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The PERSHING SQUARE BUILDING

Its Technique of Materials

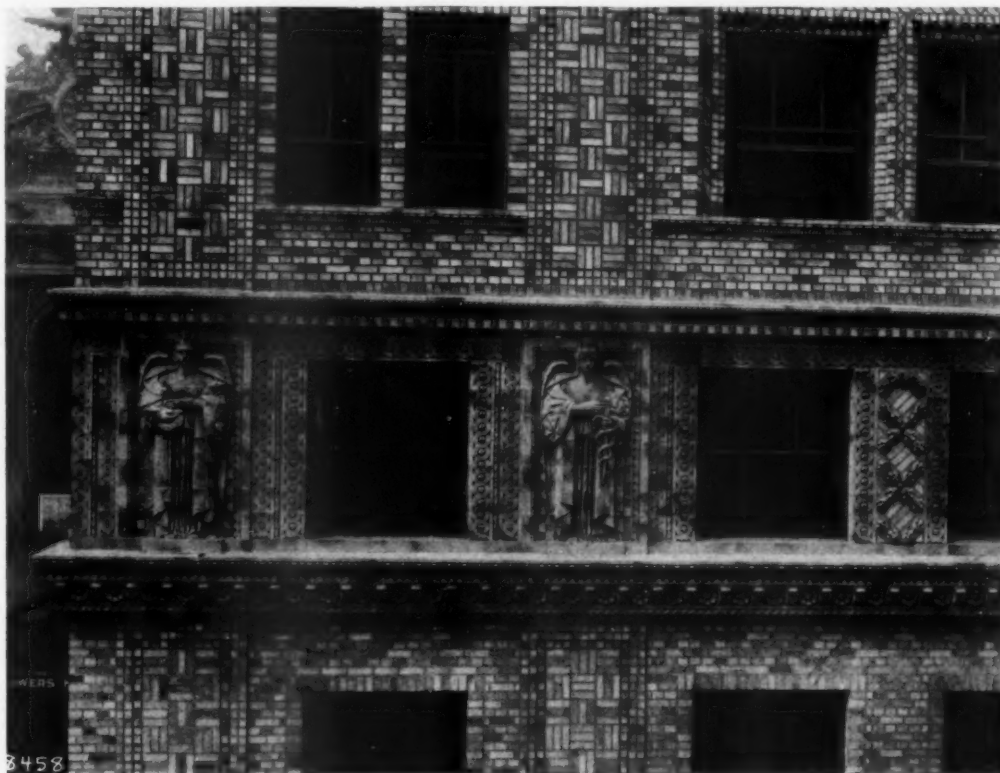
BY F. S. LAURENCE, *Executive Secretary, National Terra Cotta Society*

HOW far have we advanced on the path toward a vital, logical and beautiful treatment of the modern skyscraper building?

The *Chicago Tribune* competition and some recently completed structures bring once more to the fore the degree of our attainment in this direction and the question of how far we are likely to realize "a new architectural style" which will take

its place as a satisfying expression of enduring character.

It may be remarked in passing that a glance over the elaborately illustrated book issued by the *Chicago Tribune* containing all the designs submitted brings out strikingly the gratifying fact that American architects are so far in the lead in their grasp of the essential problem of sky-



Detail of brick pattern and terra cotta ornamentation at fifth story level

Pershing Square Building, New York

York & Sawyer and John Sloan, Architects

The extensive brick surfaces in the main shaft are broken up into a texture of consistent scale through widely differing color variations in the brick and the use of jointing patterns that may be expected to become less assertive and obviously regular as the building tones down

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PERSHING SQUARE BUILDING, NEW YORK

YORK & SAWYER AND JOHN SLOAN, ARCHITECTS

Among the latest of the monumental office buildings illustrating pronounced qualities of material technique in the use throughout from the water table to roof of burnt clay products, brick, terra cotta and roofing tile. Textural interest was evidently a primary object in the related treatment of these materials

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scraper design that with but one brilliant exception the American efforts constitute a class by themselves in their approach to a satisfying æsthetic mastery.

This is with due allowance for the fact that the best men among foreign competitors as a rule may not have participated and that some of the English and Canadian work especially entitles its authors to classification with the American participants under the general estimate of comparative

for the exterior tailoring of the actual construction which in virtually all our buildings today is merely clothed by an applied covering. All who contemplate the consistency of treatment given our modern office buildings will concede that, in terms of exterior surface design, they are usually not well tailored. At all events, not tailored logically and significantly. In respect to any frank recognition of the actual organic fact in their construction they remind the observer very much of the late



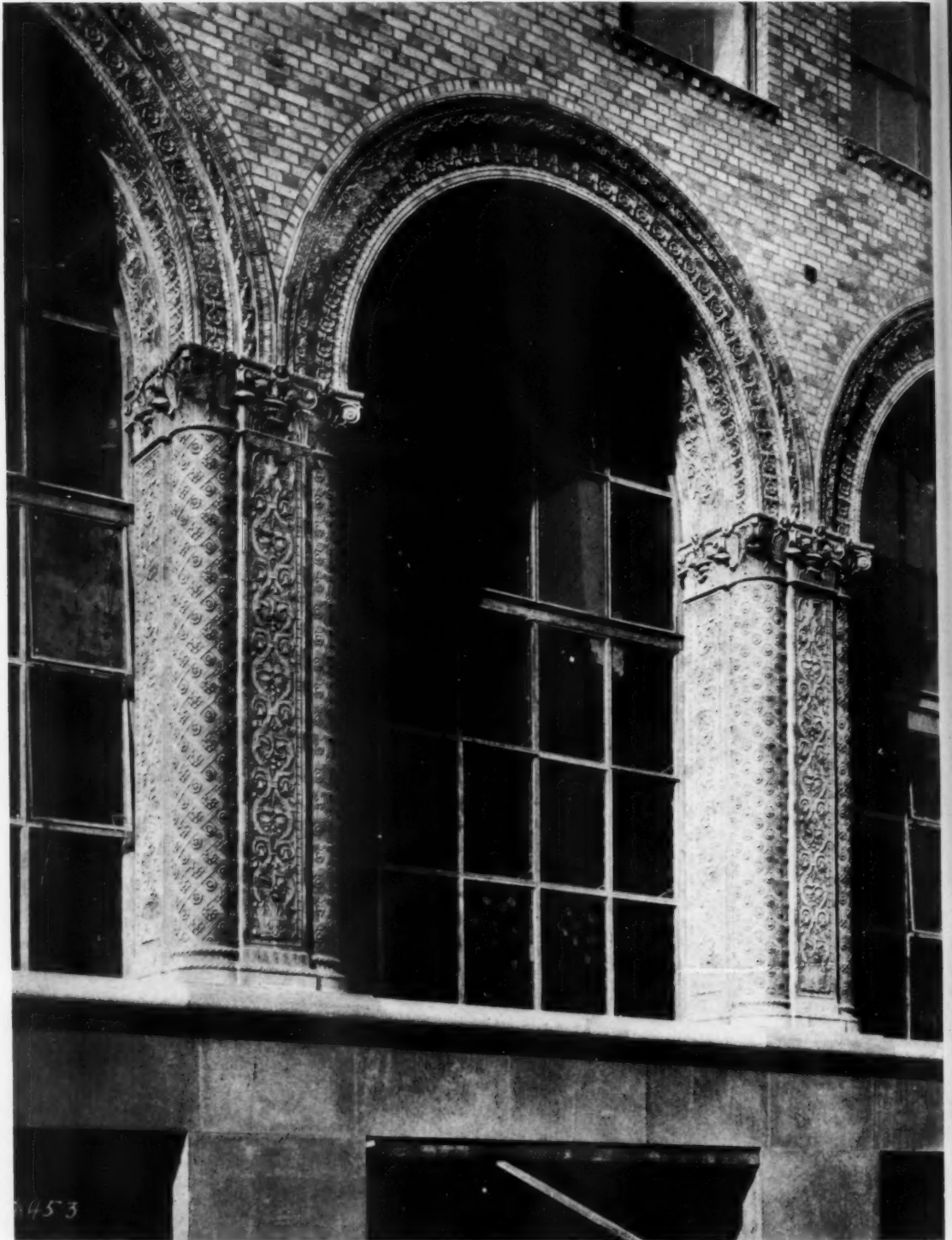
Brick and terra cotta detail at twentieth story level
Pershing Square Building, New York
York & Sawyer and John Sloan, Architects

worth ventured above. Also that the American efforts contained a large enough proportion of the horrible to present no occasion for national conceit in the general level of æsthetic taste illustrated.

Disregarding the *Tribune* competition, however, and coming down to what existing work illustrates in its approach to "a new architectural style" there are a number of examples already in existence which illustrate the steady progress which skyscraper design has been making in this direction during the past decade. Among these the Pershing Square Building is an instance where conservative adherence to precedent has been combined with a more logical technique of materials

lamented Ward McAllister's dictum upon the fundamental propriety of women's dress: "that it should aim to conceal as far as possible, the fact of their bipedity." The average office building in its applied dress of historic stylistic design pretty well illustrates the same disappointing result in the camouflage of anatomical fact. Or rather, one ought to say, accomplishes this with baffling completeness in some respects while betraying in others the existence of corporeal actualities with irritating insistence and inconsistency.

Ward McAllister has passed and with him the voluminous upholstery of earlier feminine dress and we have entered the advanced stage of the



DETAIL OF LOWER STORY ARCHES

PERSHING SQUARE BUILDING, NEW YORK

YORK & SAWYER AND JOHN SLOAN, ARCHITECTS

Showing carefully studied relation of terra cotta and brick in aspects of texture and coloring, the prevailing color being a soft buff, fire flashed with golden brown. This treatment in the terra cotta detail with the spirit of its modeling is reminiscent of the pre-Renaissance style of Lombardy. The roughened surface of the terra cotta will eventually tone down uniformly with adjacent brick and blend into soft harmony the pronounced spotting of the fire flashed coloring in these parts



TERRA COTTA PANEL AND DETAIL AT FIFTH STORY LEVEL
PERSHING SQUARE BUILDING, NEW YORK
YORK & SAWYER AND JOHN SLOAN, ARCHITECTS

short skirt immortalized by Don Marquis of the New York *Tribune* in his poem glorifying the resulting revelations in their range from the curves of Aphrodite to the angularities of Aunt Tabby's tibia.

The Pershing Square Building modestly illustrates this franker tendency of anatomical expression while not perhaps reaching the fullest consummation which might be desired. In one aspect particularly it is very gratifying as an index of progress. The use of clay materials throughout for the jacketing, above the water table, has been with a very frank recognition of certain of the qualities of medium which are quite natural to it and capable of results of the greatest charm. One might have wished that this treatment which availed itself of the natural eccentricities of coloring in burnt clay had extended itself to the formal character of modeled ornament and had included more of the same freedom in that aspect and less of the feeling of carved stone. Lombardesque precedent in terra cotta contains much which supports this freedom. One also feels that in present day adaptations of this precedent and other early Italian motives there is room for a franker implication of modern structural fact.

Here is where a technique truer to the organic nature of modern skyscraper design may be developed from study of the early historic uses of terra cotta. These often reveal suggestions in design which, quite unconsciously to the producers of it, foreshadow a treatment appropriate to the facts of modern construction. In the frank recognition of the requirements in jointing, supporting, and the freely plastic qualities of modeling, etc., which are entirely logical to veneer finish these early uses of terra cotta do not attempt to simulate the function of massive load bearing masonry. It is true they fulfilled this function in their own support and that of superimposed masonry but nowhere do we find profiles built out as a mere shell over iron framing in a form designed to deceive the eye into believing these elements to be solid features bedded into the wall and maintaining their place by gravity. They were built honestly according to the limitations of material as then produced for supporting itself, with accessory anchoring for greater security, and as a consequence are there now, intact, for all to see and study, after the passage of many centuries and even ages of time.

In the Pershing Square Building we have something of the same honesty. The use of terra cotta

reverts to the small size pieces reminiscent of the early Italian manufacture but more for consistent relationship with the jointing in the brick work than under any necessary limitation in the product as now produced, much larger units now being freely possible. In the spirit of the modeling in the terra cotta figure panel at the fifth story level, however, illustrated on the preceding page, we still find persisting strongly the treatment in modeling which suggests carving in a massive block of stone rather than ornament modeled by hand in the pliant surface of clay.

In the aspect of the builder's chromatic interest the ultimate effect of the pronounced color spotting in the terra cotta parts has evidently been deliberately calculated. Both in this and the brick the deposit of atmospheric dust will eventually tone the marked variations down into a softly harmonious play of color which should realize all that was evidently expected of it in a very knowing handling of the chromatic problem.

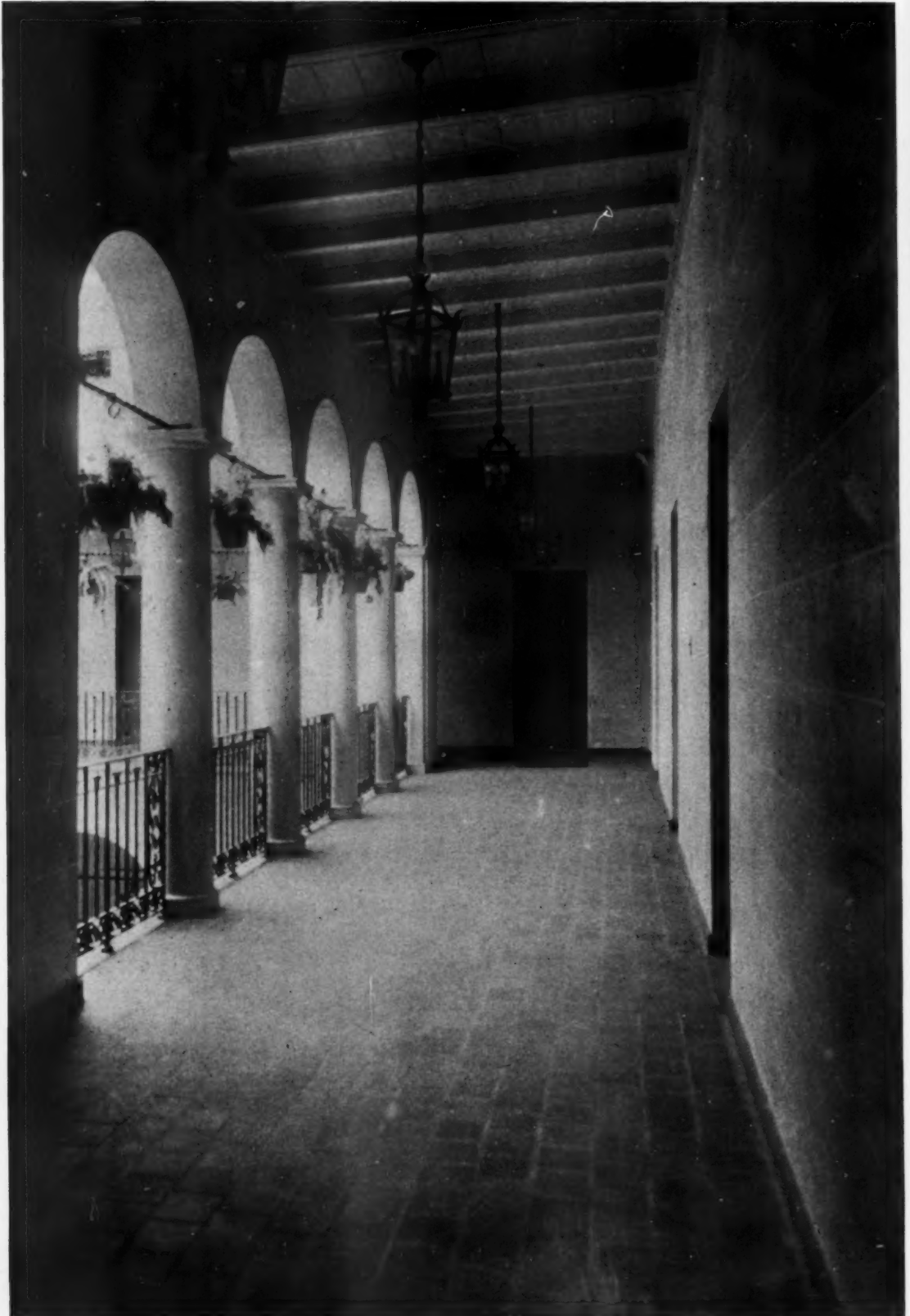
It may be added with respect to the suggestions of appropriate treatment which a study of early historic terra cotta work may yield, that employment of this resource should take into account the very marked technical development of terra cotta which has occurred in modern times and especially during the last thirty years. Modern chemistry and experimental research together with vastly improved facilities for production have greatly extended the possible scope of application and of effects in design. Very large size pieces can now be made and in a much greater variety of surface finishes and coloring than was possible in early times. Ashlar, rarely produced in terra cotta in the earlier periods of European use, has now become a large part of the normally possible production and if the modern facilities and control of material necessary for its extensive production had been possible during the early Renaissance and in preceding periods, it would undoubtedly have been used as freely as any other practical feature or improvement would have been adopted in the construction of the period. Thus development of an appropriate modern technique finds an additional resource for its accomplishment not comprehended in the suggestions which earlier precedent literally adhered to would afford. Combined with the greatly expanded scope of chromatic range offered in modern production, the circumstance carries immensely promising possibilities for the future in modern building design.



BUILDING FOR THE UNITED STATES EMBASSY, RIO DE JANEIRO, BRAZIL

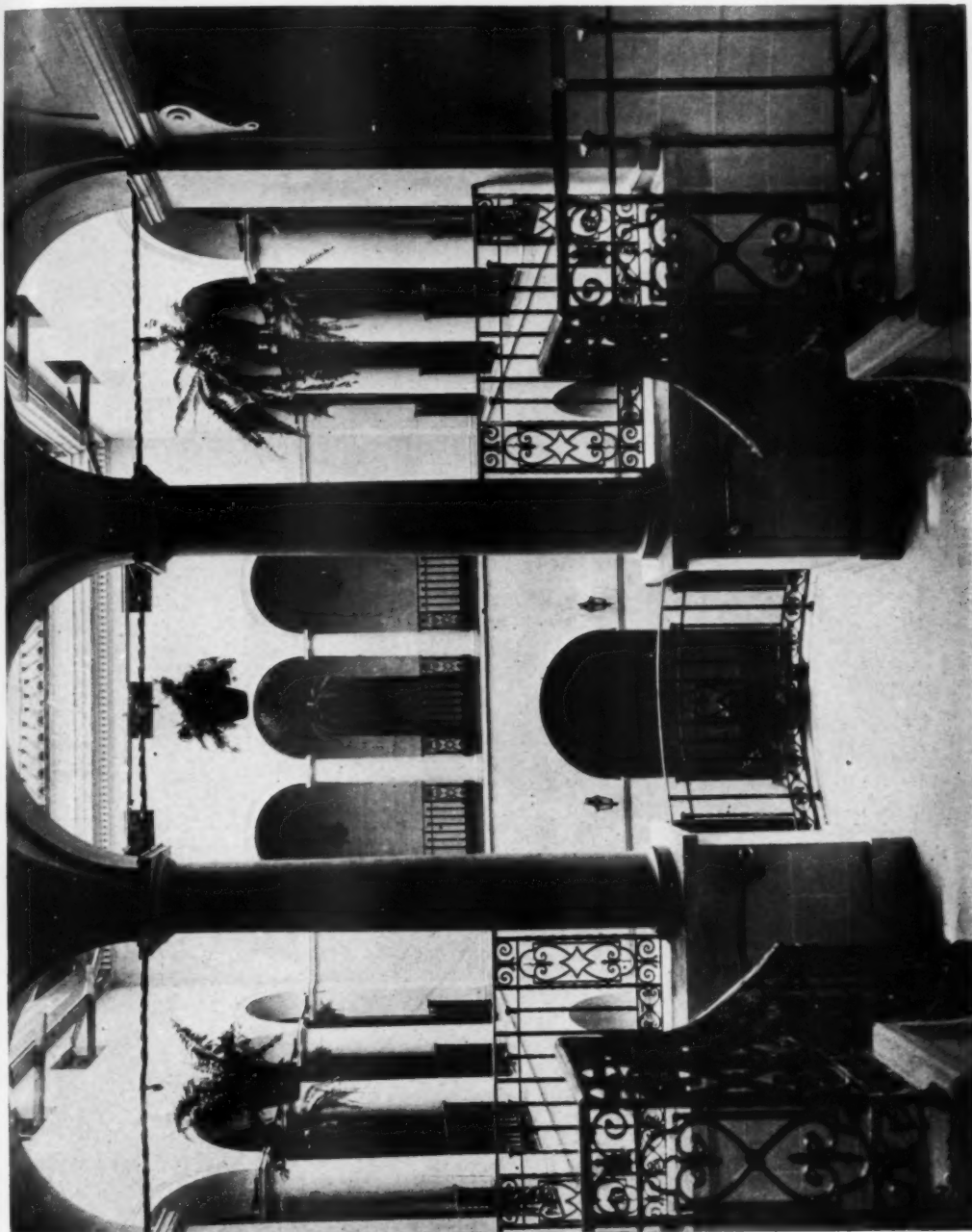
FRANK L. PACKARD, ARCHITECT

(For preliminary sketches and description, see issue of August 31, 1922)



BUILDING FOR THE UNITED STATES EMBASSY, RIO DE JANEIRO, BRAZIL

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CHATEAU D'ALINCOURT PRES MAGNY-EN-VEXIN

BY GREVILLE RICKARD, Architect

THROUGHOUT France one can find innumerable small chateaux, of medieval and Renaissance origin, sometimes in localities so far off the beaten track of the tourist as to be seldom visited or even heard of by the average traveller. These chateaux and their adjoining farm buildings quaintly picturesque yet simple in design, unaffected and with little if any adornment, possess a certain naive charm and a mysterious air of a romantic but unknown past which is often greatly and sometimes wholly lacking in the more pretentious and more frequently visited chateaux.

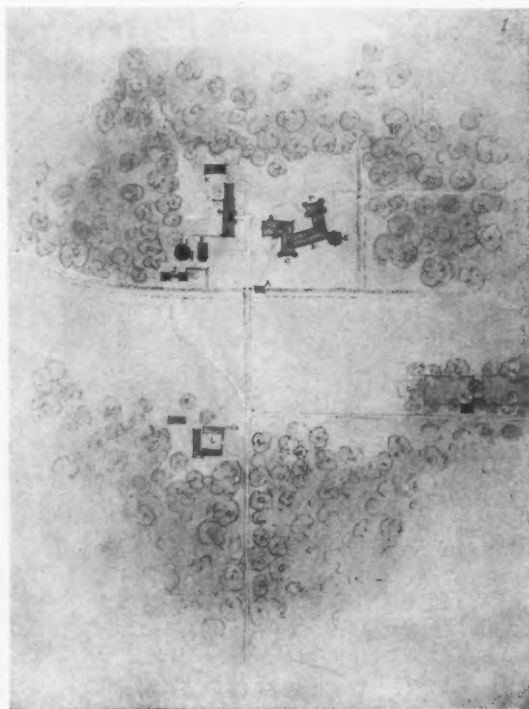
Of these is one probably even less known than the average, Chateau d'Alincourt situated near the town of Magny-en-Vexin, which is about thirty miles Northwest of Paris. I have questioned many travellers as well as natives of France and have found no one who is familiar with the name of the place. It is not only a section of the country little travelled by tourists, but the nature

of its topographical position contributes greatly toward obscuring it from the attention of any nearby wanderer.

To reach it, one approaches along the usual type of lonesome French road passing over a large open plain and leading up to and beyond a small thick forest encircled by two rows of high stone walls,

one about thirty yards inside the other. You turn from the main road between two high stone gate posts, past a gate lodge and down a steep, straight, long road lined with high trees, coming upon an open space across which is the chateau.

It was the guiding arm of the war machine that afforded me the rare pleasure of a visit to this unusual spot, the existence of which I might otherwise never have known. Not knowing whither I was going it came as a more than pleasant surprise, and the contrast of this little oasis with what had preceded and was to follow was striking. It was as part of a contingent of about fifteen men of the Camouflage



The plan and general layout

Section attached for the time to the Second Engineers of the Second Division, in the month of May, 1918. Having been withdrawn from the Verdun front, where we had been stationed with the artillery, we had reached this place after a terrific two day hike up from Paris to be billeted for a week—one week of blissful detachment from



The round tower

everything warlike, and to be abruptly followed by days more hectic than before, commencing with the fighting behind Chateau Thierry and lasting till the signing of the armistice.

The Second Division was being held in this district in reserve, pending certain movements on the front, it having been the first intention of G. H. Q. that it join the English in a Northern sector, but as the Germans' push on toward Meaux had become menacing it was hurried back again past Paris and up beyond Meaux to stem the tide, and to operate for the first time as a divisional unit instead of being mixed in with other French or English units, as had previously been the case.

The owner of Chateau d'Alincourt, spelled also

H'Alincourt and Aincourt, was Mademoiselle Beranger, a woman slightly beyond middle age. She was a beautiful character of the old school, kindly, hospitable, and possessing a rare graciousness of manner. The few servants about, who seemed to be a very part of the place, as quaint as the rest of the picture which they helped to complete, worshipped their mistress and told tales of her charities throughout the neighborhood, and how beloved she was by the peasants, who regarded her almost as one sent from Heaven. She had inherited the chateau from her grandfather who had been one of Napoleon's chief engineers.

Upon hearing that a few of us were architects, she became quite interested in our enthusiasm and gave us the privilege of going through the whole house, vacating her own living room while we sketched her fireplace of late Gothic design.

This drawing along with the others shown here are made over from sketches made at the time on the spot. This occasion afforded us an unusual opportunity for sketching, though we were not too well prepared to make the best of it. I had merely a



A picturesque view as seen through the stable arch



IT IS INTERESTING TO NOTE THE EFFECT OF GAIETY PROVIDED BY THE USE OF RED BRICK IN STRIPES AND CHECKERBOARD PATTERNS



IN THE SMALLER CHATEAU THE BOLD CORNER TOWERS HAVE SHRUNK TO SMALL CORBELLED TURRETS
CHATEAU D'ALINCOURT PRES MAGNY-EN-VEXIN

small soldier's diary which I carried in my pocket for that purpose. I have always felt that the architect should cultivate the hobby of sketching from nature and take advantage of any opportunity which presents itself to do so. Besides giving him great pleasure and stimulating the imagination, it gains for him a certain freedom and flexibility which ought to be a part of the general equipment, but which are qualities not easily acquired in other branches of his training. It impresses the subject of his drawing upon his memory as nothing else will. It trains the hand to work in co-ordination with the eye, and develops in him a perspective sense which feels instinctively the solidity and depth of masses, and the movement of form.

The plan showing the



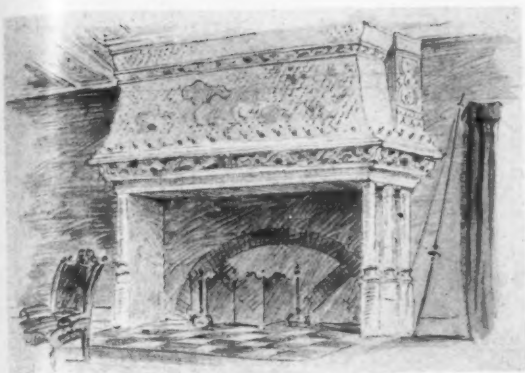
The eight cornered tower seems to have been added at a later period

general layout has been made from memory and allowance must be made for any inaccuracies. It is, however, sufficiently correct to give a general idea of the arrangement of buildings on the plot.

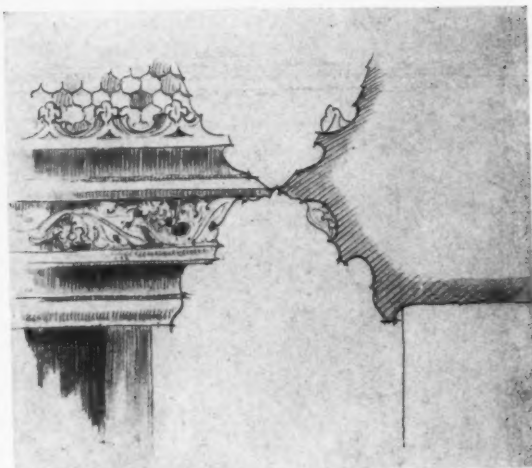
Chateau d'Alincourt is the accumulation of several centuries of growth, and one can trace the different periods of architecture in proceeding from one part to another, different wings having been added from time to time. It is of medieval origin, dating from the twelfth century. Where the dotted line occurs on the plan one can see indications of a one-time moat having surrounded the chateau grounds. Signs of an old road curving off to the left of the main approach and other indications lead one to believe that at one time the building with the



This early part of the Chateau may have been a drawbridge entrance to the Chateau



THE GOTHIC FIREPLACE



DETAIL OF FIREPLACE



THE EIGHT CORNERED TOWER



DETAIL OF DOORWAY

LEAVES FROM THE SKETCHBOOK OF MOTIVES OF CHATEAU D'ALINCOURT
BY GREVILLE RICKARD, ARCHITECT

square towers marked "J," may have been a draw-bridge entrance and that the mysterious round tower, to which we never gained access, may have been a watch tower.

Of the main chateau the wing marked "B" was built first, the detail and the character of the

were designed with some consideration of defense, and the small reproduce many of the features of the large. In the small ones the bold corner towers have shrunk to small corbelled turrets. As time went on and people had the protection of the state many of these defensive features still persisted. The Gothic machicolations emerged into the shell cornice of the Renaissance and finally into the classic modillion of the time of the Henri's. The round tower, having become impotent, often had square rooms inside, and as late as the Henri's are to be seen loopholes for musketry and casements for guns guarding the entrance. This is, however, in advance of the period of our chateau.

The eight sided tower marked "E," though without any particular indication of period, seems to have been added at a later period.

The wing marked "F," in the same style as "C," but later reinforced with some Francis I pilasters, presents a particularly romantic and picturesque effect when viewed through the stable arch.

The front of the stable marked "G" has a Renaissance facade of rusticated stone of the time of the Louis'. I have only a drawing of the rear which is, however, very attractive. An arched driveway divides the first floor into two parts.

The interior of the chapel "H" has been done over in recent years in Gothic. This was the Mademoiselle's pride. She was very devout and spent a great deal of her time in this chapel.



mouldings being of earlier Gothic than that of the wing marked "C," which is of the late Gothic period preceding Louis XII, there having been as yet no introduction of Renaissance detail. It is interesting to note the effect of gaiety produced by the use of red brick in stripes and in checkerboard pattern to contrast with the light color of the Caen stone. Brick was first used in France as a building material in the Southern provinces where alluvial soil is common, but later found its way into the North and in time came to be used in a more decorative fashion as shown here and in other buildings of the time in a variety of diaper patterns arranged in the brick itself by the use of headers of a different color from the rest of the brick.

Chateaux of this type are of the same general family as the larger ones in that originally both



Another view of the Gate Lodge

The interiors of the chateau were generally pretty well depleted of furniture. The wing marked "C" was the only part completely furnished. The bed chamber upstairs and the living room below were very attractive. I regret not having had the time to draw the ceiling of this living room. It is of Francis I period, beautifully designed with wooden beams and wood inlay of various colors which had by the hand of time been faded and mellowed into a soft beautiful tone. Time had accomplished the same end with the fireplace of Gothic design which I have sketched. The tiles of fish scale pattern, many of which have fallen away, are in all different colors, yellows, pinks, light blues, whites, etc., but all melting together into a harmonious whole. The fireplace was huge in scale, being big enough to hold five or six men standing erect.

To the back and sides of the chateau were roads leading to many interesting walks through the woods. The field to the left of the approach toward the chateau extended some distance and was used at the time of our visit as grazing ground for the horses and mules and upon one occasion for a field meet to celebrate May 30.

The two large pools of water off to the right, "N," served excellently for swimming, washing clothes, and watering horses. The hole in the ground marked "M" may once have been a dungeon, but had the appearance of having been used

more recently as a bakery. The farm buildings marked "L" surrounded a small court.

Although much of the charm of these old chateaux and farmhouses has been produced by the mellowing hand of time there is much in their design that can inspire the modern home builder. If he or she can be persuaded to indulge the extravagance of a high pitched roof and perhaps an occasional tower, there is generally a straightforward honesty of design, and simplicity of construction, free from affectation, and attained without seeming effort, that can be made to be easily adaptable to the modern house.

Before leaving Chateau d'Alincourt I must recall one evening which stands out in memory as a beautiful picture. Toward sundown of the one Sunday spent here the Chaplain had decided to hold a service in the open. The small organ was moved out of the chapel onto the grass into the space marked "K," also the chairs and benches. Those who attended, including Mademoiselle Beranger, sat in a circle hemmed in by the small buildings on two sides. The day was beautiful and clear and as the rays of the setting sun came through the tall trees that held us in, and we sang some hymns to the accompaniment of the small organ, the whole presented a peaceful picture that one could scarcely have associated with what was to be our environment within another week.



The PRISON DORMITORY SYSTEM at the DISTRICT of COLUMBIA REFORMATORY, LORTON, VIRGINIA

PART II

BY HASTINGS H. HART, LL. D., President of the American Prison Congress of 1922

ALL of the buildings, except two, thus far erected are without any excavation except for foundation walls and necessary sewage. The ground lies so as to afford perfect drainage.

The buildings were planned by the District Architect, Mr. Snowden Ashford, in co-operation with the Engineer Commissioner of the District of Columbia.

Construction is being carried on entirely by prison labor, under supervision of the Engineer Commissioner's office.

At the time of inspection five citizen foremen were employed, two bricklayers, a cement expert, a carpenter, and a steamfitter. Prisoners who had learned the work on the job were doing excellent bricklaying.

The warden and his foremen were endeavoring, with a good deal of success, to stimulate pride in the work on the part of prisoners, leading them to feel that they were constructing buildings for their own use, and that they ought to do just as good a job as could be done by free labor.

Through the courtesy of Captain J. E. Wood, Assistant to the Engineer Commissioner of the District of Columbia, I have received the following detailed information and estimates:

DORMITORY

BLOCK SIZE:—Rest room—33.5' x 23.5' x 18.75' high

Sleeping quarters—150.08' x 21.5' x 18.75' high

Arcade in front—18.50' x 8.5' x 18.50' high
Entire volume of building—78,170 cu. ft.

CONSTRUCTION, ETC.: This is a one story brick building constructed with 13" walls on concrete footings. It has a slate roof on T & G pine sheathing. Roof supported by wood trusses and purlins. The dormitories have a corrugated steel ceiling with an air space between the ceiling and the roof. The windows have all wood sash, double hung in rest room and single, hinged at bottom in sleeping quarters and toilet room. These windows swing inward and are not barred. The toilet room in front of sleeping quarters is equipped with lavatories, 2 urinals, 3 water closets and one slop sink. The floor is concrete on 4" tile (hollow). This building is designed for a capacity of 50 prisoners.

The first building of this type is not quite

complete but the cost to date with estimated cost of completing is shown below.

ESTIMATED COST

Standard Dormitory for 50 Men
(Cubical Contents 78,170 cu. ft.)

	Estimated Cost	
	Total	Per cu. ft.
123,500 bricks at \$18 per M	\$2,223	2.8c.
Cost of material and free labor to May 25, 1923	4,890	6.3
Estimated additional cost of same	3,000	3.8
Total for material and free labor (45%)	\$10,113	12.9c.
Estimated value of prisoners' labor (55%)	12,375	15.8
Grand total, including prisoners' labor	\$22,488	28.7c.
Estimated cost if built by free labor on contract	\$23,450	30.0c.

DISCIPLINARY CELL HOUSE

BLOCK SIZE:—122.00' x 42.00' x 22.17' high
Entire volume of building—113,600 cu. ft.

CONSTRUCTION, ETC.: This is a one story brick building with 18" walls, with slate roof on T & G sheathing. Roof trusses are of wood of scissors type. Metal ceiling plastered on top with cinder concrete for fireproofing and painted on under side.

Windows of single sash hinged at the bottom, swinging inward. Windows barred with iron gratings arranged to have bars opposite sash muntins so that bars are not noticeable.

Concrete floor on 4" hollow tile.

There is a line of 10 cells on each side of a utility corridor. In this corridor are placed all the piping and plumbing fixtures necessary for a water closet and lavatory in each cell. A metal door with lock at each end of this corridor prevents prisoners from injuring plumbing.

The cells are so arranged as to have an aisle completely around the cells next to the outside walls. Each cell is 10' x 10' x 9' high with 9" brick walls, sides and back and a reinforced con-

crete top over entire block of cells. The fronts of these cells are made of toolproof bar steel with sliding doors that are operated by a lever at the end of each line of cells. Any one or any number of cells on one side may be opened or closed at one time. The operating mechanism is all encased in a steel housing. The door on operating lever box may be locked with a key. This box is located near the main door to building at end of line of cells. A separate locking device is provided for each line of cells.

This building is provided with one doorway with double doors, a wooden door inside and a metal door set flush with outer face of brickwork.

Shower baths are provided for prisoners and lavatory and water closet for guards in rear of building.

ESTIMATED COST

Disciplinary Cell House for 72 Men (Cubical Contents 130,600 cu. ft.)

	Estimated Cost Total	Per cu. ft.
175,000 bricks at \$18 per M.	\$3,150	2.4c.
Cost of material and free labor to May 25, 1923	17,050	13.6
Estimated additional cost of same	700	
Estimated cost of steel cells complete	24,000	18.4
	\$44,900	34.4c.
Estimated value of prisoners' labor	25,520	19.5
Grand Total (including prisoners' labor)	\$70,400	53.9c.
Estimated cost if built by free labor under contract	\$63,180	48.4c.

SHOP BUILDING

BLOCK SIZE:—102.17' x 42.17' x 35.00' high
Entire volume of building,—150,800 cu. ft.

CONSTRUCTION, ETC.:—This building is one story brick with basement, 18" walls, slate roof on T & G sheathing supported by wood trusses. There are two double doors in front on first floor and two double doors in rear on basement floor level. As these buildings are located on a hillside sloping from front to rear, the basement doors open on the lower grade. Double hung mullion windows are used in these buildings with 12 light wood sash; concrete floor in basement and flat slab reinforced concrete main floor supported on four columns on center line; concrete floor of mushroom type designed in accordance with the Turner System.

ESTIMATED COST

Shop Building with Basement Garage (Cubical Contents 150,800 cu. ft.)

	Estimated Cost Total	Per cu. ft.
170,000 bricks at \$18 per M.	\$3,060	2.0c.
Cost of material and free labor to May 24, 1923	8,370	6.3
Estimated additional cost of same	1,200	
Total for material and free labor (45%)	\$12,630	8.3c.
Estimated value of prisoners' labor (55%)	15,440	10.2
Grand total, including prison labor	\$28,070	18.5c.
Estimated cost if built by free labor on contract	45,240	30.6c.

It was impossible to obtain an accurate account of the cost of these buildings because the work is being done almost entirely by the labor of the prisoners and no time book record has been kept of their time. The engineer, however, estimates that in the construction of buildings of this type the labor constitutes 55 per cent of the value of the building.

The architect made an independent estimate that the cost of such buildings, if built by contract, would be approximately 30 cents per cubic foot. This estimate applies to the standard dormitories, but does not apply to the two disciplinary cell houses, because the steel work in these cell houses is made under separate contract by free labor.

The two disciplinary cell houses are the only buildings which are provided with cells. Their cost is estimated at 53.9 cents per cubic foot. Of this, 18.4 cents is for the steel cells, leaving 35.5 cents per cubic foot as the cost of the remainder of the building.

From the data furnished I estimate the cost of the dormitory quarters for 864 men as follows:

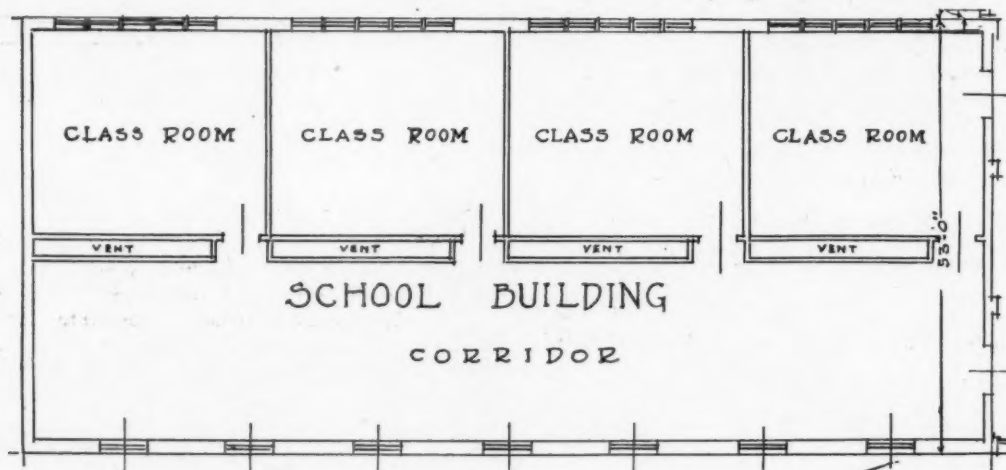
	Number of beds	Total Cost	Cost per Prisoner
12 Standard Dormitories	600	\$270,000	\$450
2 Disciplinary Dormitories	120	45,000	375
2 Disciplinary Cell Houses	144	141,000	980
Totals	864	\$456,000	\$527

The difference between this cost and that of the old style of prisons with a separate cell and complete plumbing for every man is indicated by the fact that the cost of the cell house for 500 men now building at Rockview, Pennsylvania, is estimated at \$1,882,000, or \$3,760 per prisoner, as against \$527 at Lorton.

It is true that the cell house at Rockview will be vastly superior in its construction and equipment to the dormitories at Lorton; but the latter are just as much superior to the quarters occupied by prisoners at the Indiana State Farm, the District of Columbia Workhouse and many other dormitory prisons. In my judgment, they are very much to be preferred to such cellular prisons as Sing Sing and Auburn, New York, or the old

two prisoners. I said: "I thought that these cells were designed for one man each." "Yes," said the deputy warden, "this arrangement is only temporary." "How soon," I asked, "do you expect to be able to stop doubling up and give a cell to every man?" "Oh, it will probably be three or four years," was the reply.

When cells of suitable size are built the temptation to double up is almost irresistible when the

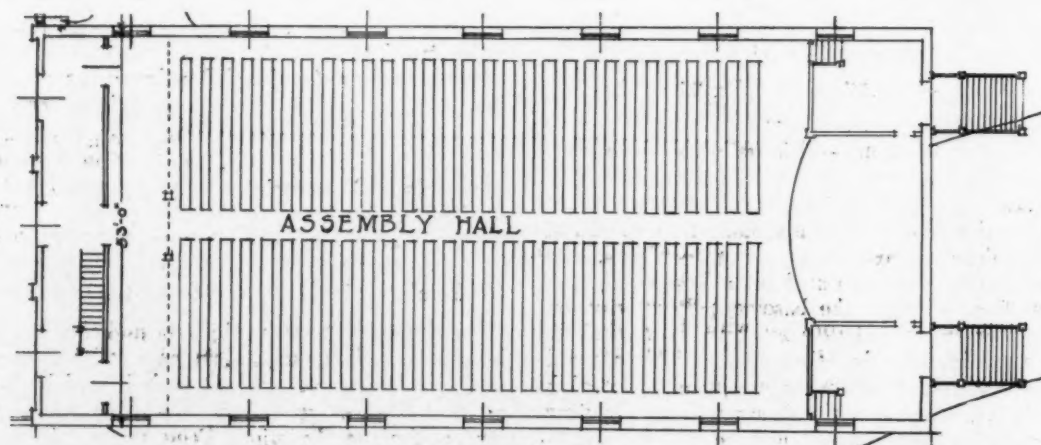


cell houses at Jackson, Michigan, and they are infinitely to be preferred to any cellular prison in which prisoners are kept two in a cell.

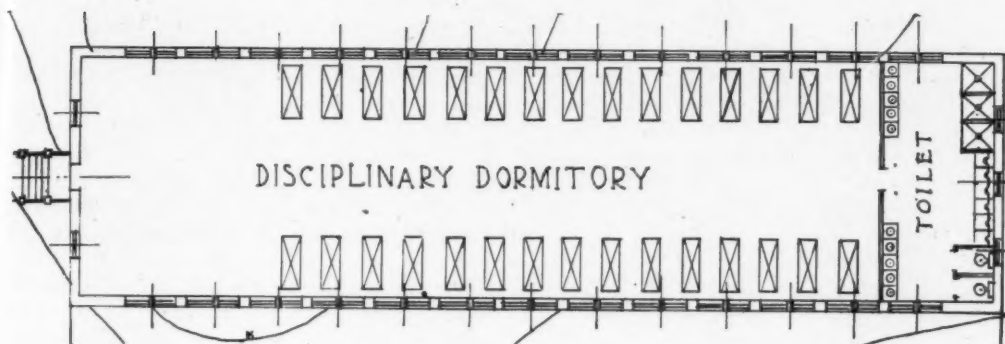
A few of the new prisons have large airy and well ventilated cells. For example, the new cell houses in the Illinois Penitentiary at Joliet are 7 x 10 feet; those at Montgomery, Alabama, are 6½ x 8 feet; those at Rockview are 7 x 9 feet; but when I visited the Joliet Prison in 1922, I found to my astonishment that each cell contained

number of prisoners increases faster than the advance of construction.

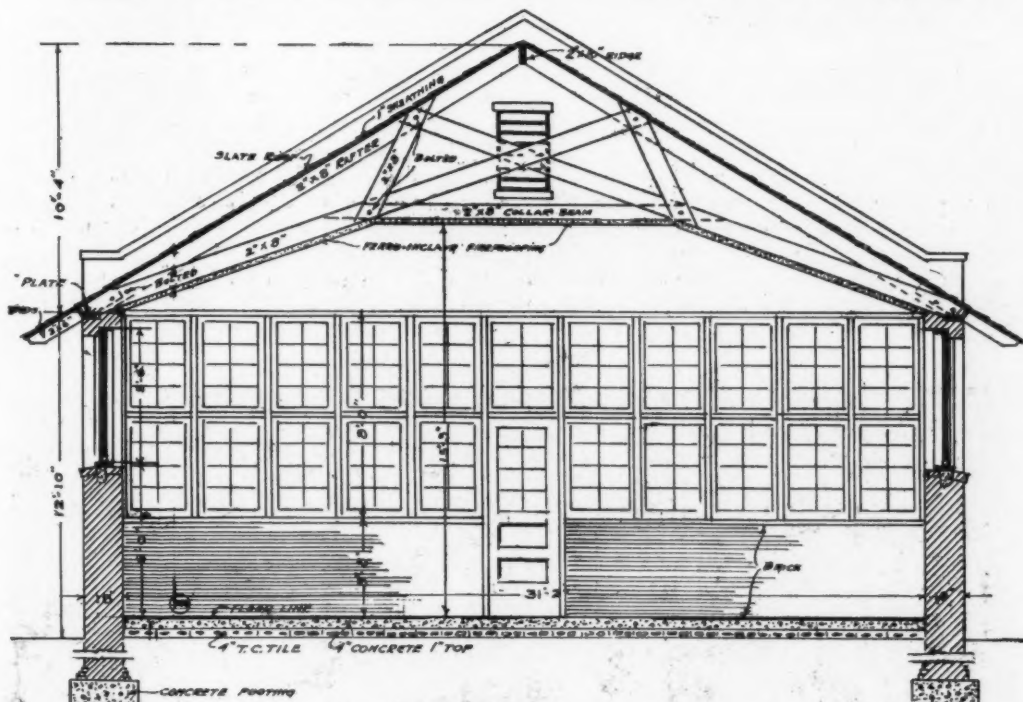
There has come a sharp reaction against the extravagance of building prisons at a cost of \$4,000 to \$5,000 per bed. Legislatures will not appropriate money for such construction fast enough to keep up with the normal increase of the prison population. The Legislature of Ohio, five or six years ago, approved plans for a new penitentiary for 3,000 men, to cost, approximately, \$5,000 per



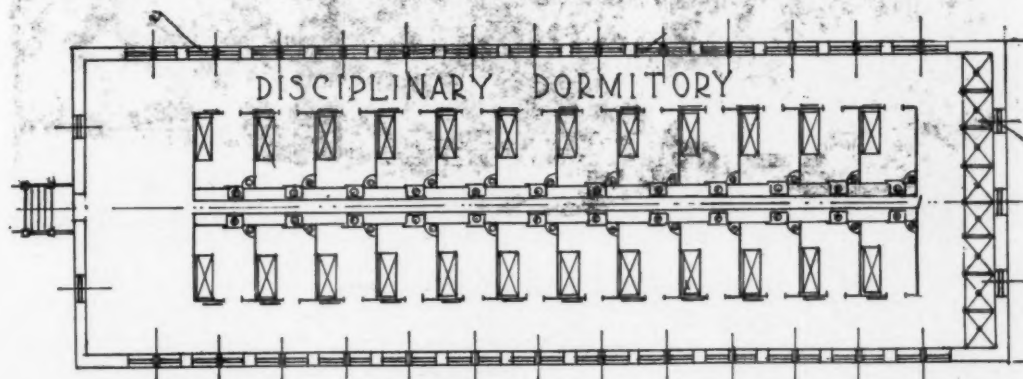
Assembly Hall for Six Hundred Men



Dormitory with baths and toilets for 60 men. Windows 4 x 5 feet, steel sash with glass 6 x 9



Cross section showing roof and floor construction, also partition between dormitory and lavatory



Cellular Disciplinary Dormitory. Twenty-four cells for seventy-two men. Each cell (for three men) 9 x 9 feet

cell, but construction has not yet begun. Illinois began her new penitentiary about five years ago, but some 500 men are still sleeping in temporary dormitories. The Legislature of Pennsylvania in 1911 authorized the building of a new penitentiary which will cost more than \$5,000 per cell. The prisoners are increasing at the rate of 140 per year, but the Legislature is appropriating money enough to build for only 40 per year. In the meantime, 1300 prisoners are doubled up, two men in a cell, in the two penitentiaries and 500 men at the new prison are sleeping in unsuitable temporary dormitories.

Every intelligent prison man prefers the dormitory system to putting two men in a cell, and the dormitory plan is steadily increasing under the pressure of the overcrowding which exists in many prisons, and it is generally agreed by those who are using the dormitory system for long term prisoners that it works much better than they had anticipated.

Whether it is desirable or not, the dormitory system prevails and will prevail in nearly all of the Southern prisons and in many of the Northern prisons. It is up to the prison wardens and prison managers to decide the standards of the dormitory system in the light of the experience of recent years; what class of prisoners is eligible to dormi-

tory treatment, and what should be the dormitory units which now range from three men in a dormitory to 300. They must devise means of creating such a morale among the prisoners as shall make dormitory life practicable.

In my judgment the District of Columbia presents the best example yet given of the adaptation of the dormitory plan to long term prisoners. It must be acknowledged that the dormitory prisons thus far built lack the dignity and impressiveness for which we are accustomed to look in public buildings. It is up to the prison architects, starting from such examples of permanent dormitory construction as the Cleveland City Workhouse, the Ontario Prison at Guelph, the Alabama prison at Speigner and the Alabama Farm Camp No. Four, and the Reformatory at Lorton, to find ways to overcome this difficulty without sacrificing the economy, simplicity and freedom from fire risk which are incidental to the dormitory plan.

I anticipate that the solution of this difficulty will come in the architectural treatment of the administration building and the cell building for a minor fraction of the prisoners which will probably be found eventually in connection with all dormitory prisons. An example of the possibility of uniting dignity with simplicity is found in the Ontario Prison at Guelph.



Fragment of North Window, United States Military Chapel, West Point, N. Y.

Designed and executed by A. L. Willet



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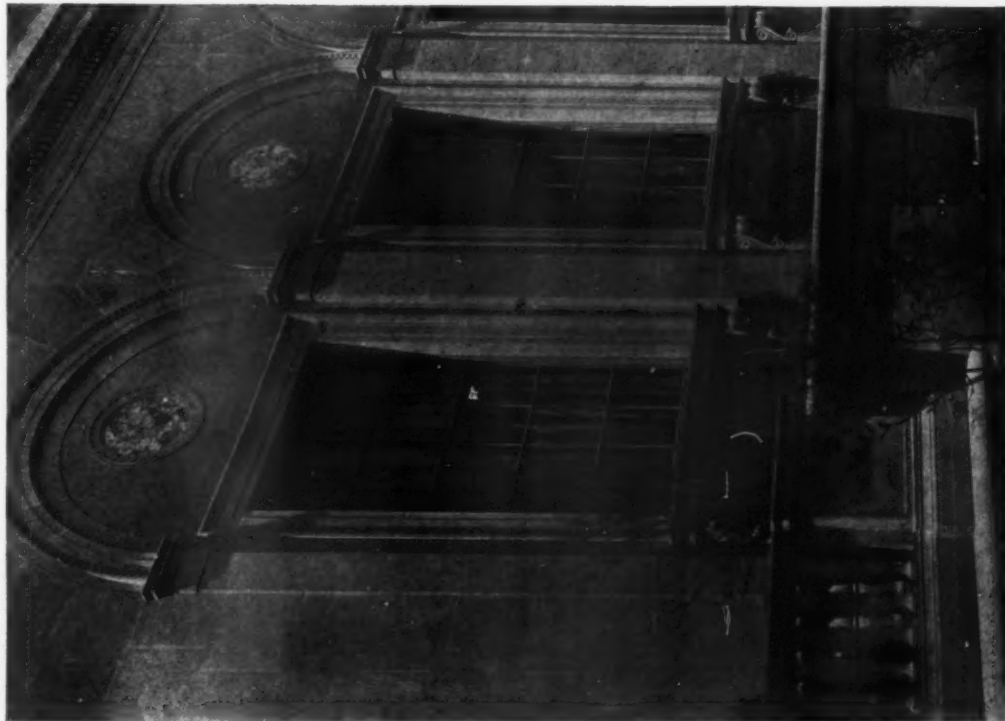


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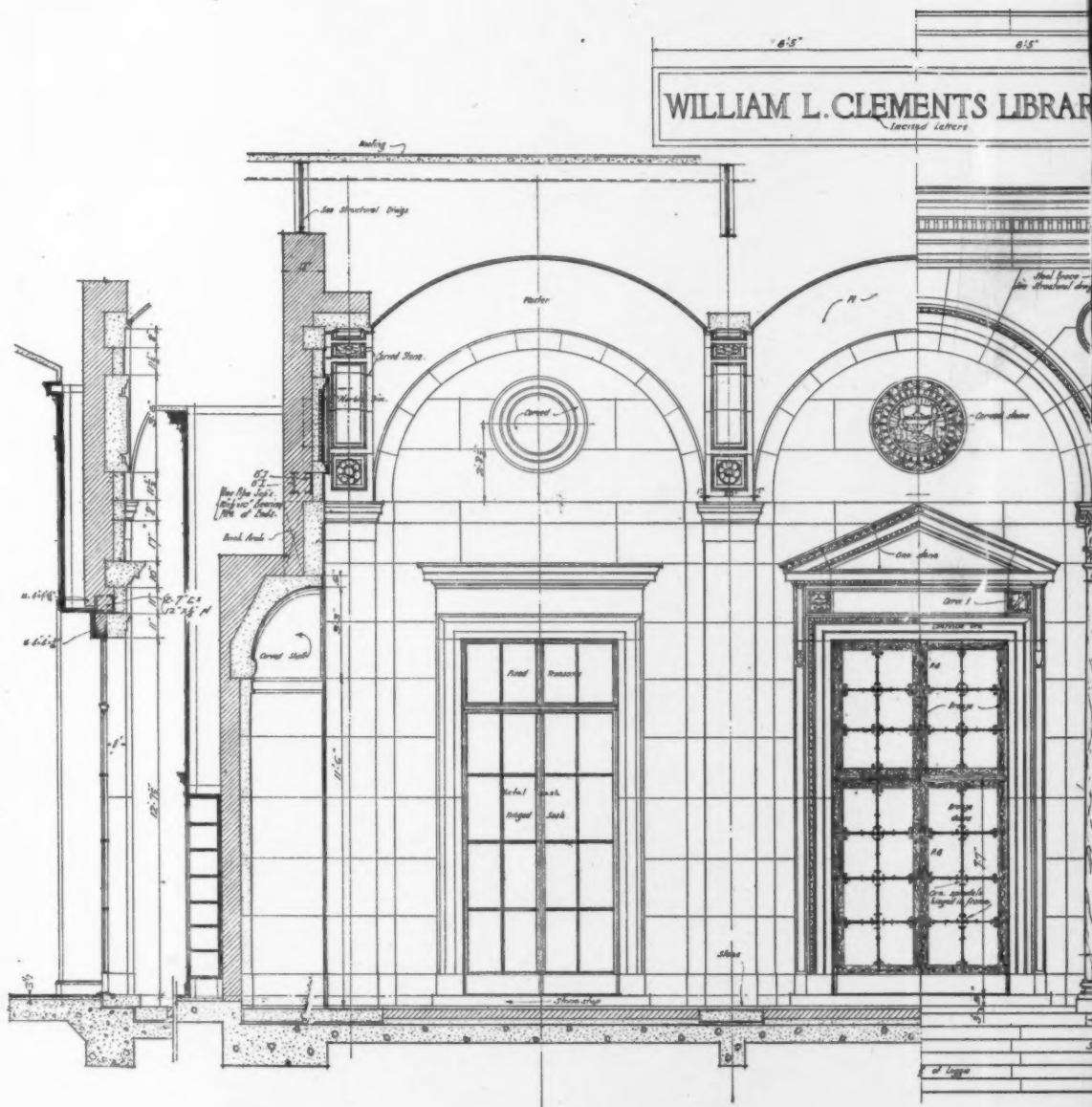
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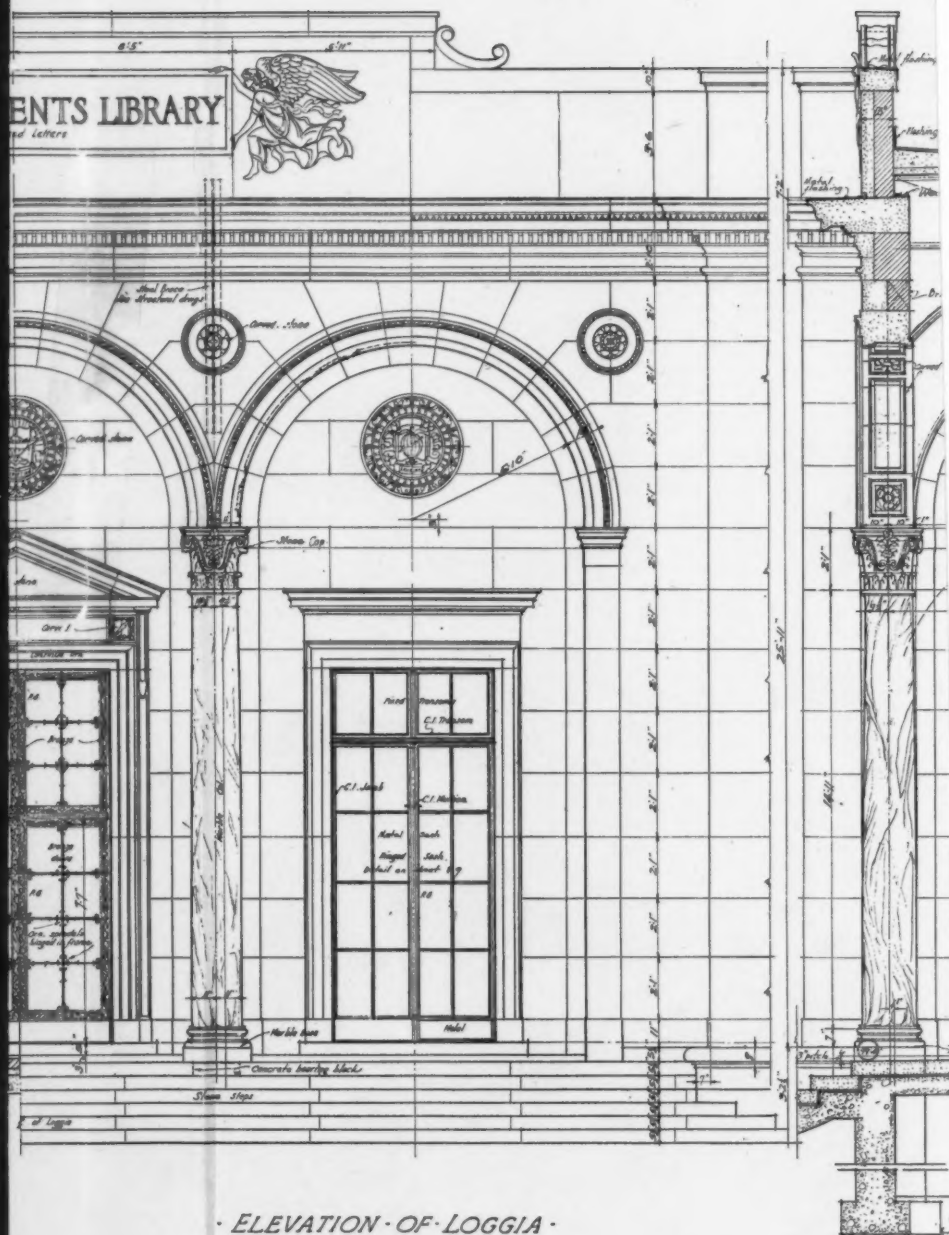
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SECTION THRU WINDOW
AT EACH SIDE OF ENTRANCE

SECTION ON LINE A-A

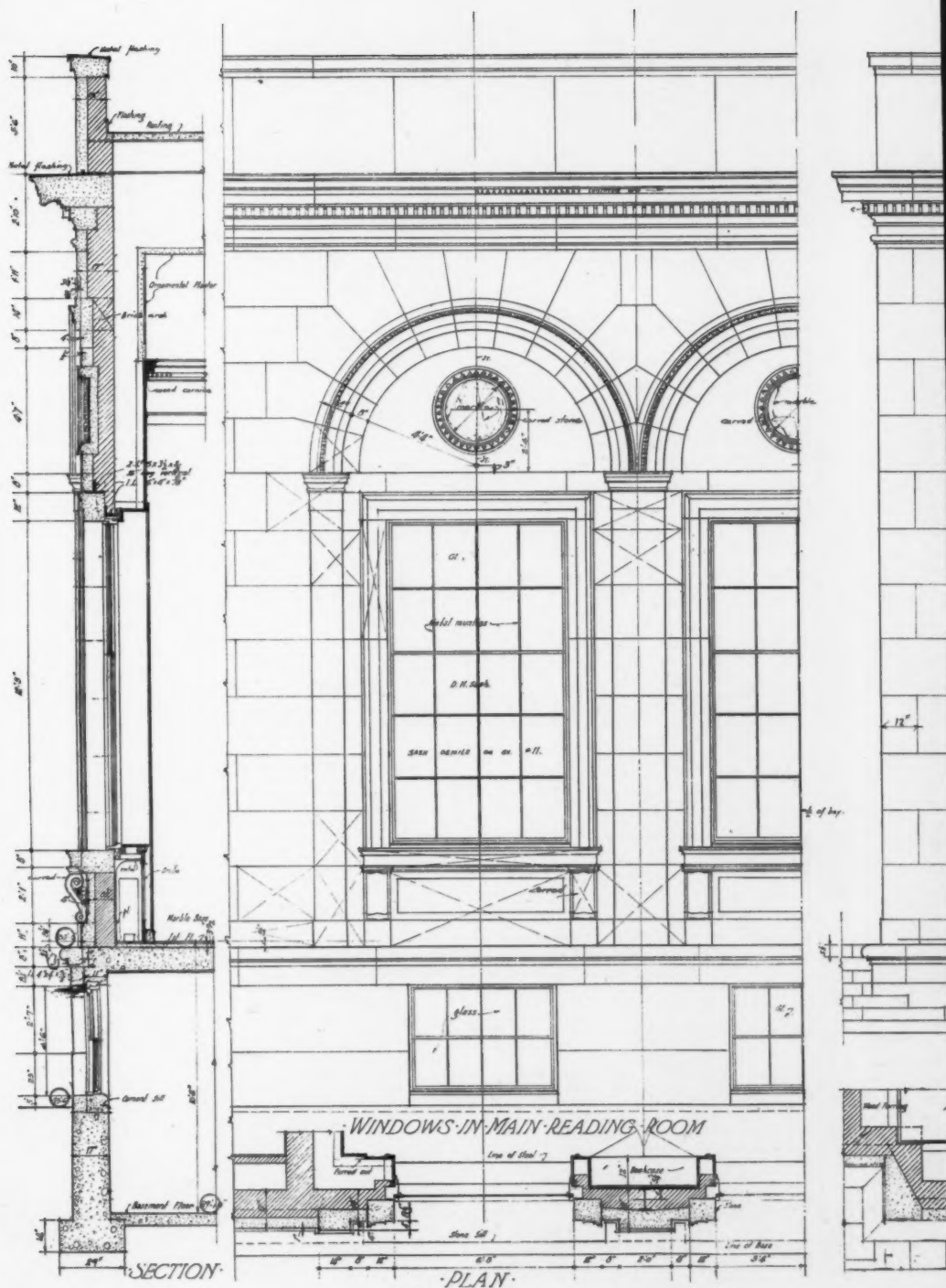
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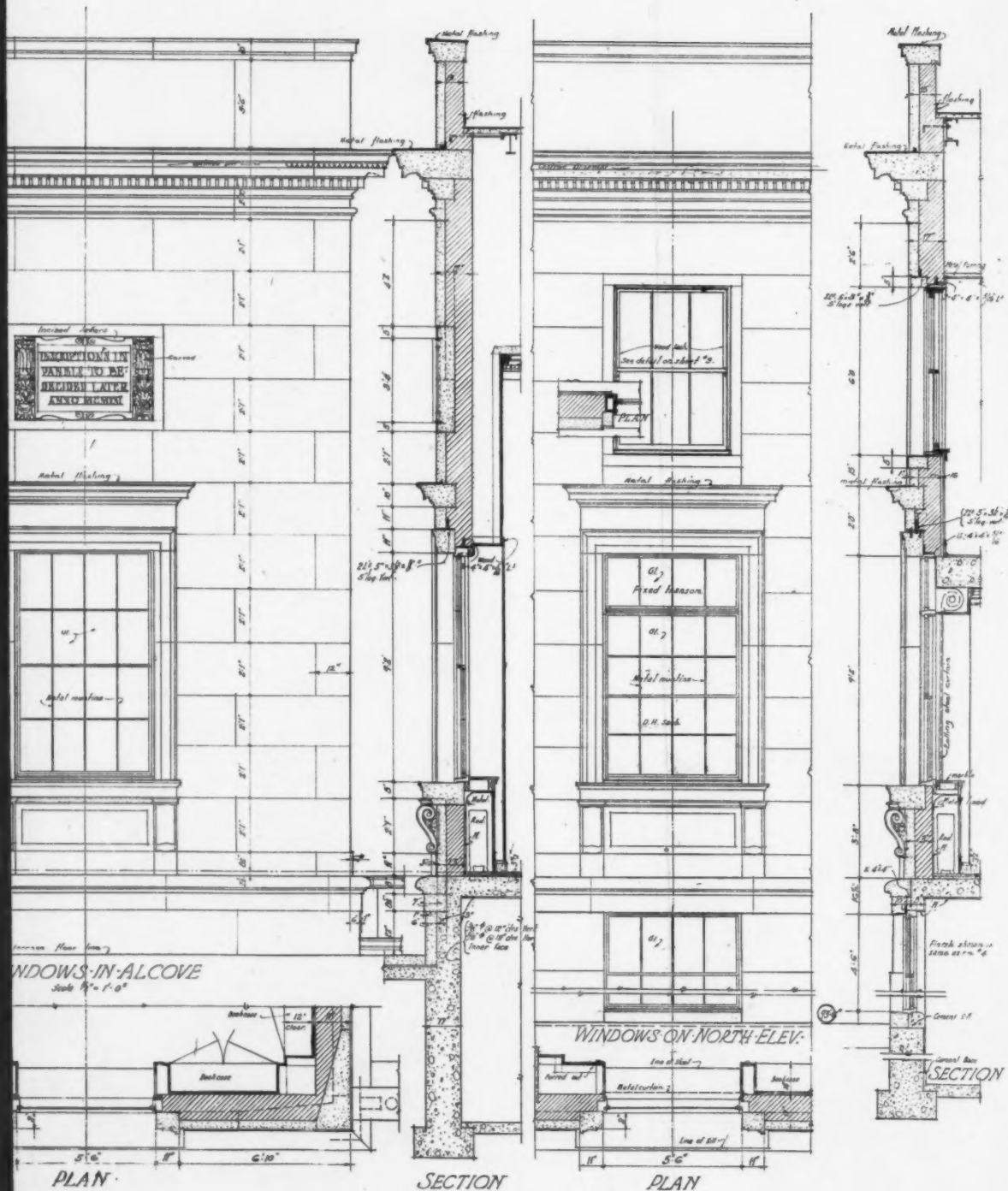
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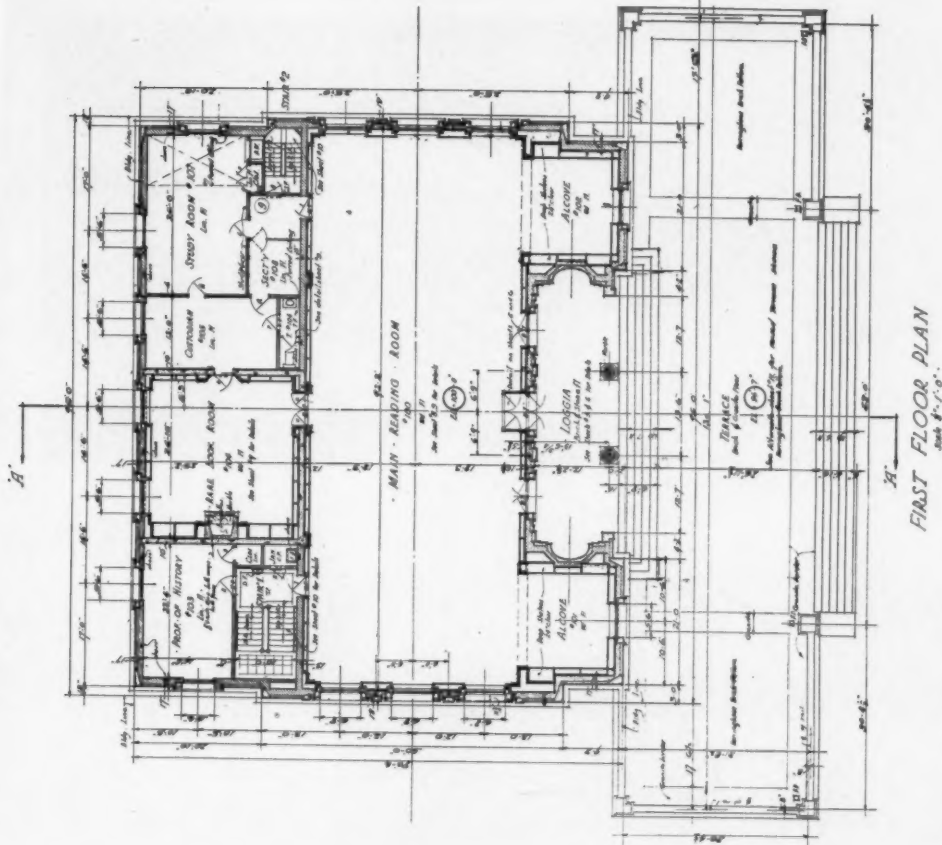




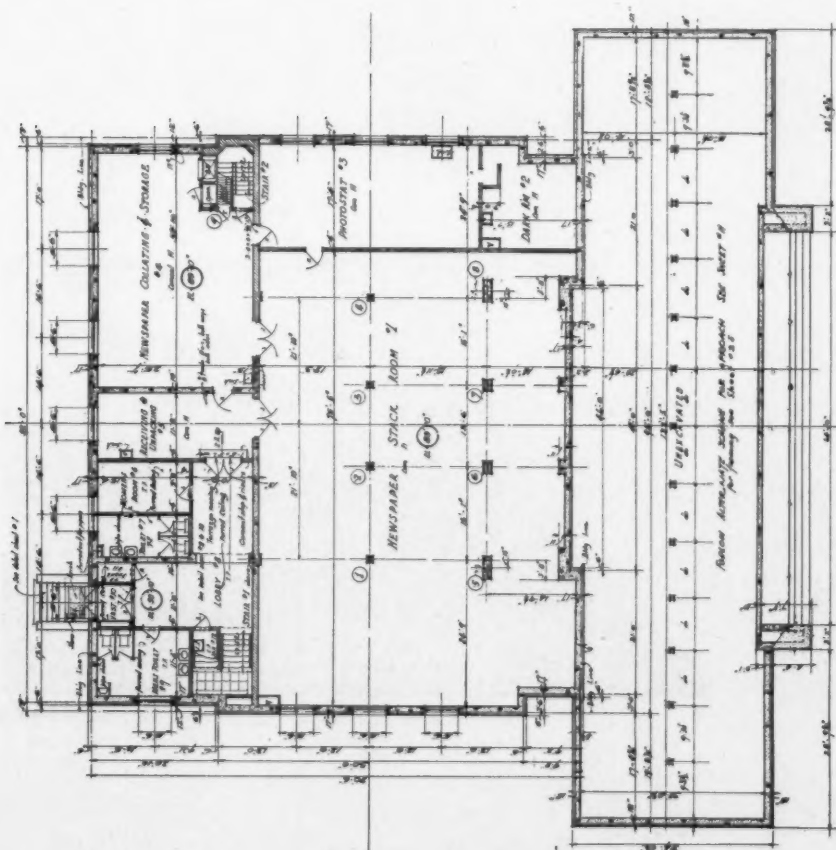
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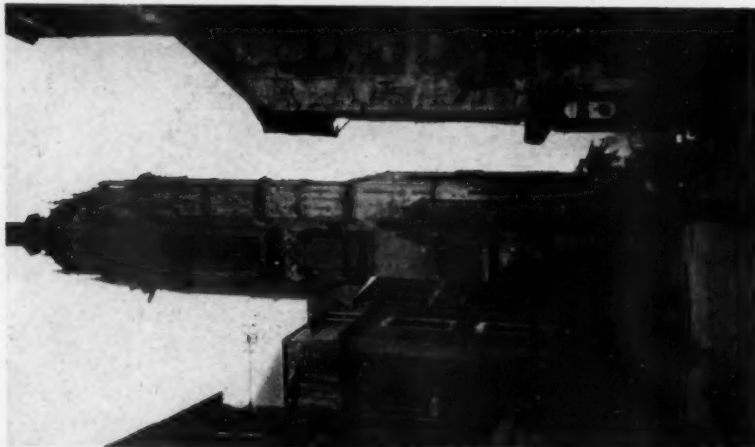
FIRST FLOOR PLAN
Scale 1/8" = 1'-0"



BASEMENT PLAN
Scale 1/8" = 1'-0"

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CHURCH OF ST. PIERRE, COUTANCES



ENTRANCE DETAIL
CHATEAU LASSON, NEAR CAEN

(Reproduced from photographs by Robert M. Blackall)



OLD HOUSE AT JOSSELYN

DEPARTMENT of ARCHITECTURAL DECORATION and FURNITURE

THE intelligent application of wrought metal work in architecture in this country has been recognized for some years past, but its widespread use was brought home forcibly to the writer several weeks ago, when, upon visiting an atelier in Philadelphia, he found that commissions alone are sufficient to keep one hundred and sixty men, including draftsmen, busy. In this curious, bustling and strangely moving shop in West Philadelphia echoes of architectural activity in many quarters of the country were in evidence. Enormous prison-like iron grilles with bars nearly three inches in diameter, for York & Sawyer's monumental Federal Reserve Bank now building in New York; lace-like bank screens for structures by Walker & Gillette, McKim, Mead & White and others; a Spanish rail for a Florida house; a charming and suave stair balustrade and two distinctive bird grilles for a residence by H. T. Lindeberg, and dozens of smaller orders in various stages of progress, were to be seen. The reception room and museum of the craftsman's place are ravishing to the eye. What an utterly undistinguished place old Philadelphia would be without a shop like Yellin's, Offices like Mellor, Meigs & Howe's, a score of residences in Germantown and Chestnut Hill, and several buildings like the Franklin Bank and Girard Trust!

Wrought Metal in Architectural Design, Illustrated by work from office of H. T. Lindeberg, Architect By . . . Roi L. Morin

Nor is this Philadelphia shop by any means alone in the distinction of producing objects of beauty in wrought metal. All over the country many smaller firms are busy turning out work of interest and individuality.

How far we have travelled in this field in the past quarter century! What a far

cry it is from the cast iron monstrosities of the Victorian Age, which are still so much in evidence, to the suave and facile craftsmanship of these grilles for residences herein illustrated. On Fifth Avenue there is an ugly brownstone church whose further claim to ugliness is a cast iron fence. In all the range of bad Victorian art there are few things so conspicuous for their utter depravity as this fence. When enveloped by misery and depression, it is reassuring to journey thither, to learn that another era was more vulgar than our own.

Nowadays cast iron and bronze have taken on a large measure of distinction, and wrought metal, by all odds the nobler craft, though not commonplace, is growing in popularity. This is due

to a few men whose tastes and ideals made them venturesome enough to endeavor to impose a standard of excellence never before known. It is ever stimulating to examine the finish which craftsmen like Yellin and Zimmerman apply to such an adamant and inflexible material as iron. (See Fig.

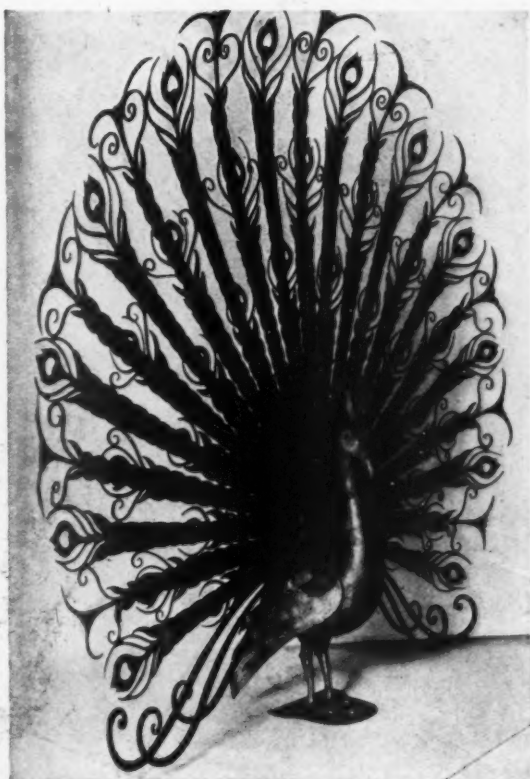


Fig. 7. Wrought Iron Peacock, House of W. S. Farish, Houston, Tex.

H. T. Lindeberg, Architect
Executed by The Iron Craftsmen

5.) The work is never sloven, never shoddy, but shows an endless patience and thorough knowledge of the material at hand. (Note the beaten surfaces and modelling in Figs. 7 and 10.)

Of a different character is the mobile and gracious modelling of Oscar Bach.



Fig. 1. Wrought Iron Grille, House of W. S. Farish, Houston, Tex.

H. T. Lindeberg, Architect

Executed by B. J. Hasselman, Renner and Maras

As all metalwork illustrated in this article was executed for residences by H. T. Lindeberg, and was designed either from scale drawings from his office, or under his personal criticism, it is not out of place to say a few words about the country houses in America designed by him. These houses may be Tudor, Normandy-French, Spanish or Georgian in feeling but they are expressive of the man in outline, plan and detail—reserved, cultured and strikingly individual. Whether working in stone (gate lodge for J. Ogden Armour, Esq.,

and residence for Mme. Galli-Curci), brick (residence for Seth Thomas, Esq.), stucco (residence for Bertrand Taylor, Jr., Esq.) or clapboards (residence for E. C. Lufkin, Esq.), H. T. Lindeberg has shown a continued and improved mastery of the texture and color of materials. He has patiently formulated a method of laying out a beautiful and yet particularly comfortable house. And the success of the method is attested to by a list of work current in his office.

To grace appropriately such work as this, it is interesting to learn with what study and care those grilles are designed, full sized, revised and examined in fabrication before being approved. Working along lines that are strangely modern in feeling, with the use of natural forms in careless and gay patterns, animal figures, satyrs and Pans (the whole gamut of the animal kingdom is run in the Carr grille, see Fig. 4), the effect achieved is one curiously appropriate to the buildings which they were meant to adorn.

Fig. 1 shows a wrought iron grille with modelled leaves and grapes finished in antique gold. This

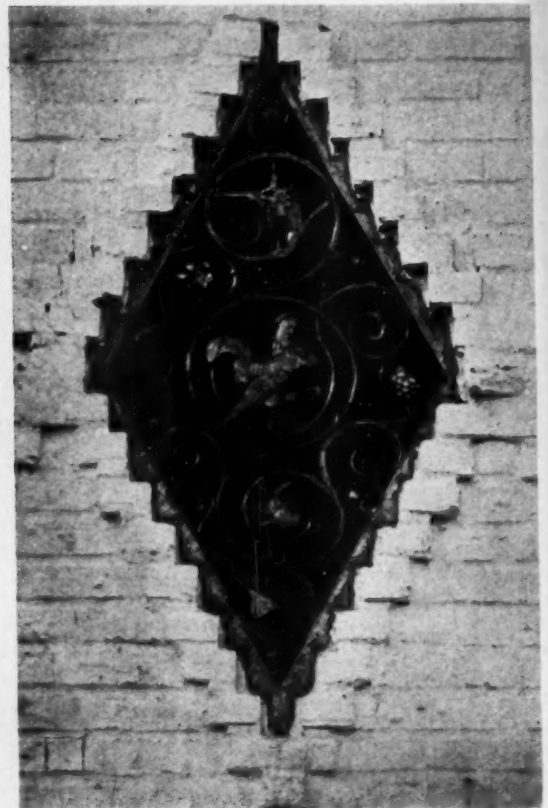


Fig. 2. Louvre Grille, House of Clyde Carr, Lake Forest, Ill.

H. T. Lindeberg, Architect

Executed by Oscar Bach



FIG. 4. MAIN ENTRANCE GRILLE IN WROUGHT BRONZE, HOUSE OF CLYDE CARR, LAKE FOREST, ILL.

H. T. LINDBERG, ARCHITECT
EXECUTED BY OSCAR BACH

delicate grille is framed by a bold, simple architrave of Kasota stone, the main entrance to a stucco house. It is designed so as to give an effect of perspective, though it is executed flat.

The fanciful creation of Bach's shown in Fig. 2 was designed to shield a louvre set in a diamond-shaped panel of brick, which is part of a continuous brick pattern running around a wing of the house. The free fancy with which Bach works is well indicated by this charming thing.

Figs. 3 and 6 are samples of another idiosyncrasy of Bach's which other craftsmen have been quick to appreciate and emulate, *i. e.*, the use of iron and bronze in conjunction with each other. In these grilles the general contours, such as the circular and volute patterns, branches, etc., are of iron, while the leaves, birds, figures, etc., are of bronze. The relief thus effected is lost in the cut, but in reality the contrasting colors are interesting.



Fig. 3. Wrought Bronze and Iron Grille, House of J. S. Pillsbury, Lake Minnetonka, Minn.

H. T. Lindeberg, Architect
Executed by Oscar Bach

The sensuous profile of the peacock door on the Vietor residence together with the lace-like pattern cast by the sun's rays on the cool tile floor is one of the most artistic features of this beautiful country house.



Fig. 5. Window Grille in Wrought Iron, House of Hugo V. Neuhaus, Houston, Tex.

H. T. Lindeberg, Architect

Executed by The Iron Craftsmen

Fig. 5 illustrates what is perhaps the best thing Zimmerman has done, the squirrel grille for the Neuhaus residence. (These grilles are fancifully called the squirrel, monkey or peacock grille to suit the animal which occupies the most prominence in the design.) For finish, leaf modelling and delicacy of execution this piece of work can hardly be excelled. It is executed entirely of iron.

The wrought iron peacock shown in Fig. 7 is executed approximately life size. It occupies a position directly over the center of an iron trellis on the garden side of the Farish residence, opposite the door grille shown in Fig. 1.

Fig. 10 shows what may be done to enhance and adorn such a simple structural necessity as a radiator enclosure. Here the repeated pattern, though one may notice that almost every motive varies, is far more appropriate. It is interesting to note how the frame has been split open at regular intervals, to admit of bands to tie in the pattern, as in old-fashioned work.

What part wrought metal work will play in the future development of architecture in this country is a matter of conjecture, but let us hope that its present growth will be continuous. If structural



FIG. 6. GRILLE DOOR IN BRONZE AND IRON, HOUSE OF FREDERICK VIETOR, RED BANK, N. J.

H. T. LINDBERG, ARCHITECT

EXECUTED BY OSCAR BACH

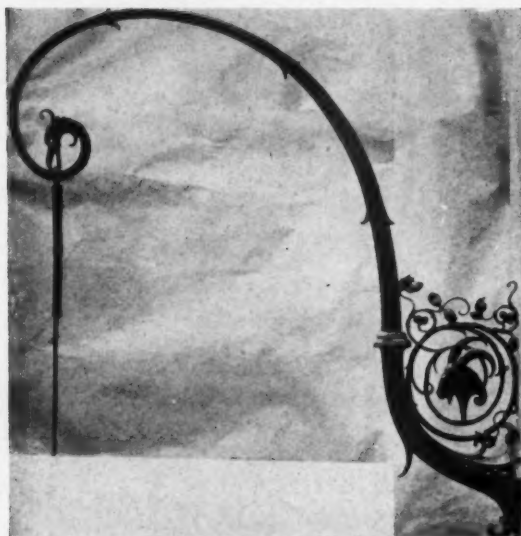


Fig. 8. Lantern Bracket, House of Clyde Carr, Lake Forest, Ill.

**H. T. Lindeberg, Architect
Executed by Oscar Bach**

steel is the prose of modern building, then surely this honest and beautiful craftsmanship is the

poetry. In this commercial day and age the hardships and ignorance of their aims with which these men have to contend must be stupendous. In America, I dare say, it must be as difficult to sell an honestly designed and executed grille as a fine piece of sculpture, or a symphony.

The commercial temptation to slur over work, or to produce tens, or hundreds of pieces of the same design must be overwhelming. Determined as we are to make men specialize, and produce like objects over and over again, we are not only content not to train young men into honest, old-fashioned crafts, but must also ruin the skilled craftsmen who immigrate here from Europe.

Where can we find these examples matched in the field of wood furniture design? Where the craftsmen so honest and painstaking not to produce two pieces alike, not to attempt "antiquing" and to expend as much care on the smallest lock or candlestick as on a monumental gateway?

Our craftsmen in iron have turned their talents to the field of wrought metal furniture; fald-stools of iron with bronze trimmings, marble-topped tables with splayed iron legs and brackets Spanish fashion, bevelled glass mirrors with bronze frames of exquisite modelling, floor lamps, cigarette boxes, ash trays, and other objects of incomparable charm and distinction.

May success attend their ventures!

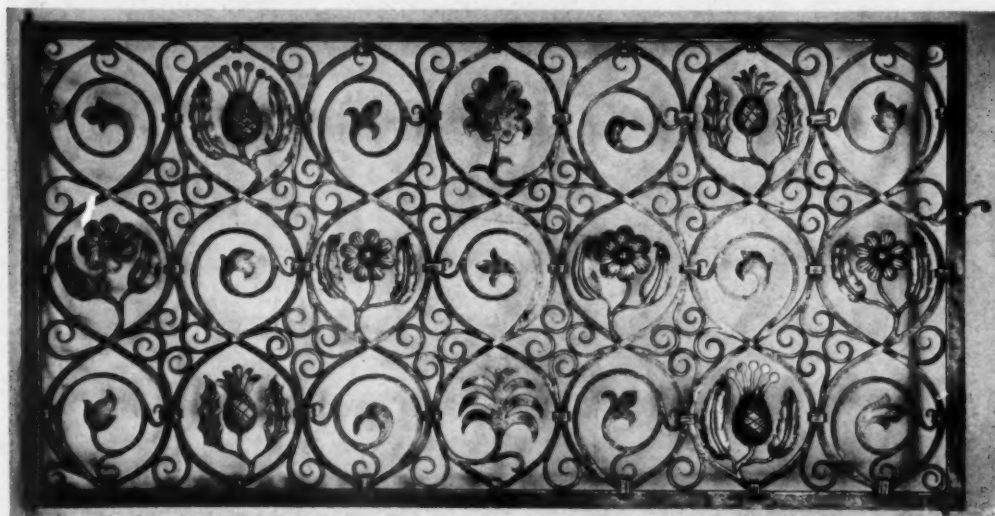


Fig. 10. Radiator Grille in Wrought Iron, House of Hugo V. Neuhaus, Houston, Tex.

**H. T. Lindeberg, Architect
Executed by The Iron Craftsmen**



HOUSE OF GEORGE F. RAND, BUFFALO, N. Y.

F. J. & W. A. KIDD, ARCHITECTS



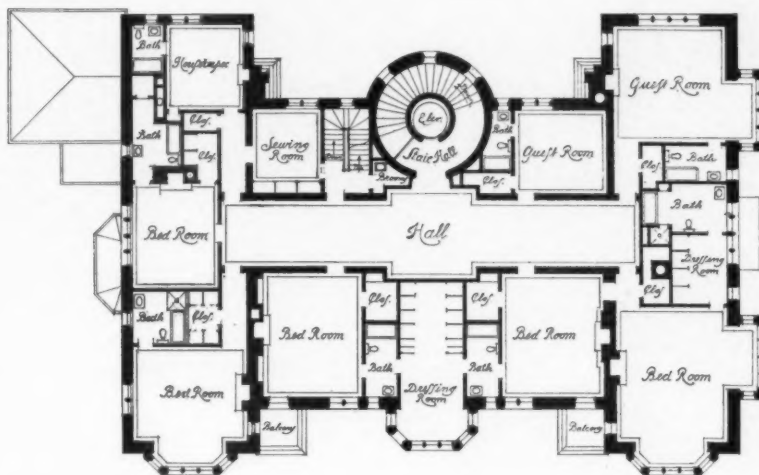
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F. J. & W. A. KIDD, ARCHITECTS

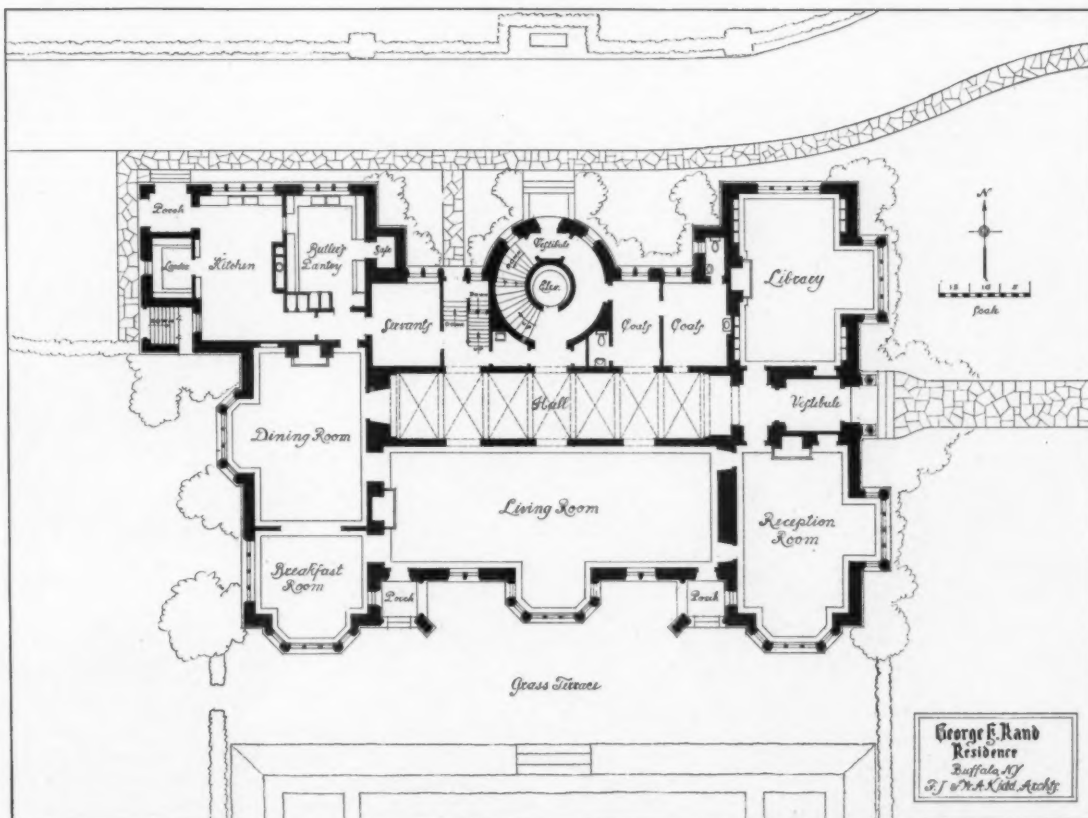


HOUSE OF GEORGE F. RAND, BUFFALO, N. Y.

F. J. & W. A. KIDD, ARCHITECTS



Second Floor Plan



HOUSE OF GEORGE F. RAND, BUFFALO, N. Y.

F. J. & W. A. KIDD, ARCHITECTS



HOUSE OF GEORGE F. RAND, BUFFALO, N. Y.

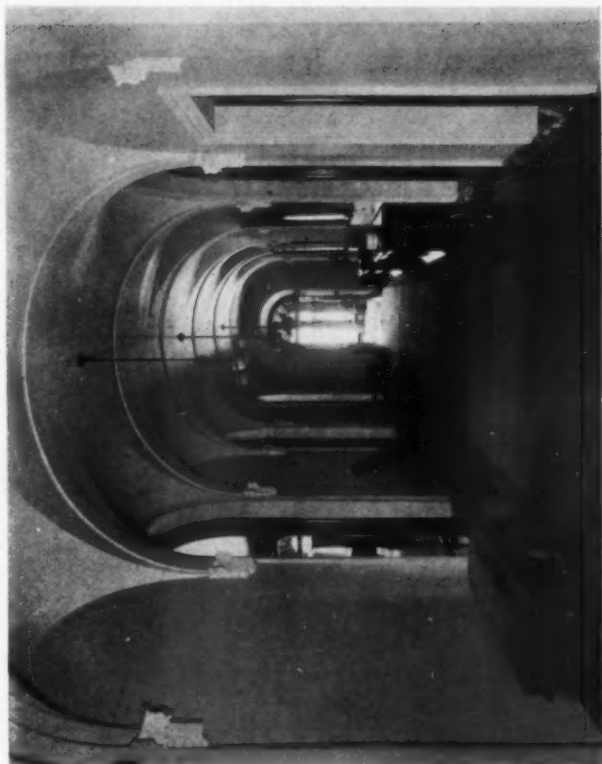
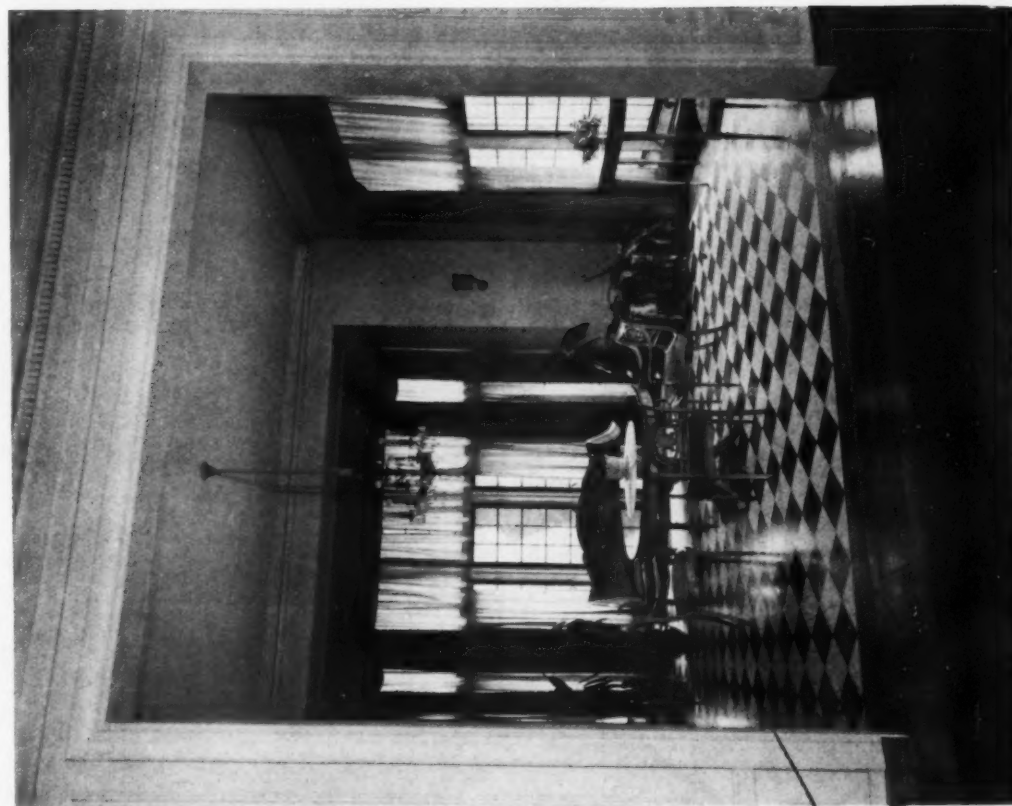
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HOUSE OF GEORGE F. RAND, BUFFALO, N. Y.

F. J. & W. A. KIDD, ARCHITECTS

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HOUSE OF GEORGE F. RAND,
BUFFALO, N. Y.

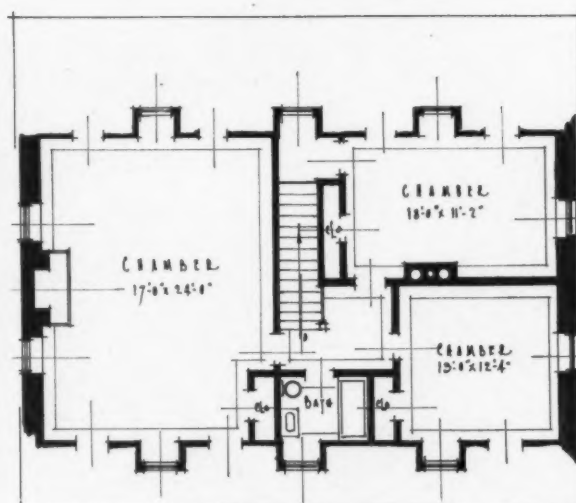
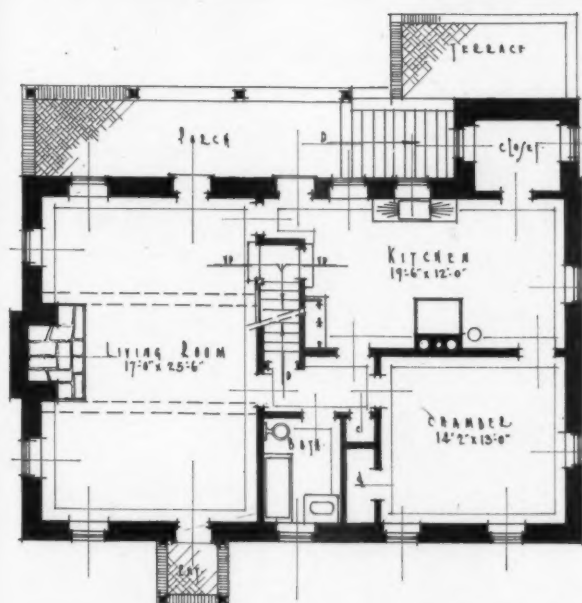
F. J. & W. A. KIDD, ARCHITECTS

EDISON CO.
1923



FARM COTTAGE AT DEMAREST, N. J.

FRANK J. FORSTER, ARCHITECT



FARM COTTAGE AT DEMAREST, N. J.

FRANK J. FORSTER, ARCHITECT

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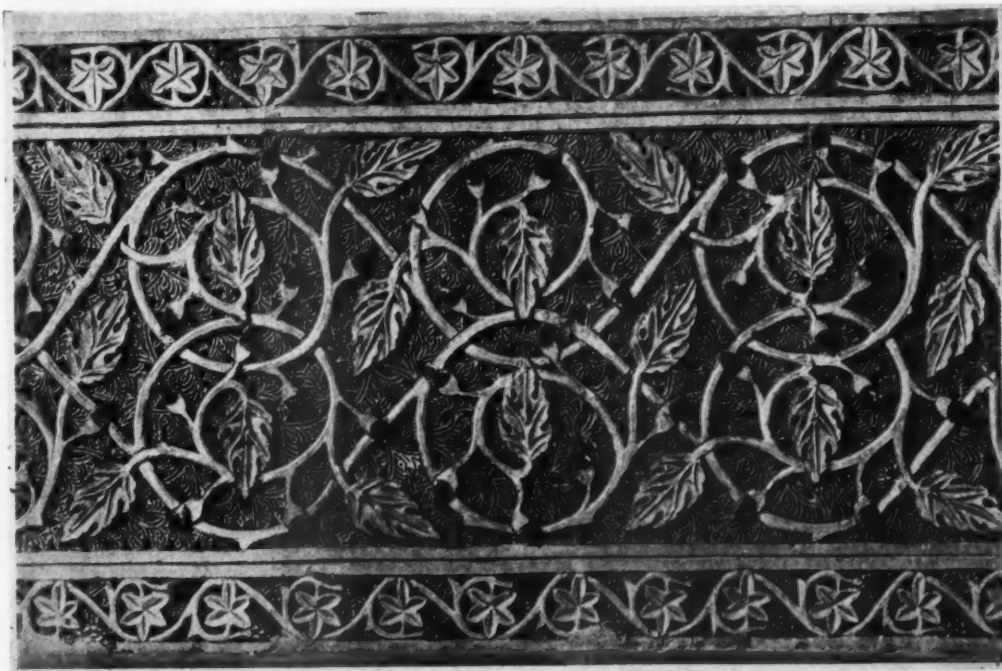
The REBUILDING of JAPAN

JUST how will Japan rebuild her ruined cities? Will she retain the elements of artistic design, the æsthetic characteristics that have marked her architecture for centuries, or will she make her new cities so Western in aspect as to destroy all traditional suggestion? That there will be a strong effort to profit by experience and build,—in the fabric,—along such construction methods as have been proven to be the best to meet earthquake conditions, is certain. But this will, or should, only refer to the fabric and not to the design. That it is not difficult to effect this desired end is shown in the fact that the Imperial Hotel, designed by Frank Lloyd Wright, architect, and built at Tokyo, has successfully withstood the earthquake shocks and became a haven of refuge for as many people as could be crowded into it. It is notable that this large building preserved in its æsthetic design the best Japanese characteristics, while at the same time there was introduced every approved feature of modern building construction.

The great artistic heritage of the Japanese cannot be realized by a recent visitor to Tokyo and Yokohama. It is now more than forty-five years ago since the writer hereof made his first visit to Japan. Commodore Perry's cruise in Japanese waters was at that time of comparatively recent happening. The great influence of this visit on Japan's future development had only then begun to be felt.

Japan was, in the early 70's, a semi-barbarous country. Its architecture and the customs of its people were practically as they had been for centuries. From that day, to this, many radical changes have been made. The Japan at the time of the earthquake was barely distinguishable as the same country and people as of half a century earlier. Who shall say that these changes have been for the best? In the large cities all over the world, standardization of material and æsthetic design is everywhere apparent. The land of the Mikados, populated by a clever and intelligent people has been quick to seize upon every innovation in building methods. This desire to keep pace with the world has resulted in a serious loss of national characteristics in architecture. Every architect will, it is quite certain, hope that the Japan to rise from the present ruins, will not be one so modern as to lose racial identity, but while rebuilt with proper regard for safety, will be thoroughly Japanese and conserve to the fullest extent the artistic beauty that has marked the centuries of Japan's growth.

At this writing there are available in this country but the few pictures, showing results of the earthquake, reproduced on the four following pages. *THE AMERICAN ARCHITECT* will present in later issues very full reports as to the effects of the earthquake on various types of building construction.

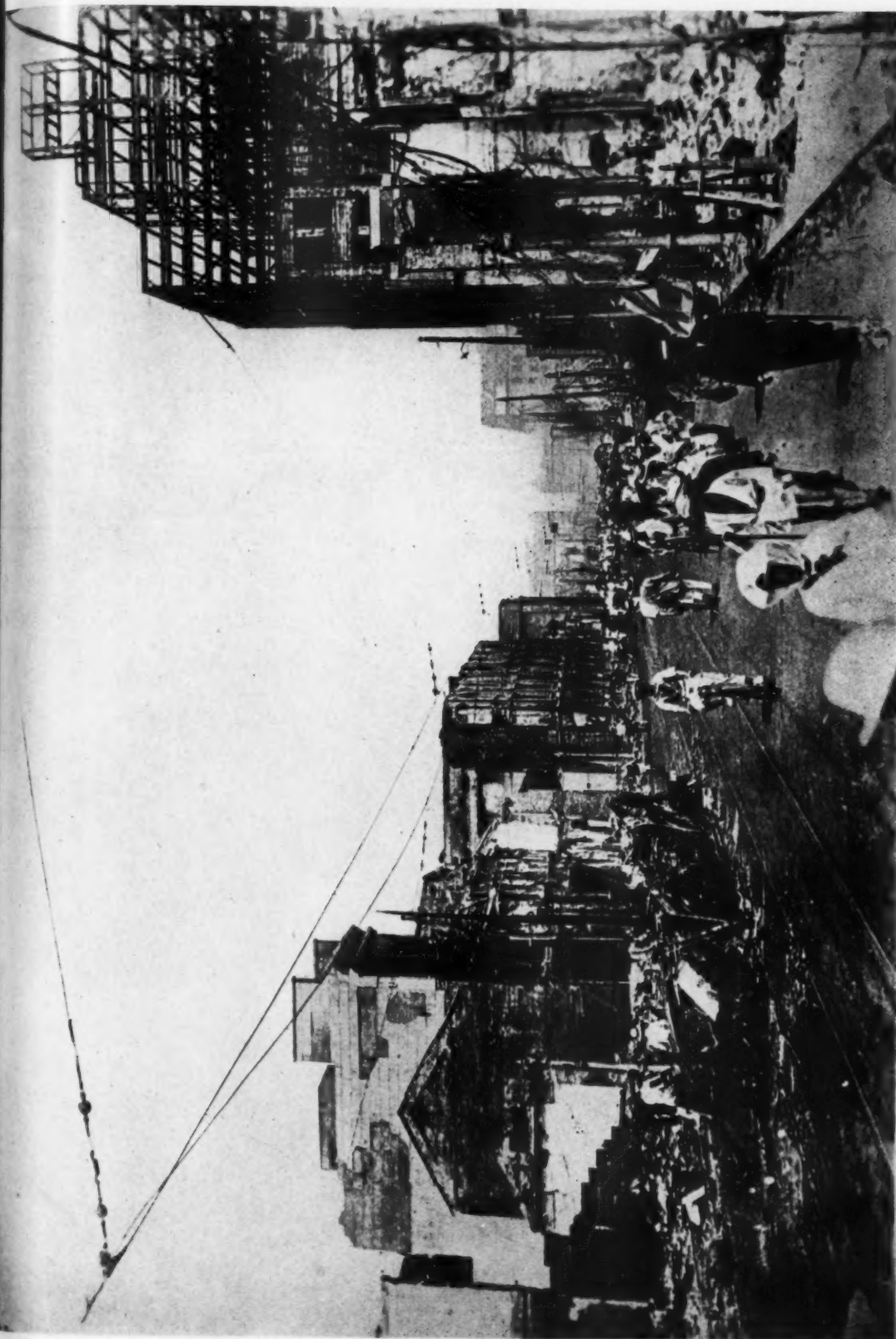


Spanish Plasterwork—Second half of XIV Century



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AN IMPORTANT THEATRE STREET, TOKYO. A DISTRICT THAT IS NOW TOTALLY DESTROYED



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RUINS OF THE GINZA, TOKYO

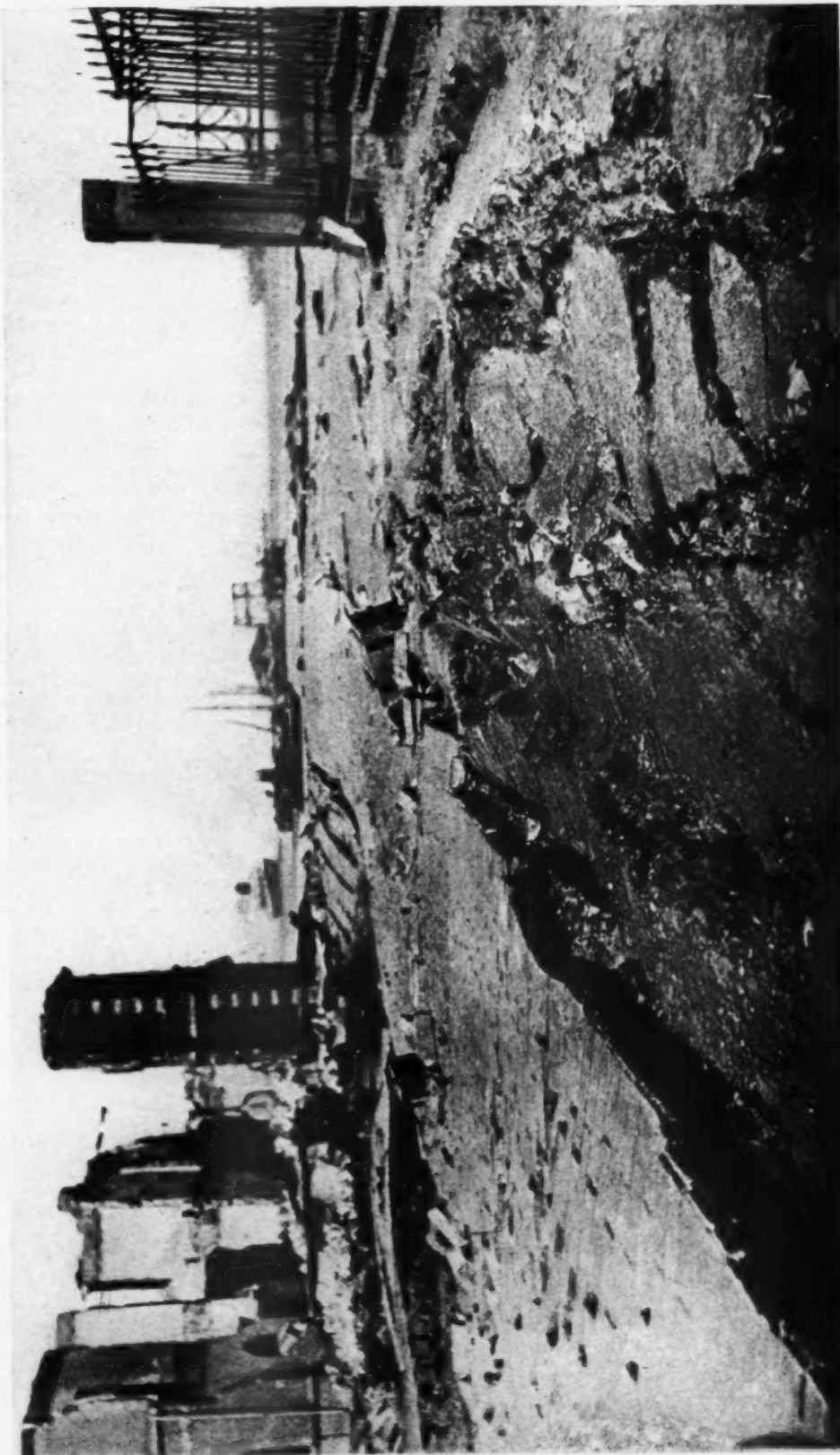
This is the principal theatrical street. Evidently all of the buildings were gutted by fire and some structurally destroyed. The appearance is very similar to that of San Francisco and Baltimore after their conflagrations



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THE MARUNOUCHI, TOKYO

This is the financial district in which the more substantial buildings were erected. The walls in some instances appear to be intact, but the contents of the buildings were destroyed by fire



THE CUSTOMS COMPOUND, YOKOHAMA

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The displacement of the ground would destroy all underground piping for water, sewers, gas and electric conduits and no system yet devised could resist such earth movements. It indicates that a "mat" foundation for a building would better resist the induced stresses than would a system of isolated foundations

FORTY YEARS AGO

Excerpts from THE AMERICAN ARCHITECT, October 6-13, 1883

AN article reprinted from *Engineering*, written by Mr. Isaac John Mann and presented to the Institution of Civil Engineers, gives the results of tests of Portland cement. The cement is divided into two grades—ordinary cement and fine cement sifted through a No. 176 sieve. The tests are made after 7 and 28 days and were to determine the adhesive and cohesive strength per square inch. The ordinary methods of testing cement refer to its cohesive power only. Briquettes are made, sometimes from neat cement, and sometimes from cement and sand, and after being subject to from 7 to 28 days' immersion in water, they are broken by a tensile strain. But it may be argued that, since the principal function of cement is to produce adherence, so as to convert loose or disconnected material into a solid coherent form, its tensile strength, unless that also be a measure of its adhesive strength, is but a fallacious guide to its constructive value. This is the view taken by the writer of the paper. The tests served to show that the ordinary seven days' test of cohesive and tensile strength is unreliable as an exponent of the cementitious value. The investigation of the effect of quick and slow setting on the adhesive strength which is capable of being developed within the limits of time available for ordinary testing purposes, shows that, with one or two exceptions, the quick setting cement manifested a greater development of adhesive strength than the slow, while in the case of cohesive strength quick setting seemed generally to produce an opposite effect.

The necessity for adopting a high standard of pulverization is also shown. For example, the particles that are sufficiently fine to pass a sieve of 10,600 meshes per square inch, viz.: No. 103, possessed less than 1/5 of the cementitious value of those passing a sieve of 31,000 meshes per square inch, viz.: No. 176. The average degree of pulverization of ordinary cement is such that 45.6% is stopped by a No. 176 sieve. With reference to a standard test the author's investigations and remarks may be summarized as follows: (1) That the cementitious or true value of Portland cement can be best determined by testing its adhesive strength. (2) That the degree of pulverization is probably the only other condition, the practical importance of which will warrant an indication into the standard system, which should,

therefore, include a standard sieve. (3) That a sieve having 176 meshes to the linear inch will be found sufficient for all practical purposes.

* * *

Mr. Benjamin S. Rotch, of Boston, who died very suddenly a year ago, had during his lifetime formed an admirable project for encouraging the study of architecture, an art in which he took a great and intelligent interest, by offering to students and draftsmen, as an incentive to special exertion, an annual prize, to take the form of a sum of money large enough to pay the cost of a year of travel in Europe. At his death no definite plan was in effect to carry out this program, and his heirs have provided for its continuance. The deed, as finally executed, assigns in trust forever to three persons, as trustees, property sufficient to yield an income of \$2,000.00 a year, and from the income of this fund not one, but two young men are to be constantly maintained as travelling students of architecture in Europe, the award of the studentship being made annually, and each successful candidate holding it for two years. By a provision which, considering all the circumstances, must be called a wise one, the privilege of competing for this studentship—the most brilliant prize, with the exception of the Prix de Rome, offered to young architects in any country—is restricted to students or draftsmen in offices in the State of Massachusetts, and no one can be a candidate who has not spent at least two years in the office of a practicing architect, this amount of experience of actual professional work being justly regarded as essential to the most intelligent appreciation of the architecture of other ages and countries. It is impossible to overestimate the future influence for good in the profession of this most noble and thoughtful gift.

* * *

Illustrations: Bits from the "Berkshire," corner Fifty-second Street and Madison Avenue, New York, Carl Pfeiffer, Architect, New York. House for W. Dudley Foulke, Esq., Richmond, Ind., Green & Wicks, Auburn, N. Y. Sketches in Seville, Spain, R. W. Gibson, Architect, Albany, N. Y.

DEPARTMENT of ARCHITECTURAL ENGINEERING

FIRE TESTS OF BRICK WALLS—PART II*

AS previously stated, the surface and wall temperatures given in Table 2 and by the curves, while the maximum for certain fixed locations on the wall, are not as high as temperatures obtaining at open joints, cracks, and under material placed against the unexposed side, such as represented by the cotton and excelsior-filled pads applied in some of the tests. The surface temperature changes at cracks and open joints in 8-inch walls ranged, at or near the end of the fire test, from 10 to 100 per cent higher than the maximum at regular couple locations. The extent to which such cracks transmit higher temperatures to the unexposed side depends on the pressure on the fire side as causing the heated gases to flow out through the crack. This pressure also affects the general heat penetration through the wall. Cracks in the upper portions of the walls generally developed higher temperatures at the outer surface on this account. In the tests there was always positive pressure within the furnace which a few measurements indicated to vary between one-fourth and one-half pound per square foot. Under the cotton and excelsior pads temperature changes from 5 to 60 per cent higher than at regular locations were recorded in the case of 8-inch walls. For the 12 and 13-inch walls these percentages ranged up to 25 for the solid wall and 100 for the hollow 13-inch wall at the end of the test. Earlier in the tests the difference between regular wall temperatures and temperatures at cracks and under the pads were generally smaller. In the tests of 4-inch walls, the cotton pad ignited at 2 hr. 25 min. in Test No. 8 and 1 hr. 54 min. in Test No. 13, and the excelsior pads at 3 hr. 18 min. and 2 hr. 45 min., respectively, in the two tests. The cotton pad ignited in three tests of solid 8-inch walls at or near 6 hours after the start of the test, and in one test of a hollow 8-inch wall the cotton pad ignited at 3 hours and the boards of the excelsior pad at 4 hours. In several tests of 8-inch solid walls of clay brick the pads ignited from 2 to 3 hours after the end of the 6-hour fire test, at which time the outside wall temperature increases reached a maximum of 40 to 75 per cent higher than those obtaining at the end of the test. For concrete and sand-lime brick the maximum on the outside of 8-inch solid walls was reached between 3 and 4 hours after the end of the test. The temperature

rise on the outside of 12 and 13-inch solid walls subsequent to the end of the tests was quite minor and in some tests no rise occurred. With the



Fig. 13. Unexposed side of 13" solid unrestrained Eastern surface clay brick wall after 6-hour fire test, Test No. 10

hollow 13-inch wall the time of occurrence of maximum temperature and its percentage increase over that at 6 hours was about the same as for 8-inch

*Part I printed in THE AMERICAN ARCHITECT, September 26, 1923.

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TABLE 2—RESULTS OF FIRE TESTS OF BRICK WALLS

No.	Brick	Thickness, Type and Restraint	Time when given maximum temperatures developed								Maximum deflection inches	
			On unexposed Face				In wall, 4 inches from unexposed face					
			Hours: Min's		Temperature at 6 hours	Hours: Min's		Temperature at 6 hours	Center of wall	Average at top of wall		
			150° C or 302° F	250° C or 482° F		150° C or 302° F	250° C or 482° F				°C	°F
1	Western surface clay	8-In. solid, unrestrained*	4:53	not attained	186	367	1:17	2:03	622	1152	3.11	
2	do	8-In. solid, restrained	5:28	do	163	325	1:39	2:23	577	1071	2.80	
3	do	8-In. solid, restrained	5:30	do	165	329	1:43	2:34	559	1038	5.05	
9	Eastern surface clay	8½-In. solid, restrained	not attained	do	135	274	1:53	2:40	554	1029	2.09	
14	Shale	8½-In. solid, restrained	do	do	148	298	2:02	2:44	514	957	2.60	
15	do	8½-In. solid, unrestrained	5:42	do	163	325	2:00	2:36	546	1015		-7.63
17	Eastern surface clay	8½-In. solid, unrestrained (cement mortar)	not attained	do	94	201	1:07	1:43	678	1252		-4.70
18	do	8½-In. solid, restrained (cement mortar)	do	do	102	216	1:37	2:22	590	1094	1.86	
19	do	8½-In. solid, unrestrained (lime mortar)	do	do	115	239	2:13	3:18	478	892		-5.80
20	do	8½-In. solid, restrained (lime mortar)	do	do	147	297	1:18	1:59	589	1092	.99	
Average					142	287	1:41	2:26	571	1059	2.64	-6.04
4	Western surface clay	8-In. hollow, unrestrained**	2:48	not attained	215	419 (4 hrs.)	0:51	1:22	571	1060 (4 hrs.)		-4.85
5	do	8-In. hollow, restrained	3:10	do	234	453	0:56	1:26	645	1193	2.09	
6	do	8-In. hollow, restrained	2:48	5:58	251	484	0:41	1:16	708	1306	2.40	
11	Eastern surface clay	8½-In. hollow, unrestrained**	2:35	4:50	256	493 (5 hrs.)	0:43	1:08	677	1251 (5 hrs.)		-4.50
16	Shale	8½-In. hollow, unrestrained	2:49	5:03	272	522	0:49	1:18	669	1236		-6.20
Average			2:56		252	486	0:49	1:20	674	1245	2.24	-6.20
7	Western surface clay	12½-In. solid, restrained	not attained	not attained	78	172	not attained	not attained	104	219	2.05	
10	Eastern surface clay	13-In. solid, unrestrained	do	do	88	190	do	do	107	225		-7.71
Average					83	181			106	222	2.05	-7.71
12	Eastern surface clay	13-In. hollow, unrestrained**	not attained	not attained	78	172 (5 hrs.)	2:18	3:36	357	675		-6.16
8	Eastern surface clay	4-In. solid, restrained	1:46	2:53	334	633	0:31	0:49	911	1672	5.04	
13	Shale	4-In. solid, restrained**	1:25	2:04	313	595 (3 hrs.)	0:40	0:52	629	1164 (3 hrs.)	10.03	
21	Concrete	8-In. solid, unrestrained	not attained	not attained	104	219	2:12	3:17	435	815		-9.00
22	do	8-In. solid, restrained	do	do	96	205	2:42	4:05	363	685	1.93	
24	Sand-lime (1)	8½-In. solid, restrained	do	do	90	194	2:28	3:50	385	725	3.46	
25	do	8½-In. solid, unrestrained	do	do	94	201	2:24	3:45	400	752		-9.70
26	Sand-lime (1)+(2)	8½-8½-In. solid, unrestrained	do	do	89	192	2:37	3:59	387	729		-9.00
Average					95	202	2:29	3:47	394	741	2.64	-9.23
23	Concrete	12½-In. solid, restrained	not attained	not attained	82	180	not attained	not attained	106	223	1.10	
27	Sand-lime (1)	12½-In. solid, restrained	do	do	80	176	do	do	105	221	1.30	
Average					81	178			106	222	1.20	

* Partly restrained by bearing against panel frame after one hour.

** Tests less than six hours are not included in averages.

solid walls, the temperatures, however, being lower, no ignition taking place. The temperature at cracks and open joints did not increase materially after the fire was out and began to decrease sooner than the general surface temperatures. The maximum in the middle of 8-inch walls generally occurred within one hour after the fire was out, the increase in temperature being 10 per cent as an average.

Decided fusion and flowing of brick occurred only with the Western surface clay brick during the last hour of the test and to less extent with concrete brick, the maximum thickness fluxed away being seldom over $\frac{1}{2}$ inch. Considerable incipient fusion without appreciable flow of material developed in the shale brick and in minor degree with the hard sand-lime brick. The mortar made of Portland cement, lime, and high silica sand was glazed on the exposed surface but apparently had softened very little.

Some of the heat effects as also deformations produced by the fire exposure are shown in Figs. 9 to 16.

TABLE 3
DEFLECTION OF WALLS IN FIRE AND WATER TESTS

No.	THICKNESS, TYPE AND RESTRAINT	Deflection, inches			
		Center of wall		Average at top of wall	
		Maxi- mum	Resid- ual	Maxi- mum	Resid- ual
28	4-Inch solid, restrained	3.58	1.65		
30	8-Inch solid, restrained	1.10	0.00		
31	8-Inch hollow, restrained	1.30	0.49		
33	13-Inch solid, restrained	.51	0.00		
29	8-Inch solid, unrestrained			4.56	—
32	8-Inch hollow, unrestrained			6.82	2.57
33	13-Inch solid, unrestrained			5.72	1.60

(c) *Results of Fire and Water Test.*—Fire and water tests were made of one 4-inch restrained wall, four tests of 8-inch walls, and two tests were made on a solid 13-inch wall, one as restrained and one as unrestrained. The walls were built of sections of the different kinds of brick used in the fire tests, laid in lime-cement mortar except in No. 32, the left half of which was laid with Portland cement mortar. The appearance of the exposed side after the one-hour fire test and the 5-minute water application is given by Figs. 17 to 20. The maximum deflection developed in the one-hour fire test and residual deflection after water application and cooling are given in Table 3. No general collapse occurred in any of the tests although partial local failure developed with unrestrained 8-inch walls. No spalling took place during the fire exposure, but on application of water the pieces loosened by the fire were dislodged, and further loss of material was caused by the sudden cooling and erosion of brick and

mortar. In point of freedom from damage the bricks range in about the same order as previously given for performance in fire tests. The cracking and spalling of the brick were more pronounced than in the fire tests, although the general loss in strength was no larger, the damage being generally confined to the one-inch thickness nearest the fire side. A feature that influenced the results was the degree of adherence of brick and mortar, mortar being washed out and bricks loosened most readily between the hard, smooth-surfaced brick. In the case of 8-inch unrestrained walls this caused local collapse at the top or border with the hard sand-lime brick laid in lime-cement mortar (Figs. 17 and 20). The half of the hollow unrestrained wall (No. 32) laid in cement mortar came through the test without dislodgement of units. The condition in Test No. 29 (Fig. 17) was perhaps a little extreme in that no header course was provided at the top of the wall, as the added bond might have helped to hold the brick in place.

4. DISCUSSION AND CONCLUSIONS

Under fire conditions in buildings outside masonry walls provide a barrier against the rapid horizontal spread of fire, in presenting an incombustible surface to outside exposure, and in helping to confine a fire within the area of origin, their effectiveness depending on stability and the proportion of area of openings to the wall area. As used in party and fire walls, the spread of fire is prevented both as it concerns passage of flame and hot gases, and temperature transmission through the wall. Distinction should be made between use of masonry walls with combustible or unprotected interior framing and structural floors, and where the interior structural building members are of protected fire resistive construction that will not collapse in a fire destroying the building contents. In the former case the wall requirements are more severe, since on collapse of the interior construction the walls are subjected to impacts of varying amounts, and left unsupported for their full height, except as support is given by the construction on the unexposed side of party and fire walls. Since combustible members may frame into them it becomes necessary to consider temperatures obtaining within the wall as well as on the unexposed surface.

As it concerns ability to carry load under fire exposure, the unrestrained test wall, while representative of some conditions of use of bearing walls, does not imply use with heavy imposed load approaching a design working load. The restrained condition imposes stresses due to thermal expansion that may be as high or higher than those corresponding to working loads, although failure is less likely to occur since relief is obtained by slight yielding of the most highly stressed portion. With masonry construction this relief can

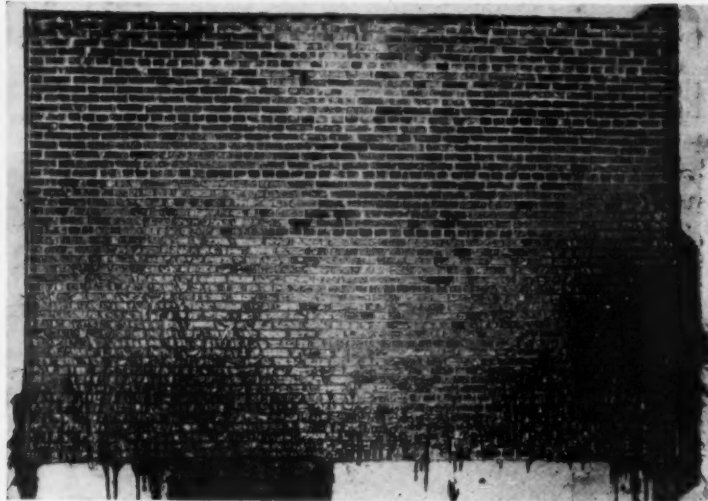


Fig. 10. Exposed side of 8" solid restrained Western surface clay brick wall after 6-hour fire test, Test No. 3

be given on the exposed side by yielding of the weakened mortar, also after a period of exposure the expansion may be in large part balanced by shrinkage from dehydration and vitrification of mortar and brick. To be fully representative of all conditions of use, in addition to tests in the restrained and unrestrained conditions, fire tests need therefore be made as well under working load. The widest use of masonry construction, however, is under light or moderate loads not approaching the maximum working load values, where the criterion is stability and heat insulation, and for such use the test results so far obtained apply with little limitation. They also apply for bearing walls, where the resistance is limited by the temperatures developed to periods considerably below the maximum duration of the tests.*

Of general conclusions that can be made from the test results, verification within the limits that can be expected is obtained as it concerns relative deflection and temperature of the walls. It can be shown from theoretical considerations that the deflection due to temperature difference between the two sides of a wall varies directly with the temperature difference, the coefficient of expansion, the square of the length, and inversely with the thickness, also, that the top deflection of unrestrained walls is four times the center deflection of similar restrained walls. The deflection of the 8-inch unrestrained walls was decreased below the relative theoretical value by the pilasters provided at the ends, the best comparison between the restrained and the unrestrained condition obtaining with the heavier walls. As it concerns temperature

*Equipment for fire tests of walls under load is being provided and it is intended to conduct therewith a further series of tests of typical brick walls.

penetration through the wall the "law of times" is verified to much greater precision than might be expected, the time required for given general average temperatures to develop on the unexposed face being very nearly proportional to the square of the wall thickness. It should be noted that the accord between theory and test results concerns relative values as between the different wall thicknesses and conditions of restraint. Values of deflection and temperature computed from the formulas with values of constants, such as heat conductivity, specific heat, and coefficient of expansion, applying for a small range of temperature differ greatly from those obtained in the tests, due apparently to

changes in the constants in the wide range of temperature incident with fire exposure.

The large outward deflection of the unrestrained walls and rapid increase of this deflection with unsupported height give proof of the instability of masonry walls after the interior construction has collapsed in fires, and justifies the practice of some experienced fire chiefs of applying hose streams to the heated side as an aid in preventing collapse. Another interesting point is the length of time required for the maximum temperature to obtain on the unexposed face after the end of the test, indicating possibility of fires originating on the opposite side of party and fire walls several hours after extinguishment of severe fires on the one side, unless proper precautions are taken.

Mortar proportions appear to have little influence on the temperature rise through the wall, although more cracking developed with the stronger mortar, and the salvage of brick was less since the general panel cracks extended through the bricks and joints, instead of only through the joints as with lime mortar, also, a greater number of bricks were broken in cleaning. The greater strength, and resistance to lateral loads and erosion obtained with the Portland cement mortar were apparent in the fire and water tests, and indicate that for walls more than one or two stories in height and of minimum permissible thickness, the cement-lime or cement mortar has advantages in these respects that may outweigh the other considerations indicated. There was loss in strength of lime mortar approaching disintegration, which must be considered where masonry strength is concerned.

Fire resistance periods derived from the test results are given in Table 4, which apply most direct-

ly to party and fire walls. These are to be considered safe units that can be directly applied to building exposures. The periods are derived considering not only the maximum temperatures developed at regular thermocouple locations as given in Table 2, but also the higher temperatures that may obtain at cracks and open joints and under combustible material in contact with the wall. A margin is also taken on the durations developed in the tests, considering that walls in buildings may at times be inferior to the test walls in material and workmanship. The criterion of 150° C. or about 300° F. as the maximum permissible temperature on the unexposed side is taken to apply to occupancies housing hazardous materials such as nitrocellulose products, chemicals, matches, etc., in appreciable quantities. Some materials in these classes ignite or suffer changes resulting in ignition at temperatures below 150° C., but being in containers they would not be in direct contact with the wall. Ordinary combustible materials, made of vegetable or animal fibers and wood ignite at higher temperatures, 250° C. (482° F.) being more nearly the temperature at which ignition occurs after the comparatively short exposures incident with fires in buildings, and is taken to apply where non-hazardous materials are concerned, also as the critical temperature for ignition of combustible floor members framing into the wall on the unexposed side.

No resistance period is given the 4-inch wall as a bearing member since the deflections even at one hour were so high that it might not support working load, nor are values given for 8-inch bearing walls for the higher periods not limited by temperatures on the surface or within the wall. Compression tests made of masonry before and after fire tests, while indicating adequate strength for most of the brick, indicated in some cases such loss of strength in the fire test, that, taken in connection with the deflections obtaining at the end of the test might prejudice ability to carry working load. The coming series of fire tests under load is intended to supply data for these conditions. It is seen that the resistance of 8-inch walls is considerably reduced by framing combustible floor members into them. In the case of hollow walls no resistance of a degree that can be recognized exists where combustible members frame into them from both sides without filling at the floor lines. The resistance can be materially increased by filling solidly above, below and between such floor members with

incombustible material. Where combustible members frame into 8-inch walls from both sides, the assumption is made that they are staggered so as to leave not less than 4 inches of solid material between them and between their ends and the opposite face of the wall. The 12 and 13-inch solid walls were proven adequate for the full 4-hour period under all conditions. Resistances in this thickness exceeding this period could probably be given by some of the brick, while with others fusion and disintegration at the higher temperatures apparently limited them to the assigned period.

All walls were tested unplastered. Plaster of such properties as to remain in place during the fire exposure would materially increase the insulating value, particularly of the thinner walls.

The information available for applying the resistance periods to fire conditions in buildings is incomplete, but fire experience, aided by tests recently undertaken, has given indications of maximum limits of intensity and duration of fires in buildings that are of value. As based thereon it appears probable that buildings housing office and residence occupancies do not generally develop fires exceeding in effect one hour of the fire exposure applied in the tests, and that very exceptional fires, if any at all will exceed the 1½ hour exposure. The materials housed can generally be taken as non-hazardous. Merchandising, manufacturing and storage are known to be responsible for fires of longer duration, possibly for some classes up to the full 4-hour period, and materials representative of the full range of ignition temperatures discussed may be present, which require an estimate for each building unit of the hazard involved.

The exterior exposure produced by a burning



Fig. 11. Exposed side of 8" hollow restrained Western surface clay brick wall after 6-hour fire test, Test No. 5

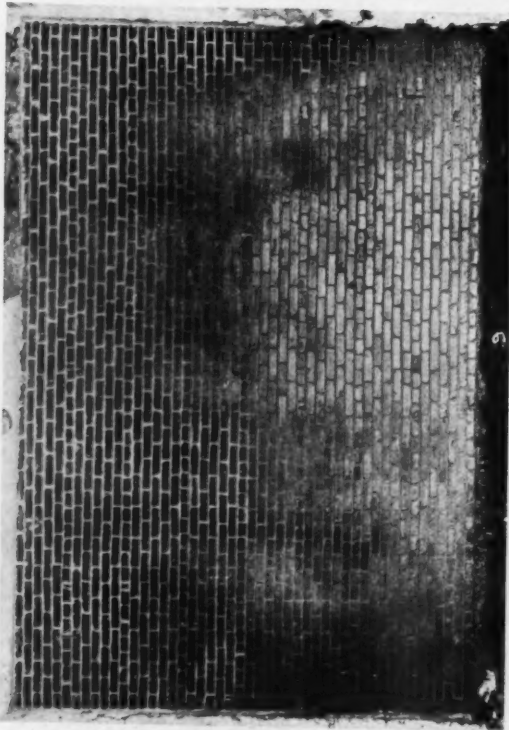


FIG. 12. EXPOSED SIDE OF 8 1/4" SOLID RESTRAINED EASTERN SURFACE CLAY BRICK WALL AFTER 6-HOUR FIRE TEST, TEST NO. 9

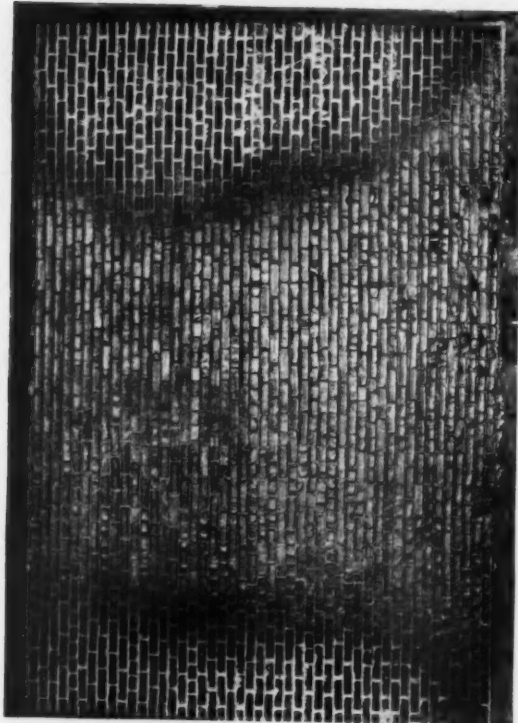


FIG. 14. EXPOSED SIDE OF 8 1/4" SOLID UNRESTRAINED SHALE BRICK WALL AFTER 6-HOUR FIRE TEST, TEST NO. 15

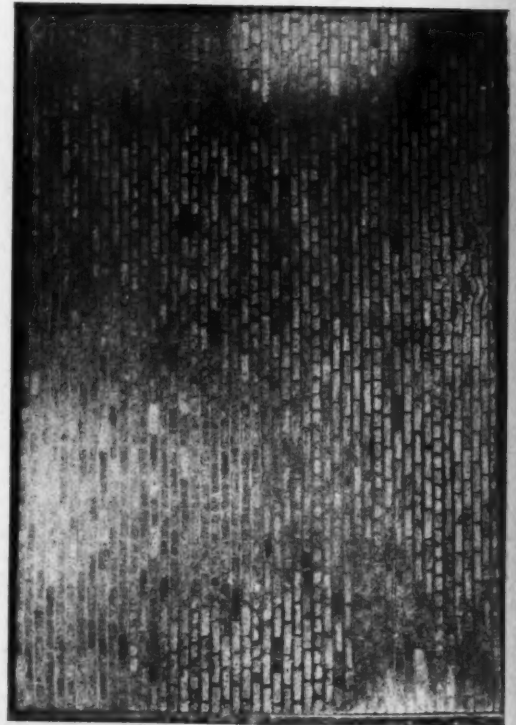


FIG. 15. EXPOSED SIDE OF 8" SOLID UNRESTRAINED CONCRETE BRICK WALL AFTER 6-HOUR FIRE TEST, TEST NO. 21



FIG. 16. EXPOSED SIDE OF 8 1/4" SOLID UNRESTRAINED SAND-LIME (1) BRICK WALL AFTER 6-HOUR FIRE TEST, TEST NO. 22

FIG. 16. EXPOSED SIDE OF 8 1/4" SOLID UNRESTRAINED SAND-LIME (1) BRICK WALL AFTER 8-HOUR FIRE TEST, TEST NO. 22

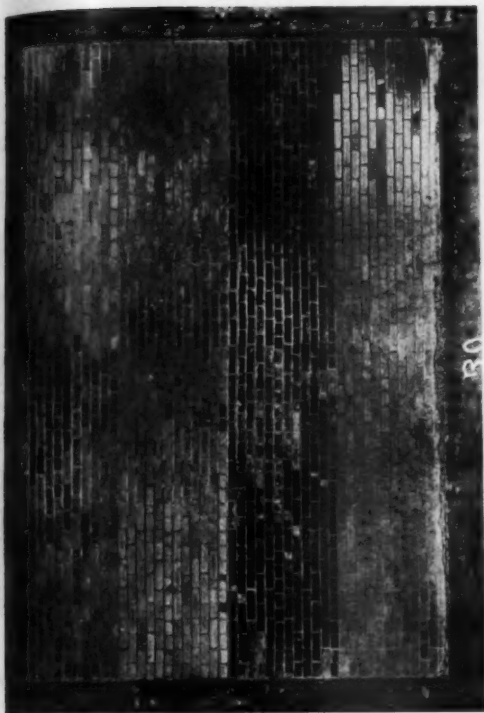


FIG. 18. EXPOSED SIDE OF 8" SOLID RESTRAINED BRICK WALL AFTER FIRE AND WATER TESTS, TEST NO. 30

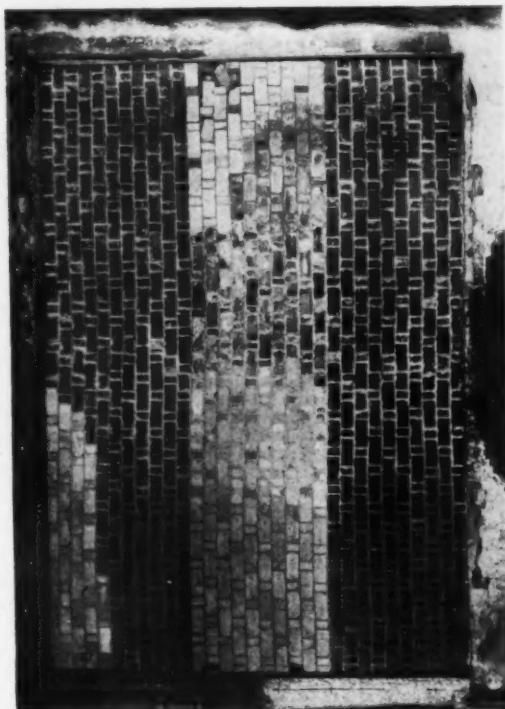


FIG. 20. EXPOSED SIDE OF 8" HOLLOW UNRESTRAINED WALL AFTER FIRE AND WATER TESTS, TEST NO. 32

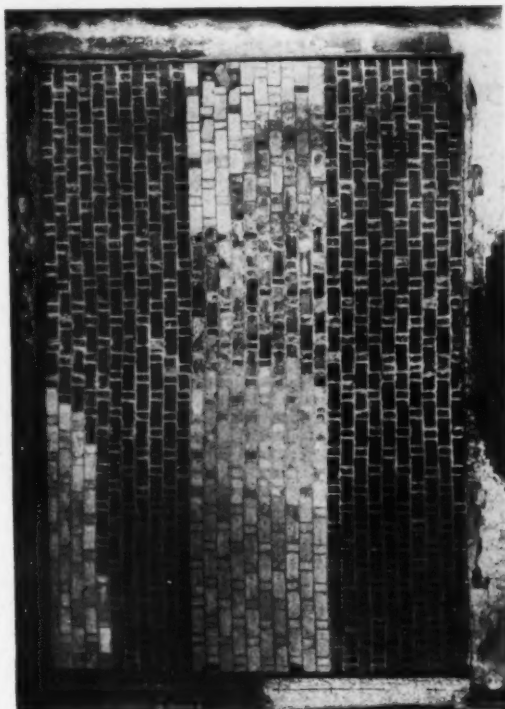


FIG. 15. EXPOSED SIDE OF 8" SOLID UNRESTRAINED CONCRETE BRICK WALL AFTER 6-HOUR FIRE TEST, TEST NO. 21

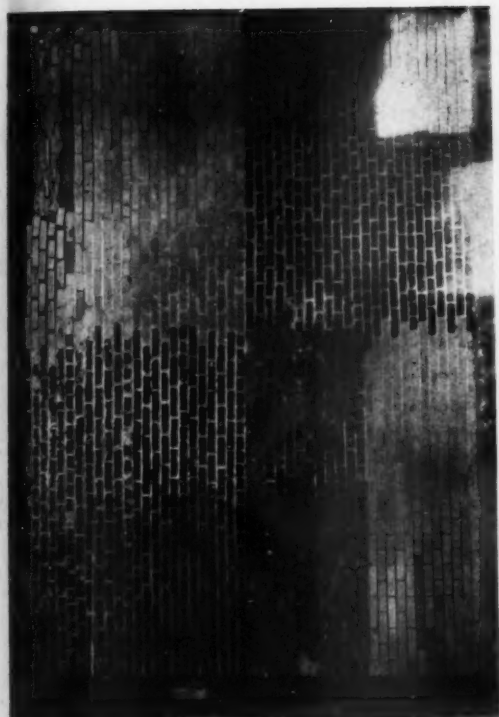


FIG. 17. EXPOSED SIDE OF 8" SOLID UNRESTRAINED BRICK WALL AFTER FIRE AND WATER TESTS, TEST NO. 29



FIG. 19. EXPOSED SIDE OF 8" HOLLOW RESTRAINED BRICK WALL AFTER FIRE AND WATER TESTS, TEST NO. 31

TABLE 4—FIRE RESISTANCE PERIODS OF BRICK WALLS

Thickness	Type	Interior structural members framing into wall	Materials protected	Load on wall	Fire resistance period
4-Inch	Solid	Incombustible and fire resistive	Non-hazardous	Non-bearing	One hour
8-Inch	Solid	Incombustible	Non-hazardous	Non-bearing	4 hours
8-Inch	Solid	Incombustible	Hazardous	Bearing or non-bearing	2½ hours
8-Inch	Solid	Combustible	Hazardous or non-hazardous	Bearing or non-bearing	1½ hours
8-Inch	Hollow	Incombustible and fire resistive	Non-hazardous	Bearing or non-bearing	2½ hours
8-Inch	Hollow	Incombustible and fire resistive	Hazardous	Bearing or non-bearing	1½ hours
8-Inch	Hollow	Combustible, on one side only	Hazardous or non-hazardous	Bearing or non-bearing	¾ hour
8-Inch	Hollow, filled solid at floor lines	Combustible or incombustible	Hazardous or non-hazardous	Bearing or non-bearing	1½ hours
12 or 13-Inch	Solid	Combustible or incombustible	Hazardous or non-hazardous	Bearing or non-bearing	4 hours
12 or 13-Inch	Hollow	Incombustible and fire resistive	Hazardous or non-hazardous	Bearing or non-bearing	4 hours
12 or 13-Inch	Hollow	Combustible	Hazardous or non-hazardous	Bearing or non-bearing	2 hours
12 or 13-Inch	Hollow, filled solid at floor lines	Combustible or incombustible	Hazardous or non-hazardous	Bearing or non-bearing	4 hours

NOTE.—When combustible or non-fire resistive floor members frame into 8-inch walls from both sides, to develop the periods above indicated, they must be so placed and protected as to have not less than 4 inches of solid material between them, and between their ends and the opposite wall surface. Filling at floor lines of hollow walls must be 4 inches or more in thickness above, below and between the floor members. In the case of 12 and 13-inch walls they shall not project more than 4 inches into the wall.

Combustible or non-fire resistive floor members must be framed to release readily from the wall in case of collapse of floor construction in fires.

For the given resistance periods, load bearing walls must be laid in cement or lime-cement mortar not leaner than used in the test walls.

building on the walls of adjacent buildings can generally be taken to be less severe than that pertaining to interior party and fire walls, due to distance between buildings, the shielding effects of masonry walls where present, and greater opportunity generally for the heat to be dissipated before becoming effective on the neighboring wall.

The fire durations above discussed pertain to the duration of the combustion taking place near enough to a given building member to produce temperature high enough to cause failure of the member or of its proper functioning, and is not

necessarily the same as the total duration of the fire within the building or within its respective subdivisions.

The work here reported is part of the fire resistance investigations of the Bureau of Standards. Acknowledgment is due to H. E. Newcomer, B. Schlosser and L. M. Hammond for assistance in conducting the tests and reducing test data.

S. H. INGBERG.

Bureau of Standards, Washington, D. C. August 4, 1923.

LEGAL DEPARTMENT

Conducted by

CLINTON H. BLAKE, Jr., of the New York Bar

WHY is it, I wonder, that the average architect, when his client asks the almost inevitable question "for how much can it be built," replies at once, without any realization of the importance of the answer and of its phrasing.

Here is the rock on which perhaps more than on any other the voyage of the architectural ship comes to grief. It is a danger point on the coast which architects, from long and bitter experience, must recognize, and for which they should have a deep and wholesome respect. Yet, when the question is asked, they often wholly forget or ignore its existence.

This question of the guarantee of cost we have discussed from time to time from different points of view. The thought that I should like, this month, to leave in the mind of the architect and the client alike, is that there is absolutely no need of any misunderstanding or of any difficulty in this respect. The problem and its solution are alike simple.

The fault is not entirely that of the architect. The client should, in common sense, realize that no architect, no matter how broad and detailed his experience may be, can do more than estimate roughly the approximate cost of the work. He should understand that, under the complex and constantly changing factors involved in the building industry of today, no man can do other than guess what the ultimate cost may be.

Nevertheless, when all is said and done, it is upon the shoulders of the architect that the burden of preventing misunderstanding on this point must rest. Better than the client, he understands that no amount of architectural skill can equip him to prophesy accurately as to ultimate cost figures. Better than the client, he knows that it is difficult, if not impossible, to be approximately correct in any such prophecy.

I have, in other issues, pointed out the danger to the architect of allowing any doubt to remain in the mind of the client with respect to the weight of the architect's estimate of cost. I have pointed out how it may imperil his whole compensation and even lay him open to claims for damages.

Aside from this danger to the architect himself, is it not, or should it not be a part of his duty to the client to make sure that the latter is not misled, whether the result of his misapprehension is calcu-

lated to injure the architect or not? He should realize that the ordinary client credits the architect with powers of clairvoyance in building cost matters, which he does not possess.

A very large proportion of the cases which come to me, involving disputes between architect and client, involve to some extent, this question of cost and the claim that the architect made certain definite representations with respect to cost.

It is a simple matter to guard against this danger. If a contract is entered into, it can in a very few lines and in plain understandable English, be made clear that the architect makes no representations or guarantees regarding cost and is not liable for any estimates which he gives with respect to it. The language should go further than the standard contract form which, as has been before pointed out, is open to the construction that the architect, while not undertaking to foretell the cost exactly, does undertake to foretell the "approximate" cost. The wording should definitely relieve the architect of all liability in connection with any such estimate.

If there be no written contract, the architect should by letter, or at the very least, orally, make clear to the client, beyond any possibility of misunderstanding, that he is giving the client his best cost *guess* only and that it is given, only, for what it may be worth, and without recourse in any way so far as the architect and his relations with the client are concerned. Let the architect follow this course, not only for his own protection, but as a part of his duty to the client. Let him choose his words carefully when cost is mentioned. Let him, by office memorandum or otherwise, see to it that the other members of his organization who might have contact with the clients of the office, are cautioned to exercise a like discretion and to avoid any thoughtless or loose statements which may, months later, reappear, to cause loss or embarrassment to them or to the organization of which they are a part. Let him remember that his compensation is based on the cost of the work and that, from the ethical, as well as the legal, point of view, he must be diligent to avoid giving to the client the slightest ground for feeling that the architect has by a low estimate, mistakenly or by intent, induced him to proceed with the work, and at the least incur a substantial charge for the plans and for the specifications.

LEGAL DECISIONS

WHERE the cost of the construction of a building is increased, as the result of errors in the plans and specifications, the architect may be held liable for the amount of the increased cost, due to such defects.

Erskine v. Johnson, 23 Nebraska 265.

AN architect prepared plans which were accepted by the client, upon the understanding that the building prepared in accordance with the plans would cost a certain amount. It developed that the building could not be erected for the amount agreed upon and the client rejected the plans. The architect sued to recover for his services. No promise to pay for the plans appeared to have been made. The court held that, in view of the agreement between the parties and the condition with respect to the cost under which the plans were submitted, the architect could not recover.

Ada Street, etc., Church v. Garnsey, 66 Illinois 132.

THE architect was employed to prepare plans and to carry out the plans. After he had executed them it developed that there were certain defects in them. The owner claimed that the architect was liable for these defects. The architect claimed that his employment had been changed from that of architect to that of builder, and that he was not, therefore, as the builder, liable for the defects in the plans.

HELD: That the architect, after preparing and executing the plans, cannot avoid his liability for defects in the plan by claiming that he had acted solely as builder and not as architect.

Louisiana Molasses Co. vs. Le Sassier, 52 Louisiana, Ann., 2070.

AN architect made an estimate of the cost of the work to be done. It developed that the estimate was not accurate, and that the actual cost would be in excess of the amount estimated. The question arose between architect and client, as to what was the correct legal measure of the architect's duty in making estimates of cost. The court held that the measure of the architect's duty, both with respect to estimates of cost and estimates as to the time of construction was "a reasonable degree of care and skill; such a degree of skill as may be expected from an average person in the profession." The court further held that, if such reasonable degree of care and skill is taken by the architect, the architect is not liable if the estimate turns out to be inaccurate.

Grant v. DuPont, 8 B. C. 7.

THE client claimed that the plans contained defects and that the architect must be held to account for them. The case involved a general discussion of the extent to which an architect may be said to warrant his plans and the degree of skill to which he must be held. The court held "the law does not imply such a warranty or the guarantee of the perfection of his plans. The result may show a mistake or defect in them, although he may have exercised the reasonable skill required. Plans, now considered safe, experience and advanced knowledge of the science may hereafter show to be unsafe. The law requires only the exercise of ordinary skill and care, in the light of present knowledge."

Chapel v. Clark, 117 Michigan 638.

THE plaintiff contracted to furnish material and to build a structure in accordance with certain plans and specifications. The plans were later changed, requiring a larger structure and more material. The change, however, was of such a character, the material and structure remaining the same, that, in effect, it merely meant the adding of additional units to the original plan. The contractor, after doing the work, claimed that he was entitled to receive payment for the additional units on the basis of *quantum meruit*, without regard to the contract price for the structure as originally planned. The defendant claimed that the original contract price under these conditions should govern and apply to the additional units constructed. The court held that, while the general rule was that, where work is done or materials are supplied, if done or supplied at an agreed price, the compensation must be based on *quantum meruit*, nevertheless, this doctrine should not apply where the subject matter of the contract is of the same character and the only change is the addition of other work and material of exactly the same character as that covered by the original contract. In the case in question, the court held, accordingly, that as nothing more than additional units of things already contracted for were supplied, the fair implication should be that the parties had agreed that the original contract price should impliedly apply to the additional units; that no one can be required to do, at a contract price, more than he has agreed to do, but that if, willingly, he exceeds his contract obligations and does additional work, which the original contract price fairly measures, he cannot compel the other party to pay him at a higher rate than such contract price.

Keystone Structural Co. v. Link Belt Co., 265 Federal 320.



The "Home Sweet Home" House in Washington

It is in keeping with President Harding's career that one of his last official acts should have been the formal opening of a model house in Washington dedicated to the movement for better homes in America.

This interesting house is a modernized adaptation of the boyhood home of John Howard Payne, author of "Home Sweet Home." Mr. Donn Barber, the architect, supervised the interior decorations which so faithfully reproduce an authentic colonial atmosphere.

We shall be glad to send to any architect interested samples of the wallpapers selected by Mr. Barber for this purpose.

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The purpose, simply stated, is to afford an organization which, it is believed, will become a most important element in architectural practice and building operations, a medium through which it may, without expense to itself, reach a class of readers that are most intimately identified with the field of the activities of The American Specification Institute.

Publishers, THE AMERICAN ARCHITECT AND THE ARCHITECTURAL REVIEW.

OUTLINE FOR TENTATIVE SPECIFICATIONS FOR ARCHITECTURAL TERRA COTTA

A. S. I. CLASSIFICATION No. 23

(The form of these specifications conforms to the arrangement of Elements of a Specification as given in Bulletin No. 5, ANALYSIS OF A SPECIFICATION. For subject matter of various paragraph captions see Standard Specifications for Terra Cotta as recommended by National Terra Cotta Society.)

I. CONTRACT AND LEGAL

1. Parties:
2. Drawings:
3. Agreement:
4. Terms of Payments:
5. General Conditions:
6. Regulations:
7. Standards:
8. Patents:

II. ECONOMIC

SCOPE OF CONTRACT:

9. Work Included:
(See paragraphs 63, 65, 66 and 85 to 91 of National Terra Cotta Society Specifications.)
10. Work Not Included:

11. Methods of Analysis and Comparison of Bids:
12. Conditional Payments:

III. GENERAL DESCRIPTIVE

13. Characteristics, Service Conditions and Ultimate Requirements:

IV. PRELIMINARY PREPARATION

14. Field Measurements:
15. Drawings and Schedules:
16. Examination of Architect's Drawings:
The Contractor shall examine carefully the structural framing plans and details and shall manufacture the terra cotta to fit the conditions.
17. Joints:
Any construction involving special design, whether arising from manufacturing problems or otherwise, shall be shown clearly on the working drawings.
18. Beginning of Manufacture:
No terra cotta shall be manufactured until the above mentioned shop drawings have been approved by the Architect.
19. Samples:
20. Modeling:
21. Photographs:
After the models finally have been corrected and approved, the Contractor shall have each



SPINK-ARMS HOTEL, Indianapolis: William K. Lairdce, Architect; Van Camp Hardware & Iron Co. and August Buschmann & Sons, Inc., Joiners; B. C. Torelli Co. and Vestal Plumbing Co., Plumbers

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And the SPINK-ARMS HOTEL

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This name, unobtrusively fused into the enamel of every Kohler fixture, is a guaranty of genuineness and of these distinctive Kohler qualities—(1) the beautiful snowy whiteness of the durable enamel; (2) the uniformity of that whiteness in every fixture.

Noteworthy among the newer hotel and apartment buildings of Indianapolis is the Spink-Arms, a residential hotel embodying the most modern thought in design and equipment.

It is another instance of the selection of Kohler Enameled Plumbing Ware, the installation including 236 "Viceroy" built-in baths and the same number of Kohler lavatories and kitchen sinks.

Thus does the steadily lengthening list of important Kohler installations throughout the country almost daily reaffirm the satisfaction of architects in Kohler quality and distinction of design.

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different detail photographed and furnish the Architect with a print showing each and every model approved. The photograph shall be mounted on linen, with a $1\frac{1}{2}$ " wide flexible binding edge and shall be $7\frac{1}{2}$ " x $9\frac{1}{2}$ " in size, with binding edge additional.

V. MATERIALS

PROPERTIES, CHEMICAL AND PHYSICAL:

22. Terra Cotta:
The architectural terra cotta shall be of the best quality, equal to the highest grade manufactured by companies of established reputation. The terra cotta shall be made from carefully selected clay, shall be well burned and shall give a sharp, metallic bell-like ring when struck.

23. Mortar:

SIZES, WEIGHTS, GAUGES:

24. Thicknesses:
The minimum thickness of walls and partitions for terra cotta shall be one inch. The maximum distance between centers of partitions shall be about eight inches.
25. Quantities:

VI. DESIGN AND CONSTRUCTION

26. Handling:
27. Mechanics:
28. Workmanship:

SHOP AND FIELD:

29. Setting:
30. Joints:
31. Ends, Walls and Partitions:
32. Washes, Weep Holes and Drips:
33. Preparation for Flashing:
34. Cutting and Fitting at the Building:
35. Replacements:
The Contractor, to prevent delay at the build-

ing, shall make a reasonable number of overs of pieces of which twenty or more are required

36. Supporting Metal Work and Anchors:
37. Protection of Supporting Metal Work:
38. Terra Cotta Setter:
39. Surface Finish, Ceramic Finish and Color:
(See paragraphs 9, 10, 50 to 62 and 69 to 79 of National Terra Cotta Society Specifications.)
40. Inscriptions:
The incised inscriptions shall be directed by the Architect.
41. Co-operation with other Contractors:
42. Pointing:
43. Protection:
44. Cleaning Down:

VII. SCHEDULES

45. Shipment, Delivery and Care:

VIII. RESULTS

46. Inspection and performance:
47. Guarantees:
All terra cotta shall be guaranteed for a period of eighteen months after final acceptance, against all defects in manufacture, including discoloration, crazing, scaling, etc., and the Contractor shall replace at his expense all defective materials during this period.
48. Tests:
49. Rejection:
All material shall be straight and true, free from wavy lines and other imperfections. Any pieces warped, overburned, discolored, spalled or cracked will be rejected by the Architect. The Contractor shall, without charge and in the shortest time possible, furnish new pieces to replace any defective ones rejected by the Architect.

STANDARD SPECIFICATION

for

TERRA COTTA

First Edition

September, 1923

The Standard Specification for the manufacture, furnishing and setting of Terra Cotta has been completed and is now ready for distribution.

This Specification is the result of exhaustive co-operative study and embodies the highest standard of quality, the best features of modern shop practice and the most thoroughly tested methods of incorporating Terra Cotta in sound masonry construction.

The Standard Specification enables the Architect to specify in detail every factor that makes for entirely satisfactory Terra Cotta.

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PERSONALS

W. P. Hardman, architect, has moved his offices from Amityville, N. Y., to 65 Franklin Avenue, Glen Cove, L. I., N. Y.

Wilson B. Parker, architect, has moved his office from 620 State Life Building to 507 Board of Trade Building, Indianapolis, Ind.

Chas. A. Smith, architect, successor to Smith, Rea & Lovitt, has moved his office from 602 to 800 Finance Building, Kansas City, Mo.

D. O. Whilldin, architect, announces the removal of his office from Rooms 501-2, Title Guarantee Building to his new building at 515 North Twenty-first Street, Birmingham, Ala.

W. Holmes Crosby, architect, announces the removal of his offices from 1209 West First Street, Oil City, Pa., to Room 414 Veach Building, that city.

Harold Thorp Carswell, architect, formerly of Walker & Carswell, has opened an office at Room 1101 Jefferson Building, 1015 Chestnut Street, Philadelphia, Pa.

The Building and Security Corporation, designers and builders, announce the opening of their offices at 918 East Main Street, Richmond, Va. Manufacturers' catalogs and samples are desired.

A. Thomson Thorne, architect, has moved his office from the Cosden Building to 301 Roberts Building, Sixth and Main Streets, Tulsa, Okla., where he would be glad to receive manufacturers' new catalogs and samples.

Announcement is made that William I. Deming, architect, has succeeded to the architectural firm of Donn & Deming, continuing the business at the same address, namely, 808 Seventeenth Street, Washington, D. C.

Rudolph Weaver, A. I. A., announces his withdrawal from the State College of Washington to become University Architect and Professor of Architecture in the University of Idaho, Moscow, Idaho.

Announcement is made that Leonard Anthony Gliatto, architect, has opened an office for the general practice of architecture at 64 East Van Buren Street, Chicago, Ill. Manufacturers are requested to send catalogs and samples.

Raymond Mathews, instructor in the College of Architecture at the University of Michigan, desires manufacturers to send catalogs and samples to his home address, 848 Brookwood Place, Ann Arbor, Mich.

It is announced that Bertram A. Weber, architect, will continue the architectural practice of his father, Peter J. Weber, in his offices in the Fisher Building, 343 South Dearborn Street, Chicago, Ill.

Ralph Evans Hacker, A. I. A., announces his withdrawal from the firm of Ernest Sibley, architect, L. C. Licht, Hacker & Hacker, associated, and the opening of his office for the practice of architecture at 1012 Palisade Avenue, Palisade, N. J. He will continue to specialize in schools only.

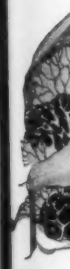
It is announced that N. W. Overstreet, architect, with offices in the Overstreet Building, Jackson, Miss., has taken into his organization C. M. Kimble. Mr. Kimble is a specialist in interior and exterior bank work. Manufacturers are requested to send catalogs and samples.

A. R. Feliciano, architect, formerly of Birmingham, Ala., announces the removal of his office to 33 North Ontario Street, Toledo, Ohio, where he would be pleased to receive manufacturers' catalogs and samples. Mr. Feliciano specializes in schools and ecclesiastical architecture.

Raymond T. Gleeson, Thomas F. Mulrooney and William M. Burke announce the formation of the partnership of Gleeson, Mulrooney & Burke for the practice of architecture, with offices at 404 South Broad Street, Philadelphia, Pa. Manufacturers' catalogs and samples are desired.

Albert C. Martin, architect, Los Angeles, Cal., has enlarged his organization to take care of increased business with Arthur McArthur, formerly of Chicago, as general manager. The office has removed to larger quarters at 228 Higgins Building. Manufacturers' catalogs and samples are requested.

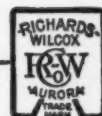
Announcement is made that E. L. Rice, Jr., architect, formerly located at 17 East Seventh Street, Wilmington, Del., has been appointed supervising architect for the Board of Education of that city. Mr. Rice will appreciate any catalogs and samples of building materials, addressed to him at his office in the High School Building, Delaware Avenue and Monroe Street, Wilmington.



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Merely for the few short months of summer—and then only on warm, pleasant days—can an old-fashioned open porch afford comfort and enjoyment to a family. At slight additional expense, *AiR-Way Multifold Window Hardware* will make the

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BOOK NOTES

Domestic Sanitation and House Drainage

THIS book is prepared from notes used by the author in lectures to students. It is written in a clear and concise manner and is well illustrated. It is not clear as to what benefit this book would be to an American architect or student. The English practice is so widely variant from ours that they have little in common. Some of their methods would not be permitted by our sanitary regulations nor thought desirable by our architects.

It is of interest as an exposition of sanitary engineering in countries other than ours and adds to the reader's fund of general information.

Domestic Sanitation and House Drainage. By Henry C. Adams, Consulting Engineer. 228 pages, illustrated, 5½ x 8½. Oxford University Press, New York City. Price \$3.50.

Drafting Room Standards

CAREFULLY worked out details, especially those developed through years of experience, are of value. To the detailer who really masters his work, the study of one type of details unconsciously aids in other types and for that reason all kinds of good details are worth consideration.

This portfolio of details consists of 34 plates drawn to scales of 3" and 1½" to the foot from which tracings can be made, and 18 sheets of specifications. These details and specifications illustrate metal windows of the standard type, projected, standard casements, basement, continuous sash, counterbalanced and double hung windows, also mechanical operators, pressed steel frames and industrial doors. Other details will be added. The details are models of expert draftsmanship.

Drafting Room Standards for All Types of Steel Windows. 34 plates of details, 18 specifications, 8 1/2 x 11. Truscon Steel Co., Youngstown, Ohio. Furnished on request.

Heating and Ventilating Guide, 1923

THIS second volume of the series issued annually by the American Society of Heating and Ventilating Engineers is ready for distribution. Naturally it is divided into two sections—heating and ventilation. A considerable portion of the data is that recently developed by the Research Laboratory of the Society in co-operation with the U. S. Bureau of Mines Laboratory at Pittsburgh. The work of this Research Committee is of great value and its findings represent the highest type of scientific investigation. Other topics are written by recognized authorities.

An article on Warm Air Furnace Heating, by Prof. A. C. Willard, is based on the extensive

series of tests made during the past four years at the University of Illinois. It is an important contribution to a heretofore poorly developed field of heating engineering. The important elements of heat transmission, infiltration, insulation, boilers, pipe sizes, pumps and other factors included in a heating plant are fully covered.

The section on Ventilation contains working charts pertaining to humidity, temperature and air motion in relation to comfort and sanitation. Investigations of the relative effectiveness of roof ventilators, air conditioning, refrigeration and other topics are included in this section.

The book is well written and easily understandable by those having an elementary knowledge of physics. It is essentially a working book as well as a reference book and will be found invaluable to engineers and contractors and to architects who wish to understand the fundamental principles of heating and ventilation.

Heating and Ventilating Guide, 1923. Prepared by the Guide Publication Committee of the American Society of Heating and Ventilating Engineers. 408 pages, illustrated, blue cloth, 6 x 9. The American Society of Heating and Ventilating Engineers, New York City. Price \$3.00.

Architecture Toscane

THIS book is a reproduction of an original edition first published in Paris in 1815. It is the work of Grandjean de Montigny and A. Famin, architects. It contains 110 plates of measured drawings which are excellently rendered. It embraces important ancient buildings in Florence, Pisa, Siena, Arezzo and Pistoja. A chronological table is given of the different architects whose work is illustrated as well as an index, both in French. The preface and description of the plates have been translated into English which makes the book entirely usable by those unacquainted with the French language.

The reprinting of this book places it within the reach of everyone who might be interested. It should find a place in the libraries of architects, designers and draftsmen. It is the first volume of a series of reprints that will be known as "The Library of Architectural Documents." The second volume will be "D'Espouy, One Hundred Selected Plates from Fragments D'Architecture Antique," which has only recently come off the press.

Architecture Toscane. Measured and drawn by Grandjean de Montigny and A. Famin. Reprinted with a Preface and Description of Plates by John A. Van Pelt, F. A. I. A., A. D. G. F. One hundred and ten plates with index and chronological list of architects. Volume I, The Library of Architectural Documents, 9 x 12. The Pencil Points Press, New York City. Price \$6.00.

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When the ordinary shower mixer is set to give water of the temperature desired, and cold water is drawn from adjacent showers, flush valves, etc., the reduced pressure on the cold water line allows a "shot" of hot water to reach the bather. The Powers Shower Mixer removes this obstacle to complete enjoyment of a safe and comfortable bath.

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Bul. 154 gives full information and roughing-in dimensions. May we send it?

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European Design Prize to Honor American Engineer

ALINDENTHAL prize for artistic design, it is learned, has been instituted by the Verein Deutschösterreichischer Ingenieure. It is to be awarded each year to the best design of architectural and engineering character presented at the Behrens school of the Vienna Academy of Arts. The initial award has recently been made for the design of a hydro-electric powerhouse. The prize is named after Gustav Lindenthal, engineer of the Hell Gate Arch and the proposed Hudson River suspension bridge, who was born in Austria.

The Upkeep of Famous Houses

AT the annual general meeting of the National Art Collections Fund, a suggestion was made by Viscount Lascelles, states *The Architectural Review*, London, in one of its recent issues, that a society should be formed to help maintain some of the historic houses of England, which were open to the public, and to relieve their owners from some of the expenses of upkeep.

In the course of his speech Viscount Lascelles pointed out that a large number of our great houses were now no longer inhabited by their owners, who were at a considerable expense in paying rates and cost of upkeep, and, if they allowed the public to see them, to guard and maintain them. He could not help feeling, he said, that the time was rapidly approaching when the owners, however rich, would no longer be prepared to bear such a burden for the benefit of public education. If their society did not feel capable of undertaking it, he felt that some society should be formed to interest itself in a method of maintaining such houses as Syon House and Hardwicke Hall, so that they might be kept in such a condition that the public could see them. It was very hard that the owners should be charged rates and large additional sums for allowing the public to view them. The owners might, as an alternative, realize thousands of pounds by allowing rich men from America to purchase them. As a society they might be able to buy the pick of a collection and show it in a museum, but that was the most they could hope to do.

The furniture and pictures in the magnificent long gallery of Syon House might not be by themselves the greatest works of art (said his lordship), but, taking the long gallery as a complete whole, it was unique in England, and existed nowhere else. The moment it was broken up the individual objects in it became of minor importance. As a complete whole its value to England was unique. It was an epitome of the style of Robert Adam, and could never be replaced if broken up. He felt

that pressure must be brought upon the Government or upon the public to take sufficient interest in these places to secure that they be maintained as they were, so that the public could view them.

He asked, in conclusion, whether the society could not bring pressure on the Chancellor of the Exchequer to recognize this fact and to agree that, if an owner guaranteed that certain interesting portions of his house should be shown to the public, further relief from taxation might accrue to him.

An English Appreciation of Bush House, London

WITH the scaffolding removed, the central block of Bush House, Helmle & Corbett of New York, architects, at last stands revealed in all its ethereal whiteness, states *The Architects' Journal* of London. Not until the flanking wings are added will it be possible to judge the design properly, but if what we now see affords a fair standard of judgment, London is to have a group of buildings at its heart that would do honor to any city. Bush House has its critics; they make much, for example, of its non-axiality with Kingsway. A building that did not stimulate criticism would probably not be worth looking at at all. This, however, is not the place to give a considered judgment of Bush House architecturally. All we would say here is that Mr. Corbett, by raising in the heart of London a typical example of modern American architecture, has rendered English architects and architecture a notable service. He demonstrates convincingly the value of reticence, and the architectural effectiveness of plain, smooth surface. Professor Reilly put it very clearly, if rather picturesquely, when he said that Bush House has the appearance of being clean-shaven while many of its neighbors have grown whiskers. Bush House will have done excellent work if it does no more than stimulate a certain amount of activity with the razor.

Discovery of the Bell of St. Mochaoi

DURING the course of some recent excavation work at the ancient ruins of Nendrum Abbey in Ulster, England, some workmen, while clearing debris from the foundations of walls, found hidden in an angle the ancient ecclesiastical bell of Nendrum. The bell is made of riveted wrought iron, originally covered with a coating of bronze, and, except for a crack at the base and a portion of the handle torn off, is perfect, though much corroded. There is little room for doubt, states the Ulster Association, that the bell is actually that of St. Mochaoi, given him on his ordination by St. Patrick.

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A PRIVATE GARDEN, CORDOBA, SPAIN
(From the photograph by Francis Howard)

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