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Fig. 1. Elaborately carved lintel

This lintel is 14 feet long by 4 feet in height, cut from a single piece of limestone

LIMESTONE in BUILDING CONSTRUCTION

INTRODUCTION

THE architect, the engineer and the architectural draftsman have found it necessary, and as time goes on increasingly so, for them to know more about the materials of construction. The acquiring of a fairly comprehensive knowledge of the physical properties of building materials, their methods of production or manufacture and limitations as to use, is receiving more attention on the part of the profession than was formerly the case. This fact is attested by the architect's attitude today, as compared with the quite evident intentional neglect given to the consideration of materials by many of the earlier writers on architectural subjects.

The belief that building stone, and especially limestone, constitutes a subject of timely interest to the architectural profession seems patent, both on account of the extent to which this material is being employed by architects, and because of the apparent lack of anything except dry technical reports on American building stones.

The first of a series of articles giving a general outline of the Use of Limestone in Building Construction together with proper methods of structural detailing
By H. S. BRIGHTLY

and a better standard of excellence in point of design.

This quite naturally affects the choice of building materials. The medium must be worthy of the design, as it affects the execution of detail to an extent that often precludes a determination of the features of the design, if not the type of design itself, until after the decision as to material has been made.

It is not the purpose of this article to devote any space to axioms of this sort which are common knowledge among architects. The point is mentioned here only in order to call attention to another related fact, which is, that in the method of detailing a particular design, there often exists an opportunity to affect the cost of

Furthermore, with the country's increased wealth there is a natural broadening of education and a more highly developed culture which, along with the now general interest in Fine Arts, also manifests itself in the desire for a higher type of building construction, greater structural permanence

building in a major way without changing materially the character or general effect of the particular design.

The extent to which this is possible is not always appreciated by architects as much as it should be, in order that they may best serve their clients in an economic way and at the same time get the most out of their designs. Especially is this true

It will therefore be the effort of the writer of this series of articles to present to the profession a general statement of the use of limestone in building construction, extracting from some of the technical reports on this material, such information as it is thought will be generally useful and assembling it in a very brief form for convenient reference. This will be supplemented with detailed

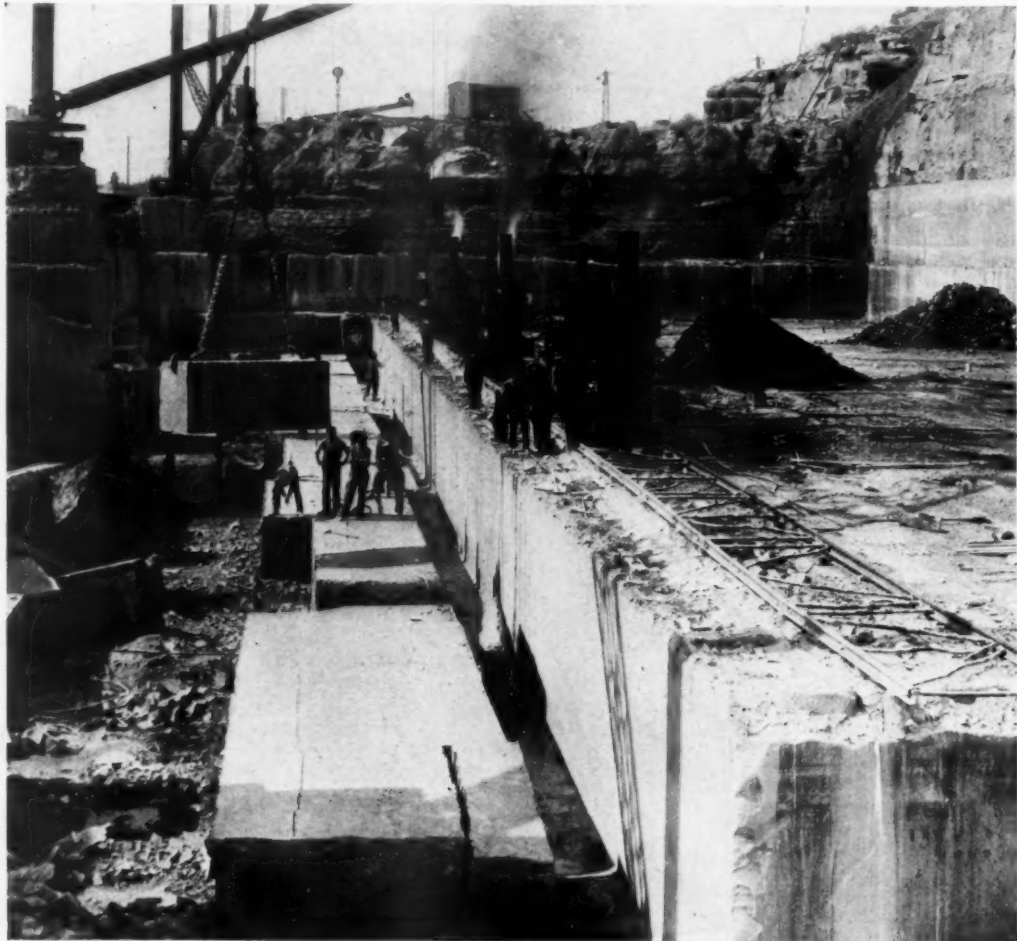


Fig. 2. General view of a limestone quarry

Showing the huge blocks of stone that are cut from the solid ledge by the channeling process and then split up in Mill Blocks for shipment to cut stone plants

of natural stone, which must be shaped from or cut out of the solid block; even more so of building stones like Indiana Limestone which are to such a large extent worked by highly developed machine methods.

The architect can often magnify the beauty of his building design by the execution of it in the most appropriate material, a material that will age gracefully; and can be depended upon to assure for all time the good appearance of his creative work.

information regarding the proper and economical use of limestone in modern building construction.

While it will, of course, be impossible in the scope of these articles to prepare anything like a comprehensive treatise on the detailing of limestone, an attempt will be made to present all of the more important points and prepare a series of solutions of the many questionable points, which are more or less perplexing to the architectural draftsman and which are all more or less affected by modern machine methods of production.



Fig. 3. DETAIL VIEW OF DOORWAY IN L. C. HANNA'S LIMESTONE RESIDENCE AT CLEVELAND, OHIO
WALKER & GILLETTE, ARCHITECTS

A later article or chapter will be devoted largely to a brief historical sketch of the use of limestone in building construction and its effect on design, and an outline of the development of architectural practice with this material.

The remainder of the present chapter will be devoted to the material and its formation, and the classes or subdivisions into which it is divided by geologists.



Fig. 4. Corinthian Cap, carved from a single block of limestone

It is thought that the consideration of any material should be prefixed by a clear and concise definition of the various classes into which it is divided, with a general statement of the reasons for this classification of the product, and in the case of natural stone, a brief outline of the geology and economic importance of the products under consideration, their composition, origin and differences in formation, and consequent properties, appearance and comparable features. For a more complete or thorough discussion, the reader is referred to the various textbooks on the Geology of American Building Stones and to the reports issued by both State and Federal Government Departmental Surveys.

LIMESTONES IN GENERAL

Limestone is a so-called "aqueous" or sedimentary rock, composed principally of the mineral Calcite or calcium carbonate, of which the chemical formula is CaCO_3 . It is formed by the accumulation of calcium sediment in a body of water, principally in the ocean or one of its seas, but also in certain bodies of fresh water.

Limestone differs from such other sedimentary rocks as sandstone, conglomerate and shale, in con-

sisting almost entirely of calcium carbonate, which is popularly called carbonate of lime. While there is no essential difference in the technical terms, "calcite" and "calcium carbonate," which are frequently used synonymously, and no difference in the chemical composition, there is an untechnical popular usage of these terms which is considered appropriate. This consists of using the term "calcium carbonate" to designate the matter in its original practically non-crystalline shell or only slightly crystalline form, and the term "calcite" for this same matter in crystalline form.

In all forms of carbonate rock, we therefore have the same mineral matter as primary carbonate (shell remains) and often as both secondary and tertiary calcite (crystalline accretions thereto), the predominance of either form, that is the extent of crystallization, determining the appropriate use of the two terms.



Fig. 5. Corinthian Cap and Column, carved from a single block of limestone

At this point it seems appropriate to interject the statement that marbles, that is most marbles which are high in calcite, are converted limestone, i.e.—metamorphosed and recrystallized limestone and when of a pure, or reasonably pure calcium carbonate rock, are quite similar in composition to limestone. The marble, originally limestone has undergone a metamorphic change due to heat, moisture and pressure and in this manner has lost, either entirely or very largely, its original shell or other sediment grain formation, becoming either fully or very nearly crystalline in structure.

So-called marbles, which are only semi-crystal-



Fig. 6. DETAIL VIEW OF MAIN DOORWAY, ACADEMY OF ARTS AND LETTERS, NEW YORK CITY

McKIM, MEAD & WHITE, ARCHITECTS

Fine example of the recent use of limestone in monumental building

line in structure, are not really marbles in the technical sense of the term, but are limestones that are sufficiently dense and hard to take a polish, due to the percentage of their basic matter which is present as Calcite rather than as primary calcium carbonate.

The line between marble and limestone is therefore a difficult one to draw, as the two merge into one another, and it is more nearly correct when designating monotone or neutral-toned, semi-crystalline calcareous building stones, to base the application of these terms on the trade usage of the



Fig. 7. Baptismal Font in St. Paul's Cathedral, Toronto, carved of limestone

material. The term "marble" being reserved for decorative stones, used principally for interior work, and the term "limestone" for that material used for general building purposes, principally exteriors, but including interior work in which the texture, natural color-tone and carved or sculpture detail is the principal feature or a factor governing its usage, rather than the colors and veining or other markings developed by polishing or honing of plain or moulded surfaces.

Having thus explained the close relation of certain limestones with certain classes of marble, we will now proceed further to consider limestone and the several general classes into which it is divided.

In a previous paragraph, it was stated that limestone was composed principally of the mineral "calcite" or "calcium carbonate." There is a varying exception to this, in that stones composed principally both of calcium carbonate and magnesium carbonate are also classed as limestone, when the proportion of the magnesium carbonate ($Mg CO_3$) replacing the calcium carbonate ($Ca CO_3$), does not exceed a given proportion, since practically all limestone will have some small percentage of magnesium in its composition. When the magnesium carbonate does not exceed 10 per cent the stone is classed as limestone; when it exceeds that percentage, as Magnesium Limestone; and when it equals 30 per cent or more, as Dolomite.

Dolomite and Magnesium Limestones are not very generally used in the production of cut stone for building purposes, but this class of limestone rock is extensively used for burning into quick lime (lump lime) and for the production of hydrated lime for building and other purposes. Dolomitic marbles on the other hand are quite frequently used for ornamental work.

COMPOSITION OF LIMESTONE

Carbonate of lime is the principal constituent of shells and of corals, and it is largely to the accumulation of the shell remains of small to minute shell-bearing marine organisms, including corals, more or less broken and ground up into fragments of fairly uniform size by the action of the waves or currents, that limestones owe their origin.

Thus a limestone rock is formed of calcium carbonate generally in the form of calcareous sand grains cemented together with the same material, rubbed off of other shells or shell grains and dissolved by the water action, and then again redeposited from solution. Whereas sandstone is composed of quartz or silica sand grains, cemented or consolidated in various ways.

Many limestones and especially those most useful for building purposes may therefore be referred to as calcareous-sand rock. The Indiana Limestone or so-called "Bedford stone" is the outstanding domestic example of this formation, and will be described later.

The shells, when incorporated in the stone in their original form rather than as fragments, are known as fossils. Apart from the differences in composition already mentioned, the different varieties of limestone owe their difference principally to: *first*, their purity and freedom from an appreciable percentage of other mineral elements; *second*, to the form of aggregate or degree of fineness to which the shell fragments are reduced; *third*, the thoroughness of consolidation and cementing together of the grains; *fourth*, the freedom from interbedding of foreign matter in seams and consequent layering or stratification of the formation; and *fifth*, to the degree that crystalline



Fig. 8. THE MEMORIAL ARCH, NEW ORLEANS, LA.

An example of the use of limestone in purely monumental structure

calcium carbonate or calcite is present in lieu of the primary so-called non-crystalline carbonate in its original form as shell fragments. Since the original shells may vary in size from several inches in length to microscopic dimensions, the fineness of grain of the stone may be due in part to the size of the original shells, as well as to the degree of grinding by wave or current action.

When this grinding has been so severe that the shell fragments are reduced to grains as fine as a powder, the deposit takes the form of a mud, and the consolidation of such a mass is termed a "chalk."

A partly consolidated stone formed of shells that are microscopic in size, is also called "chalk." When such a calcareous mass is mixed with ordinary mud or clay matter, the resulting consolidation is termed "marl." Very soft or poorly consolidated limestone with quite ordinary size grains is sometimes also called marl.

On the other hand, when the shells are not ground up, and especially where the large shells and other animal remains are well preserved in the solidification of the mass, it is often called a fossiliferous limestone, a shell rock or "coquina"

a term that is also applied to recent coral rock formations.

When impurities are introduced into the mass prior to its consolidation; the stone will generally be qualified by a descriptive term. Thus, when silica sand is intermixed we have "arenaceous limestone," and when clay is intermixed "argillaceous limestone."

The Nummulitic Limestones of Egypt and Asia are simply limestones that have been consolidated from a deposit of fairly well preserved nummulite shells.

The term "oölitic" is a little more loosely applied. Theoretically this refers to a calcareous sand rock, in which the grains are decidedly rounded, or in the form of small pellets resembling the roe of a fish, these grains having been formed by the crystalline growth of calcite around an original microscopic shell or shell fragment, and the mass later cemented together with calcite. The European oölitic are generally of this type. The principal American oölitic or oölitic limestone, is found in Southern Indiana. Formerly this was called "Bedford stone," but is now almost invariably referred to as "Indiana Limestone." There



Fig. 9. The Northcott Memorial, Springfield, Ill.
Ernest Bruce Haswell, Sculptor

A fine example of low relief carving in limestone

are numerous other limestone formations in the State of Indiana but only the well known oölitic stone of Lawrence and Monroe Counties that is used so extensively for building purposes, is implied by the term "Indiana Limestone."

A somewhat similar deposit, more or less impregnated with asphaltic oil, is found in Kentucky and there are other somewhat similar deposits at several points in Alabama, Missouri and Texas.

The Bedford oölite is composed almost entirely of shells and shell fragments, and is unlike the European oölite in that the grains are less rounded and are not to such an extent the result of crystalline growth around an original fine particle of carbonate. The grains show a coating of secondary calcite, however, and in certain parts of the deposit the rounded oölitic formation is more evident than in others, justifying the term oölitic, which was first applied specifically to this stone by a state geologist in 1857.

The principal differences between the nummulitic limestones of Egypt, which were so extensively used by those ancient builders, and the oölitic limestone of Southern Indiana that is now so extensively used in America, apart from such differences in mineral composition or purity that may exist, can be briefly stated thus:

The nummulitic stone is a deep sea water deposition composed primarily of nummulite shells

and shell fragments; and being a sea water deposit also contains some salt. This is an Eocene or early Tertiary deposit, roughly about 4 million years old, according to the generally accepted geologic time table.

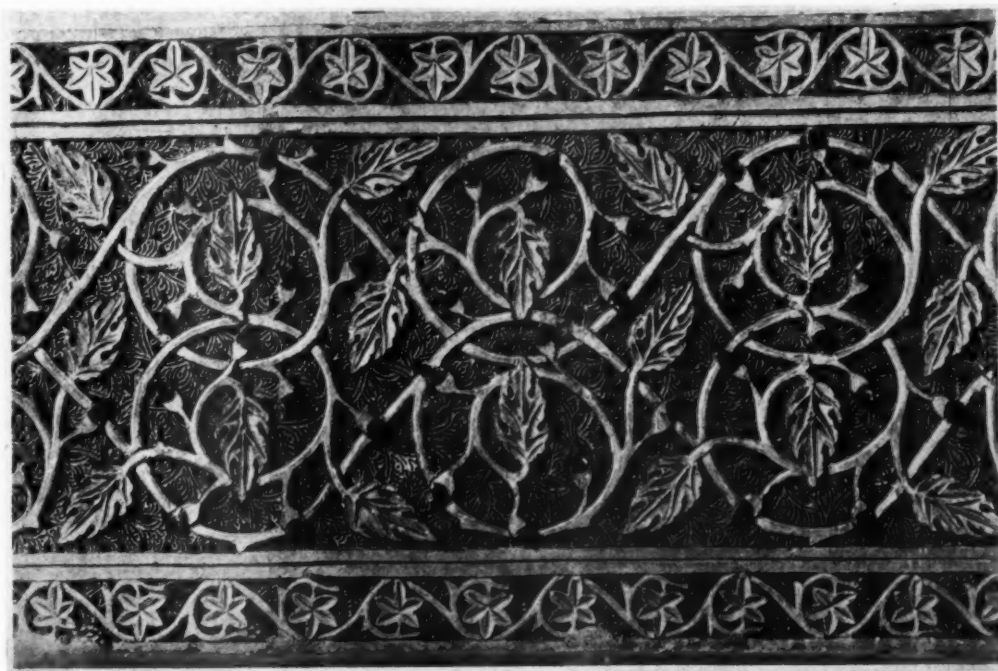
The Indiana oölitic stone is on the other hand a shallow fresh water deposition, composed principally of a low order of foraminifera, like tiny clams, mostly intact, with species of *Bryozoa*, *Gasteropoda* and *Braceopoda* and other fossil shells, all cemented together with calcite. This is a Mississippian or Sub-Carboniferous (late Paleozoic) deposit, roughly somewhere around 18 million years old according to the same geologic time table.

The oölites of Europe are mostly Jurassic or Cretaceous (late Mesozoic) deposits, roughly from 5 to 7 or 8 million years old according to the same table.

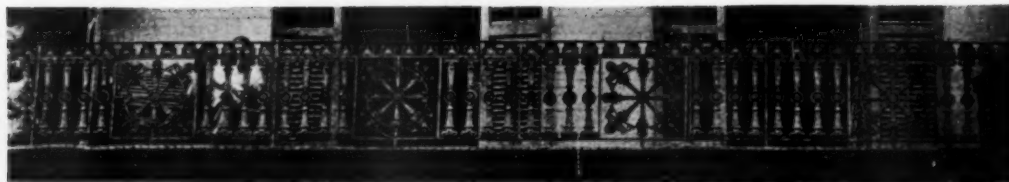
The American stone is therefore much the oldest of these limestone rock formations.

The several illustrations which accompany this article while having no direct bearing on this particular chapter of the series will be referred to in later articles in the series.

In the next article the physical properties and other characteristics of limestone will be discussed and this will be followed by a historical outline of the use of limestone in building construction and its effect on building practice.



Spanish Plasterwork—Second half of XIV Century



Gallery rail, Bourbon Street

ORNAMENTAL IRONWORK of NEW ORLEANS

BY I. T. FRARY

ONE who has visited the city of New Orleans can never forget the lavish use of ornamental ironwork on the exteriors of the old buildings. It is found in greatest profusion in the streets of the Vieux Carré, or old French Quarter, where extraordinary ranges of ornamental galleries clothe the street fronts with lacy creations of fanciful design.

Because of the narrowness of the streets, the "galleries" are supported by brackets or by slender iron columns of gas pipe proportions. Above these simple supports the designer's fancy ran riot in all manner of treatment of balustrades, pilasters, crestings and other architectural features, the inspiration for which was drawn from practically every French period, from the Gothic down to the First Empire.

Most of the work is delightful in effect and surprisingly well executed. Although much of the sharpness has disappeared under countless coats of paint, occasional examples that are not thus submerged, show modeling that is sharp and crisp, and casting of excellent quality.

Perhaps the most extraordinary example of cast ironwork to be found here is the famous corn stalk fence. The design is a naturalistic treatment of corn stalks, complete with leaves and ears of corn, growing from a conventionalized stalk, laid horizontally at the bottom, and tied to a similar

one at the top, the tassels projecting above and forming a cresting. The effect of naturalism is enhanced by little vines which clamber up the stalks. The gate posts are of conventionalized stalks grouped like clustered columns. These also have the vines twining about them and are surmounted by finials in the form of grouped ears of corn. The member which binds the design together at the top, and to which the stalks are tied, is developed into a large ring in the gate, within which are a wreath and flowing ribbon.

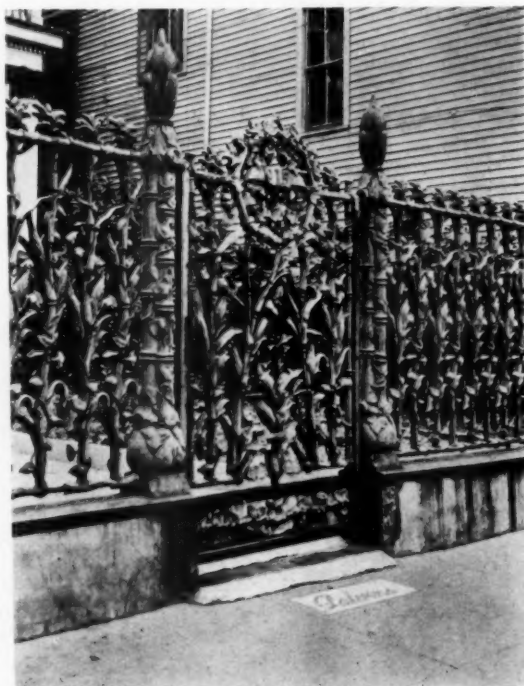
One example of this fence is located near the lower end of Royal Street in the old French Quarter, and a duplication of it is to be found uptown on Prytania Street in the "Garden District."

Here a corner post has been worked out with the conventionalized corn stalk motif on the four angles and a bas relief filling the panels between.

This curious design, although it violates most of the canons of art as we are taught them, is so ingenious that it cannot but command the admiration

of the most astute stickler for the conventions. Is it possible that this fence was designed by Latrobe, who is credited with designing the corn stalk columns in the Capitol at Washington, and who constructed the water works system of New Orleans?

The extensive use of ironwork in the old part



"Corn stalk" Fence, Royal Street

of the city can undoubtedly be traced to a desire for fireproof materials as a precaution against conflagrations such as nearly wiped out the city in 1788 and again in 1794. Then, too, the fact that the city was under Spanish rule at that time and was reconstructed under the personal direction of



Galleries, Royal Street
Each property owner built to meet the floor levels of his own house

a Spanish governor would naturally suggest the use of a material in the use of which the Spaniards were so adept.

There were formerly many fine examples of wrought iron in the Vieux Carré, but many of these have, unfortunately, been removed. The wrought iron was undoubtedly contemporary with the buildings which it enriched, but the cast iron is of much later date. It is questionable whether any of it antedates 1850; in fact the gallery railing on the Pontalba Buildings, which were erected in 1849, is said to be the earliest example of this work in the city.

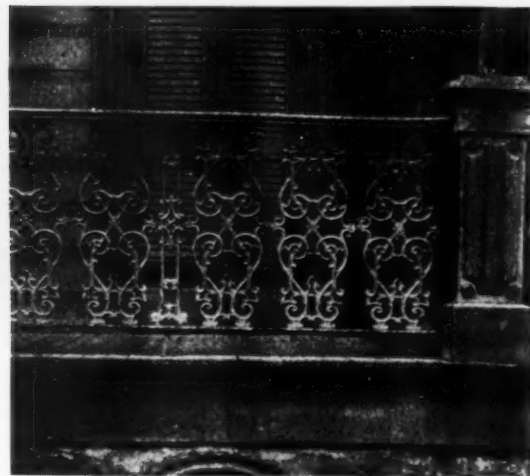
During the next ten years the bulk of New



Wrought iron at its best

Orleans' cast iron galleries was erected. They were designed by local architects, the patterns were cut by local carvers of exceptional skill, and the castings were made in foundries, some of which are still in existence.

With the blight of the Civil War, fortunes dwindled, and arts such as this ceased for lack of support. Instead of producing new patterns the old ones were recast, catalogs were issued and cast ironwork commercialized until its artistic quality was to a large degree lost. As a result of selling



Gallery rail, Ursuline Street

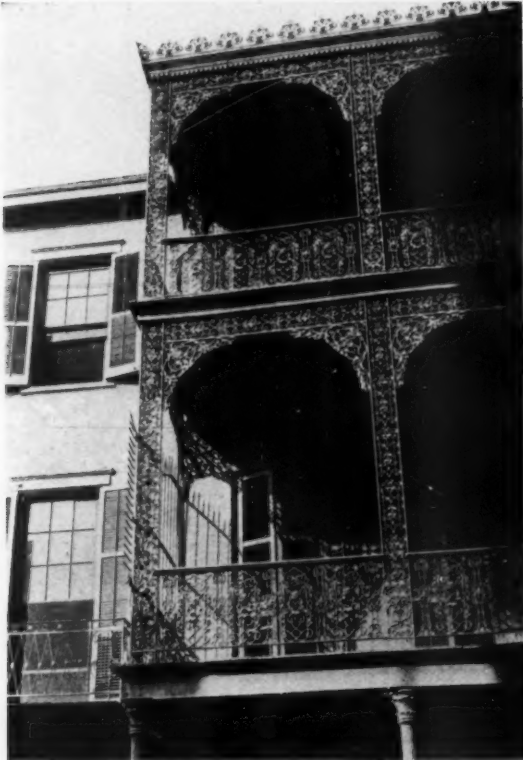
from catalog, most incongruous minglings of styles are found, in which Gothic, Renaissance and Empire details hobnob in a most delightfully democratic fashion.

In the old quarter where the houses are built solidly to the sidewalks, the galleries often cover the entire fronts continuously for considerable distances, but with an entire disregard for continuity of effect. Each property owner built to meet the

floor levels of his own house and to gratify the dictates of his own taste, regardless of the effect upon his neighbors. Thus we find abrupt changes in levels of adjoining galleries and to emphasize the disregard of neighborliness, insurmountable

not left its impress here, though more or less modified in the process of transplanting.

The "Iron Age" of New Orleans occupies an interesting place in our national architectural history, and although the same use has been made of the material in many other cities, there is none probably where it has become so dominant a feature as here. Ornamental ironwork is as inseparably associated with New Orleans as is marble with Rome, and it is to be hoped that instead of



Galleries, Conti Street

barriers, with discouragingly sharp points sticking out, put a stop to continuous promenades. This apparently unfriendly attitude may have been dictated by the possibilities for juvenile marathons had the passageways been left continuous.

The use of ornamental cast iron was not limited to the Vieux Carré but was common throughout the city, particularly in the newer "Garden District" where it was used indiscriminately on houses of all sorts.

There is an amazing variety of pattern and range of styles, and as has already been mentioned, there is scarcely a period of French art that has



A New Orleans cast iron fence

permitting it to disappear and be superseded by other types and materials, as seems to be the tendency now, a local pride in the old traditions will dictate the perpetuation of ornamental cast iron as a definite feature of the city's future architectural development.

EDITORIAL COMMENT

THE NECESSITY for an architect, in his relation to manufacturers of building materials or equipment, to be, like Caesar's wife, "above suspicion," is conceded by everyone. What is true of the individual is true of an architectural organization and the propriety of such a body receiving financial support from manufacturers of materials subject to specification, has always been questioned by the thinking element of the profession. We are gratified, therefore, to note some promise of the eventual separation of the Structural Service Department from the *Journal of The American Institute of Architects*. As heretofore conducted, this department has been ethically unsound.

* * *

ZONING ORDINANCES are today recognized as a necessity. They safeguard and enhance the value of real property as well as the well-being of the occupants of buildings. The adoption of a zoning ordinance by the city of Chicago is a matter of prime importance, especially to architects, as it vitally affects the design and construction of buildings. Architects everywhere should be active in the promotion and formulation of such legislation.

In order to acquaint them with the general terms and limitations of this, the latest ordinance of its kind to be adopted by a great city, THE AMERICAN ARCHITECT prints in this issue a digest and illustrative diagrams of its principal provisions.

Chicago is fortunate in having the experience of New York, St. Louis, Milwaukee, Newark, Cleveland, Philadelphia and Pittsburgh to guide it in this work. It was also fortunate to have as chairman of the Commission, Charles Bostrom, Commissioner of Buildings, and as secretary, Charles H. Wacker, Chairman of the Chicago Plan Commission and as consultants on zoning, Edward H. Bennett, A. I. A. and William E. Parsons, A. I. A.

* * *

THREE NOTABLE art exhibitions in Washington were many times visited by delegates to the last convention. These exhibitions are the Corcoran Gallery, the Freer collection and the National Academy of Art. In the latter, the people of this country have the nucleus of an art collection that could be made as fine and as valuable as any in the world. The Corcoran Gallery, representing every phase of art in this country, has large possibilities, retarded by influences that mark, and mar, the progress of art in this country.

The Freer Gallery, a beautiful building by Charles A. Platt, houses the splendid collection of pictures and examples of Eastern art, generously given to the nation by Mr. Freer. This collection, by the terms of the gift, will always remain a separate unit. It is the National Gallery of Art that the people of this country should in the future regard as a national possession to be proud of.

W. H. Holmes, director of the National Gallery, identified for many years with the best development of national art, in addition to his fine abilities as an executive, is also a painter of unusual merit. In a recent article, contributed to *The American Magazine of Art*, Mr. Holmes asks, "Shall America have a National Gallery of Art?" Commenting on the growth of the present collection and the difficulties of further enlargement due to lack of funds to provide for its care, he states, "Strangely enough, no single work of painting or sculpture has been acquired for the National Gallery of Art by purchase with funds provided by the national Government."

Such a condition on the part of our Government is in marked contrast to that of countries in Europe. There is now as strong a disposition as in the past, on the part of patrons of art, to give generously from their collections to this National Gallery. The shame of it is that the nation cannot accept such gifts for the reason that there are no accommodations for them nor any fund to provide for their care.

"Our people," says Mr. Holmes, "as a natural result of our birth and rapid material advancement, think first of material and political interests, and art has had, until now, little place in their thoughts."

While Congress is appropriating large sums of money without patriotic motive, and altogether for political reasons, it fails to lend a listening ear to the needs of one of its important departments. It is a national scandal that a condition should arise that makes it possible for the director of the National Gallery to appeal to the people to use influence on Congress in a matter of this sort. This purely sordid attitude cannot much longer continue. Continuance would be materially shortened if the people would, through their many important art organizations, let Congress understand that there is a rapidly growing sentiment that may not much longer be ignored.

It is unfortunate, but true, that politicians are eager to meet the views of constituents only when party success or self interest is menaced.

The National Gallery of Art should receive the support of Congress. Its wall space should be

greatly enlarged and the maintenance of its collections should be guaranteed by an ample fund.

The present growth and maintenance are largely due to Mr. Holmes' fine ability and the confidence and respect with which he is held by art lovers everywhere. Given a proper building and an adequate fund, under such competent directorship, the National Gallery of Art would at once assume

its proper place as a representative gathering of art.

Architects everywhere are naturally very greatly concerned in these matters. There can be no more laudable effort than one that would seek to show the next Congress its duty to itself and to the people it has in these matters so long failed correctly to represent.

FORTY YEARS AGO

Excerpts from THE AMERICAN ARCHITECT, July 14-28, 1883

A SOMEWHAT remarkable meeting was held in New York two weeks ago, under the name of the First National Convention of Master Plumbers, which was composed of delegates from nearly all parts of the United States, and probably represented pretty fairly the whole plumbing trade. * * The very first task after the nomination of officers was to make a totally uncalled for assault upon the sanitary engineer by means of a document spread upon the minutes of the convention. This compared "the old time steady and conservative plumber" favorably with the "new exerescence on the body politic" who are also called "magniloquent braggarts and book taught experts." The fact that "the unlucky plumber is relegated to the humble position of a mere fitter-up of whatever fantastic ideas or notions have been evolved from the brain of the sanitary expert" called for "emphatic condemnation" by the convention against "this abuse."

* * *

The Governor of Colorado has decided not to call an extra session of the Legislature to repeal the original capitol building program and substitute a less objectionable one. It was not considered advisable to expend the sum of seventy-five hundred dollars for this purpose and the matter will be deferred until the next meeting of the Legislature in 1885. Meanwhile, the drawings submitted in competition have been returned to their unfortunate authors, the total result of whose efforts has thus been to advertise themselves as persons of character or attainments so inferior to those of other architects as to induce them to accept terms which all respectable members of the profession rejected at once.

* * *

The German architects are engaged in a discussion in regard to a revision of their present schedule of charges, which has been in use for fourteen years, and is now found inadequate for

its purpose. The Austrian members of the profession have been the first to propose a change, their proposals being published in the *Bauzeitung*. The main provisions are about the same as those in use in all other civilized countries, the variations applying mostly to minor matters, about which English and American schedules say nothing. They follow: All disputes between architects and their clients should be left to a Court of Arbitration of the Austrian Engineers' and Architects' Association for determination. This suggestion would not commend itself to English speaking clients, who can generally count on a curious prejudice against architects on the part of judges and lawyers, and a dense ignorance of the whole subject on the part of juries, to warp justice in their favor; but it has, for all that, a good deal of merit. The eleventh article prescribes the fees for office consultations, the price for a question and "simple reply" being two dollars, and the remuneration increasing with the difficulty of the subject on which advice is sought. For business on which the architect has to work after seven o'clock in the evening, his fees are doubled; and in measuring or other outside work where the architect is accompanied by an assistant, the services of the latter are charged for at half the price of those of the architect himself. In estimating traveling expenses, the architect is to be entitled, when he has to take a carriage, to use one with two horses and charges also for first class fare on railway trains and boats; but an assistant is expected to travel on land in a one horse carriage or a second class compartment on railways, although entitled to first class accommodations on steamboats.

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Chicago, July 5, 1883

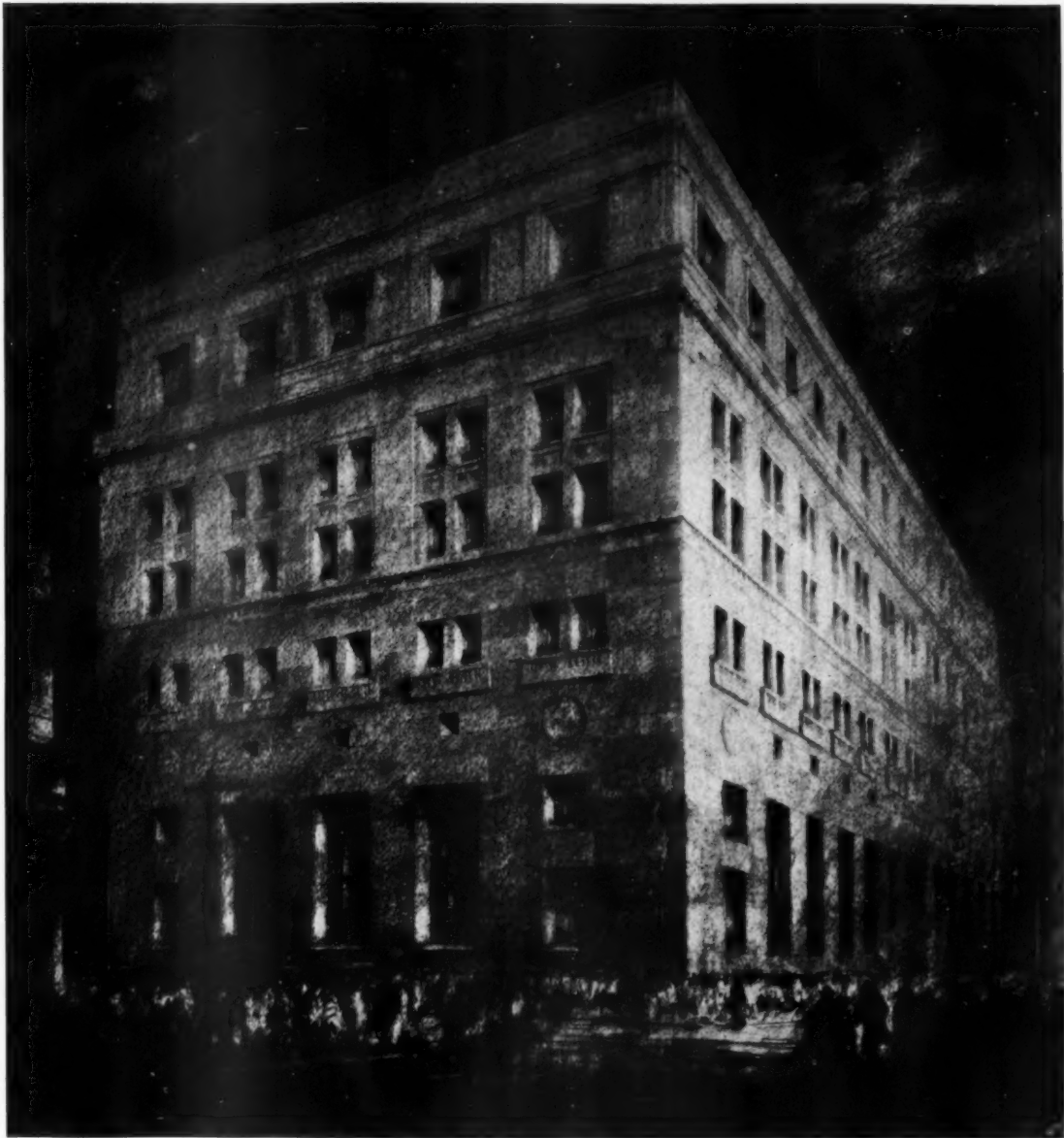
To the Editors:

Dear Sirs:—

Can you refer me to any work on the subject of the construction of factory or boiler chimneys?

Yours truly,

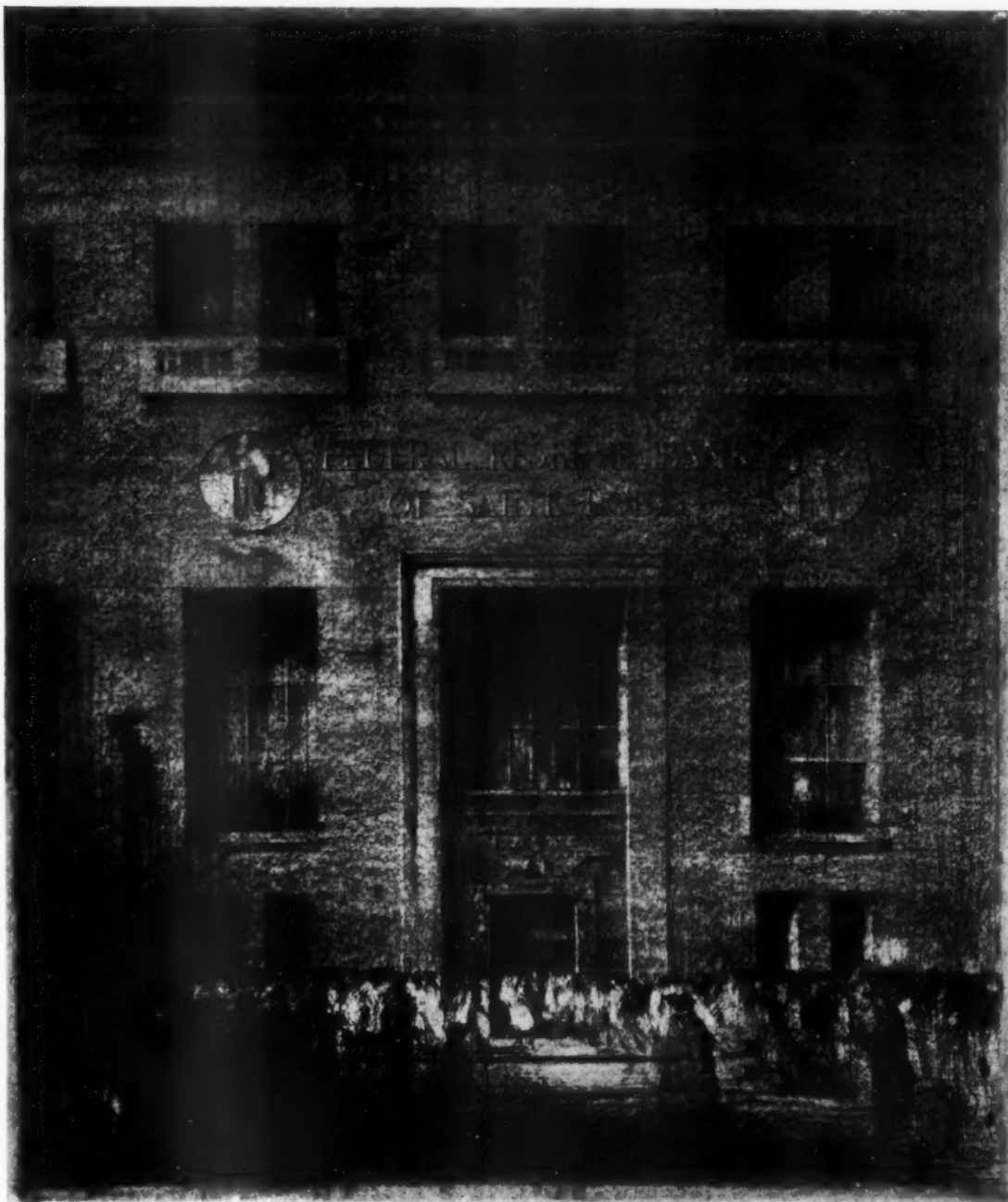
S. A. TREAT



FEDERAL RESERVE BANK OF ST. LOUIS, MO.

MAURAN, RUSSELL & CROWELL, ARCHITECTS

(Reproduced from the original drawing by Hugh Ferriss)



FEDERAL RESERVE BANK OF ST. LOUIS, MO.

MAURAN, RUSSELL & CROWELL, ARCHITECTS

(Reproduced from the original drawing by Hugh Ferriss)



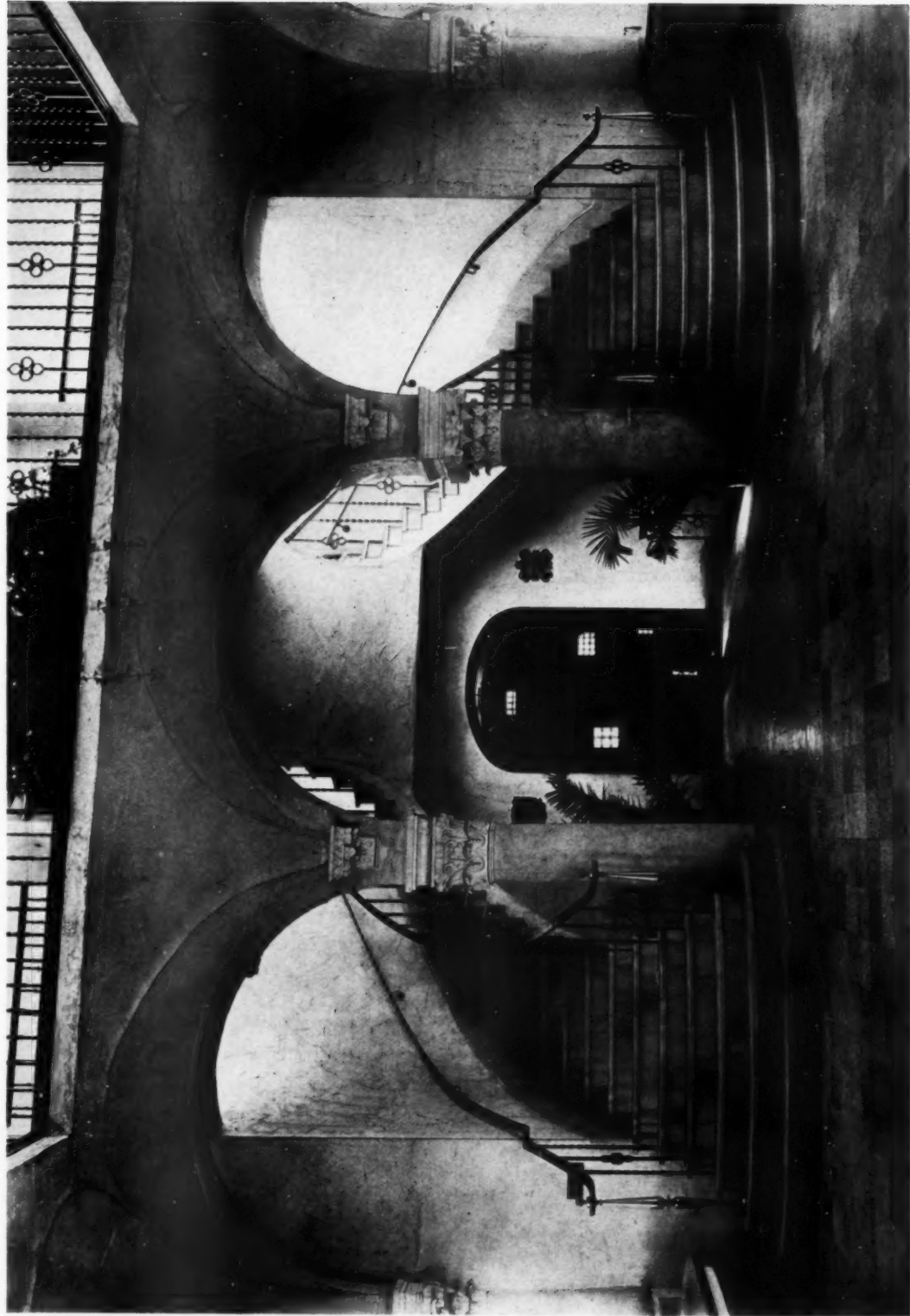
CENTRAL STATES LIFE INSURANCE CO. BUILDING, ST. LOUIS, MO.

T. P. BARNETT & CO., ARCHITECTS



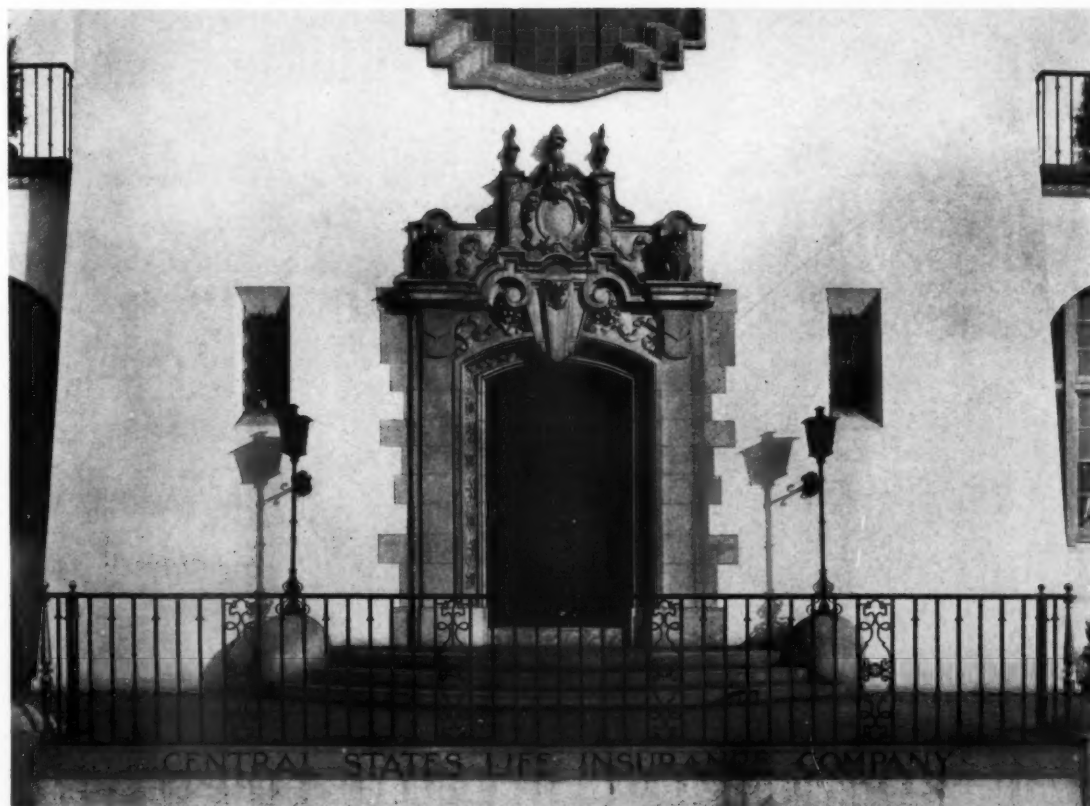
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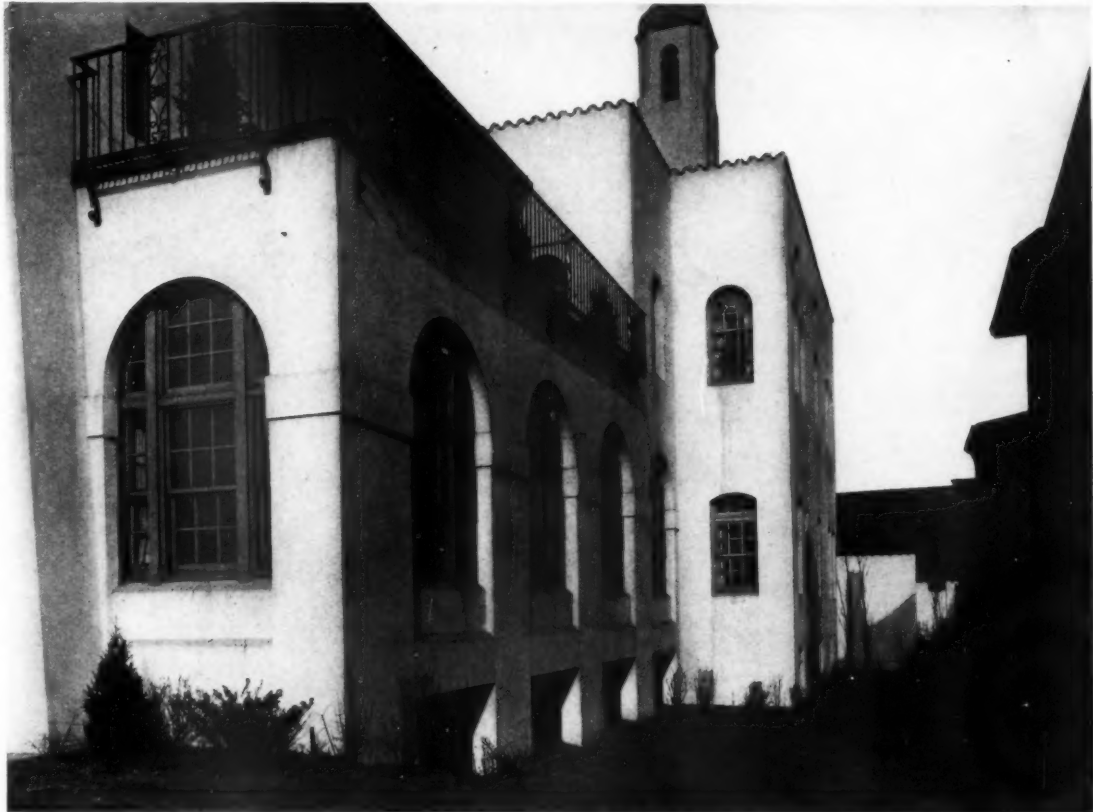
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CENTRAL STATES LIFE INSURANCE CO. BUILDING, ST. LOUIS, MO.

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MAILLARD'S RESTAURANT, MADISON AVENUE, NEW YORK
BUCHMAN & KAHN, ARCHITECTS



MAILLARD'S RESTAURANT, MADISON AVENUE, NEW YORK
BUCHMAN & KAHN, ARCHITECTS

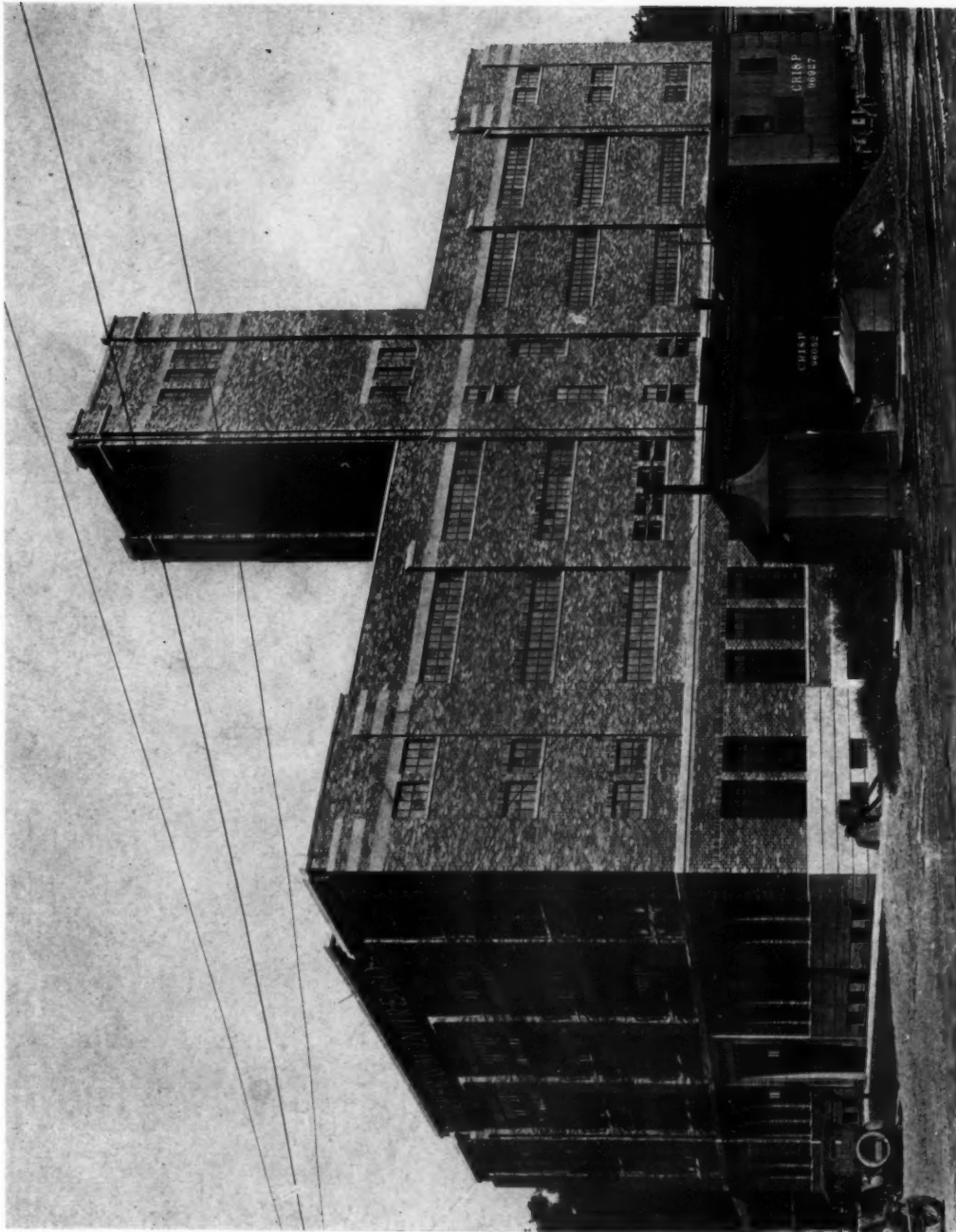


MAILLARD'S RESTAURANT, MADISON AVENUE, NEW YORK
BUCHMAN & KAHN, ARCHITECTS



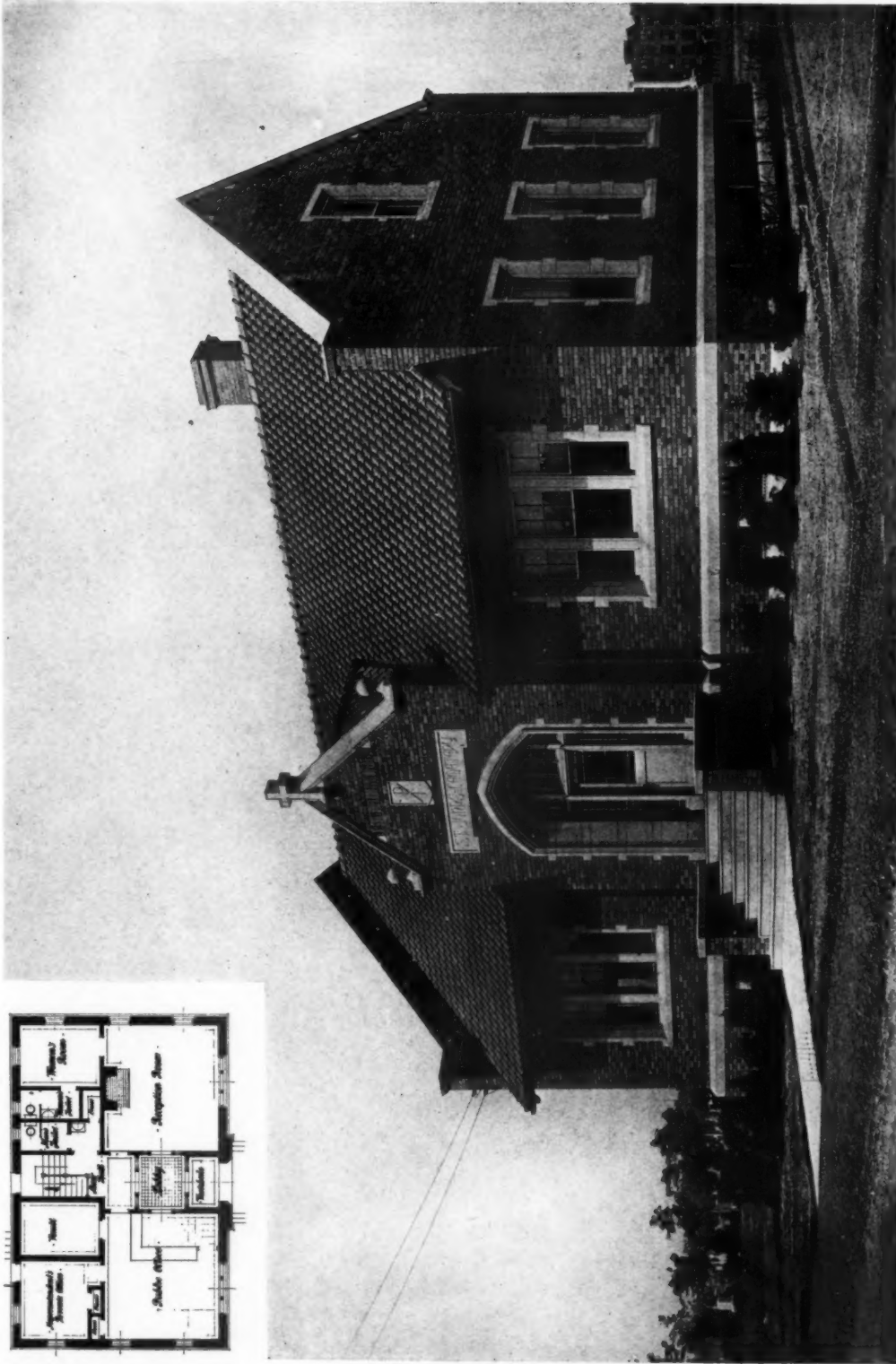
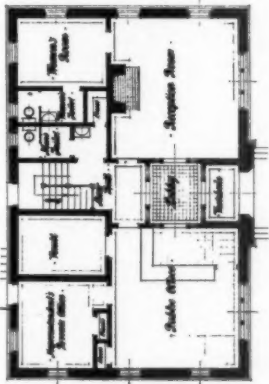
MAILLARD'S RESTAURANT, MADISON AVENUE, NEW YORK
BUCHMAN & KAHN, ARCHITECTS





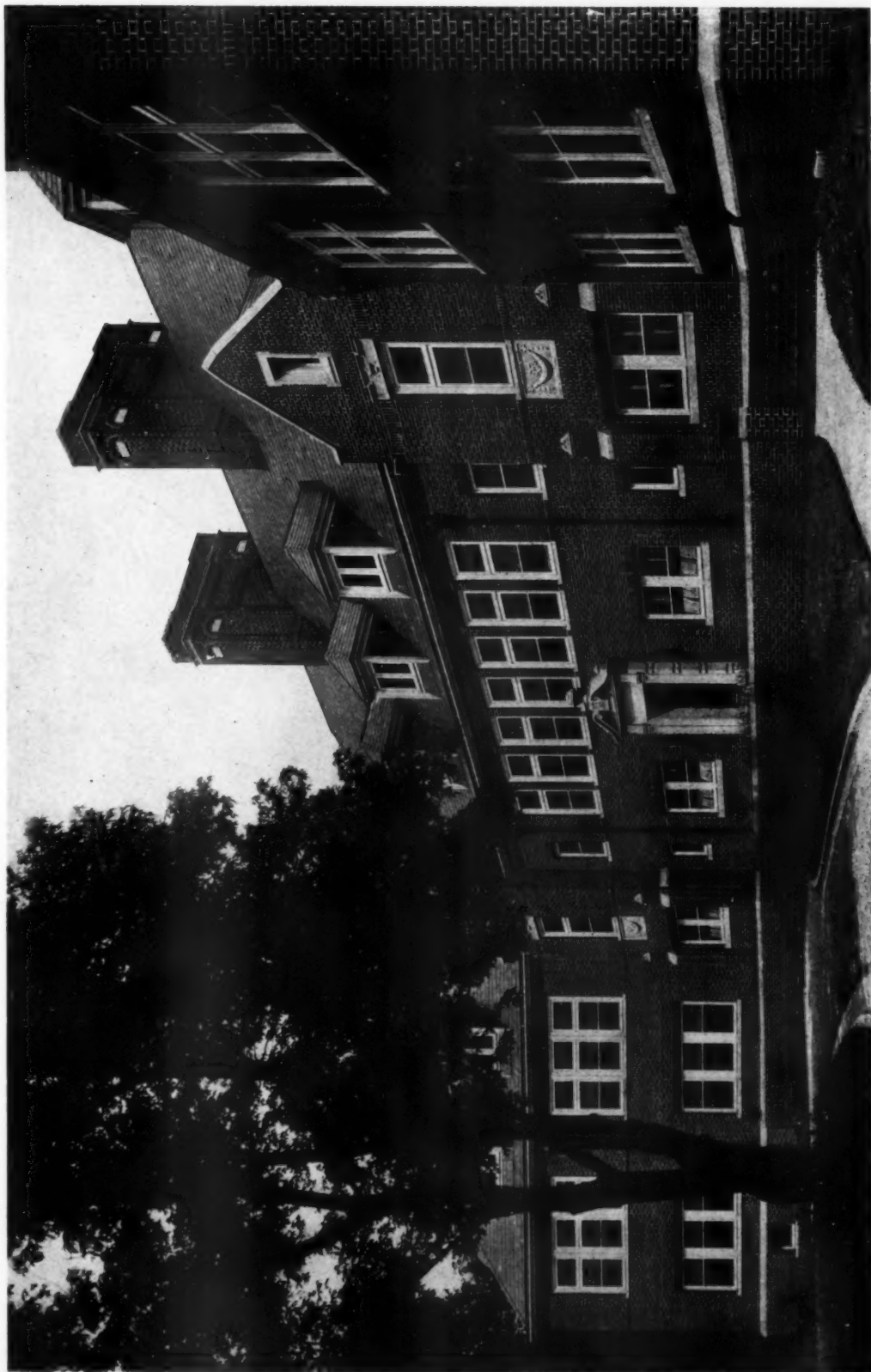
HARPER & MCINTIRE WAREHOUSE BUILDING, CEDAR RAPIDS, IOWA

CROFT & BOERNER, ARCHITECTS AND ENGINEERS



OFFICE BUILDING FOR ST. JOHN'S CEMETERY, WORCESTER, MASS.

JNO. WM. DONAHUE, ARCHITECT



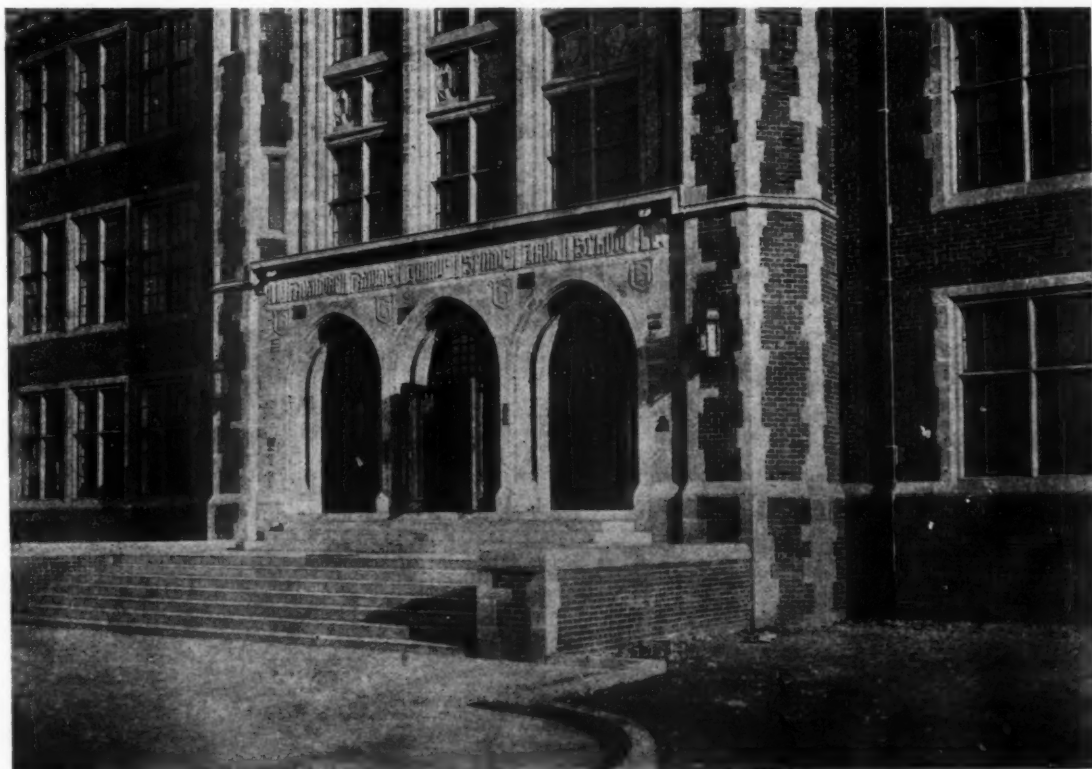
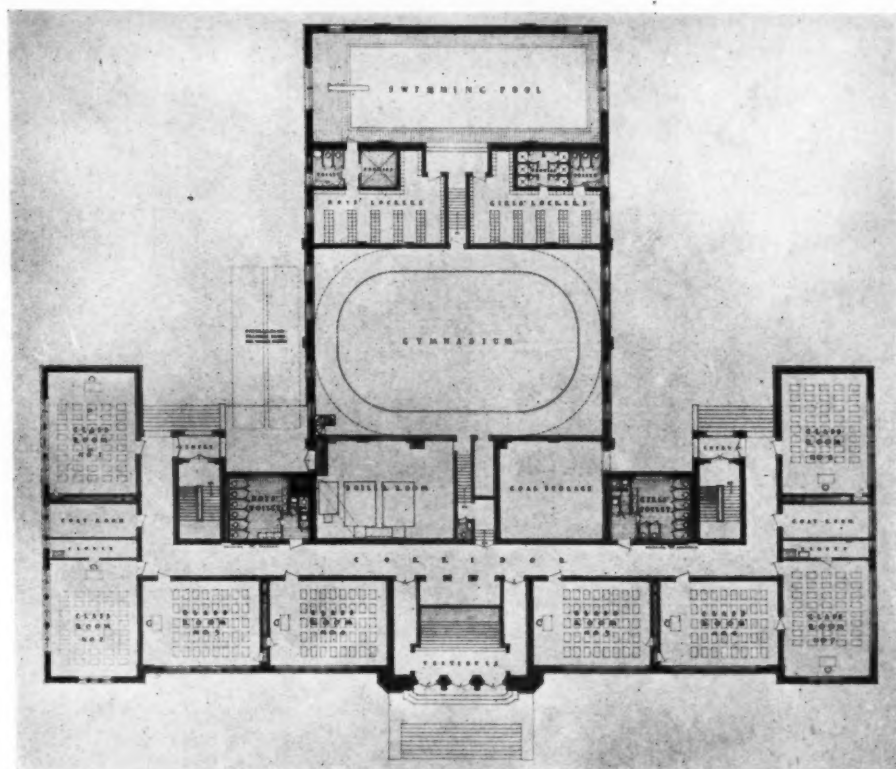
WALTER BARKER MEMORIAL HOME FOR THE FRIENDLESS, PEORIA, ILL.

HEWITT & EMERSON, ARCHITECTS

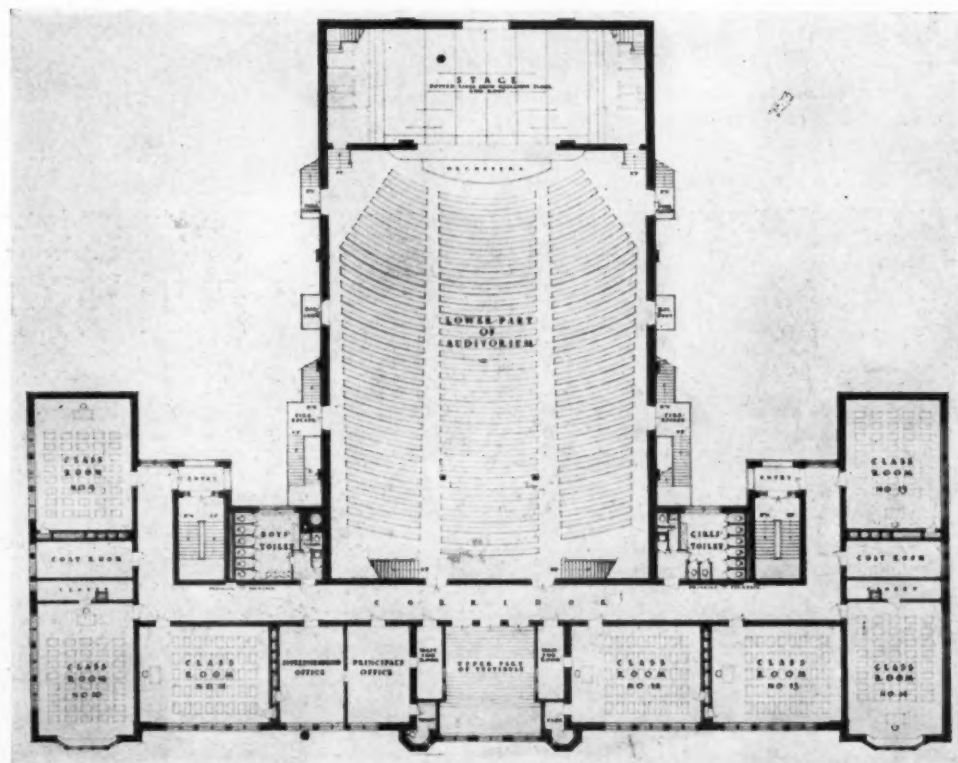
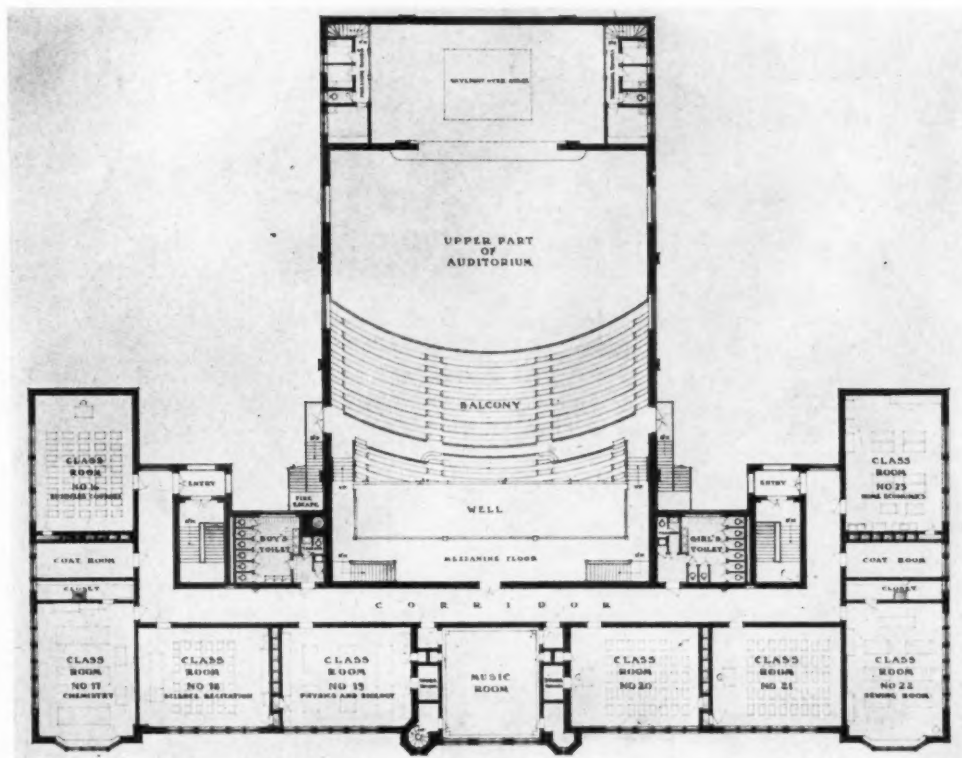


JUNIOR-SENIOR HIGH SCHOOL, ROANOKE RAPIDS, N. C.

HOBART B. UPJOHN, ARCHITECT



FIRST FLOOR PLAN AND MAIN ENTRANCE
JUNIOR-SENIOR HIGH SCHOOL, ROANOKE RAPIDS, N. C.
HOBART B. UPJOHN, ARCHITECT



SECOND AND THIRD FLOOR PLANS

JUNIOR-SENIOR HIGH SCHOOL, ROANOKE RAPIDS, N. C.

HOBERT B. UPJOHN, ARCHITECT

JUNIOR-SENIOR HIGH SCHOOL, ROANOKE RAPIDS, N. C.

HOBART B. UPJOHN, *Architect*

THIS building was erected by the Board of School Trustees of Roanoke Rapids and is dedicated to the memory of the young men of Halifax County (in which Roanoke Rapids is situated), who gave their lives during the World War.

Anyone familiar with this section of North Carolina will be surprised to note the size of this building, in comparison with the population of the town. The building is located between the two small towns of Roanoke Rapids and Rosemary, and the combined population of the two is in the neighborhood of three thousand people. This is an example of the spirit that is being carried on throughout the South today.

The building contains twenty-four classrooms, including a manual training room and a chemical and biology laboratory, as well as a music room. The main façade is two hundred and ten feet long and the wings are seventy-nine feet deep. There is an auditorium in the rear extending ninety-five feet. It is seventy-six feet wide.

This auditorium has a seating capacity of two thousand people and is fitted with a stage twenty-seven feet deep which has a proscenium arch of thirty-two feet by twenty-eight feet. The stage is equipped with complete dressing rooms, located on the mezzanine floor.

The basement of the auditorium section is used for a gymnasium and swimming pool, together with lockers and showers.

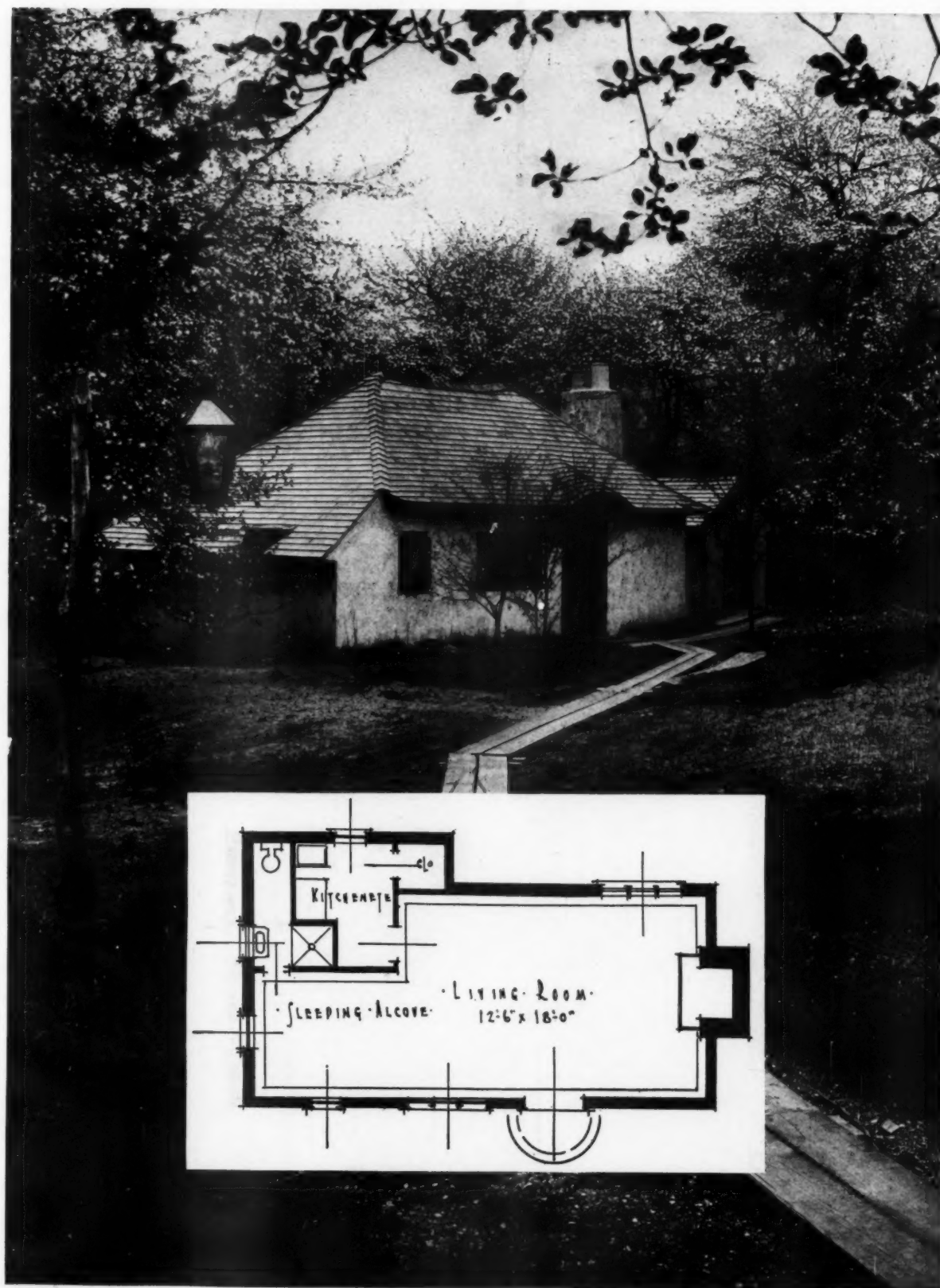
The design contemplates repeating the present front to the rear of the auditorium and forming two courts on either side.

A unique feature is the detail of the windows, which are ordinary factory sash. To obtain a good line the steel sash were set in a wood frame giving the detail shown in the illustrations.

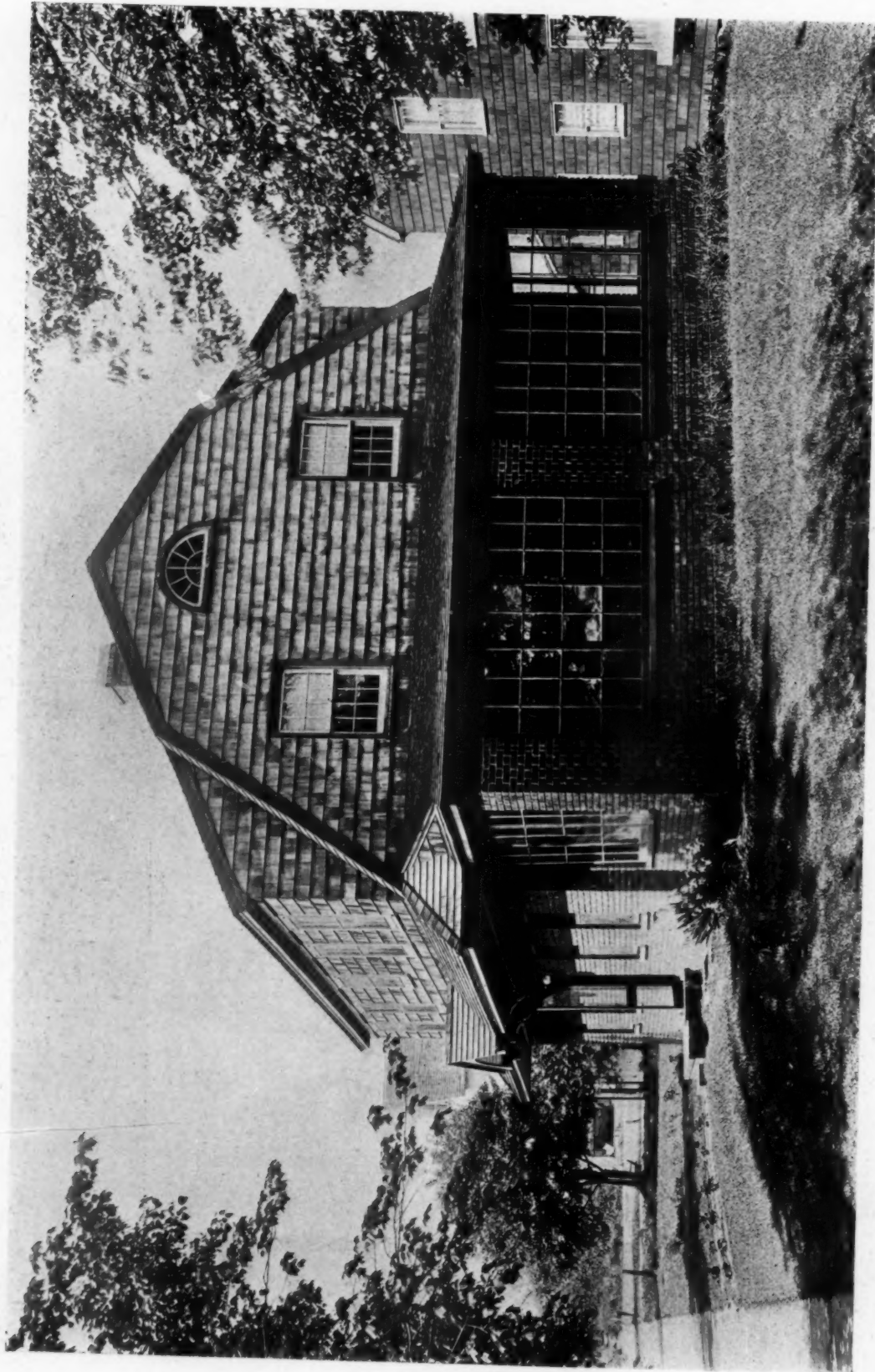
Another feature is the stair towers, situated at either end of the hall. This is a requirement of the North Carolina State Insurance Commission, and although it has its merits would not do for a Northern climate, as each time pupils go from floor to floor they are required to step out into the open while passing from the corridor to the stair tower. The stair tower is completely surrounded by fireproof material and stairs made of channel strings and slate treads. The doors entering the same are fireproof, so that once the pupil is on these stairs, he is out of danger from any fire in the building. In getting from the building into this stair tower, pupils have to pass an open portion, which at all times has a cross draft. This keeps the tower free from smoke, the greatest danger of panic during a fire. This overcomes the disadvantage of an interior stairway.



A Greek Panel—Arthur Covey, Painter



LIVING STUDIO OF JOHN E. SHERIDAN, PORT JEFFERSON, L. I., N. Y.
FRANK J. FORSTER, ARCHITECT



HOUSE OF W. R. RICHARDSON, ENGLEWOOD, N. J.
R. C. HUNTER & BRO., ARCHITECTS



HOUSE OF W. R. RICHARDSON, ENGLEWOOD, N. J.

R. C. HUNTER & BRO., ARCHITECTS

BEAUX-ARTS INSTITUTE of DESIGN

ACTING DIRECTOR OF THE INSTITUTE—WHITNEY WARREN

ARCHITECTURE, RAYMOND M. HOOD, DIRECTOR—SCULPTURE, JOHN GREGORY, DIRECTOR

INTERIOR DECORATION—ERNEST F. TYLER, DIRECTOR

MURAL PAINTING—ERNEST C. PEIXOTTO, DIRECTOR

Special Notice to Students

By special arrangement with the Society of Beaux-Arts Architects, there appears in each issue of THE AMERICAN ARCHITECT an average of five pages devoted to the presentation of drawings selected from the Beaux-Arts Institute of Design exhibitions, and also the listing of awards and the promulgation of all notices to students. These matters will be exclusively presented to students of the Beaux-Arts Institute of Design through the pages of THE AMERICAN ARCHITECT. By arrangement with the publishers of THE AMERICAN ARCHITECT, a special student subscription rate of \$5.00 per annum has been secured. Further particulars with reference to this service to Beaux-Arts students may be obtained by addressing THE AMERICAN ARCHITECT, 243 West 39th Street, New York City.

OFFICIAL NOTIFICATION OF AWARDS

JUDGMENT OF MAY 22, 1923

CLASS "A"—V PROJET
"A SMALL OPERA HOUSE"

A group of music lovers propose to erect in one of the large cities of the United States a small Opera House, suitable to the production of light opera, (such as for instance, La Boheme, Manon, Tosca, et cetera) and similar in purpose and scope to the principal national theatres of Europe, of which the Opera Comique in Paris is an example. As an adequate endowment is assured for the maintenance of the Opera, the building should be conceived not from a commercial, but from an artistic standpoint and special attention given in the plan to the provision of large public entrances, grand staircases leading to the Foyer, Smoking Room, Retiring Rooms, et cetera. The Auditorium will seat about 1500 persons distributed in the parquet, one tier of boxes and galleries. The Foyer, a gathering place for the audience during the intermission, should be a large and handsomely decorated room on the approximate level of the Boxes and should be readily accessible from all parts of the house. A Smoking Room with buffet will be provided on the same level as the Foyer and a Restaurant may be placed, if desired, in the Basement. Separate carriage entrances, under cover, should be provided for subscribers as well as special entrances for the occupants of the top galleries. Elevators for the public will be required and an adequate number of staircases to assure the rapid egress of the audience.

The detailed requirements for the Stage and dependencies are as follows:

A Stage of ample proportions, placed upon the level of the outside grade with rooms known as scenery docks in immediate connection with the Stage for the storage of scenery to be used in current productions. Other scenery will be stored in the scene loft above the Stage.

A Property Room on the level of the Stage for the storage of furniture, decorations, hangings, et cetera.

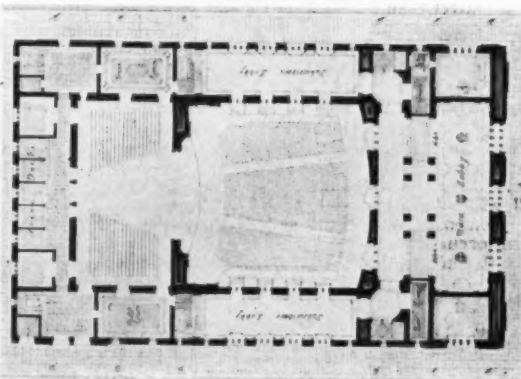
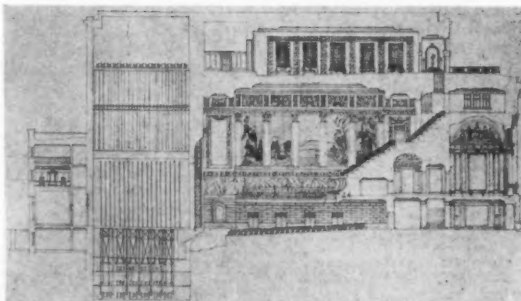
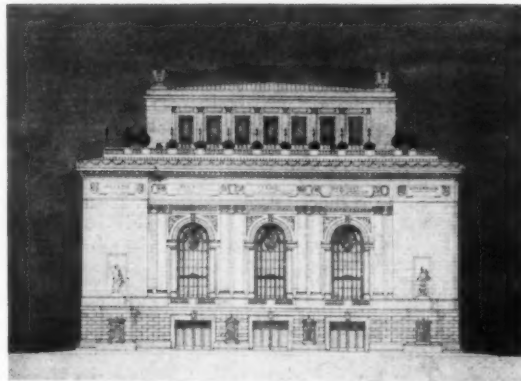
A Green Room readily accessible to the Stage to serve as an assembly and waiting room for the performers.

A Ballet practice room for the dancers with direct access to the Stage.

Dressing Rooms, Chorus Rooms, Stage Managers Rooms, et cetera, arranged on different levels but accessible to the Stage. These rooms should have outside light.

A special entrance should be provided for the performers with elevators and adequate stairs.

The Orchestra may be placed, if desired below the Stage.



R. NICKEL SECOND MEDAL "T" SQUARE CLUB
CLASS "A"—V PROJET—A SMALL OPERA HOUSE
STUDENT WORK.
BEAUX-ARTS INSTITUTE OF DESIGN

A site 170' x 280' has been acquired, the narrow frontage being on one of the main avenues of the city. Public thoroughfares bound the other sides of the site and the building will be prominently visible from all four streets.

JURY OF AWARDS:—R. M. Hood, P. A. Cusachs, J. H. Freedlander, H. R. Sedgwick, J. O. Post, J. W. O'Connor, W. F. Paris, E. S. Hewitt, R. H. Pearce, P. P. Cret, F. R. King, H. W. Corbett, H. Sternfeld, F. C. Hiron, E. S. Campbell, and S. W. Morgan.

NUMBER OF DRAWINGS SUBMITTED:—75.

AWARDS:—

FIRST MEDAL:—P. F. McLean and K. H. Snyder, Carnegie Inst. of Tech., Pittsburgh.

SECOND MEDAL:—J. Franklin and H. C. Brockman, Carnegie Inst. of Tech., Pittsburgh; T. M. Prentice and A. Marshall, Columbia Univ., N. Y. C.; R. Nickel, "T" Square Club, Phila.

FIRST MENTION:—C. E. Landefeld, H. B. Tross, W. Z. Bane, J. H. Delo, R. A. McKee, D. D. McGervey, L. E. Considine, R. Patterson, J. J. Keil, E. H. Beckman, A. Staples and L. A. Brink, Carnegie Inst. of Tech., Pittsburgh; A. Dick, K. Matunoi, A. Ehrenrich, S. Whinston, Elsie Pollak and O. W. Wilson, Columbia Univ., N. Y. C.; R. L. Linder, Atelier Denver, Denver; E. Fuhrer, Dept. of Architecture of Armour Inst. of Tech., Chicago; C. L. Martin, H. R. Russell, and E. V. Gauger, Univ. of Illinois, Urbana.

SECOND MENTION:—V. H. Stromquist, M. D. Smith, H. C. Kreisle, C. J. Pellegrini, W. Harris, E. M. Griesser, and P. Hohorst, Carnegie Inst. of Tech., Pittsburgh; A. Erdman, Columbia Univ., N. Y. C.; W. H. Speer, Atelier Denver, Denver; O. F. Cerny, A. R. Hausser, E. A. Johnson and W. L. Suter, Dept. of Architecture of Armour Inst. of Tech., Chicago; P. Simonsen, Atelier Hiron, N. Y. C.; E. R. Perry, H. C. P. Harth and R. Stillwell, Princeton Univ., Princeton; E. Malczewski, Syracuse Univ., Syracuse; R. Billerbeck, R. D. Henderson, A. Fordyce, J. D. Geffers, J. A. Drielsma, E. E. Lundeen, J. D. Tuttle, and C. O. Beeson, Univ. of Illinois, Urbana; F. L. Hutchins and S. Chao, Univ. of Pennsylvania, Phila.
H. C.:—J. B. Blair, Carnegie Inst. of Tech., Pittsburgh; G. M. Burch and C. L. Cummings, Columbia Univ., N. Y. C.; A. S. Phillips and W. D. Sorgatz, Univ. of Illinois, Urbana.

**CLASS "A"—V ESQUISSE-ESQUISSE
"THE GREAT HALL OF A STEAMSHIP"**

The trans-oceanic liners have developed in size and luxury until the problem of the interiors is more that of the architect than of the ship designer.

The important feature around which center the activities of the passengers is the great hall. This problem calls for the design of such a hall. Its main level is that of the main deck with balconies at the level of the promenade deck above. At the balcony level the hall gives access to the salons, smoking rooms and promenade decks. On the main floor level are the information desk, the offices of the Wireless Telegraph Company and a Travel Bureau. The chief architectural feature of the hall will naturally be the grand staircase, leading up to the promenade deck level and down to the dining room which occurs on one of the lower decks. The entire space to be devoted to this hall, including the staircase and balconies is 45'-0" in width and 80'-0" in length. The promenade deck is 10'-0" above the main deck and the entire height of the hall from the level of the main deck shall not exceed 40'-0".

JURY OF AWARDS:—R. M. Hood, P. A. Cusachs, H. Sternfeld, F. C. Hiron, and E. S. Campbell.

NUMBER OF DRAWINGS SUBMITTED:—33.

AWARDS:—

SECOND MENTION:—G. A. Brink, Carnegie Inst. of Tech., Pittsburgh; A. F. Euston, Atelier Hiron, N. Y. C.; C. G. McTaggart, Univ. of Illinois, Urbana; E. A. Lehti, Yale Univ., New Haven.

**THE KARNAK TEMPLE CHAPTER OF THE
SCARAB FRATERNITY PRIZE COMPETITION**

**CLASS "B"—V ESQUISSE-ESQUISSE
"A VASE"**

JURY OF AWARDS:—R. M. Hood, P. A. Cusachs, J. O. Post, H. Sternfeld, F. C. Hiron, and E. S. Campbell.

JURY FOR THE AWARDING OF THE PRIZE:—R. M. Hood, P. A. Cusachs, J. O. Post, and E. S. Campbell.

NUMBER OF DRAWINGS SUBMITTED:—60.

AWARDS:—

PRIZE—(\$50):—Wm. C. Pyle, Carnegie Inst. of Tech., Pittsburgh.

FIRST MENTION:—Wm. C. Pyle and B. G. Martin, Carnegie Inst. of Tech., Pittsburgh; R. V. Merwin, Columbia Univ., N. Y. C.; J. J. Wallwork, Atelier Hiron, N. Y. C.

SECOND MENTION:—F. Martinelli, Atelier Corbett-Koyl, N. Y. C.; E. D. Stevens, Univ. of Virginia, Charlottesville; H. F. Neville, Univ. of Kansas, Lawrence.

**CLASS "A" AND "B" ARCHÆOLOGY—V PROJET
"AN ENGLISH 18th CENTURY PUMP ROOM"**

JURY OF AWARDS:—R. M. Hood, P. A. Cusachs, H. Sternfeld, F. C. Hiron, and E. S. Campbell.

NUMBER OF DRAWINGS SUBMITTED:—7.

AWARDS:—

SECOND MEDAL:—H. A. Dumper, Columbia Univ., N. Y. C.; Alberta Raffl, Univ. of Illinois, Urbana.

MENTION:—O. Betts, Columbia Univ., N. Y. C.; Elizabeth Kimball and Fay M. Harris, Univ. of Illinois, Urbana; W. Douglas, Yale Univ., New Haven.

**EMERSON PRIZE COMPETITION
"THE BASE OF A FLAG STAFF"**

JURY OF AWARDS:—P. A. Cusachs, J. H. Freedlander, J. O. Post, J. W. O'Connor, W. F. Paris, E. S. Hewitt, and H. W. Corbett.

JURY FOR THE AWARDING OF PRIZE:—P. A. Cusachs, J. H. Freedlander, J. O. Post, J. W. O'Connor, W. F. Paris, and E. S. Hewitt.

NUMBER OF DRAWINGS SUBMITTED:—28.

AWARDS:—

PRIZE—(\$50):—Charles Fuller, Columbia Univ., N. Y. C.

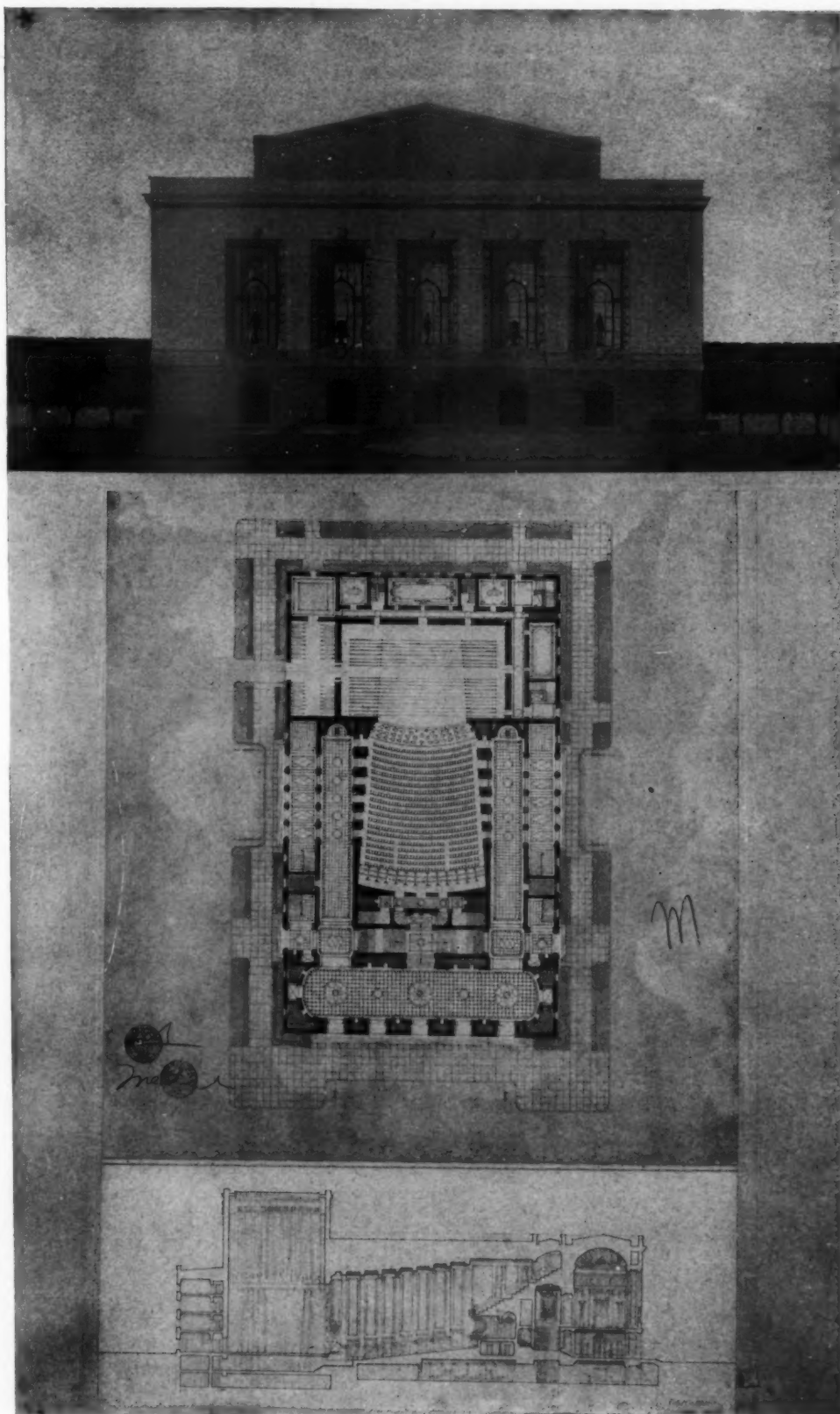
FIRST MEDAL:—Charles Fuller, Columbia Univ., N. Y. C.; P. Goodman, Atelier Licht, N. Y. C.

SECOND MEDAL:—M. C. Hills and N. B. Mead, Jr., Columbia Univ., N. Y. C.

FIRST MENTION:—V. H. Stromquist, Carnegie Inst. of Tech., Pitts.; R. Trow and E. Fuhrer, Dept. of Architecture of Armour Inst. of Tech., Chicago; J. F. Mullins, Atelier Penn State—Pennsylvania State College, State College.

SECOND MENTION:—S. R. Moore, Columbia Univ., N. Y. C.; K. C. Kreisle, Carnegie Inst. of Tech., Pittsburgh; F. E. Sloan, W. L. Suter and O. F. Cerny, Dept. of Architecture of Armour Inst. of Tech., Chicago; H. B. Hoover, Univ. of Washington, Seattle; K. McLeary and R. H. Hugman, Univ. of Texas, Austin; J. D. Tuttle and A. Fordyce, Univ. of Illinois, Urbana.

H. C.:—R. Patterson, Carnegie Inst. of Tech., Pitts.; H. H. Stewart, Atelier Penn State—Pennsylvania State College, State College.

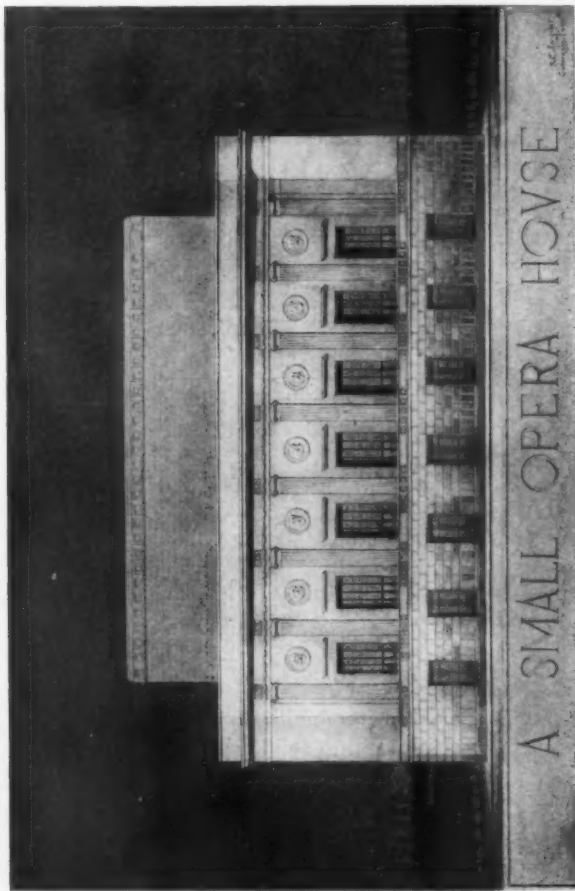
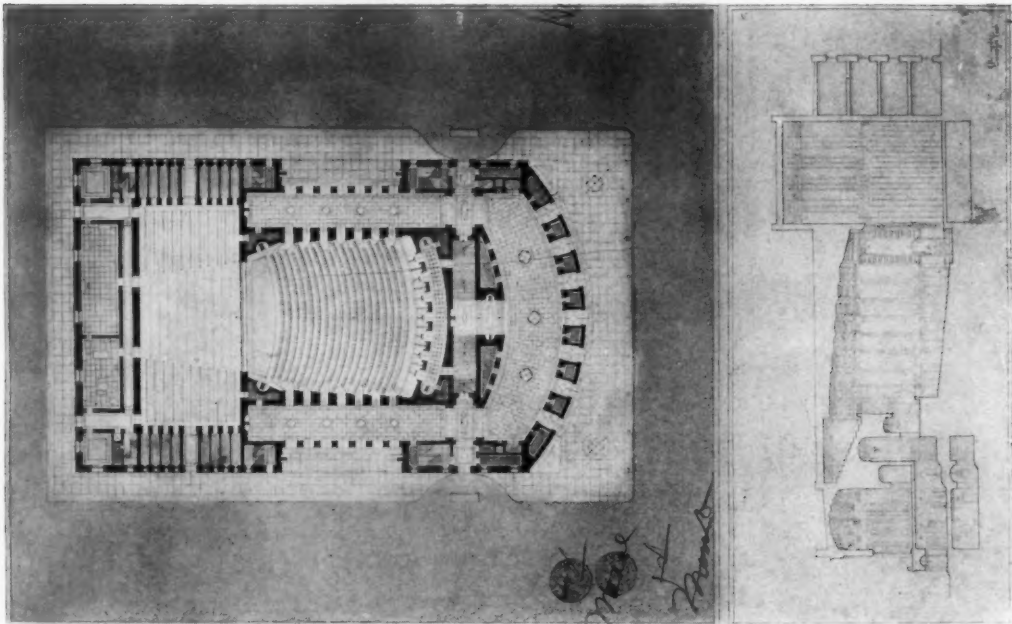


P. F. McLEAN

FIRST MEDAL

CARNEGIE INST. OF TECH.

CLASS "A"—V PROJET—A SMALL OPERA HOUSE
STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN



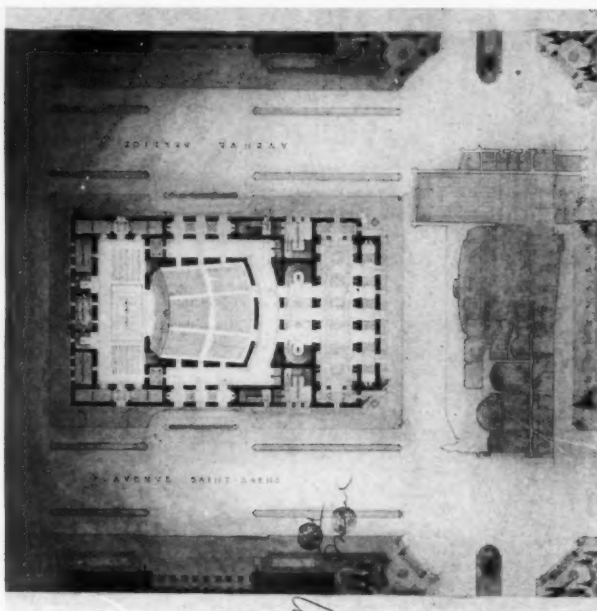
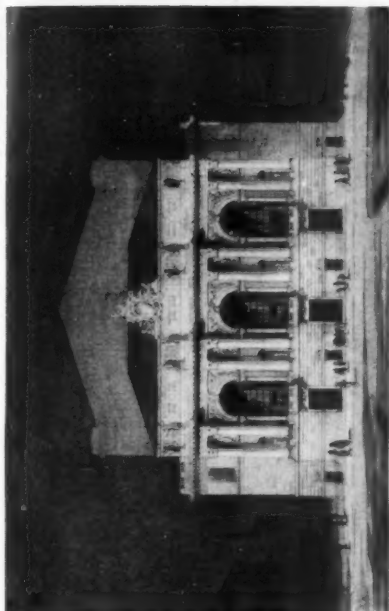
CARNEGIE INST. OF TECH.

FIRST MEDAL

K. H. SNYDER

CLASS "A"-V PROJET—A SMALL OPERA HOUSE

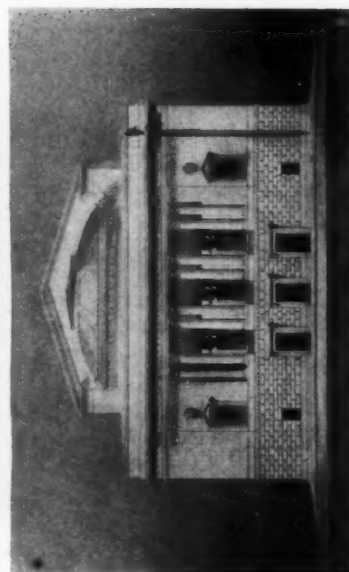
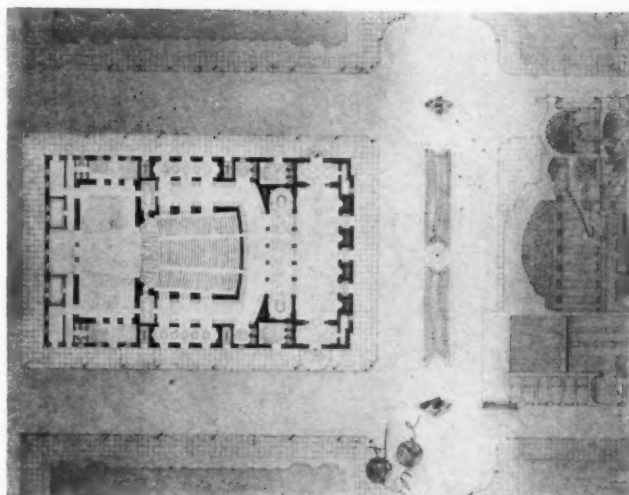
STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN



T. M. PRENTICE
SECOND MEDAL
COLUMBIA UNIVERSITY

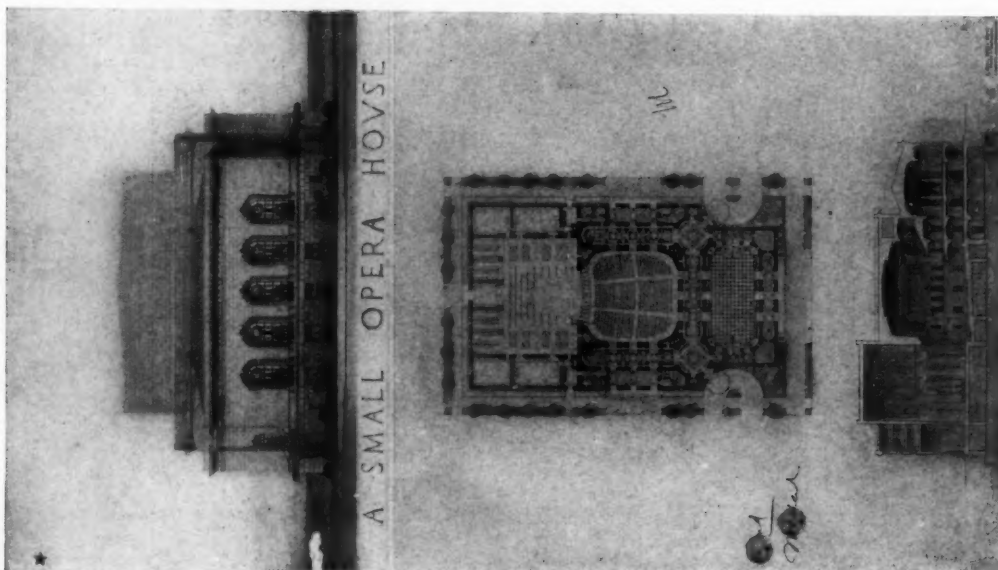
T. M. PRENTICE
SECOND MEDAL
COLUMBIA UNIVERSITY

CLASS "A"-V PROJET—A SMALL OPERA HOUSE
STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN



A. MARSHALL
SECOND MEDAL
COLUMBIA UNIVERSITY

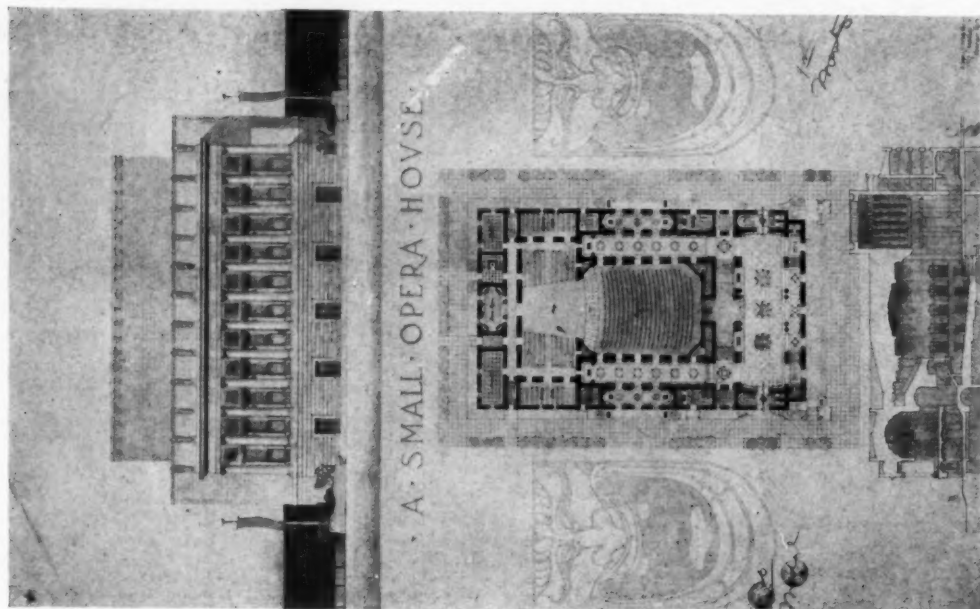
A. MARSHALL
SECOND MEDAL
COLUMBIA UNIVERSITY



SECOND MEDAL

H. C. BROCKMAN

CARNEGIE INST. OF TECH.



SECOND MEDAL

J. FRANKLIN

CARNEGIE INST. OF TECH.

CLASS "A"-V PROJET—A SMALL OPERA HOUSE
STUDENT WORK, BEAUX-ARTS INSTITUTE OF DESIGN

DEPARTMENT of ARCHITECTURAL ENGINEERING

The CHICAGO ZONING ORDINANCE

THE zoning ordinance, recently adopted by the City Council of the city of Chicago, may well be considered a model of its kind. It is brief and concisely written, consisting of thirty-two sections and use and volume district maps each consisting of forty-nine sections. The ordinance is to be enforced by the Commissioner of Buildings. A Board of Appeals is to be appointed by the Mayor, consisting of an architect, a structural engineer, a builder, a real estate dealer, each of whom shall have had ten years' practical experience in his profession. In addition a chairman shall be appointed. The appointments must be approved by the City Council.

USE DISTRICTS

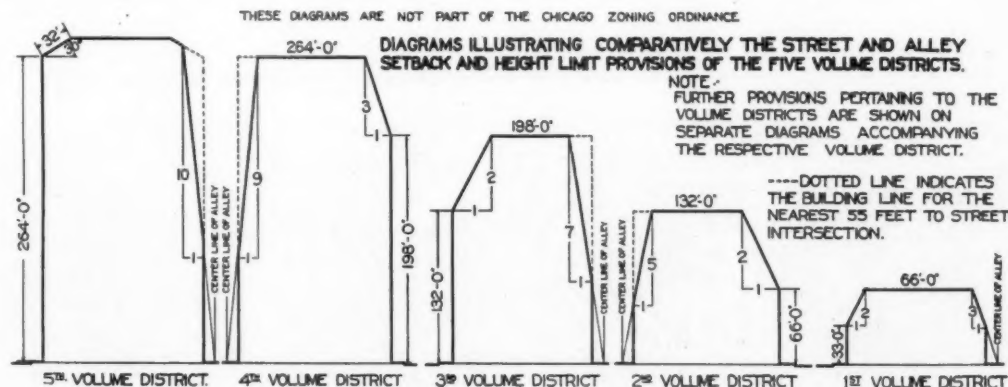
The entire city is divided into four classes of use districts, shown on the *Use District Map* and designated as:

RESIDENCE DISTRICTS, in which private residences, churches, schools and parks are permitted and in which no business, commercial and manufacturing of any kind is allowed.

APARTMENT DISTRICTS, in which all residence uses as named above, also apartment houses, hotels (without store fronts), public libraries, hospitals, private clubs and other similar buildings are permitted and in which no business, commercial or manufacturing use is allowed.

COMMERCIAL DISTRICTS, in which all uses as named above are permitted and in which commercial uses are permitted, subdivided into three groups:

C1 Uses. Those of the first group may be located anywhere within a Commercial district. They include retail businesses, garages and filling stations, storage



The function of the Board of Appeals is to adopt from time to time such rules and regulations as it may deem necessary to interpret and to carry into effect the provisions of the ordinance and to recommend to the City Council such ordinances or amendments as it may appear desirable and to permit variations from the present ordinance under certain conditions.

The city is divided into Use Districts controlling the kind of occupancy. These districts are designated as Residence, Apartment, Commercial and Manufacturing districts. Certain special and non-conforming uses are regulated. Each section of the city, in addition to being in one of the four Use Districts, is also in what is called a Volume District, of which there are five. The technical restrictions pertaining to these districts and illustrative diagrams are given herewith.

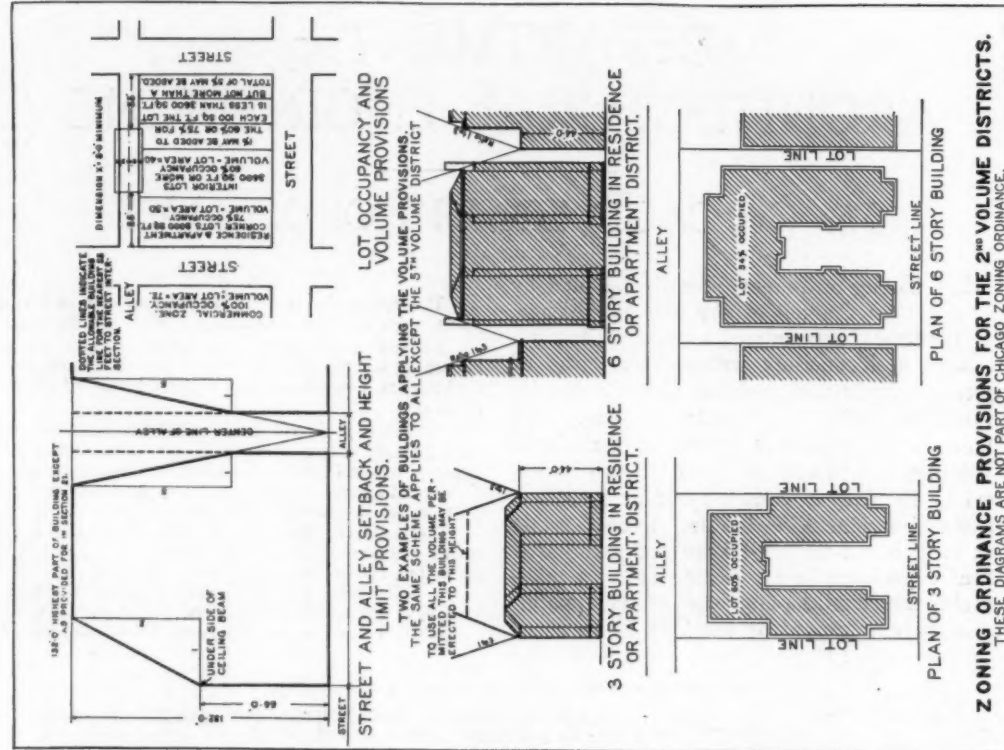
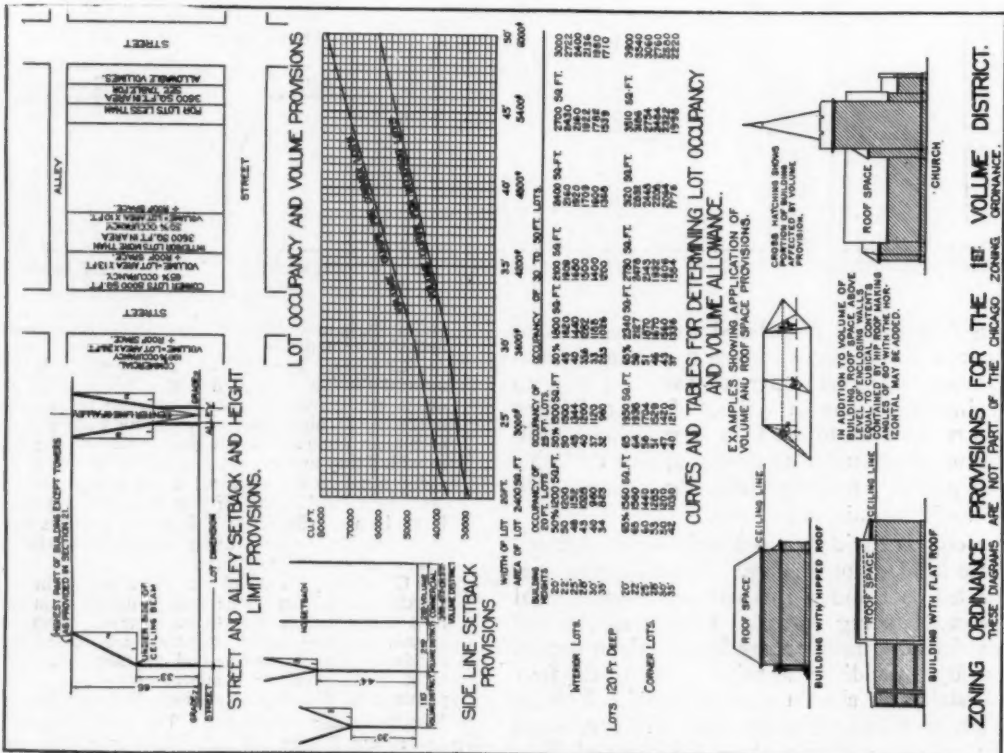
buildings, banks, offices, theatres, laundries, showrooms and similar activities.

C2 Uses. Those of the second group in a Commercial district if located within 125 feet of a Residence or Apartment district may be prevented from operating at night, and they cannot occupy a greater area than one-half of the floor space of the building in which they are located, but they may occupy at least space equal to the lot area in any case. (Exceptions are made to this rule if the commercial property is located on a railroad.) This group includes light unobjectionable manufacturing when conducted wholly within substantial buildings.

C3 Uses. Those of the third group in a Commercial district cannot be located nearer than 125 feet to a Residence or Apartment district. They include certain activities which frequently are objectionable to residence, such as dyeing and cleaning establishments, large food products manufactures, coal yards, ice plants, milk distributing stations, large stables.

MANUFACTURING DISTRICTS. The uses permitted in a Manufacturing district are subdivided into three groups:

M1 Uses. Those of the first group are permitted in any part of the Manufacturing district and include



unobjectionable manufacturing activities even though conducted on a large scale.

M2 Uses. Those of the second group cannot be located nearer to Residence or Apartment districts than 400 feet and include manufacturing activities which may create, to a certain degree, dust, gas, smoke, noise, fumes or odors.

M3 Uses. The third group may not be located nearer to a residence or Apartment district than 2,000 feet and include all nuisance type of manufacturing activities, such as fertilizer, glue, cement and starch manufacturing, petroleum refining, tanning, and the like.

NON-CONFORMING USES. Uses which existed at the time of the passage of the ordinance and which do not conform to the district in which they are located are called non-conforming uses. They are permitted to remain; but limits are placed on their expansion and on changes which might take place in their activities.

VOLUME DISTRICTS

Each section of the city, in addition to being in one of the four use districts, is also in what is called a volume district. There are five volume districts, and in each of these the amount of land area which can be occupied by a building and the height of the building are regulated. In each of the five volume districts the regulation for corner lots is slightly different from that for interior lots; while the regulation for commercial and manufacturing properties is slightly different from that for Residence and Apartment districts. The volume districts are outlined on the *Volume District Map* and indicated by the numerals 1, 2, 3, 4 or 5, and are designated as 1st, 2nd, 3rd, 4th and 5th Volume districts.

1ST VOLUME DISTRICTS. These districts cover areas of the city devoted to private residences, two-flat buildings and similar residential uses where existing buildings have provided ample yard space and where buildings do not cover a large percentage of the lot area. They also cover the business districts of these neighborhoods.

In 1st Volume districts which are also in a Residence or Apartment district, the building shall not occupy more than 50% of the area of an interior lot, 65% of a corner lot, and may occupy the entire lot if in a Commercial or Manufacturing district.

The cubical contents of the building shall not exceed 10 times the lot area (13 times if a corner lot or 36 times if in a Commercial or Manufacturing district). Roof spaces are allowed in addition to the above cubical contents.

The height limit at the street line is 33 feet; the maximum height is 66 feet, provided the allowable cubical content is not exceeded.

2ND VOLUME DISTRICTS. These districts cover areas of the city where the tendency is toward large three-story apartment buildings. They also cover the business districts of these neighborhoods.

In 2nd Volume districts, which are also in a Residence or Apartment district, the building shall not occupy more than 60% of the area of an interior lot, 75% of a corner lot and may occupy the entire lot if in a Commercial or Manufacturing district.

The cubical contents of the building shall not exceed 40 times the lot area (50 times if a corner lot or 72 times if in a Commercial or Manufacturing district).

The height limit at the street line is 66 feet; the maximum height is 132 feet, provided the allowable cubical content is not exceeded.

3RD VOLUME DISTRICTS. These districts cover areas of the city where the tendency is toward tall apartment buildings and apartment hotels, as well as highly developed business and manufacturing centers outside of the central district.

In 3rd Volume districts, which are also in a Residence or Apartment district, the building shall

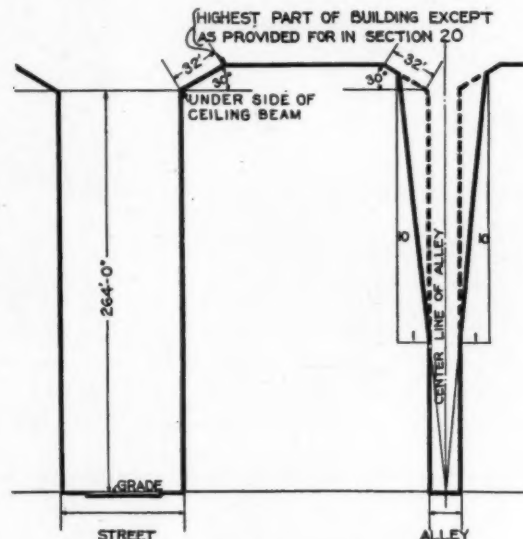
not occupy more than 75% of the area of an interior lot, 90% of a corner lot, and may occupy the entire lot if in a Commercial or Manufacturing district.

The cubical contents of the building shall not exceed 100 times the lot area (120 times if a corner lot or 144 times if in a Commercial or Manufacturing district).

The height limit at the street line is 132 feet; the maximum height is 198 feet, provided the allowable cubical content is not exceeded.

4TH VOLUME DISTRICTS. These districts cover areas of the city lying close to the central section and are largely warehouse and office building districts.

In 4th Volume districts, the lot area provisions are the same as those of the 3rd Volume district.



Envelope for 5th Volume District

(No volume provision)

Dotted line indicates the allowable building line for the nearest 55 feet to street intersection

Note: For cornice and parapet provisions, see diagrams accompanying the 3rd volume district provisions. Above the height limit and occupying not more than 15% of the area of the premises, in no case more than 3,600 sq. ft. that portion of the building may be erected to an ultimate height of 400 ft. For diagrams pertaining to portion of buildings permitted above height limit, see diagrams accompanying 4th volume district provisions.

The cubical contents of the building shall not exceed 216 times the lot area.

The height limit at the street line is 198 feet; the maximum height is 264 feet, provided the allowable cubic content is not exceeded.

5TH VOLUME DISTRICT. This area covers the downtown district.

In the 5th Volume district, the lot area provisions are the same as those of the 3rd and 4th Volume districts.

The height limit at the street line is 264 feet. Limited space above this height generally used for pent houses, water tanks, storage and similar purposes is allowed if set back from all street lines.

Buildings are required to set back from alley lines above certain heights so as to provide adequate light and air along rear and sides. Towers are permitted in all volume districts. Cornice projections are limited to 2 feet at the top of tall buildings.

The PRESERVATION of STONE BUILDINGS

THIS country is old enough for us to be confronted with the decay of stone buildings and it is timely, that consideration be given to the problem. The preservation of stonework is receiving attention in England and Scotland where an extensive series of experiments has been under way for a considerable period of time. Certain phases of this work have been put in charge of Prof. A. P. Laurie by the Office of Works. In a lecture delivered at the Royal Academy last Fall Prof. Laurie made a report of conditions and progress.

The problem of arresting decay in old stonework is not the same as that of preserving new work. A new stone, like a freestone, can be treated with certain preservatives and have its life increased and in the same way sound stone in old buildings can be treated. The problem of decayed stone in old buildings is very much more difficult. We have there the problem not only of preserving from future decay, but also of reconstructing the stone itself and of replacing the lost cementing material by some new cementing material, and in many cases the building is a ruin exposed to weather on every side. There was a time when ancient monuments suffered terribly from restoration. Old carved work and old mouldings were not only cut out and replaced, often very carelessly and with unsuitable material, but, in addition, when the stone preserver came along he first began to scrub with a wire brush and take off everything he could, and when he got down to the raw stone put on his preservative. It is not altogether a scientific problem, it is to a certain extent an aesthetic problem as well.

There are also obvious limits to what a stone preservative can do. For instance, if there are fissures in the stone, and the surface is treated with preservative, the stone will come away in lumps presently because of the cracks behind; or if the stone is falsely bedded in the first instance it will come away in sheets of considerable thickness.

The problem, therefore, is not a problem for the chemist alone, but for the architect, too, for he has to decide what can be done to preserve what remains of artistic value. The chemist having told him exactly how far he can go, the architect must consider each case on its merits to decide whether he is going to replace, whether he is going to fill up the cracks through which water may penetrate, or whether he is going to treat with preservative and so get his result. There is, however, one treatment which is quite unjustifiable—the treatment with the wire brush. Far better leave the carving and mouldings alone.

One thing to which not very much attention has been given yet, and much more ought to be given, is the question of the filling up of cracks. More study ought to be devoted to the filling up of fine cracks so as to prevent water getting in and disintegrating the stone.

It is absolutely essential, if we are to make any progress at all, that photographs as near full size as possible should be taken at different stages. In Elgin they experimented with one group of mouldings, leaving the other set untreated. They have taken photographs, and every Summer we have compared the photographs to find out exactly what has happened. One of the reasons why more progress has not been made in this matter is that, in the past, whole surfaces have been treated. If you treat small portions at a time, leaving other portions untouched, and take photographs as you go along, it is possible to obtain results that may lead to definite conclusions.

The main causes of stone decay are, in the first place, the effect of wind. Wind, carrying sand, acts as a sand blast and wears away the stone. We have heat and cold, expansion and contraction of the stone. In the case of granite, where you have the expansion with change of temperature of different kinds of closely packed crystals with different coefficients of expansion, fine openings are formed through which moisture and injurious gases can enter. There is also the action of ice. If we have a stone saturated with water, and it is caught by the frost, the ice expands and breaks up the stone. The main disintegrating agent that we have in a country like this for the breaking down of rocks is the action of frost. Another disintegrating agency is the carbonic acid gas in the air. Carbonate of lime is the main constituent of limestone, and is in a great many cases the binding material. It is a very common binding material for sandstone in a crystalline form known as calcite. If we put some carbonate of lime into a vessel suspended in distilled water, and pass carbonic acid gas through it, we notice that the solution gradually clears. This is due to the fact that carbonate of lime is soluble in an excess of carbonic acid gas. There is carbonic acid gas in rain water. It is present in the air, and this solution of carbonic acid gas acts upon limestone and gradually dissolves it. These are the main natural causes we have of stone decay.

That is not all that we have to suffer from under modern conditions. The coal that we burn, owing to the sulphur it contains, pours into the air sulphur compounds, sulphurous acid, sulphuric acid, and ammonia sulphate. These powerful agents act upon carbonate of lime. If you put an acid

into a vessel containing suspended carbonate of lime the whole liquid will at once clear, showing the solubility of carbonate of lime in the acid. These acids, then, dissolve carbonate of lime—i.e., they will dissolve limestone. If they did that only it would not matter so much, but the result of the action of these sulphur gases on the limestone is to form a compound known as gypsum or sulphate of lime, which is, when heated, plaster of Paris. This sulphate of lime crystallizes, and in crystallizing exercises tremendous pressure and breaks up the stone.

The problem of sandstone and the problem of limestone are somewhat different. We can, roughly speaking, divide stones into two divisions, sandstone and limestone. We can divide sandstone roughly into two other divisions: sandstones which have carbonate of lime as their cementing material, and sandstones which have an insoluble cement such as silica. There are other cementing agents, but these are the most important for our present purpose. Sandstone consists of particles of quartz which are practically indestructible; consequently, if it comes to pieces, it comes to pieces because the cement which holds it together has perished. If the cement is a silica cement we have a very durable sandstone, because it will not, at any rate, be attacked chemically, though it may be mechanically. In some cases it is not so durable as it should be because there are not enough connecting points. The Elgin stone is a stone with a silica cement, and therefore is not easily attacked chemically; but as the connecting points are very few it is a stone which yields readily to mechanical attack, such as frost and the infiltration and crystallization of sulphate of lime.

In the case of the sandstone we have already a material on which the chemist can build, while in limestone we are dealing with a material in which the stopping of stone decay is very much more difficult. It is also known that some limestones are much more durable than others for reasons which are, to some extent still obscure.

In the last twenty or thirty years no really new and original material for dealing with the question of stone decay has been suggested. The proposed materials can be divided roughly into three groups. There are, first of all, the silicates and silico-fluorides. The principle upon which they act is that lime in combination with the silicates gives an insoluble precipitate. Take some lime water and add a little silicate of soda to it and a white precipitate is at once thrown down. Silico-fluorides are even better from a chemical point of view for the formation of insoluble compounds of lime. If, then, you take a limestone or a sandstone that contains calcite you can convert a part of it into an insoluble substance, hardening the stone to a certain depth and partially converting it into an insoluble material. At the time when the

House of Commons was built the chemist spoke highly of silicates. The results from its use were most disappointing. Then silico-fluorides came into favor. They have a certain value for the hardening of certain surfaces, but they have been found of little value for re-cementing rotten sandstones and limestones. We have a whole variety of mixtures of paraffin wax, of oil, of resin, and insoluble soaps of which the permutations are endless, but none of these solutions has been found satisfactory from the point of view of reconstructing a decaying stone surface.

The experiments that Prof. Laurie made on stone preservatives soon made him realize a very great danger which may result from their application. The first question is not whether the stone preservative is going to make the stone last longer, but whether the stone preservative is going to destroy the stone. The question after soaking the stone with a preservative, is whether the solution as it dries is going to leave the preservative in the pores of the stone or is going to deposit itself near the surface. Every solution has to be tested from that point of view. In a great many cases it comes to the surface. What is going to happen? The preservative will not prevent water getting in. Water gets in and dissolves some of the substance of the stone, and crystals are formed behind the layer of preservative because the water containing dissolved material cannot get out to crystallize on the surface. The result is that the stone comes off in flakes. You have to be very careful that your stone preservative is not going to do more harm than good. In the same way you can get a water-lock owing to a preservative which keeps the stone saturated with water so that it breaks up from the action of frost. It is for that reason that the architect always quite wisely says the stone ought to be able to breathe.

An architect can easily test for himself the value of a preservative for re-cementing rotten stone. Take a little sand and make a little sand brick with the preservative and allow it to dry, and see whether it is going to dry hard. If your brick dries hard just drill a little hole with the point of a knife, and see whether the sand pours out from the inside. If the distribution of the preservative has been right, the brick should stick together all through, though it will never be quite so hard inside as at the surface. If the preservative is coming to the outside as it dries, you have only to make a little hole and you will be able to pour out the sand. If it stands these tests, soak the brick in water, and see whether you have got a chemical binding there or not, and if you find it stands these three very simple tests, it may be worth while giving it a further trial outside. Besides sand, you can try some of the stone you wish to preserve crushed into a fine powder and mixed with the preservative.

There has now been experimenting for some five or six years in Scotland with thin solutions of resin, and some interesting results have been obtained. The mistake made in the application of resin in the past has been that the solutions have been too strong, and, consequently, they have penetrated a very little way and produced scaling. The solutions should not be stronger than 15 per cent to 5 per cent of common resin in toluol; the denser the stone the thinner the solution. Penetration is also helped by treating the stone first with the pure solvent, and then following up with the resin solution. If the stone is shiny after treatment sponge over with the solvent, and if darkened sponge over with lime water. In the case of close-grained sandstone, excellent results have been obtained so far, but in the case of limestone sufficient penetration has not been obtained, and in the case of very coarse-grained open rotten sandstone surfaces, while the stone no longer comes away in large pieces after a Winter's weathering, a slow surface decay goes on, owing to the destruction of the resin itself by the action of the weather. In some cases the surfaces have actually hardened with time. In no case has any injury been done or scaling caused. The penetration aimed at was about one inch, and the amount of resin applied sufficient to close about 20 per cent of the pores so as to enable the stone to breathe. For interiors where the stone is sufficiently porous it should be very successful.

A word or two should be said about lime-washing, which is now very popular. In a great many cases the idea of lime-washing is sound. You protect the surface of the stone with a coat of lime-wash, and it may very well preserve the stone. On the whole, there is a great deal of evidence to show that lime-wash was used in mediæval times, and that lime-washed buildings have stood the test of time very well. Some people object to it on æsthetic grounds—they don't like the look of a lime-washed building. The feeling is that if it really can be proved that lime-wash is going to preserve, even though it does not reconstruct, then any question of æsthetic feeling must be put on one side. The main thing to do is to save the ancient monuments.

On the subject of lime-wash, Prof. Laurie concludes with a word of warning. He recently saw a case of lime-washing which had been done in 1914, and in which, apparently, the effect had been to tear the stone all to pieces. Part of a moulding had been treated with lime-wash, and had fallen to pieces, while the untreated portion of the moulding was all right. There it was, not only scaling off, but taking one-eighth to one-quarter of an inch of the stone with it. It is quite possible for lime-wash to act as a destroyer, and the explanation seems to be this. The building

was a ruin of porous sandstone, and had only been lime-washed round the moulding. It was exposed to rain and weather, the lime-wash did not cover the whole of it, and the result was that there was plenty of room for water to soak in; the water formed a water-lock behind the lime-wash, and there had been freezing, probably, and breaking up of the stone. If you take a building with a straight wall and a roof on it, lime-wash could, it is believed, be applied without the slightest danger. If you have a pinnacle of stone exposed in all directions you must consider whether you are going to do more harm than good by locking in water. This, again, will depend on the porosity of the stone. Lime-wash, while preserving close-grained limestone, may well destroy a porous sandstone. Therefore, it is evident that lime-wash, though there is a great deal to be said for it, needs careful investigation. You must be careful not to let water in to form a water-lock behind the lime-wash.

In cases such as roofed buildings where lime-wash can be safely used, and where the stone is sufficiently porous to absorb weak solutions of resin, it is believed something permanent could be done by soaking the rotten surfaces first with a weak resin solution, and then lime-washing the whole. For lime-wash a mixture of lime and salt, is preferred to a mixture of lime and tallow. Projecting cornices should either be flashed with lead on the top, or if this is too expensive, thoroughly saturated with a weak solution of resin.

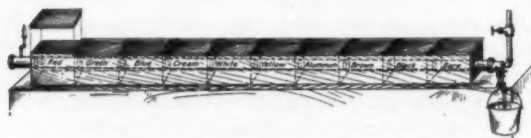
Prof. Laurie has recently been experimenting on a very interesting solution which has never been tried before as a preservative: silicon ether. It is a compound which can be dissolved in alcohol, and on exposure to air and moisture it is decomposed and deposits thin layers of hydrated silica, cementing the particles of stone together. The experiments being made with this new material on rotten sandstone surfaces look very hopeful, and a definite conclusion should soon be reached as to its value. Experiments on rotten limestones have not turned out so successfully, mainly owing to the difficulty in penetration.

Quoting Prof. Laurie: "I fear I have rather uttered words of warning than given a solution of this most difficult problem, but little has been done in the way of systematic experiments in the past, and the chemist today is on his guard against making the mistakes of the chemist in the past, and assuming from successful laboratory experiments that he is going to get equally good results outside. The whole situation is gradually clearing, a great deal of rubbish has been removed, and I have no doubt that the time is approaching when the chemist will be able to tell the architect exactly what he can and cannot do, and the architect will frame his policy accordingly."

Color and Radiation

TESTS have recently been made by Henry A. Gardner and Harold C. Parks to ascertain the effect of color on the efficiency of radiating surfaces. They used a very simple apparatus which is hereafter described and illustrated. This apparatus was entirely adequate for establishing, in a general way, the relative effect of painting radiating surfaces. To have secured correct results each compartment of the test apparatus should have been insulated from the adjoining one as the transmission of heat from one to the other through the galvanized iron naturally tends to equalize all of the temperatures.

The results of the three tests correspond very closely with those made by the late John R. Allen which were described in THE AMERICAN ARCHITECT of February 13, 1918, page 195. The outstanding feature of this investigation is the fact



View of apparatus used in tests

that color has a decided influence on the transmission of heat and that flat finish is preferable to gloss finish paints.

Economy of fuel consumption demands efficient radiating units and the percentage of variation due to color is such as to justify consideration, especially in large installations. It will be noted with pleasure that the gaudy copper and aluminum bronzes used for finishing radiators is the least efficient of all coatings. In part, the report of tests reads as follows:

The difficulty of obtaining coal for heating purposes suggests to the consumer the importance of using every safeguard to conserve fuel values. That the color of a radiator may have some direct effect upon the situation, at least from the standpoint of increasing the efficiency of transmission, is apparent from recent tests conducted by the writers with the apparatus shown above. Subsequent to the presentation of the following data will be found information regarding previous work that was afforded by a research of the literature on heating and ventilation.

The apparatus shown in the illustration, made specially for the tests, consists of a trough of galvanized iron eight feet long, six inches wide, and six inches deep, inside measurements. This trough is divided into ten compartments, each nine and one-half inches long. Through the trough runs a two-inch iron steam pipe, the compartments dividing this pipe into ten lengths, nine of which were painted with a different paint, namely: Cream, white, yellow, red, green, brown, black, aluminum, gold bronze, one section being left bare.

Ten cover pans one-half inch deep were made, each one fitting into a compartment. Five hundred cubic centimeters of water were placed in each pan. Steam from a boiler was turned into the pipe.

Two sets of temperature readings were taken; one of the air in the compartments and another of the water

in the pans. After a number of tests the following average results were obtained:

Order of radiation efficiency as calculated from several tests.

1st	(Best)	White
2nd		Cream
3rd		Red
4th		Green
5th		Yellow
6th		Black
7th		Aluminum
8th		Brown
9th	(Poorest)	Bare Iron Pipe

The greatest observed differences in temperature between the white and the dark colors or bare iron was about 10 per cent, which is considerably lower than the results obtained by Prof. Allen.

Tests also indicated that additional coats of paint (up to four coats were applied) do not reduce the radiation efficiency, if the same colors are applied as finish coats.

Tests were also included of flat versus gloss paints in the same colors, and the indications were usually in favor of the flat. Inasmuch as a flat paint film is generally considered as being more porous than a gloss, this might have some bearing upon the matter. The results would suggest the use of washable flat wall paints on radiators, and preferably of the same light tints that are used upon walls. Such paint bakes to a firm film upon radiator surfaces, and practical tests with such paints upon radiators in the laboratory have indicated a life of at least ten years without showing defects.

Starved Glue Joints

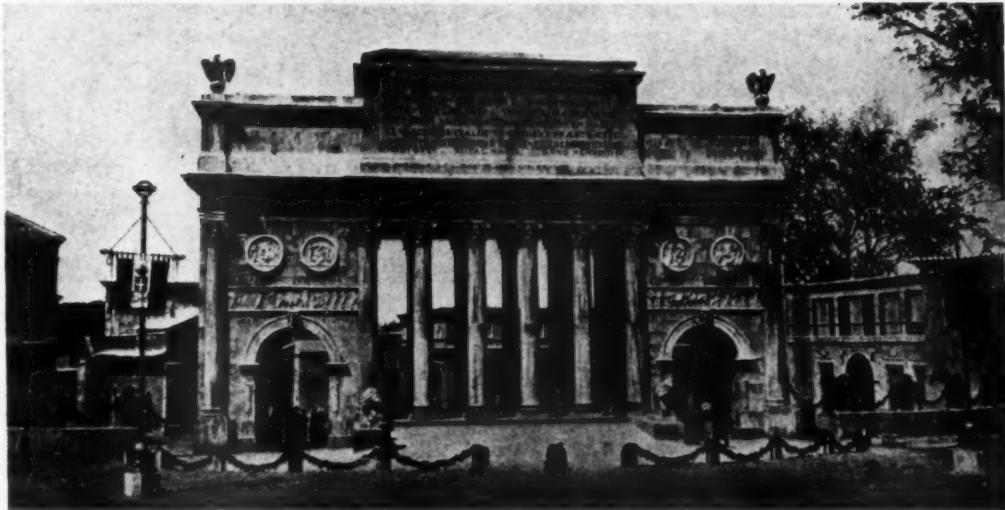
MANY failures in glued-up wood are caused by "starved" joints, or joints in which the film of glue between the wood surfaces is not continuous. Such joints, according to the Forest Products Laboratory, Madison, Wis., are not necessarily the result of a lack of glue spread on the wood; heavy spreads are as likely to produce them under ordinary commercial conditions as light spreads. They are caused rather by the application of pressure to the joint while the glue is too fluid.

Starved joints are more likely to occur with glues of low viscosity, such as warm animal glue and most blood albumin glues, than with casein, vegetable, and other thick glues.

Some woods are more susceptible to the production of starved joints than others. Birch, maple, red oak, and ash, which have open pores, absorb glue from the spread in such considerable amounts that they often leave the joints starved. Basswood and yellow poplar also take up a great deal of glue, but weak joints are not very noticeable in these woods because the woods themselves are weak. Other woods with smaller cells open to the gluing surface do not seem to be so subject to starved joints.

To avoid starved joints it is necessary to mix a glue solution thick or allow it to thicken on the wood from drying or chilling before pressure is applied. When it is necessary to glue under conditions which might produce starved joints, the use of light pressure is advantageous.

From "The Architects' Journal," London



The Entrance to the first Roman Exhibition of Agriculture, Industry and Applied Art

REVIEW of RECENT ARCHITECTURAL MAGAZINES

BY EGERTON SWARTWOUT, F.A.I.A.

WHILE in this country the authorities in general, and in New York in particular, are trying to regulate and reduce the height of buildings by zoning ordinances and the like, over in England there seems to be a persistent effort not to make them lower but to make them higher. While we, having experienced the blight of the high building, realize that once we have started we can never absolutely stop, and that the best we can do is to control the output by rigorous restrictions, and attempt to preserve for ourselves thereby some modicum of light and air,

locking the stable door as it were after the horse has been stolen, the English architects, some of them, and their clients, many of them, have shown the most persistent intention of unlocking the door entirely and inviting the thieves in to supper. The most persistent of those anxious to issue invitations is a gentleman by the euphonious and somewhat oriental sounding name of Delissa Joseph, whose agitations have recently culminated in a paper read before the Royal Institute of British Architects and published in their Journal of the 16th of June. Mr. Joseph is very much in earnest

From "The Journal of The R. I. B. A."



The Quadrant and part of Regent Street

From "The Journal of The R. I. B. A."



Regent Street as it was

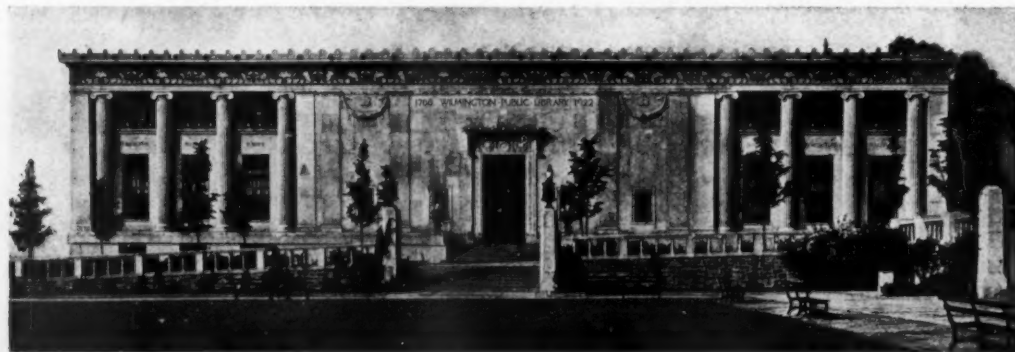
From "Architecture"

**Public Library, Wilmington, Del.***(Final design exactly as built)*

about it, and, seems not to have a very high regard for Parliament, or the lawyers or the Law of Ancient Lights, which last is apparently such a nebulous and uncertain thing that to object to it seems almost like objecting to the Milky Way. But Mr. Joseph does object, not only to the law but to the statement that he is advocating skyscrapers, when he has made it perfectly evident that he is only advocating buildings of a mere 150 feet in height, and everybody knows that skyscrapers are 600 feet high, and in case they don't know it he shows them in a neat design of his which is apparently inspired by the Flat Iron Building, and which, Mr. Joseph seems to think, might be found on every other corner in Manhattan. And to show that Mr. Joseph was not alone in his position, Sir Sydney Skinner, the chairman of a large distributing firm, in seconding a vote of thanks, said that high buildings are a necessity to his business and merchants "want to be allowed to build to a greater height than 80 feet. Otherwise the floor space is very considerably limited or you have a narrow height in which goods will not show to

advantage," a statement in which Sir Sydney palpably shows who is taking the role of Potiphar's wife. The idea of anyone thinking that goods would show to advantage in a narrow height! But, in spite of all the earnestness and the oriental imagery, the Royal Institute did not seem to be impressed; they callously preferred the narrow height of their own London, and they spoke rather bitterly of the change in Regent Street and of the few high buildings that had been built. The English are too familiar with the dreadful results of our unrestrained development to take such chances with London. They are in a position to see, and the remarks that followed Mr. Joseph's address clearly show that they do see, that a building of abnormal height is an offense artistically and morally as well, for it steals the light and air of its neighbor, and, because of the greater number of those that it houses, arrogates for itself the greater part of the public thoroughfare that was meant for others. Primarily such structures were built for greed, and when it became evident that

From "Architecture"

**Public Library, Wilmington, Del.****Edward L. Tilton and Alfred Morton Githens, Associated Architects**

there was an economic limit of height, they were built for advertisement; they are never built for necessity. Artistically they are generally failures. Some few are good and a very few fine, and they all have, by their very size, a certain

From "Architecture"



West Branch Library, Bridgeport, Conn.
Leonard Asheim, Architect

crude grandeur which is imposing, as Mr. Dooley says, to those who are easily imposed on. Of course, if owners want to build them, there will always be found architects to design them, and the only safeguard is to restrict future work rigorously in those localities where the idea has taken root, and to keep established a low limit of height in those fortunate localities in which it has not.

For the last hundred years or so, from the time when the ruins of classical architecture in Greece have been explored and measured, there have been a series of attempts to show that in the design of these great works the Greeks were governed by some mystic formulae; that they had by some

From "The Architectural Review," London



The University Club, New York
(From a sketch by William Walcot)

happy chance stumbled on these formulae or that the formulae had been perhaps handed down on tables of stone in the Mosaic fashion; at any rate, they knew just how to do it and the secret had been lost and now rediscovered. Mr. William B. Dinsmoor gave a most interesting and authoritative discussion of this question in the June number of *Architecture*, and in the July issue completes an article which should be read with interest by all architects or laymen as well, who are concerned with such things. It should be read aloud into the unwilling ears of those theoretical gentlemen who have lately taken up so much space in architectural journals, even if the aforesaid gentlemen have to be hogtied in order to render this possible. Referring to the Parthenon, "What then," says Mr. Dinsmoor, "was the method employed in the design? During an investigation of the problem extending over more than a dozen years, I was forced, in spite of myself, to see that the method adopted was hardly different from that of modern times. I find no mystery in the plan of the Parthenon, nor in that of any other Greek temple; I have no secret to disclose—It is my thesis that the Greek architects worked entirely with proportions based upon linear measurement; and I must ask

From "The Architects' Journal," London



The Theatre at the Roman Exhibition

you to believe that all the measurements hereafter quoted have been faithfully transformed into Attic feet of 12-7/8 inches (327 millimetres)." As I see it the great trouble with all these theoretical gentlemen is, that not being designers themselves, they are not able to conceive the mental processes by which any design is made. They are in the position in which I would find myself if, knowing nothing of music, I should attempt to analyze mechanically the composition of an opera. They are unable to appreciate that modular or lineal measurements are useful only for drawing out or describing a conception so that it can be built by others, or in preserving the pro-

From "Architecture," London



Cartoon for the painting in the eye of the Dome,
Missouri State Capitol

By Frank Brangwyn, R. A.

portions of a structure built in some distant locality. A sculptor makes a model of his statue in clay and casts it in plaster and from this model the bronze is cast or the marble cut. He cannot give verbal directions, nor can he write out a series of dimensions. In the case of a building it is different. You can't model a complete temple

From "Architecture," London



The Home Builders

Pendentive at base of Dome, Missouri State Capitol

By Frank Brangwyn, R. A.

in plaster; you can only draw it on paper, and if you haven't got the paper or the drawing materials, the next best thing is to express your contemplated design in some dimensional way, by some standard unit such as the foot and its subdivisions, or by modular dimensions starting with the assumption, say, that the lower diameter of the column is so much and making subdivisions of that. The latter way is, of course, the only way by which can be made a careful comparison of one building with another. Then, too, these theoretical gentlemen, not being designers, fail to realize the different elements that enter into a design, the peculiarities of the site, the material available, the question of cost, the use of old material, the requirements of the client, and above

From "Architecture," London



The First Landing

Pendentive at base of Dome, Missouri State Capitol

By Frank Brangwyn, R. A.

all they do not realize that the workings of the human mind are probably just the same now as they were in the classic days of Greece. What would happen if an architect nowadays ignored all the requirements of his client and the regulations of the Building Department and made his design over a system of crisscross lines and squares? Where, as they say colloquially, would he get off? And yet, such things are seriously advocated and this advocacy is spreading much more rapidly than one would think possible. I had a case in point recently. The graduating class of a high school we had built some years ago decided to erect a gateway, an entrance to the school, as a memorial to their class. One of the members of the class

who was interested in architecture made a design for it, and submitted it to me for approval. It was very simple and good, a little crude naturally, but what chiefly attracted my attention was a brick wall at each side of the entrance which was figured 4 feet 2-3/5 inches high. At first I supposed it connected up with an old wall which he had measured but upon inquiry I found the young man had worked out this height on the Hambidge theory which had been explained to him by his teacher of Art. And so it goes. Years ago when I first came in contact with these theoretical gentlemen and their theories I was merely amused, later I was bored, and now I feel strongly it all should be suppressed, and I have animadverted on it at length in these columns and elsewhere, but not being an archeologist, and not having given years of personal study to the ruins, I was not in a position to speak with authority as to measurements.

From "Architecture," London



The Pioneers

Pendentive at base of Dome, Missouri State Capitol
By Frank Brangwyn, R. A.

I could only look at it all from the standpoint of common sense design. I knew from analogy that no one ever designed anything by rule, and that in the case of a standard, such as the scheme of a Doric temple, it was all a matter of the development and study of proportions, a gradual improvement over the proportions of former temples, governed of course by the limitations and requirements of each particular case. Mr. Dinsmoor's article is the result of many years of study of the ruins and of all existing records, and the publica-

tion of his book on the Culmination of Greek Architecture in the Age of Pericles is eagerly awaited.

There has been a great deal of loose talk lately to the effect that modern architects, when they attempt the Classic are only copying old forms and playing the same old tune on the well-worn strings of the same old classic instrument, and that the spirit of free America is to be found in the covering of the steel frames of skyscrapers and so on *ad nauseam*. It's perfect rot, of course. The best work done in this country is the monumental work, and it's much better done here than anywhere else, just now, and as a whole it compares very favorably with that done in any age in any modern country and it's generally very original. The orders are the same old orders, but why not? There may be other possibilities in an order that have never been tried, but I question it. The detail and to some extent the proportion, and the general feeling, can be changed a little, but the originality of a building lies in the use of the parts, not of the parts themselves. A particularly good example of modern monumental work is the Wilmington Public Library which is profusely illustrated in the same paper as Mr. Dinsmoor's article, the July number of *Architecture*, a very good number, by the way. The architects of this building, Edward L. Tilton and Alfred M. Githens had an unusual and difficult problem to solve and they did it in an original and interesting manner. Here is no slavish copy of the antique, but a real live piece of architecture. The

From "Architecture," London



The Bridge Builders

Pendentive at base of Dome, Missouri State Capitol
By Frank Brangwyn, R. A.

idea of a solid central mass flanked by a four column colonnade is as novel as it is daring. Unfortunately I have not seen the building itself; I can only judge from photographs, but viewed merely in front elevation it is remarkably good. The detail is charming and the building as completed looks very like the fine rendering of Mr. Githens. I am just a little in doubt about the combination of terra cotta and stone in the entablature; they are such radically different materials that I question if in time they may not weather differently. Undoubtedly they look well now. I think I would also prefer it if the first story of the colonnade were more intimately joined to the columns, particularly as there is no second story screen wall. It might be that if the flutes were omitted this effect would be gained, and yet, the order unfluted would not be as good. I'm inclined to prefer the effect of Mr. Githens' rendering to the photograph at this point, and I was going to suggest that the columns be half columns instead of over half, but on closer inspection of a side view of the Library it seems as if they were half columns after all. I remember in this connection a very interesting statement of William Walcott, the English artist, who told me he much preferred half columns, as they were so much more a part of the wall, and did not seem to detach themselves as three-quarter columns do. It's an interesting point. But in any event, Messrs. Tilton and Githens have made a notable contribution to the architecture of this country and I can only wonder at the vast amount of work they have gone through to accomplish this result. Surely this is the very antithesis of commercialism and I hope the library authorities appreciate what they have got, or rather, I hope they have paid for what they have got. There is another interesting library in this same magazine, the West Branch Library in Bridgeport by Leonard Asheim, which is excellent, barring the end bays and possibly the cupola, which is small; the gable and the main wall are charmingly done.

Speaking of modern classic work, there is an exhibition now being held in Rome of Agriculture, Industry and Applied Art for which some really good temporary buildings have been erected, as can be seen from the accompanying illustrations which are taken from *The Architects' Journal*, London, June 6, which says that "the architect responsible for the entire scheme and for the carrying through of the works was Professore Armando Brasini." The entrance recalls to some extent the arch of Constantine; but the treatment is novel and the detail good, and the open air theatre is very interesting. The whole exhibition seems architecturally head and shoulders over any recent attempt.

In the June number of *Architecture*, London, there are published a number of reproductions of the decorative paintings by Frank Brangwyn for

the Missouri State Capitol, the originals of which have recently been placed in position. They consist of the four pendentives at the base of the Dome and the oculus of the Dome, and are rather large size, the oculus being about 32 feet in diameter and the pendentives 22 feet high, and 16 feet at the base, and about 30 feet from the floor, the Dome itself being about 63 feet in diameter. All the side walls up to the top of the pendentives are of a local limestone of a warm gray tone, hone finish, and above this the plaster is simply treated in the same color so that the general effect is a monotone which serves as an excellent background for the brilliant decorations of Mr. Brangwyn. His treatment of the spaces is unusual, but in my opinion the only correct treatment. The pendentives are exceptionally broad for their height, in fact on account of the width of the splayed corners they become much more of a wall surface than is usually the case, and they are much too big to be treated in the conventional manner with a central motive or panel surrounded by two panels at the side and one at the bottom. Such a treatment would destroy the fine, large effect of the pendentives. It was always the idea of the architects that these spaces should be treated as wall surfaces and the motive should be continuous around the entire dome, and Mr. Brangwyn has followed out this scheme in a very remarkable manner. I have not yet seen the work in place, in fact the scaffold is not yet down, but I did see the pendentives in the Brangwyn studio at Hamersmith last Fall. The treatment is big and robust as all of his work is, and the colors are kaleidoscopic, brilliant and rich, and carry wonderfully well. The subjects are mainly historical, but after all the subject of a decoration is only of interest to the guides of the Capitol and to the casual visitor who is more concerned with the story than with the general effect. In this case they are pure decoration and they have that flat quality so essential to decoration. No one thing stands out clearly; for example, notice how the wagon top in the Pioneers panel fades into the sky. If it didn't the whole effect would be lost. Much has been written about Mr. Brangwyn's method of work, but one has to see all his sketches in his studio to appreciate how he goes about it. He does not use the ordinary run of models; if he is making a study of a man with a sledge hammer he sends to some factory and gets a man who is accustomed to handling a sledge, and he makes him actually hammer something in the studio, and sketches him while he hammers. He draws with marvelous dexterity and sureness and makes hundreds of small sketches and from these he works up his scale cartoons. The consequence is that all his work has a vitality which is noticeably lacking in most decorative work. I think it can be said safely that this dome treatment of Mr. Brangwyn's is the most successful of any in modern times.

DEPARTMENT of ECONOMICS

Economic Factors Which Underlie Construction Activity—Prepared by

THE AMERICAN ARCHITECT by the American Chamber of
Economics, Incorporated*

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JUL 25 '23

CONSTRUCTION costs are still rising, but, happily, the ascendancy of one of the chief factors contributing to that movement has been arrested. Building materials prices, according to the Bureau of Labor index, declined scarcely 1 per cent in May in contrast with April. June figures have not appeared at this writing. The quotations of builders' materials have increased more than 30 per cent between March, 1922, and May of this year, which is in excess of increases enjoyed by other commodity groups in the same period. In April, 1923, the Bureau's index stood at 204, the peak of the present movement, and it contrasts with 300 (April, 1920), the high mark attained in the intensely active post-war period. The depth to which the index subsequently fell was 155 (March, 1922).

The fractional loss disclosed by the index during May is of itself immaterial, of course; it is the direction in which the curve of materials prices is headed that is full of meaning. Further recessions will undoubtedly occur, particularly throughout the Summer months, but there isn't the slightest indication that the readjustment will be of a drastic, malicious, or malignant character.

The trend of materials prices will be influenced very probably by the course of general commodity prices, for the broad, underlying forces that shape the tendencies of general prices would have a similar reaction upon a specific market, such as that of building materials. The trend of these basic economic forces suggests that there will be some probably fair sized recessions, but present indications are that this process of realignment

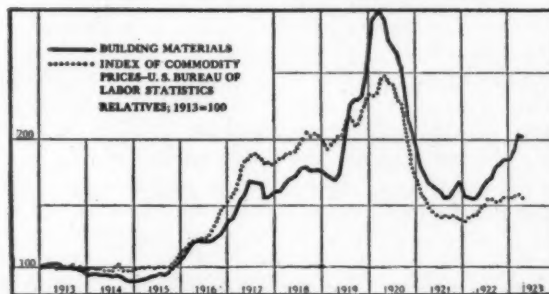
will be mild, gradual and orderly, and that it will probably extend over a period of several months.

The growth of the building program beyond the limitations of the capacity of the industry and its culmination in prohibitive costs and consequent recessions has been no small part of a broad comprehensive wave of caution and retrenchment, which has had an extreme effect upon the psychology of the present situation. Confidence, rudely shaken, and depressed far more than the facts and developments of the situation warranted, has again begun to lift its head. Speculative

feeling has not yet lost its pessimism, and in some circles is unjustly apprehensive. In conservative quarters it is simply disinterested. Production is running at a level under its March peak, and the indications are that it is seeking stabilization at a slightly better than normal level, where "business will be good" but not exceptionally active for a protracted period. Commodity

prices, like materials prices, are receding, having encountered a stiff consumers' resistance in their last advance, but the increasing buying strength of the consuming public generally is sufficient security against a drastic decline. Therein lies the strength of the present price situation, and it has especial application to the materials market. Above the present level the market has encountered determined, active and convincing resistance. At a certain lower level there is every indication that the slowly growing but steadily accumulating buying strength of the consuming public will serve as an effective barrier against a shattered market. This buying power is evidenced by general employment, and increasing wages for workmen the country over. Farmers are gradually coming into a more comfortable financial position. Corporate statements taken at random in widely representative fields reveal improved earning power, which is sure to find reflection in the buying ability of salaried men and stockholders. Finally the banking resources of the country could finance com-

Building Material vs. General Prices.



(By courtesy of the Standard Statistics Co.)

The degree to which building materials have worked out of line with the trend of general commodity prices is obvious from the above chart. During the Autumn and Winter months much of this maladjustment will be remedied if economic trends, now in their incipient stages, are permitted to grow to maturity

*The American Chamber of Economics conducts a consultation and educational service for executives, in economic principles. Its Supervising Director is George E. Roberts, Vice President of the National City Bank of New York. Co-operating with the Chamber are James B. Forgan, Chairman of the Board of First National Bank, Chicago; Frank A. Vanderlip, Financier and Economist, New York; Samuel Insull, President, Commonwealth Edison Company, Chicago; Joseph H. Defrees, Ex-President, United States Chamber of Commerce; Henry S. Pritchett, President, Carnegie Foundation; Edward J. Nally, Managing Director, International Relations, Radio Corporation of America.

fortably a greater volume of business than is being transacted today. Credit stringency, hitherto forerunner of fear and depression, is a possibility far removed. So it would seem that there is little justification for much of the fear and apprehension that exists, and there are many reasons why the architect should encourage a brighter and more confident attitude toward the future.

Lumber has been the first of the four major materials, lumber, structural steel, Portland cement, and common brick, to reveal weaknesses. According to the composite price index computed by *The American Contractor*, lumber has declined from \$40.39 in the week of April 28 to \$36.61 during the seven days ending June 23. Demand has been light as a result of the suspension of construction, variously estimated from \$150,000,000 to \$200,000,000 in a movement confined almost wholly to the Northeastern states, and to the decided improvement manifested in the transportation situation. According to the reports of the National Lumber Manufacturers' Association for the week ending June 16, orders were 72 per cent and shipments 88 per cent of production. Output is still above last year's turnover at this time, but orders and shipments are both lower. Yards are reported to be well stocked. Staple grades are holding up well, the noticeable weakness occurring most frequently in the less popular classifications. The outlook is for still further gradual and moderate declines.

Structural steel likewise has experienced some readjustment. *The American Contractor's* index reports a recent high (May 2) of \$2.56, which represents a composite price of shapes, plates and bars, f. o. b. Pittsburgh. During the week of June 23 this index had dropped to \$2.49. New business is appearing in better volume, however, and in some instances premiums for immediate delivery have been called back into vogue. Inasmuch as output normally declines in response to seasonal influences during the Summer months, not much change in structural steel prices is expected.

The demand for cement is exceptionally heavy, and *The American Contractor's* index has held firm at \$2.55 for the past two months. Production is expanding to meet this growing need, and output for May has been estimated at 12,910,000 barrels, establishing a new high record for any single month. Shipments approximated 14,257,000 barrels for the same period and stocks in the hands of manufacturers were diminished by 1,348,000 barrels. The lull in Eastern construction, better transportation facilities, and the weakness in other materials markets are saving the cement market from a wild carnival of hysteric buying that probably would have culminated in a severe shortage. Cement prices are not likely to undergo any immediate appreciable change, for the market seems to be firm and stable at present levels.

Quotations from common brick have been advancing, and the composite price, computed from quotations in fourteen cities by *The American Contractor*, has risen from \$16.79 on April 28 to \$17.07 June 23. For an average movement that reflects strength. The advance is due to higher production costs brought about by wage increases and attempts to unionize the brick plants along the Hudson, and the curtailment of output occasioned by these labor troubles has left supplies on hand uncomfortably low. A brick shortage is again the subject of conversation among architects in some quarters. Such a condition would at once suggest a firm market possessing a great deal of pent-in strength. However, should production and shipments be allowed to continue undisturbed, and should the lull in construction continue, conservative opinion is that brick prices may seek easier levels in the late Autumn.

This review of the materials markets emphasizes several elements of strength which the architect, in discounting present day trends, should carefully consider. In the first place, new business is no longer swamping the industry, and the longer it is confined to manageable limitations the better off the architect, builder, banker and general public will be. The seller's position in the markets is weakening, and this fact of itself should make for saner and more reasonable prices. Inventories, with the exception of brick, are fairly adequate, although not evenly balanced. Shortages are not a certainty. Transportation has ceased to occupy a major position in the minds of the trade, which is a source of considerable satisfaction. The practice of speculative buying and the policy of over-extension of commitments have been abandoned. And finally, the banking situation is strong enough to finance any materials movement that is basically sound and reasonably priced.

But the price of building materials is only one of three essentials that make up the cost of construction. The other two are wages and the rate of mortgage money. Coming at a time when labor was almost fully employed, building and construction in assuming boom proportions merely helped to accentuate the existing labor scarcity and to start contractors bidding against one another for the available workmen. The supply of workmen has been held inflexible by restricted immigration and in the face of an extraordinarily active demand wages have risen. Union officials were not long in appreciating fully the advantageous position in which they found themselves, and they began to exploit the situation assiduously. To say whether the bidding of the contractors or the demands of the unions have been the more responsible for present high wages is to attempt to name the blade of the shears which does the cutting. The fact is that wages are at their previous high levels as a result of these two forces. Other strikes and

more unreasonable demands may materialize, but public opinion, the lull in building activity, and the present downward trend in commodity prices are at the moment working to the disadvantage of labor. A recession in wages, if one does occur, will depend upon the development of these trends into ripe maturity. Such a contingency will take months to crystallize, and there is nothing in the immediate future to indicate that labor costs are going to follow materials prices downward.

The demand for new building carries every indication that wages will lag and linger long before taking the downward step. Conservative architects are advising their clients to postpone all but urgent business until next year, for the Autumn months are not expected to bring much relief from these high labor costs. Much depends upon the trend of general business and general employment, and the architect should attentively watch developments in these lines. The present indications are that business will settle possibly a little lower, but still on a better than normal plane, and then continue at a fairly stabilized pace. The building industry pointedly hints at the same sort of a future. A recession in wages obviously cannot be of material character as long as employment remains at present levels, and as long as so much work remains to be done—unless, of course, cheaper labor is imported from abroad.

There are still memorials to be erected, and industrial and business structures to be built. Schools and churches are crowded, and clubs and social organizations are seeking new and more commodious lodgings. Residential building has not yet lost its urgent character in some sections, and will be generally active as long as rents hold doggedly to their present high levels. A recent survey conducted by the Department of Labor reveals the fact that housing is adequate in only 8 states; that an acute shortage exists in 9 others, and that conditions are described as improving in the remaining 31.

May's record building shows how stubbornly construction holds its high levels in the face of mounting costs. That alone is evidence of the wealth of demand back of the industry. May construction was the heaviest of any month on record, according to the F. W. Dodge reports, covering 27 Northwestern states. Building during that month

was almost 5 per cent ahead of May, 1922, the previous high record, and the first five months of this year have run about 13 per cent ahead of the same period a year ago. As long as these evidences of demand exist, they will militate against any material reduction in wages, provided the general industrial situation does not slump, and provided the bars raised by the present immigration law are not let down. If labor has any political foresight it would realize that it cannot afford to antagonize public opinion for fear of increasing its receptivity to an amended immigration law, and such a piece of legislation might turn the tide of wages and cripple the strength of the unions.

Rates of mortgage money have undergone no market change, generally speaking. Still, 6½ per cent money is more frequently encountered in some districts than it was several months ago, and bankers have not yet altered their rigid policies in regard to construction loans. They continue to refuse applications for loans on building of a speculative character, and they pass upon that construction only, which they feel will relieve an urgent situation. New applications are receiving increasingly critical scrutiny, and the owner is being compelled to provide his banker with more ample margins of safety. While money is in good supply to finance construction at a safe and reasonable cost, bankers are united in the stand that their and their depositors' funds are not to be used to finance boom-price building. The risk is both unattractive and unsafe, and their position can be seen to be an economically sound one.

Conservative opinion among architects seems to be that construction costs will not be easier until the Spring or early Summer of 1924, and they are advising clients to hold jobs in abeyance until then. Costs are still mounting, and they may continue to move upward for several months yet. *The Engineering News-Record's* index on June 1 was 221 (1913 equalling 100). This represents a rise of about 35 per cent since March, 1922, and the present level is only about 20 per cent below the record high, 274, established June, 1920. The peak of building and construction for this year is impending, if it hasn't already occurred, and costs will probably linger high for some months after the curve of volume has turned downward.

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OUTLINE OF TENTATIVE SPECIFICATIONS FOR TRAVELING GRATE STOKER

(The form of this Bulletin conforms to the arrangement of Elements of a Specification as given in Bulletin No. 5, ANALYSIS OF A SPECIFICATION, revised January 20, 1923.)

I. CONTRACT AND LEGAL

1. Parties:
2. Drawings:
3. Agreement:
4. Terms of Payment:
5. General Conditions:
6. Regulations and Codes:
7. Standards:

II. ECONOMIC

8. Patents:

SCOPE OF CONTRACT:

9. Work Included:
10. Work not Included:
11. Methods:
12. Basis:
13. Form of Bids:
14. Conditional Payments:

III. GENERAL DESCRIPTIVE

15. Characteristics:

SERVICE CONDITIONS:

16. Location of Stokers:
17. Shipping Instructions:
18. Visiting Site:
19. Working Facilities:
20. Ultimate Requirements:

IV. PRELIMINARY PREPARATION

21. Field Measurements:
22. Shop Drawings:
23. Samples:

V. MATERIALS

24. Properties, Chemical and Physical:
25. Sizes, Weights, Gauges:
26. Quantities:

VI. DESIGN AND CONSTRUCTION

27. Shop Work:
28. Stoker:
29. Grates:
30. Stoker Frame:
31. Stoker Hopper:
32. Stoker Rails:
33. Floor Sleeves:
34. Shafting, Hangers, Belts, etc.:
35. Special Tile Arch:
36. Fire Clay:
37. Water Backs:
38. Stoker Engine:
39. Engine Accessories:
40. Stoker Motor:

41. Motor Starter:
42. Foundation:
43. Electric Wiring Conduit:
44. Piping:
45. Furnace and Boiler Tools:

FIELD WORK:

46. Erection:
47. Finish:
48. Protection of Work:
49. Co-operation with Other Contractors:

VII. SCHEDULES

50. Shop Production:
51. Field Operations:
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VIII. RESULTS

53. Inspection and Performance:
54. Guarantees:
55. Tests:
56. Rejection:

CURRENT NEWS

Columbia Graduate Wins Prix de Rome

THE Prix de Rome, which carries an award of \$1,000 a year for three years and study at the American Academy in Rome, has been won by Arthur F. Deam of Springfield, Ohio. He is a graduate of the School of Architecture of Columbia University, New York, and of Ohio State University, Columbus.

Seven men were selected to compete for the prize, and they were allowed three weeks to complete their drawings. Deam was adjudged the winner by the jury composed of Breck Trowbridge, William M. Kendall, Charles A. Platt, Henry Bacon and William A. Delano.

Honorable mention was awarded to Fritz Stephens of New York, William Douglas of New London, Conn., and Paul F. Simpson of Pittsburgh.

New York Architect Wins Prize for Design of K. of C. Clubhouse

AS a result of a competition conducted in New York City by the Knights of Columbus for the selection of an architect to design its New York Chapter clubhouse at the Southeast corner of Eighth Avenue and Fifty-first Street, the jury of award recently announced that the first prize had been awarded to Edward F. Fanning of 522 Fifth Avenue, a native New Yorker and a Columbia graduate.

The award carries with it the commission to design and supervise the construction of the building. The building is to be twelve stories, 100 by 150 feet, the exterior walls being of granite, limestone and brick.

The clubhouse will have an auditorium on the ground floor seating 1,700 persons.

On two mezzanine floors, running parallel with Eighth Avenue, and included in the height of the auditorium, will be council chambers, executive offices, coat rooms, etc. Leading from the upper

of these mezzanine floors will be a stone staircase connecting with the club floor above, which will contain a lounge, dining rooms, smoking, billiard and card rooms.

Above the club floor will be eight bedroom floors, with all modern hotel accommodations. On the top floor have been placed the gymnasium, swimming pool and necessary locker and shower facilities.

The approximate cost of the project, on which it is proposed to start construction immediately, will be \$1,650,000.

Yale and Union to Teach Building Construction

THROUGH gifts from the trustees of the Louis J. and Mary E. Horowitz Foundation, courses in building construction have been established at Yale University, New Haven, and Union College, Schenectady. The organization in charge of the course will be known as the Thompson-Starrett Foundation.

The Thompson-Starrett Company offers to provide two annual prizes of \$2,500 each to be awarded each year to graduates of the course who shall commend themselves by the quality of their work and by their promise as practical building constructors, and who desire to connect themselves with the Thompson-Starrett Company for practical training in their chosen calling.

The course in building construction is to be offered as a development of the civil engineering course, rather than an appendage to a course in architecture. This move is made upon the theory that building construction is looked upon more as a profession in itself than subordinate to architecture.

In proposing the establishment of such a course and undertaking to support it, the purpose in view was to supply a number of technically trained and educated men to perfect the capacity and

work of the constructor with the hope that building construction would become a profession as dignified as architecture, and on a parity with it. In establishing the courses the donors do not propose to diminish the importance of the architect or exalt that of the constructor, but to recognize the trend of events and the conditions existing in the building industry and to make every effort to meet them to the satisfaction of the public.

West Virginia Chapter, A. I. A., Organized

THE West Virginia Chapter of The American Institute of Architects was recently organized in Charleston, W. Va., with sixteen charter members, including the following officers: President, Jas. L. Montgomery, Charleston; First Vice President, Elmer F. Jacobs, Morgantown; and Secretary-Treasurer, L. G. Tucker, Charleston.

West Virginia also has a License and Registration Law which has been in effect two years, and was enacted through the efforts of the West Virginia State Society of Architects. The present officers of the Society are: President, H. Russ Warne, Charleston; First Vice President, J. C. Burchinal, Fairmont; Second Vice President, E. J. Wood, Clarksburg; and Secretary-Treasurer, Carl Reger, Morgantown.

Jersey Forms Building Congress

THE New Jersey Building Congress, which will seek amicable settlement of disputes in the building trades, was recently organized at Newark at a meeting of a committee of sixty employers from various parts of the State at the Essex Club.

Appointed Head of the Department of Architecture, Carnegie Institute of Technology

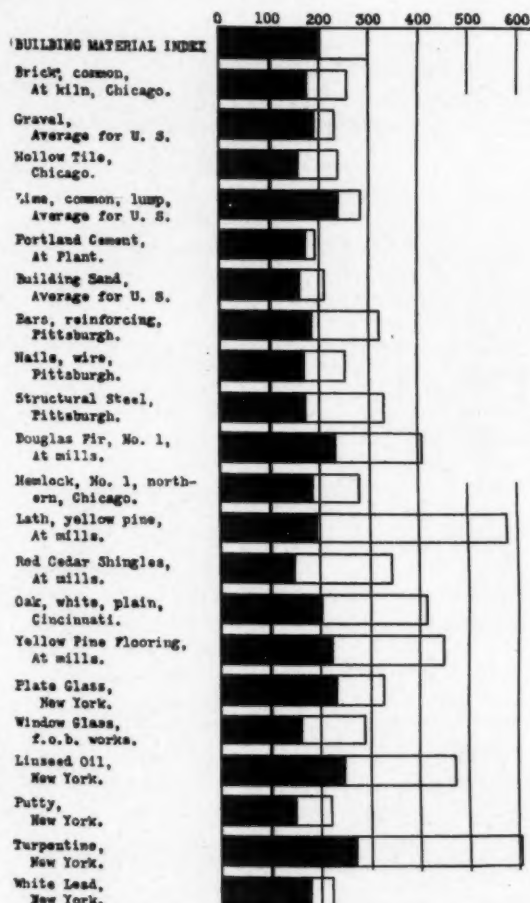
HENRY K. McGOODWIN, A. I. A., was recently appointed Head of the Department of Architecture, and Chairman of the faculty of the College of Fine Arts, at Carnegie Institute of Technology, Pittsburgh, to assume his duties with the next college year. In his twofold capacity, Mr. McGoodwin will succeed Professor Harry Sternfeld, Acting Head of the Architectural Department, and E. Raymond Bossange, Director of the College of Fine Arts, both of whom have resigned. Incidentally, Mr. McGoodwin's choice is a reappointment, as he was Acting Dean of the College of Fine Arts, and Head of the Department of Architecture when he left the institution five years ago.

Professor Sternfeld leaves Carnegie Tech after ten years of service to accept an appointment as Professor of Architecture at Pennsylvania. Director Bossange goes to Princeton University as Head of the Department of Architecture.

Wholesale Prices of Building Materials Bureau of Labor Statistics Figures

Maximum Price Level.
Price Level May 1923.

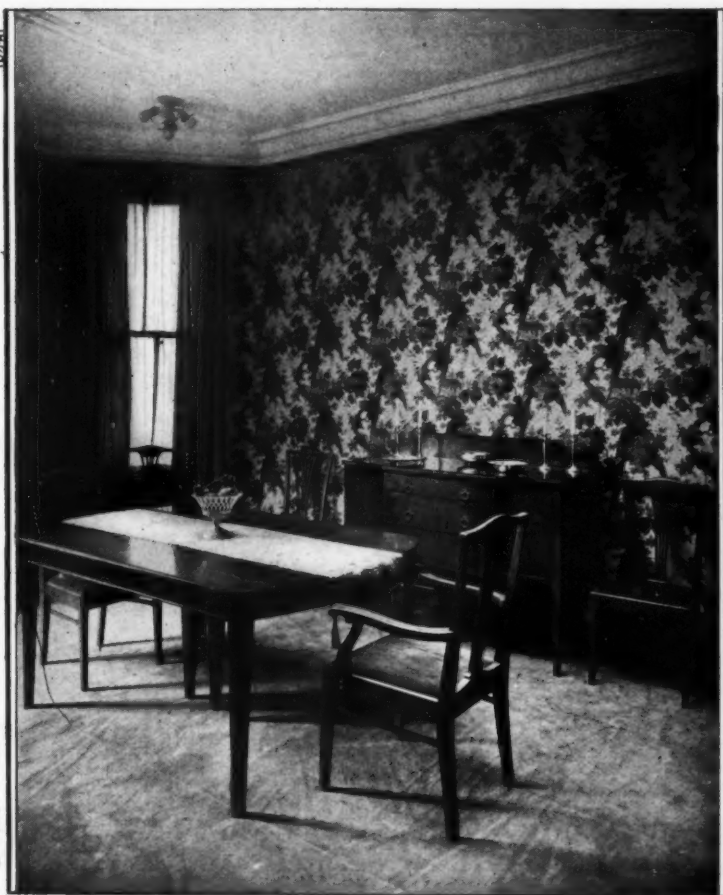
1913 AVERAGE PRICE = 100



COMMODITY	INDEX NUMBERS				
	At Peak	March 1923	April 1923	May 1923	
	Date	Index	Index	Index	Index
Building material index	Apr. 1920	299.7	197.6	204.3	201.5
Brick, common, at kiln, Chicago	Oct. 1920	251.1	175.2	176.0	*
Gravel, average for U.S.	Jan. 1921	233.7	196.2	191.4	192.3
Hollow tile, Chicago	June 1920	234.9	105.3	105.3	161.3
Lime, common, lump, average for U.S.	Oct. 1920	284.0	232.1	232.9	240.6
Portland cement, at plant	Sept. 1920	192.9	173.1	173.1	173.1
Building Sand, average for U.S.	Jan. 1921	209.6	167.2	163.7	164.9
Bars, reinforcing, Pittsburgh	July 1917	327.1	145.4	145.4	167.2
Nails, wire, Pittsburgh	Jan. 1920	252.9	160.8	166.3	170.4
Structural steel, Pittsburgh	June 1917	331.0	145.7	172.1	173.8
Douglas fir, No. 1, at mills	Jan. 1920	407.3	233.5	233.5	233.5
Hemlock, No. 1, northern, Chicago	Mar. 1920	282.1	163.8	167.4	167.4
Lath, yellow pine, at mills	Feb. 1920	242.0	197.7	199.3	198.7
Red Cedar Shingles, at mills	Feb. 1920	246.8	173.9	166.3	151.5
Oak, white, plain, Cincinnati	Mar. 1920	419.0	216.3	216.3	202.7
Yellow pine flooring, at mills	Feb. 1920	453.3	229.9	232.4	234.4
Plate glass, New York	Aug. 1920	329.5	185.9	232.4	232.4
Window glass, f.o.b. works	Aug. 1918	295.2	162.7	162.7	162.7
Linseed oil, New York	Aug. 1919	480.4	220.7	251.0	248.3
Putty, New York	Jan. 1920	224.4	162.3	150.9	150.9
Turpentine, New York	Apr. 1920	401.6	361.6	356.1	272.7
White lead, New York	Mar. 1920	229.3	181.2	181.2	181.2

*Brick, common, at kiln, Chicago is as of April.

Chart prepared by Department of Commerce, Division of Building and Housing of Bureau of Standards.



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of the United States

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NEW YORK



Alfred Granger Re-elected President

AT the recent annual meeting of the Chicago Chapter of The American Institute of Architects, Mr. Alfred Granger was unanimously re-elected President.

Tests of Flooring Materials

THE American Hospital Association Committee on Floors is this year continuing its study on the subject of floors, and solicits samples for testing, these tests to be made the basis of a further report to the annual meeting of the Association. Particulars may be obtained by writing the Chairman, Frank E. Chapman, 1800 East 105th Street, Cleveland, Ohio. The committee consists of Doctor Thomas Howell, New York Hospital, New York City; Doctor Charles E. Young, Hospital of the Good Shepherd, Syracuse, New York; Mr. Charles F. Owsley, Architect, Cleveland and Youngstown, Ohio; Mr. J. W. McBurney, Engineer of Tests, Board of Education, Cleveland, Ohio, and the Chairman.

MacNeil Wins Saltus Medal

HERMON A. MACNEIL, sculptor, President of the National Sculpture Society, recently received the J. Sanford Saltus medal. The award is made annually "for signal achievement in the art of the medal."

MacNeil designed the newest twenty-five cent piece, the Architectural League medal and the Pan-American Exposition medal. The presentation was made by A. A. Weinman, Chairman of the Committee on Award. Mr. Weinman took the first Saltus medal five years ago.

Architectural Club of New Haven

AT a recent meeting of the Architectural Club of New Haven, Leo R. Hammond was unanimously elected secretary of the club in place of Philip Sellers, resigned.

Former Home of Milton

A DEALER in antiques recently bought the house Milton once lived in, just a few days before it was to be torn down. The house, a Jacobean relic, is in a part of London called Little France, Westminster. An extension of the famous Wellington Barracks was about to claim the historic place along with many others in the same block. Now, reports have it, it is to be preserved.

Alfred Noble Fountain Planned by Engineers

A FOUNTAIN to the memory of Alfred Noble, New York City engineer, who died in 1914, was recently announced to be the goal of a

\$100,000 campaign being conducted among members of the engineering profession. The campaign is being run by the American Society of Civil Engineers. The fountain is to be erected in Rawlins Square, Washington. Alfred Noble engaged in many great engineering feats, including work in the East River tubes of the Pennsylvania Railroad.

Predict a Timber Famine

FORESTRY experts in many lands fear a world timber famine before many years pass, according to the British Forestry Commissioners, who say that the results of such a famine will be more disastrous to the United Kingdom than to any other country. The virgin forests are being used up far more rapidly than had been supposed.

Many other countries in Europe fear such a famine, and the commissioners urge that measures be taken at once to meet the situation. They are taking steps to ascertain what reserves of coniferous timber are available and how long they are likely to last; but foresters say there can be little doubt that in the near future the British Government will have to choose between resuming the extensive planting program adopted by Parliament at the close of the war and running the risks of deforestation.

The commission urges the people to take a broad view of forestry problems, pointing out that the reasons which make necessary the maintenance of the Forestry Commission are not merely local, but arise from world-wide conditions.

Rents in Ancient Rome

THE housing question seems to have been acute at times in ancient Rome, and disputes between landlords and tenants frequent. Researches show that in about 150 B. C. a Senator of Rome appealed to the courts against his landlord, who had demanded of him 6,000 sesterces a year—say \$300—for a house which had been rented at only half that sum. Apparently rents were much lower in those days.

Cæsar, long famous for his wealth, made much of his fortune through the building of houses which he rented by the year. He had trouble with the courts when he tried to make a Conscript Father pay 15,000 sesterces for an elegant bachelor's apartment. Against these abuses Cæsar promulgated a law according to which landlords could never exact more than 2,000 sesterces or \$100 a year for villas in Rome or more than 500 sesterces or \$25 in the rest of the country.



LEWIS-CLARK HOTEL, Lewiston, Idaho: Kirtland Cutter, Spokane, Architect; Hucker & Co., Spokane, Jobbers; Jas. Smythe Plumbing & Heating Co., Spokane, Plumbers; Hurley-Mason, Spokane, Contractors

KOHLER

And the LEWIS-CLARK HOTEL

The new Lewis-Clark Hotel, Lewiston, Idaho, stands near a spot memorable in the history of the adventurous expedition of Captain Meriwether Lewis and William Clark over a century ago.

Here is a fine and interesting hotel—worthy to bear the two great names which are forever linked with the development of the Northwest Territory. Particularly impressive is the Victory Room with its arcaded aisles and clerestory lighting, and its decorations recalling the spirit both of the pioneer days and the World War.

The observing guest of the Lewis-Clark Hotel will remark a telling sign of a project carried out on a consistently high plane—the name “KOHLER” in the enamel of the plumbing fixtures.

Kohler “Viceroy” built-in baths, Kohler lavatories, and various other Kohler fixtures, 234 in all, are numbered in this installation.

KOHLER

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

KOHLER OF KOHLER

Kohler Co., Founded 1873, Kohler, Wisconsin
Shipping Point, Sheboygan, Wisconsin

BRANCHES IN PRINCIPAL CITIES

MANUFACTURERS OF ENAMELED PLUMBING WARE AND KOHLER AUTOMATIC POWER AND LIGHT 110 VOLT D. C.

PERSONALS

George E. Pitcher and Son, architects, have moved their offices from 65 Broadway to 108 Broadway, Norwich, Conn.

Thomas Franklin Power, architect, has removed his offices from 308 Tajo Building to 2615 W. Seventh Street, Los Angeles, Cal.

A. S. Nibecker, Jr., and W. L. Risley, architects, have moved their offices from 421 to 625 Washington Building, Los Angeles, Cal.

Voss & Lauritzen, architects, announce the removal of their office from 65 DeKalb Avenue to 308 Livingston Street, Brooklyn, N. Y.

Phillips & Needham, architects, have moved their offices from the Grosse Building to the Ferguson Building, 307 S. Hill Street, Los Angeles, Cal.

Marston, Van Pelt & Maybury, architects, are now located in their new offices occupying the entire second floor at 25 S. Euclid Avenue, Pasadena, Cal.

Lane, Davenport & Peterson, architects, are now occupying their new offices at 1017 Charlevoix Building, Park Boulevard and Elizabeth Street, Detroit, Mich.

Charles M. Hart, architect, announces the removal of his offices from 331 Madison Avenue to the Park-Lexington Building, 247 Park Avenue, New York City.

Raphael A. Nicolais, architect, announces the removal of his offices from the Fort Worth National Bank Building to Suite 2106, F. & M. Bank Building, Fort Worth, Texas.

Arthur W. Angel, architect, has moved his offices to 2136 East First Street, Los Angeles, Cal. Mr. Angel was formerly located in the H. W. Hellman Building, that city.

E. R. B. and Allan E. Chapman, is the new firm name of architects with offices at 101 Tremont Street, Boston, Mass. The firm was heretofore known as E. R. B. Chapman, architect.

Samuel B. Birds, architect and engineer, who has recently been granted a certificate to practice in California, has opened an office at 305 Citizens National Bank Building, Los Angeles, Cal.

Charles Morris and Joseph L. Weinberg, architects, have formed a partnership for the general practice of architecture under the firm name of Morris & Weinberg, 3226 Euclid Avenue, Cleveland, Ohio.

It is announced that John C. Austin and Frederick Ashley, architects, have opened a branch office at 410 Hollywood Security Bank Building, Cahuenga Avenue and Hollywood Boulevard, Los Angeles, Cal.

Willis C. Huson, formerly with Louis C. Mullgardt, architect, has opened an office for the general practice of architecture in the Chronicle Building, San Francisco, Cal. Manufacturers' catalogs and samples are requested.

Announcement is made that Lawrence S. Funke, architect, has opened an office for the practice of architecture at 707 Haas & Howell Building, Atlanta, Georgia. Manufacturers' catalogs and samples will be appreciated.

It is announced that Ervin T. Smith, architect, has opened an office at 224½ West Main Street, Alhambra, Cal., where he will engage in the general practice of architecture. Manufacturers are requested to send catalogs and samples.

The Owsley Company, architects, announce the removal of their Youngstown office and studio from the Mahoning Bank Building to 669 Wick Avenue, Youngstown, Ohio. The Cleveland, Ohio, address of this firm remains the same, namely, 807 Cuyahoga Building.

The Hongkong Realty & Trust Company, Ltd., has opened an architectural department in the Powells Building, Hongkong, China. This company is anxious to obtain samples and catalogs of building materials; also any new products or appliances suitable for the latest type of hotels or office buildings.

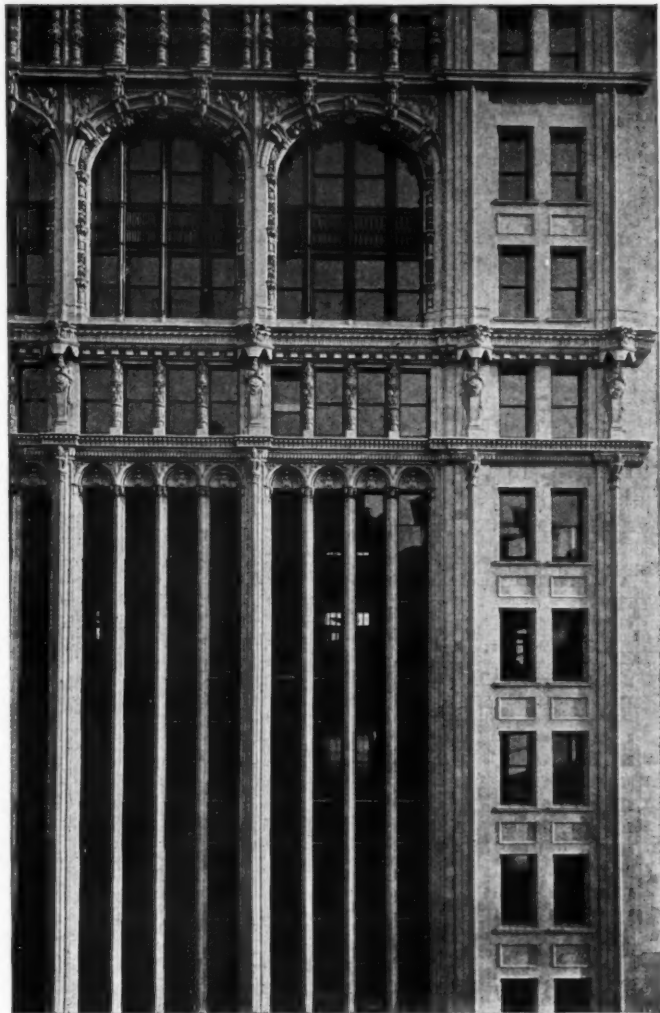
The firm of Spencer & Powers, architects, has dissolved the partnership formed in 1905, Horace S. Powers having become junior partner at Lansing, Mich., in the Warren S. Holmes-Powers Company. Robert C. Spencer will succeed to the practice of the firm of Spencer & Powers at their old location in the Tacoma Building, 5 North La Salle Street, Chicago, Ill., under his own name.

For the Monumental Building

AS the logical facing material for the steel frame skyscraper terra cotta is unsurpassed by any existing material.

For appropriately clothing this form of construction terra cotta meets every requirement of scale demanded by sincere organic design. To the monumental structure terra cotta also brings possibilities in color for emphasizing effects of scale, form and proportion which are presented by no other enduring medium.

Literature pertaining to color and proper construction in terra cotta for permanence will be sent on request. Address **National Terra Cotta Society**, 19 West 44th Street, New York City.



DETAIL of terra cotta facade, Emmett Building, Madison Avenue and 29th Street, New York City.

*J. Stewart Barney and
Stockton B. Colt,
Architects.*

TERRA COTTA

Permanent

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BOOK NOTES

The Architecture of Tuscany

THE history of Tuscany is that of a political pawn. The Etrurians or Tuscans were the earliest inhabitants known to history. First possessed by the Ostrogoths, then by the Emperors of Constantinople and later the Lombards, Germany in the twelfth century set up a claim for this territory and finally Italy possessed and today holds it.

Pre-eminent in the arts, the architectural development of Tuscany has been one of such unusual interest as to focus the attention of students for many centuries. Its artistic and architectural remains are many and their illustration and description have been the motives for the publication of many works. The most recent that has come to our attention is the *Details of the Architecture of Tuscany*. These to the extent of more than a hundred plates have been selected, and grouped for publication by the joint efforts of Mr. Eberlein and Mr. Oliver Reagan. The former has supplied the photographs and the text, while the latter contributed the measured drawings. Here we have old wine in new bottles. This work carries forward traditional methods of presenting to architectural students material that is worthy of the most serious consideration.

Details of the Architecture of Tuscany. By Harold Donaldson Eberlein and Oliver Reagan. More than 100 plates, size 11 x 14 in. In portfolio form, price \$12.50; if bound in cloth, \$15.00. New York, William Helburn, Inc.

The Revised Georgian Period

IF any member of the architectural profession is sceptical as to the value of *The Georgian Period*, the classic work of Colonial architecture in this country, let him try to find and purchase a copy of the original edition. Such a copy may only be had, if at all, at a price that puts the work at once into the class of rare books.

The work is a monument to the rare ability and scholarly attainments of William Rotch Ware, who in 1876 founded *THE AMERICAN ARCHITECT* and later began and finally completed *The Georgian Period*. Probably no work intended to cover a specific field was ever more exhaustively or better done as to the choice of subjects and their description. Men who are today high in the architectural field, searched for and found the many splendid examples, measured and drew them and wrote descriptions whose literary merit are not the least important contributions to this work.

This classical work has gone through many editions, and is now republished in a form that better

adapts it to its purposes of greatest value. In the old work the only criticism that could be made was of matters of arrangement of plates and the indexing of plates and text. With the exception of the addition of a small number of plates of subjects not included in the former editions, *The Georgian Period* is practically unchanged. The new arrangement under the editorship of Charles S. Keefe is admirable. Every building, all of its details, and every article may readily be found. This measurably increases the value of the book to the architectural draftsman and gives the student of history the very help he needs in the chronological sequence of his studies. In short, the revision of this valuable work has been carried forward as it should have been, with respect for the work of those who first conceived and carried it to execution.

The architectural reader may accept the assurance that in possessing this work he has the very best description, both written and graphic, that has ever been attempted in any phase of our architectural history.

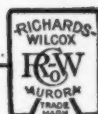
The work in its new form consists of six portfolios, as compared with the original form of twelve. The first portfolio is all text and with leaves bound in. The remaining five, consisting of plates, have loose leaves, facilitating their use in the drafting room.

Of course, the work is standard and no architectural library may be considered complete without it.

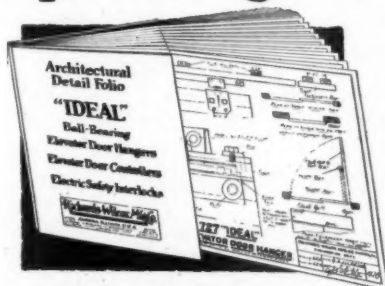
The Georgian Period. Being photographs and measured drawings of Colonial work, with text. By William Rotch Ware. 1923 edition with new classifications and indexes. Six portfolios, full bound; size 10 x 14 inches. New York U. P. C. Book Co., Inc. Price \$60.00.

Acoustics of Buildings

THERE is a great deal of confused thinking pertaining to the subject of sound and its relationship to things with which it comes in contact. This is caused by the lack of literature and a general study of the subject. It is, however, one of the most important things which confront the designer of buildings because it so vitally affects the use of buildings. A building may be beautiful and structurally correct but its usability is the true indication of its success. Sound in its various phases, is as important as light, heat or any other condition that affects the occupant. Architects and owners are becoming impressed with the necessity for giving careful consideration to this subject. Even if the solution of the problem is left to the engineer, the architect should have technical knowledge of the subject so as to enable him properly to consider it when making the pre-



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liminary layouts and studies. Such knowledge would avoid costly alterations that are made after the building is practically completed, to correct acoustical defects.

Professor Watson's book is broad in its scope and covers the theoretical and practical phases of the subject. The principles involved are few and very clearly explained. The working formulae are reduced to the most simple factors and easily applied. It is not a mere digest of existing literature. It contains the results of the author's experimental investigations and practical applications to existing buildings. It is up-to-date and describes conditions in buildings completed within the year.

The book consists of three parts, thirteen chapters and an appendix. The illustrations are adequate and especially applicable to the text. The tables of coefficients and variables and graphic diagrams are complete and serviceable. The writing is direct and concise. It is not only a valuable addition to the library of the architect and engineer, but is a readable book for those interested in physical science.

Acoustics of Buildings, by F. R. Watson, Professor of Experimental Physics, University of Illinois. 155 pages, illustrated, 6x9. John Wiley & Sons, Inc., New York. Price \$3.00.

Automatic Sprinkler Protection

THIS booklet is a supplement to the second edition of a book of the same name and by the same author. It contains a full description of new sprinkler devices that have been placed on the market since 1919, as well as several that will probably be put on the market in the near future. Future copies of the current edition of Automatic Sprinkler Protection will contain this supplement.

Automatic Sprinkler Protection, Supplement to Second Edition. By Gorham Dana. 41 pages, illustrated, 5 1/4 x 8. John Wiley & Sons, Inc., New York City. Price 50 cents.

Georgian Interiors and Details

LONDON houses of the late Georgian period have been sharply criticized. That they lacked in their architectural expression the brilliancy of those of an earlier period was conceded. But, if the exteriors of the late Georgian houses were sufficiently repellent to warrant their being looked at askance, their interiors were so fine, so delicately beautiful in many instances as entirely to redeem the exteriors.

Craftsmanship wherever found in its best development is always worthy of exploitation. There can be no doubt that many interiors that

had their origin during the Georgian period are so fine in their workmanship that they enhance to the highest degree the work of the architects who originated them. We need in this country today more and better craftsmen. There is perhaps noticeable a slow growth toward better conditions, but not sufficiently fast to keep pace with the demand.

Architects in England during the eighteenth century suffered no handicaps of this nature. They were free to give the fullest expression in design. The excellent series of interiors presented in *Small Houses of the Georgian Period* show in a splendid way the value of good co-operation. This book has the finest suggestive value and is to be strongly commended.

Small Houses of the Late Georgian Period, 1750-1820, Vol. II, Details and Interiors. Fifty photographic reproductions, six 9x12 1/2 inches. Full cloth. Price \$10.00. New York, William Helburn, Inc.

A Symbol of Safety

THE insurance companies accept the approvals of the Underwriters' Laboratories, Inc., and base premium rates accordingly. In order to secure favorable rates for their clients, architects specify devices and forms of construction which bear approval as evidenced by a label attached thereto.

The manner of conducting these various tests and the apparatus and equipment used have never been made readily accessible to those interested. This book describes in an extremely readable and moderately technical manner the methods employed by the Underwriters' Laboratories, Inc., in their work. It cannot fail to be instructive to any person who is at all interested in the determination of the physical and mechanical properties of things used for fire prevention and safety. It is only by reading this book or by visiting the Laboratories that one can gain a comprehensive knowledge of the scope of these undertakings.

By reading this book, architects and engineers will have a better appreciation of the qualities of approved and labeled devices and materials and a greater respect for those engineers who have devoted themselves to the task of correctly determining and measuring qualities and characteristics—all of which has resulted in a vast improvement in the standard of the articles and materials which they inspect.

This publication is divided into 18 chapters, 13 appendices and index.

A Symbol of Safety. By Harry Chase Brearley. 290 pages, illustrated, 6x9. Doubleday, Page & Company, Garden City, N. Y. Price \$2.50.



LADY CHAPEL, LIVERPOOL CATHEDRAL, ENGLAND

G. G. SCOTT, R. A., ARCHITECT

See Article, Daylight in Buildings

(From *Modern English Churches*)

THE AMERICAN ARCHITECT