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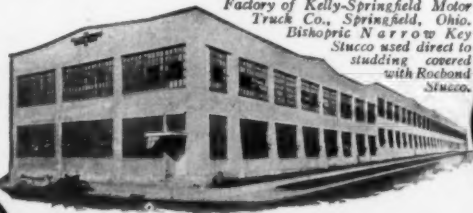
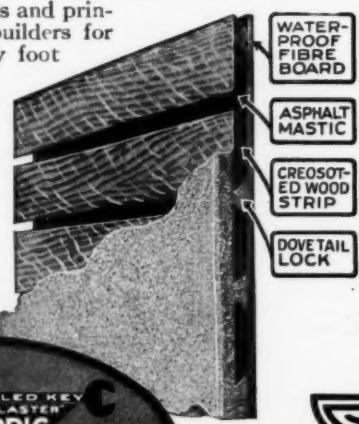
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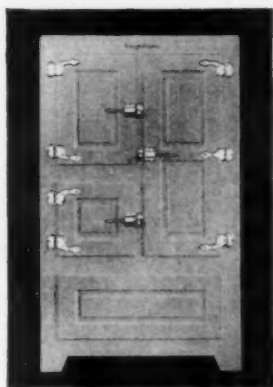
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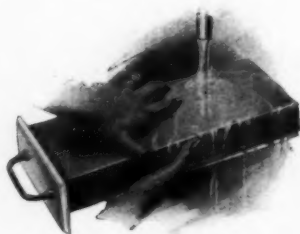
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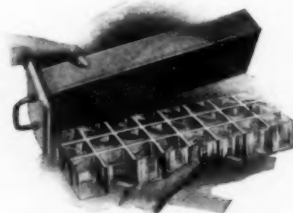
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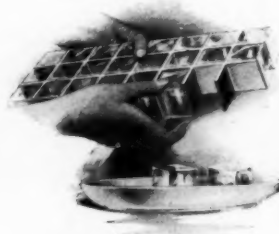
Frigidaire dimensions: small food compartment, 12 inches high, 15¼ inches wide, 18 inches deep. Large compartment, 39 inches high, 15¼ inches wide, 18 inches deep, with 5 double-tinned, removable, wire shelves. Height of **Frigidaire** 67½ inches; Width 39 inches; Depth 24½ inches.



Ice molds are easily released by holding ice draw under faucet



Illustrating ease with which ice molds are released



Illustrating method of releasing individual ice cubes

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Architects of America— Who Are They?

It is an unfortunate outgrowth of the fact that in many states anyone may call himself an Architect, but it is undeniably true that many Advertisers who are seeking the attention of the Architectural profession fail to distinguish between the Architects of America and a host of almost-but-not-quite Architects that exist on the outer borders of the profession. Some day, perhaps, there will be the sharp defining line that is so sorely needed, but until it is in sight Architects who are Architects will have a right to resent any Advertising or Selling policy that attempts to include them in a heterogeneous collection with contractors, material men and others whose professional interest in building is nil.

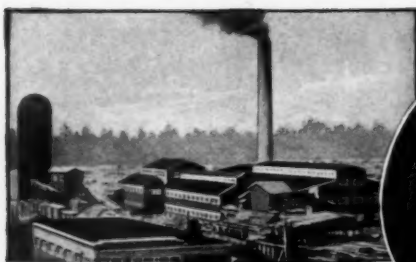
The Architect, who functions properly, is the jurist of the building business. He deals freely with evidence, but he resents the shadow of an attempt to introduce influence. And the Architect who functions thus is the only one entitled to the name.

But this is by no means the sole factor in the formula for identification of Architects. They neither have nor claim monopoly of integrity. It is merely one of the essentials. Beyond this, they serve competently as professional advisers—as expert counsel. In other words, they possess the extraordinary collection of attributes and abilities that enable a man to set himself up as a Master of Building. Necessarily, on such a basis, they are known chiefly by their works; seldom by the fact that they have acquired licenses or lack them.

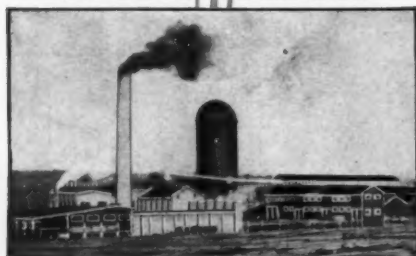
These men are listed in the same classified directories with an army of others whose talents run in different channels, but who choose to call themselves by the name Architect for want of something more accurately descriptive. Thus the novice in Advertising to Architects is apt to be misled into the belief that there are several times as many Architects in the country as really could be found if a careful search were undertaken. And it too often happens, also, that the same novice finds himself visualizing the wrong kind of Architect in his effort to approach the field.

It is in this respect, particularly, that the strictly professional journal of Architectural practice renders a joint service to Architects and to those who have a message for Architects. Its subscription list is a real key to the profession, as distinguished from what may be termed the "popular" side of the field. It brings to the profession many messages of the highest importance and it carries such messages directly and efficiently to the Architects of America for whom they are intended.

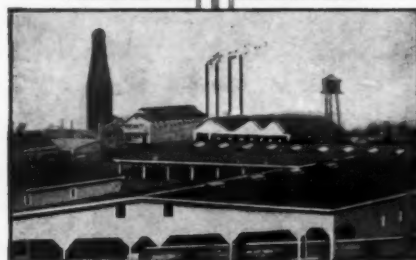
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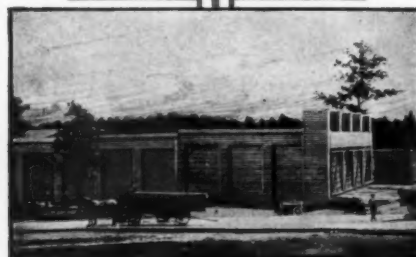
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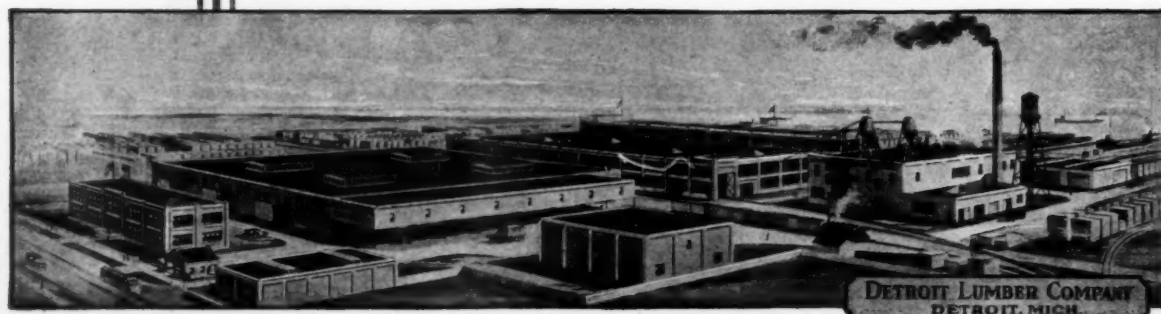
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THE AMERICAN ARCHITECT

Founded 1876

Volume CXVI

WEDNESDAY, SEPTEMBER 10, 1919

Number 2281

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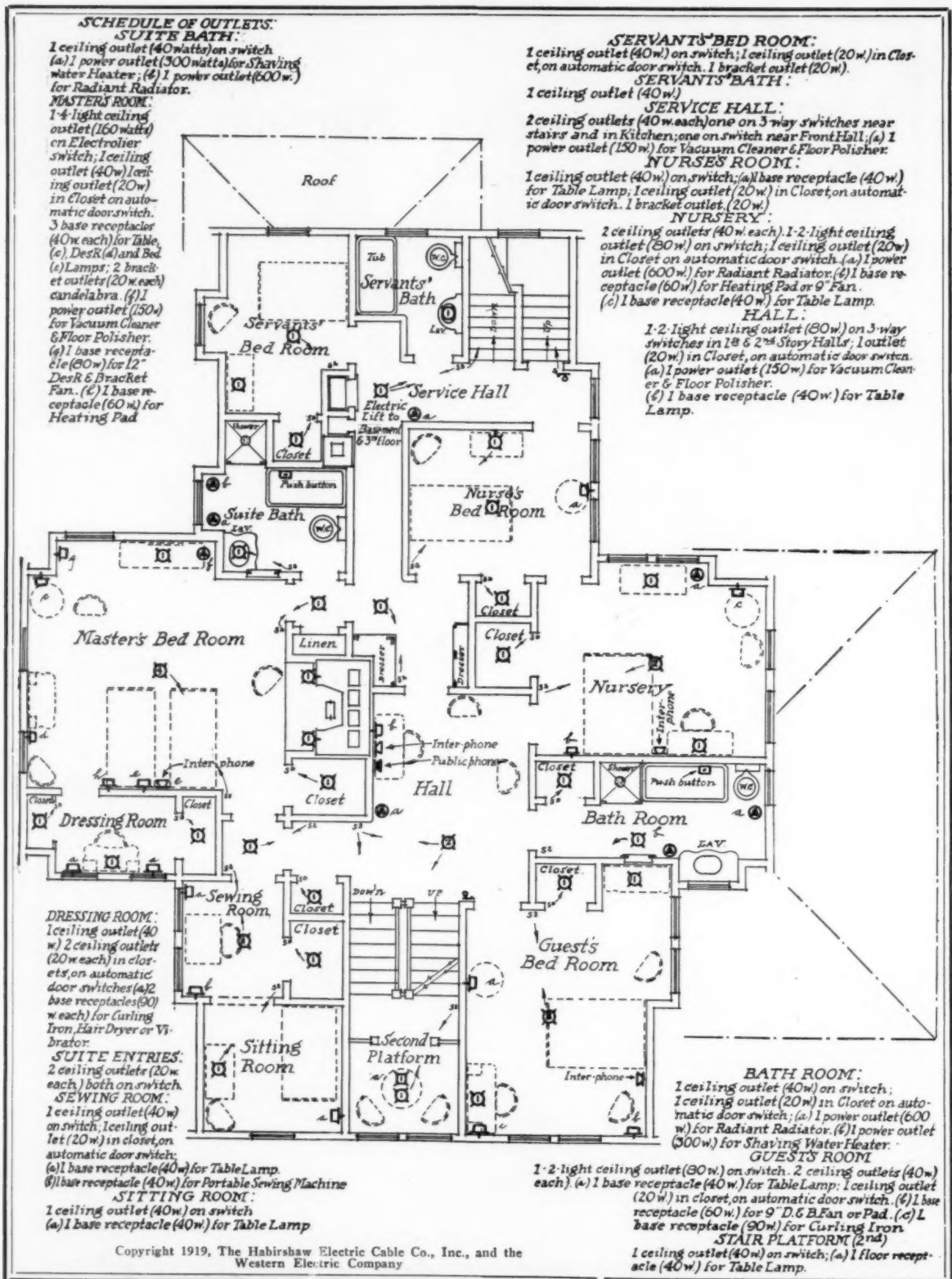
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This is one of a series of four drawings showing details of a complete electrical installation in the home. Our Engineering Department will be glad to furnish architects with this series as well as with other useful electrical data and information.

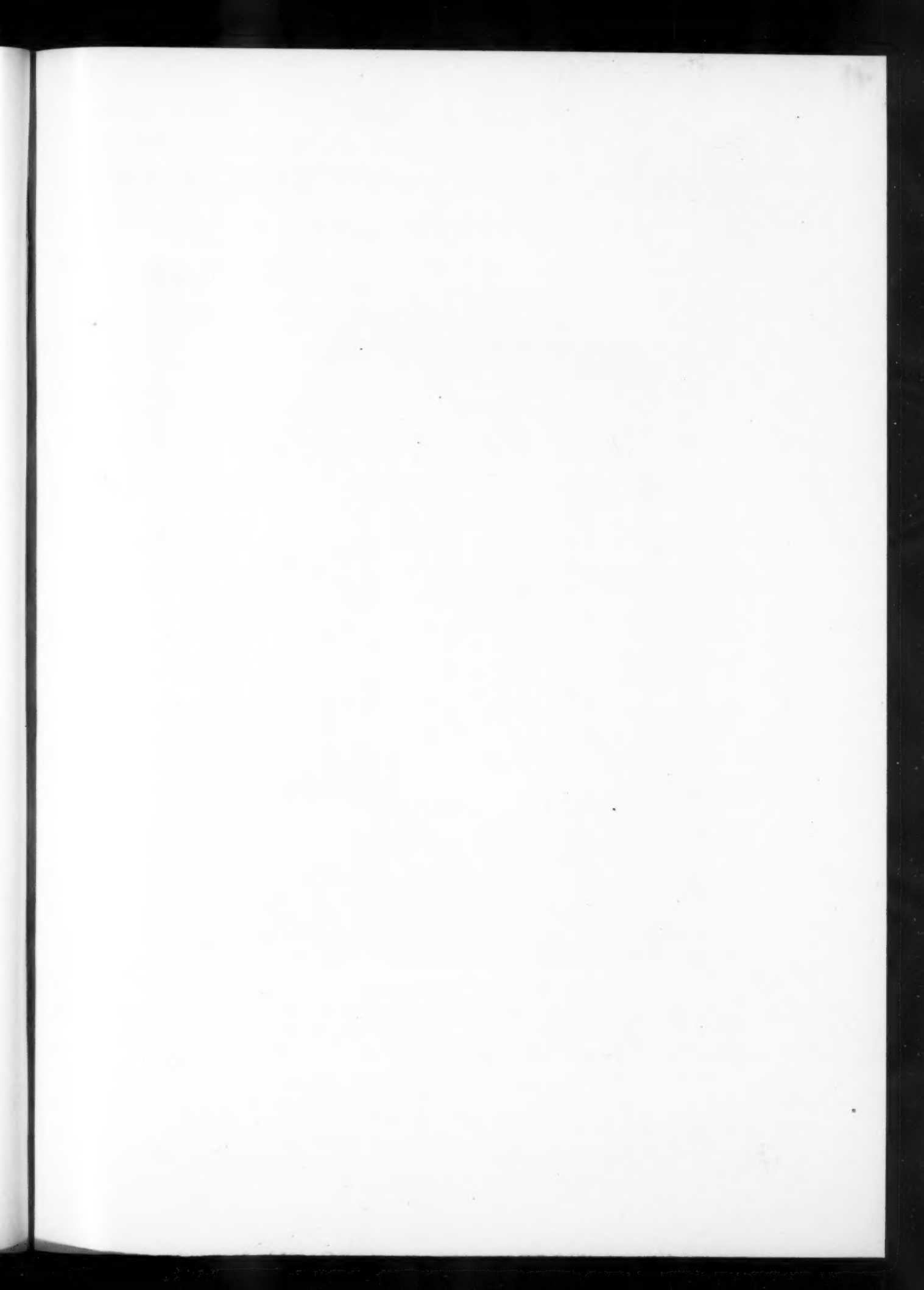
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VOL. CXVI

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BERNIER STREET BRIDGE OVER BRIDLE PATH

Some Bridges of Boston's Park System

By J. A. SCHWEINFURTH

IT sometimes happens that Nature offers to the ready hand of the landscape architect a wealth of crude material. So it is in the case of Boston, whose abundance of outlying marshes, intersected by meandering streams, was early utilized for a park system, which for variety and extent has become the envy of its rivals.

This system begins at the Boston Common and nearly encircles the city, ending at Marine Park, South Boston. It has been in process of development for many years, and millions have been spent in attaining that perfection which is now becoming apparent. As in the architecture of buildings, that subtle effect which we in this new country call "weathering," and in ancient lands we recognize as the gnawing of the tooth of time, so in landscape architecture. Not less than twenty years are required to show the full beauties of such a system of parks as we have here in contemplation.

In looking over some official photographs made by the Park Commission on the completion of various bridges, roads, plantings, and comparing them with those presented in this brief note, one becomes deeply impressed with this fact. As the celebrated French surgeon, Dr. Ambrose Paré, in one of Alexander Dumas' stories, said when highly commended for his apparently wonderful cures, he was not to be praised, as he only administered the medicine—but God made the cure—so the landscape architect can rest assured that in time Nature will vivify his work and make it beautiful, if he but do his own part well. And it will also be charitable and cover a multitude of sins. Many have been long familiar with these scenes; but if they have not visited them for two or three years, while Nature has been getting ready for this exhibition to show Man how much he depends on her for all that really counts, there awaits them a wonderful surprise, a refresh-

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BELLEVUE STREET BRIDGE

ment, a relief from straight lines, from brick, mortar and stone, from all the crude form and color of things constructed by the hand of the human architect.

June is the month in which to view these scenes—for then there is the atmosphere of growing things, and all is fresh and new, with the tones of yellow and of green, of lush emerald, and those juicy rich blue greens, with brown tree trunks showing against golden green, or bathed in blue black shadow, and the dusky dull green of the shadowy arches, reflected in the slow moving waters; waters lined by the yellow, the green and the purple-blue iris, and the aggressive cat-tail, and navigated by the wild duck followed by his young brood. In such scenes as these one begins to appreciate the marvelous skill of the landscape architect whose work has made all this possible; for this park was designed by Man—by Man who knew that Nature loves to co-operate by spreading her rich green mantle over his crudities, blending all into one opulent harmony.

That part of the parkway extending from a point in "The Fens" near Simmons College, through Longwood and Brookline near the Massachusetts Psychopathic Hospital, perhaps a distance of three-quarters of a mile, contains more beautiful bridges, with their superb natural accessories, than will be found in any other park known—at least to the writer. In this narrow area were taken the views here presented.

The most interesting of all is the "Fens bridge," near Simmons College, built in 1890 at a cost of about \$28,000. It is of

almost Cyclopean construction, the parapets being of huge blocks of roughly dressed pudding stone, laid with wide open joints, free from all mortar, below which the walls are of huge natural boulders, laid with wide joints of loam to encourage the growth of green things therein. All of the masonry is exceedingly "rustic," the voussoirs of the archway only being roughly cut, and laid in cement, this being the only place where mortar is used in the surface construction. Like many of these bridges, it is built on spruce piles over which is laid planking, all of course being submerged. Nature has apparently appreciated and accepted the imitation of open and of loam-filled joints, and so has decorated them with her usual green and gold in Spring—to be followed later with the red, yellow, russet and brown of Fall, for there are little trees here growing in the crannies of rocks and all manner of green creeping

and spreading plants clinging to the richly tinted stones which makes, under a blazing sun, a riot of color—and turns this mass of huge rocks into a living thing of exceeding beauty. It has thrown out beckoning hands; Nature has responded, and this harmony results. This bridge is the work of the Olmsteads of Brookline.

The two views of the Bellevue Street bridge show a simple segmental arch, which with the



BERNIER STREET FOOT BRIDGE

THE AMERICAN ARCHITECT



LONGWOOD AVENUE BRIDGE

masonry over it, is built of seam faced granite, the rigid straight-cut stone coping alone being out of harmony with the scene. It is rich in color, and its landscape setting unequalled anywhere, each view making such a beautifully composed picture that one wonders why it has never been painted by some of the numerous painters one so often sees hastening through these scenes with elaborate kit and preoccupied air.

The Bernier Street foot bridge, Longwood, is

a noble span of an attenuated arch of seam faced granite, covered with an iron balustrade, all of exceeding simplicity, its whole design light, airy and free, indicating its use as a foot bridge only—a triumph of design by Henry F. Bryant, Landscape Architect and Engineer, of Brookline. In the distance can be seen the top of the tower of that church in Longwood which it is said the late Prof. Charles Eliot Norton thought the most beautiful piece of architecture in America. This is a tradi-



BRIDLE PATH BRIDGE

THE AMERICAN ARCHITECT

tion handed down by Mr. Norton's friends, but which it has been impossible to confirm. It has always reminded one, however, of Billings' book of examples of architecture—or those early books of architecture found in auction sales, with crudely colored lithograph illustrations of villas, country seats, churches, etc. A few years ago, before the foliage had developed as now shown, this bridge with the church tower would have made a fine subject for a painter. This bridge has, as most of the others, been vastly helped by the foliage concealing the substantial abutments, giving them a light and airy look. The wrought iron balustrade further helps this aspect.

The Bridle-path bridge, near Brookline Avenue, takes care of a roadway above and a pathway at each side of a water course, below. It is the most complicated bridge in this part of the parkway and is of dressed granite, with groined brick vaulting over the arched ways.

The Bernier Street bridge over a bridle-path is of seam faced granite with brick vaulting in the arched way, and a tool-house in one abutment.

The Longwood Avenue bridge is the largest and most important of all the bridges of the system, and one does not remember to have seen such an

impressive segmental arch since the Rialto in Venice. It has a noble span of one hundred and twenty-five feet at the water level, and ranks among the large arches of this country, if not the largest. It is entirely of masonry (except the foundation which is of concrete and which nearly meets under the stream), the material being a beautiful rich toned seam faced granite, the vault of the arched way being of the same material; the echo here is quite impressive. It supports a wide roadway bordered by a pathway at each side, which cares for the considerable traffic crossing the park system between Boston and Brookline, and cost \$250,000 some fifteen or twenty years ago. The late Edward Atkinson, famous economist, strongly advocated a steel bridge here, as there would be a great saving of money thereby. This beautiful and impressive work, by Shepley, Rutan and Coolidge, architects, has, however, saved the feelings and prevented the execrations of future generations, as one can easily imagine the effect of a steel bridge in such surroundings.

The small tile roofed building on a pathway at the edge of a steep declivity here forming a shelter, makes a Belvedere when viewed from the lower and distant levels, the lower part being util-



BELLEVUE STREET BRIDGE

THE AMERICAN ARCHITECT

ized for a tool house. Although not a bridge, it is presented here on account of its superb setting, and the unusually attractive tile roof. These tiles have the effect of the very thick, imbricated scales of a pine cone, and more nearly approach the effect of old Spanish or Italian tile roofs, although so entirely different in shape and dimensions. One wonders why this type of tile, so much superior in appearance to the usual American tiled roof with its hard, mechanical steel-like lines, could not be used in preference to the prevailing kinds made and used in this country. On this conical roof, from every point of view, the heavy tile ends lead the eye in beautiful, pleasing curves, and it is of a good dull color, not the raw and inflamed crude red product of many of our tile makers.

In wandering through these charming surroundings, one is struck with the scarcity of visitors.



THE FENS BRIDGE

same question to himself. It is the same question one asks when strolling through the Art Museum, and one wonders if "the people" care for Art, or combinations of Art and Nature such as are seen in this parkway, and will they ever care. If not, why should they be provided for the few, or for visitors from less favored communities? There is no question, however, that the possession of such surroundings does put a city on the map, and does create a certain prestige and it also undoubtedly inculcates a large amount of civic pride.

There are beautifully designed bridges, blended in with natural accessories, charming vistas, shaded paths and roads, seats and secluded nooks, and yet so little appreciated. Are the millions thus spent so generously for parks for the people's benefit wasted? This question, put to a park official, elicited the reply that he had often put the



LONGWOOD SHELTER

The National Association Building

STARRETT & VAN VLECK, *Architects*

(For illustrations see plate section)

WHILE no distinctively American type of architecture has been developed, yet the stamp of the new world is as plainly marked on our buildings as was that of ancient Greece or Rome. A certain touch or daring treatment for which no precedent had been established marks the American spirit as incorporated in its buildings.

As cities in the new world increased in population, a feature peculiar to the western hemisphere was noticed. The height of our buildings increased. First ten and twelve-story structures were erected, then twenty and thirty, and finally that notable example of Gothic adapted to a commercial structure—Cass Gilbert's Woolworth Building—lifted its towering yet graceful mass some fifty-five stories above the curb.

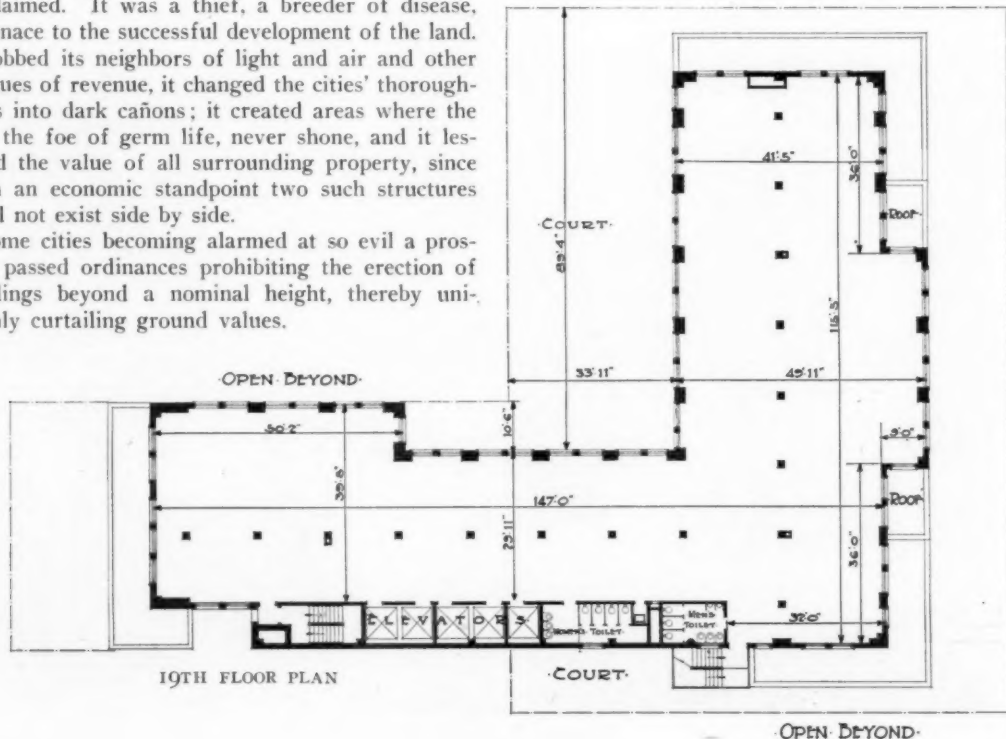
Foreigners visiting our shores were eager for a glimpse of our wonderful "skyscrapers" whose fame had reached to all the quarters of the globe.

Soon the evils of the skyscraper were loudly proclaimed. It was a thief, a breeder of disease, a menace to the successful development of the land. It robbed its neighbors of light and air and other avenues of revenue, it changed the cities' thoroughfares into dark cañons; it created areas where the sun, the foe of germ life, never shone, and it lessened the value of all surrounding property, since from an economic standpoint two such structures could not exist side by side.

Some cities becoming alarmed at so evil a prospect passed ordinances prohibiting the erection of buildings beyond a nominal height, thereby uniformly curtailing ground values.

But New York City could not so easily cast down her idols. A commission was appointed, a careful and painstaking study made, and the result—embodied in the zoning resolution—is now being utilized for the benefit of many other cities. This resolution became effective July 25, 1916, and is designed to limit the location, height and areas of buildings. Its framers believed that by its provisions future buildings were safeguarded against former evils.

Although in force some three years, no really high structure has been erected under its provisions and limitations, and it is therefore of interest to note the influence induced thereby on the architectural treatment of the future skyscraper. It aims to limit the bulk of buildings in such a manner that to both itself and its neighbors is reserved for all time sufficient light, air and ventilation to promote the health and welfare of the occupants of the buildings erected in conformity with its restrictions.



THE AMERICAN ARCHITECT

This can be judged to some extent by a careful study of the accompanying illustrations of the proposed National Association Building to be erected at 19 to 31 West Forty-third Street, extending through to Forty-fourth Street, of which Starrett & Van Vleck are the architects. This section of the city was laid out by the Zoning Commission as a "two times" height district. Here the perpendicular walls of the building may rise to a height twice the street width, and above this level the walls must be set back one foot horizontally for each four feet that they extend vertically. As the two streets on which the plot fronts are of different widths, the set-backs vary on the Forty-third Street and Forty-fourth Street façades. Rather than simulate a pyramidal form by adding set-backs at each story, which would also complicate the structural design, these were arranged to occur at but three intermediate levels on the Forty-third Street front and four on the Forty-fourth Street front as follows:

Forty-third Street façade—A perpendicular wall on the building line from the curb to the thirteenth floor level, where a 15-ft. set-back occurs; a perpendicular wall from this level to the eighteenth floor level, where the set-back of 8 ft. 6 in. occurs; a perpendicular wall from here to the twenty-first floor or main roof level, and a 6-ft. set-back for the walls of the top story.

Forty-fourth Street façade—A perpendicular wall on the building line, from the curb to the eleventh floor level; a 5-ft. 6-in. set-back, then a vertical wall to the thirteenth floor, another set-back of 14 ft. 6 in., and a vertical wall to the eighteenth floor, where another 6-ft. set-back occurs for the top story walls.

The intermediate terraces formed by these set-backs are a positive asset to the structure, for not only do they serve the purposes contemplated under the zoning law, but they also provide areas which may be used to good advantage as roof gardens or similar purposes.

The ground area of the building is regular in shape and has a frontage on Forty-third Street of 142 ft., running through 200 ft. 10 in. to Forty-

fourth Street, where the frontage is 50 ft. The construction is of skeleton steel with concrete floor slabs. The exterior has a limestone façade with a granite base for the first three stories, above which the material is brick with limestone belt courses, sills, cornices and other embellishments.

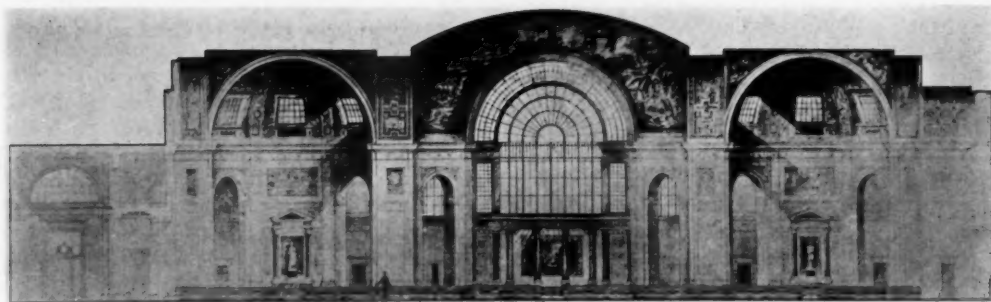
As will be noticed by reference to the first floor plan, the entrance hall at the street level is in the form of an arcade. It has marble floors, an 11-ft. high wainscot with a groined ceiling. There will be shops on either side of this arcade.

The office arrangements, as shown on the plans, provide an unusual amount of light and air and the most modern equipment. They will have cement floors, metal finish throughout. The building will be served by eight elevators of traction type, four for local and four for express service.

With the completion of this important building, located in what will probably eventually become the center of New York's office building district, opportunity will be afforded to observe the result of painstaking effort to evolve principles of zoning that will overcome many deterrents to the legitimate expansion of Manhattan Island.

There is no doubt that an area improved on the set-back principle so well worked out in this instance will present a skyline so thoroughly attractive in appearance, so perfectly conserving those essentials of light and air that are necessary in restricted areas, and so completely satisfactory from an artistic point of view as to be in marked and most satisfactory contrast to the present development of the lower Manhattan, or Wall Street district, whose gloomy cañons have robbed it of a large part of its income-bearing possibilities.

Cities in this country will no longer be developed on the good old plan of "he may take who has the power and he may keep who can." With efficient zoning laws, honestly administered, there will be no risk attached to ventures in building operations such as has marked the past. Nor will the selfish and arbitrary encroachment of a building on its neighbor be possible, and we shall no longer observe a one-time good investment ruined by the unrestrained encroachment of another.



LONGITUDINAL SECTION OF GREAT HALL

The Cunard Building in New York

BENJAMIN WISTAR MORRIS AND CARRERE & HASTINGS, *Associated Architects*

ON a site bounded by Broadway, Morris and Greenwich Streets, a location particularly interesting to the student of old New York, there will soon be erected a twenty-one story office building to house the New York offices of the Cunard Steamship Company, Ltd., and its allied and subsidiary lines.

This structure is probably the largest building operation that will have been undertaken since the cessation of building incident to the war. It is significant and interesting that the promoters of this important building operation were so very certain during the progress of the war of the successful future of business relations between this country and Great Britain that the negotiation for the acquisition of the plot and the designing of a suitable building were begun during that period and consummated as long ago as February of last year, or nine months before the signing of the armistice.

The base area of the site is 48,400 square feet, which is about 2,000 square feet less than the base area of the Equitable Building, the largest office building in the world.

The building will be twenty-one stories in height and will have a rental floor space on the varying

floors from 25,000 to 30,000 square feet, with a total floor area of more than 700,000 square feet. It is expected that it will be completed not later than October, 1920.

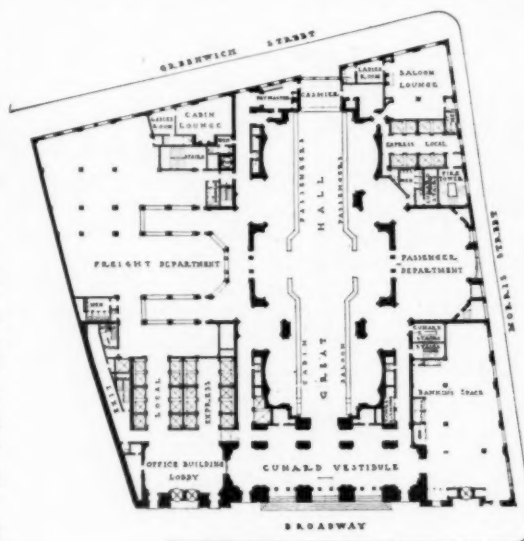
The equipment in this building will be of the most modern type and it will be interesting to make mention of the more important features. As a characteristic detail, it may be stated that there will be 28 high speed passenger elevators, while the

necessary freight elevators are to be totally distinct from the passenger service and will have a separate approach. Another feature of the building that will give a certain exclusiveness to its tenantry is that the entrance hall will not be encumbered with news stands, booths and other miscellaneous minor business adventures, but will be kept perfectly clear so that the architectural and decorative treatment may at all times be seen without the presence of these disturbing features.

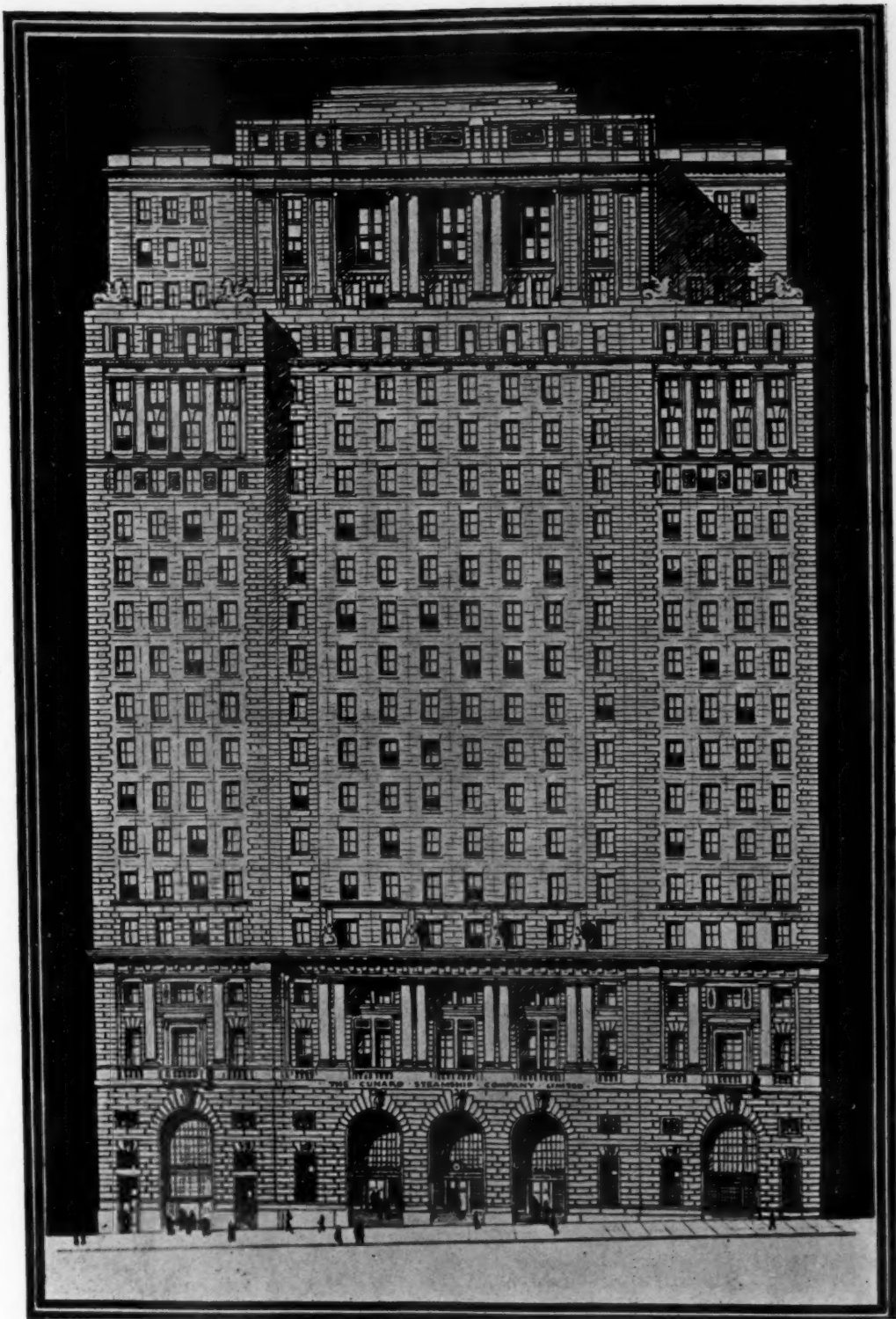
The architectural style expressed in plan and construction is an adaptation

of the Italian Renaissance.

It is interesting to note the skillful manner in which the architects have availed of certain unusual features in the location of the plot. The site being



1ST FLOOR PLAN



CUNARD BUILDING, 25 BROADWAY, NEW YORK
BENJAMIN WISTAR MORRIS AND CARRERE & HASTINGS, ASSOCIATED ARCHITECTS

THE AMERICAN ARCHITECT



PERSPECTIVE OF GREAT HALL, LOOKING WEST

opposite the upper end of Bowling Green where Broadway widens out to Bowling Green Park and the southern end of Trinity Place where that street widens into an open square as it turns into Greenwich Street, is one that affords unusual opportunity for light and air. The floor plans show that there are no interior courts and that in the center of the northerly frontage of Morris Street and at the southwesterly corner of Greenwich Street, there are two open courts, each much wider than the average street in lower New York. There are no inside offices for rent in the building. This building is of fire-proof skeleton steel construction, the Broadway front being of stone, and the remaining fronts of stone, brick and terra cotta.

An interesting feature of the plan is the great hall provided for the passenger department of the steamship lines, an architectural sketch of which is given herewith. It compares favorably with large auditoriums or the terminal waiting rooms of the

railway systems. The floor plans show that this great hall has a length of 185 feet, is 74 feet wide and 65 feet high.

With further reference to the historic location of this building, it is interesting to note that across Morris Street, a few feet to the north, were at one time erected the first white habitations on Manhattan Island, when Captain Hendrick Block built four huts to house the crew of the "Tiger" during the interval between the burning of that ship and the building of the "Restless." With the buildings adjacent to the south, the Bowling Green Building and the Washington Building, the Cunard Building occupies the site of the first Dutch city of New Amsterdam. At No. 1 Broadway, under the Washington Building, is the site of Kocks Tavern, British headquarters during the Revolution. Where the Bowling Green Building now stands at No. 9 Broadway, was for many years the well known Atlantic Garden. Bowling Green, upon which the Cunard Building faces, was for two centuries the social center of New Amsterdam and of New York. It still retains in part the hand-wrought, soft-iron railing put up over a century ago. At No. 3 Morris Street, in a dingy, worn house, which has for several years been a boarding house for Bulgarian emigrants, lived Aaron Burr when he

(Continued on page 344)



8TH TO 14TH FLOOR PLAN

Editorial Comment

A Scrap of Paper

IT is a fundamental truth that the present high cost of living can only be materially reduced by increased production and the practice of the most rigid economy. Organized labor all over the country, apparently, deliberately ignores this truth and is endeavoring to wring from capital concessions the granting of which will have but a temporary beneficial result.

It is unfortunate that organized labor, now intoxicated by an inflated prosperity—a condition as unreal as it is universally unjust—should, in so many instances, show complete disregard for the rights of the public as to ignore agreements that at the time of their making they were willing to regard as binding for the full period of their respective contracts. Evidences multiply that many labor organizations are making unreasonable demands for an increase of wages, ignoring the fact that agreements they have made have yet long periods to run.

A specific instance is that of the Painters' Union in New York City. An agreement entered into by this Union with the Association of Master Painters and Decorators will not expire until December 31st of this year. In this contract a wage of \$6.00 per day and a forty-four hour week are agreed to, but in spite of this agreement the Union is now treating this contract as a "scrap of paper" and insists that the wage shall now be \$1.00 per hour with a forty-hour week, with no work on Saturdays or Sundays. Their demands as to working conditions would practically deprive the master painters of the control of their shops and vest it in representatives of the Union.

This is not an isolated instance of the unreasonable demands of labor. Similar conditions are to be found all over the country.

THE question that naturally arises is: How may this radical element of labor drastically and speedily be taught that it will absolutely lose the respect and support of the very element it looks to for encouragement if it continues a course so antagonistic to the principles it will be necessary to employ if we are quickly to return to normal conditions?

Restating, as an economic truth, the necessity for increased and uninterrupted production as a necessary condition in the reduction of the high cost of living, will it not appear that labor presents an ex-

ample of a group, blindly seeking to accomplish its own destruction? If labor continues to regard with indifference the obligations of contracts solemnly entered into, is there not introduced an element that will prevent the existence of claims that are based on such utter disregard of moral and legal obligations?

In a public statement issued by President Wilson with reference to the present economic condition, he stated:

"Only by keeping the cost of production on its present level, by increasing production and by rigid economy and saving on the part of the people can we hope for large decreases in the burdensome cost of living which now weights us down. * * * Any substantial increase of wages in leading lines of industry at this time would utterly crush the general campaign which the Government is waging with energy, vigor and substantial hope of success to reduce the high cost of living."

It will be well for labor seriously to ponder the significance of an opinion from so high a source and one that will be so well able to influence the action of the Government in these matters.

AS in marked contrast to the general attitude of labor all over the country, there is to be noted, with a large measure of approval, that the representatives of thirty thousand employees of the Midvale Steel & Ordnance Co. and its subsidiary companies, in session at Atlantic City, passed resolutions opposing further demands for higher wages and shorter hours as uneconomic and unwise. This action, it is stated, was taken entirely on the initiative of the workmen and without the knowledge of the Midvale officials.

So excellent an example more generally followed will do more to restore a pre-war status than any amount of mandatory legislation on the part of the Federal Government could accomplish.

ENCOURAGED by the example of the Midvale Steel & Ordnance Co. employes, and further encouraged to learn that a Committee on the Cost of Living of the New York State Federation of Labor had decided in favor of a six-month strike truce, it is regrettable that there is not, as far as the Federation of Labor is involved, any sound basis for elation.

The Chairman of the American Labor party now states, and with considerable emphasis, that his organization will have nothing to do with any anti-

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strike program and will positively not agree to any curtailment of its activities to enforce its demands.

While this is merely an expression of opinion as relating to but one State, it may be fairly assumed that a similar attitude toward the discontinuance of strikes during the period in which the Government will be working out a legislative program, will be followed in a majority of States.

With a cessation of strikes and a general resumption of production in essential lines of manufacture, there would have been afforded an opportunity practically to demonstrate, and especially to labor, that a prime factor in the reduction of living costs was in the uninterrupted progress of all our manufactures and in every department of building construction.

If in view of such stubborn refusal to realize these things as the main element in the solution of our economic problems, labor shall find it suffers from a reaction of popular sentiment, it will have only to blame the unwisdom of its leaders who have utterly failed to read the signs of the times with ordinary perception.

Housing and Labor Unrest

THAT housing problems lie at the root of much of our present labor unrest is undoubtedly true. Opportunities afforded labor, due to abnormal wages paid during the war, to realize certain ambitions, were largely availed of, and found so very good that there is now an earnest intention to maintain a position heretofore considered outside the social pale of the working class.

Undoubtedly, and in spite of the drastic lessons in housing that were learned during the war, the average housing conditions that are available for the laboring classes fall far short of what labor now demands as commensurate with its improved conditions. Types of houses heretofore considered as meeting the requirements of the labor population in large industrial communities are no longer acceptable, and inability to find satisfactory housing within easy distance of the day's work promotes discontent and much moving about to other cities, and increases to a very large degree the generally unsettled condition that is present everywhere.

IN England the question of industrial housing as relating to labor unrest and agitation has been very earnestly considered. So serious has this matter become that the British government has found it

necessary to give its consideration precedence over others that might with reason be regarded of greater importance.

There is no doubt that if the present labor unrest in the United States is to be alleviated, either national or state action must be promptly taken. It is unfortunate that with the signing of the armistice the greater part of the work in housing undertaken by this Government was abandoned. The taking up of these problems under the exploitation of private capital has already resulted in profiteering and has largely served to increase the acute aspect of the entire matter.

Having tasted the fruit of bettered social conditions, labor will not be denied the right to a seat at the board in company with others who, while not so well paid, are yet better housed. Just now it would seem that labor is powerless to change present conditions of housing by any action of its own. So also is the employer; his finances do not permit him to undertake any venture that is outside of his own commercial operation.

Meanwhile there exists in the matter of housing a certain "dead lock" that can only be broken by governmental action.

Every man who has given careful study to the question of the housing of labor will have become convinced, first, of its very great importance, second, that a speedy solution cannot be secured just now either by labor itself nor the capital that employs it, and third, that if early relief is to be secured, it will be necessary for the national and state governments to lend aid, if not assume the greater burden.

IT has been stated by those who have closely observed the underlying causes of the race riots which have recently occurred in Washington and Chicago, that the main cause of these outbreaks can be traced to poor housing conditions. In the course of investigations made in both cities, the statement has many times been made that the principal cause of the negro unrest was due to segregation in certain quarters where the housing conditions bordered on the squalid and where the city governments had failed to carry forward the same details of sanitation and care of the neighborhood that were given to other sections. This being true, it indicates the necessity of good elements of housing and domestic surroundings if the laboring classes are to be afforded all the rights and privileges which as citizens they have a right to expect.

Criticism and Comment

The Cost Plus Fee System

The Editors, THE AMERICAN ARCHITECT:

In the Sept. 3rd issue of *THE AMERICAN ARCHITECT*, Mr. A. E. Wells, president of a building construction company, presents several arguments in favor of the universal adoption of the cost plus fee contract system as the only fair system for both owner and contractor. The subject presented is an important one, and deserves serious consideration by both owner, architect and contractor.

While the cost plus fee system has been in operation in a limited way for many years, it was during the war period that it became operative on a large scale. Since the signing of the armistice and the cessation of practically all of the Government's "war emergency" construction, contractors have again turned to peace time building operations. They have found conditions greatly changed since pre-war days, largely due to labor unrest, but this situation is common in all industries, and must be met by everyone engaged in business.

The safety to the contractor of the Government's system of letting contracts and the speed with which it was possible to proceed thereunder produced many advocates for its continuance in all building activities, whether governmental, municipal or fostered by private capital for economic investment. The discussions pro and con have been numerous and inconclusive. It is therefore profitable carefully to analyze the factors involved in the problem, as related to the arguments presented by Mr. Wells.

In all building work the owner is the important factor, for he makes the building possible and he pays the bills. He desires a specific type of building of a certain size for a definite purpose and at reasonable cost. He consults the architect who proceeds to draw up plans for this project, presumed to be within this reasonable cost. The owner will not authorize the builder to proceed until he is assured that this figure will not be exceeded. The logic of this course was a proverb two thousand years ago, for we read, "No man buildeth—until he first counteth the cost." The cost cannot be arrived at until a careful estimate has been made of the quantities which must enter into the structure and of the value of the labor necessary to place them properly. Neither the materials nor the labor can be computed until the plans and specifications are complete.

Mr. Wells agrees with this, for he says: "But from the owner's standpoint is it not preferable to know in advance what a certain project will cost? It is true that a careful estimate is due him. It should be made by a reliable contractor and checked by owner's architect and engineer."

If the owner is entitled to a "careful estimate" then it is difficult to reconcile with this statement Mr. Wells' further contention that the cost plus fee system results in greater speed of construction. After mentioning several buildings constructed under this form of contract he states: "For these firms we have been able to start actual construction much earlier than otherwise would have been possible, which means early occupancy. The reason for this is that we can start the foundation just as quickly as the foundation plans are complete and further design and construction may go on coincidentally. Money tied up during construction earns nothing until the building is ready for occupancy and the interest often amounts to a considerable sum. When we have opportunity to work with the owner, architect and engineer from the very inception of plans and when we begin foundations as soon as the general contour of the building and equipment are determined upon, we are able materially to cut down the period during which the owner's capital is unproductive. Under the lump-sum contract it is necessary that the plans be complete before bids are taken, which may delay occupancy for months, and without occupancy a building investment is poor as a dividend producer."

This statement seems illogical as well as contrary to the previous one. At the time the "general contour of the building" has been determined, it would be manifestly impossible to make any careful estimate of the cost of the completed structure and the chance of making subsequent alterations due to changes in the plans as they are developed is great. Again the statement that the foundations can be started as soon as the foundation plans are complete, while further design and construction may go forward coincidentally, seems at variance with the usual procedure. The purpose of the foundations is to support the weight of the building. To first design the foundations, and while these are being constructed, to design the building to fit them seems as foolish as making the foot fit the shoe, when the reverse process is more reasonable. A proper foundation plan *cannot* be made until the building plans have been well developed,

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in order that the loads coming upon them can be computed with a fair degree of accuracy. Engineering is too exact a science to countenance rough guess work in such an important item.

Emergency war work constructed for the Federal Government consisted very largely of temporary buildings, immune from local building ordinances. Many of these are already being dismantled. The situation obtaining was vastly different from peace time conditions. The buildings were necessary at any price, and speed—not cost—was a paramount condition. To apply methods adopted to meet such conditions to buildings erected by private capital to provide an adequate financial return on the investment would seem unwise.

But Mr. Wells again jumps to an unwarranted conclusion when, with a sweep of the pen he embraces the crap shooter and the building contractor in the same vicious circle, the latter, however, gambling for larger stakes, with the owner as the loser. The cost plus fee system, he points out, furnished a mutual protection of contractor from owner and vice versa. The fact that hundreds of reputable contractors have been engaged in a profitable business for years on the "lump-sum" system, giving satisfaction to both architect and owner in each operation refutes this unwarranted conclusion that contracting is simply a gamble. In the gambling game all parties thereto are not satisfied with the results, yet in the building industry we can find thousands of cases in which mutual satisfaction existed between all parties at the completion of the work. *There is no more an element of gambling in the building industry than in any other line of legitimate business.* The man lacking the knowledge and experience necessary to qualify him to engage in building, and unwilling to assume his just share of responsibility, belongs in a salaried position under another's direction, and not with those who successfully grapple with to-day's problems.

With complete plans there is no gamble necessary to determine the actual quantities entering into the structure. Competent "quantity surveyors" are to be had whose figures are as reliable as those governing the engineer's design. These materials can all be signed up in advance at current market prices. To arrive at the value of the labor necessary to place these materials requires excellent judgment, a competent organization and adequate experience in building work. If there is a possibility of increased labor costs during construction, this can be covered by a clause in the contract, the owner acknowledging the estimate as based on current labor prices, and agreeing to pay the added labor cost, should this occur. An estimate of what

this would amount to could be furnished in advance.

Finally in the matter of "fairness" to the building contractor, Mr. Wells again goes astray. The cost plus fee contract, if it is a fair system, is fair only to the general contractor. At best he constructs but a small part of the building, leaving the large proportion of the work to be done by sub-contractors, each of whom he carefully signs up on a "lump-sum" contract, failing to show them that same degree of fairness which he demands for himself.

The universal adoption of the system advocated by Mr. Wells would ultimately result in the general contractor losing his status as a responsible man of business, and becoming but a highly paid architect's superintendent of works and purchaser of materials. Sooner or later his actual status would be discovered and he would disappear, being replaced by the architect who, from his own office would supervise the construction and employ such supervisors as the work justified, paying them on a salary—and not a percentage—basis.

A SUCCESSFUL LUMP-SUM CONTRACTOR.

The Licensing of Builders

The Editors, THE AMERICAN ARCHITECT:

In your editorial comment in the issue of August 6, on the declaration of the Building Officials Conference in favor of a licensing system for builders, you take a position which, unless it can be supported by better argument than you have so far presented, is in my opinion entirely untenable.

You seem fully to concur in the views expressed at that conference, which views you quote, to the effect that the art of building is lost, that the builder though formerly a mechanic was such no longer and that unsafe building was the rule and due to incompetent builders.

You further seem to agree with these gentlemen that a license, based presumably upon manual proficiency in the use of the tools of a mechanic and the solution of certain set academic problems in construction and the payment of a fee, is the logical cure for present ills and would tend to restore the defunct art of building.

The speaker quoted by you as having so poor an opinion of present day efficiency among builders was reported by you as stating that the trouble complained of by him was caused by moneyed institutions backing would-be builders and offered the license proposition as a cure for that trouble.

There seems much to contradict both in the views of the building official quoted and in your conclu-

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sions based partially thereon. Neither the art nor the science of building shows signs, in any general way, of decadence. On the contrary, builders of to-day are accomplishing feats in construction more difficult in all respects and with more speed and greater degree of success in every way than those of any former time.

If it be true that the art of building has passed and that builders are no longer mechanics and a law is desirable providing that mechanics only shall be licensed to take contracts for buildings, who are to be our licensed builders? Foremen of working crews would probably pass the necessary examinations but they would be builders under the present system had they the qualifications named in a "definition of a contractor" by the Associated General Contractors quoted and disparagingly commented on by you.

The average foreman may be conceded to know more about the mechanical end of contracting and building than the average contractor but licensed or unlicensed he would, as a general rule, make a sorry mess of contracting. The foreman would not fail as a contractor because he had not "acquired the knowledge of how to properly construct a building" nor because he could not compute accurately the quantities and values but simply because he lacked the qualities of mind essential to successful contracting as enumerated in the "Definition of a Contractor" promulgated by the Associated General Contractors. The possession of the qualities named in that excellently worded definition would make a contractor every time, with or without an "office and telephone," yes and with or without a license.

"Having the sense that tells a man values without estimating" or "the sense that tells a man quantities without measuring" and with both these "common sense," a contractor will not need to be told the peril of guessing, but lacking either one of these three senses he will necessarily have to do some guessing if his business gets beyond the one man

dimension. Is it possible that the editor of THE AMERICAN ARCHITECT sees in the "Definition of a Contractor" as worded by the Associated Contractors, advice to determine quantities without measuring or values without estimating? Such seems the inference of the editorial comment on this definition. Such interpretation seems to be very unfair to a remarkably well worded description of the ideal contractor.

Licensing of contractors as a step toward raising their collective standard of efficiency is not promising of success in that it tends only to better craftsmanship of the individuals who in actual practice are not called upon to so function. No scheme in the nature of categorical examination will discover those qualities most essential of possession by a contractor who would be a financial success as such. It is imperative that the building industry be in the hands of contractors who are financially successful.

As to the annoyance to Building Officials by contractors whose endowments better qualify them for other pursuits, this will probably have to be endured to a considerable extent and permanently, as we have all endured annoyance due to misfits in all lines of endeavor both commercial and professional, not excluding the architectural profession both licensed and unlicensed. There are, however, open for adoption several means of reducing that annoyance to the Building Officials. First and most promising of these seems to me to be the repeal of all lien laws affecting building operations. This would far more effectively check the financing of incompetents than would the licensing system. Another means to the same end would be a change in building ordinances and the attitude of Building Officials whereby the building codes would no longer serve as text books and the officials as teachers of the art and science of building to those who would avoid the expense of an architect's service.

FRANCIS W. GRANT.

Seattle, Wash.

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The Cunard Building in New York

(Continued from page 338)

was Water Commissioner of the City of New York. The Stevens House on the Broadway and Morris Street corner was for a long period, especially during the decade immediately preceding the Civil War, the fashionable hotel of the city. It has existed in its present form since 1846, when it was remodeled by the original Charles Delmonico, and for many years housed his celebrated restaurant.



To the person interested in the sentimental and historic aspects of New York City there is something peculiarly fitting in the rescue of this piece of land from the base uses to which it had descended in the last generation and in the erection thereupon of a building which will not only be a model "skyscraper" but which will also have a historic interest.

How to Light a Movie Theater

The old idea that a completely darkened room is required to show lantern slides clearly was disproved before the advent of the moving picture. It had been demonstrated that the only points to be watched were that the light from without should not fall directly on the screen itself nor shine into the spectators' eyes. Yet moving picture house managers have been slow to realize this. Some of their buildings are even now too dark for comfort. Since illuminating engineers have given much consideration to the topic, this is no longer necessary. Analyzing the problems in-

volved, the *Electrical World* gives the following information:

"When lighting problems are considered, auditoriums of photoplay theaters present a condition differing somewhat from that presented by the legitimate theater because sufficient light must be furnished to permit the audience of the photoplay theater to find its way about, yet the distribution of this light must be such as not to interfere with the picture on the screen. The intensities in different parts of the theater may be materially different, since the surface most vitally important is the screen. It is usually quite practicable to raise the illumination in the rear or at the entrance if the screen itself is properly submerged in darkness.

"In this way a person entering is not at first subjected to so low an intensity of illumination as he is after passing down toward the front of the theater. The minute or two which elapses between the time of entering and the time of reaching an area of low illumination gives the eye time in which to accustom itself to the lower intensity.

"A second requirement of this type of lighting is that the greatest amount of illumination should be thrown upon the horizontal plane; that is, the seats and aisles. It is considered poor practice to throw any amount of light on the side walls because of the effect of reflection toward the screen. Moreover, such light serves no useful purpose. The third point to be considered is the elimination of sources of light from the field of vision. In this category fall such items as bracket lamps along the side-walls or lamps on either side of the screen, if the units are low enough to catch the eye. Such lamps not only tend to disturb the eye, but they also produce depression of vision and cause a diversion which distracts attention from the picture.

"As an example of a method by which such lighting can be worked out, an illustration is shown of a lighting installation at Escanaba, Mich. . . . The lighting is effected solely by means of artificial windows in the ceiling. Above these windows are long boxes approximately 18 inches (45 cm.) in height, painted white inside. These boxes act as diffusers, throwing the light through the windows into the auditorium. The type of glass used gives very good diffusion and efficiency. The lamps are arranged on three separate circuits, allowing for the use of full intensity, a secondary intensity, or a very low intensity for photoplay work. The lamps on the circuit which give the lowest intensity have been so graded in size as to furnish a very low value of illumination near the front of the theater and a higher value of illumination near the rear. This type of lighting directs the greater percentage of light where it is needed.

Evolution of Airship Sheds

By A. R. FAIRBAIRN*

At the present moment the giant airships, which have recently been completed, attract a great amount of interest in that they are the largest yet constructed in this country. Apart from the difficulties attached to their development and construction, it does not appear to be realized generally that the sheds in which they are built are in many ways a development in building which carries constructional engineering far beyond its previous achievements. The airship sheds which are in existence in various parts of the country are in many ways the largest and most remarkable buildings in England.

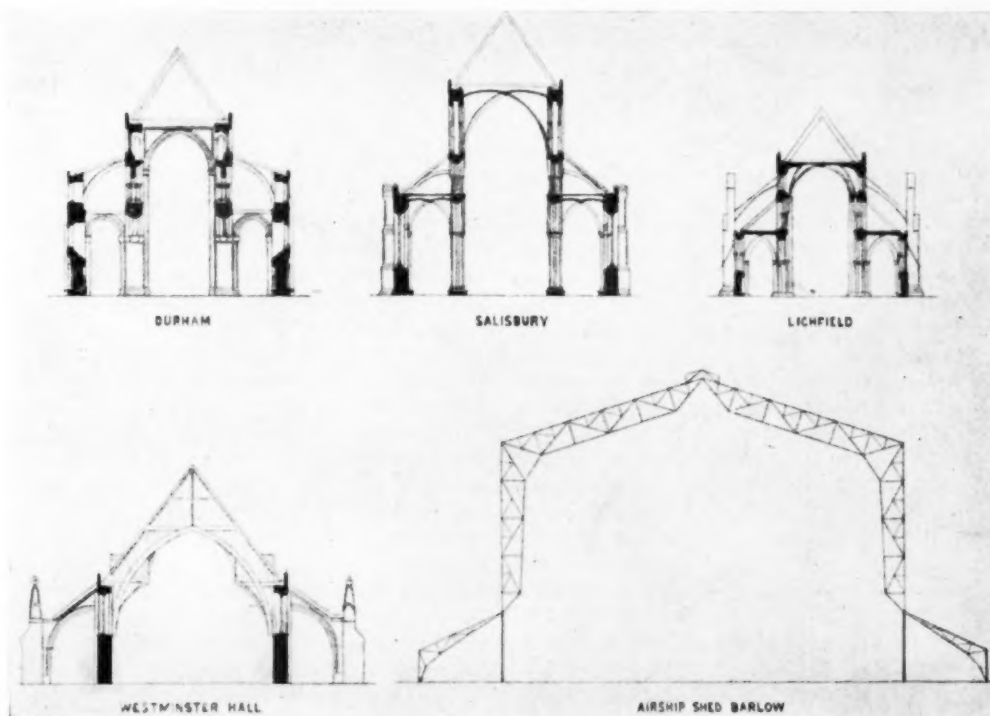
The accompanying diagram shows cross sections of some cathedrals, and as these are all drawn to the same scale their size can be readily compared with that of an airship shed. Curiously enough, these sheds, though built of different materials and being in their baldness of outline the very antithesis of a cathedral, are yet built upon the same

structural principles. The problem in all cases shown on the diagram was to construct a building which should carry at a great height an arch, which in the case of the cathedral is the stone vault seen from inside. It should be pointed out, by the way, that the roofs involve no structural problem and add comparatively little to the load which the walls and piers have to carry.

The section of Durham Cathedral shown on the diagram explains the Norman builders' solution of the problem—the outward thrust of the vaulting arch being resisted by the dead weight of the enormously heavy stone work. This cathedral has the earliest form of a flying buttress existing in England, and it will be noticed how this carries the thrust of the vaulting arch to outer walls.

The section of Salisbury Cathedral shows the early English vaulting carried at a much greater height, the thrust from this being transmitted by the flying buttress, not, as in the case of Durham Cathedral, to a heavy continuous wall, but in each

*Reprinted from *The Builders' Journal* of London.



COMPARATIVE DIAGRAMS, SHOWING EVOLUTION OF AIRSHIP SHED

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case to a buttress designed to carry it. The flying buttress and the wall buttress now become external features.

Litchfield Cathedral is an example of the development of this method of balancing pressures as dealt with in the decorated period. Though the height of the vault is not so great as in the former examples, the whole building is designed on more scientific lines. The flying buttresses are lighter, but are placed in a better position to take, in the direct manner, the thrust from the vaulting. In the case of the external buttress, these are now made not merely more decorative, but more scientific, by being crowned by tall pinnacles, thus adding weight to resist the overturning tendency transmitted from the vaulting.

In the case of Westminster Hall the same principle is involved, though the arch in this case is constructed of timber. This, which is our largest timber-roofed building, has its construction explained at once by the cross section shown. The two halves of the hammer-beam roof trusses are in reality leaning against one another and producing, as in the case of a stone arch, an outward thrust at the top of the walls of the main building. This in turn is upheld by flying buttresses, springing from independent pinnacled buttresses which originally were not connected to each other by any other wall.

Referring to the section of the airship shed, the

similarity between this and the last mentioned building is apparent. The whole shed is constructed on the "three-pinned arch principle," in which at the top of the main steel columns, shown by a single line, and at the ridge of the roof the whole structure is jointed by huge steel pins 8 in. in diameter. These concentrate the stresses due to wind pressure at points where they can be safely resisted without any fear of deforming the steel trusses which form the roof framing.

Just as a cathedral requires aisles—for constructional reasons—so the airship sheds have annexes at the sides which transmit side pressure directly to huge concrete foundations. These resist the overturning tendency of wind pressure on the sides of the shed, and for that reason have larger foundations than the stanchions of the main building, which only take the dead weight of the structure. The external appearance of these sheds is, of course, quite ugly; but internally they have, if not beauty, at least architectural as well as engineering fitness, for there the structure of the shed is apparent and conveys to the mind a sense of security in spite of the enormous span.

Unfortunately, the annexes are entirely separated from the main building by corrugated sheeting. Were they to be opened out the "aisles" which would be thus foremost, would reveal the whole framing and add enormously to the internal effort.

Art, Architecture and Engineering*

By JOSEPH PENNELL

MAY I tell you what many of you may already know, that the great feats of engineering in the past were achieved by artists who were also engineers? This has been true from the very beginning of civilization. Noah was an engineer when he built the ark, and I am sure that he decorated it with colors.

But, to skip from that period down to the time of two of the greatest engineers who have ever lived: one was Michael Angelo. In addition to being an artist, a painter, a sculptor and an architect, he was also an engineer and a poet. He designed (about 1547) and constructed, as an engineer, the whole of St. Peter's (Rome). He put the dome of that church in the air in a most wonderful engineering fashion, did it all himself, and was paid the munificent pittance of \$40 a month and a bag of flour, and then a mere sculptor and

architect got the job and nearly ruined the building. The other, and almost contemporary with Michael Angelo, was Leonardo da Vinci, who likewise was an engineer as well as a painter, an architect, a sculptor and a caricaturist. Leonardo da Vinci built a great many of the fortifications around Milan. He built bridges and designed the first aeroplane known. Whether the machine, if constructed, successfully flew or not, I do not know, but in the British Museum, in one of his sketch books, there is a series of drawings for an aeroplane.

From the time of the Egyptians and the Assyrians down through centuries to the Greeks and the Romans, there was no difference between an artist, an architect, and an engineer. They all worked together, and worked with the same aim—building and beauty. Only a few years ago I went to Panama and saw that most wonderful piece of

*An address delivered before the Engineers' Club of Philadelphia.

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engineering—the Panama Canal. Just before the water was let in, I went down there one day and was talking to Mr. Williamson, one of the engineers, the man who built what they call the “Miraflores” lock and the “Peter McGill” locks. They had other names in Spanish, but that is the way they are pronounced in English. The first time I went to the Miraflores lock to make a drawing, I saw two wonderful Romanesque buttresses in concrete leading up to the great lock gates, and I remember—the following Sunday night, I think it was—we were sitting on Mr. Williamson’s porch, and I said to him: “How in the name of Heaven did you design those Romanesque buttresses just the way the designers of the cathedrals in the south of France did the same work?” He said: “I never heard of any Romanesque cathedrals or buttresses or anything of the kind, but if they built those buttresses the way I did, they were pretty good builders.” Then I asked: “Why did you do it?” He replied: “For two reasons; first, because it is the strongest way to build an arch, and, second, because it saved concrete.”

When I think of an American engineer knowing that much, it reminds me of another story. Colonel Goethals said one day a number of United States Congressmen and Senators came down to the Canal on a special steamer and landed at Colon. One of these gentlemen was good enough to ask the Colonel: “Have you any idea how long this concrete will last?” The Colonel replied: “No, I have no idea how long this concrete will last. Neither did the Romans know. But I know how long theirs has lasted, and this is going to last as long as theirs at least.”

There are many other Panama stories that I could tell you of an engineering type, but what I want to say is this: That, having seen the Panama Canal and other great engineering works of this country and Western Europe, there were several things I wanted to find out, one of which was whether that statement of Williamson’s was so or not, whether the great lines of modern engineering were the same as the constructional lines of ancient art, and I went to Greece, where I knew I could find out whether I was right or wrong, and I found out that the structural, supporting, vital lines in the Greek temples are the same that you people are putting in concrete and steel work in the great iron works and every great building to-day—whether you know it or not, you are doing so, because from the very beginning it has been the strong line, the line of resistance, the line which everybody knows is the right one—the line of best support. The only difference is that in the past the Greeks and Romans devoted their energy and their skill to constructing

temples and monuments while we to-day have our churches and our monuments in the great industrial works, the modern temples—the shrines of work. But every line that you put up is the line which was used three of four thousand years ago in engineering and building. You cannot improve those lines of construction, but only carry on tradition. Of course, instead of stone, you are using steel, but every line is the same, and that is the reason why the work of the engineer is so wonderful.

To get down to hard facts, instead of psychology and uplift and soul and various other things and “isms” of that sort, the proposition has been made that in this country there should be a minister—not of finance, but of art. When you come down to it, that means that this country should have, as every civilized country in the world has, except Great Britain—and she would have had it if she had not had the war instead—a minister to control, direct and advise about art. And engineering is a part of it. We thought that we had done something in that last conference. I do not know that we have, because it means an enormous amount of work, and all the talking that went on there was only preliminary. Nevertheless, we have the idea, and if you adopt that idea of a minister of art, under him will be included the artists, the architects, the musicians, the players, and even you engineers. We are all going to come in under the circus tent because, to go back again for a moment when the Greek engineers designed their structurally perfect buildings, they always had architects, sculptors, and painters to decorate them. And that is what we have to do again to-day. You engineers must work with us, and we are bound to work with you.

Let us consider for a moment one of the great buildings in the United States—Cass Gilbert’s Woolworth Building. He told me himself that it was simply an engineering problem. He said, “I put it up from an engineering standpoint and had to hire engineers really to work out the construction but I wanted to do what the engineers could not do—make that wonderful building beautiful.” And he has. If such a structure were in London or Paris you would take an excursion steamer and go to see it, but now you do not pay any attention to it, except to put your hat on tighter as you go by, lest you might lose it in the wind that swirls round the base. Yet there is one of the greatest engineering problems that has even been solved in this world. The bridges in New York are splendid examples of the same thing. The Brooklyn Bridge and Manhattan Bridge are, owing to your engineers, beautiful in line to artists. Manhattan Bridge has splendid approaches, and we have a chance here in Philadelphia, as Professor Laird told you two months ago,

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to make another beautiful bridge from Camden to Philadelphia. You must make it strong, to last, and the architects and the sculptors will make it beautiful. But in all these things, as I say, you and we artists must work together.

And that leads me to another question: At the present time everybody is thinking and talking about memorials, and every war memorial is to be devoted to the benefit of something or somebody. The whole question of war memorials is rather like a story that is told of a bill that was bought up in the English House of Commons one day. A member got up and said: "I have a great bill to propose for the benefit of Scotland." Immediately a Scotch member arose and said: "And what are you doing for Glasgow?" He sat down and another member jumped up and said: "Nae, it's nae Glasgow. What be ye doin' for Sauchiehall Street?" A third caught the Speaker's eye: "Nae, 'tis not what ye be doing for Sauchiehall Street; it's what'll ye be doin' for me?"

Now, there is just the difficulty with the war memorial in this country. There is no big idea in the big country at all. Every local authority, in fact, every man, woman and child—especially the children—in this country has an idea as to just where the war memorials are going to be, and that they are to go in their town or village or street. That is their idea, and they don't care a cent about the rest of the nation.

When Napoleon won his battles at the beginning of the last century—when he conquered more or less of Germany, and thought he had conquered more or less of Italy, and thought he had conquered Russia, and attempted to conquer England—he built to the very utmost point of conquest his wonderful high roads. There are fifty or sixty of those roads, all starting from Paris to-day. He built

those roads, and then, like the Romans, he decorated them. As you leave Rome by road, if any of you have, as I have, you know there is a road which stretches from the Forum in the City of Rome, straight to the City of Newcastle, England. That road still exists and is used to-day. I do not say that the paving was not pretty terrible, but when that road was built and finished the Romans decorated it, and erected their triumphal arches, their great bridges, their temples, their theatres, all along it from Rome to Newcastle.

Before the war I saw a great deal of Germany. I was there when the war broke out. I do not know if any of you have seen that wonderful steel plant, the Cape of Good Hope Works, at Aberhausen. Well, there are a series of blast furnaces in the background painted every month or so a beautiful blue. The stacks are painted the most gorgeous vermillion, and in front of that wonderful color scheme in the evening, when the sun sets, they have a grass plot. I have never seen such a color scheme in all my life. Little trains carried fiery slag around it, and the color scheme in the evening was beyond words. That thing if put up on the highway—Lincoln Highway—would bring more people to see it than any cathedral or church. It is one of the most wonderful spectacles in the world.

The same thing was being done all "over there" just before they were driven into war. The same thing was being done at some of the shipyards. I have been at some of those yards, Whitworth's and the Vulcan. That German yard is a most beautiful thing, and it was designed exactly like a Greek temple. So are the New York Ship Building Company's yards; the interior of those yards is one of the most wonderful things I have ever seen, and yet they were purely engineering projects, designed on the line of the Greek Temple.



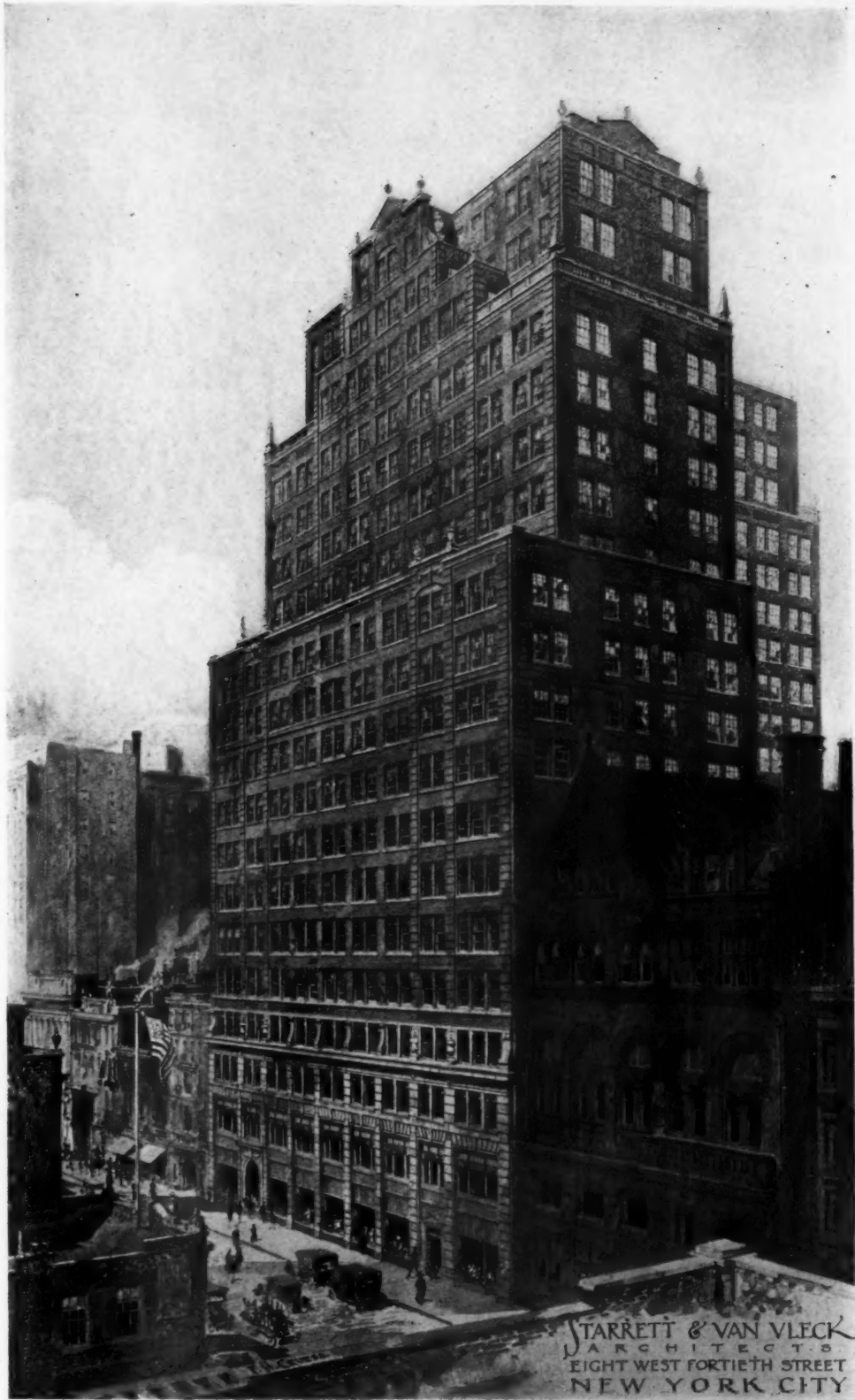


PLATE 95 NATIONAL ASSOCIATION BUILDING, 43RD AND 44TH STREETS, NEW YORK
STARRETT & VAN VLECK, ARCHITECTS



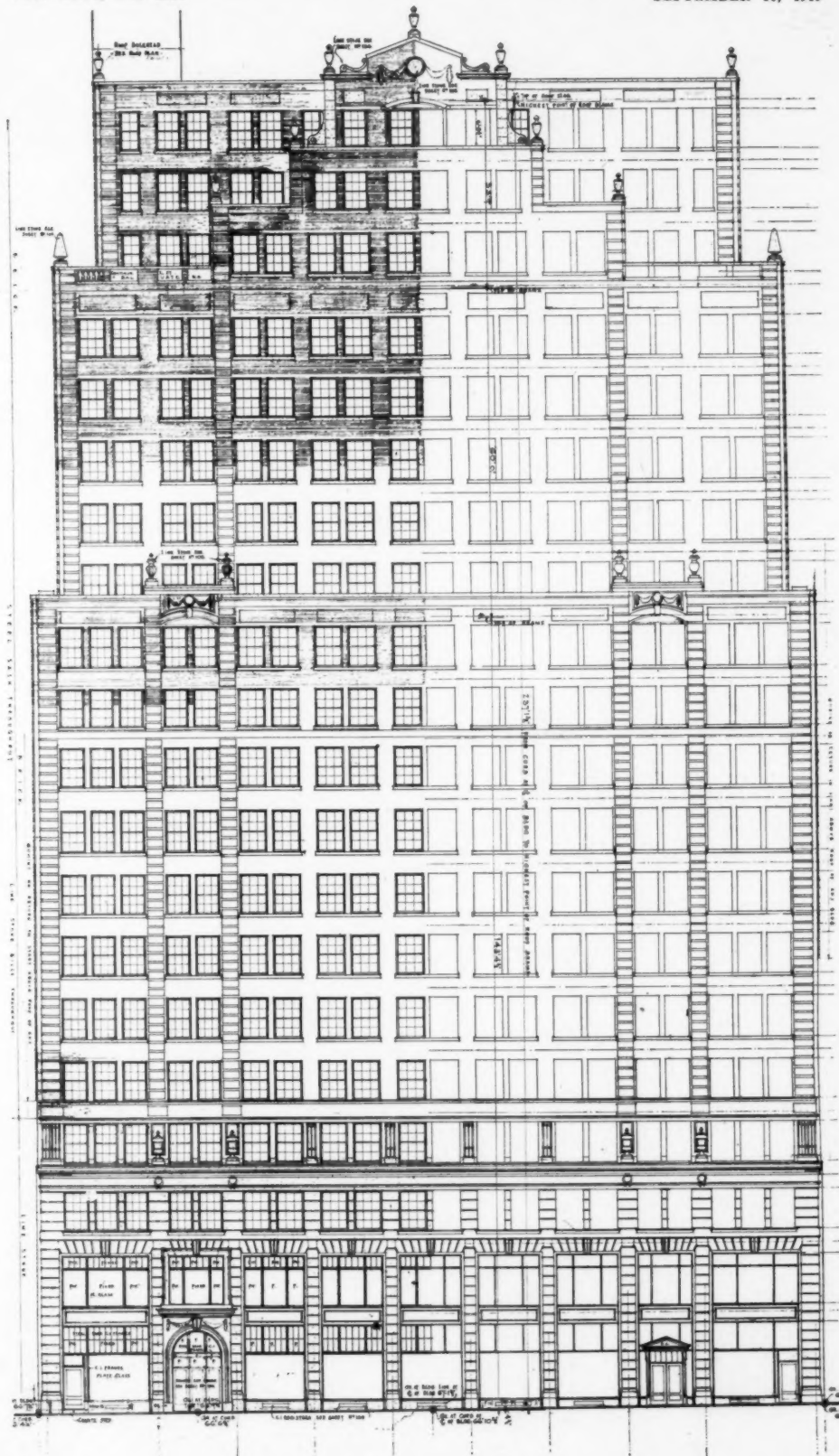
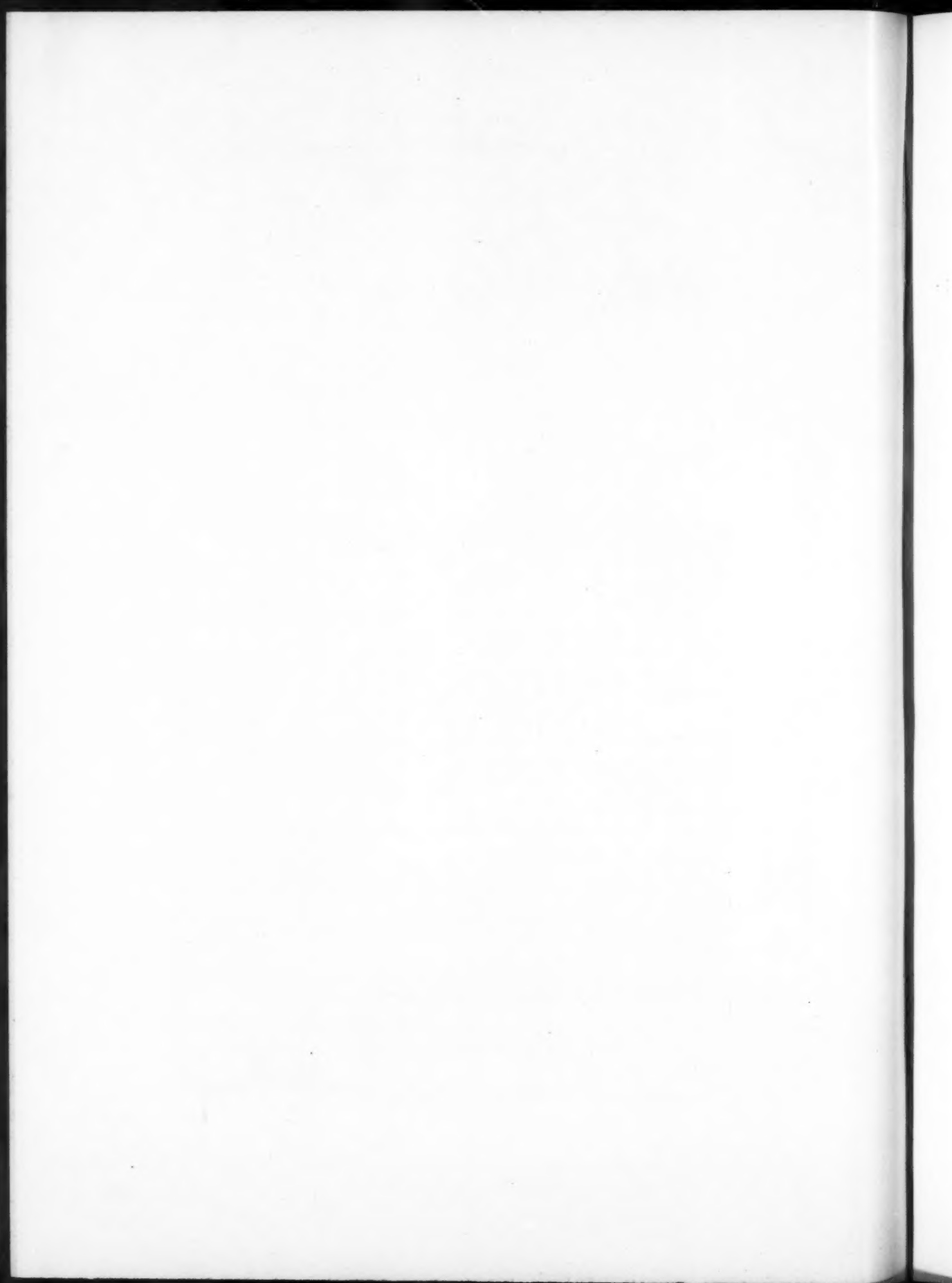


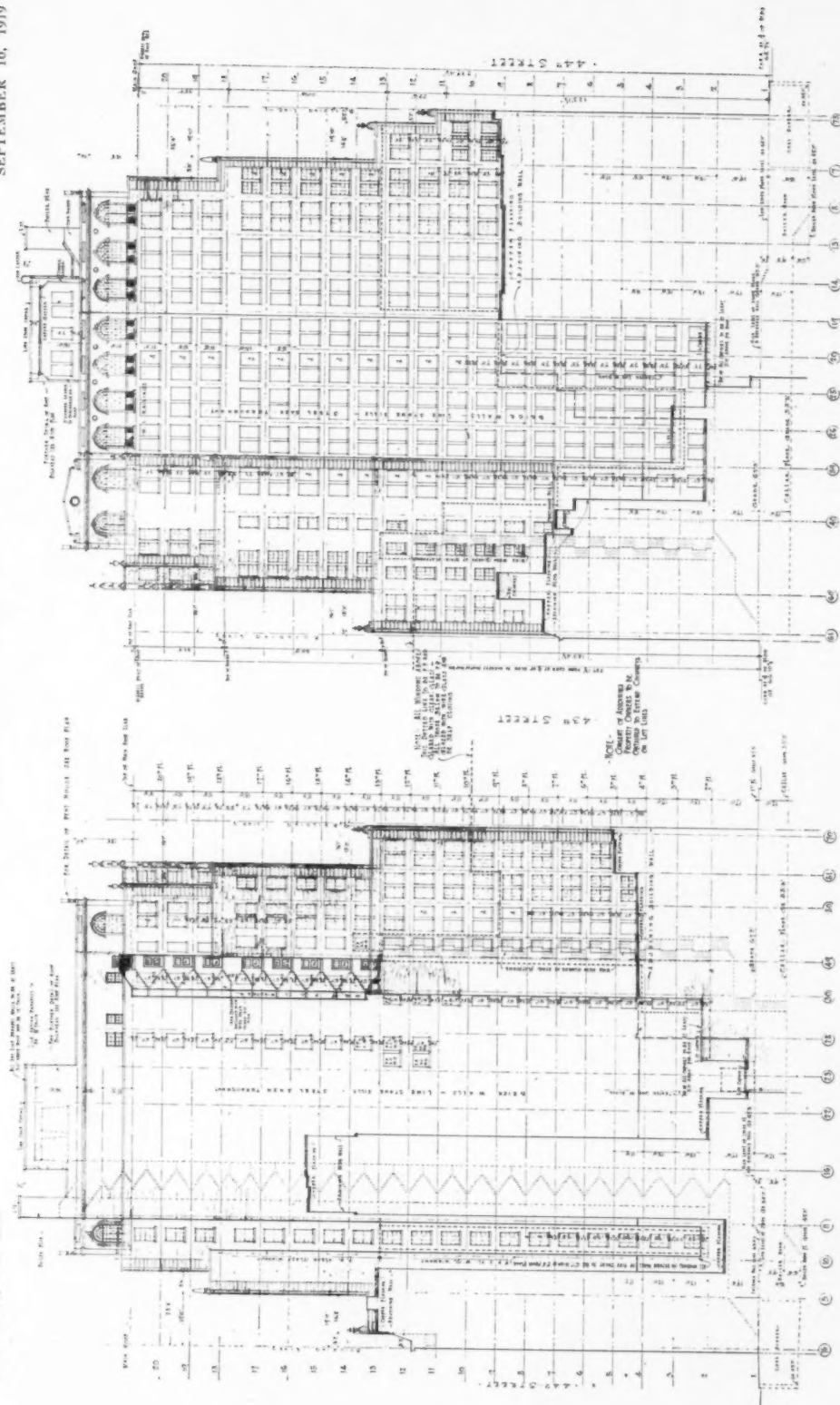
PLATE 96

43RD St. ELEVATION

NATIONAL ASSOCIATION BUILDING, 43RD AND 44TH STREETS, NEW YORK

STARRETT & VAN VLECK, ARCHITECTS





ELEVATION OF WEST WALL
Scale 1/8" = 1'-0"

ELEVATION OF EAST WALL
Scale 1/8" = 1'-0"



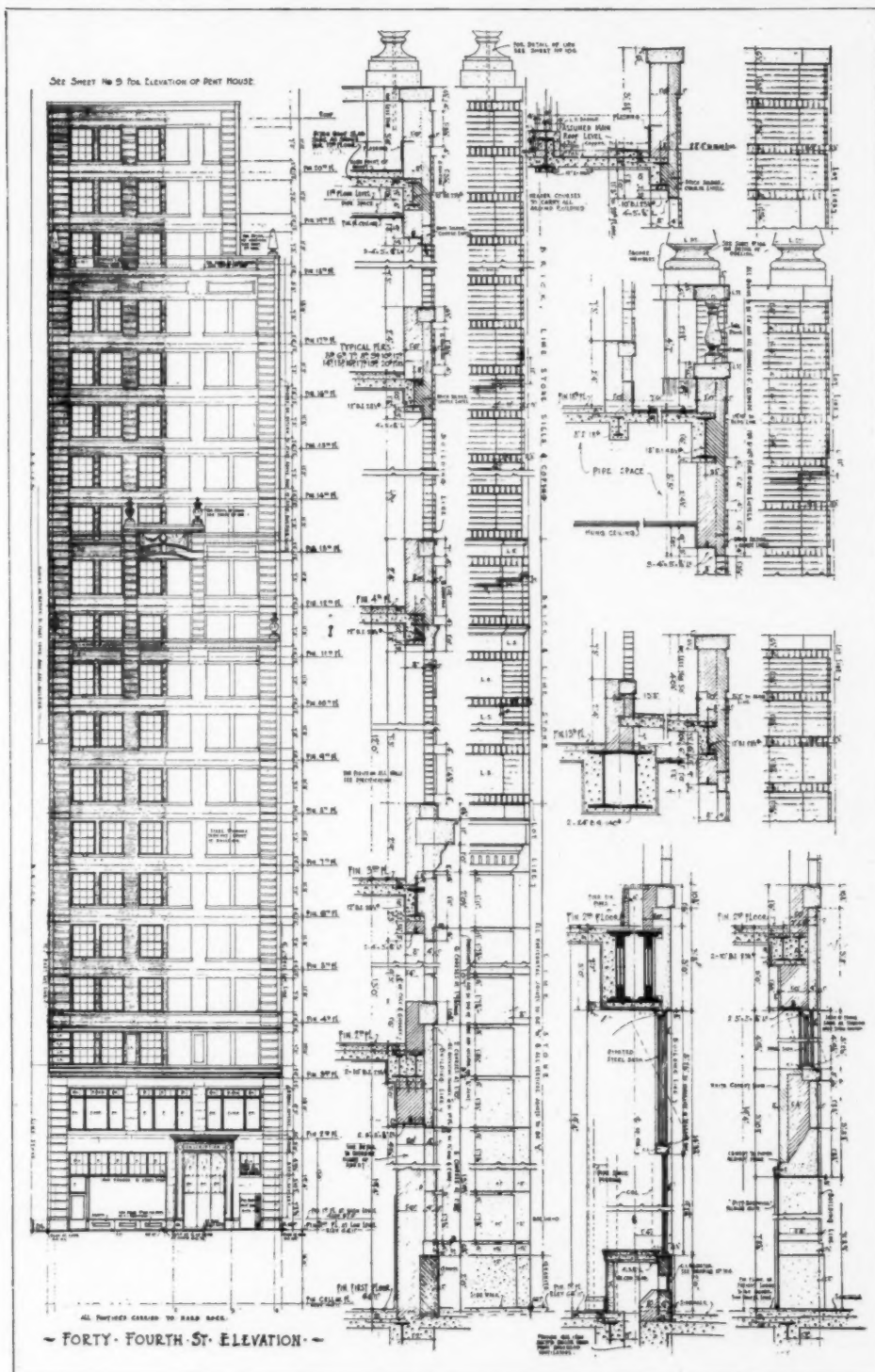
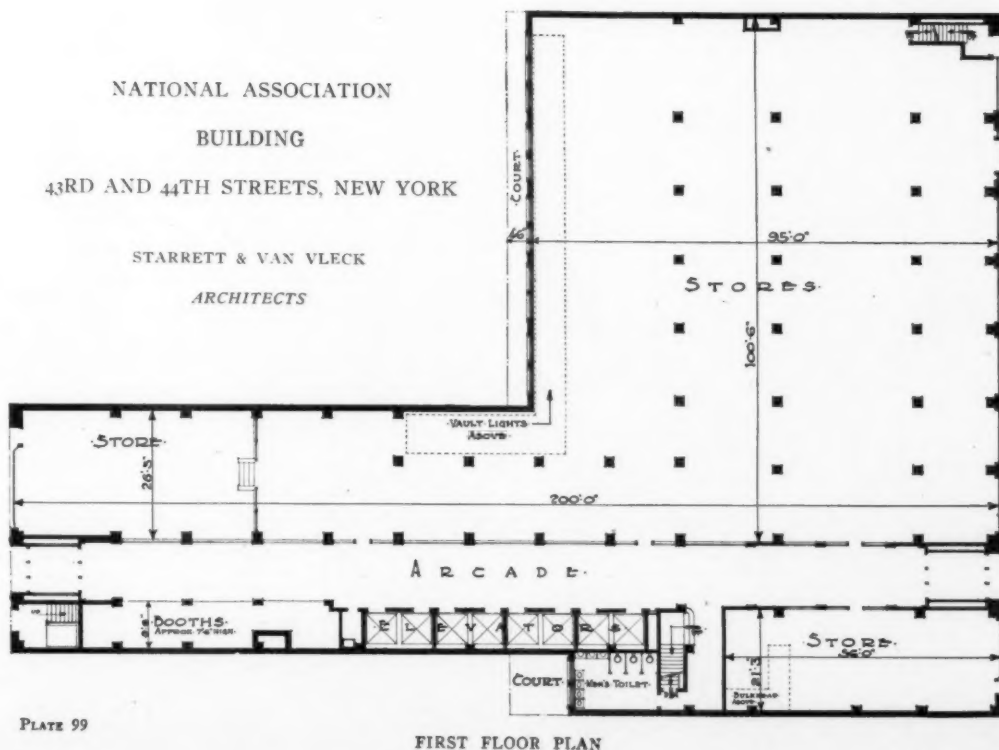
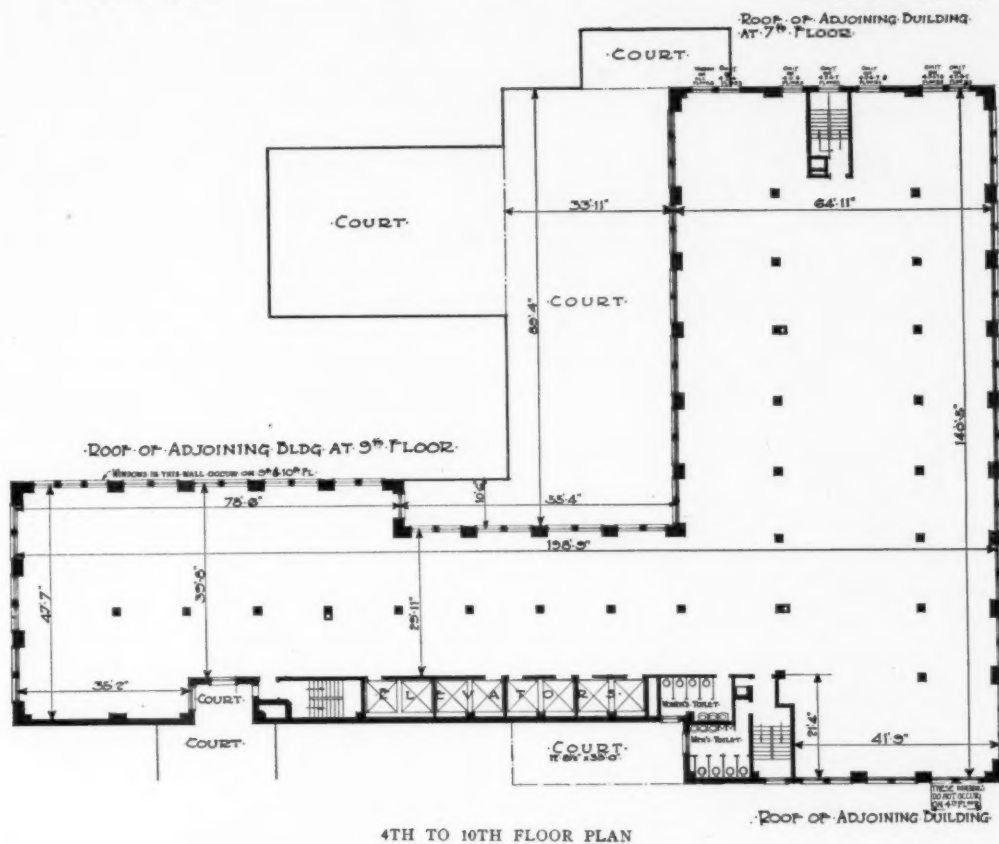


PLATE 98

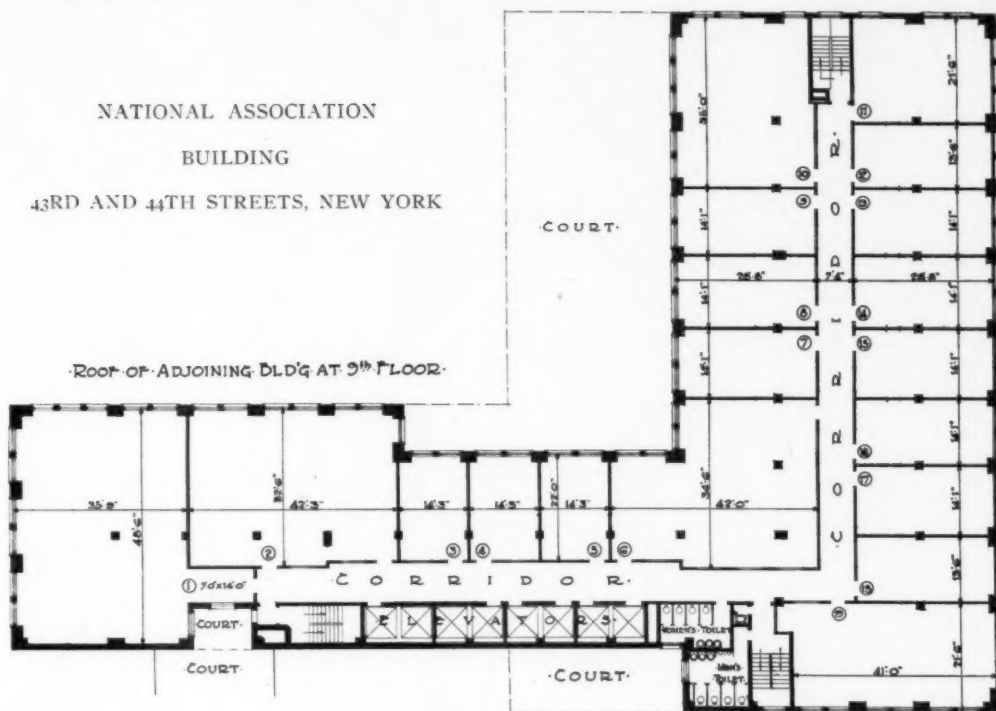
NATIONAL ASSOCIATION BUILDING, 43RD AND 44TH STREETS, NEW YORK
 STARRETT & VAN VLECK, ARCHITECTS





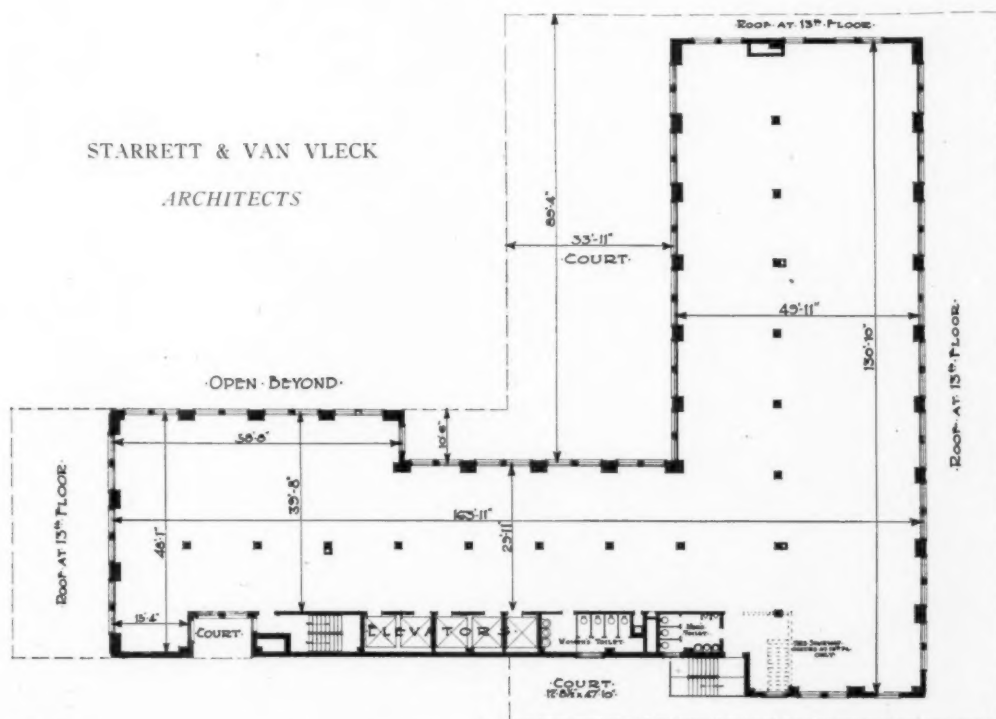


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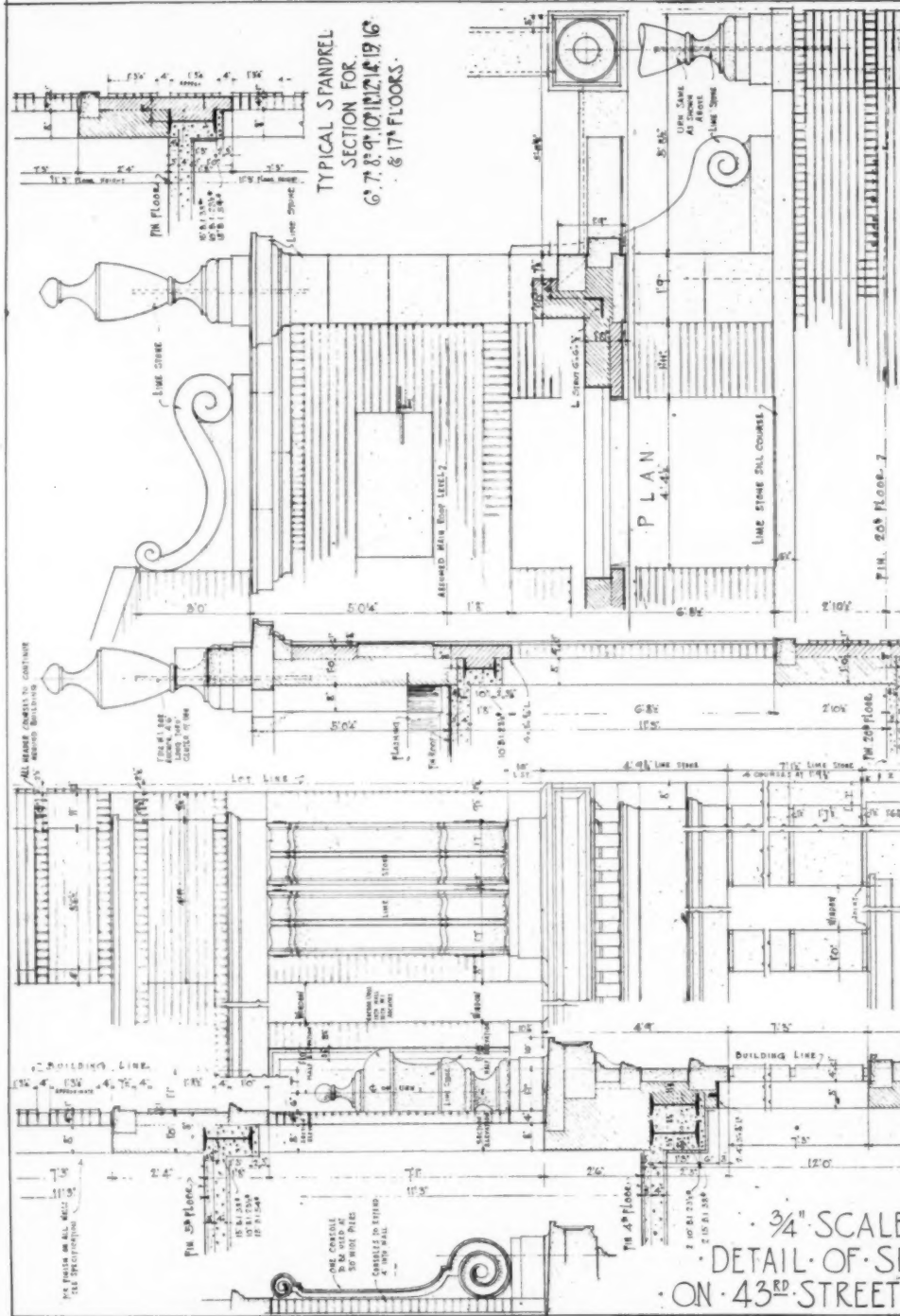


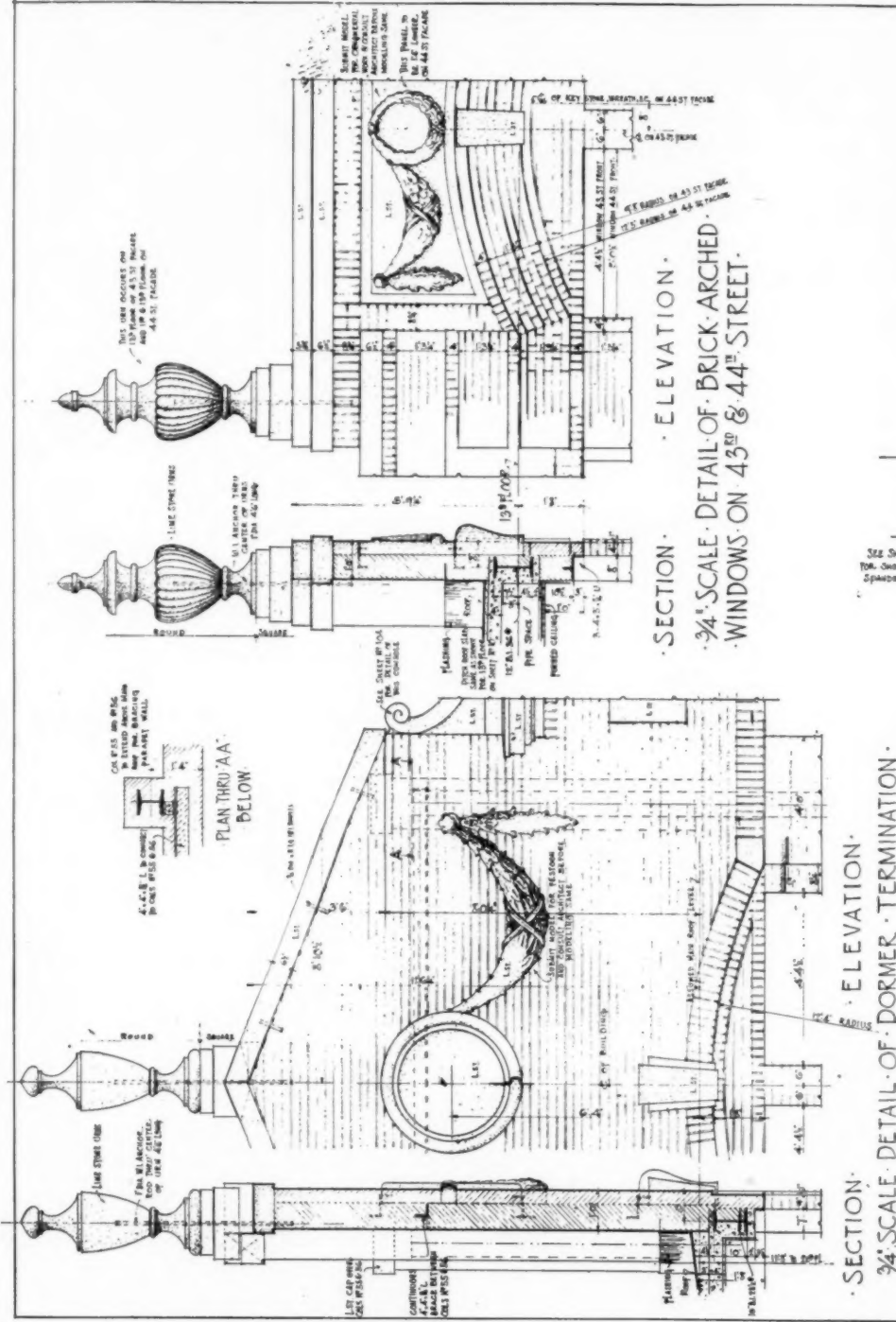
9TH FLOOR PLAN

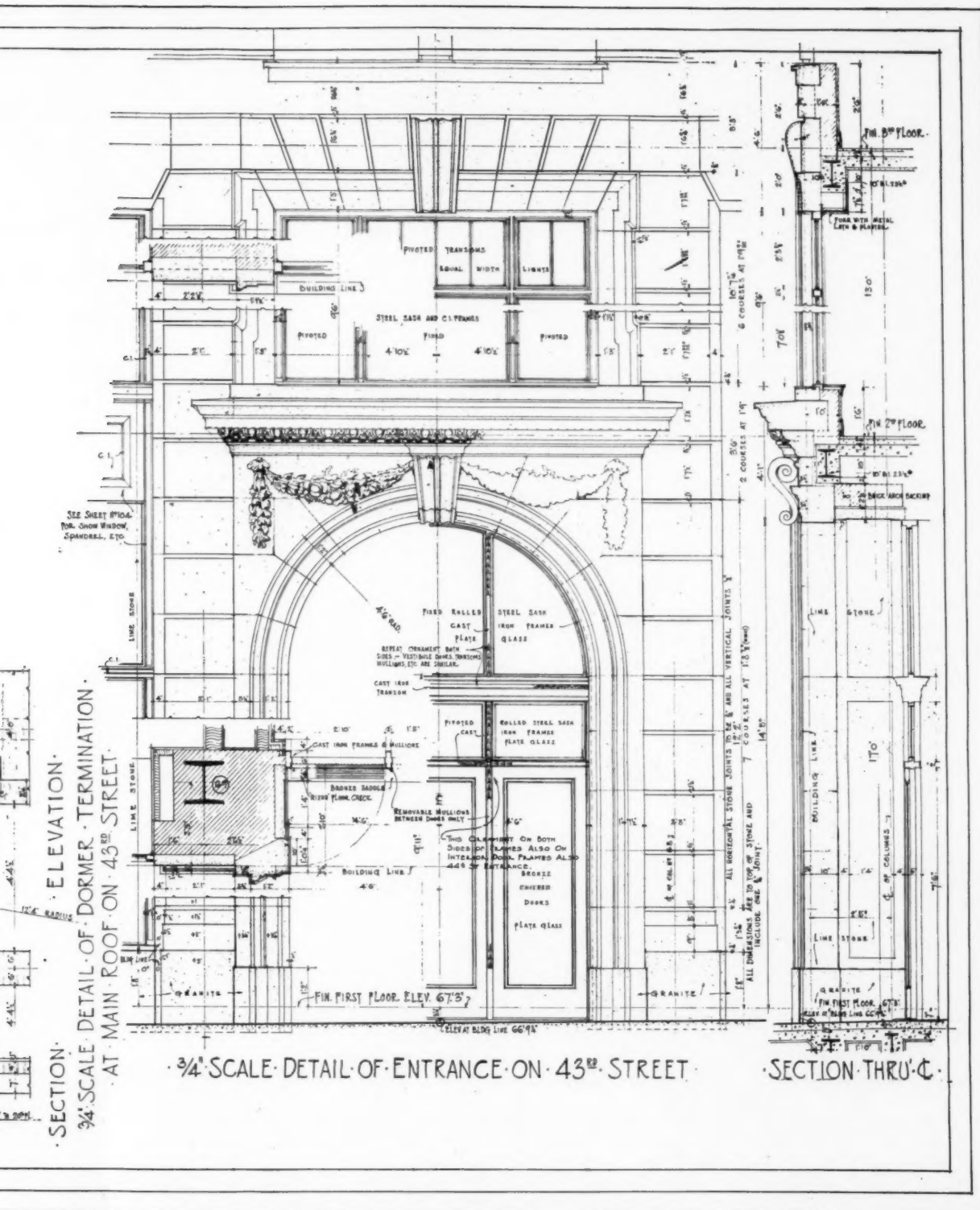
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ARCHITECTS



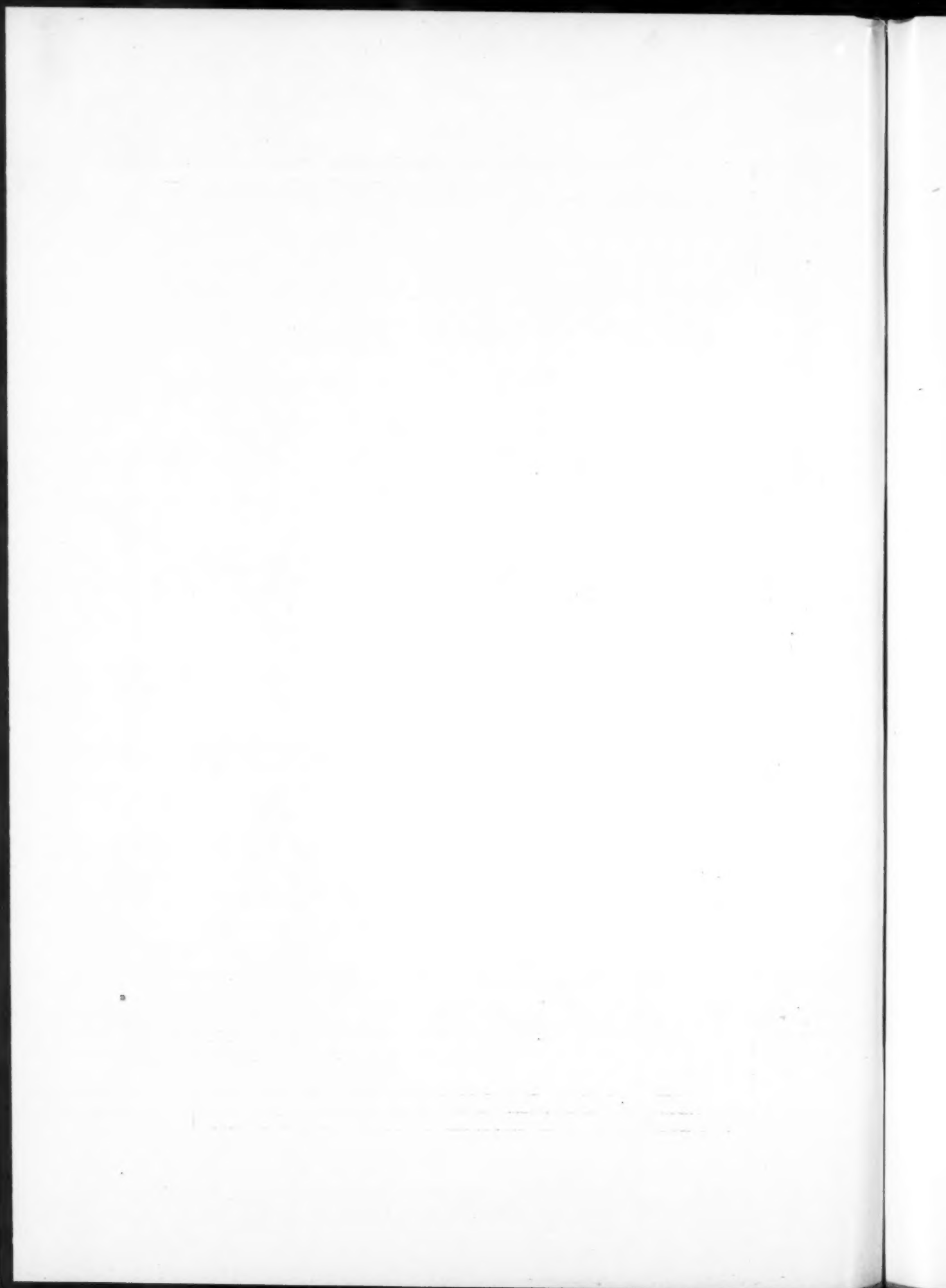
13TH TO 17TH FLOORS







NATIONAL ASSOCIATION BUILDING, 43RD AND 44TH STREETS, NEW YORK
 STARRETT & VAN VLECK, ARCHITECTS



Current News

Late Happenings and Comment in the Fields of Architecture and the Allied Arts

Designs Business Types for Honolulu

SAN FRANCISCO, CAL., Aug. 30.—Louis Christian Mullgardt, architect, has prepared preliminary drawings for seven commercial structures that are to be the first unit of a new, harmonious business center in Honolulu. Mr. Mullgardt returned from the islands recently after having arranged for the construction of the first building.

Architectural designs for the commercial center of Honolulu are typical and suggestive of the island city. Honolulu's effort is the first toward accomplishment of suggestions that business buildings of a city be made to harmonize in design with one another.

The big wholesale building Mullgardt designed occupies an entire block, and has an area of more than 60,000 square feet. The building has four high stories, which in some instances are subdivided into eight stories.

The building will be of reinforced concrete, fireproof in every detail. The structure will be enclosed with hollow tile and enameled terra cotta.

"The primary object of the business representatives of Honolulu is to create a co-ordinate scheme of commercial buildings that are truly appropriate to Honolulu and to their various needs," Mullgardt said. "The object is to obtain a perfect architectural expression. The result will in no sense be of a stencil pattern, but a composite of harmonious expressions instead of the customary heterogeneous mass of structures that have a clashing effect on one another."

Damage to French Churches Totals \$100,000,000

An incomplete survey of the devastated regions in northern and eastern France shows that 1,380 churches are in ruins; 1,337 damaged, but repairable; 2,949 sacristies destroyed and more than 2,500 priests deprived of places of worship, according to French reports. The total damage is at least \$100,000,000.

This announcement has been made in New York City in connection with an appeal by Archbishop Hayes to the 208 Catholic churches in the archdiocese of New York for a fund of at least \$500,000 to erect temporary edifices in the devastated areas.

United States Timber Will Last 150 Years

With the addition of the present growth of new timber at the annual rate of approximately 20 billion feet, there is now standing in the United States enough timber to secure a supply of raw material for the lumber industry for over 150 years, according to the Secretary-Manager of the National Lumber Manufacturers' Association. He adds that the excess of exports over imports may somewhat increase the annual drain upon our forests, but thinks it exceedingly doubtful whether the total domestic consumption will, much if any, exceed to-day's figure, which is less than 33 billion feet a year.

Because lumber production is below normal and stocks are low, many persons make the mistake of supposing that the timber resources of the country are fast failing and that they must look about for some substitute material for wood.

With the diminishing of the timber supply is the equally important fact that not so large a supply as formerly will probably be needed in the future, as standards of wood utilization and methods of living change and demands vary in different generations.

Before worrying over a timber famine and demanding that more trees should be planted, public and private interests should both look to the conserving of the timber resources they now possess. There should be more adequate public protection from fire and insects, and private care in preventing animals from uprooting seedlings and in not injuring trees by turpentine and similar processes.

Will Erect War Memorials in 236 Cities

Decision to erect war memorials in the form of buildings to be social centers has been reached by 236 cities, towns and villages in the United States, according to War Camp Community Service. The organization is carrying on a country-wide campaign for community memorials through its bureau of memorial buildings. Reports in the offices of that bureau show that 450 other communities are considering the erection of memorial houses.

In hundreds of other cities committees have been formed or are being formed to consider suitable memorials for the men who obeyed the summons to the colors. These new committees will be asked by War Camp Community Service to put up community memorial houses instead of the old-fashioned stone and iron monuments which were so popular after the Civil and Spanish-American wars. The community memorial house, war camp organization workers say, forms a living memorial to the men who fought and died. It is the center of social activities of the community and constantly is a reminder of the men it was put up to honor.

Establishment of the bureau of memorial buildings of War Camp Community Service was the result of the merger of that organization with the national committee on memorial buildings. After the amalgamation the activities of the national committee were continued under the memorial buildings bureau. Wider scope has been given to the movement through the joining of the two organizations. Harrison Grey Otis, secretary of the national committee organization, now heads the bureau of memorial buildings.

Leading men in all parts of the United States are supporting the movement for erection of community memorial buildings. They include the governors of many states; Dr. John Grier Hibben, president of Princeton university; Paul D. Cravath, Frank A. Vanderlip; William C. Redfield, secretary of commerce of the United States; John G. Agar of New York, James R. Garfield, Charles E. Hughes; Bishop Peter J. Muldoon, Roman Catholic prelate of Rockford, Ill.; Franklin K. Lane, secretary of the interior, and Philander P. Claxton, United States Commissioner of education.

High Prices Paid for Old Wall Coverings

Tapestry, we are told by the *Architects' Journal* of London, was developed from a very plain wall-covering put up "to stop a hole to keep the wind away," as Shakespeare says, rather nastily, of "Imperial Caesar, dead and turned to clay." To make it decorative was the happy thought of the lady left at home to beguile the anxious time as best she might while her lord was away a-foraying or a-hunting, or perhaps combining these amusements at the imminent deadly risk of life and liberty. Her lord's absences were so frequent and so long as to give her ample opportunity to acquire a very pretty knack of stitchery. She became an artist of considerable accomplishment, if we are to believe that the beautiful examples of tapestry that have come down to us were really her work and not that of professional needlewomen. Whoever did it, there is ocular evidence that it was done with consummate skill; and today the surviving specimens of the ancient art are sought after more eagerly than ever. At Christie's last week, three Flemish panels of the sixteenth century, with subjects from Roman history, brought 2,600 guineas; and two panels of the same period and country, with scenes from the life of King David, 3,500 guineas. Naturally, the prices dwindle as the date gets later, and hence we read that at the same sale a panel of late seventeenth-century Brussels tapestry, with figures dancing outside a chateau, realized but 750 guineas; while an oblong panel of Joseph and his brethren, dated 1755, fetched but a paltry 680 guineas.

Romans Return to Caves to Avoid High Rents

"Cavemen," relics of prehistoric days of human housing, live in Rome side by side with institutions of art and learning.

The caves are under the very shadow of the British Art School and the Italian College of Modern Arts. Within a short distance is the national stadium. On the other side of them is the Porta del Popolo, through which before the day of railways all pilgrims to Rome passed.

The reversion of Romans to the caves is not retrogression. It is evasion of high rents. All efforts of the police to eject the tenants from the caves have failed. The "cavemen" move out but return as soon as the police depart.

Railroad Problem Evokes Keen Interest

The railroad question, ever present for discussion, is attracting more attention now than at any former period, according to the Chamber of Commerce of the United States, which daily receives hundreds of requests from all parts of the country for detailed information about it.

Having suggested a program for railroad legislation, which was submitted by referendum to the business men of the country and adopted, the National Chamber in addition gave its members details of the twenty-nine other plans for taking care of the transportation situation. As a result, the demand for data has been so heavy that republication of all the Chamber's pamphlets and statements is necessary. An edition of 10,000 copies of the statement of George A. Post before the House Committee on Interstate and Foreign Commerce, in which the National Cham-

ber plan was set forth, was exhausted within a week. Many inquiries are coming from farmers.

While the thirty different railroad plans have been presented to the Senate and House Committee, only two have had anything like nation-wide consideration—those proposed by the Chamber of Commerce and Mr. Plumb, the former having been endorsed by the business men, the latter by the railroad brotherhoods.

Frick Adds to Art Collection

Henry G. Frick has added to the art collection of his Fifth Avenue, New York, home at a reported cost of \$1,500,000, the famous Limoges enamels included in the collection of the late J. P. Morgan.

There are about 40 bronzes and triptychs. Notable among the enamels are portraits by Leonard Limousin and earlier artists, such as Monyaerni, Nardon and the Penicauds.

In 1915 Mr. Frick bought for more than \$1,000,000 some of the rare Morgan porcelain china. Previously he had acquired the famous Fragonard paintings.

Chemists Now Allied with Skilled Labor

At the headquarters of the Union of Technical Men of the American Federation of Labor, Local 16,388, in New York City, announcement was made last night that the skilled chemists and assistants of the New York City Health Department had become affiliated therewith.

These scientists represent the highest form of trained men employed in city service, and their resolve to pool their interests with skilled labor represents a radical departure from established tradition, the announcement pointed out.

To Hold Metal Lath Week

The members of the Associated Metal Lath Manufacturers have united on a co-operative campaign to promote a more extensive use of metal lath for fire resistive construction. The climax of this campaign will be Metal Lath Week, October 6 to 11, 1919, which is co-incident with Fire Prevention Week, held under the auspices of the National Fire Protection Association, U. S. Department of Commerce, Boards of Fire Underwriters and other national organizations interested in fire prevention.

During this week all of the member companies of the Associated Metal Lath Manufacturers will instruct their entire sales force and all agents to concentrate on Metal Lath as a fire resistive material. Special efforts will be made to link up metal lath with fire prevention in the minds of architects, contractors, dealers and the general public. Individual brand names will be avoided and all will work for a more general recognition of the fire resistive qualities of metal lath.

The Association has arranged with the Society for Fire Resistive Frame Construction to distribute a design for a test house, which is published by that society. Efforts will be made to have this house reproduced in as many localities as possible and set fire to it on Fire Prevention Day, October 9.

This test house is designed so that one half is built with the usual wood construction and the other half of fire resistive frame construction, using metal lath on the inside and metal lath and stucco with a fire resisting roof outside.

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New England Still Keenly Feels Housing Shortage

From all parts of the country come reports of the congestion of housing conditions and particularly in New England there has been alarm at the scarcity of suitable dwellings, reports a Brockton, Mass., daily. That the building situation in New England is acute is perfectly evident to anyone who is forced to seek a new home. In the matter of store, manufacturing and office properties the situation is a little better but by no means normal.

It is therefore gratifying to find that building operations in this section are beginning to make headway. It is reported that contracts awarded during July in the New England States amounted to \$27,964,000, which is an increase of 20 per cent over the June, 1919, figures. The July total indicates an increase in volume of activity of 23 per cent over the average for July of the years 1914-1918, inclusive. The July figures bring the total amount of contracts awarded in this district during the first seven months of 1919 up to \$108,513,000.

This figure is 25½ per cent less than the average for the first seven months of each of the five years preceding 1919 (figures for previous years being reduced to figures based on 1919 costs).

There is hope, however, that while resumption has been less rapid in New England than elsewhere, the steady increase in contract awards from month to month leads to the expectation that the total for the year 1919 will reach a figure indicating something close to a normal year's building activity.

Use for Luminous Paint

The British army had disks or buttons two or three inches in diameter, coated with luminous paint and having a sharp spike on the under side. These were stuck upon the sides of trenches, buildings, fences, etc., or were swung by hand to give signals in the well-known code where bright lights were dangerous or where silence was golden.

The luminous disks were visible from 30 to 60 feet, so they formed valuable landmarks. Luminous ribbon also was used for marking trails through the woods, and luminous patches were attached to the backs of stretcher bearers to prevent them from being fired upon by their own troops.

The *Scientific American* suggests that the names and numbers of city streets might well be marked with this luminous paint.

Coat Gluing Wood with Varnish or Shellac

Glue joints between wood surfaces which have been coated with shellac or varnish have low or very erratic strength. This has been thoroughly demonstrated by a recent test at the Forest Products Laboratory, Madison, Wis. Sixty pairs of test blocks were prepared in which one or both wood surfaces were varnished or shellacked and were joined with either casein or animal glue. A great many of these blocks fell apart before testing, and all which held together long enough to be tested sheared apart in the glue joint and not in the wood.

The highest strength value obtained was 1712 pounds per square inch, which is low for casein glue. The other

values were 1000 pounds per square inch or less. It is evident, therefore, that all shellac or varnish should be carefully cleaned from wood which is to be glued, if high strength is desired.

A few blocks were joined using shellac as a glue over surfaces previously coated with shellac. The maximum shear strength obtained was 1425 pounds, the minimum 450 pounds, and the average 758 pounds per square inch. These values are low and do not indicate that shellac has gluing properties which compare favorably with casein or animal glue.

June Exports Record Breaking

WASHINGTON, D. C., Sept. 8.—June broke all export records, exceeding the previous high mark of April by more than \$200,000,000. June exports are estimated at \$918,000,000.

Total exports for the fiscal year 1919 are more than seven billion dollars, as compared with five billion, nine hundred million for 1918. The 1919 figures are more than three times the exports for 1914, the last normal year.

Although imports for June fell off from May records, they are high and show a substantial increase over June, 1918, figures. Total imports for the fiscal year just closed are placed at something over three billions.

Architect Says New York City Pay Is Too Low

One reason why the Public Service Commission has difficulty in getting competent help of a technical character was given in a letter received yesterday by the Transit Construction Commissioner, John H. Delaney. The writer, an architect-engineer, said:

"I have your letter of July 30, asking me to take a position with you at \$75.08 a month. If you will notice, the window cleaners demand \$36 a week, and refuse to arbitrate, and a man gets nearly \$1 an hour for pulling a bell or closing a door on the subway or street car.

"Because of the above-mentioned facts I will be unable to accept your kind offer, for if I had to earn that amount of money a month I would rather go out and do hard labor than engineering, which requires many years of education."

Big Lumber Demand in South America

WASHINGTON, D. C., Sept. 6.—There is a splendid market for American lumber in South American countries, especially now that everything German is looked upon with disfavor, says Trade Commissioner Ewing, who has just returned from an extended trip through Spanish-American countries. In Brazil, particularly, Germany will find it very difficult to regain her foothold and if the lumbermen of the United States will study the needs and be prepared to extend reasonable credit to South American business men, there is a fine opportunity to extend their market for the kinds of lumber that have been imported. Chile and Peru are very good markets for lumber, but in Venezuela, Colombia and Ecuador, not much is imported because of the abundance of native woods.

Cuba needs lumber, but has a decided disadvantage in that storing facilities are poor at Havana.

Housing Campaign Reveals America Is Awake to Best Possibilities

In its "own-your-own-home" campaign the United States Department of Labor has received abundant assurance of a widespread interest in the artistic side of building. Wherever cities have conducted organized work to stimulate the construction of houses, evidence has been abundant that interest in beauty as well as utility governs the work of providing shelter for growing populations.

While the plan of the American Federation of Arts to make a tour of the country for the purpose of improving the public taste by the exhibition of pictures and statuary is praiseworthy, the application of art to everyday affairs must be made concrete, it is pointed out, if it is to have a speedy effect. For this reason exhibitions of wall paper, rugs, curtains, artistic in design, have been provided in connection with a number of the local campaigns. Models showing varieties in architecture and grouping of houses, with a view to best general effect, also have been shown.

Landscape architecture has its part in the plans projected in most cities. The development of the garden as part of the home idea is extended to its community relationship wherever possible so that in the wholesale home-building cities beautiful may be assured.

City Building and the Politician

The following is the peroration of a short editorial in a Houston, Texas, paper, and raises an interesting question. Architects know these things, and no better purpose can be served than to stimulate the laity to similar opinions through the daily press. It states:

"The problem of city building, like the problem of house building, is one for experts and specialists.

"The problem of city building is the problem of life and happiness. The city is merely an enlarged home for those who dwell in it. It is not satisfactory unless equipped with all those comforts, conveniences and safeguards which science has discovered and demonstrated. It cannot get these in the most economical way without expertness and specialized skill.

"Yet city building is still left to politicians, as though their peculiar trade had anything to do with it."

Organizing for Vocational Service

WASHINGTON, Sept. 8.—The Federal Board of Vocational Education is charged with the administration of two laws: (1) the Vocational Education Law and (2) the Vocational Rehabilitation Law. For the administration of the second law a very far-reaching organization has been perfected. The Chief of the Division of Rehabilitation, who is immediately under the Director of the Board, has as assistants superintendents for advisement, for training, for placement, for medical care, for cooperation, for case work and for records and returns.

In the fourteen districts into which the country is divided for the convenience of the disabled men, as well as the work, the district vocational officers each with their corps of assistants make the personal contacts with the soldiers. Supervisors and field officers are the connecting links between the district offices and central office. This organization is for the purpose of making easy the way of re-education for the disabled man.

After thorough investigation of the vocational needs of disabled men, by the district staffs, recommendations for their training are sent in to the central office, and immediately upon the receipt of a favorable decision of the Board the district office places the man in training and his training pay begins.

If any disabled soldiers of your acquaintance are ignorant of this organized effort of the government for his return to civil life, advise him to write to the Federal Board for Vocational Education, 200 New Jersey Avenue, Washington, and find out the facts for himself.

To Prevent Motor Car Thefts

A real solution of the motor car theft problem and a reduction on theft insurance rates of at least fifty per cent is the promise of a western corporation which proposes to issue abstracts of title for automobiles.

No more feasible plan has been advanced for the complete and absolute elimination of the automobile thief.

It is claimed to be quite as impossible to steal and sell a motor car so protected as it would be in the case of real estate. In fact the automobile abstract finds an exact parallel in the abstract issued for real estate—to prove ownership and guarantee title.

From the motorist's point of view the immediate and most important results will be a material reduction in theft rates which, in many parts of the country are now prohibitive.

In addition, the abstract will serve a number of other worthy purposes such as providing information of mortgages, liens, and similar legal claims which may exist against a car.

The automobile abstract is the biggest thought in motor car protection since the advent of the automobile itself. It is the only logical, business-like manner in which five billions five hundred and fifty millions of motor car wealth can be adequately protected.

The Death of Futurist Freaks

"Fuss and froth" of art—cubism, futurism, and the like—died, a war casualty, declares Lorado Taft, the noted Chicago sculptor.

For six months he was a Y. M. C. A. worker and lecturer in the A. E. F. University, Baume.

The war has awakened America's soul to art—to a desire to create beauty rather than absorb it. Enough American soldiers have brought home a vision of things worth while to do this, although the idea may not yet be clearly formed.

"Even Europe," he said, "has awakened to a new and more serious idea of art. In the next century only the beautiful and imposing will count. An exaggerated Russian exhibit in Paris—I think it was the last of its kind—received only scant attention."

To Consider National Unrest

A conference to consider the existing situation of national unrest, with a view of formulating a consensus of opinion, was called by the Illinois Manufacturers Association, 76 West Monroe Street, Chicago. It was held at the Congress Hotel, Chicago, Sept. 8-9. Committees have presented the conclusions reached to Congress and others concerned.

News from Various Sources

Announced that British Government, finding it impossible to get along without American-made cars and trucks, has decided to permit importation of 5,000 American motor cars.

* * *

Announced that one of the greatest needs of farmers in United States, according to students of agricultural economics, is short-time personal credit on reasonable terms.

* * *

Quartermaster General states that Quartermaster Corps is in position to utilize services of a large number of partially disabled soldiers at the various posts, depots and stations throughout U. S. and insular possessions.

* * *

Monthly bulletin of Wells-Fargo Nevada National Bank of San Francisco, in discussing high cost of living, says that present economic situation must continue despite legislative efforts to regulate it until it has run its course.

* * *

New York War Camp Community Service states that it is experimenting with new method of Americanization, which allows the foreigner to Americanize himself. States that Tompkins Square unit, in midst of 150,000 Slavs and Italians, is trying out plan.

* * *

The Department of War is offering for sale town of Nitro, W. Va., complete industrial community embracing 737 manufacturing buildings, housing accommodations for 20,000 people, and utilities and civic improvements that constitute conveniences of a modern city.

* * *

Cable to N. Y. *Sun* states that American business men disheartened at outlook are quitting Germany. Those who entered country expecting to book orders realize that Germany will not be able to pay present obligations, unless means are found to stabilize mark, worth only 5c.

* * *

Wall Street Journal states that Gen. T. C. du Pont has announced that anonymous donor has subscribed \$4,000,000 toward endowment fund for Massachusetts Institute of Technology, provided another \$4,000,000 to raise fund of \$8,000,000 shall be obtained by committee of which Gen. du Pont is chairman.

* * *

Announced from Paris that development of water power of Rhone River for manufacture of electric power and organization of its facilities for river transportation and irrigation are provided for in bill which Government has submitted to Chamber of Deputies. Expenses of project are estimated at 2,500,000,000 francs.

* * *

Col. Arthur Woods, Assistant to Secretary of War, who is conducting nation-wide drive for re-employment of service men, states Aug. 25 that to date 1,700 officers and ex-officers of American army, greater portion of them who have seen service in A. E. F., have registered with department as applicants for positions.

* * *

Trade Commissioner A. W. Ferrin reports from Melbourne, Australia, that New South Wales Government, in effort to cope with housing situation, is planning to build,

first, houses to let at low rentals, and then houses to sell, and finally it will provide money with which people can build houses or purchase houses already built.

* * *

Announced by San Francisco Chamber of Commerce that for purpose of bringing communities of entire Pacific slope, including States of California, Oregon, Washington, Idaho, Nevada, Arizona and Utah, into closer contact with one another, Associated Chambers of Commerce on the Pacific Coast is to be reorganized.

* * *

Wall Street Journal quotes Dr. P. B. Altendorf, late special agent of U. S. Military Intelligence Service, as saying that within six months after this country ratifies Peace Treaty, Germany will have economic control of Mexico, through exodus of Germans from this country to Mexico, taking with them \$400,000,000 capital.

* * *

Announced from office of Rev. A. P. Stokes, of Yale, chairman of trustees of American College Union, that American colleges in Paris and London for Americans who are in military service are to be made permanent. A new building for the American College in Paris will be constructed this fall on site given by French Government.

* * *

Dr. L. Levine quotes A. R. Marsh, in article in N. Y. *World*, as saying that factory and farm production is cause of high living cost; that crux of problem is attitude of mind of laboring people which has resulted in reduction of production. In cotton industry a large laboring force supplied with more machinery is producing less goods this year than in 1916.

* * *

Department announced that Chief Signal Officer has been authorized to send six officers to Mass. Inst. of Technology, and six officers to Sheffield Scientific School of Yale University, for purpose of taking special technical courses. Chief of Coast Artillery has been authorized to send eight officers to technical schools for purpose of taking advanced courses in technical subjects of use to Coast Artillery.

* * *

Report received from Belgian Department of Economic Affairs shows that Belgians are working for restoration with extraordinary courage and energy. Report states that some industries suffered too severely to recuperate promptly and in automobile and cycle manufacture, for instance, period of convalescence will depend on rapidity with which machine tools, almost all of which were carried away, can be replaced. Table is given showing renewal of activity, based on number of employees engaged, as compared with those at work in 1913.

* * *

Herbert Hoover said in interview Aug. 25, cabled to Philadelphia *Public Ledger*: "The whole world must continue to suffer from the economic demoralization and lowered productivity, and while these things, if left to themselves, may become righted, they can each time be enormously expedited by organization and co-operation among the various governments. But even co-operation in finance and distribution must fail if we are to face a continuous decrease in production of commodities. No amount of economic co-operation can create bricks without straw."

Financial and Commercial Digest

As Affecting the Practice of Architecture

Lower Prices Through Increased Production

MORE firmly convinced than ever that the only avenue remaining in the movement toward the lowering of building material prices is through increasing production, architects and builders are now urging with all vigor the adoption of methods that will develop our national resources and industrial facilities so that an era of unprecedented effectiveness will be attained. The shortage of labor we are now facing demands immediate application of all methods that will increase efficiency of manufacture and distribution.

Enlarged output must now be the slogan. Authorities offer no encouragement that there is to be a lowering of costs in any other way on account of influences beyond control, the shortage of labor and materials, political complications and tax burdens. Price recession through the curtailment of exports or the increase of imports is at this time impossible. Increased and steady production can alone reduce the cost of living.

England is taking the long-expected turn toward enlarged output. This is decided evidence of growing confidence, as well as a factor in reducing prices. David Lloyd George, in a recent address before the House of Commons, made an appeal to the nation to increase production. He pointed out the fact that the country is consuming more than it is producing and that this state of affairs could not long continue. He struck the keynote when he declared that economic matters could never be improved until there came an increase in production. "There is no other alternative," he said, "except quitting the country for which we fought for four years."

If Great Britain must work with might and main to avert disaster, so too must the United States demand that every one get into the game for all it's worth to insure greater production and the turning out of more and more of the goods the world so sorely needs. Then, and only then, can the present distress be eliminated. Europe's unprecedented under-production after five years of war should be a lesson to this country, for this condition is attributed by experts to be one of the primary factors in the high cost of living over here.

We should not let ourselves take as pessimistic a view of our problems as does Lloyd George of conditions in England. In time we shall emerge from the present post-war depression greater, stronger and richer than ever. Our vast resources are still intact. The country's finances, despite large loans made to foreign governments, are stronger than ever before. Prosperity should increase as soon as labor and material prices become more stabilized. America's building boom will be greater than England's, as the great majority of builders here have not been affected as they have in Europe. Our builders, fortunately,

have been in a position to secure materials more readily.

The only disturbing factor at present comes from the conditions of labor unrest which is now sweeping the country. It requires no unusual power of perception to realize that the cost of construction always advances in corresponding ratio to the cost of labor. Many owners erroneously figure the cost of material apart from the cost of labor and thus arrive at what in their judgment is, or will be, the labor cost of the building. However, if they will carefully consider every one of the many items of material that goes into the building they will readily see that in every case the labor of production of that material is largely in excess of the cost of the raw material used in its manufacture.

It is, therefore, practical to assume that the percentage of labor cost on any structure will equal, if not exceed, an average of 80 per cent. It at once becomes apparent that every increase in the wage scale will sharply react on every detail of building costs, and as sharply contribute

to the high cost of living. In fact labor's insistent demand that the national government use all its machinery of legislation to cut down living costs is, in view of its equally insistent demand for higher wages, one of the greatest difficulties in reaching a pre-war condition of living that confronts the country. It is also complete and irrefut-

able evidence of the unreasonableness of labor's demands and emphasizes the fact that the need of today is for production, greater and even greater production.

Representatives of 30,000 employees of the Midvale Steel and Ordnance and subsidiary companies at Atlantic City, N. J., have passed a resolution opposing further demands for higher wages and shorter hours as uneconomic and unwise. The action taken was entirely on the initiative of the workmen and without knowledge of the Midvale officials.

Production and High Wages

Samuel Crowther, writing in the September number of the *World's Work*, believes that more attention should be paid to the result of a man's work and less to the high cost of living. If there is production in return for a wage then the cost of living will take care of itself.

The curious part of it all is that in most discussions of wages, what the man does for a wage is seldom considered, while page after page of testimony is taken as to how much it costs to live, although it must be self evident that so long as we work under a wage system, if production be not returned for wages, then a living wage can never exist. Inevitably a wage paid, which is not wholly earned, must be added into the price of the finished product and eventually raise the price of all products, so that when the wage earner goes to buy he is bound to find his money insufficient.

Wages are high when they do not result in production; they are low—no matter how many dollars are contained in them—if they give production. The union between wages and production is inseparable, but it is neglected by nearly all employers and by most employees. There is

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somehow an idea, regardless of all the facts, that a particular job is worth just so much and no more. Hence we have what is called the market rate, which in turn varies according to the demand, as compared with the supply of labor.

But the best employers of the country have long since given up any idea that there is such a thing as a market rate for labor. There is no market rate for professional men above a certain grade, there is no market rate for surgical operations, or for good portrait painting.

Whether wages will stay up or come down does not depend upon the employers, or upon Mr. Gompers, or

upon any other group in the world. The particular number of counters used is not of the slightest importance anyway. Wages are too high when they do not give production. They are too low, not when they do not support life, but when the return to the employer is higher than it should be. This is a very indefinite statement, but the whole matter of wages is indefinite because it gets down to particular cases, and the balance between labor and capital is not a thing which can be decided except in the crudest manner by national boards, for it is largely a matter of individual brains. Nationally fixed wages promote sloppy production and inevitably raise prices.

Price Situation Must Be Met By Increased Production

Report of Grosvenor B. Clarkson, Director of the United States Council of National Defense, Emphasizes that High Standards of Living Cannot Be Maintained Upon Basis of Reduced Output

HIGHLY illuminating from an economic point of view is the report just issued by Grosvenor B. Clarkson, director of the United States Council of National Defense, on the high cost of living, which is being transmitted to the members of Congress by the Secretary of War. The findings indicate, as was pointed out some time ago by *THE AMERICAN ARCHITECT* in its department of economics as applied to architecture, that high prices are primarily due to the curtailment in the production of nearly all commodities except agricultural products. Other influences include hoarding of storage food products; profiteering, conscious and unconscious; and to inflation of circulating credit.

The report states that the situation may be most advantageously met by stimulated production; the repression of hoarding and profiteering; the improvement and standardization of methods and facilities for distributing and marketing goods; and the perfecting of means of keeping the Nation informed regarding probable national requirements, current production and stock.

The report says in part:

"The problem of the high cost of living is so interrelated with other reconstruction problems that the opening of this problem is tantamount to opening up the question of reconstruction practically in its entirety.

"The very fact that prices of finished commodities, consumption goods so-called, have risen to an extent out of proportion to the rise in prices of raw materials and perhaps out of proportion to the rise in general wages, indicates that production carried on under these conditions is, in general, yielding profits abnormally high."

The Council's report points out that one important factor in the high cost of living lies in the mistaken idea that an increase in income, even though accompanied by a real reduction in the amount of the necessities of life produced, should raise the individual standard of living. The report very carefully points out the fallacy of the belief of the individual that a raise in wages or income under present conditions should alone increase that individual's standard of living. The public does not readily realize an increase in their own income is a case of profiteering, but it should be clear that increased purchasing power, derived from reduced service, is the very essence of

profiteering. It is possible on no other basis than the deprivation of others, while a general improvement of real income is possible on no other basis than increased production or improved distribution.

The report further emphasizes the fact that the deficiency of commodities, as compared with the volume of circulating credit and also as compared with living requirements, has survived the duration of the war, and the only safe and practicable method of effecting a readjustment now is by the practice of genuine economy, by increased production of the things society needs, and by curtailment in the consumption of those luxuries which larger money incomes have falsely led us to believe that we could afford.

It does seem not safe or practicable to initiate readjustment of prices by a premature reduction of credit for essential purposes, inasmuch as the first effect of contraction of such credit would be reduced production—the intensification of the fundamental cause from which the country now suffers. On the other hand, it is quite possible by increased production to create such a volume of commodities and wealth that the balance between physical goods and circulating medium will be normal.

It will not be overlooked, of course, that any movement to reduce prices otherwise than by the elimination of waste, the repression of profiteering and the stimulation of production may tend to bring on, as an indirect consequence, an increase of reduced production.

Relative to the acute housing shortage throughout the country the report says:

"It has been estimated that the United States was short a million homes at the end of the war. A campaign to stimulate and encourage increased building was begun soon after the end of the war and carried on during the first half of the present year, and the national need of increased building became thoroughly advertised. In the meantime, however, those industries whose activity is a prerequisite to building, such, for example, as brick-making, lime, cement and lumber production, remained relatively stagnant or tied up with price and labor disputes until late in the spring.

"The production of raw materials necessary in building construction was far below normal throughout the armis-

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tice period. Many plants were operating on part time and some were closed down entirely. Glass production was reported to be on a 50 per cent basis as late as May. In response to the building campaign and the recognition of the general need, and also, no doubt, in anticipation of handsome prices renderable obtainable by the acute shortage of housing, a fairly large building program was eventually gotten under way, and it is now experiencing handicap by reason of the shortage of building material which throughout the winter was obviously impending. The period of high and increasing rents and of high and ascending prices of houses appears, therefore, to be fairly certain of continuing for some time to come."

As to estimating requirements the report states:

"The function of estimating requirements in peace-times is performed in an entirely different manner. In fact, the national requirement is ordinarily not estimated at all. Neither is the national productive capacity surveyed.

"If current statistics were available showing production,

stocks and hand and in transit for all important articles of consumption, this information would serve as an invaluable guide to both producers and distributors, as well as to the consuming public. Such information would indicate from week to week or month to month the sufficiency or insufficiency of current production and available stocks to meet future requirements.

"The estimation of future national requirements of consumption goods presents certain problems that are quite capable of approximately accurate solution. The bases of such forecasts are:

(1) The record of previous consumption and the law of its variation.

(2) Changes in national factors tending to alter the general trend toward increasing or decreasing national consumption.

(3) Calculation based upon the average requirements of the individual family."

Late Building Material Market Reports

(From Our Special Correspondents)

Material Supply Dealers Want Complete Unity Before Closing

THE request of master builders in New York City has been met by building material supply dealers, who will close down their yards completely in order to promptly meet the strike situation in the skilled trades, with a request for full co-operation from all mason material producers and distributors. Committees of the Building Material Dealers' Association are now at work among the brick, lime and cement manufacturers to learn the extent of the unity of action that may be expected from sources of supply should action as requested by the master builders be granted.

While this situation is being worked out every building material manufacturing center is preparing for a large amount of construction activity. The price situation is shaping itself for the future rather than the present. The problem of car shortage is becoming increasingly difficult to shippers in the East, particularly affecting the cement manufacturers. A more hopeful attitude is being assumed for Autumn building. There is a noticeable tendency on the part of manufacturers to hasten production in anticipation of the January inventories, which may be prolonged in order to assist in the general wage stabilization plan.

Difficult to Supply Building Material Requirements

CHICAGO, ILL., Sept. 8.—Settlement of the building trades lockout, which for over a month has kept 110,000 men idle and tied up \$125,000,000 worth of construction, is but a matter of a short time, according to reports from the headquarters of both the employers and the unions. Simon O'Donnell, head of the building trades, issued a statement in which he said he believed the men will be back at work within a week.

In the meantime the local lumber and building material

dealers have refused to make deliveries to contractors. They have taken this stand on the ground that it is the best means of bringing about stabilization of prices, and regardless of court action instigated by the independent contractors.

In practically all markets for building material there still is a tendency for higher prices. There is a big demand from both the local and outside industrials, but it is becoming more and more difficult for the producers to supply the requirements of trade. Throughout this entire section the consuming public realizes that it is useless to delay buying in the hope of lower prices. They are in the market for badly needed stocks, and they are willing to pay the price, but the producers are unable to fill orders and make prompt shipment. They give as the reason short production because of strikes and other conditions over which they have no control.

The problem of the plumbing, steamfitting and other metal-consuming industrials is to get supplies sufficient to keep them going on contracts. Pipe is exceptionally hard to get. The consuming industrials are sending representatives to the mills in an effort to get delivery on previous orders. There also is a scarcity in the supply of other manufactured metal goods, including brass pipe and rods. Business in the clay products, especially for sanitary purposes, is exceptionally good, but many of the manufacturers have orders on their books in sufficient volume to keep them busy the balance of the year. It is announced that new lists are expected to be issued, advancing prices of plumbers' woodwork. This action is due to the advancing prices of lumber and the forest products.

Representatives of all branches of the lumber industry recently met in joint conference in this city. High prices and important legislation impending at Washington were the subjects discussed. The retailers, the wholesalers and the manufacturers all reported a demand for lumber far in excess of the supply. It was the consensus of opinion that increased production and decreased consumption is the only hope of bringing about lower prices.

(For Building Material Price Table See Page 366-A)

Department of Architectural Engineering

Encasing Steel Roof Trusses in a Church Building

By N. SERRACINO, *Architect*

IN certain types of buildings a large unobstructed floor area and high ceiling are required to render the structure adaptable to the contemplated occupancy. This feature is especially desirable in halls, auditoriums, armories, churches and many buildings for similar occupancies.

Various methods have been developed by which this purpose is accomplished.

During those times when stone and brick formed the principal building materials, domes provided the logical method of roof support. Later heavy timber trusses, with iron straps and ties to connect the members, found much favor, and in our present day we have accomplished, with structural steel, feats of engineering along this line formerly unattainable with other materials. It is to be noted that reinforced concrete is more and more crowding steel for first place as a structural material. Trusses of reinforced concrete have already been constructed and are giving satisfactory service.

It is a marked feature of all structures of this class—i. e. those requiring high open spaces—that the resultant type of architecture evolved has in the past depended almost entirely upon the method

by which the roof is supported. To-day, however, it is possible to simulate practically any of the former types with the use of steel construction by so modifying the shape of the structural members that they adapt themselves to the selected design.

Economy of construction is often a prime factor in the choice of materials, and for this reason it has

been the opinion of many designers that the use of timber trusses, within certain limits of span and load, is to be generally advocated in buildings where fireproof construction is not made mandatory by law.

It is also true that very often the timber truss can be given a more artistic treatment when exposed to view than is the case with steel or reinforced concrete.

A church building recently

erected for the United Presbyterian Church of the Bronx, New York City, furnishes an example of both economical and efficient roof design. In this building steel trusses were used for comparatively short spans and light loads. The building fronts on three streets and is approximately 50 ft. by 95 ft. in area, laid out (in ground plan) in the form of a modified crucifix thereby producing a crossing 40 ft. square at the intersection. The height from curb to ridge of



INTERIOR, UNITED PRESBYTERIAN CHURCH, NEW YORK CITY

N. SERRACINO, ARCHITECT
SHOWING METHOD OF FRAMING CROSSING

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UNITED PRESBYTERIAN CHURCH, NEW YORK CITY
N. SERRACINO, ARCHITECT

roof is 50 ft. and the roof slopes at an angle of 45 deg. The auditorium floor is 7 ft. above the curb, and below the auditorium is provided a basement in which the Sunday school rooms are located. There is a small balcony at one end of the auditorium and an organ loft at the opposite or pulpit end. Below this, and to the rear of the pulpit platform, is the pastor's study. The space below the balcony can be closed off from the auditorium by folding partitions. The auditorium has a seating capacity of 350 persons and the balcony has provision for seventy-five persons. With the space beneath the balcony thrown open about 500 persons can be accommodated altogether.

Considerable study was given to the design of the roof framing. In the original design it was the intention to use heavy timber roof trusses of the scissors type. The walls are not buttressed, and in the main are but 12 in. thick above the auditorium floor level and contain several large window openings. Since with the scissors type of truss, when constructed of timber, it is practically impossible to avoid a thrust on the walls, some doubt was entertained as to the wisdom of using timber trusses. For this reason it was decided to alter the structural design and use riveted steel trusses.

When steel trusses have been made use of in church buildings it has been customary to hide them from view by a hung ceiling, the ceiling joists framing into the lower chords of the trusses. In the United Presbyterian Church it was desired to have the trusses exposed to view, so in order to accomplish this purpose, and at the same time preserve the appearance of timber trusses, the steel trusses were enclosed with 1-in. quartered oak

casing. This "camouflage" has deceived the majority of observers, who naturally believe the trusses to be of timber.

The wisdom of this decision was demonstrated shortly after it was made, as in a new church building of approximately the same size where timber trusses of the scissors type were used, the lack of rigid connections in the truss members and insufficient buttressing of the walls caused the walls to be forced out of plumb. Expensive alterations were necessary to place the structure in a safe condition and remedy the damage.

It is not intended to convey the idea that all timber trusses produce thrust at the bearings, as where horizontal lower chords are used this is not the case. It is important, however, in choosing a certain type of truss to investigate its possible weak points, in order to guard against them. In the construction of church roofs both the scissors and hammer-beam types of trusses are frequently made use of. Each of these have weak points which were well understood by medieval builders, and an examination of their work shows to what extent they were provided against in the heavy masonry walls and buttresses.

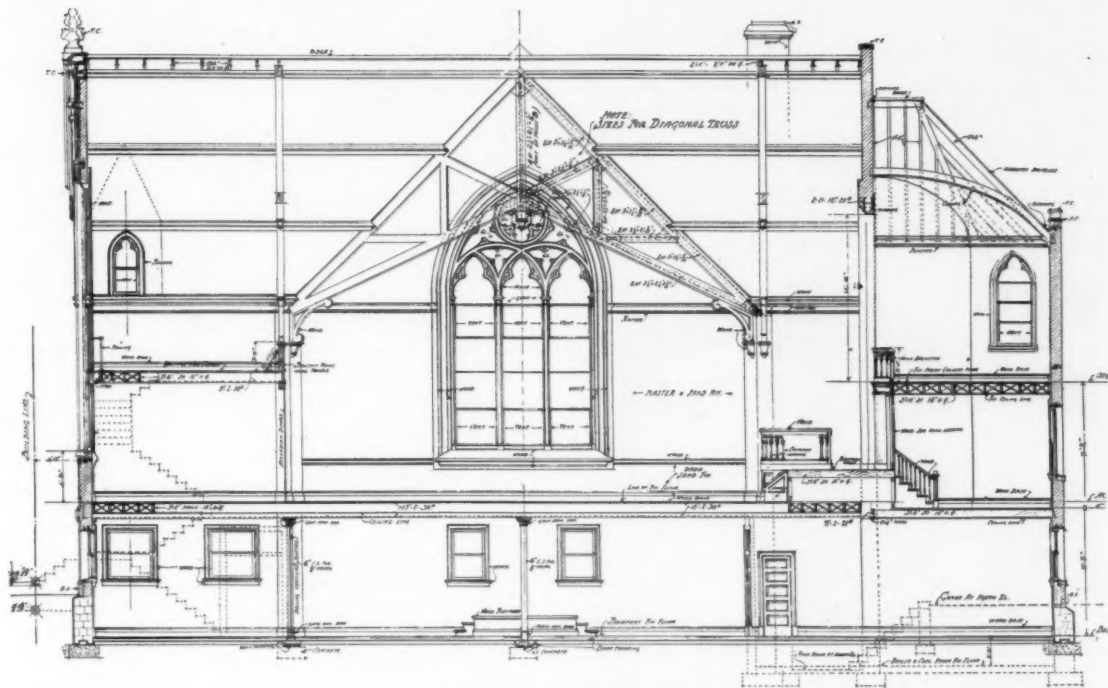
These men possessed a "common sense" engineering skill which would be an asset to many designers of to-day. It is important that we realize the limitations of the materials with which we work.

The layout of the roof framing of the United Presbyterian Church is shown on the roof framing plan opposite. Two trusses, "A" and "B," run diagonally over the crossing, intersecting at the center. These have a span of 58 ft. At either end a cross truss "C" is provided, having a span of 40 ft. The design of both diagonal and cross trusses

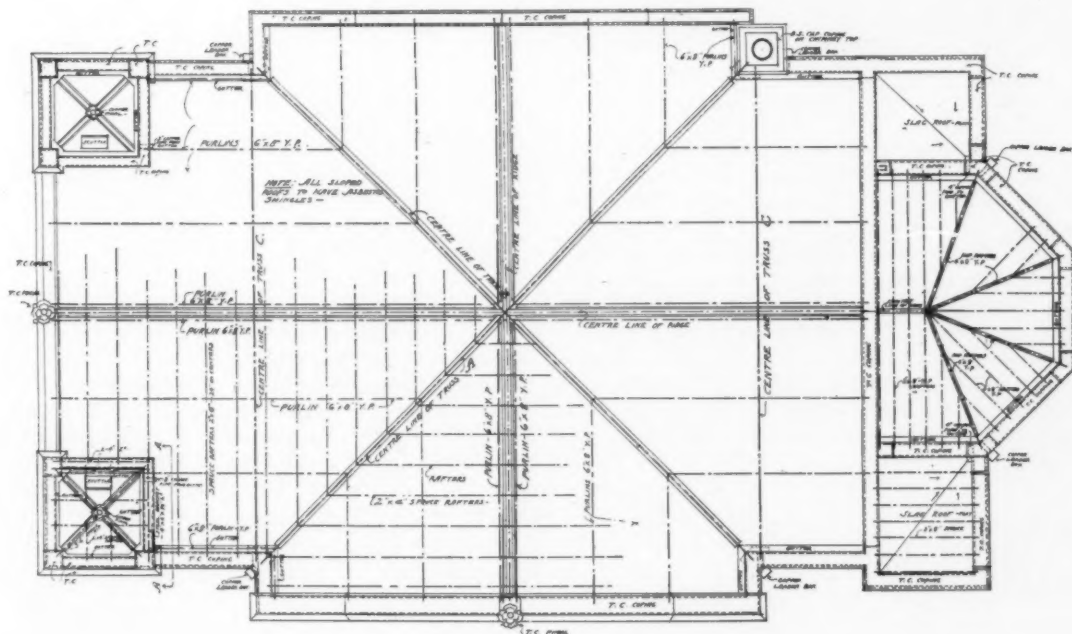


REAR VIEW, UNITED PRESBYTERIAN CHURCH
NEW YORK CITY
N. SERRACINO, ARCHITECT

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LONGITUDINAL SECTION

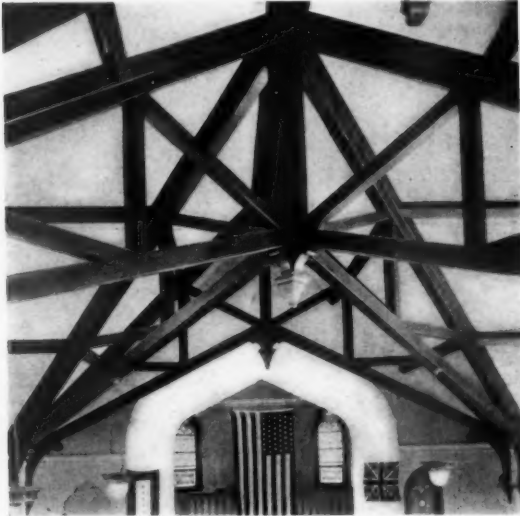


ROOF FRAMING PLAN
UNITED PRESBYTERIAN CHURCH, NEW YORK CITY
N. SERRACINO, ARCHITECT

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is similar. The trusses rest on brick piers of moderate size, formed at the wall intersections. Each truss is anchored to the masonry at one end by bolts built into the piers, while slotted holes are provided in the shoe plates at the opposite end to permit of expansion and contraction.

As no object was to be gained by the use of steel purlins, yellow pine timbers, 6 in. by 8 in. in section, were used for this purpose, these supporting the 2 in. by 6 in. jack rafters.



Intersection of Diagonal Trusses "A" and "B," United Presbyterian Church. Cross truss "C" can be seen to the rear

Clip angles were riveted to the top chords of the trusses at the panel points to which the wood purlins were bolted. This arrangement proved satisfactory.

The outline and stress diagrams of both trusses, with size of members, are shown in Fig. 1. The longitudinal section, page 359, shows the general arrangement, and the photographs show the appearance of the completed work.

The purlins, projecting below the plaster line, divide the ceiling into panels. The plaster used was composed of white sand and Portland cement with

10 per cent of hydrated lime, placed on metal lath. Since the rafters are 24 in. on centers, the ceiling was cross furred with 1 in. by 2 in. wood furring strips, spaced 12 in. apart.

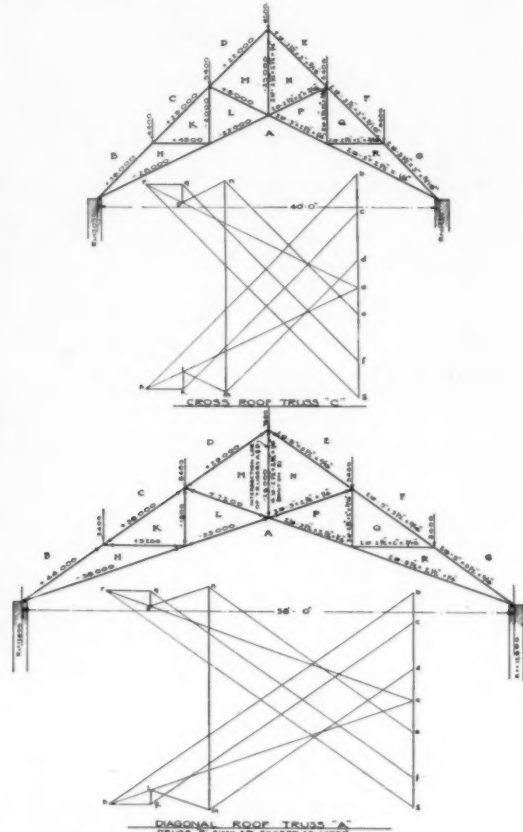


FIG. 1

Outline and Stress Diagrams for Roof Trusses of United Presbyterian Church, New York City

This same feature of steel roof trusses with wood casing has just been used to advantage in another church building, and it is with the thought that this feature may prove helpful to others that I have been led to present the matter in the foregoing article.

Recent Amendments to the New York City Plumbing Regulations Discussed*

By ALBERT L. WEBSTER

THE amendments to the rules and regulations for plumbing in New York City, that went into effect January 27, 1919, permit the restricted use of approved anti-siphon traps. This action has, locally, revived the controversy over the relative merits of the vented bend trap and the anti-siphon trap which was so active thirty-five or forty years ago.

Most of the arguments of to-day duplicate those vigorously presented about 1880, but the subject has changed since then in some of its aspects. At that time the popular and technical conceptions of the danger of, so-called, "sewer gas" were very different from what they are to-day. Its escape into the dwelling was then considered a deadly menace, and the direct cause of diseases now known to be in no way attributable to such a source. The study of the germ origin of disease has changed the aspect of most questions of sanitation. It is accepted that in complex modern life it is impossible to prevent daily exposure to disease germs of many kinds, and the escape of the individual from attack depends more upon his resistant condition than on his freedom from exposure.

Scientists to-day will hardly admit that air and gases escaping into a dwelling from the public sewers and house drains through defective plumbing is the direct conveyor of disease germs in kind or quantity sufficient to constitute an exposure comparable with that of a crowded theater, the average railway train or the public streets of a great city. At most, the danger of drain air is considered an indirect menace through its depleting effect on resistance.

Although this view may be open to controversy in some limited fields, it is probably substantially correct in its general trend. However, until we know the facts more explicitly as to the effect of drain air and what it carries with it, the safe course is to insist that the plumbing and drainage of buildings be so installed that air from the drains may not escape into the building.

Since every fixture necessarily requires a connection with the drain a device must be interposed

through which the waste water from the fixture may discharge but from which drain air may not escape. To meet this dual requirement the water-seal trap has developed.

Without attempting to follow the history of trap development, it may be well to consider the elements of a water-seal trap. In its simplest form, which is the bend trap, known as the $\frac{1}{2}$ S or S trap, it is, in principle, only a "U" tube connected on the outlet side with the drain and on the inlet side with the fixture. Through the emptying of the fixture the trap automatically fills and retains waste water to the level of the inner bottom of the connecting waste pipe, thus forming a water-seal. The surface of the water in both legs of the trap remain at the same level as long as the air pressure on the water surface in each leg is the same. The surface of the water, when at rest, in each leg is under an atmospheric pressure per square inch of 235 ounces Av. (about 15 lbs.) and the maintenance of this equal pressure on each side is necessary to retain the maximum quantity of water in the trap.

If the balance of air pressure is disturbed on one side or the other the water in the trap will move in response and attempt to again establish equilibrium. The difference in air pressure per square inch on the two legs will be equal to the weight of a column of water one square inch in area and as high as the difference of the water surfaces in the two legs. If the air pressure on the outlet side is *reduced* through any cause the trap water will flow out of the waste pipe until the water surface in the inlet pipe has fallen sufficiently to balance the reduced pressure. If the pressure on the outlet side of the trap is *increased*, the water will rise in the inlet leg until equilibrium is established. The device is, in effect, a very delicate air pressure balance.

In every system of plumbing, both of the changes in air pressure, here mentioned, occur in the drain pipes in a greater or less degree at frequent intervals. The former (reduced pressure) is termed "siphonage" and the latter (increased pressure) "back-pressure".

The changes of air pressure in the drainage system may be caused by the discharge of one or more fixtures or rain pipes connecting with the drains, by wind currents blowing over the open ends of the drain at roof or ground level, by difference in temperature of the air in the drains and the air in the building or connecting sewers or in different parts

*Editor's Note. At the present time, the controversy between the advocates of back-venting and simplified plumbing, is spreading throughout the entire country. The matter is of such great importance that it should be definitely decided and the scope of both systems determined by scientific research. Mr. Webster, one of the foremost sanitary engineers of the day, and chairman of the Government's committee which investigated the plumbing installations in the Bridgeport, Conn., housing development, here sets forth his views on the subject and raises certain questions, apparently impossible of satisfactory answer without additional investigation.

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of the same system, and these disturbing causes may operate singly or in any combination.

The disturbance of pressure may be local, more or less general, or coincident at various places in the system, and is often of very short duration and frequently is quite violent in extent.

The changes in pressure can all be analyzed by well-known laws of physics.

Unless protected in some way, a very slight change of air pressure in the drainage pipes will seriously affect the traps of the fixtures. The effective depth of seal of the ordinary $\frac{1}{2}$ S or S trap is less than 2 inches. The weight of a column of water 1 square inch in area and 2 inches high is a little over 1 ounce.

As previously stated, the normal quiescent air pressure on the two surfaces of water in the trap is 235 ounces per square inch; if, therefore, the air pressure on the outlet side of the trap is temporarily reduced 1 ounce, or $1/235$ th of an atmosphere, through any disturbing cause, the water level on the inlet side of the trap will fall to the bottom of the trap, and half of the water-seal will have drained over into the waste pipe and be lost; and when the disturbing cause ceases the trap water will again seek a level in the two legs of the trap, but there will have been a loss of one-half of the effective seal.

If the air pressure has been sufficiently reduced, all of the water in the trap will be drawn over into the waste pipe and the trap left unsealed.

If the pressure in the drain is moderately increased, the water in the trap will be blown, or forced, back into the fixture, and will drain back and seal the trap when the disturbing cause ceases. If the "back pressure" is violent, the trap water will be thrown

clear of the fixture and lost for re-seal.

It is apparent that comparatively slight pressure changes produce disastrous effects on unprotected traps.

In order to prevent the changes of air pressures in the drains from destroying the water-seal of the traps, two methods have been developed. The first provides a supplemental system of air pipes, so designed that changes of pressures occurring in the drain pipes will at once be annulled or equalized through the responsive air movements in the system of air pipes. This method has evolved into the so-called "vented system."

The other method is to so change the form and design of the trap that disturbance of air pressures in the drain will not permanently remove the water-seal of the trap, although they may, temporarily, draw air through the seal, to relieve pressure, or blow air from the drains through it to relieve increased pressure.

In either case the design of the trap is intended to retain sufficient water therein to provide an effective seal after the disturbing cause ceases. This method has developed the "anti-siphon" or "re-sealing" trap system. The depth of seal of such traps varies from 4 in. to 7 in.

Both systems have been in practice. Both systems have their faults and advantages. The controversies arising therefrom have been partisan and acrimonious. So far as I know, a comprehensive and dispassionate consideration of the subject in all its aspects has not been undertaken.

It is apparent that the range and extent of pressure changes will vary greatly in different installations, depending upon the magnitude of the system, the height of the building, and num-

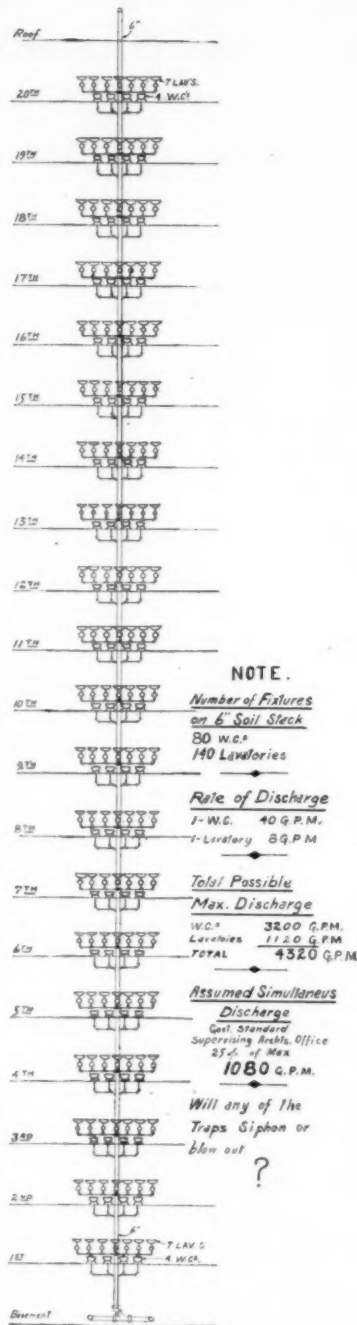


Fig. 1—A Possible Arrangement of Unvented Fixtures Permitted by the Revised Plumbing Regulations, New York City.

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ber and distribution of fixtures, the seasonal changes and a multitude of other variants.

The test experiments that have been made to determine the relative value of the two systems have been confined to comparatively small installations, and directed, chiefly, to determine the relative resistance to siphonage of vented and anti-siphon traps. This feature is only one of the elements to be considered in judging their respective merits and

In the same way the results of tests on comparatively limited stacks, and under arbitrary standards of tests, have been accepted as ground for approving a system, formulating general conclusions and extending their application far beyond anything that the results of the tests warrant.

It would seem that this is what has been done by the Board of Standards and Appeals in changing the rules of plumbing in New York City.

Under these revised rules, a building 20 stories high, at the option of the owner, can be equipped with a 6-inch soil stack having four "approved deep seal, siphon-jet water closets," and seven lavatories, with approved anti-siphon traps, in each of the 20 stories, a total of 80 water closets and 140 lavatories, without trap ventilation of any kind other than provided by the foot vent or fresh air inlet, and the open end of the soil riser at the roof. Such a stack is shown in the accompanying cuts, Figures 1 and 2.

Figure 2 shows the plan of a group of unvented fixtures each provided with an anti-siphon trap on one floor of a 20-story building, which can be duplicated in the remaining 19 stories, under the amended New York City rules. Figure 1 shows the stack riser for the 20 stories.

If all the fixtures were discharged simultaneously, or at successive intervals from above down, there could be an accumulated discharge at the base of the stack at the rate of 4320 gallons of water

a min., equal to about seventeen fire streams. The disturbance of air pressures in the soil stack, under these conditions, would be violent in the extreme—in fact, hydraulic pressure would be produced at the base of the stack.

Of course, no such coincident discharge of fixtures is humanly possible in actual service, but to what extent coincident discharge will take place is a pure matter of speculation. The U. S. Supervising Architect's office of the Treasury Department has adopted a somewhat arbitrary but convenient

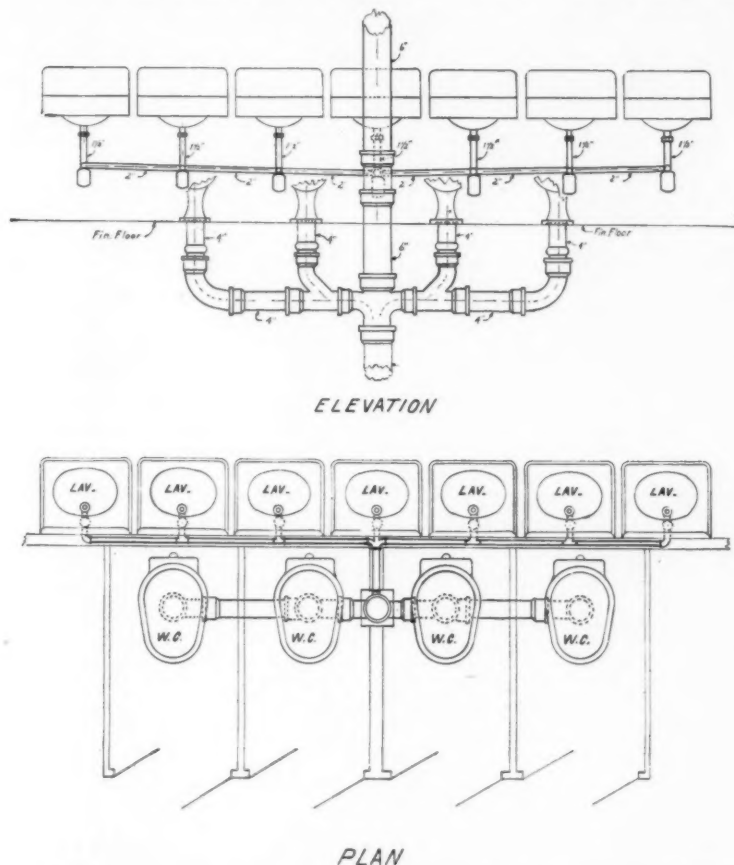


Fig. 2—Detail of Possible Arrangement of Unvented Fixtures Permitted on One Floor of a 20-Story Building Under the Revised Plumbing Regulations, New York City.

demerits. It is an important element, perhaps the most important, but other features should not be overlooked.

The range and magnitude of air pressure changes in the plumbing system will vary greatly with the extent and design of the system, and it is due to this fact that the opportunity for controversy has arisen.

An installation perfectly satisfactory for a small and limited extent of piping has been accepted as evidence that it is a *correct system* and may be extended indefinitely.

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working hypothesis that 25 per cent of the fixtures on a stack may discharge simultaneously, and the plumbing must be designed to take this load.

Adopting this hypothesis, the possible actual discharge at the base of the stack in Figure 1 may be at the rate of 1080 gallons a minute, or equal to about four standard fire streams.

The air pressure conditions in the stack, undoubtedly, would still be violently disturbed, and it seems incredible that the slight resistance pressure

permitted under the New York City plumbing rules for a similar vented installation.

In my judgment, this vented system would operate more satisfactorily, but that even here it would be found inadequate to protect some of the traps and that for this

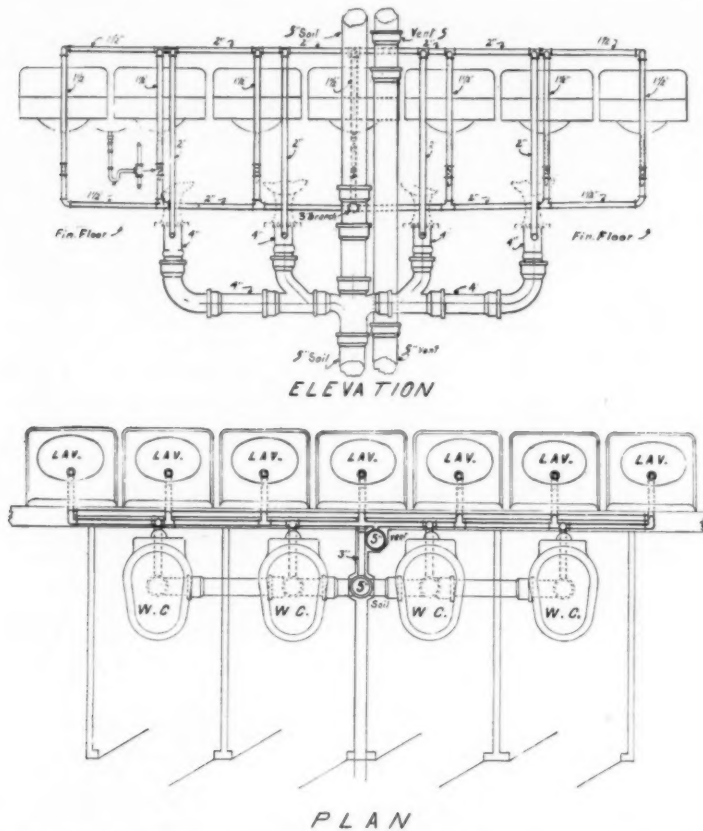


Fig. 4—Detail of Similar Arrangement with Vented Traps, Under Plumbing Regulations, New York City.

of 2 or 3 ounces per square inch offered by the anti-siphon trap seals would stand such a strain without loss of effective seal.

This illustration is offered to emphasize the futility of attempting to extend the application of a specific system, adequate in moderate sized installations, to an enlarged application, where no data are available to warrant such expansion.

For the purpose of comparing the vented system with the anti-siphon system illustrated, Figures 3 and 4 have been drawn showing the additional air

particular case the vent pipes, permitted under the rules, should be made considerably larger to insure absolute safety. It would be possible to change the design of the system by introducing yoke vents, as now permitted by the New York rules, which if properly sized, should prove adequate.

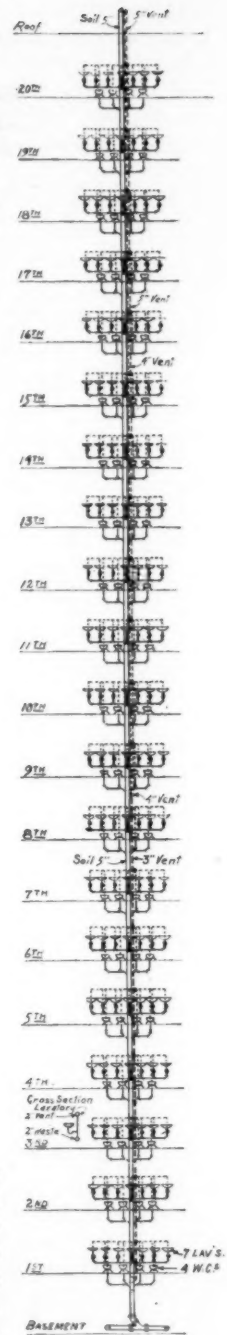


Fig. 3—A Possible Arrangement of Trap-vented Fixtures Permitted by the Revised Plumbing Regulations, New York City.

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The purpose of this article is to direct attention to the necessity of radically revising the entire plumbing rules. The whole subject needs pretty general overhauling. The height and complexity of modern buildings have imposed problems in plumbing work which have outstripped our knowledge of the subject, and the fundamental principles involved have not been studied and tested with sufficient thoroughness to supply a satisfactory solution and form the basis for a proper code.

Such a code should determine and specify within what limits one system or another is safe and permissible, and should definitely fix the require-

ments under which each system shall be designed.

The requirements should properly safeguard the building without the use of unnecessary piping.

No such code could be formulated without a great deal of careful study, practical tests, research work and consultation.

If formation of such a code were properly undertaken, it could be made a standard for the country and would be a welcome step toward the solution of the present vexed question of plumbing design. It would also form the basis for the skillful and conservative use of materials in plumbing that good engineering should require.

National Chaos in Our Public Buildings

Do We Need a National Department of Public Works?

By E. J. RUSSELL, *Architect*

DURING the years 1907-1916, inclusive, the United States Government spent for building construction an average of \$20,000,000 per annum. These figures demonstrate that it is the largest single agency in this country engaged in work of this nature.

Strangely enough, it does not act as a unit; on the contrary—it acts as nine or ten separate and independent agencies. In fact, there are several instances of bureaus in a department working independently of one another.

In the Treasury Department, the office of the Supervising Architect and Coast Guard construct buildings; in the Department of the Interior the Reclamation Service, National Park Service, and the Office of the Indian Affairs act in these matters; in the Department of Agriculture there are four branches, viz: Forest Service, Weather Bureau, Bureau of Animal Industry, and the Bureau of Experiment Stations; the Department of Commerce has one—the Lighthouse Bureau—that builds.

Certain types of buildings are of like character—hospitals might be mentioned as an example. These buildings require special investigations and studies and yet we find this work handled by the Treasury, Army and Navy Departments. This involves duplication of effort and consumes an unnecessary amount of time and money.

What private corporation would allow each of its several departments to maintain separate building organizations? Such corporations naturally cen-

tralize work of this character in order to avoid mistakes and waste of time and money. They also consider it essential to economize in every possible way by buying materials wholesale and by standardizing materials and methods. It was found that economies could be effected by standardizing appliances such as pertained to plumbing, steam heating, hardware and mill work. The economy of such standardization is readily apparent.

Should not the lessons taught by war industries, private corporations and European countries be brought to bear upon our own problem to the great advantage of the taxpayers? An unlimited taxing power is not sufficient justification for the tremendous waste that is inevitable under the present disjointed method of handling the work.

If this work were centralized in one department it could visualize the building situation throughout the country and if it were found that slack times were coming or that a great dearth of building existed in a portion of the country, an effort could readily be made by the Government to fill the gap. With the knowledge that approximately so much business was to be done for the coming year it would be possible to assure manufacturers of material and labor engaged in construction, of steady employment. By the standardization of materials and appliances and securing of options based upon wholesale prices, great economies could be effected. This can be accomplished by the establishment of a National Department of Public Works.

Estimating and the Builder's Overhead*

THREE prime factors enter into the conception and execution of every building—the owner, the architect and the builder. Each renders certain services, each rightfully expects certain service in return.

Before retaining an architect the owner has already formed a tentative picture of the structure he desires, and further has determined an approximate sum for which it must be produced. The owner expects, and rightfully, that the architect will grasp his ideas and supplement and expand them with his own technical knowledge and artistic skill, that he may prepare for the builder a clearly intelligible graphic representation thereof, supplemented with such descriptive text as may be necessary to indicate the true intent of the plans. The architect is made familiar with the financial limitations imposed, and this will influence him in the choice of materials and the appointments specified. Having completed his plans and specifications the architect next turns to a certain number of selected contractors in whom he has confidence and asks: "How much will it cost?" The answer received very often decides whether or not the improvement shall be carried out.

Let us follow the course of events from this stage to determine the manner by which this answer is obtained.

In erecting the large building at this time, a general contractor is usually selected by the architect, who in turn sublets a certain portion of the work to others. Many of the better class of general contractors do their own mason and carpentry work and sublet the balance, which embraces (1) excavation and grading; (2) structural steel and iron work; (3) ornamental steel and iron work; (4) hollow metal or kalamine work; (5) sheet metal work and roofing; (6) millwork; (7) cut stone; (8) marble and tile; (9) lathing and plastering; (10) painting and varnishing; (11) plumbing and drainage; (12) electric wiring; (13) heating and ventilating, and numerous smaller trades. Thus a total of from fifteen to twenty contractors are required for the construction of the average large building.

The average number of general contractors in-

vited to bid on such a building is six. Each receives a set of plans and specifications. Usually ten days or two weeks will be allowed for preparing estimates. The contractor's estimating division hurriedly takes off the masonry and carpentry work, after which the general contractor gets figures from at least three sub-contractors for each of the, say fifteen, other separate divisions of the work. These come to an estimating room, maintained for this purpose by the general contractor, and take off their quantities from the plans in his office. Due to the large number of sub-contractors (forty-five in all) it is often the case that each does not have time sufficient to carefully go over the plans and fully read and digest the specifications. For this reason a slight increase is made to the figured cost, in order to be on the safe side.

Including the six general contractors and the six groups of sub-contractors we have a grand total of at least 200 contractors (there being some overlapping) estimating the cost of this one job in order to answer the architect's question: "How much will it cost?"

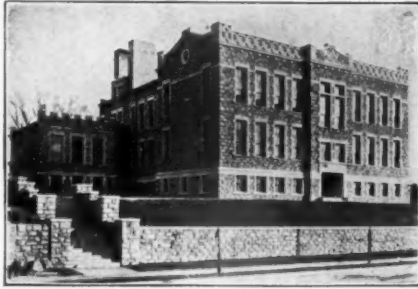
Of these 200 firms only one general contractor and fifteen sub-contractors will be awarded contracts, so that five general contractors and about 180 sub-contractors will have spent their time and money without obtaining any financial return from this particular job. Contractors repeat this performance on an average of fifteen to twenty times before winning a job. Since neither a general contractor nor a sub-contractor who consistently loses money stays long in business, it stands to reason that in addition to a reasonable profit and legitimate operating expenses the cost of estimating from fifteen to twenty jobs must be included by the general contractor and the sub-contractors in the contract price of every building.

Clearly a method requiring such duplication of effort is cumbersome, illogical, inefficient, expensive and unbusinesslike to the extreme.

Its only excuse for existing at all is that this has been the custom for many years in the building trades, and to the owner, if he considers the matter at all, may appear advantageous in that he erroneously believes that he can obtain as many estimates as he desires free of charge, which adds to the possibility of getting a "low" bid.

What is believed to be a better and more logical method will be later discussed.

*In the AMERICAN ARCHITECT of July 23, 1919 (page 132) a study of building costs was discussed and possible methods of eliminating waste suggested. In this article one item of such waste is analyzed.



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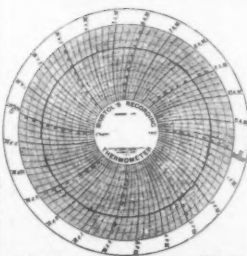
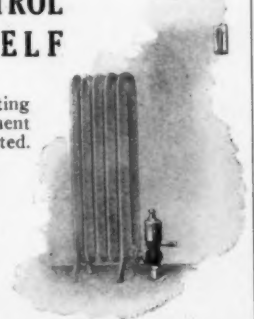


Chart Showing Even Temperature Obtained.



Application of Electric valve to radiator

Late Quotations in Building Material Markets

(Price quotations now current on building materials and supplies as quoted by dealers and jobbers for delivery in New York and Chicago follow. The quotations set forth are placed before readers of THE AMERICAN ARCHITECT to afford an accurate review of market conditions rather than for use as a basis for actual purchase. They will not only provide knowledge of the exact state of the market as to items quoted, but will also present a basis to judge conditions as affecting correlating materials. Items marked (*) indicate an advance over last week, while those marked (†) record a decline. Other prices did not fluctuate during the week.)

BRICK		New York	Chicago
Face brick (delivered on job):			
Common (Delivered at job in Borough of Manhattan only), per thousand.....	\$17.85	\$12.00	
Rough red	37.00	40.00	
Smooth red	38.00	40.00	
Rough buff	42.00	40.00	
Smooth buff	42.00	40.00	
Rough gray	45.00	42.00	
Smooth gray	47.00	42.00	
Colonials	26.00	30.00	

BROKEN STONE		New York	Chicago
(Delivered on job):			
1½ in. per cu. yd.....	\$2.75	\$2.50	
¾ in. per cu. yd.....	2.75	2.50	

BUILDING PAPER		New York	Chicago
Rosin sized sheathing, 500 sq. ft. roll, 36 in. wide:			
25 lbs. to roll.....		85c.	
30 lbs. to roll.....		\$ 1.00	
40 lbs. to roll.....		1.35	
Deadening felt, 50 sq. yd. rolls, 36 in. wide:			
Per ton		85.00	

BUILDING STONE		New York	Chicago
Indiana limestone, per cu. ft.....	\$1.23	.83	
Kentucky limestone, per cu. ft.....	1.35		
Brier Hill sandstone, per cu. ft.....	1.50		
Gray Canyon sandstone, per cu. ft.....	.95		
Buff Wakeman, per cu. ft.....	1.50		
Buff Mountain, per cu. ft.....	1.50		
North River bluestone, per cu. ft.....	1.05		
Seam-face granite, per sq. ft.....	1.00		
South Dover marble (promiscuous mill block), per cu. ft.....	2.25		
White Vermont marble (sawed), New York, per cu. ft.....	3.00		

BURNED CLAY		New York	Chicago
(Delivered on job)			
Block partition:			
3 in., per sq. ft.....	.13	.10	
4 in., per sq. ft.....	.15	.11	
(Chimney tops:			
12 x 12 for 8 x 8 flues.....	\$3.50	\$2.25	
Flue lining:			
4½ ft. x 13 ft., per lin. ft.....	.24	.12	
4½ x 8½, per lin. ft.....	.18	.16	
8½ x 8½, per ft.....	.24	.16	
8½ x 13, per ft.....	.35	.20	
13 x 13, per ft.....	.60	.45	
8½ x 18, per ft.....	.60	.50	
13 x 18, per ft.....	.95	.75	
18 x 18, per ft.....	1.25	.85	
Wall coping (double slant):			
8 in., per lin. ft.....	.18	.14	
12 in., per ft.....	.33	.26	
18 in., per ft.....	.54	.30	
Wall coping (single slant):			
8 in., per lin. ft.....	.16	.14	
12 in., per ft.....	.26½	.30	
18 in., per ft.....	.54	.30	
(Corners and angles four times the price of one foot of coping the same size.)			

Hollow Tile		New York	Chicago
(Delivered at job, in New York below 72nd St.):			
2 x 8 x 12 partitions, per 1,000 sq. ft.....	\$70.15		
3 x 12 x 12 partitions, per 1,000 sq. ft.....	102.00	\$67.90	
4 x 12 x 12 partitions, per 1,000 sq. ft.....	114.75	72.50	
6 x 12 x 12 partitions, per 1,000 sq. ft.....	153.00	99.60	
8 x 12 x 12 partitions, per 1,000 sq. ft.....		135.80	
10 x 12 x 12 partitions, per 1,000 sq. ft.....		167.50	
12 x 12 x 12 partitions, per 1,000 sq. ft.....		194.60	
2 x 12 x 12 split furring, per 1,000 sq. ft.....	63.75	45.30	

CHIMNEY TOPS		New York	Chicago
Revolving	40%	40%	

CEMENT		New York	Chicago
Per bbl. in 15 cent bags (Rebate 60c. per bbl. for bags in New York). 15 cent bags in Chicago (Rebate 60c. per bbl.):			
	\$3.25	\$3.00	

CONDUCTOR PIPE		New York	Chicago
Galvanized steel	5 & 10 & 5%		
Galvanized charcoal iron.....	44½%		
Copper	40%		

Elbows (all sizes to 6-in.)		New York	Chicago
Galvanized steel		70%	
Squares		60%	
Copper		30%	

COPPER SHEETS		New York	Chicago
At the mill, hot rolled, 16 oz. base-price, per lb.: 33½c.			
(From jobber's warehouse add 2 to 3 cents.)			
Cold rolled per lb.....	35½c.*	36c.*	
From stock in 100 lb. lots and over.....	35½c. to 37½c.	37½c.	
For less than 100 lb. lots 2c. per lb. advance.			
Polished, 20 in. wide and under, 1c. per sq. ft. extra; over 20 in. wide, 2c. per sq. ft. extra. Planished, 1c. per sq. ft. more than polished.			
Bottom, pits and flats, 1 oz. and heavier, per lb.....	44c.	44c.	
Tinning one side, per sq. ft.....	.06c.	.06c.	

CORNER BEAD		New York	Chicago
Per foot	.02	.05	

EAVES TROUGH		New York	Chicago
(Discounts from list):			
Galvanized steel	.60 & 10%		
Galvanized charcoal iron.....	55½%†		
Copper	40%†		
(Also note Conductor Pipe).			

FIBRE		New York	Chicago
Per bushel	.36	.30	

FINISHED IRON AND STEEL		New York	Chicago
(Mill Shipments)			
Bar iron, refined grade.....	2.77c.	2.62c.	
Bar iron, double refined.....	3.77c.		
Soft steel bars.....	2.62c.	2.62c.	
Shapes	2.72c.		
Plates	2.92c.	2.65c.	

GALVANIZED SHEETS		New York	Chicago
Nos. 12 and 14 gauge, per lb.....	6.35c.	6.20c.	
No. 16	6.50c.	6.30c.	
No. 18 and 20.....	6.65c.	6.62c.	
Nos. 22 and 24.....	6.80c.	6.75c.	
No. 26	6.95c.	6.92c.	
No. 27	7.10c.	7.07c.	
No. 28	7.25c.	7.23c.	
No. 30	7.75c.	7.60c.	
(No. 28 and lighter, 36 in. wide, 20c. higher.)			

GLASS		New York	Chicago
(Discounts from manufacturer's price lists)			
Single strength, A quality, first three brackets.....	77%	77%	
Single strength, B quality.....	77%	77%	
Double strength, A quality.....	79%	79%	
Double strength, B quality.....	81%	81%	
Plate—up to 5 sq. ft.....	82%	80%	
Plate—over 5 sq. ft.....	84%	80%	
Plate—up to 10 sq. ft.....	80%	80%	
Plate—over 10 sq. ft.....	80%	80%	
Polished plate glass (commercial run of thickness and quality) sizes to 5 sq. ft., inclusive.....			
Sizes over 5 sq. ft.....	82%		

GRAVEL		New York	Chicago
1½ in. (Borough of Manhattan only), per cu. yd.....	\$3.25	\$2.50	
¾ in. (Borough of Manhattan), per cu. yd.....	3.50	2.50	

GRIT		New York	Chicago
Delivered at job in Borough of Manhattan.....	\$2.25	\$2.00	
Delivered in the Bronx.....	2.50	2.25	

GYPSUM		New York	Chicago
Plaster Board: Delivered at job, Boroughs of Manhattan and Bronx.			
27 x 28 x 1.....	37c.		
27 x 48 x ½.....	34c.		
32 x 36 x ¼.....	22c.	20c.†	
32 x 36 x ½.....	22c.	21½c.†	
32 x 36 x ¾.....	24½c.		

Plaster Blocks:		New York	Chicago
Delivered at job, Boroughs of Manhattan and Bronx.			
2 in. solid, 12 x 30, per sq. ft.....	11c.	10c.	
3 in. hollow, 12 x 30, per sq. ft.....	11c.	10c.	
4 in. hollow, 12 x 30, per sq. ft.....	12½c.	11c.	
6 in. hollow, 12 x 30, per sq. ft.....	18c.	13c.	

LATH		New York	Chicago
Eastern spruce, per thousand.....	\$8.50*		
No. 1 white pine, per thousand.....	8.25*	\$8.00*	
No. 1 hemlock, per thousand.....	7.50*	7.00*	
No. 1 yellow pine, per thousand.....	8.25	6.00*	

LEAD		New York	Chicago
American pig, per lb.....	6½ to 7c.	6¼ to 6½	
Bar, per lb.....	8 to 9c.	6½ to 6¾	

LIME		New York	Chicago
Common, 200 lb. bbls., per bbl.....	\$2.50	\$1.50	
Finishing, 300 lb. bbls., per bbl.....	3.70		
Hydrated, in paper bags, per ton.....	18.50	17.50	
Hydrated, in cloth bags, per ton (Rebate per bag 10c.)	22.60	24.00	

LUMBER		New York	Chicago
(Retail prices per M, delivered.)			
Yellow pine, 2 x 4.....	\$70.00	\$55.00*	
Yellow pine, 2 x 6.....	70.00	55.00	
Yellow pine, 4 x 4.....	75.50	60.50	
Yellow pine, 8 x 8.....	72.00	64.00	
Yellow pine, 12 x 12.....	82.50*	70.00	
Yellow pine, No. 1 boards, 1 x 6.....	100.00	85.00	
Yellow pine, No. 1 boards, 1 x 12.....	110.00	95.00	
Yellow pine, B and better flooring (plain).....	100.00	90.00	
Yellow pine, B and better flooring (quartered).....	125.00	110.00	

(Continued on page 366-B)



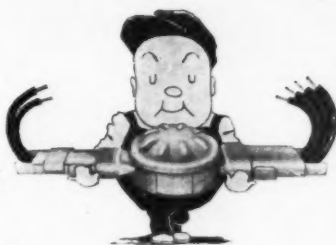
222
TWO WIRE ONLY

"National"



333
THREE AND FOUR WIRE

Inter-connecting Metal Moldings



No. 222 Molding is for two wire work only: it is neat, easy to install and economical. May be used as an independent system or in combination with No. 333.



No. 333 Molding is for three and four wire work. It bears the same relation to No. 222 as 3-4 inch conduit to 1-2 inch, and should be used for main and feeder circuits and where necessary to install two parallel two wire circuits.



The line of fittings and devices is complete. Write for our Installation Chart and Complete Descriptive Bulletin 101.



National Metal Molding Co

1111 Fulton Building
PITTSBURGH, PA.



Atlanta
Boston
Buenos Aires
Buffalo

Chicago
Dallas
Denver
Detroit

Havana
Los Angeles
Manila
New York

Paris
Philadelphia
Portland
Rio de Janeiro

Salt Lake City
San Francisco
Seattle
St. Louis

Canadian Distributors—Canadian General Electric Co., Limited

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THE AMERICAN ARCHITECT

Building Material Market Reports

(Continued from page 366-A)

	New York	Chicago
North Carolina pine, flat flooring, No. 2 and better	\$97.00	\$85.00
North Carolina pine, flat flooring, No. 3	85.00	75.00
North Carolina pine, rift flooring	125.00	110.00
Norway pine, 2 x 4	70.00	63.00*
Norway pine, 2 x 12	85.00	76.00*
Douglas fir, 6 x 6 to 12 x 12	75.00	67.50
Douglas fir, 12 x 12 to 14 x 14	85.00	78.00
Hemlock, 2 x 4	63.00	57.00
Hemlock, 2 x 12	65.00	58.00
Oak, quartered, 1 in., F. A. S.	250.00	235.00
Oak, plain, 1 in., F. A. S.	175.00	160.00
Oak flooring, 13/16, quartered (white)	275.00	238.00
Oak flooring, 13/16, quartered (red)	275.00	225.00
Oak flooring, 13/16, plain (white)	200.00	175.00
Oak flooring, 13x16, plain (red)	200.00	178.00
Maple, 1 in., F. A. S.	100.00	95.00
Maple flooring, 13/16, clear	150.00	140.00
Maple flooring, 13/16, select	140.00	135.00
Maple flooring, 13/16, No. 1 factory	110.00	97.00
Basswood, 1 in., F. A. S.	120.00*	100.00
Mahogany, 1 in., F. A. S.	320.00	315.00
Sap gum, 1 in., F. A. S.	85.00	75.00
Red gum, 1 in., F. A. S.	125.00*	115.00
Chestnut, 1 in., F. A. S.	110.00	105.00
Poplar, 1 in., F. A. S.	150.00	130.00
Birch, 1 in., F. A. S.	120.00*	85.00
Spruce, random, 2 in.	70.00	65.00
Spruce, wide, 8 in.	75.00	70.00
Spruce, 10 in.	75.00	72.50
Spruce, 12 in.	77.50*	70.00
Cypress, 1 in., F. A. S.	105.00	90.00

METAL LATH

Under 100 sq. yd., per sq. yd.	40c.	35c.
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MORTAR COLORS

Red, per lb.	.05	.05
Brown, per lb.	.05	.05
Chocolate, per lb.	.05	.05
Black, per lb.	.05	.05

NAILS

Wire nails and brads, miscellaneous	.75%	
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OILS

Linseed, city, raw	\$2.25	\$2.48
Linseed, boiled, advance, per gal.	.01	.02
Out of town, American seed, at	2.25	2.48

PAINTS

Leads:		
American white, in oil, kegs; lots over 100 lbs.	13c	13c
White, in oil, 25-lb. tin pails; add to keg price.	14c	14c
Red, bbl., 1/2 bbl. and kegs; lots over 100 lbs.	13c	14c
Dry Colors:		
Red Venetian, American, per 100 lbs.	\$2.00 to \$4.50	\$2.00 to \$4.00
Metallic Paints:		
Brown, per ton	\$32.00 to \$36.00	\$24.00 to \$32.00
Red, per ton	35.00 to 40.00	24.00 to 32.00

PIPE

Cast Iron:		
6 in. and heavier	\$54.30	\$53.80
4 in.	57.30	56.30
3 in.	62.30	68.80
(and \$2.00* additional for Class A and gas pipe.)		
(Discounts to jobbers for carload lots on the Pittsburgh basing card; freight rates from Pittsburgh to New York, and also from Pittsburgh to Chicago, in carloads, per 100 lbs., are 27c. An additional 5 per cent discount is allowed to large jobbing interests over those listed below.)		

	F.O.B. Pittsburgh	F.O.B. Chicago
Wrought:		
Steel:		
Black, 1/2 to 3 in.	50% to 57 1/2%	42.6 to 49.6%
Galv., 1/2 to 3 in.	24 to 44 %	14.6 to 34.6%
Iron:		
Black, 1/2 to 1 1/2 in.	29 1/2 to 34 1/2 %	19.6 to 29.6%
Galv., 1/2 to 1 1/2 in.	2 1/2 to 23 1/2 %	9.4 to 11.6%
Steel:		
Black, 2 1/2 to 6 in.	53 1/2 %	45.6%
Galv., 2 1/2 to 6 in.	41 %	31.6%
Iron:		
Black, 2 1/2 to 6 in.	34 1/2 %	24.6%
Galv., 2 1/2 to 6 in.	21 1/2 %	9.6%
Steel:		
Black, 1/2 to 3 in.	46 1/2 to 56 1/2 %	33 to 43 %
Galv., 1/2 to 3 in.	29 to 44 %	10.6 to 18 %
Iron:		
Black, 1/2 to 1 1/2 in.	28 1/2 to 39 1/2 %	
Galv., 1/2 to 1 1/2 in.	11 1/2 to 24 1/2 %	
Steel:		
Black, 2 to 6 in.	48 1/2 to 50 1/2 %	35 to 37%
Galv., 2 to 6 in.	37 to 39 %	10 to 12%
Iron:		
Black, 1 1/4 to 6 in.	25 1/2 to 34 1/2 %	
Galv., 1 1/4 to 6 in.	10 1/2 to 22 1/2 %	

PIPE-VITRIFIED SEWER

(Standard pipe and fittings, F.O.B. carloads):		
3 to 24 in.	.67%	
27 to 30 in.	.66%	
33 to 36 in.	.64%	

PLASTER

	New York	Chicago
Rebate for bags 15c.		
Neat wall cement in 15 cent bags, per ton	\$21.30	\$19.00
Finishing plaster	24.00	19.00
Lath mortar, in cloth bags, per ton	15.05	12.50
Brown mortar, in bags	15.05	14.00
Finishing plaster, per bbl. (250 lbs.)	3.50	3.00
Finishing plaster, per bbl. (320 lb. bbl.)	4.35	

PUTTY

In bladders, per 100 lb.	\$6.25	\$4.25
In 1-lb. to 5-lb. tins, per 100 lb.	6.75	6.50

RADIATION

(A further discount, effective July 1, of 25% on direct radiators, 12 1/2% on wall radiators, and 10% on steam and hot water boilers is announced. This approximates a drop of 36% on radiators and 33% on boilers from prices in effect before the 1st of January, 1919.) Chicago reports a 57% discount on standard heights.

REGISTERS

	New York	Chicago
Cast iron semi-steel or steel, in black or white japan or electro plate and small faces and borders	40%	40%
Wall frames	40%	40%
Large faced, 14 x 14 in. and larger	40%	40%
Base board registers	40%	40%
Base board intakes	40%	40%
White enameled goods	15%	15%
Solid brass or bronze goods, except grilles	net	net
Grilles in black and white japan or electroplate in cast iron, plain lattice design—smaller than 14 x 14 in.	40%	40%
—Larger than 14 x 14 in.	60%	60%

REINFORCING BARS

High carbon steel from mill	\$48.50	\$49.50
Medium steel from mill	48.50	49.50

ROOFING MATERIAL

Tarred Felt Paper:		
No. 1—25 lbs. to 100 sq. ft., per ton	\$62.00	\$75.00
No. 2—16 lbs. to 100 sq. ft., per ton	63.00	75.00
No. 3—12 lbs. to 100 sq. ft., per ton	64.00	75.00
Rosin sized sheathing, per ton	60.00	65.00
Corrugated roofing, galvanized, 2 1/2 in. corrugation, over flat sheets, 30c. per 100 lbs.		

Rubber, 108 sq. ft. rolls, 32 in. wide, per roll:

First Quality:		
1 ply—35 lb. rolls	\$1.90	
2 ply—45 lb. rolls	2.30	
3 ply—55 lb. rolls	2.85	
Second Quality:		
1 ply—35 lb. rolls	1.45	
2 ply—45 lb. rolls	1.75	
3 ply—55 lb. rolls	2.20	

ROBIN

Common to good, strained (wholesale), 80 lb. per gal.	\$17.75*	
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SAND

Mason, per cu. yd.	\$1.80	\$2.50
Torpedo, per cu. yd.	1.80	2.50
White sand, per cu. yd.	4.00	

SHINGLES

Red cedar, 5 to 2, clear, per thousand	\$11.00	\$7.00
White cedar, extra star, A star, per thousand	11.00	7.00
Cypress, 6 x 18, No. 1 hearts per M.	17.00	14.00
Cypress, 6 x 18, No. 1 prime per M.	15.00	12.00

SLATE ROOFING

	F.O.B. cars, Quarry Station	F.O.B. Chicago
Pennsylvania:		
Best Bangor	\$7.75 to \$9.00	\$10.20 to \$11.45
No. 1 Bangor Ribbon	6.75 to 7.00	9.20 to 9.70
Pen Argyl	6.50 to 7.25	9.70 to 10.45
Peach Bottom	10.50 to 12.50	12.45 to 14.45
No. 1 Chapman	6.25 to 7.25	8.70 to 9.95
Vermont:		
No. 1 Sea Green	4.25 to 6.75	5.95 to 9.00
Unfading Green	9.00 to 10.50	9.40 to 12.50
Mottled Green Purple	9.00 to 10.50	
Red	12.00 to 20.00	14.80 to 22.80
Maine:		
Brownsville, U'fg Black, No. 1	12.00	14.10 to 15.10
Slaters felt, 30 lb. roll	.92	
Slaters felt, 40 lb. roll	1.22	

SPIRITS TURPENTINE

	New York	Chicago
Per bbl.	\$1.75 to \$1.77 1/2	†

STONE SCREENINGS

Lime, per cu. yd.	\$2.35	\$2.50
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STRUCTURAL STEEL

Beams and channel, 3 to 15 in., per lb.	2.72c.	3.47c.
Beams and channel, over 15 in., per lb.	2.72c.	3.57c.
Angles, 3 to 6 in.	2.72c.	3.47c.
Zeas	2.72c.	3.47c.
Teas	2.77c.	3.52c.*
Steel bars, half extras, from mill	2.35c.	3.37c.

STUCCO

In cloth, per ton (white, mixed)	\$22.50	\$19.50
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STUCCO BOARD

Medium weight stucco board, plain, per M sq. ft.	\$42.50	\$45.00
Medium weight stucco board, creosoted, per M sq. ft.	50.00	50.00
Heavy weight stucco board, plain, per M sq. ft.	55.00	55.00
Heavy weight stucco board, creosoted, per M sq. ft.	60.00	60.00
Medium weight stucco board, plain, narrow key, per M sq. ft.	50.00	50.00
Medium weight stucco board, narrow key, creosoted, per M sq. ft.	55.00	55.00
Insulating board, heavy felt background, per M sq. ft.	50.00	50.00

SHEATHING BOARD

Heavy weight sheathing board, per M sq. ft.	\$50.00	\$50.00
Medium weight sheathing board, per M sq. ft.	45.00	45.00
Stucco or plaster board, sheathing board and insulating board are in rolls containing one sheet 25 ft. long and 4 ft. wide (100 sq. ft.)		

WALL BOARD

Wall board, shipped any length, 4 ft. wide, per M.	\$45.00	\$40.00†
Packed flat in cars if ordered in less than car lots. Add \$5.00 per M ft. for crating.		