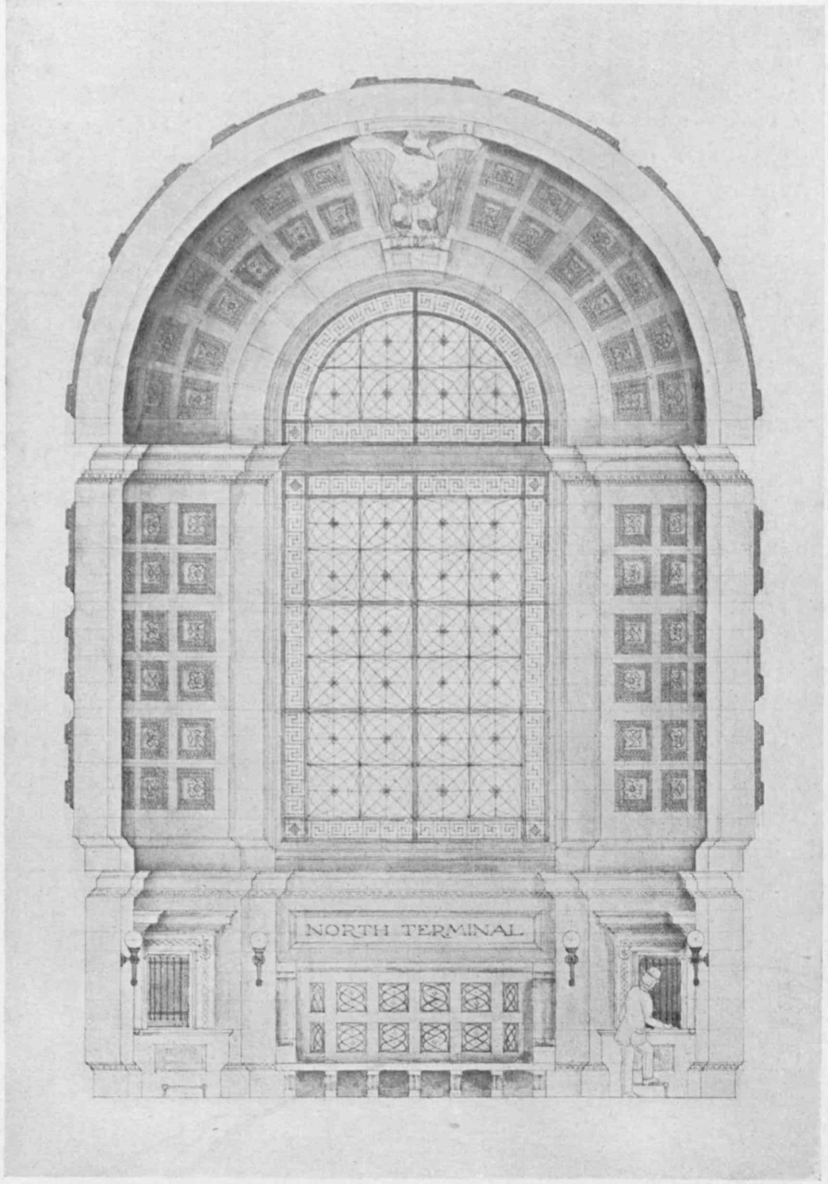


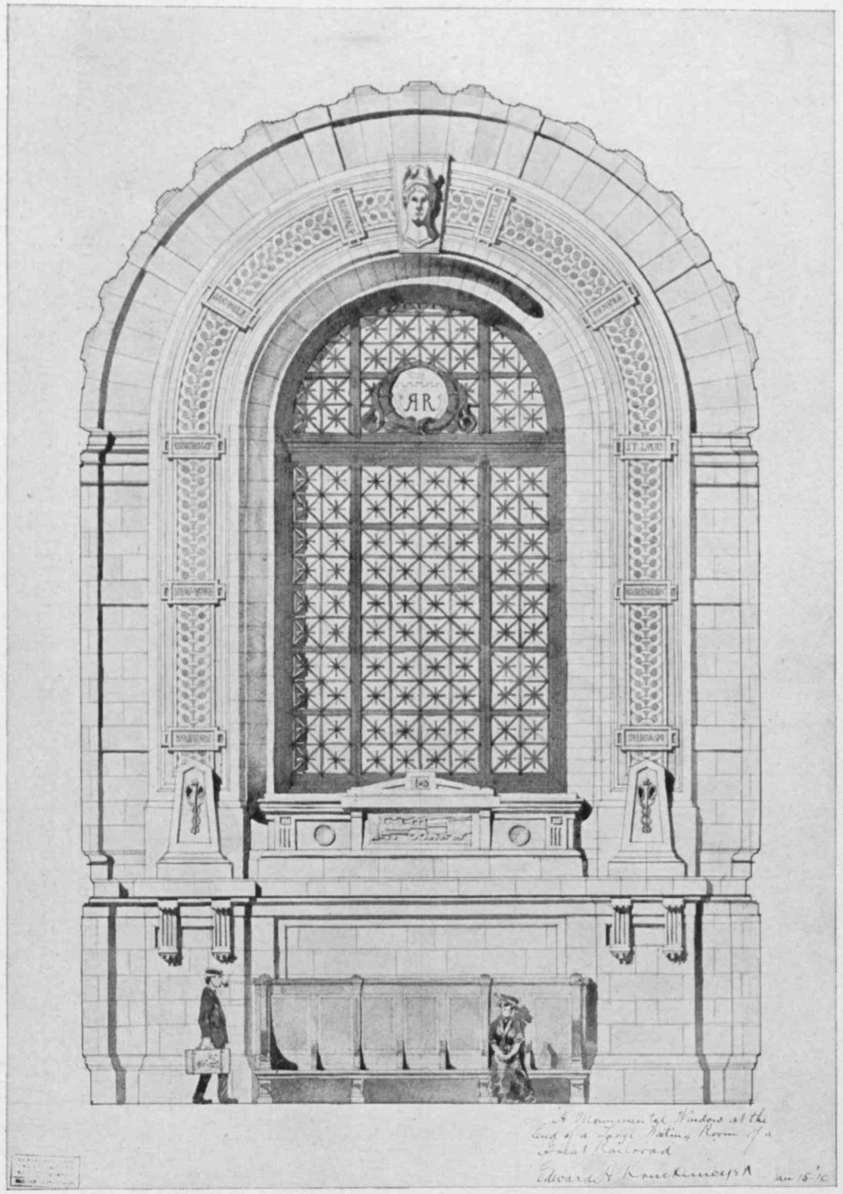
BIRD'S-EYE VIEW OF AN AERODROME FIRST FIRST MENTION, K. E. CARPENTER

ADVANCED DESIGN, 12-HOUR SKETCH PROBLEM, "EN LOGE"

A CITY STREET STAND FIRST MENTION, J. H. SCARFF

SECOND YEAR OF DESIGN SKETCH PROBLEM



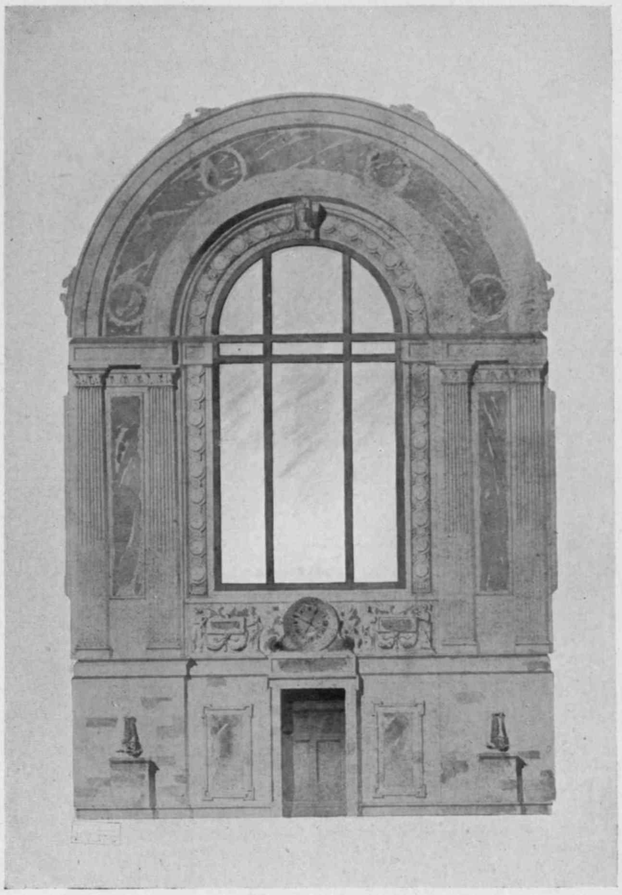


PRIZE DESIGN FOR REGULAR STUDENTS — L. GRANDGENT

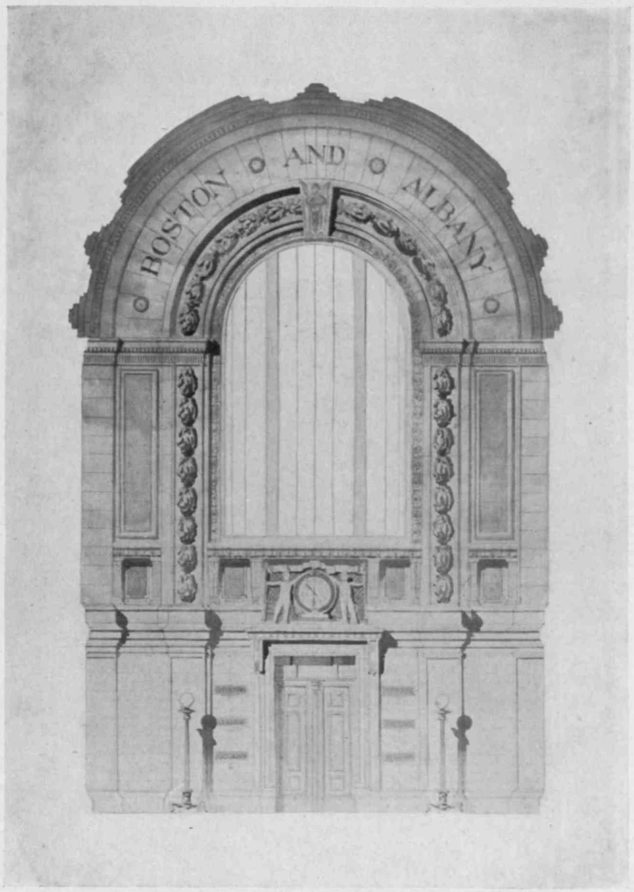
PRIZE DESIGN FOR SPECIAL STUDENTS — E. H. KRUCKEMEYER

COMPETITION FOR CLASS OF 1904 PRIZE

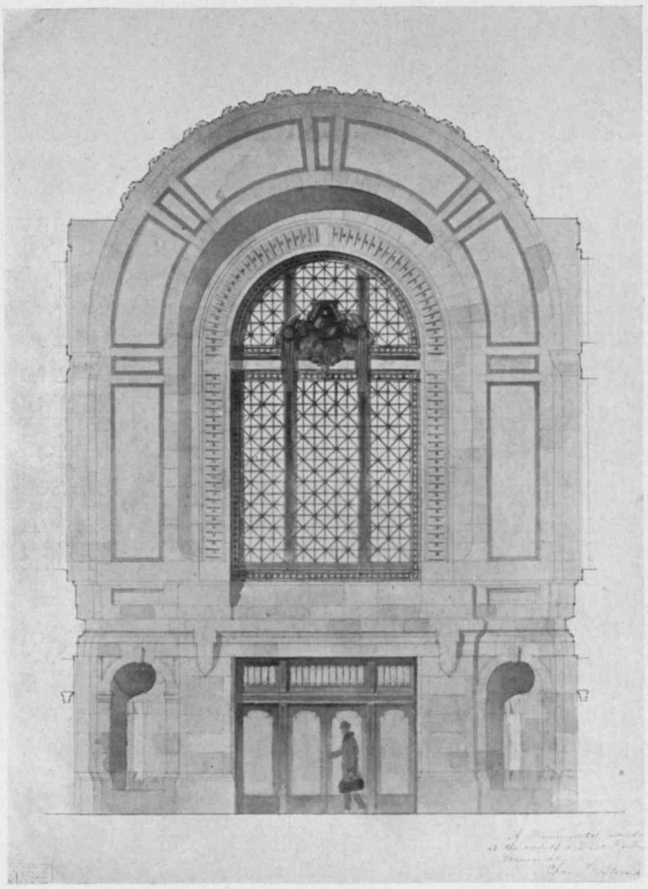
A MONUMENTAL WINDOW IN THE WAITING-ROOM OF A GREAT RAILROAD TERMINAL — SECOND YEAR OF DESIGN



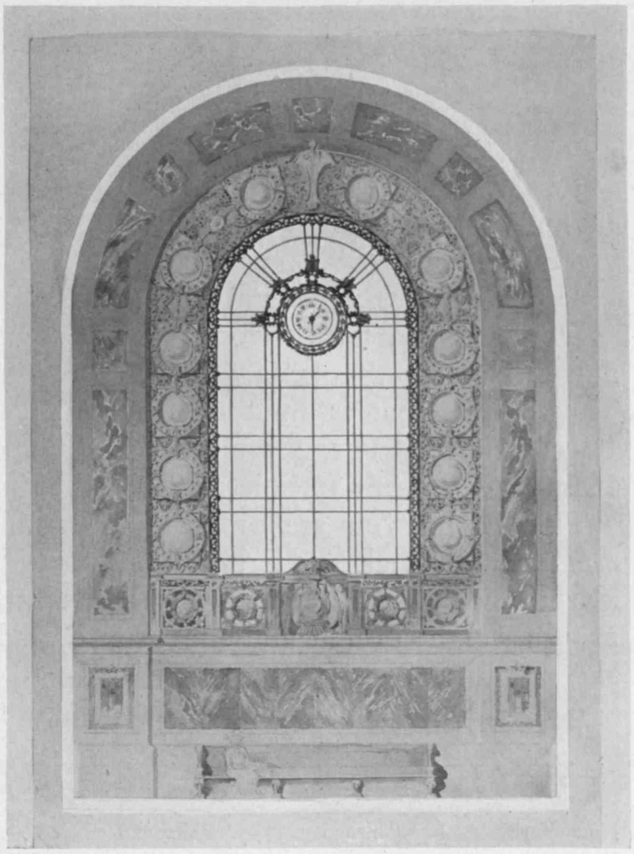
FIRST MENTION, W. D. FOSTER



SECOND MENTION, J. T. ARMS, JR.



THIRD MENTION, C. R. STRONG



FOURTH MENTION, MISS M. A. FULTON

Design

AWARDS FOR FIRST TERM, 1909-1910

Advanced Design

THE TRIBUNE OF HONOR OF A GRANDSTAND FOR AN AERODROME

First mention: K. VONNEGUT.
" " K. E. CARPENTER.
" " G. FOX.
Second " H. M. GLAZIER.
" " A. G. KELLOGG.
" " L. H. KING.

A CHIMNEYPIECE OF IMPORTANCE IN THE MAIN DINING-ROOM OF A LARGE HOTEL
(Sketch Problem)

First mention: K. E. CARPENTER.
Second " K. VONNEGUT.
Third " G. FOX.

FIRST PROBLEM TREATED AS AN ESQUISSE-ESQUISSE

First mention: K. E. CARPENTER.
Second " F. R. SIMMONS.
" " H. M. GLAZIER.

COURT-HOUSE FOR A LARGE AMERICAN CITY

First mention: K. E. CARPENTER.
" " A. G. KELLOGG.
" " H. D. BOUNETHEAU.
" " K. VONNEGUT.
Second " G. Fox and F. R. SIMMONS.
" " W. P. DOERR.

A MONUMENT IN HONOR OF CHARLES McKIM, ARCHITECT
(Sketch Problem)

No first mention.
Second mention: K. VONNEGUT.
" " A. G. KELLOGG.

A PAVILION PASSAGE IN A PUBLIC GARDEN GIVING ACCESS TO TWO GALLERIES OF AN ART MUSEUM
(Sketch Problem)

First mention: K. VONNEGUT.
" " G. FOX.
" " K. E. CARPENTER.
" " H. D. BOUNETHEAU.
Second " L. H. KING.
" " A. G. KELLOGG.

INTERIOR DECORATION OF A GRAND RECEPTION-ROOM IN THE MINISTRY OF FOREIGN AFFAIRS AT WASHINGTON

First mention: G. FOX.
" " H. D. BOUNETHEAU.
" " K. VONNEGUT.
Second " F. R. SIMMONS.
" " K. E. CARPENTER.
" " H. M. GLAZIER.

SALLE DES PAS PERDUS OF COURT-HOUSE

No first mention.
Second mention: L. H. KING.
" " H. M. GLAZIER.
" " W. P. DOERR.
" " A. G. KELLOGG.

A MODERN ATHÆNEUM IN THE FENWAY, BOSTON
(24-hour Sketch Problem)

First mention: K. VONNEGUT.
Second " A. G. KELLOGG.
Third " K. E. CARPENTER.

Third Year of Design

A MUSEUM OF THE MOST RECENT MODELS OF AEROPLANES AND DIRIGIBLE BALLOONS

First mention: C. C. CLARK.
" " R. H. HANNAFORD.
" " F. A. GODLEY.
" " J. H. SCARFF.
" " W. S. DAVIS.
Second " W. E. HAUGAARD.
" " H. S. GERITY.
" " J. W. NORTHROP, JR.
" " J. M. GRAY.
Third " J. E. BARNARD.
" " B. S. HIRSCHFELD.
" " B. M. PETTIT.

A PAVILION ON THE EDGE OF A TERRACE IN A PUBLIC PARK
(Sketch Problem)

First mention: D. W. PHELPS.
" " H. S. GERITY.
" " J. H. SCARFF.
" " J. M. GRAY.
Second " J. E. KELLEY.
" " R. H. HANNAFORD.
" " F. A. GODLEY.
" " W. S. DAVIS.
" " J. E. BARNARD.
" " C. C. CLARK.

A CONCERT-HALL IN A CITY OF IMPORTANCE

First mention: J. H. SCARFF.
" " W. S. DAVIS.
" " C. C. CLARK.
" " R. H. HANNAFORD.
" " J. M. GRAY.
Second " H. S. GERITY.
" " D. W. GIBBS.
" " B. M. PETTIT.
" " W. E. HAUGAARD.
" " W. H. MARCH.
Third " P. L. FOLEY.
" " W. R. WALKER.
" " J. E. KELLEY.
" " F. A. GODLEY.

DECORATION OF A WALL OF AN OPEN INTERIOR COURT OF AN ART MUSEUM
(Sketch Problem)

First mention: J. H. SCARFF.
" " J. E. KELLEY.
" " R. D. JOHNSON.
" " W. S. DAVIS.
" " H. S. GERITY.
Second " J. M. GRAY.
" " L. A. DOW.
Third " R. H. HANNAFORD.
" " P. L. FOLEY.

DECORATED COLUMN IN A PUBLIC GARDEN
(Sketch Problem)

First mention: J. M. GRAY.
" " R. H. HANNAFORD.
" " H. S. GERITY.
" " C. C. CLARK.
" " W. S. DAVIS.
" " J. W. NORTHROP, JR.
Second " B. S. HIRSCHFELD.
" " W. E. HAUGAARD.
" " L. A. DOW.
" " P. L. FOLEY.
" " J. H. SCARFF.

Second Year of Design

SWIMMING-POOL AND PAVILION ON A GENTLEMAN'S ESTATE

First mention: S. N. WHITNEY.
" " J. T. ARMS, JR.
" " W. D. FOSTER.
" " J. F. ALTER.
" " Miss M. A. FULTON.
Second " H. A. ANGELL.
" " C. R. STRONG.
" " E. H. KRUCKEMEYER.
" " O. H. CHASE.
" " J. N. FRENCH.
Third " M. E. HAYMAN.
" " S. A. FRANCIS.
" " P. S. AVERY.
" " A. T. GAY.

EXEDRA AT THE BASE OF SWIMMING-POOL
(Sketch Problem)

First mention: S. A. FRANCIS.
" " E. H. KRUCKEMEYER.
" " R. T. WALKER.
" " J. T. ARMS, JR.
Second " S. N. WHITNEY.
" " M. E. HAYMAN.
" " J. F. ALTER.
" " E. SCHWARZ.

PAVILION IN A PARK FOR ORCHESTRAL CONCERTS

First mention: J. T. ARMS, JR.
" " L. GRANDGENT.
" " C. R. STRONG.
" " W. D. FOSTER.
" " E. H. KRUCKEMEYER.
Second " J. F. ALTER.
" " M. E. HAYMAN.
" " Miss M. A. FULTON.
" " S. A. FRANCIS.
" " P. S. AVERY.

A SMALL MUSEUM FOR COL. ROOSEVELT'S TROPHIES

First mention: E. H. KRUCKEMEYER.
" " S. N. WHITNEY.
" " W. D. FOSTER.
" " M. E. HAYMAN.
" " C. R. STRONG.
" " J. F. ALTER.
" " Miss M. A. FULTON.
" " J. T. ARMS, JR.
Second " A. T. GAY.
" " J. N. FRENCH.
" " H. A. LEWIS.
" " C. DE LANDA.

INTERIOR DESIGN OF A MONUMENTAL WINDOW IN THE WAITING-ROOM OF A GREAT RAILROAD TERMINAL
("Class of 1904 Competition Prize" Problem)

Prize, regular student: L. GRANDGENT.
Prize, special student: E. H. KRUCKEMEYER.
Mention: W. D. FOSTER.
" J. T. ARMS, JR.
" C. R. STRONG.
" Miss M. A. FULTON.
" S. N. WHITNEY.
" P. S. AVERY.
" M. E. HAYMAN.
" O. H. CHASE.

(To be continued Vol. 3, No. 3)

Building-Materials

(Continued from Vol. III, No. 1)

Limes, Cements, Mortars, and Concretes

[These notes were prepared for the students in the Department of Architecture, to serve as a text in a short course of instruction in the classroom. Many authors have been consulted and often copied literally; and as a list of the most important will be given at the end of this article, it has not seemed necessary always to make direct mention of them in the text. — Ed.]

Cement Mortars. The proportions generally used in practice are: for Portland and Puzzolan cements, one volume of cement to two or three volumes of sand; and, for the Rosendale or Natural cements, one volume of cement to one or two volumes of sand. Hydraulic cement mortar hardens simultaneously throughout its mass, and, if good, continues this process with age. For the very best results the cement paste should be just sufficient to coat the grains and fill the voids of the sand. More cement than this adds to the cost and weakens the mortar. The most accurate but least common method is to weigh the ingredients for each batch.

Cement Mortars with Lime. Professor I. O. Baker says:

"Cement mortar before it begins to set has no cohesive or adhesive properties, and is what the mason calls 'poor,' 'short,' 'brash;' and consequently is difficult to use. It will not stick to the edge of the brick or stone already laid sufficiently to give mortar with which to strike the joint. The addition of a small per cent of lime paste makes the mortar 'fat' or 'rich,' and more pleasant to work. The substitution of ten to twenty per cent of lime paste for an equal volume of the cement paste does not materially decrease the strength of the mortar, and frequently the addition of this amount of lime slightly increases its strength. In all cases the substitution of ten to twenty per cent of lime decreases the cost more rapidly than the strength, and hence is economical; but the substitution of more than about twenty per cent decreases the strength more rapidly than the cost, and hence is not economical. The economy of using lime with cement is, of course, greater with Portland than with Natural cement, owing to the greater cost of the former. The addition of lime does not materially affect the time of set, and usually slightly increases it."

Mr. L. C. Sabin's conclusions made from laboratory tests are:

" . . . The addition of a small amount, ten to twenty per cent, of slaked lime to cement mortars containing as much as three parts sand not only renders them more plastic, but actually increases the tensile strength, especially if the mortars are kept damp during the hardening. It also appears that for mortars exposed to the open air the lime should be in the form of slaked powder rather than paste. It may be added that in all cases care should be taken that the lime is thoroughly slaked before use, and all lumps should be removed by straining or sifting."

Pointing-Mortars. General Gilmore says pointing-mortars should be compounded of a paste of finely ground cement and clean, sharp, silicious sand. The measure of sand will generally vary between two and one-half and two and three-fourths that of the cement paste, his rule being that the volume of cement paste should be very slightly in excess of the voids of the sand, which he would carefully ascertain. This mortar when ready for use should appear rather incoherent and quite deficient in plasticity, and should be mixed in quantities of not over two or three pints at a time.

Before pointing, the joint should be dug out to the depth of one inch at least, and all loose matter brushed from it. The wall should then be thoroughly wet with water and kept in such a condition that it will neither absorb water from the mortar nor impart any to it. Walls should not be allowed to dry too rapidly after pointing, but should be kept moist several days; or, better still, for two or three weeks. Pointing in hot weather should therefore be avoided if possible. The mortar is put in the joint with the trowel, and in good work should be caulked with a caulking-iron until a film of water appears on the surface of the mortar, after which more mortar is put in and the caulking repeated; finally, the mason rubs and polishes the joint under as great a pressure as he can exert.

Grout. Grout is a thin liquid mortar which is sometimes poured into the joints and crevices of a stone or brick wall to conceal poor workmanship. It has no strength, and its use should be condemned.

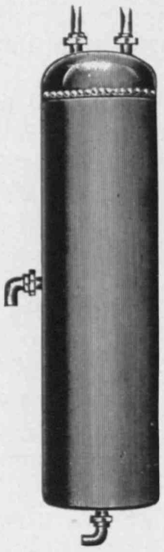
It should be remembered that the setting of all mortars is prematurely stopped if they are allowed to dry too quickly, so that it is of the utmost importance, especially in hot weather, that the stone or brick should be thoroughly soaked so that they cannot absorb the moisture from the mortar; at the same time, the wetting removes all dirt or dust from the material, which otherwise would prevent the mortar from adhering.

Sometimes, for sake of economy, the backing of a wall is built with poorer mortar than the face; that is, has less cement, or perhaps none at all, mixed with the lime. This should never be allowed, as the unequal contraction of the two mortars endangers the stability of the wall. The same mortar should be used throughout.

Freezing of Cement. In the Transactions of the American Society of Civil Engineers, March, 1887, there is an article by Alfred Noble on the effect of freezing of cement mortar. He says:

"In the construction of a lock at the St. Mary's Falls Canal masonry work was discontinued about October 20 of each year. On the last days of the work in 1887 mortars of Portland cement and of a good quality of Natural cement were used in adjoining portions of the same wall. The proportions of cement and sand, 1 to 1, were used in both classes of mortar. In the following spring the Portland cement mortar was perfectly sound. The Natural cement mortar was disintegrated to a depth of three or four inches. In the same locality a concrete foundation was laid in February, the weather generally about zero. The mortar was made of Portland cement, and salt was used freely. There never was any settlement of the masonry and in a few months the concrete sustained a pressure of fifteen feet of water without developing any leaks. Some small piers were built for the St. Louis River Bridge near Duluth in the winter of 1884–85. The temperature varied from zero to occasionally above freezing. Portland cement was used with one and one-half and two and one-half parts of sand. During the extremely cold weather salt was used freely in the mortar, and the sand was warmed; but at 20° the mortar froze quickly after being spread over the stone;

G. J. MORIARTY



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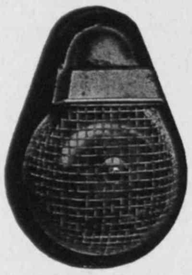
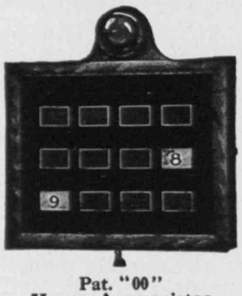


Schoolyard Bell



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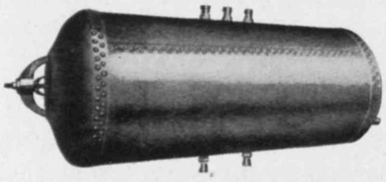

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so that if the exposed stone was not adjusted to its bed at once the mortar had to be scraped off and fresh put on. In the later examination no difference could be discerned in the piers built in the extreme cold and those built in the comparatively mild weather."

THE PROPORTION OF SALT. In regard to the use of salt, James R. Cross quoted a paper presented in 1874 on the construction of a masonry dam. In freezing weather the mortar was mixed with salt water. The rule for proportion of salt was one said to have been used in the works of Woolwich Arsenal some years ago; viz., dissolve one pound of rock salt in eighteen gallons of water when the temperature is 32° F., and add three ounces of salt for every three degrees of lower temperature. The masonry thus prepared stood well and showed no signs of having been affected by the frost.

Taylor & Thompson speak of this rule as one frequently cited in print, but which has proved entirely inadequate with practical tests made by them. With water at 16° F. such an amount would be slightly more than one per cent of its weight, an amount too small to be effective.

Baker, however, says that the above rule gives a slight excess of salt, and suggests the rule, easily to be remembered and scientifically correct, "Add one per cent of salt for each Fahrenheit degree below freezing."

In the New York subway work in 1903 nine per cent of salt to the weight of water was adopted. On the Wachusett Dam during the winter of 1902 the proportion was about two per cent.

The addition of salt is to lower the freezing-point of water until the set has taken place, or until the mortar can be protected in some other way.

COMMON LIME MORTAR. In making simple lime mortar the caustic lime is usually spread in a layer of uniform depth not exceeding six to eight inches in a water-tight plank box, which to be large enough to treat a cask of lime in at a time should measure 4 x 8 feet, with sides ten or twelve inches high. The necessary amount of water to reduce this to a paste should be added at the outset. This is called "drowning." Fresh water should be used, as sea-water gives greatly diminished volume.

The right amount of water is a very important factor; for if the paste is made too fluid its binding qualities are injured, and if too little has been used the addition of more after the slaking is well along, thus suddenly lowering the temperature, chills the lime and makes it granular and lumpy. The heap of lime is then covered over with the exact proportion of sand. This keeps in the heat and moisture and so makes the slaking more rapid and thorough. In a short time the water becomes heated to the boiling-point, when a sudden evolution of vapor, a rapid increase in volume, and a reduction of the lime to a thick paste ensue.

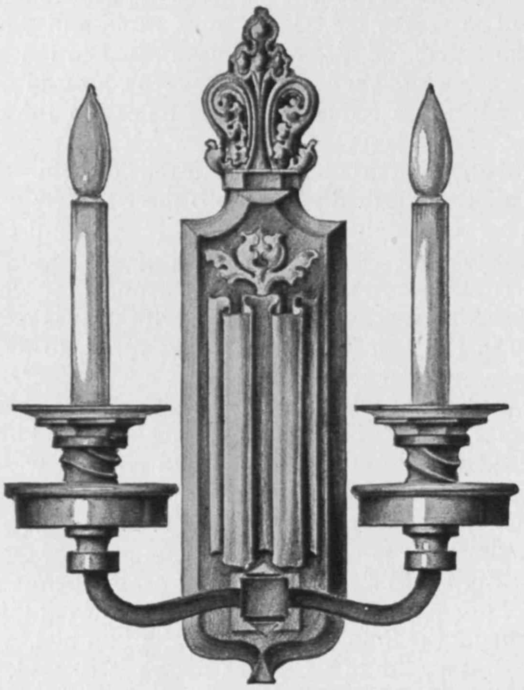
It is of great importance not to stir the lime while slaking, but to allow it gradually to absorb the water by capillary attraction and its natural avidity for it. General Gilmore recommends that the lime be slaked at least one day before it is incorporated with the sand, and that when the lime is slaking it should be covered with canvas or boards to keep in the heat and the escaping vapor, to make the slaking more rapid and thorough.

The practice in this country is to use mortar as soon as it becomes cool. It is made in any quantity, and after being mixed with sand is piled up and covered with more sand to protect it from the air. As it is needed, part of this pile is broken down and tempered for use. To insure perfect slaking it is customary in some parts of the continent of Europe to slake the lime the season before it is to be used, protecting the paste from the air during this time. In Germany the lime is slaked and run into pits, where it remains from four to six weeks before it is used. Pliny says, "The older, too, the mortar the better it is in quality. In the ancient laws for the regulation of building no contractor was to use mortar less than three months old."

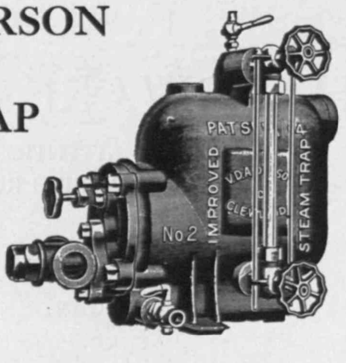
HALF-CEMENT MORTAR. In making the usual half-cement mortar the beginning of the process is as described above; then the cement with its proportion of sand all perfectly dry should be mixed together, and this mixture is added to the lime mortar, which should then be thoroughly worked over with probably a little water added until of an even color without streaks, when the mortar is ready for use.

CEMENT MORTAR. In the making of cement mortars, whether the proportion of sand be one, two, three, or more parts of sand to one of cement, about half the sand is spread in the mortar-box and the dry cement is spread evenly over the sand, after which the remainder of the sand is spread on top and the whole is thoroughly mixed together; and finally, enough water is added to make a stiff paste.

"If by hand labor, the dry cement and sand shall be turned over with shovels by skilled workmen not less than six times before the water is added. After adding the water the parts shall be again turned over and mixed with shovels by skilled workmen not less than three times before it is used."



Andrews, Jacques & Rantoul, Architects, Boston



ROMAN CEMENT MORTAR. In making a mortar of English Roman cement, a quick-setting Natural cement, one to one and one-half parts of sand to one of cement, is the greatest proportion that should be added, as the little strength of this cement rapidly diminishes with the addition of sand.

REGAUGING OR RETEMPERING MORTARS. The best and safest rule is to require the mortar to be thoroughly mixed, and to forbid the use of any after initial set has taken place. Sabin says: "Sand mortars, especially of Portland cement, usually develop a higher tensile strength under moderate treatment of this kind; and if regauged frequently with sufficient water added to keep them plastic, mortars of slow-setting cements may be used several hours after made without serious detriment to the tensile strength." It is better, however, not to take any chances with Natural cement.

(To be concluded in Vol. III., No. 3)

(Continued from page 37)

running along one end of the desks. Or the piping can be arranged upon the back of one line of desks, and the other line, which is movable, backed up to it. Iron piping should be used as far as possible, the outside being painted with a pitch or asphalt paint. Lead-lined pipe, instead of lead, would seem to be satisfactory for suction. For peaty service waters, black pipe fills up rapidly with zooglea, crenothrix, and iron rust. This can be avoided to a large extent by the use of galvanized iron or lead-lined pipe. For drainage the lead-lined or even plain wooden troughs kept well painted with thin coats of asphalt have given good satisfaction. They are much to be preferred to lead pipes, which continually give trouble from clogging. In concrete construction the writer has these troughs replaced by trough-like depressions made in the floors and lined with asphalt. Care should be had to make these of sufficient capacity and fall; they are covered with slate or cast-iron slabs. The vertical drains should be constructed of hard baked Akron tile or, better yet, chemical pottery, and the joints made with cement, or possibly with the same material as the asphalt floors. These vertical drains can either be in the elevator-well or in a square space in the wall, it being closed with doors so that they too are readily accessible. Individual traps and vents are not needed in the various laboratories, but the whole system should be effectively protected by traps in the basement. For sinks, the ordinary round stoneware wash-bowl may be used. This is made with an overflow; and instead of the usual brass fitting at the bottom, a porcelain tube two or three inches long projects from it, carrying eyelets at the top on either side of the bowl. The tube fits down into a piece of lead pipe two feet long which empties into the trough on the back of one line of desks. This lead pipe is supported at the top by the eyelets just mentioned. These pipes can then be easily replaced by the janitor, the services of the plumber not being needed. Each laboratory should be provided with valves so that the steam, water, and gas can be shut off from it without disturbing another room. The gas-valve should be placed near the exit, so that it can be closed nightly and diminish the danger from fire.

Alumni Notes

The department is in receipt of many applications from architects and others for assistants. We have no information as to whether our alumni are satisfied with their present positions and prospects, consequently many opportunities for Institute men are doubtless lost.

The Secretary of the Institute will send application blanks to any of our former students who wish to register their names with the view of making a change whenever a suitable opportunity occurs.

Miss Helen M. Longyear, '09, is with Miss Alice E. Neale, Interior Decorator, New York City.

H. D. Chandler, '08, and W. P. Blodget, '09, are in Paris preparing for the entrance examinations to the École des Beaux-Arts.

C. H. Preston, '08, has recently returned to this country after a year's study in Paris.

F. A. Naramore, '07, is now with the Northwest Bridge Works of Portland, Ore. B. R. Honeyman, '06, is the chief engineer. Naramore writes, "The opportunities here are manifold, and Tech men, in architecture especially, are doing almost all of the best work."

Stebbins, '06, & Watkins have removed their offices from 42 Chauncy St. to the Edmunds Building, 164 Federal St., Boston, Mass.

In the recent preliminary competition for the Robert Fulton Memorial ten competitors have each been awarded $300, and chosen for the final competition. Among these are R. P. Bellows, '04, associated with H. G. Ripley, '91, J. F. Clapp, '99, and O. Faelton, '04; and Bosworth & Holden, of which firm F. H. Holden, '94, is a member. Messrs. George P. Post and Thomas Hastings were the professional members of the jury, and in their opinion "this competition indicates more than any other with which we are familiar the great advances the profession has made in recent years, and that out of the sixty-two designs submitted the average merit is exceedingly high, and made it difficult for us to limit the choice to twenty;" twenty being the number first selected.

Frederic Nickerson, '04, has established an office in the Postal Telegraph Building, San Francisco, Cal. He writes, "As you probably know, this city of ours is one we are very proud of and the building up of which has been something so wonderful that one cannot appreciate it unless one had happened to be here right after the fire. In fact, it has built up so rapidly that for the past four or five months building has been at rather a standstill compared to what it was for the three years after the fire. The new year, however, promises to be good, and there are rumors of much building to be done all over the city.

A. R. Nichols, '02, has removed to Minneapolis, and is a member of the firm Morell & Nichols, Landscape Architects, with offices in the Palace Building.

W. P. R. Pember, '02, is a member of the firm of Pember & Kearfott, Architects and Landscape Engineers, Bristol, Tenn.–Va.

L. E. Vaughan, '02, is with the Fiske-Carter Construction Co., Worcester, Mass.

The marriage is announced of A. L. Klieves, '01, and Miss Elva Turnbull, on Oct. 27, 1909.

G. F. Ashley, '00, was appointed Assistant Professor of Technical Drawing at Tufts College in June, 1909. He also has charge of the course in descriptive geometry at the Lawrence Scientific School, Cambridge, for the year 1909–10.

G. B. Ford, '00, has an illustrated article on the new Hôtel Meurice, Paris, in the September *Architectural Review*.

F. E. Coombs, '98, is New England Manager of the Altantic Terra-Cotta Co., with offices in the Old South Building, Boston. He designed and installed the terra-cotta finish in the new Boston Opera-House.

The two firms of Ferguson, '98, & Calrow and Taylor, '04, & Hepburn, '04, have formed a new partnership under the firm name of Ferguson, Calrow & Taylor, with offices in the Law Building, Norfolk, Va. Hepburn has returned to Boston, and is with Winslow, Bigelow, '88, & Wadsworth, '04.

Dickey, '94, & Reed, '08, have removed their office in San Francisco to the Russ Building.

A. F. Rosenheim, '81, is the new president of the Coast League of Architecture; E. F. Lawrence, '01, is again the vice-president. This association of the A. I. A. Chapters of Southern California, San Francisco, and Washington, and the Architectural Clubs of Los Angeles, San Francisco, Portland, Seattle, and Denver, is doing much to make more effective the architectural interests of that section of the country.

Current Work of the Alumni Illustrated in the Magazines

AMERICAN ARCHITECT.

June 30, Richardson, '98, Barott & Richardson, '03, House, New York, N. Y.
July 28, H. L. Walker, '00, Commercial Buildings and Club-house, Atlanta, Ga.
August 4, Ewing, '97, & Chappell, Houses, Tarrytown, N. Y.
" 25, A. D. Jenkins, '03, Memorial Altar, New York, N. Y.
September 1, Hunt, '94, & Grey, Garden, Hollywood, Cal.
October 13, Davis, '94, McGrath & Kiessling, Houses, Glenridge and Englewood, N. J.
" 20, Snelling, '82, & Potter, Church, Jacksonville, Fla.
November 3, Davis, '92, & Brooks, Insurance Building, Hartford, Conn.
" 10, Hill & Woltersdorf, '94, Factory Buildings, Chicago, Ill.
" 17, Brainerd,'87, & Leeds, '93, Schoolhouses, Malden and East Boston, Mass.
" 17, Davis, '92, & Brooks, Schoolhouse, Hartford, Conn.
" 17, Davis, '94, McGrath & Kiessling, Schoolhouse, Englewood, N. J.
" 17, Kilham, '89, & Hopkins, '96, Schoolhouse, Marblehead, Mass.
" 17, Parker, '95, Thomas, '95, & Rice, '91, Schoolhouse, Boston, Mass.
" 24, James Purdon, '98, Club-house, York Harbor, Me.
December 15, Ewing, '97, & Chappell, Houses, Tarrytown, N. Y.
" 22, Hill & Kendall, '87, Apartment-house, Washington, D. C.
" 22, Newhall, '91, & Blevins, Apartment-house, Cambridge, Mass.
" 22, Stone, '88, & Averill, Apartment-house, Washington, D. C.
" 22, Wood, Donn, '91, & Deming, Apartment-house, Washington, D. C.
" 29, Green & Wicks, '76, Garage, Kennebunkport, Me.
" 29, Kilham, '89, & Hopkins, '96, Garage, Cohasset, Mass.
" 29, J. W. Lavalle, '87, Garage, Brookline, Mass.
" 29, Tallmadge, '98, & Watson, Garage, Oak Park, Ill.
" 29, A. T. Taylor, '95, Garage, Syracuse, N. Y.

ARCHITECTURAL RECORD.

June, A. W. Longfellow, '78, Charles Eliot Memorial, Boston.
" Stickney, '75, & Austin, '76, Metropolitan Park System Buildings, Boston, Mass.
" Wheelwright, '75, & Haven, Metropolitan Park System Bridges.
July, Howard, '86, & Galloway, Exposition Buildings, Seattle, Wash.
August, Cass Gilbert, '80, West St. Building and Broadway Chambers, New York City.
" L. H. Sullivan, '74, Prudential Building, Buffalo, N. Y.
September, MacNaughton, '02, Raymond & Lawrence, '01, Group Plan for Whitman College, Walla Walla, Wash.
" Whidden, '77, & Lewis, Corbett Building, Portland, Ore.
November, Bosworth & Holden, '94, House, Oceanic, N. J.
" Frost, '79, & Granger, Houses, Lake Forest, Ill.
" M. Hunt, '94, & E. Grey, House, Pasadena, Cal.
" H. V. Shaw, '94, Country Club, Flossmoore, Ill., and Houses at Lake Forest and Winnetka, Ill.
" W. C. Zimmerman, '81, House, Chicago, Ill.

ARCHITECTURAL REVIEW.

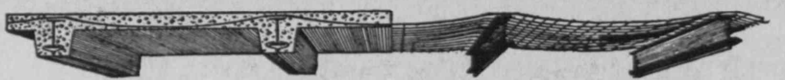
July, L. H. Sullivan, '74, Sketches for Buildings in "Island City," near Philadelphia, Penn.
September, E. J. Lewis, Jr., '81, Church, New London, Conn.

ARCHITECTURE.

June, Lord, '88, & Hewlett, Westchester County Court-house, White Plains, N. Y.
September, Winslow & Bigelow, '88, House, Hamilton, Mass.
October, Bliss, '95, & Faville, '96, Bank of California, San Francisco, Cal.

October,	O. C. Hering, '97, House, Ardsley, N. Y.
November,	Bliss, '95, & Faville, '96, Theater, San Francisco, Cal.
"	Lord, '84, & Hewlett, Memorial Monument, Albany, N. Y.
December,	Heins, '82, & Ross, State Normal College, Albany, N. Y.
BRICKBUILDER.	
June,	A. H. Hepburn, '04, *Brickbuilder* Competition for a Terra-Cotta Block House, First Prize Design.
"	W. G. Holford, '01, *Brickbuilder* Competition for a Terra-Cotta Block House, Second Prize Design.
"	Fernekes & Cramer, '96, *Brickbuilder* Competition, Submitted Design.
"	Newhall, '91, & Blevins, Municipal Gymnasium and Public Baths, East Boston, Mass.
"	Parkinson & Bergstrom, '99, Pacific Mutual Life Insurance Building, Los Angeles, Cal.
"	Shepley, '82, Rutan, & Coolidge, '83, Borland Block, Chicago, Ill.
"	Simonson & Pietsch, '89, Car-barn, Baltimore, Md.
July,	Lord, '88, & Hewlett, Masonic Temple, Brooklyn, N. Y.
"	Olds & Puckey, '01, Irem Temple, Wilkes-Barre, Penn.
"	Wood, Donn, '91, & Deming, Masonic Temple, Washington, D. C.
August,	Alden, '79, & Harlow, '78, House, Pittsburg, Penn.
"	Heins, '82, & LaFarge, '83, Zoölogical Park Building, New York City.
"	H. F. Keyes, '04, House, Chestnut Hill, Mass.
"	Mauran, '89, Russell, & Garden, Houses at Clarksville and St. Louis, Mo.
"	Stickney, '75, and Austin, '76, Associate Architects, House, Milton, Mass.
September,	L. Boynton, '92, Stores and Apartments, Cedarhurst, L. I.
"	Heins, '82, & LaFarge, '83, Tuskegee Tenements, New York City.
"	C. H. Johnston, '80, Minnesota State Agricultural School.
"	F. L. Packard, '90, House, Columbus, O.
"	J. K. Taylor, '79, Post-office, Marion, O.
"	Wood, Donn, '91, & Deming, Union Trust Company Building, Washington, D. C.
October,	W. D. Austin, '76, *Brickbuilder* Competition for a Brick House, First Prize Design.
"	C. C. Clark, '10, *Brickbuilder* Competition for a Brick House, Third Prize Design.
"	Derby, '02, & Robinson, '99, *Brickbuilder* Competition for a Brick House, Second Mention Design.
"	Diboll & Owen, '94, Church, New Orleans, La.
"	H. V. Shaw, '94, Mentor Building, Chicago, Ill.
November,	Brainerd, '97, & Leeds, '93, Schoolhouse, Boston, Mass.
"	Coolidge, '92, & Carlson, '92, Squash Court, North Easton, Mass.
"	C. H. Johnston, '80, House, St. Paul, Minn.
"	Marsh & Peter, '92, Schoolhouse, Washington, D. C.
"	Newman, '92, & Harris, Schoolhouse, Washington, D. C.
"	Parker, '95, Thomas, '95, & Rice, '91, Schoolhouse, Boston, Mass.
"	D. H. Perkins, '89, Schoolhouses, Chicago, Ill.
"	Schmidt, '87, Garden & Martin, Refectory, Chicago.
"	Wheelwright, '78, & Haven, Opera-House, Boston, Mass.
December,	Bliss, '95, & Faville, '96, House, San Francisco, Cal.
"	Harding, '89, & Seaver, '97, Town Building, Lenox, Mass.
"	Kilham, '89, & Hopkins, '96, Schoolhouses, Chelsea and Salem, Mass.
"	Ripley, '91, & Russell, Schoolhouse, Newton, Mass.
"	Robins, '95, & Oakman, House, Williamstown, Mass.

Roofs



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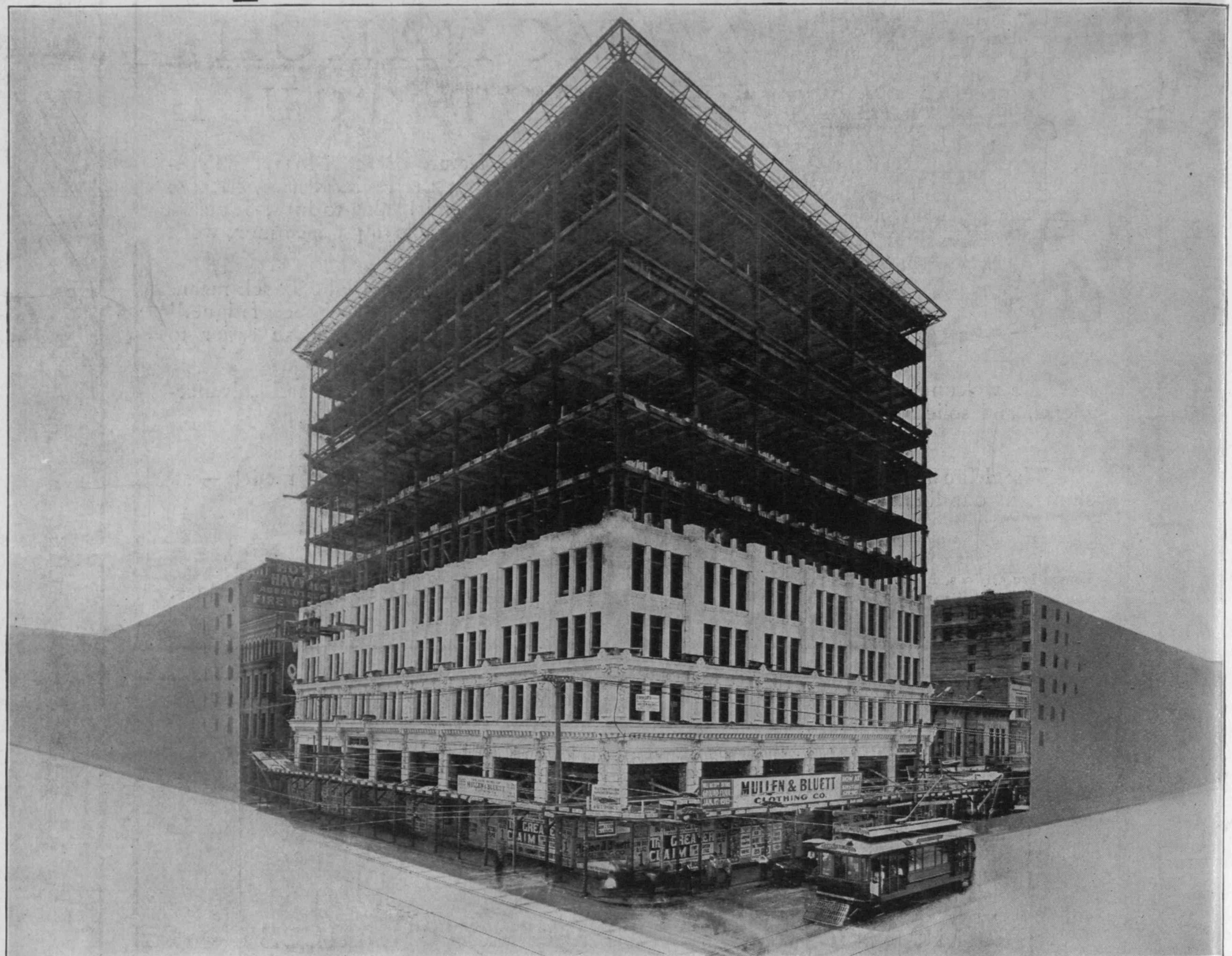

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