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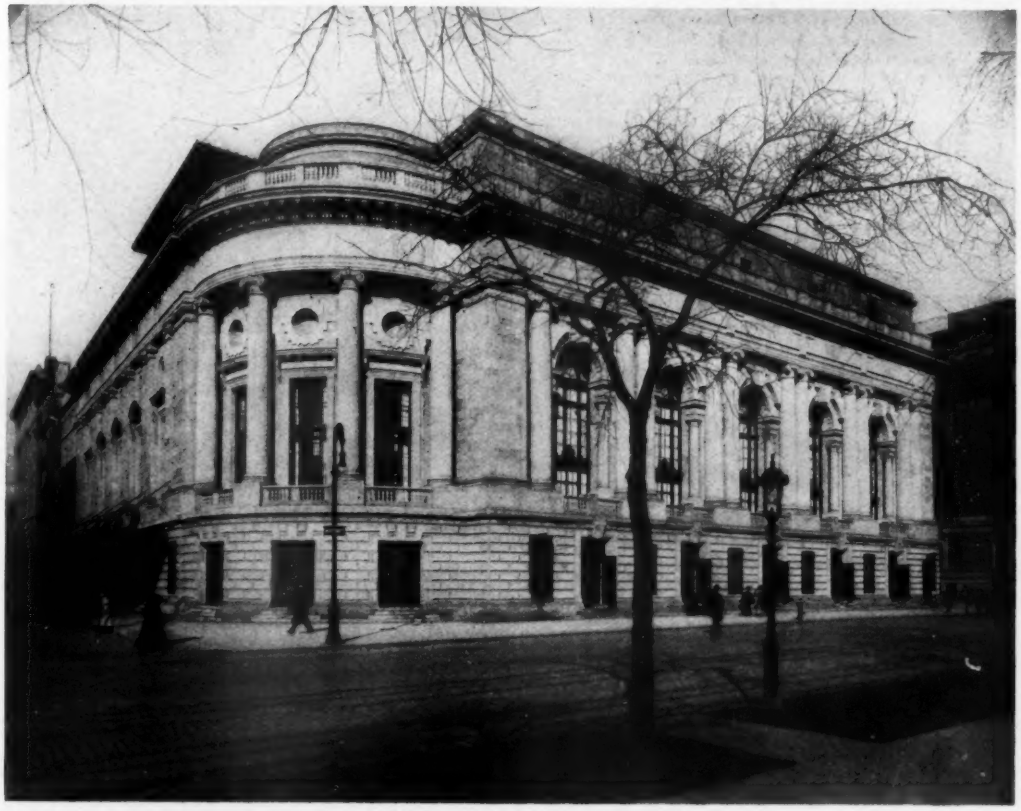

Fig. 2. The Century (New) Theater, New York
Carrere & Hastings, Architects

DESIGN AND CONSTRUCTION OF THEATERS*

BY ROI L. MORIN

THE theater today is in a state of revolutionary transition unparalleled in its history. The change which the theater is undergoing seems scarcely perceptible to its contemporaries, but if we draw comparison with the high-lights of the stage, the Attic theater, the Elizabethan stage and the age of Moliere, the movement which began hardly thirty years ago in Europe appears to have grown rapidly and to astonishing proportions. This movement, which will be hereinafter termed the "modern" movement originated partly in the development of a conventional, intellectual and sociological type of drama, but more especially in the growth of a new stagecraft in revolt against the absurd and vulgar daubing which passed for scenic art during the 19th century.

The movement began amongst the dramatists, of which Ibsen is one of the earliest prototypes, in the creation and refinement of the realistic drama into a conventional form in which the en-

*In this series of articles it is the intention of the author to confine the discussion for the most part, to the type of theater which the Germans designate as a Schauspielhaus, and is here called a "legitimate" house, i.e., a playhouse of the spoken drama.

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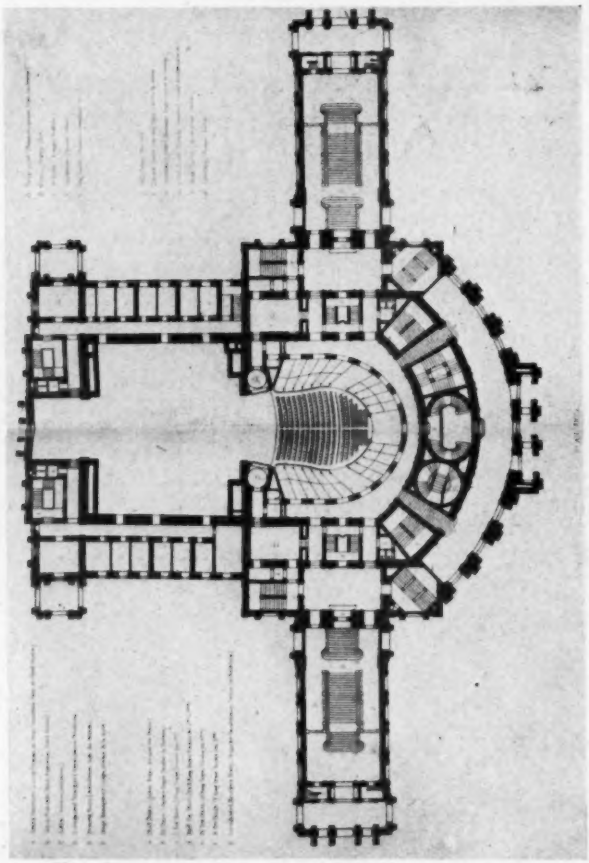

Fig. 3A. Court Theater, Vienna
(From Sach's Modern Theaters and Opera Houses)

THE THEATER OF YESTERDAY
HORSESHOE TYPE

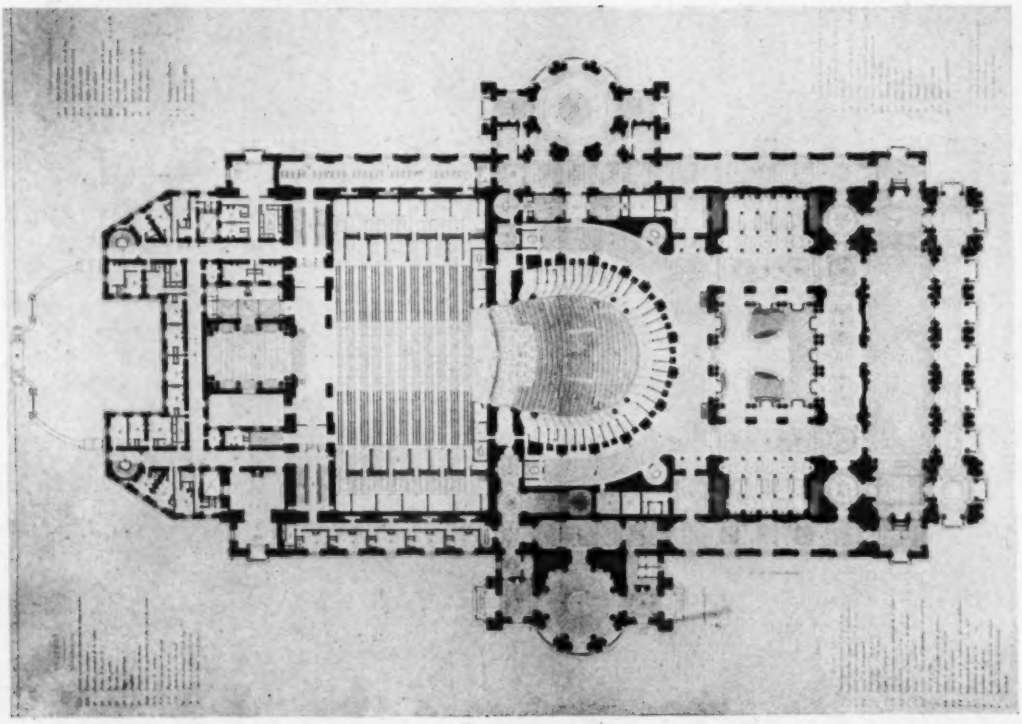

Fig. 3B. The Paris Opera House
(From Charles Garnier's Monograph)

tire action was so arranged, or distorted, to take place in four, three or even one location. This drama had for its intellectual content the problems which confronted the people of the day, and was destined to oust, on the one hand, the cheap melodrama which was then current, and, on the other, the elaborate revivals of Shakespeare and Sheridan.

The old type of drama was associated with hanging borders for both interior and exterior

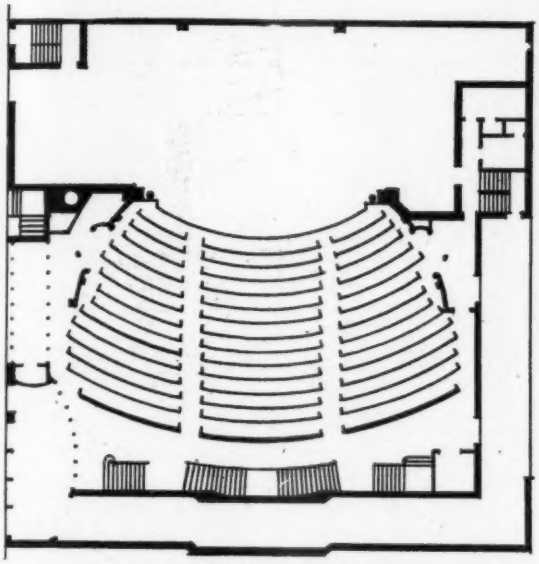

Fig. 3C. The Music Box Theater, New York

THE THEATER OF TODAY

FAN SHAPE

sets, the light canvas wings thrust out on each side parallel to the footlights, the painted mountain backdrops that fluttered whenever a breeze blew in through the loading door and the "palace" or "drawing room" interior that swayed and occasionally collapsed when a forgetful actor slammed a door. The new drama brought with it the built-up architectural sets, the revolving and wagon stages, the "horizont" or sky-domes and an entirely new system of stage lighting.

The creation of these new scientific devices of stage mechanics developed a new corps of men in the theater known as scenic artists and stage engineers. The former were recruited, in a large measure, from easel artists who became vitally interested in the stage, the latter from stage mechanics who made the study and invention of new devices and more flexible stage machinery their life work. Foremost among the former is Edward Gordon Craig, an Englishman, who has the widest and strongest influence in modern scene design, (fully half of the new sets on Broadway show his influence) and among the latter is Lautenschlager, inventor of the revolving stage and Fortuny, the inventor of the lighting system which bears his name.

These inventions and developments in stage machinery completely changed the layout and design of the building which housed them. The old stages, of which the Paris Opera House and the Vienna Court Theater are excellent examples, were deep and only twice as wide as the proscenium opening, whereas the new stages, of which the Dresden Court Theater and Reinhardt's

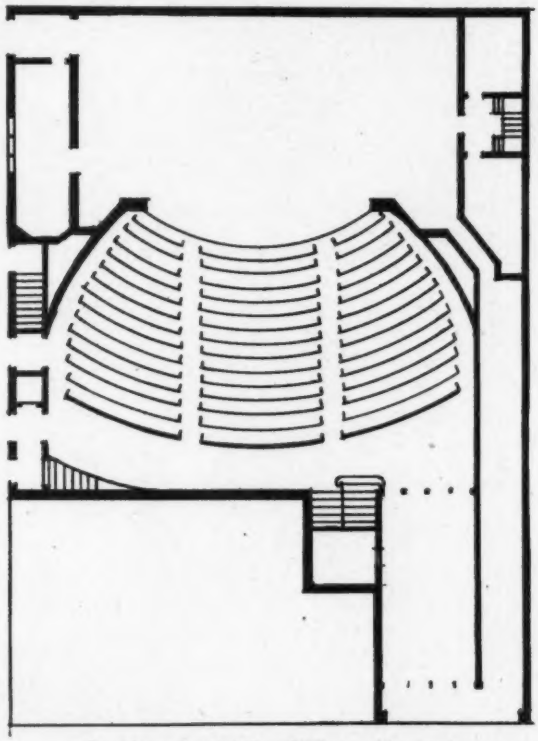

Fig. 3D. The Earl Carroll Theater, New York

THE THEATER OF TODAY

FAN SHAPE

Grosses Schauspielhaus in Berlin are examples, are much wider and revised to enclose the sky-dome.

The rise of the democratic dogma and the development of modern science and safety legislation have affected the auditorium side no less. The horrible disasters of theater fires and panics have caused to be enacted laws to protect the people and to make public auditoriums as fireproof as possible. Social conditions have changed the old "horseshoe" and tiers-of-boxes type of auditorium of the 18th century to the comfortable, small, fan-shaped auditorium of today. The theaters of yesterday had four, five and sometimes six tiers of seats whereas today even the second balcony has disappeared. In the latest types of intimate theaters in Germany the first balcony is

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eliminated and the parquet floor is strongly "raked" in a single, unified bank of seats after the manner of the old Greek theaters.

All this has taken place in the past thirty years, and has completely antiquated most of our older

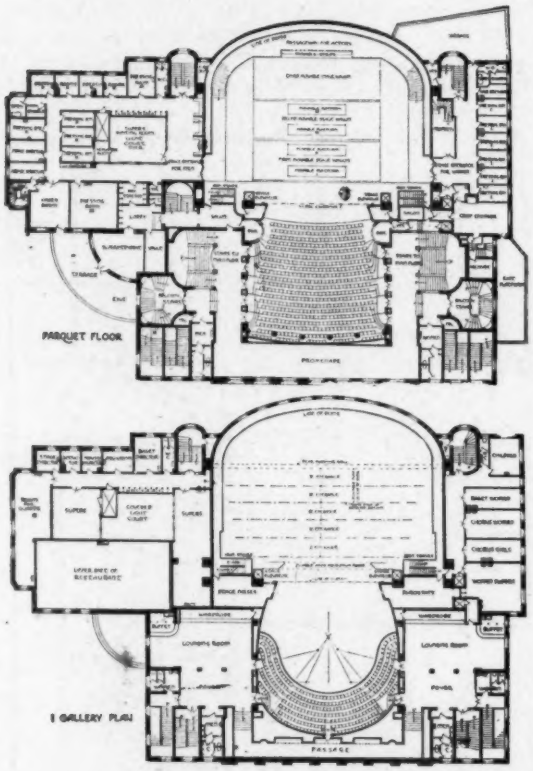


Fig. 3E. The Court Theater, Dresden

THE THEATER OF TOMORROW

theaters. In 1859, Joseph de Fillipi, a French theater specialist, in preparing a monumental treatise on the subject of theater design, wrote of the "Teatro de La Scala" in Milan, designed by an Italian architect in 1774, in these words, "Le théâtre de La Scala, construit en 1774, presente, nous ne craignons pas le dire, le meilleur modele que nous ayons encore ..... depuis Piermarini (the architect) l'art de construire les theatres na pas fait de progres essentiels." Match such an absurdity today; a theater over seventy-five years of age standing as a model in design!* The modern drama and the development of scenic art, together with modern social conditions, have so completely changed the physical aspect of theater buildings, that today a structure thirty years old is so completely out of date as to be impracticable to use except for the most banal productions.

*I am aware that the decrepit, old La Scala has been remodeled and is still doing service today, but principally as an opera house, and opera is not as keenly alive nor as vigorous an art as that of the theater.

A THEATER is sub-divided into two distinct and separate institutions, the auditorium, which is a playhouse, and the stage, a workshop. These two I will take up separately, the stage first and with greater emphasis as this side of theater design is sadly neglected by native architects.

A stage is primarily a place where a set, picture, illusion or what-not is created, presented before an audience and withdrawn to make way

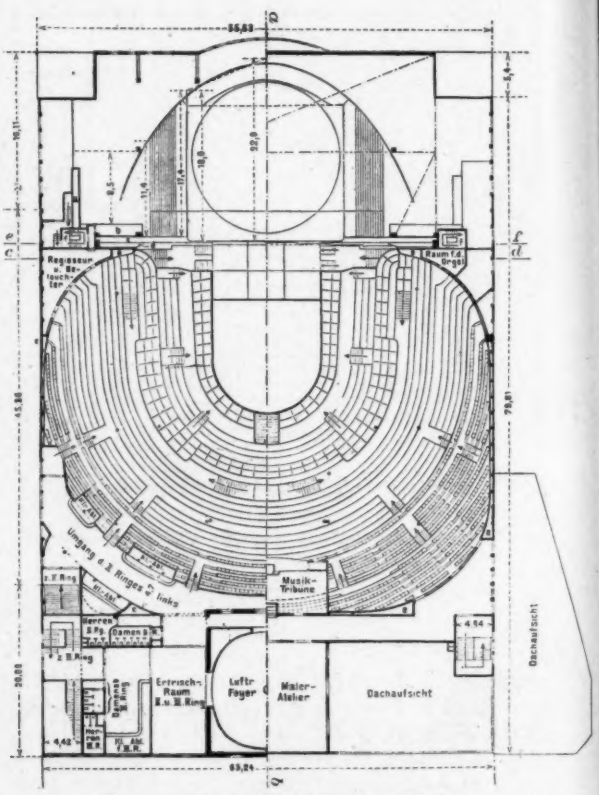


Fig. 3F. The Grosses Schauspielhaus, Berlin

THE THEATER OF TOMORROW

for another. *Though it may seek to present things as realistically as possible, it must obviously be a place of conventions for when it attempts to present a marble palace or a stone cliff it can present neither real marble nor stone.* The sets must be rigid and plastic but flexible and easily manipulated. Throughout the 19th century there was but one way in which to build these stage sets, and that was to construct light frames of flat pieces of wood, cover these frames with canvas, hang them from the rigging loft above by means of ropes or fasten them temporarily to the floor and then shove them off into the wings. The new school of stage experts sought to make the sets more solid, to give them form, a third dimension; in other words an architectural treatment.

Royal Court Theater, Stuttgart, Germany
Max Littman, Architect

With this end in view it was necessary to devise new methods of manipulating scenery. Some means of escape was sought from the laborious and extravagant method of putting together a set for use and dismantling it immediately after, only to go through the same cycle every night thereafter until the play was discarded. Sets were solidly mounted on movable stages which swung, slid, rolled, raised or lowered the scene before the proscenium opening and back again. The now well known Asphaleia system of stage

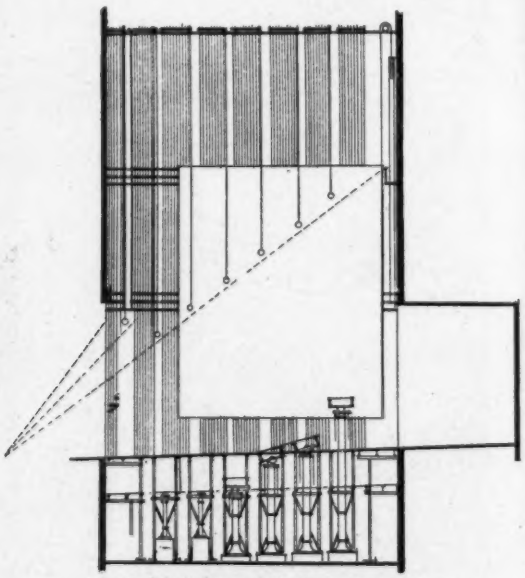
Fig. 4. Proscenium and Curtain in Henry Miller Theater, New York

bridges that raise and lower was devised, and installed at the Hofburg Theater in Vienna, the Paris Opera House, Drury Lane in London and the Chicago Auditorium. Stages were constructed in the manner of huge single or double-deck elevators, and the sets were mounted either in the flies above the proscenium opening or in the "sink" 20 or 30 feet below the stage level. Both of these systems were costly to install, cumbersome to handle and never came into general use.

A great advance was then made, in the design of a revolving stage by Lautenschlager, a German stage expert. Upon this stage several different sets might be mounted and each swung around in turn before the proscenium opening. This stage was a large round table whose diameter was greater than the proscenium opening (¼ of the circumference in the opening). Stages of this type were installed in the New (Century), Little and several other American theaters but are little used here as a stage set must be built up to go "on the road" to play in the so-called combination houses, and consequently its technique must not be superior to that of the worst house. Sets mounted on these revolving stages could not be similarly used in the provinces. This stage is being used today in a number of the finest theaters in Continental Europe.

The one great drawback of the revolving stage, however, and one which will eventually cause it to be discarded, is the fact that it prevents the use of a clear stage, as the sets which are mounted behind the one in view mask the depths of the sky-dome behind, and make it difficult to obtain effects of distance, landscape and spaciousness.

A number of different improvisations were then devised, most notable of which was the wagon stage, consisting of a number of small platforms on rollers. On these platforms the sets were mounted, pushed out before the proscenium and

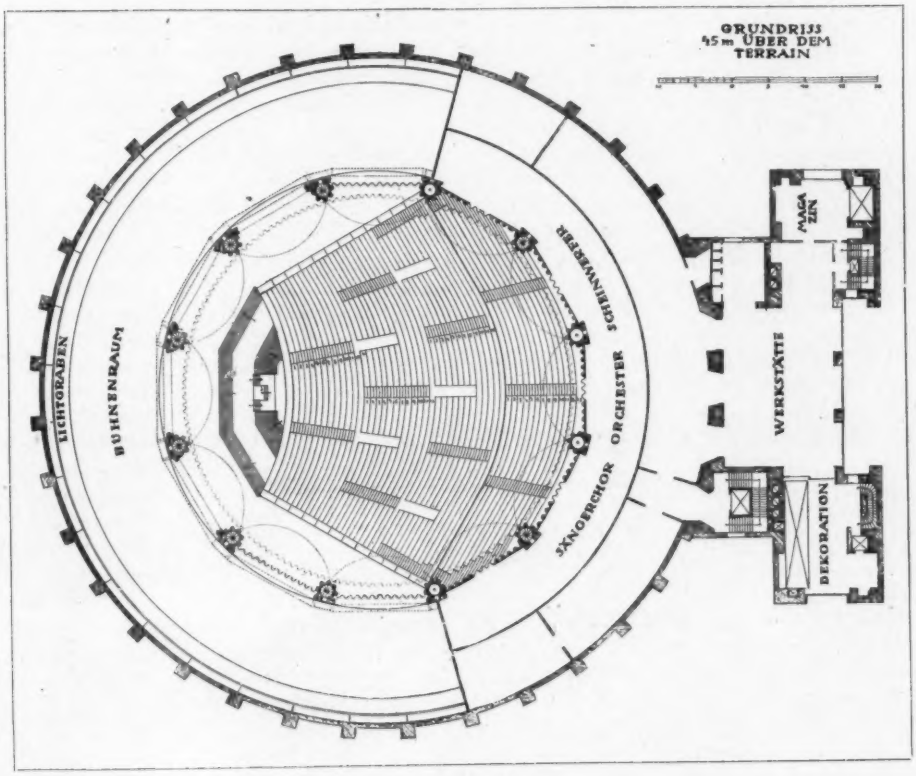


"Asphaleia" Stage, Wiesbaden Theater

Fig. 5

then back again in the wings. This device is practical and inexpensive and is used in a number of smaller theaters abroad.

The most excellent stage yet devised is a combination of the sliding and raising stage as it is built and used in the Dresden Court Theater. Four full size stages are mounted on trucks in the basement, sets are mounted thereon, and the trucks are moved along tracks on to huge elevators which raise them into place to the floor above. Any type of set may be mounted thereon and it



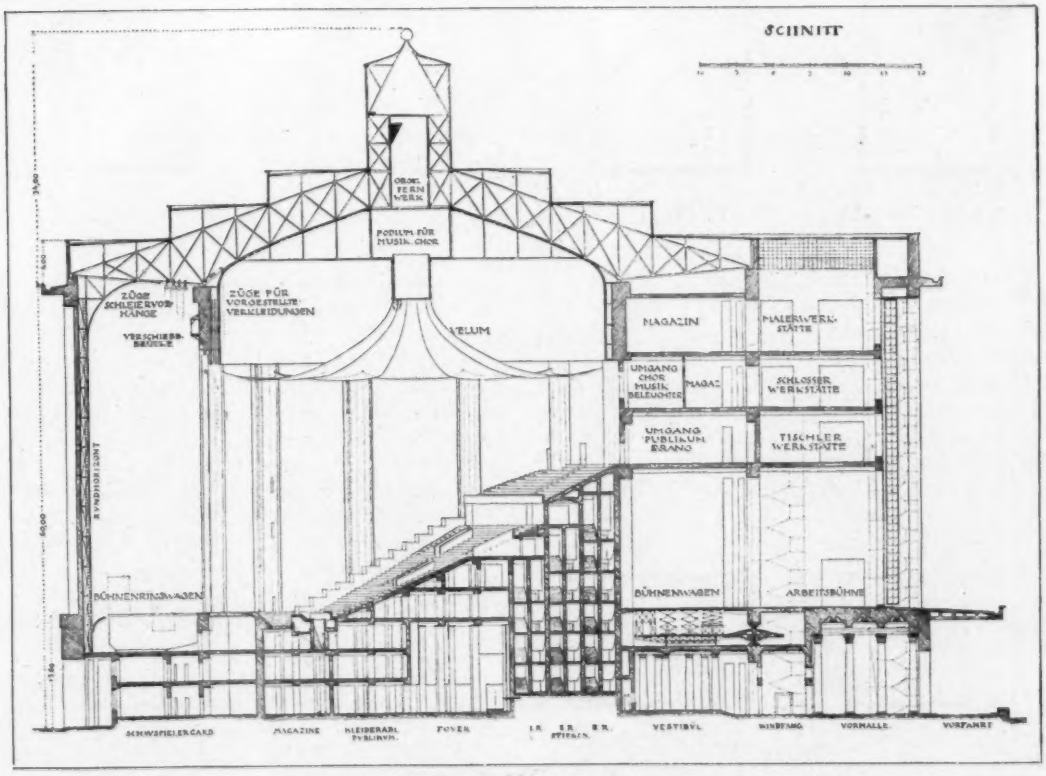


Fig. 7. A proposed Theater, Oskar Strand, Vienna

does not interfere with the use of the sky-dome or rigging loft, while several more sets may be mounted in the basement, when one is in use.

The great majority of playhouses in this country have none of these improvements, and with the exception of the substitution of fireproof materials for the old wooden gridirons, pin rails and fly-galleries, scenes are "struck" exactly in the same manner as they were 100 years ago. This makes it necessary to improvise all manners of makeshifts to gain speed or economy. One such scheme is shown alongside; the use of a pivoted stage by Arthur Hopkins for the performance of "On Trial." Two platforms were swung, one on each side of the proscenium opening and while one was playing the other was being reset.

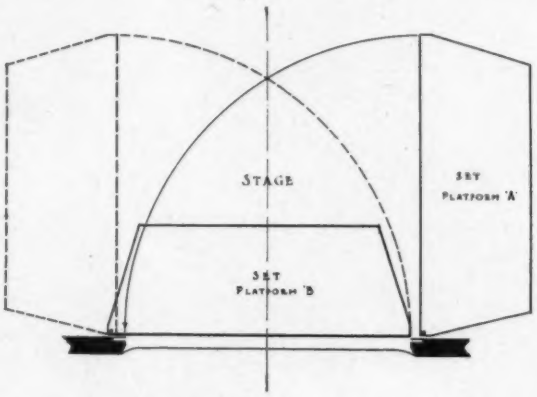
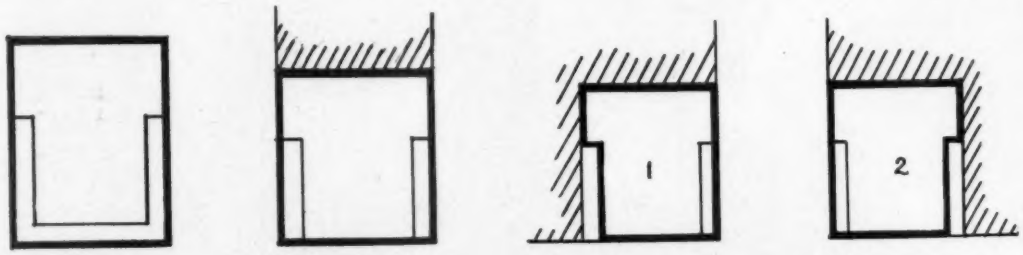


Fig. 6. Improvised Stage for "On Trial"

æsthetic and with no more lobby, foyer and exit room than is absolutely required by law,—a law that is in sad need of revision.

Occasionally a building is first laid out and a site is afterwards chosen for it, but in most cases a building must be designed to fit a plot, and the size, location and character of the plot will influence the design of the building. Roughly speaking, the layout of theater buildings on plots fall into five different classifications, as is shown by the accompanying cut. In Continental Europe most municipalities require by law that a theater shall be on an open block, with streets on the four sides, (type A). Some large or ideal American theaters are laid out with streets on three sides with the adjoining buildings on the side of the back



WHEN called upon to draw up preliminary sketches for a new theater, an American architect is immediately confronted with the problem of designing a theater as it should be built, with ample stage space, modern machinery, spacious lobbies, foyers and exits, or to design it as he will be forced to build it by the gentry who control this industry, i.e., with a stage far too small to house anything above the Broadway stage wall, (type B). Another good layout which is often used is that of a corner plot, (type C, 1 & 2); this necessitates the introduction of one exit court, as three sides of the auditorium must open out. The fourth classification has the adjoining buildings on opposite sides and the theater on two streets; this requires the use of one or two exit courts, (type D, 3 & 4). *It is more desirable to lay out the building with the*

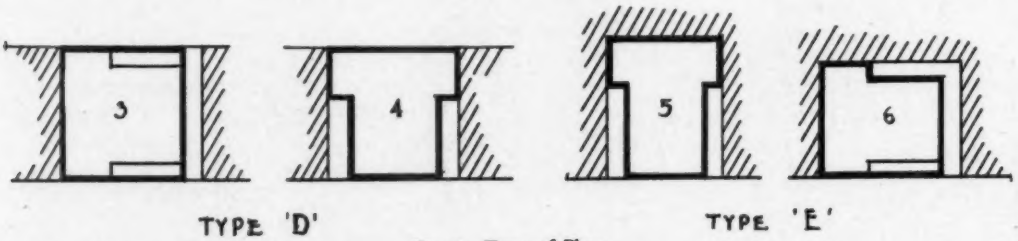


Fig. 8. Types of Plots

center line of the auditorium parallel to an adjoining street so that large "flats" may be brought in through a loading door located in the side wall of the stage. The most common type of all is a plot bounded by buildings on three sides, (type E, 5 & 6); the stage is then located in the rear of the plot or along the street, depending upon the location and length of the main axis. (Occasionally a theater is laid out on a diagonal axis, but this is not theater design but cheap trickery to gain seats.)

The next consideration is the types of theater, and these may be sub-divided as follows:—

1. Opera, opera-comique or Ballet
2. "Legitimate" dramatic houses
3. Vaudeville (Variety)
4. Motion picture

The "legitimate" houses may be further subdivided as follows:—

a. Production houses
b. "Combination" houses (on the road)
c. Girl-and-music-show houses
d. Intimate or "art" theaters

All of these classifications differ from one another, and these differences determine the design of the house.

A theater is built about three axes, the center line of the auditorium, the stage datum and the curtain line. As all three axes cut through the proscenium opening and the size of the latter bears a definite relation to the rough dimensions of the entire building, it is well to ascertain what the size of a proscenium opening may be.

Theaters built expressly to house Grand Opera, comic or light opera, or ballet, should have a proscenium at least 46 feet wide and this may be increased even to 60′. In Production houses (theaters in which plays are built up from the manuscript), the proscenium width should be from 38 to 44 feet, while "combination" houses

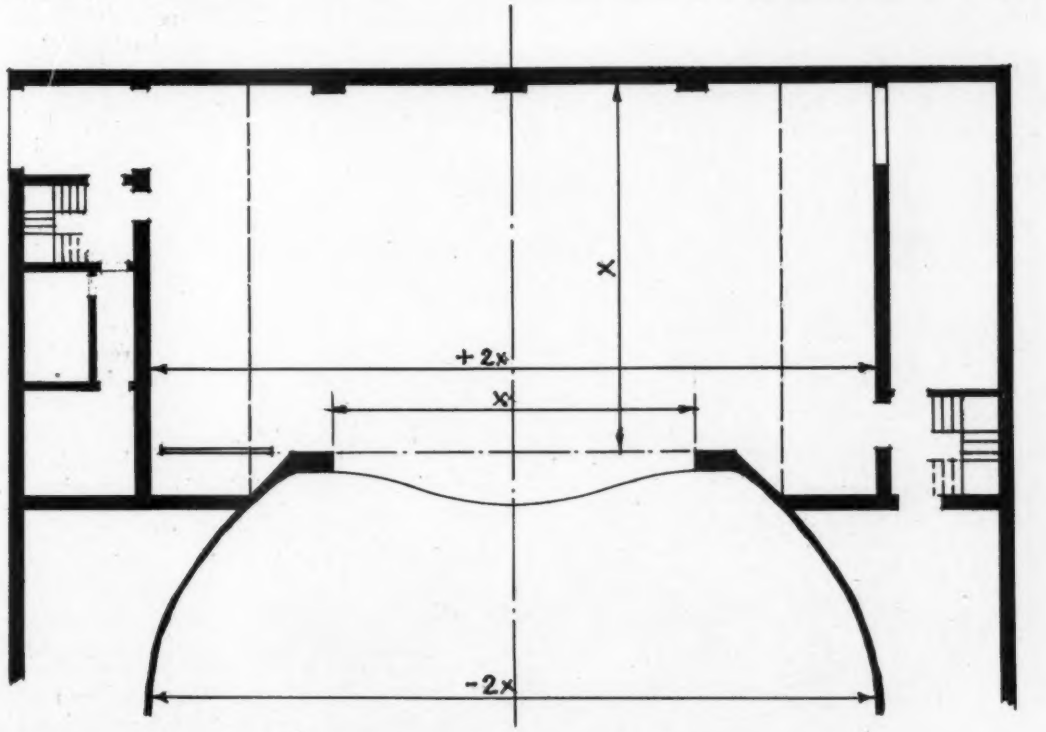


Fig. 9. The Principal Dimensions of a Stage

vary from 34 to 40 feet. The girl-and-music shows, which are the modern substitutions for opera-comique and ballet, require wide openings of 44 feet or more. Vaudeville theaters vary from 32 to 40 feet, while the "intimate" theaters (the last word in modern theater design) only require from 28 to 36 feet.

Fig. 9 shows the rough dimensions of a theater, and the table below shows the relation of the proscenium width to the other dimensions.

Pros. Wid.	Pros. Hgt.	Stage Dep.	Stage Wid.	Grid Htg.	Aud. Wid.
X	4X	X+	2X+	2X+6	—2X

The following table shows the relative dimensions of some prominent theaters:

	Type of Theater	Pros. Width	Pros. Hgt.	Stage Depth	Audit. Depth	Stage Width	Grid. Hgt.	Sink Depth	Fly Hgt.
Vienna Court	Drama	41-9	42-6	77-9	92-0	101-6	90-0	-36-0	
Paris Opera	Opera	52-6	45-0	86-9	101-9	173-0	119-0	-46-9	
New Amsterdam	Girl	40-0	36-0	78-0		80-0	70-0	-22-0	34-0
Lyceum	Prod.	34-0	32-0	33-0		81-0	80-0	-30-0	31-0
Metropolitan	Opera	54-0	50-0	76-0		100-0	98-0	-27-0	
Century	Opera and Classic Drama	48-0	40-0	67-0	112-0	100-0	116-0	-32-0	50-1
Music Box	Girl	45-0	26-0	31-0	43-6	App. 75-0	60-0	-10-0	46-2
Earl Carroll	Prod.	40-0	27-0	33-0	55-0	73-3	60-0	-10-0	46-2
Little	Intimate	29-0	20-0	30-0	54-0	76-0	58-0	- 7-3	26-1
Maxine Elliott	Prod.	38-0	30-0	31-0		61-0	65-0	-12-0	32-0

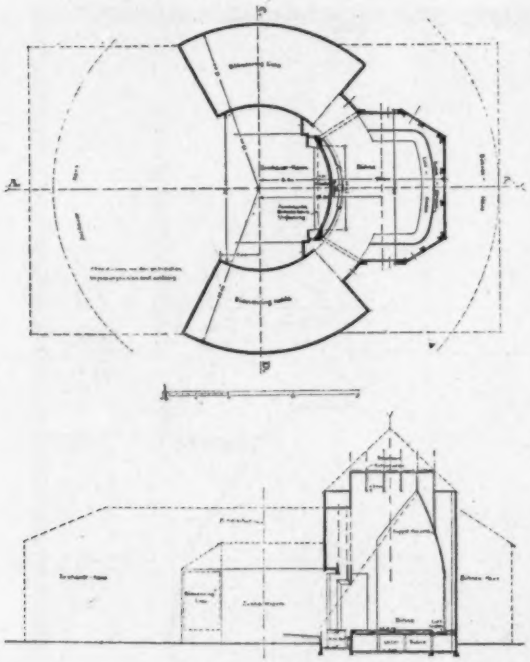


Fig. 10. Plans of Adolph Linnebach for stage of a new playhouse to be equipped with a sliding stage but because of limited ground space the rolling wagons and their tracks have been bent to form a horseshoe

The seating capacities for the theaters mentioned in the foregoing table are as follows:

Vienna Court	1475
Paris Opera	Unknown
New Amsterdam	1750
Lyceum	957
Metropolitan	3526
Century	Unknown
Music Box	1000
Earl Carroll	1000
Little	588
Maxine Elliott	950

(To be continued)

Stained Glass Collecting

IS there any class of object that has escaped the attentions of the collector? "Collecting old stained glass windows" is, according to Mr. Maurice Drake—than whom nobody knows more about stained glass in all its bearings—"a hobby for millionaires." In support of this curious statement, he cites, in *The Daily Mail,* some truly staggering figures. "A simple window of the type most frequently painted in the fifteenth century, with, perhaps, three figures on backgrounds of the diamond-shaped panes known as quarries, would be fairly cheap at £5,000." He cites a still more stupendous price. A thirteenth-century panel, containing only the head and shoulders of a saint, was bought by a dealer for £17,500. Mr. Drake warns the embryo collector against stained glass forgers, yet adds the reassuring statement that the holes or "shallow pits," like those found in York Minster windows, cannot be successfully imitated. Such holes, due to corrosion, while they attest the genuineness of the glass, depreciate its price, however. The presence of Mr. Drake's interesting and informative little article in *The Daily Mail* is a further gratifying proof of the growing attraction of art of all kinds for the "general reader," if only the subject be treated in a sufficiently popular style. Mr. Maurice Drake's interest in painted glass has descended to him even unto the third and fourth generation from ancestors who were noted experts in stained glass manufacture; and to his high reputation in the gentle art of making painted windows he adds that of a writer of distinction, whether as the author of a standard treatise on stained glass or as the author of several successful novels. — *The Architects' Journal,* London.

Origin of the Windsor Type of Chair

IT is said that an early English monarch saw a chair of the Windsor type in the home of a peasant, and was so pleased with it, that he had one sent to Windsor Castle. Other authorities claim that the name was derived from the town of Windsor, England, where chairs of this type were first made.

Certain it is, that the first Windsor chairs were brought to New England by the Pilgrims in 1620. The pattern was varied and improved upon until the familiar Colonial Windsor arm chair was evolved. This chair has a back shaped like an archer's bow, and usually the arms are formed by another "bow" extending around the back. There are supporting spindles (which differ in number), vase-shaped outspread legs and a roomy, shaped seat.

The name "Windsor" is often applied to any chair which has any of these characteristics, but the chair having all is the authentic copy of an original.

LLOYD WARREN

An Appreciation

BY JAMES GAMBLE ROGERS, President, Society of Beaux Arts Architects

IN the untimely death of Lloyd Warren on October 25 last, the cause of architectural education in the United States has suffered a severe loss. Mr. Warren worked hard and faithfully in every department of the profession that he so greatly honored, but it was to the development of the Society of Beaux Arts Architects and the Beaux Arts Institute that his life work was dedicated. So sincerely did he labor that now, while it may no longer receive his support and wise counsel, it has become inevitably an established organization so firmly founded as to make it in the United States as important in its relation to architectural education as is the Ecole des Beaux Arts in Paris.

Lloyd Warren, Died October 25, 1922
Photograph taken in uniform as Director of Instruction and Dean of the Faculty Educational Corps A. E. F., Art Training Center at Belleville, France

In the great influence of Mr. Lloyd Warren's example, we have presented what a capable and highly intelligent man of means may accomplish,—a man of high ideals, of great force of character, with the means to further his visions and make them tangible and valuable realities. Other men in other fields of education may well be inspired to follow so fine an example, and to lend their wealth and their abilities to the furthering of a great purpose, in exactly the way Mr. Warren did.

From his first connection with the Society of Beaux Arts Architects, and at a time when it was at best but a social architectural organization, his clear vision made it possible to discern the great possibilities that might be evolved from a group of that kind. With infinite patience and at the expense of much time, Mr. Warren perfected an organization which today bends all of its energies and influence toward the education in architecture of the younger men in the profession.

Twenty years ago, when Lloyd Warren was first faithfully and patiently working out these problems, it was the custom in this country for any architect seeking highly skilled assistance to send to Europe for trained men, which proved to him the necessity for training men here. Owing to the work that Mr. Warren did, such a course became no longer necessary. He materialized his dream of a competently trained group of men in the United States into an actuality, thus adding largely to the dignities of architectural practice in this country. No one can adequately estimate or calculate the indirect benefit of this training to the thousands of young men who during the past have come to receive the benefits of the methods that have been so wisely inaugurated by Lloyd Warren.

To give the widest scope and influence to the Society of Beaux Arts Architects, he originated and established the Beaux Arts Institute of Design, which in addition to its work in architecture, also provides well conducted courses in Decorative Painting and Sculpture. This Institute, primarily established as a means of providing poor boys, working in offices, a means of securing an architectural education, one that would be equal in its opportunities to that of the more fortunate youth who goes to college, was so finely conducted, that numerous universities asked the Beaux Arts to give its students the benefits of this education and

to judge the drawings of their architectural studies so that the college boys would be able to have the same excellent opportunities that their poorer brethren were enjoying.

The very essence of Lloyd Warren's educational ideals was in its practical nature. They did not take long periods to work out to a successful conclusion. In fact, from the outset they vindicated a judgment that was uniformly correct. As the Society of Beaux Arts Architects has now more than thirteen hundred students, with twenty-six universities sending work to be judged, it may readily be seen how valuable an effect this training has on our architecture.

The Paris Prize, now nationally known as the most important architectural competition, was first established by Mr. Warren. This is a scholarship, annually awarded, which pays the expenses in Paris for two years of the prize-winning student. The great importance of this annual competition in the architectural world is made manifest by the fact that it is the only thing outside the Ecole des Beaux Arts that the Ecole recognizes. Students going to the Ecole from any of our universities, no matter how large or important they may be, must pass the entrance examinations of the Ecole, exactly as must any student from a high school. But the winner of the Paris Prize of the Society of Beaux Arts Architects is not only admitted without examination, but is at once enrolled in the first class of the Ecole. All this did Mr. Warren accomplish for the Society of Beaux Arts Architects. Furthermore, the winner of the Paris Prize becomes architecturally a made man, for no one may doubt that having passed through the many stages that lead to success, he will have acquired by reason of the methods for which Mr. Warren was so largely responsible, an education so firmly grounded that no one may justly question his ability. Men whose station in life under usual conditions did not permit them to compete for this important prize, were, through Mr. Warren's fine liberality, enabled to test their ability in these annual competitions. And win or lose, the great educational advantages placed them in a position to continue successfully in a profession that so many of them now adorn.

Mr. Warren not only gave largely of his own wealth to all these fine undertakings, but by means of his example and urgent solicitations, was able to secure the valuable financial assistance of other generous donors. Not only money, but also time did Mr. Warren contribute to the upbuilding of the Society of Beaux Arts Architects. The recreations of other rich men, things that absorbed, and perhaps trivially, so much of their time, had no appeal for Mr. Warren. He made the cause of architectural education his life work. No matter was too insignificant, no projected thing too large to divert him from the purpose to which he appeared to have given his whole life.

And now that he is dead, we shall mourn the passing of a man whose life was given to such unselfish efforts. That life may stand as a model to other men, and while they may emulate so fine an example, no one can dull the luster that attaches to the name of Lloyd Warren as one of the most valuable figures in the history of architectural education that this country has thus far produced. The Society of Beaux Arts Architects stands today as a monument to the greatly respected memory of Lloyd Warren.

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·EDITORIAL·COMMENT·

LLOYD WARREN'S tragic death brought to a sudden end a career devoted to the profession he so finely adorned. A man of keen intelligence and the highest culture, he dedicated a life that might, had he so desired, have been spent in idle luxury, to unceasing service to the younger men in the profession of architecture.

On another page of this issue there appears a fine appreciation of Lloyd Warren's life and work, written by James Gamble Rogers, President of the Society of Beaux Arts Architects.

Among his intimates, Lloyd Warren's memory will be cherished by reason of those fine characteristics that marked the cultured gentleman.

In the profession of architecture, the Society of Beaux Arts Architects and the Beaux Arts Institute of Design, remain as memorials to his great work in the field of architectural education.

The following lines have been sent to us by a man who was daily in close association with Mr. Warren. They beautifully express the vital things of Lloyd Warren's useful life.

"Builder of men, he taught the young to build;
And by his hand their future was designed.
In them his faith, his dream, shall be fulfilled,
Wrought in the nobler architecture of the mind."

* * *

WHAT ZONING HAS DONE for New York in the enhancement of real estate values, is shown by the recent sale of the house of the Democratic Club on Fifth Avenue, between Fifty-second and Fifty-third streets. Twenty years ago, this property, then a private residence in an exclusive and ultra-fashionable district was, it is stated, acquired for $250,000. It has now been sold to the owners of a large department store for $1,110,000. The gradual development of Fifth Avenue into the finest shopping thoroughfare of the world has resulted in a great enhancement of values, but such an increase in value as in the present instance could not occur unless the future of the property was securely safeguarded by zoning regulations.

It is not solely to Fifth Avenue that this increase in value is to be noted, but generally throughout that part of Manhattan Island to which zoning regulations apply. Rarely does it happen that a law that so drastically applies as a remedial act, shows such quick and satisfactory results.

The invasion and spoilation of restricted areas may no longer occur. Restriction of property uses is now something more than "a gentleman's agreement" between buyer and seller. Zoning regulations have taken the place of written agreements, (so often ignored in the past) and the man who buys a piece of property for a specific purpose has the finest assurance that he will not be deprived of his rights by mercenary people.

There is a transformation going on in New York that is the direct result of these wise zoning laws. The city is growing logically and architecturally good. There is confidence as to the future and the building operations now so largely being carried forward have received a direct impulse from the zoning law.

* * *

"IN THE GREAT TOWNS every man must have room to live, room to work, room to play," said Mr. Raymond Unwin recently in New York City. "This is the first requisite of our new city plan, first for health, first for efficiency, first for pleasure, first for beauty. Secure this and all else becomes possible. Grasp at all else without this and failure must follow."

Mr. Unwin, who needs no introduction to believers in zoning, town planning and whatever else contributes to the betterment of massed humanity, is at present Chief Architect for the British Government on Housing and Town Planning and is in this country in connection with the work proposed by the Russell Sage Foundation for treating as one community New York City and the suburban areas which house its workers.

The eminent authority said that two problems stand out today prominent alike for importance and urgency. Both arise from the great developments in ease of communication and transmission of information in modern times. The first arises from the relation of peoples and nations to one another; the second from the conditions of life in great modern cities. It is with the second problem that Mr. Unwin is most concerned.

"There are some," he said, "who think that city planning consists in playing with streets and parkways, zones and building blocks, and weaving them into pretty patterns on a sheet of paper. The paper and the pattern have their place, all in good time; but our conception of city planning goes far beyond these. It is concerned with the town as a whole, its form and the distribution of its parts; and not only with the whole town but with its environments, with the proper allocation of the surrounding lands to those purposes for which each section is best adapted, and in the fulfillment of which each can make the greatest contribution to the economic prosperity, the health, wealth and happiness of the expanding city and its whole community."

XUM

Mr. Unwin said that for the greatest efficiency, grouping of residences and industrial buildings should be the rule. In a growing community these areas must expand and should be able to expand without having to buy up and pull down expensive buildings that should never have been erected in these locations. Such areas should be reserved for their more important function and used meantime for such purposes as will not create a serious obstruction or involve a heavy loss when their time comes to be utilized for commerce.

The field to be covered by city planning is extensive. Its basis must be fundamental. The city should be the home of a great community, the shelter of their private life, the platform on which their public activities are staged. It should not consist of more or less extensive groups getting together and depending for their existence on the support of one or another of the special interests which compete for profit or influence in the mass. City life should be communal; the city an organic structure. In city building nothing is gained by crowding. In solving the problems of growing cities the first aim should be to stop crowding and distribute the population properly. This done, the second aim should be to localize their lives.

Smoking room in Roof House, Private Pavilion
Mount Sinai Hospital, Fifth Avenue, New York

Arnold W. Brunner, Architect — Dr. S. S. Goldwater, Consultant

VIEW LOOKING NORTHEAST—PRIVATE PAVILION AND AUDITORIUM

MOUNT SINAI HOSPITAL, FIFTH AVENUE, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT DR. S. S. GOLDWATER, CONSULTANT

(For Floor Plans see Pages 407, 408 and 409)

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MAIN ENTRANCE, PRIVATE PAVILION

MOUNT SINAI HOSPITAL, FIFTH AVENUE, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT DR. S. S. GOLDWATER, CONSULTANT

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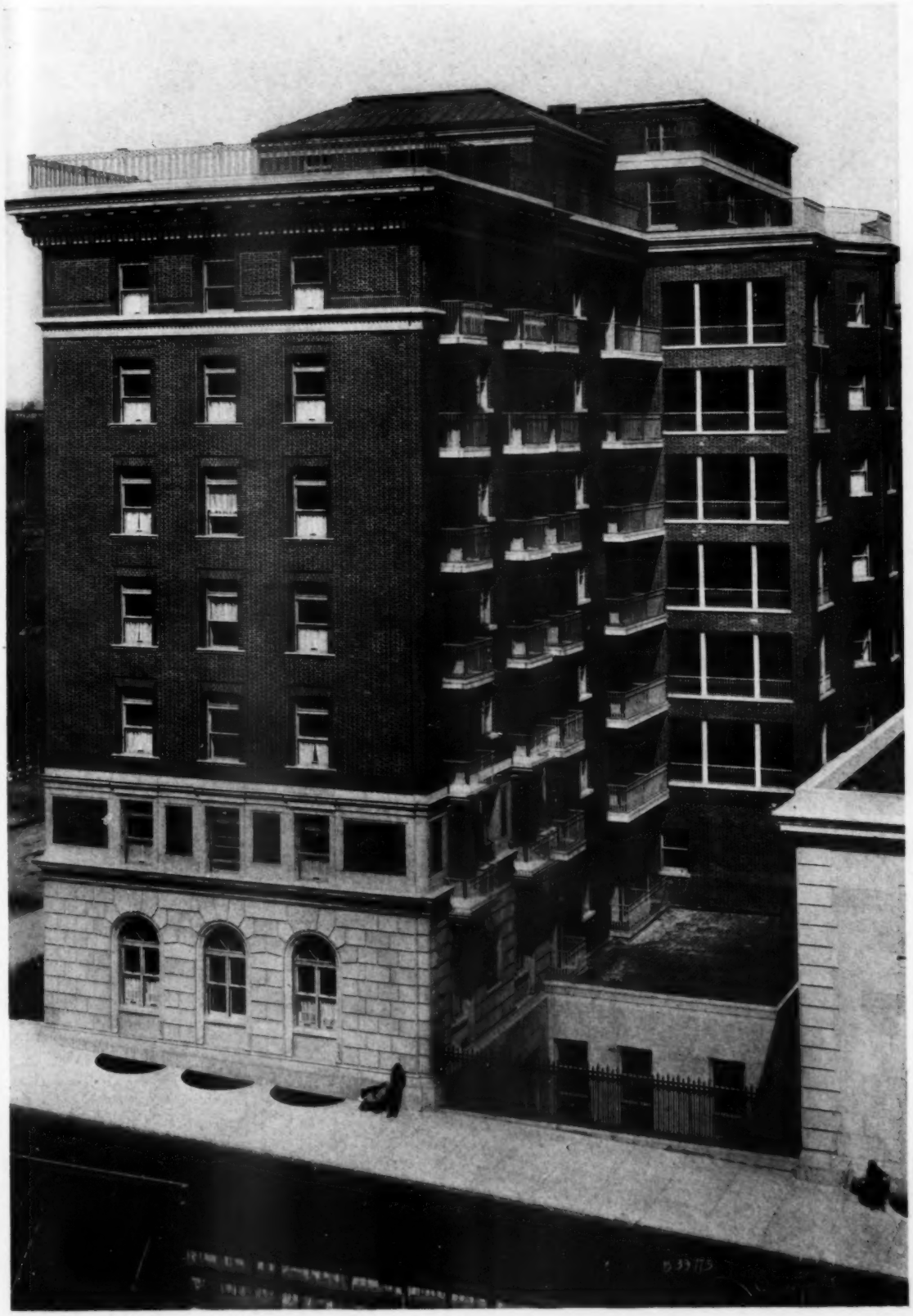

END VIEW, PRIVATE PAVILION, LOOKING NORTHWEST

MOUNT SINAI HOSPITAL, FIFTH AVENUE, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT DR. S. S. GOLDWATER, CONSULTANT

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CHILDREN'S PAVILION

MOUNT SINAI HOSPITAL, FIFTH AVENUE, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT DR. S. S. GOLDWATER, CONSULTANT

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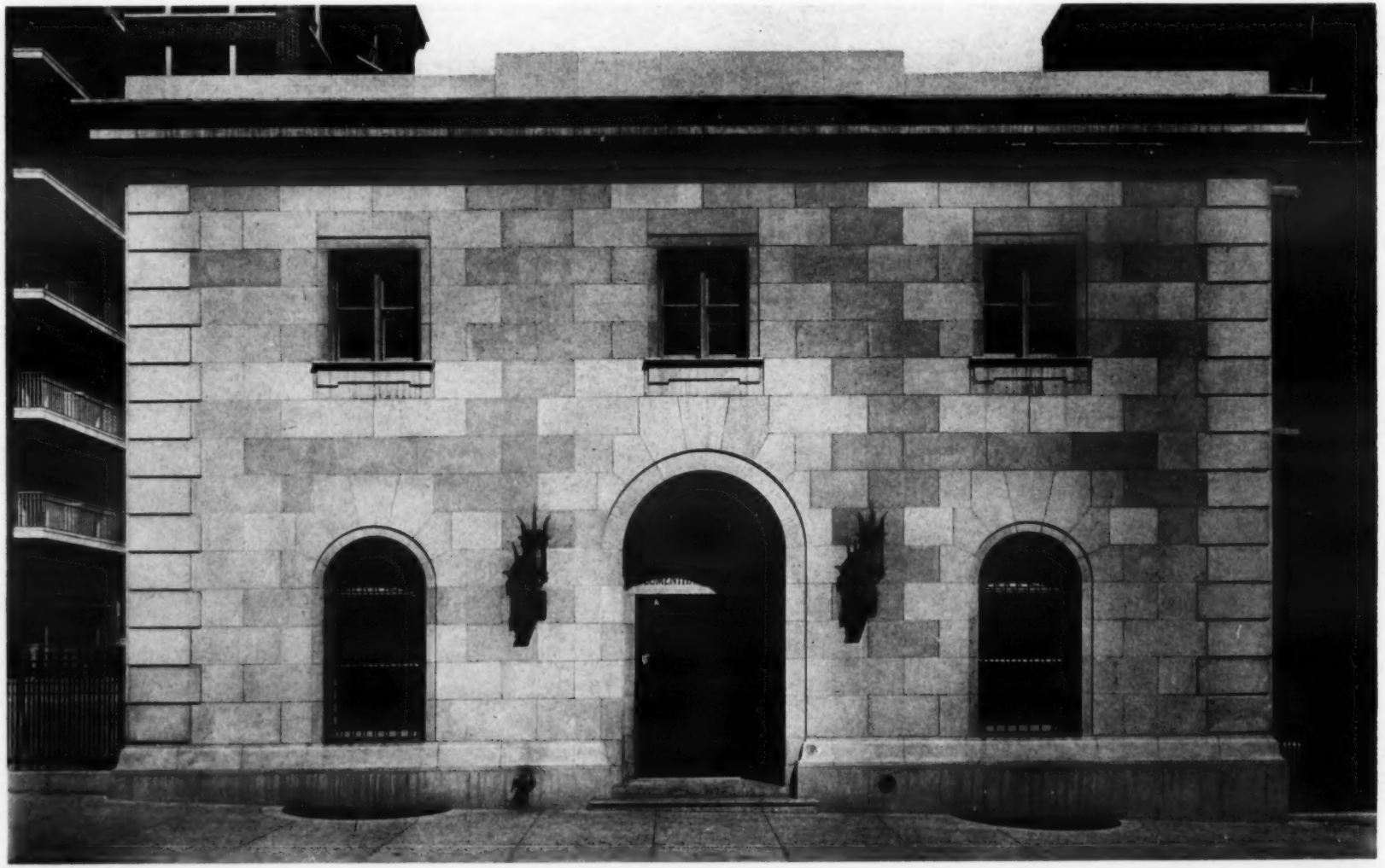
VOL. CXXII, NO. 2406 NOVEMBER 8, 1922



AUDITORIUM

MOUNT SINAI HOSPITAL, FIFTH AVENUE, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT DR. S. S. GOLDWATER, CONSULTANT

ROOF OF CHILDREN'S PAVILION, PRIVATE PAVILION AT REAR

MOUNT SINAI HOSPITAL, FIFTH AVENUE, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT DR. S. S. GOLDWATER, CONSULTANT

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RECEPTION ROOM, PRIVATE PAVILION

MAIN ENTRANCE VESTIBULE, PRIVATE PAVILION

MOUNT SINAI HOSPITAL, FIFTH AVENUE, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT DR. S. S. GOLDWATER, CONSULTANT

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CHILDREN'S PLAYROOM
DECORATIONS BY L. HELMHOLZ JUNKER

MAIN WARD, CHILDREN'S PAVILION

MOUNT SINAI HOSPITAL, FIFTH AVENUE, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT DR. S. S. GOLDWATER, CONSULTANT

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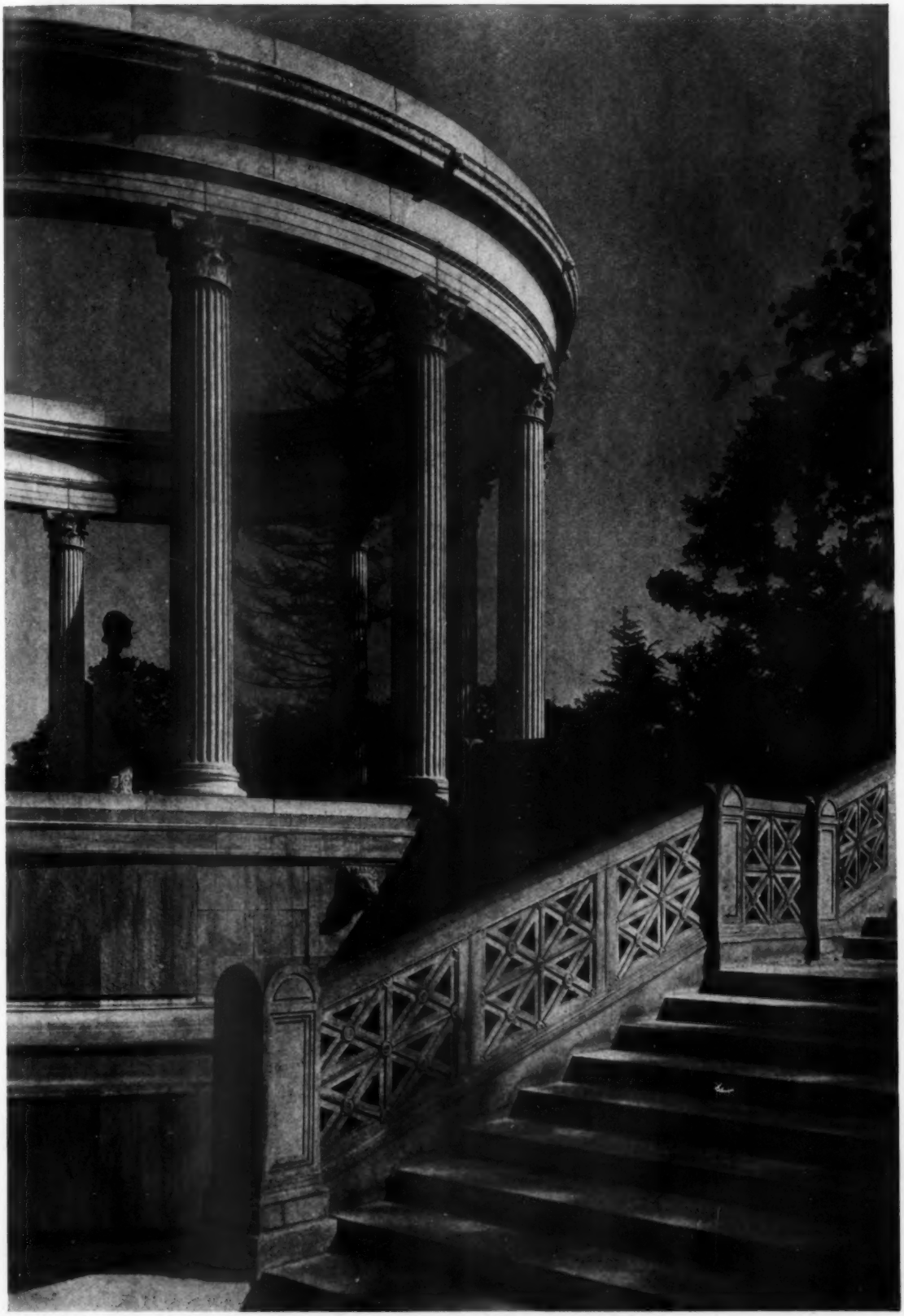

VIEW IN GARDENS OF SAMUEL UNTERMYER, ESQ., GREYSTONE, N. Y.

WELLES BOSWORTH, ARCHITECT

XUM

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APARTMENT HOUSE, NO. 960 PARK AVENUE, NEW YORK

D. EVERETT WAID AND J. E. R. CARPENTER, ASSOCIATED ARCHITECTS

(For Floor Plans see Page 410)

XUM

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DETAIL OF PRINCIPAL ENTRANCE

APARTMENT HOUSE, NO. 960 PARK AVENUE, NEW YORK

D. EVERETT WAID AND J. E. R. CARPENTER, ASSOCIATED ARCHITECTS

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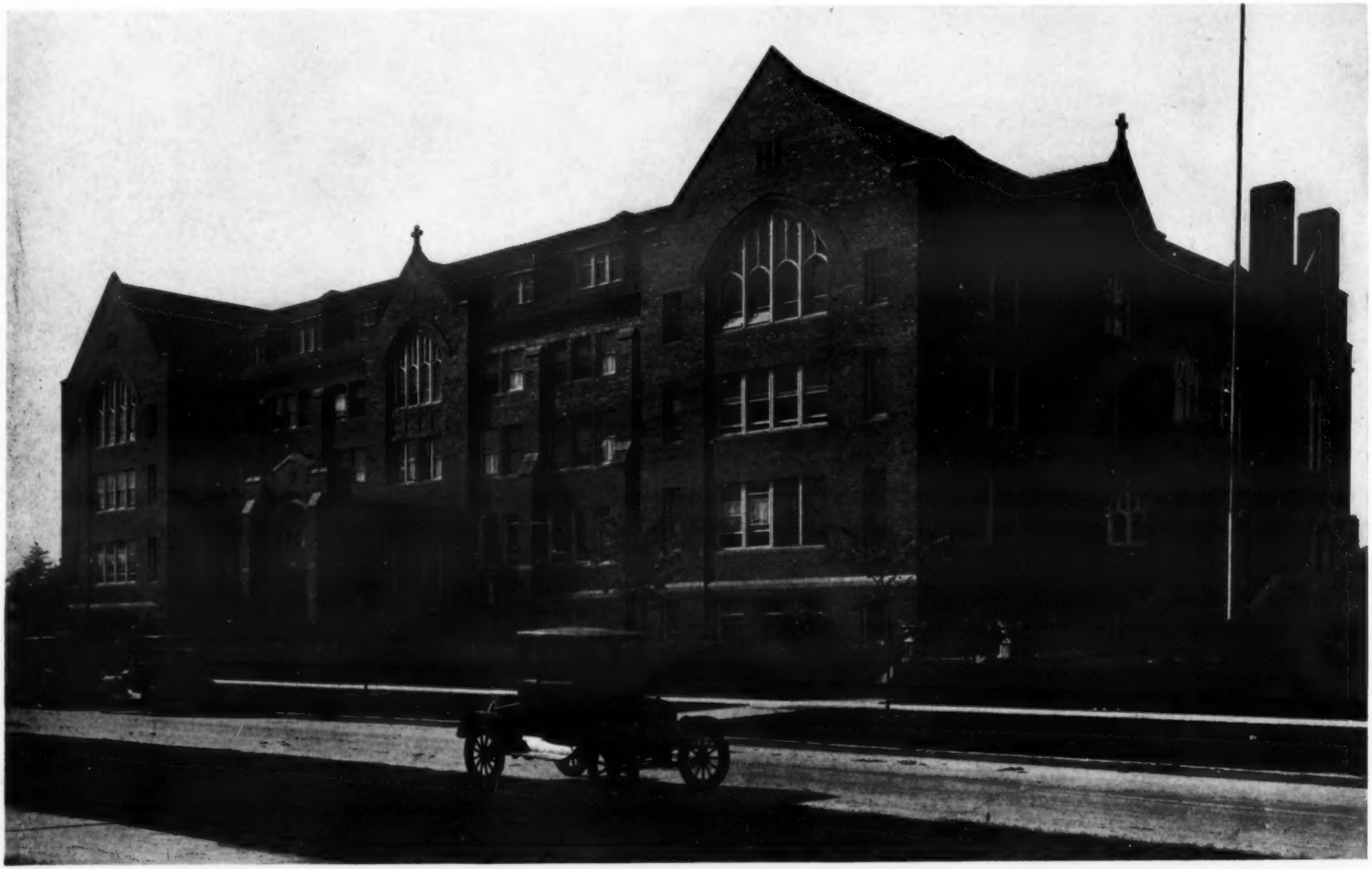
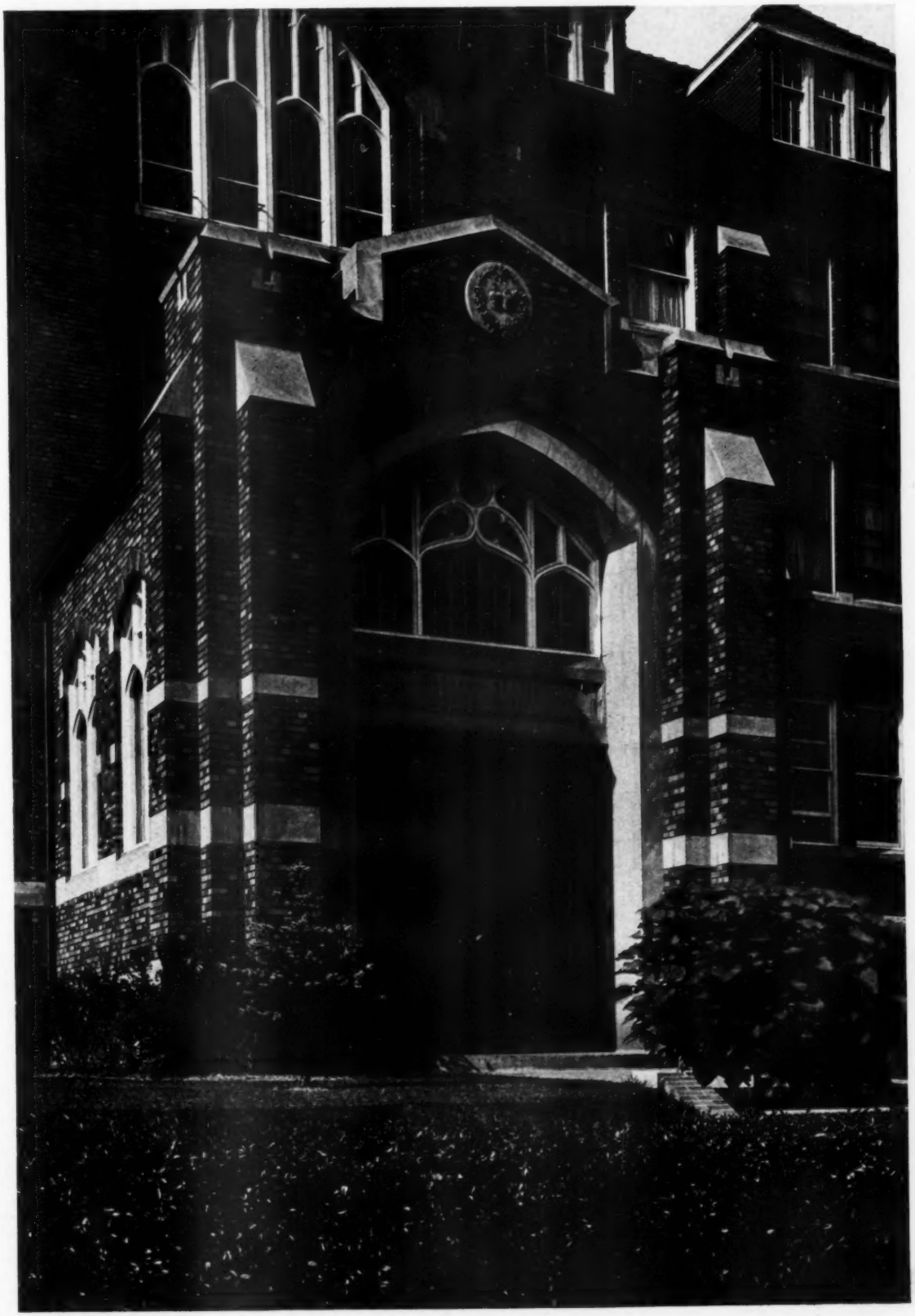


CONVENT OF THE SACRED HEART, DETROIT, MICH.

DONALDSON & MEIER, ARCHITECTS



MAIN ENTRANCE DETAIL

CONVENT OF THE SACRED HEART, DETROIT, MICH.

DONALDSON & MEIER, ARCHITECTS

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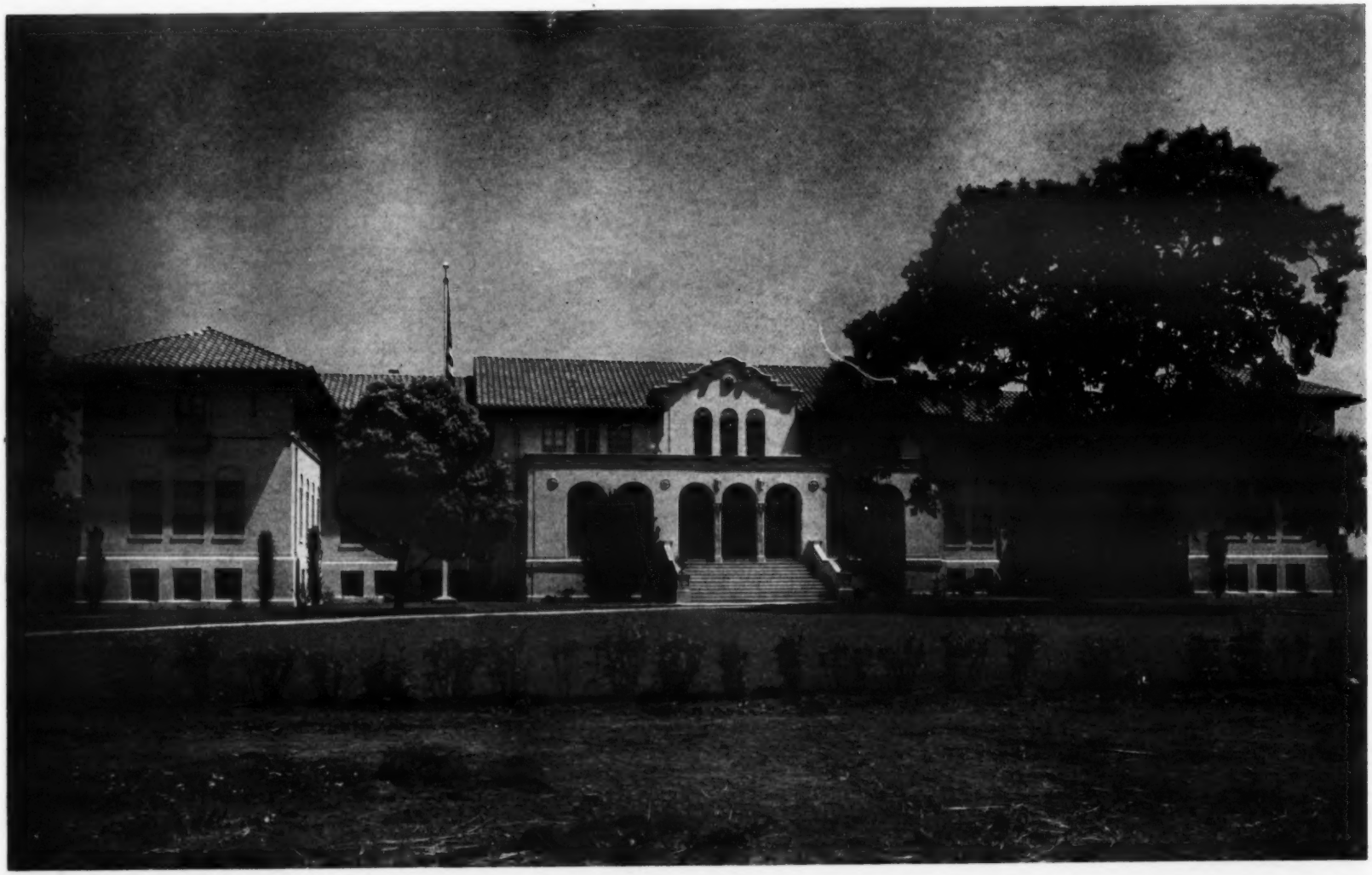
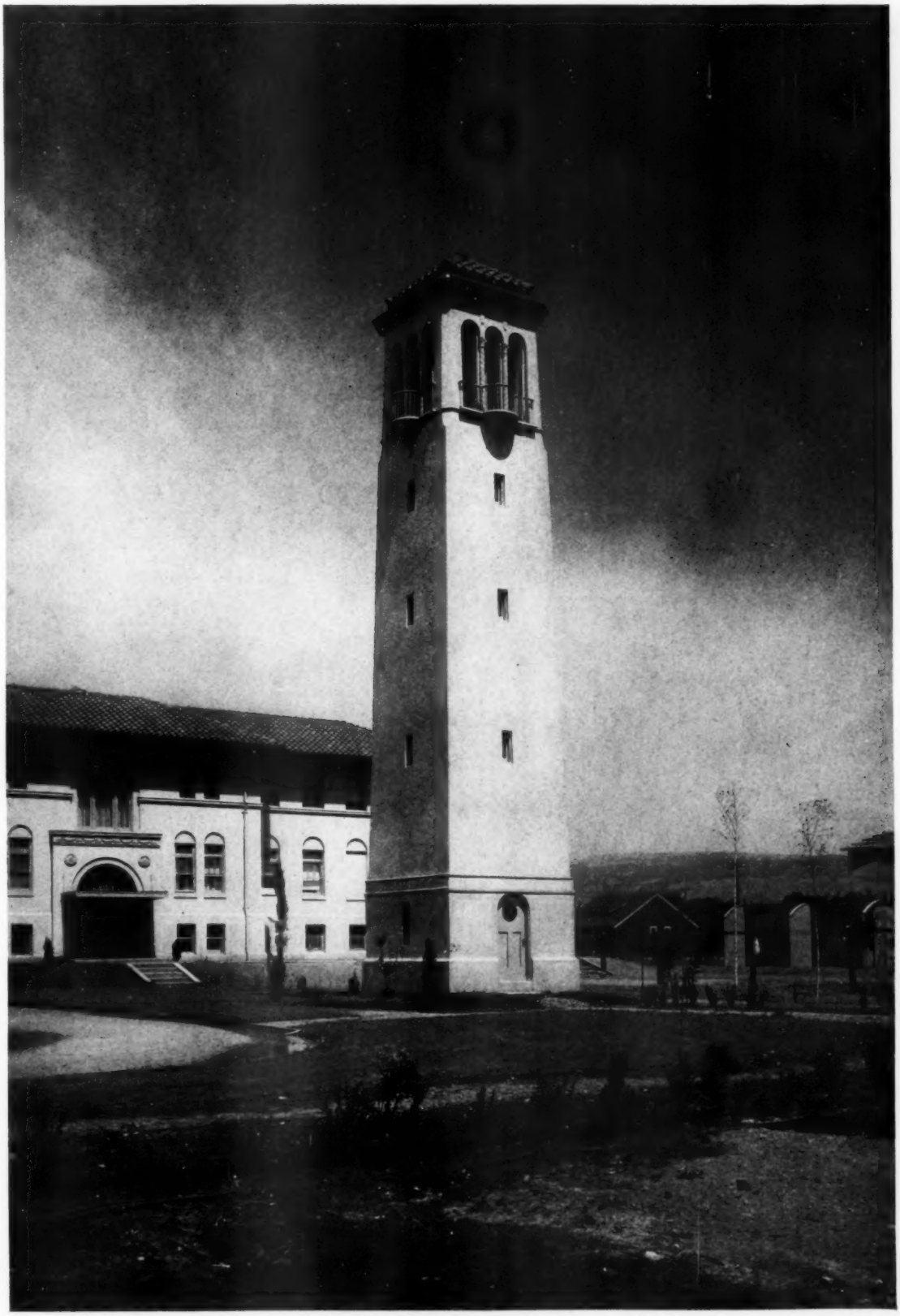


ODD FELLOWS CHILDREN'S HOME, GILROY, CAL.

W. H. WEEKS, ARCHITECT

ODD FELLOWS CHILDREN'S HOME, GILROY, CAL.

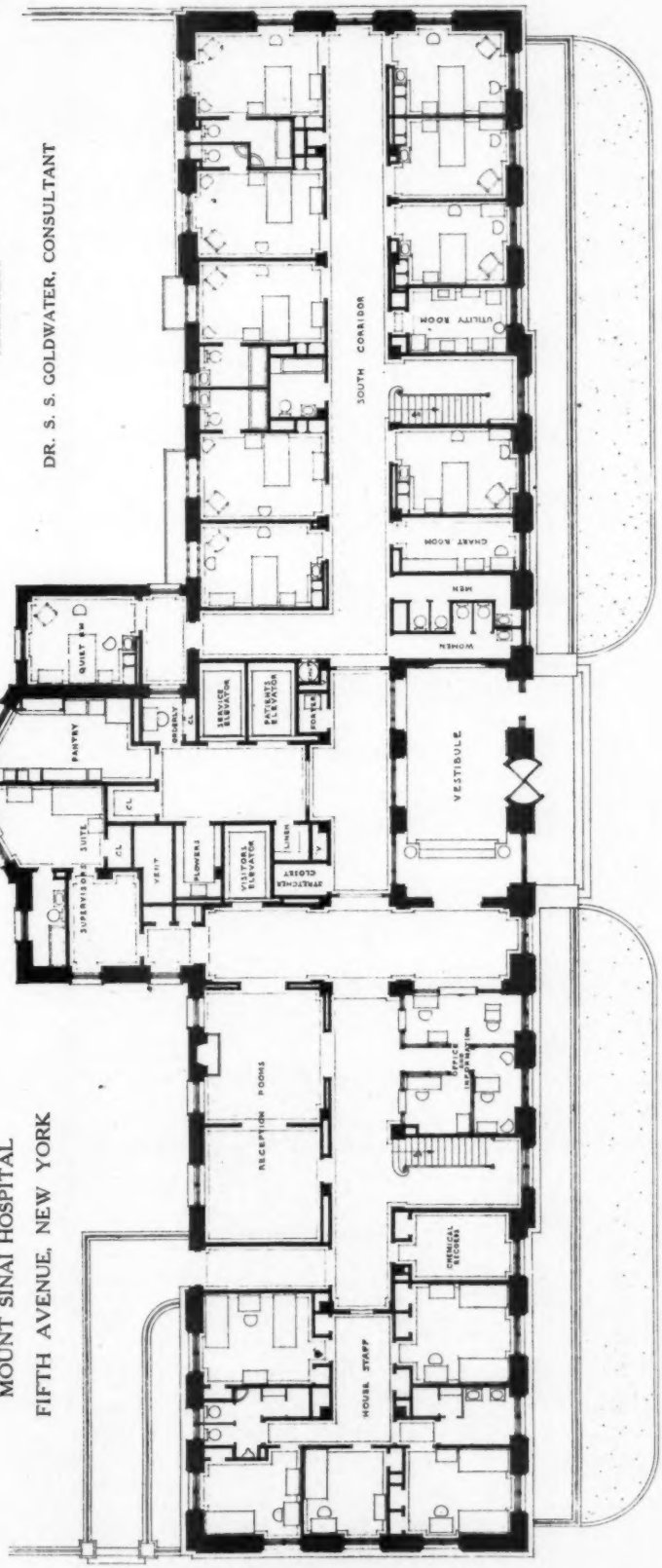
W. H. WEEKS, ARCHITECT



ODD FELLOWS CHILDREN'S HOME, GILROY, CAL.

W. H. WEEKS, ARCHITECT

XUM



FIRST FLOOR PLAN

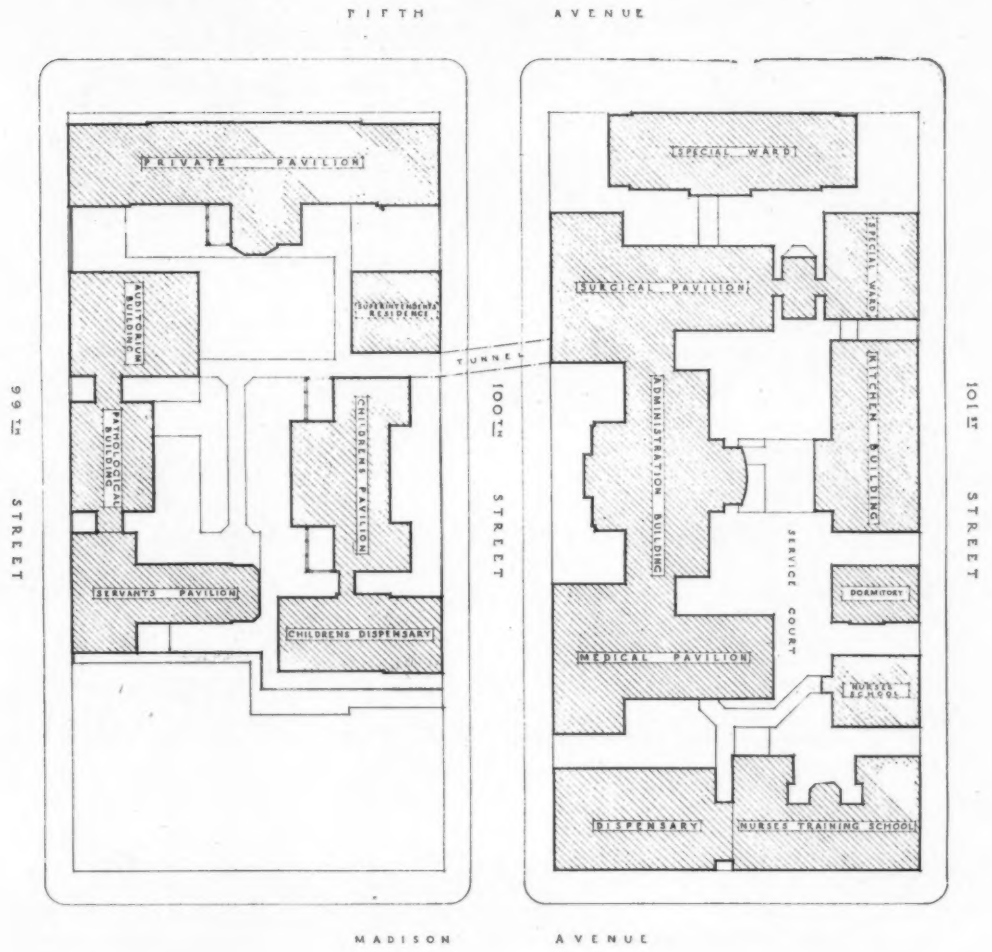
PRIVATE PAVILION
MOUNT SINAI HOSPITAL
FIFTH AVENUE, NEW YORK

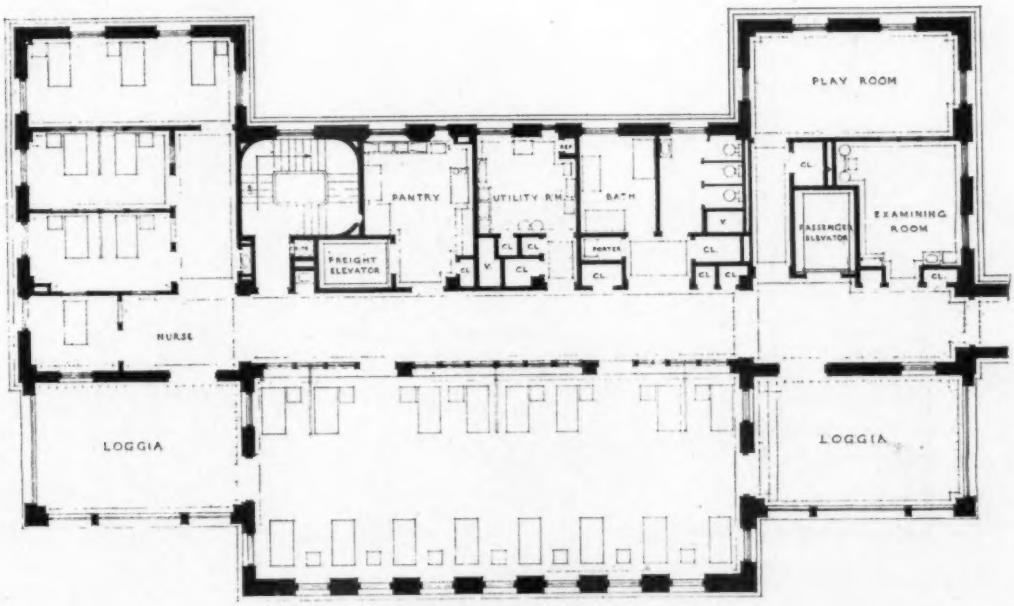
ARNOLD W. BRUNNER
ARCHITECT

DR. S. S. GOLDWATER, CONSULTANT

(For illustrations see Plate Section)

(For illustrations see Plate Section)





TYPICAL FLOOR PLAN, CHILDREN'S PAVILION

MOUNT SINAI HOSPITAL, FIFTH AVENUE, NEW YORK

ARNOLD W. BRUNNER, ARCHITECT DR. S. S. GOLDWATER, CONSULTANT

(For illustrations see Plate Section)

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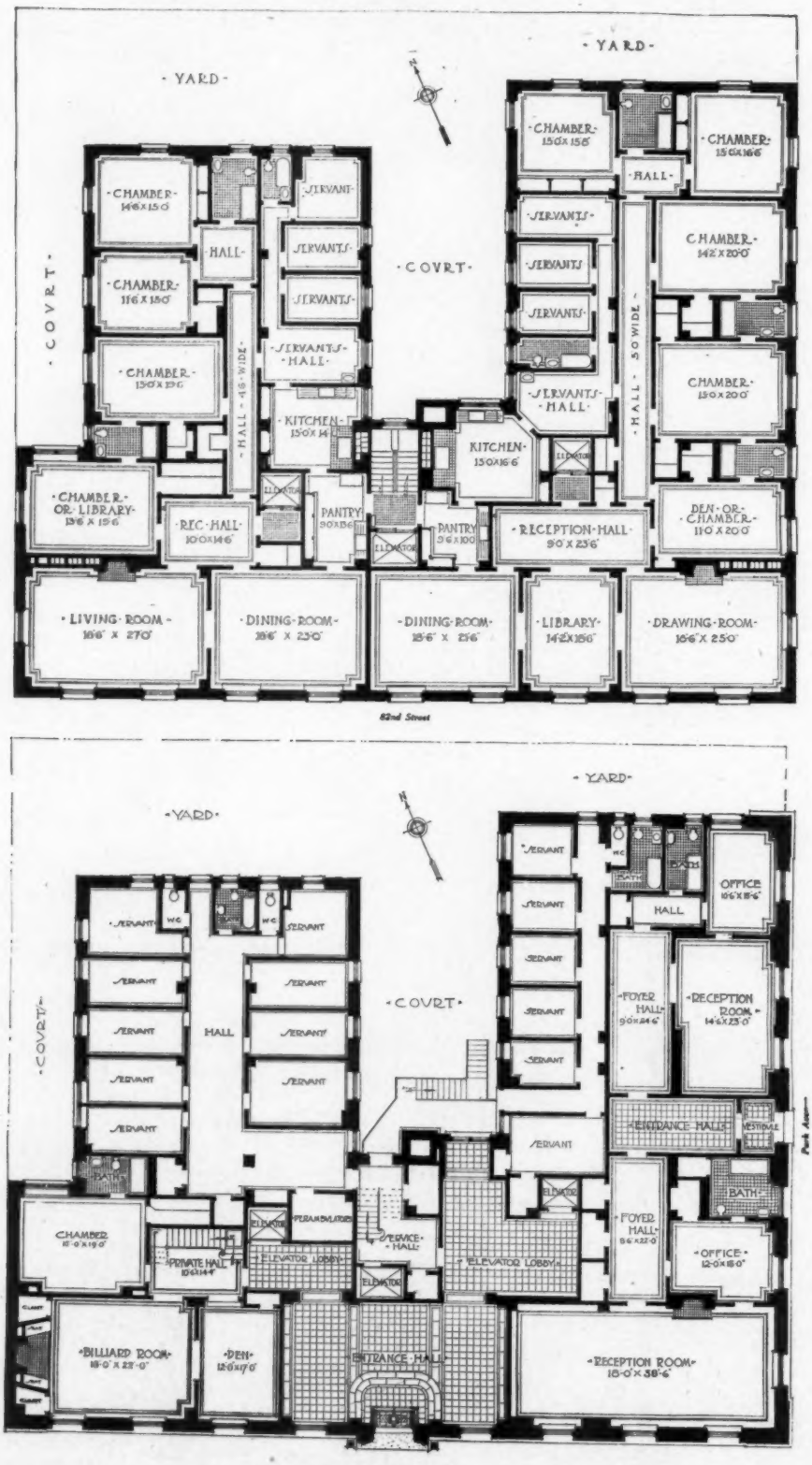
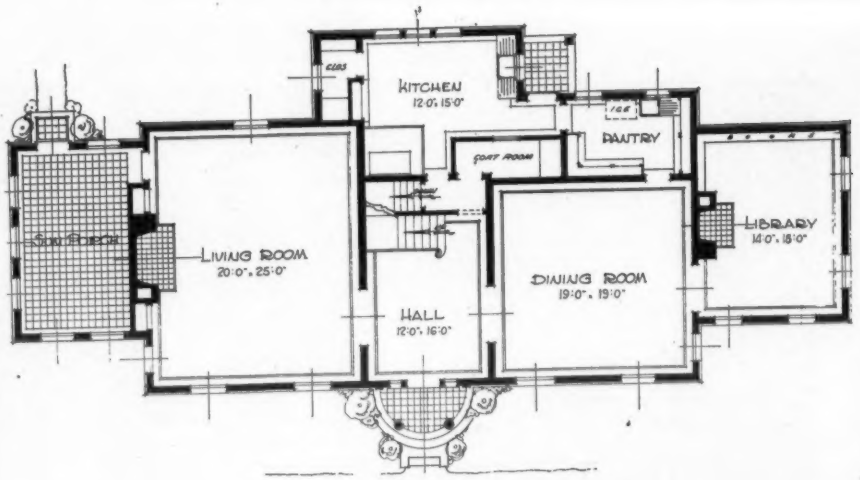


FIRST AND TYPICAL FLOOR PLANS

APARTMENT HOUSE, NO. 960 PARK AVENUE, NEW YORK

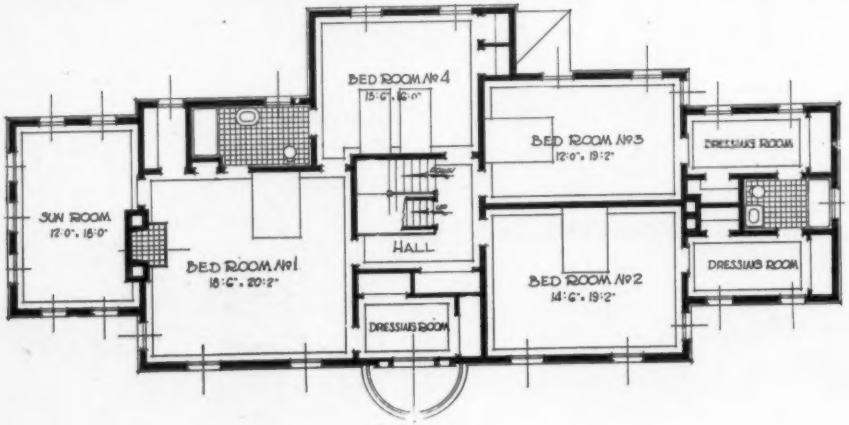
D. EVERETT WAID AND J. E. R. CARPENTER, ASSOCIATED ARCHITECTS

(For illustrations see Plate Section)



GENERAL VIEW AND FLOOR PLANS

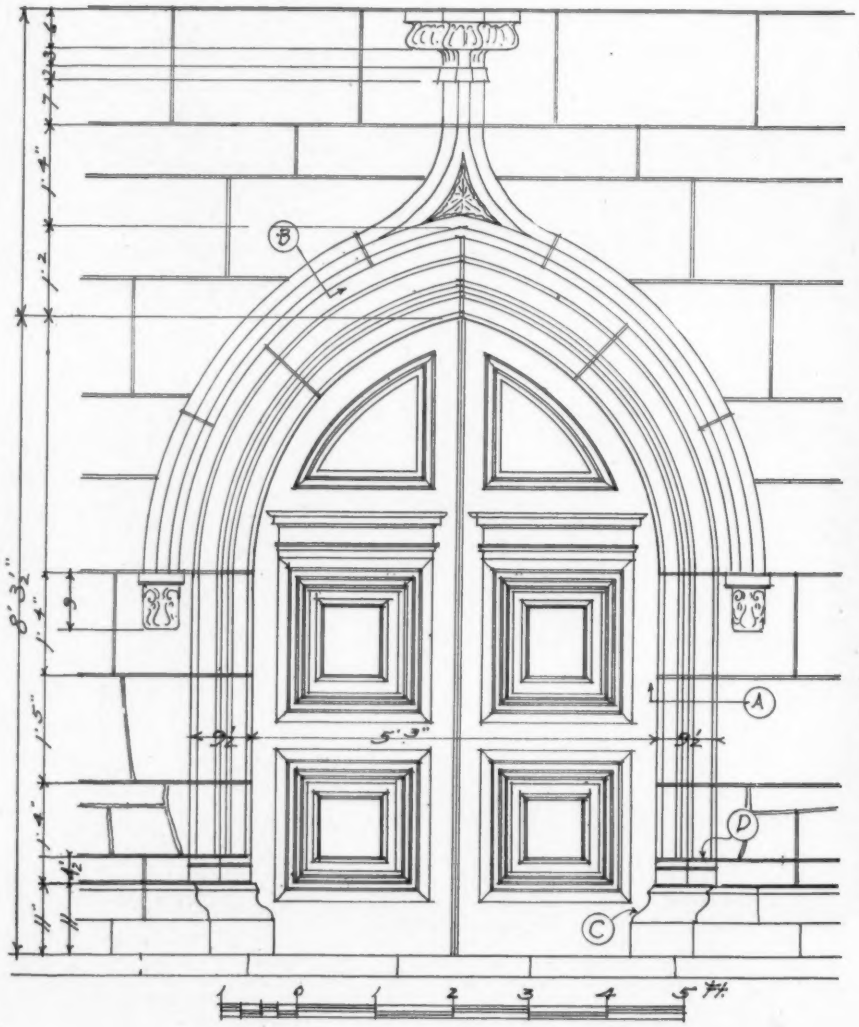
HOUSE OF K. B. C. SMITH, ESQ., TENAFLY, N. J.



R. C. HUNTER & BRO., ARCHITECTS

HOUSE OF K. B. C. SMITH, ESQ., TENAFLY, N. J.

R. C. HUNTER & BRO., ARCHITECTS

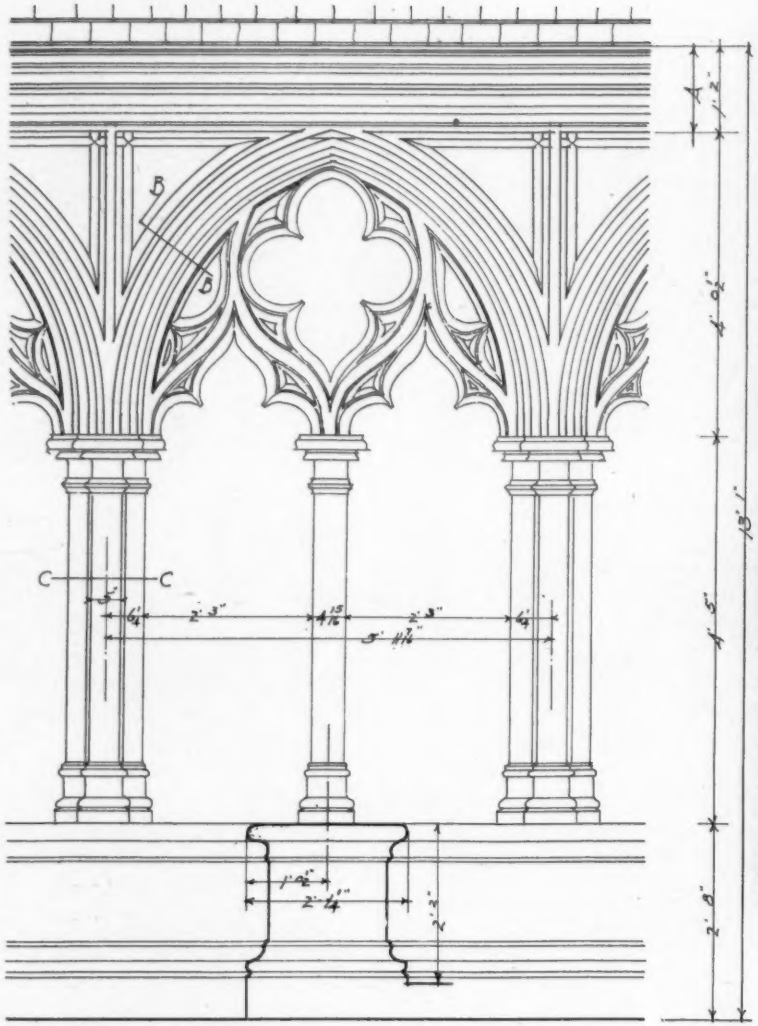


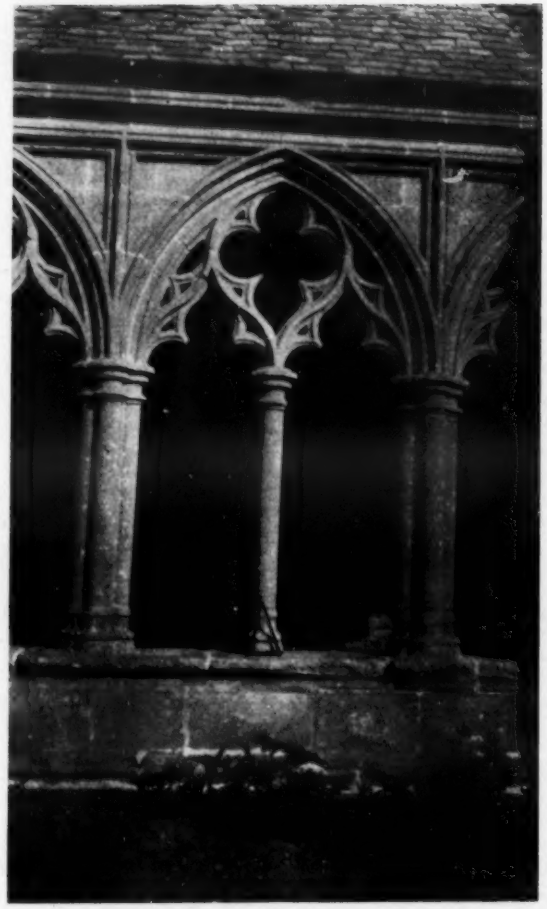
MAIN DOOR, CHAPEL KERFONS, LANNION

THE Chapel Kerfons is situated among the trees several miles off a small road about 5 miles from Lannion in Brittany. It well repays one to visit this little chapel now rarely used for a service, and which bears the date 1559. This main door situated on the axis of the nave is truly medieval in character and although the modern wooden door is a little unfortunate, it does not detract from the splendid qualities of the stone work mellowed by age.

MEASURED AND DRAWN BY ROBERT M. BLACKALL, 35TH HOLDER, ROTCH TRAVELLING SCHOLARSHIP

THE AMERICAN ARCHITECT, SERIES II.
FRENCH AND ITALIAN DETAILS





CLOISTER BAY, TREGUIER CATHEDRAL

THE church at Treguier which was formerly a cathedral was begun in 1150, but not finished until 1461 at which time the cloister was built. Plain for its period, surrounding a garden with a fountain, this cloister of irregular shape nestles close to the church beside it. This church is one of the very few in this portion of Brittany which have a cloister.

MEASURED AND DRAWN BY ROBERT M. BLACKALL, 35TH HOLDER, ROTCH TRAVELLING SCHOLARSHIP

THE AMERICAN ARCHITECT, SERIES II.
FRENCH AND ITALIAN DETAILS

SOUND WAVE PHOTOGRAPHY IN THE STUDY OF ARCHITECTURAL ACOUSTICS

BY ARTHUR L. FOLEY

NO one denies that "the proof of the pudding is in the eating." Yet no one patronizes a baker whose product from day to day must be tested in this manner. No one denies that the ultimate proof of an auditorium is in the hearing. The trouble is that, to date, it has been the only proof in the vast majority of cases. People will not spend a dime with a baker unless assured in advance of the eating that the eating will be satisfactory. They continue to spend millions with architects with no assurance whatever that the hearing will be satisfactory. A dime is too much to spend with a baker who does not know his business. Millions are spent with architects who do not know theirs. Indeed, there are companies whose business is the correction of faulty acoustics for which the neglect or ignorance of the architect is directly responsible. If architects were compelled to guarantee the hearing in their buildings and to pay for its correction when not satisfactory, they would waken to the fact that there is a science of architectural acoustics which, if understood and applied, would enable them to plan buildings with the positive assurance that they will be found fit for the purpose for which they are intended.

Most architects scarcely know that there is such a science as architectural acoustics; comparatively few know that the Riverbank Laboratory at Geneva, Illinois, once described in these columns, Vol. CXVI, July 30, 1919, No. 2275, was erected, equipped and manned for the study of acoustical problems. It is the purpose of this paper to present briefly one of several phases of the problem now under investigation at Riverbank.

The chief acoustical factors with which the auditorium architect has to do are the materials of construction (particularly the plaster or other material of walls and ceiling) and the shape of the room. Sound wave photography is the only method of studying the latter, and as far as the writer knows the Riverbank Laboratory is the only place where such a study is in progress.

The following explanation of the method and apparatus used may be of interest to the reader who cares to know something as to how sound waves are photographed:

In Fig. I, B (at right) is the light tight box about ten feet long and a foot square, cut away in the figure to show details of spark gaps, etc. The far end of the box is arranged to receive an ordinary 8x10 dry plate holder for exposure of the plate P. Upon this plate an intense electric spark at L casts a shadow of anything between it and the plate. If, therefore, an earlier electric spark at S has produced a sound wave at such a time that the wave is still between the light spark L and the plate P, a sort of shadow of the sound wave is cast on the plate.

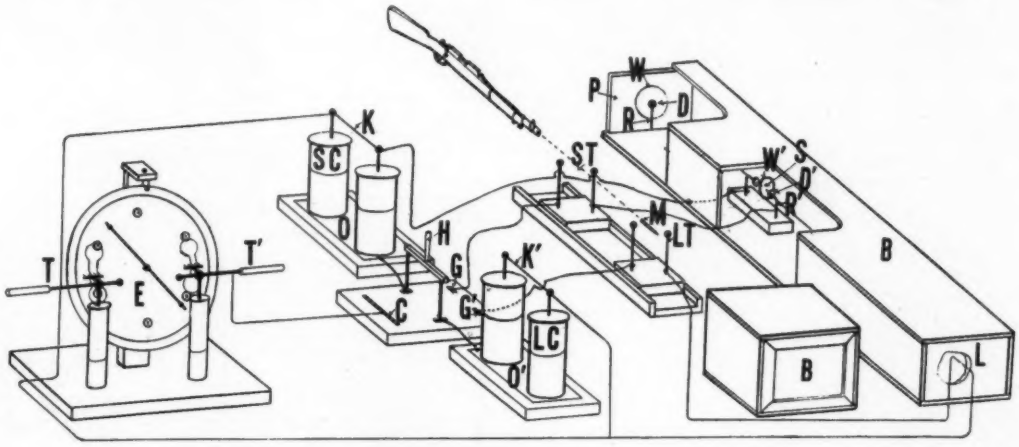


FIG. 1.

If, for instance, W′ represents a vertical cross section of an expanding sound wave at the instant the light spark occurs at L, W represents the shadow of the wave on the photographic plate, which is developed in the usual manner. D is the shadow of small hard rubber disks or buttons

D′ placed on the sound gap terminals to minimize the fogging effect of the light produced by the sound spark, and R is the shadow of the vertical brass rods R′ which support the platinum terminals between which the sound spark is passed.

The chief difficulty is to adjust properly the

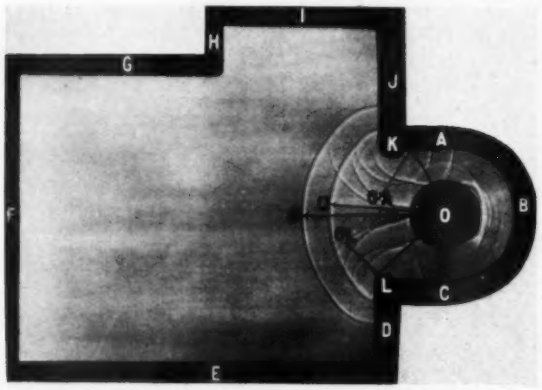


Plate 1

time interval between the sound spark and the light spark. If the interval is too short, the sound wave will not have had time to get out from behind the button D′. If too long, the wave will have expanded so far that its shadow will not fall upon the dry plate. Inasmuch as sound travels at a rate of some 1100 feet per second (depending on the temperature) and we are dealing here with waves at most only a few inches from the source, it is evident that we are dealing with very small time intervals. These intervals usually lie between one-twenty-thousandth and one one-thousandth of a second, and must be controlled to within less than one one-hundred-thousandth of a second.

The sound spark is produced by the discharge of the sound condenser S C, consisting of two or more Leyden jars, the number depending on the desired intensity of the sound spark. The jars have their inner coatings connected by the conductor K, and their outer coatings by the metal sheet O, on which they stand. Similarly K′ and O′ connect the inner and outer coatings respectively of the several jars of the light condenser L C. Thus the capacities of the condensers can be increased at will by adding jars. To insure sufficient light for photographing sound waves, six or more jars are used in the light condenser. Although both the sound and the light condensers are charged simultaneously by means of one electric machine E, the arrangement is such that the two condensers discharge independently of one another.

To charge the condensers the switch H is thrown to the left—connecting one terminal T′ of the electric machine with O and O′, the outer coatings of the two condensers whose inner coatings are continuously connected to T, the other terminal of the machine. When the condensers have taken on a sufficient charge the switch H is thrown to the right, connecting O with G, and O′ with G′. It will be noted that the sound spark must jump an additional air gap S T and the light spark a gap L T, which will be called the sound trigger and the light trigger respectively, as they are introduced for the purpose of "touching off" the spark at the proper time. These gaps are adjusted to be just long enough to prevent a premature passage of the spark. The spark can then be made to pass by bringing a piece of metal between the trigger gap terminals, thus decreasing the resistance of the gap by decreasing the distance the spark must pass through air. The trigger gaps are operated by firing a projectile from a high powered rifle between the terminals. In the figure the projectile M is in position to permit the light spark to pass. The terminals of the gaps are staggered to get a sufficient distance between them to prevent premature sparking and at the same time to permit the long projectile to bridge most of the space when passing. As the projectile passes the sound trigger gap the sound spark occurs and the wave is generated. The wave expands and the projectile moves on and operates the light trigger gap, which causes the light spark which photographs the wave. The position in which the wave W′ is photographed is determined

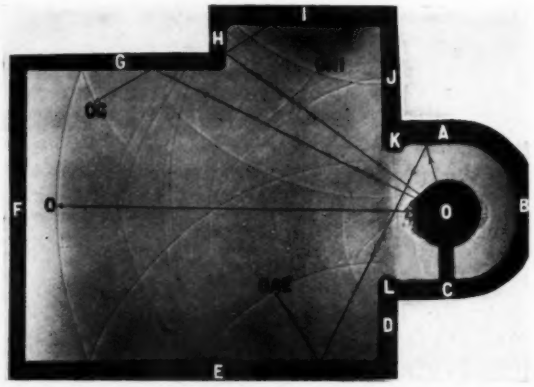


Plate 2

by the speed of the projectile and the distance between the two trigger gaps. The latter is adjustable, as shown in the figure. Because of the relatively high velocity of sound it is desirable to use a high velocity projectile or the two trigger gaps will need to be so close together that cross sparking may occur. The projectile is stopped by means of a box of sand, as shown at B at left of L, in Fig. 1.

The apparatus as used at Riverbank includes an automatic device which throws the switch from the charge to the discharge position and fires the rifle when the charge on the condensers has risen to a certain predetermined value. As such

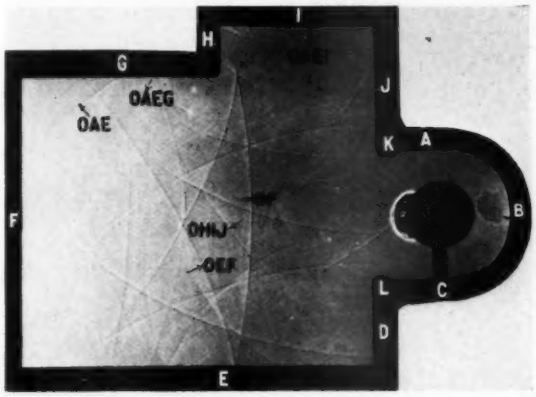


Plate 3

a device is a convenience only and not necessary in the operation of the apparatus, and as its inclusion would complicate the drawing, it is not shown in the accompanying figure.

The photographic method used at Riverbank is essentially that described by Foley* with the exception of the control of the interval between the sound and light sparks. He used the two sparks in series with a single condenser, retarding the light spark by an auxiliary capacity. His method gives results for time intervals so short that the Riverbank method cannot be used. For larger time intervals the latter method is more reliable, because it permits of a more definite control of these intervals. The former only is suitable for visual observation of the waves. Obviously it would be impractical to fire a projectile for every wave where one is making a visual study of them.

The application of sound wave photography to the study of architectural acoustics, using the Foley method, was begun by the late Professor Wallace C. Sabine, of Harvard University, by whom the Riverbank Acoustic Laboratory was planned and for whose use the laboratory was erected and equipped. Professor Sabine's successors at Riverbank are continuing and extending the work, using the modified method previously described. An account of Sabine's work at Harvard was published in THE AMERICAN ARCHITECT, Vol. CIV, December 31, 1913, p. 257, and the *Journal of the Franklin Institute*, January, 1915. Both papers will be found in Sabine's "Collected Papers on Acoustics," published by the Harvard University Press.

It is not the purpose of the author to enter upon any lengthy discussion of the merits of the photographic method of studying architectural acoustics. It is a fact, however, that such a study will yield considerable information to one who has had experience in interpreting sound wave pictures—sufficient information to enable one to know in advance of its construction, something of the possible defects of a proposed room or auditorium. The study is made by making a small plaster paris model of a horizontal section of the proposed auditorium, also a model of a vertical section, so disposing these (one at a time) about the sound spark that the spark will be relatively in the same position with respect to the model that the source of sound would be in the auditorium itself, and then photographing the waves. The four plates accompanying this paper illustrate such a study in the case of a horizontal section of a model of a certain auditorium. The shadow or projection of the section corresponds to the floor plan of the building. The circular end of the building is the stage and the dark circle in the center of the stage is the shadow of the button or disk behind which the sound spark was produced. Thus the source of sound was at or near the center of the stage. The waves shown in the pictures (with the exception of O and O′ on Plate I and O on Plate 2), are those that have been reflected once or oftener from the stage walls,

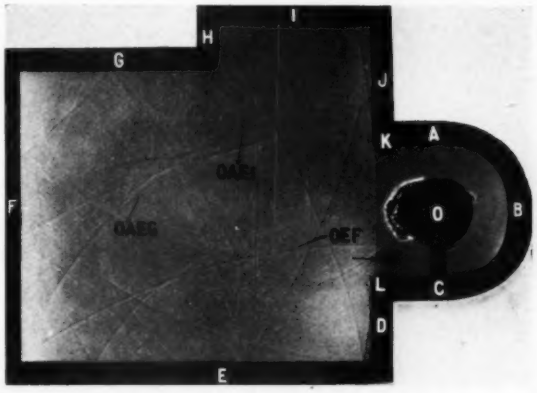


Plate 4

side walls or end wall of the model. For convenience in referring to them these walls or portions of them have been lettered in white and the waves reflected from any one of them given the corresponding letter in black. For instance, on Plate 1 OA (black letters) is the portion of the wave which, starting from the origin O, was reflected from the wall A. On Plate 2, OHI

*Phys. Rev., XXXV, No. 5. pp. 373-386. Nov., 1912.
Brit. Jour. of Phot., LX, Nos. 2751 and 2752, pp. 62-65, 86-89, Jan. 24, 31, 1913.
Revue generale des sciences pures et appliquées, No. 20, pp. 750-752. 30 Octobre, 1913.
Sci. Am. Sup., Vol. LXXV, No. 1937, pp. 108-111, Feb. 15, 1913.

XUM

is the portion of the wave from O which was reflected first from the wall H and later from the wall I. For the convenience of readers not familiar with the science of wave motion the writer has traced the course of a few of the waves and has indicated by arrows the direction of travel of some others. Obviously it would be impractical to try to draw lines to show the paths of all the waves, or even to letter all the waves. It is interesting, however, to trace a few of them through the four pictures. It gives one a vivid idea of what causes reverberation, and of the considerable effect that comparatively slight architectural changes might produce.

The two waves O and O′ on Plate 1 were produced by exposing the dry plate to two sparks with a difference of time interval of 0.00017 second. Plate 1 is the only one on which more than one pulse or wave has been photographed. The more or less complicated wave systems on the other plates are the result of successive wave reflections from the side and end walls of the model of the building. It will be observed that the complication increases as the wave progresses. It would continue indefinitely were the sound energy not gradually absorbed by the surfaces on which the waves fall. The writer knows of a room in which a sound of ordinary intensity can be heard for twenty seconds after its cessation. Inasmuch as the room is but eighteen feet square and sound travels about 1100 feet per second, there must be in this room as many as 1222 reflections (20 x 1100 ÷ 18) before absorption reduces the energy of the sound waves sufficiently to make the sound inaudible. This means that upon the ear of one listening to a speech in such a room there would fall at any instant waves corresponding to all the words spoken during the previous twenty seconds. That speech can be understood at all under such conditions is due to the fact that the sound intensity of the last words spoken is greater than is the intensity of those multiply reflected.

The reverberation period mentioned above was for an empty room. It would have been considerably shortened had an audience been present. An audience is a good absorber of sound energy. Sabine's measurements give a ratio of some thirty to one between the absorbing power of an audience and of a plastered wall,—the exact ratio depending upon several factors, chief of which is the compactness with which the audience is seated, the kind and thickness of the plaster, and the character of the surface plastered. Because of the very high absorbing power of an audience many auditoriums in which the hearing is poor for small audiences are fairly satisfactory for large audiences.

The reader is reminded that the four plates accompanying this paper show the waves reflected from the side and end walls only and that a complete study must include reflections from floor and ceiling, obtained by using a model of a vertical section of the auditorium. Had the writer not found that many do not understand the matter he would not mention the fact that the energy absorption of any surface is a per cent or fraction of the incident wave, and not a constant amount of energy. For instance, if a given surface has an absorbing power of .1 (10%), half the energy will not be absorbed after five reflections or all of it after ten reflections. Calling the initial wave energy 100 and assuming an absorption of 10%, after one reflection the energy remaining is 90%. The second reflection absorbs 10% of 90%, or 9%, and the energy remaining is 81%. The third reflection absorbs 10% of 81%, or 8.1%, leaving 72.9%. More than twelve per cent of the energy would remain after *twenty* reflections and it would require some fifty reflections to reduce the energy to one per cent of the original.

For good hearing an auditorium must have an absorption neither too great nor too little. But whatever the value of the absorption the hearing will not be good in all parts of the room if no attention is given to architectural details which profoundly affect the sound distribution in the room.

DEPARTMENT OF ARCHITECTURAL ENGINEERING

THE RECONSTRUCTION OF A FIRE DAMAGED REINFORCED CONCRETE BUILDING

THE value of reinforced concrete as a building material was well demonstrated during and after the fire in the Sarotti Chocolate Factory at Templehof, Berlin in January 1922. The building, of reinforced concrete, has an overall width of 180 feet with a length of 225 feet. It is built around a central court of about 50 by 70 feet. Before the fire it was five stories high, with basement. A sixth story was added at the time of the reconstruction.

The accompanying illustrations give an excellent idea of the damage done by the fire which damage however, affected the structural strength of very few members. The concrete was of good quality made of aggregates evidently selected for their ability to withstand the action of fire. The importance of such selection was well brought out in this building which might have been a total loss with other aggregates. The greater part of the damage occurred in the concrete fireproofing over the reinforcement. In some places the damaged portions were deeper than the plane of the steel, such destruction not always being apparent but it was discovered when repairs were started.

Fig. 1. Appearance of walls on Interior Court after the fire in the Sarotti Chocolate Factory, Berlin, Germany

The illustrations, while they give the impression that the building was badly damaged, show only the superficial damage. Many apparently sound places were found to be badly shattered when cleaning commenced preparatory to making repairs. The few members that needed to be replaced were entirely removed and new members were cast in place, following ordinary methods for doing such work, great care being exercised in splicing the reinforcement. The joining of new concrete to old was effected by carefully cleaning all surfaces with air chisels followed by a sand blast and washing with neat cement.

When an examination of the structure showed that there was practically no general structural impairment, the decision was reached to replace all the damaged fireproofing and enlarge the columns in order to enable them to carry an additional floor. The question of properly bonding the new work to the old assumed great importance and it was felt that ordinary pouring would not be safe. Some method should be adopted that would force the fresh concrete into the old surface so the bond would be perfect. Some of the larger columns had 12 inches added to the thickness; while about half required 6 inches. In cases where it was suspected that the reinforcement had been damaged new steel was attached to the old and where columns were enlarged to enable

XUM

them to carry additional load new reinforcement was placed outside of the old. The question of cleavage however was most important for slabs and beams, due to the great effect on these mem-

Fig. 2. One of the floors after the fire

bers of changes in floor loadings from time to time and the vibration of machinery.

The owners were anxious to have the repairs completed as quickly as possible in order to reduce the losses due to the factory being shut down. The necessity for obtaining the best bond possible

Fig. 3. An[interior view of an apparatus room after the fire

added to the desire to have the work done quickly led to the decision to use cement guns and cover all reinforcement with gunite. Recent reports of successful fire tests by the Fire Underwriters in Chicago on gunite slabs also did much to form this decision. The removal of damaged concrete was done with an ordinary hammer and chisel. Where necessary, further cleaning was done by means of an air hammer or chisel. The final cleaning was at first done by hand, using wire brushes. A trial of the cement gun as a sand blasting machine proved that this work could be done four times more rapidly than by hand at a great saving in cost. Sand blasting is of course far superior in every way to work done by hand with wire brushes.

The work done on the columns consisted in first cleaning away all concrete showing any sign of damage. New reinforcement was then put in place where necessary and the Gunite was shot on

Fig. 4. Columns after damaged concrete was removed in order to make repairs

to the shaft until the steel was covered. Guides termed "shooting strips" were attached to define the thickness of the second coat, which was then shot and screeded.

The cleaning of beams and girders differed in no way from the methods used for cleaning the columns. The original stirrups and reinforcement were used as supports for whatever new reinforcement was deemed to be necessary and for the reinforcing used for the gunite. New stirrups of round steel were used and to them was fastened expanded metal. The cleaning of the under surface of slabs was very carefully done and expanded metal was used wherever necessary.

Two standard Type N-1 cement guns were first used on this work. Each gun was located in approximately the center of the length of the building but on opposite sides of the interior court. A

separate, electrically driven, air compressor of suitable capacity, was provided for each machine and was located in the central court. Each cement gun was equipped with 100 meters of material hose. The cement and sand were dumped into the basement from the first floor level, close to each machine.

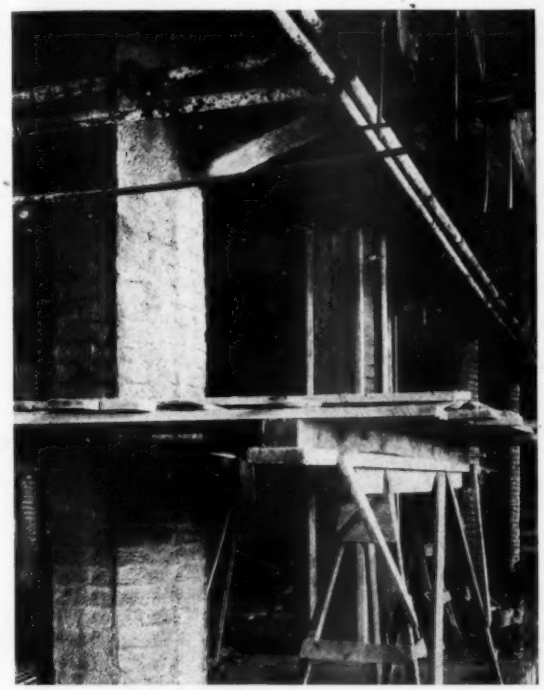


Fig. 5. Appearance of columns after application of first coat of Gunite

Fig. 6. Using a compressed air chisel to remove damaged concrete. Beams in center ready for Gunite

All the shooting, in whatever part of the building, was done from one location of the cement gun. The 100 meters (328 feet) of material hose were found to be needed and the extreme difference in elevation between the machine and the nozzle was 30 meters (about 110 feet). The foregoing lengths and elevations are not out of the ordinary for cement guns.

After the work was commenced it was found to be practicable to install two more guns and work in two shifts. This was done and in each shift one gun was used for sand blasting and the other for shooting gunite.

The reconstruction was from designs by, and executed under the supervision of, Bruno Buch, Architect, Berlin. The contractors were Wayss & Freitag, Berlin.

PAINT PROTECTION FOR WOOD*

BY CORNELIUS T. MYERS, M. Am. Soc. M. E.

Need for Research

WHAT has been said so far shows the need for research work on this subject. Cabinet and furniture makers are vitally interested in a coating which will prevent wood from "working," shrinking and swelling, due to atmospheric changes in winter and summer. Interior woodwork could be greatly simplified if the dimensions of each particular piece of wood remained the same or varied but a very small amount. Flooring, decking, paneling, etc., would be greatly benefited if it did not "work." Many wooden structures would be simpler and more permanent if so protected, and with thoroughly dried timber they would either have a greater factor of safety or could be built with less lumber. Many other advantages will develop as thought is given to this subject—*The Dimensional Stabilization of Wood by Rendering it Moisture-Proof to Some Substantial degree.*

It is well known that shingles and weather boards fastened with old fashioned wrought-iron nails stay tight much longer than those in which the modern steel nail is used. The reason for this is that the steel nail rusts and is flaked off by the movement, or "working," of the piece through which it is driven. A nail tightly driven is practically sealed against external moisture by its head and the paint around it; but if moisture reaches the nail by the capillary action of the wood fibers, it will rust in spite of end sealing. Then too the moisture and capillarity of the wood cause the "working" that rubs off the layer of rust and exposes the nail to continuous corrosion. The

**Continued from page 340 of our October 11 issue.*

XUM

working also abrades the wood and leaves the familiar large, rust-stained hole around an attenuated nail. The same conditions apply to the bolts and other steel fastenings in farm machinery, wagons, motor-truck bodies, and a long list of other articles. It is of vast importance in wood construction, therefore, that we have paints to protect the wood from absorbing moisture. Ordinary paint does not effectively do this except when a large number of coats is applied, and so far as the writer has been able to find out, there has been little or no attempt to produce a paint that will do it.

In the realm of house painting there seems to be a great possibility for economies, either by the use of cheaper paints which will give the necessary protection, or by the use of paints which will last longer. The writer is not familiar enough with this subject to warrant any comments other than to refer to Dr. A. H. Sabin's letter to the *Engineering News-Record* of August 18, 1921, in which he states that even the Pennsylvania Railroad is not always able to protect itself in the matter of paints, and he asks what chance the ordinary citizen has to check up on the paint he should use to protect the house that very possibly represents his life's savings. Paint literature of a technical nature is of no assistance to the average man, and is quite inadequate to explain the why and wherefore of much present practice. Great differences of opinion and some vague reasoning appear. Many contentions seem to be based on a desire to use certain materials or formulas, rather than on comparative service data of a reliable sort. Such men as Dr. Sabin of the National Lead Co., and Dr. Holly of Acme White Lead and Color Works, made frank acknowledgment of the shortcomings of paint technology and totally disavow any detail information concerning the effect of paints on moisture-proofing the cell structure of woods of various kinds. The Engineering Foundation has approved the desirability of this research and has appointed a committee to report ways and means of furthering it. This is a most substantial endorsement. The Society of Automotive Engineers and the American Institute of Architects have also approved and will lend their support.

It would seem that an intimate knowledge of wood cell structure is essential to any investigation of this subject. The Forest Products Laboratory is by all odds our most authoritative source of information on woods and their structure. The Director and his staff have been interviewed and fully agree that this research would be productive of important results, some of which could be expected in the course of 8 to 12 months; also that it can be handled there if funds in a very modest amount, between $10,000 and $20,000 per year, were made available for, say, from five to ten years. The Bureau of Standards has a paint division and has funds to work on the paint end of the research. Doubtless a co-operative arrangement could be made between these two of the most capable and helpful arms of our governmental service. Doubtless, too, the technical heads in the paint and varnish trade would place at the disposal of the Bureau of Standards and the Forest Products Laboratory their great fund of knowledge of paints and oils. Many of these men are already working on this problem, as has been set forth above; but they are handicapped by a lack of intimate knowledge of the various kinds of woods, and they are very much limited both in the time they can give and in the range of materials which they can test.

There is a crying need for such information, and inside of a year after the work is started a considerable amount of usable data should be forthcoming. The difference between the insignificant cost of the research and its value to the country at large is so vast that the writer believes it is only necessary to call attention to the matter in order to institute a widespread demand for action.

THE DESIGN OF A REINFORCED CONCRETE COLUMN FOOTING

BY M. M. BUSH

REFERRING to the article on "Short Methods for Foundation Design" in THE AMERICAN ARCHITECT, October 25, the following example is given as illustrative of the method.

Data:

Column load (live and dead) = 150,000 lb.
Soil value assumed at 5000 lb. per square foot.
Allowable stresses according to Plate I.
Type of footing, two course.

Solution:

Enter Plate 6 and substitute 150,000 lb. for load "L."

$$A = \frac{\sqrt{L}}{70.6} = \frac{\sqrt{150{,}000}}{70.6} = 5.48', \text{ say } 5'\ 6''$$

$$B = \frac{\sqrt{L}}{33.7} = \frac{\sqrt{150{,}000}}{33.7} = 11\tfrac{1}{2}''$$

Total depth $= 11\tfrac{1}{2}'' + 3'' = 14\tfrac{1}{2}''$

$$C = \frac{\sqrt{L}}{192} = \frac{\sqrt{150{,}000}}{192} = 2'\ 0''$$

$$D = \frac{\sqrt{L}}{40} = \frac{\sqrt{150{,}000}}{40} = 9.7'', \text{ say } 10''$$

The design is governed by bond rather than tension, 150,000 lb. being less than the critical load 288,000 lb. Using ½ sq. bars the bond area $A = 0.0556 \checkmark L = 0.0556 \checkmark 150{,}000 = 21.6$ sq. in. The perimeter of a ½ sq. deformed bar is 1.92 sq. in., hence the steel required each way = 21.6 ÷ 1.92 = 11.25. Use eleven ½ in. square bars.

Graphical check of design:

Enter Plate 5 and from 150,000 lb. on load scale trace horizontally to intersection with 5000 footing base curve. From this point trace upward to footing base curve and read $A = 5'\ 6''$.

Continue tracing upward to top scale and read $B = 11\frac{1}{2}''$, add 3 in. for cover, making total depth, 14½ in.

In a similar manner find intersection of load and second curve from the left, from this point tracing upward to top scale as before and read $D = 10$ in.

Repeat process, stopping at cap curve and reading above on middle scale $C = 2$ ft.

The steel and bond areas are obtained in the same way as the concrete sizes: Starting from the intersection of load and bond curve corresponding to 5000 lb. soil, read vertically above on lower scale 21.6 sq. in., required bond area. This area is furnished by eleven ½ in. sq. bars. The corresponding steel area, A_s, is found to be 2 sq. in., the reading being taken from the top scale directly over the intersection of load and 5000 steel curve. In this problem A_s is neglected in favor of bond area, the former requiring ten ½ in. sq. bars each way, while the latter requires eleven ½ in. sq. bars each way. It is necessary to pay attention to bond stress in footings.

RADIUM IN THE HOUSE

BY WILLIAM H. DEY

SINCE the time Monsieur and Madame Curie announced the discovery of the element called Radium, one of the most emphasized points has been the high cost of this remarkable substance. It is worth $3,500,000 an ounce and there are only a few ounces in the world yet many household articles in daily use are treated with radium and can be retailed for as little as twenty-five cents. This is because the properties of radium are such that it can be divided into particles infinitesimally small, but powerful enough to activate other more bulky substances and cause the whole to glow.

The commercial use of radium is made possible through the fact that it can be compounded with a very sensitive crystallized zinc sulphide. The crystals of zinc sulphide when impregnated with a tiny amount of radium produce a self-luminous compound which will glow in the dark continuously over a long period of years.

Luminous Locator Pendant

The best known and most highly developed use for radium luminous compound is on the dials of watches, clocks and recording instruments. The recent war probably did more than anything else to further its development along these lines, the army and navy using large quantities for treating instruments and various articles limited solely to military purposes. With the signing of the armistice the demand for radium for these purposes abruptly ceased. Due to the great demand for radium compound during the war for strictly war purposes, such as watches, compasses, tape, etc., its use in other lines of industry, especially in the electrical field, was greatly retarded.

After the armistice a number of manufacturers immediately turned their attention towards the production of small articles to be attached to objects which had to be located or seen in pitch darkness. The first articles of this nature were pendants or acorns which could be slipped over balls on the ends of pull chains or attached to the keys of key sockets. These were followed by small disks, some of them backed with adhesive substance and others with tacks, which could be used for marking the ends of push button switches and other important things such as keyholes, steps, newel posts, hand rails, furniture, fire extinguishers, match boxes, lantern hooks and other articles too numerous to list.

The success of these articles was remarkable. They seemed to fill a long felt want and manufacturers soon undertook to supply luminous inserts in place of mother of pearl, and pendants containing radium compound, permanently attached to sockets. At the present time architects may specify luminous equipment for any make or style of switch or socket and contractors can obtain the articles through the regular distributing channels. The additional cost of the luminous feature is pretty well standardized and adds to the list price of the wiring device an additional cost of about twenty-five cents.

The value of the radium illuminated switch button, or the pendant on a socket, lies in its accessibility in total darkness. In spite of the fact that the average individual believes he, or she, knows the exact location of all switches in the house, very few can find a button or pendant in the dark without considerable feeling and fum-

XUM

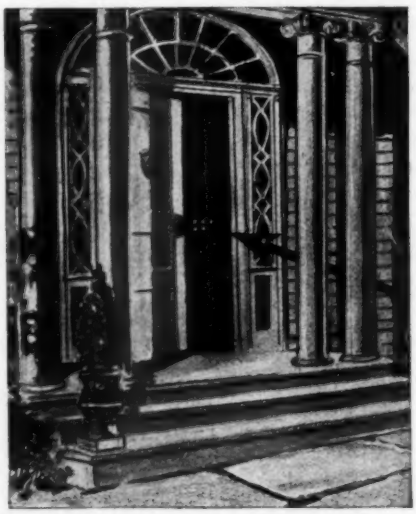
bling. This means the soiling of walls and collisions with furniture and other objects. These difficulties can be overcome by the installation of luminous tipped switches and pendants. For guests in the house who oftentimes are unfamiliar with the location of switches and pulls the radium device is a great convenience.

The outstanding advantage electricity possesses over gas lies in the fact that it can be turned on and off so easily and this leads to considerable saving. However it often happens that an individual on leaving a room for a short time hesitates before turning off the light because of inconvenience in locating the switch or pull chain acorn on his return. The wastefulness of this habit is so great that in thousands of homes lamps are used which may be turned down to consume very little current and give out little more light than is necessary to enable them to be located. Here the radium luminous wiring device performs a service of economy and the burning lamp is not necessary. Radium, the highest priced substance in the world, offers every householder three points of value—convenience, safety and economy.

Toggle Switch with radium luminous insert

The architect can now specify luminous escutcheons and key holes. Nearly all manufacturers of standardized building hardware can supply luminous locks at an additional charge of twenty-five cents for the luminous feature.

There are at the present time four different companies supplying luminous house numbers held in, and protected by, frames. These average in cost about one dollar per numeral. Having located the house by reason of this luminous number, the caller will also appreciate the luminous bell button now furnished by several of the prominent wiring supply manufacturers.



Alcove with luminous insert switches

Fire extinguishers can also be ordered with luminous inserts. This is of particular advantage in case the fire interferes with the electrical wiring and throws the house or building into darkness.

Exit signs in places of public assemblage can be made with luminous letters. This does away with the expense of burning lights at such points and insures the signs being visible if anything interferes with the supply of electricity. It is little short of criminal not to specify luminous letters for all exit signs.

Many furniture manufacturers supply on request at a small additional cost, luminous inserts to be applied to projecting parts of furniture.

Three of the larger companies making hospital signal systems have adopted luminous locating devices so patients may readily call attendants at night, without the annoyance of a night light being maintained.

The location of switches in hotel guest rooms is a topic ever fruitful of discussion. A switch beside the door may be convenient for those who leave and enter but it is not a good location when one wishes to use a light during the night. As a rule the switch at the door should serve only the main light, all other lights being controlled by chains or keys. Switch buttons, acorns on pendants and keys should be luminous.

If switches are luminous and thus easily located one readily can appreciate that there will be less need for the customary sign on the door "Turn out the light before leaving the room." It probably would surprise the average hotel keeper if he could realize how much current is consumed wastefully because switches are inconveniently located, or guests are not familiar with their locations, and have no means by which they may locate them in the dark.

Radium luminous numbers can be used to advantage on hotel room doors. In many cases the management can turn out many lights at a reasonably early hour without causing any annoyance to guests whose rooms happen to be located in unlighted or, at best, dimly lighted halls.

Sufficient examples have been cited to show that clients can be supplied with luminous conveniences in every part of a house and at small cost. They do away with the necessity for lighting matches in order to find one's way around a house when it is dark, and thereby reduce risk of fire. They also do away with wasteful burning of lights when such burning is principally for the purpose of enabling one to find a switch or a pendant. This is another item for architects to add to the Specification Checking List.

Burglar Resistive Concrete For Bank Vaults

By C. D. Hale

IN working out a design for a bank vault McCormick and French, architects of Wilkes-Barre, Pa., developed and tested a method for making burglar-proof concrete which proved to be quite effective as well as economical. The concrete was proportioned and mixed like ordinary concrete, except that 300 pounds of 10 penny cut steel nails were mixed with each yard of concrete. Each batch was thoroughly mixed with the least amount of water required to produce a workable consistency and carefully spaded in the forms. It was found that with the stiff consistency used the nails remained evenly distributed throughout the concrete and did not settle through the mass to the bottom as would have been the tendency had a thin consistency been used.

A specimen of this concrete, one foot thick and three feet square, was made in April and tested in September, 1921. Attempts to break it with sledge hammers were unsuccessful. It proved very difficult to break or drill as pneumatic drills stuck and refused to turn. A block was finally separated by drilling a row of holes part way through with star drills and hard hammers, after which it was wedged open with plugs and feathers. The operation required considerably over six hours time of capable mechanics.

With the pneumatic drills used two hours were required to drill a hole three inches deep. No shattering occurred when explosives were used. The same drills penetrated blocks of the same concrete without nails 3½ inches in two minutes.

This type of construction will not render a vault absolutely burglar-proof where no other protection is afforded, but the tests indicate that the difficulties of penetration are greatly increased and that an effective method has been found for making burglar-proof concrete at a comparatively low cost.

Temperature and Humidity

FROM studies made by the Chicago Commission on Ventilation the relation between temperature and humidity may be expressed by the formula

$$R = 316 - 4T$$

in which

R = relative humidity

T = any temperature above 55 deg. F.

This is a straight line formula and may be plotted on a sheet of quadrille ruled paper. Number vertically upward from 55 to 75 for the temperature and from left to right, from 30 to 78 for humidity. Plot the line given by the formula to obtain the center of the zone of comfort which is approximately three degrees each side of this line until a minimum temperature of 61 deg. at 61% and a maximum of 68 deg. at 57% are reached, the limiting curves then expanding to 5 deg. at 55 deg. F. and 5 deg. at 65 deg. F. An average of three degrees above or below the zone of comfort is too warm in the one case and cool in the other. Above the zone in which it is too warm one finds it very warm and uncomfortable. Below the cool zone it is too cool.

Just what is the best relative humidity for a temperature of 70 deg. F.? Many specifications call for 50%, which is claimed by a number of authorities to be too high as it causes condensation and the deposition of frost on windows during the coldest weather. For a temperature of 70 deg. F. the relative humidity should never exceed 40%. This may be determined immediately from the diagram constructed as above described which gives 48% maximum for 70 deg. F., which is on the edge of the "Too Warm" zone. $316 - 4 \times 70 = 36\%$ as the desirable relative humidity.

The Slump Test for Concrete

IN a recent issue of the *Concrete Builder*, a publication of the Portland Cement Association, appeared the following description of the slump test for determining the proper amount of water to use in concrete. Owing to variations in sizes of materials and changes in moisture content of aggregates the amount of water to be added will naturally vary from hour to hour. The slump test was devised by Prof. D. A. Abrams to enable workmen to test the mixture whenever it may appear necessary during the day. In order to ascertain the proper amount of water the materials used in making the test must carefully be measured, in order to be sure of the percentage of water used.

The only apparatus necessary is a special mold, made from sheet metal, preferably non-corrosive, in the form of a frustum of a cone 4 inches in diameter at the top, 8 inches in diameter at the bottom, and 12 inches in vertical height.

After thorough mixing the concrete is placed in the mold in three or four successive layers, each layer carefully puddled or rammed with a blunt-pointed ⅝-inch round rod. The metal mold is then removed with a steady, vertical lift, leaving the concrete free to spread at the base. The "slump," or reduction in vertical height of the pile of concrete which results, is an indication of the consistency of the mixture.

The consistency which produces concrete of maximum strength is known as a "normal" mixture, and has a slump of about one inch. A reduction in the amount of water of 10 per cent below that required for a normal mixture will change the slump to only one-half inch, and decrease the strength of the concrete about 30 per cent. Increasing the water 10 per cent above normal will result in a slump of almost three

XUM

inches, and a loss of at least 15 per cent in strength.

A portion of the strength of the concrete must sometimes be sacrificed in order to obtain the plasticity of mixture required by the manufacturing processes employed. For pavements, floors and large foundations, the slump should not exceed 3 inches. For thin, reinforced concrete walls where smoothness is required but compacting is difficult, a mixture with a slump of 6 or 7 inches is permissible because its wet consistency practically eliminates the necessity for tamping. Do not make the mixture more plastic than is required by the nature of the work.

Joist and Rafter Tables

THE National Lumber Manufacturers Association, Chicago, Ill., and Washington, D. C., is now distributing tables for the use of designers and constructors.

These tables provide a handy means of determining the maximum clear spans for wood joists and rafters. They are based upon a wide range of strength values and cover ordinary load conditions. The work is so arranged that they may be used in any city and meet the requirements of all building ordinances. The tables were prepared by Richard G. Kimball and bear the issue date of Sept. 10, 1922.

Building Codes and Fireproofing

THE Proceedings of the Eighth Annual Meeting of the Building Officials Conference have been printed and may be procured from the Secretary-Treasurer, Mr. Fred W. Lumis, Building Commissioner, City Hall, Springfield, Mass.

The meeting was held in April, 1922 in Indianapolis, Ind., and was well attended. The papers and discussions covered many points of interest to architects and architectural engineers, who would generally receive much benefit from their perusal and study. Wood, brick, hollow tile, concrete blocks and metal lath received attention together with the difficulties encountered by officials in enforcing building laws.

Power Engineering Exposition

ALL architects, specification writers and architectural engineers should be interested in the National Exposition of Power and Mechanical Engineering to be held in Grand Central Palace, New York City, December 7th to 13th, 1922.

During the past several years, the question of economy in fuel consumption, in the efficient combustion of fuel and the production of power therefrom and the distribution of that power to the points of its application with the minimum of loss, has been much discussed and made the subject of conferences and exhibits.

Numerous means of securing more complete combustion of fuel, a higher percentage of developed power and more effective application of that power exist. In fact, the apparatus, equipment, machinery and materials for securing these ends are legion.

For the purpose of making these things known to manufacturers, architects, engineers, contractors, capitalists and other users and consumers it has been decided to make this an exposition of apparatus employed in the generation, distribution and utilization of power. It is the first of its kind.

The Growing Importance of Gas

SALES of manufactured gas for 1921 touched a new high figure of 326 billion cubic feet, an increase of 7 billion cubic feet over 1920 and 20 billion cubic feet over 1919, according to the third annual survey of the gas utilities of the United States just completed by the American Gas Association.

Coincident with the compilation of its 1921 figures, the association has also made an analysis of the per capita consumption of gas for the last twenty years. This shows that the per capita increase for the ten-year period 1901 to 1911 was 30 per cent, while for the period 1911 to 1921 it was 80 per cent, showing that the American people during the last ten years consumed nearly three times as much gas per capita as they did during the preceding decade.

One of the principal factors in this increase is said by the association to be due to the growing use of gas in industrial plants during the last ten years. At the present time, the survey shows, about 22 per cent of the total amount of gas sold is used by industry in more than 1,000 different ways.

Figures showing the domestic use of gas also reveal a remarkable increase. At the end of 1921, according to the association, 46,700,000 persons in the United States were served with gas through 69,500 miles of mains and 9,291,000 meters, the gas being used in 7,040,000 cooking appliances, 1,573,000 water heaters, 1,268,000 space heaters and 8,800,000 incandescent burners. This is an increase over 1920 of 363,000 customers, 314,000 meters, 1,000 miles of gas mains, 370,000 cooking appliances, 150,000 water heaters, and 144,000 space heaters.

Of the total amount of gas sold for the year 1921, 18.50 per cent was for illumination, 56.71 per cent for domestic uses other than illumination, 21.62 for industrial uses and 3.17 for other uses not classified.

DUNCAN PHYFE, MASTER CRAFTSMAN

Being an account of his work and a description of an exhibition at the Metropolitan Museum of Art

AN exhibition of American craftsmanship of what was probably its very best period, and by a man undoubtedly the best exponent of his time is now open in the Metropolitan Museum of Art. No more important group by a single American cabinet maker has ever been gathered together. The Metropolitan Museum has performed a valuable service in the development of American craftsmanship in the assembling of so important a collection. In a large gallery, splendidly lighted, there are now exhibited more than a hundred pieces, the work of Duncan Phyfe, the New York cabinet maker, whose best period dates before 1825. Every piece shown is of the most undoubted authenticity. In fact, Phyfe is the one American cabinet maker to whom it is possible definitely to attribute a large group of furniture upon other than circumstantial evidence.

The *Bulletin of the Metropolitan Museum of Art,* issued at the time of the opening of this important exhibition, is largely devoted to an historical, biographical and descriptive article. By the courtesy of the Museum authorities, we are permitted to republish this article. It states, in part:

A Phyfe writing table

"The first quarter of the nineteenth century, like all transitional periods, was in the United States one of the most important in its history. Assured of its independence, the new republic was first testing its strength in its internal affairs and in its relations with other nations.

"In New York City this activity in the nation was reflected in concentrated form. The character of the city changed from that of a provincial town into the beginning of a cosmopolitan metropolis. From a leisurely, overgrown village in which Dutch stolidity was mingled with English downrightness, in twenty-five years the town had changed to one whose flavor was predominantly French. This was so markedly true that Mrs. Frances Trollope tells us that she felt herself in a French provincial town during her visit to New York.

"Expression to this change was given in many ways—artistically, economically, and scientifically. A group of young writers, of whom Washington Irving was the particular bright star, created a literature based upon national themes. These writers acted both as recorders of the dying New York of Knickerbocker days and as heralds of a cosmopolitan attitude toward society. Painters such as Vanderlyn and Morse, architects such as McComb and Thompson, were adding to the physical beauties of the city. Fulton, in his forwarding of steam motive power in navigation, Clinton in his championship of the Erie Canal, and Morse in his invention of the telegraph, were men of the day whose contributions led to the great commercial advance of the nineteenth century.

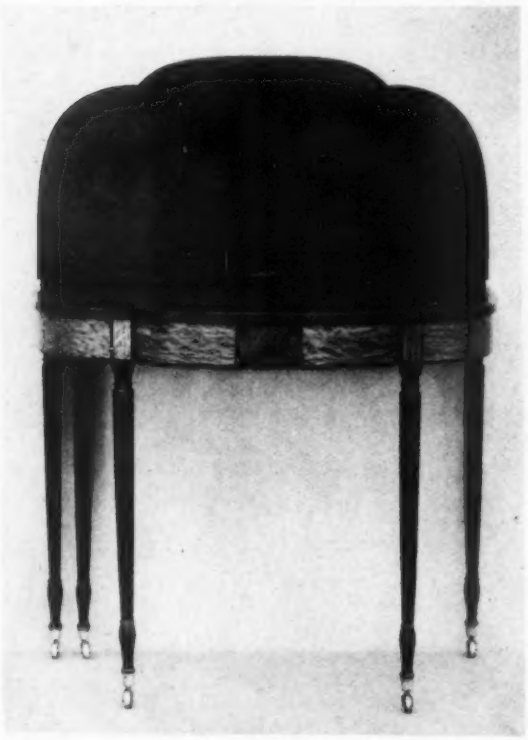
"A concomitant of the increasing prosperity of the city was the building of handsome houses. These required furnishing in the prevailing taste which was growing more and more sophisticated. To Duncan Phyfe would seem to have come the patronage of the most prominent people of the time, and in his work may be seen one form of the record of the tastes and customs of his day, its cultural quality and commercial prosperity.

"Phyfe's importance to us today is thus twofold. First of all, it forms a record of a day which is gone. In the second place, his importance arises from the fact that he, as the heir of the great cabinet makers of the end of the eighteenth century, carrying on their noble traditions of fine design and consummate craftsmanship well into the nineteenth century (farther than they had seemed destined to go), presents in his work an example to modern cabinet makers of the manner in which furniture for contemporary use may be

XUM

designed in the terms of an ancient tradition.

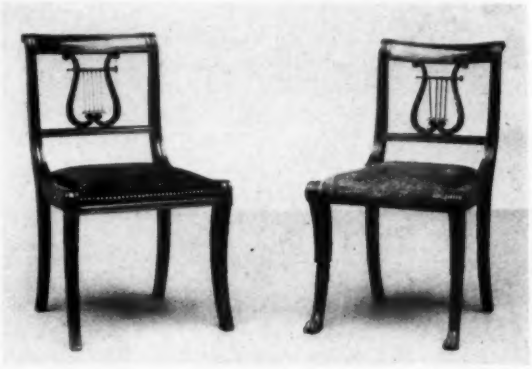
"Partly as a result of the Industrial Revolution, which occupied almost exclusively the interest of the public throughout the second and third quarters of the century, this tradition broke down at the end of the first quarter. In searching today for the earlier traditions which may well be revived in the architecture and decorative art of our own time and carried on with the adaptation dictated by modern tastes and usage, the point of departure would seem to lie in the period when Phyfe was at his best and when such notable buildings as the City Hall in New York, the Capitol at Washington, and the State House at Boston were being built.



A table of Phyfe's best period

"Duncan Phyfe, a Scotchman by birth, came to this country with his family about 1783, at the age of sixteen years, settling first in Albany, where he plied his trade of cabinet maker. Attracted by the growing fame of the young metropolis, he came to New York some time early in the 1790's, where after a few years of struggle a fortunate connection was made with certain members of the family of John Jacob Astor. This meant for him a start in business under the auspices of one of the wealthiest families of the day. From this time on, his output increased continuously, reflecting the changing tastes of the time.

"At first his work was purely Hepplewhite and Sheraton in inspiration, but by 1802 or 1803 the artistic influence of France, which was rapidly



Side chairs

increasing in the new cosmopolitan New York, brought to him certain elements of Directoire, Consulate, and early Empire origin. These he combined gracefully and successfully with the English forms and details with which he was most familiar. Still later, the heavy, solid lines of the full French Empire style came into vogue, and much of his furniture was of this type, simplified, ornamented in a restrained manner with gilt-bronze, and possessing, in spite of its over-

Table with supporting colonnettes

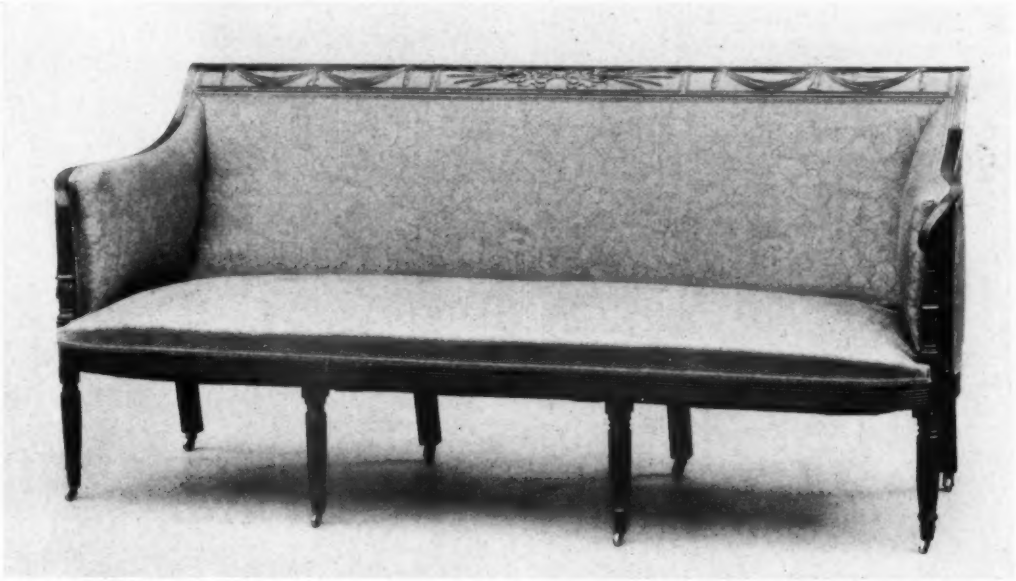
solidity, the qualities of good craftsmanship and material, as well as of intelligent design. With the period of black walnut and so-called 'butcher' furniture, he entered with the public of his day on the downward path of bad taste along which there was for some time no return. Thus a part of his later work need not be considered as a contribution to the history of furniture design, though it does form a record in the history of taste.

"The work of Phyfe, as shown in the Museum exhibition, falls into certain definite groups. His principal output consisted of chairs, tables, and sofas. In addition to these, he made a number of incidental or important pieces of furniture for special use. Although he is not supposed to have done much case furniture (that is, furniture such as chests of drawers, sideboards, and other pieces with drawers and containers), we still do find a limited number of such pieces as sideboards, dressing tables, and serving tables.* Phyfe's furniture varies considerably in the combination of his typical decorative motives. These are too many to take up in detail in this place.

"Certain of Phyfe's details are witnesses to the love of the craft and the pride of workmanship which pervade all of his work. A most apposite example of this is the delicately veneered corner-block which occurs on many tables. The veneer in rectangular or curved form is so unobtrusive as to escape the eye of any but a connoisseur.

"In the arrangement of the exhibition an effort has been made to place the furniture in conjunction with various objects of decorative art of the same period. This has helped greatly in modulating between the delicacy of the furniture itself and the hugeness of the gallery in which it is shown. On the walls are hung paintings and prints by artists contemporary with Phyfe, looking-glasses, girandoles, and sconces. Silver and porcelains are set on the tables. The true effect of the fine mahogany upon which Phyfe lavished such careful attention can thus be seen in association with the colors and gilding characteristic of the period."

*See *Furniture Masterpieces of Duncan Phyfe*, by Charles O. Cornelius, Chapter III.



A Phyfe sofa of Sheraton Derivation

XUM

REVIEW OF RECENT ARCHITECTURAL MAGAZINES

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

THE *Architectural Forum* for August is about the size of a telephone book and is entirely devoted to schools; there are plans of schools, pictures of schools; schools of all sizes and of every conceivable style; schools trying to masquerade as Greek temples; Colonial schools, Mission schools, schools in what they call the Tudor style, all with their innermost secrets laid bare and neatly tabulated, the cost per cubic foot and the cost per room, and the cost per scholar. And there are articles by distinguished architects proficient in school building which tell you just how schools should be built, and that there should be 1 Portable Forge and 1 6 ft. lathe 14 in. swing and 1 grinder, and unilateral lighting and smoke proof tower stairs and all sorts of things that are mysterious and practical, but there seems to be very little said about the architecture of schools. Perhaps there isn't much to say about it; certainly there has not been very much done about it. With all the information contained in the *Forum* it should be quite possible and even quite easy to plan a good practical school, but it is quite a different thing to design one. Probably this very wealth of information and this standardization of requirements have stagnated, and not stimulated, the artistic imagination, and the difficulties are appalling if not insurmountable. A building that is all windows in one place and all blank wall in another, is not easily to be expressed architecturally, particularly if it is a great overgrown box of a building of three stories or more. With such difficult conditions, criticism that is not constructive is out of place, but it might be suggested that the auditorium could, in most cases, be treated with more dignity and architectural expression. The auditorium is, perhaps, not actually the dominant feature of any school, but at least it is the largest unit, and it is only here that there is given an opportunity to do something really worth while. There is no logical reason for treating a room that is to seat 1,000 people, merely as a large rectangu-

From "The Architectural Review," London

West Front, St. Paul's Church, Deptford, England

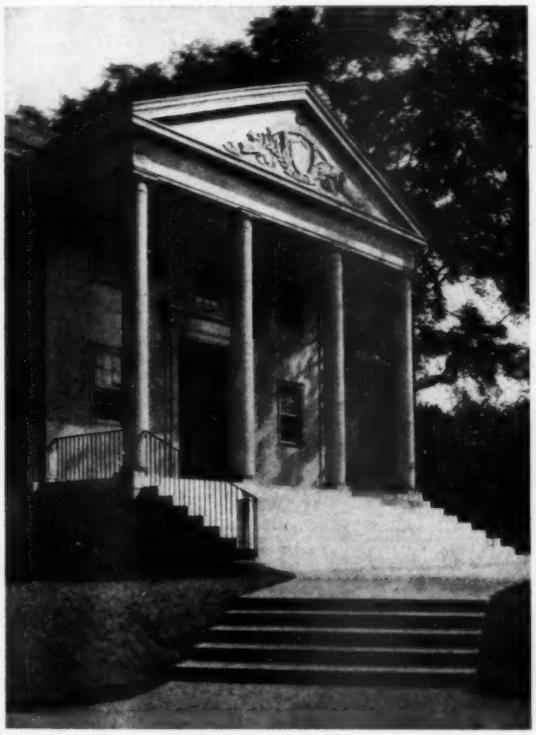
From "The Architectural Forum"

Junior High School, Savannah, Ga.
Wm. B. Ittner, Architect

lar room with a flat ceiling, relying for architectural effect on a few lonely pilasters stuck against the wall. And then again on the exterior there is a general tendency to force upon the elevation some feature as an accent. It may be a portico, or a tower, or an imposing looking doorway which does not contain a door but only a recessed panel. Oftentimes the blank sides of the class rooms are treated as solid massive pavilions, which are imposing when viewed from the front, but entirely out of relation to the excessive fenestration on the side.

Still there are good schools, many of them, and

From "The Architectural Forum"



Detail of Entrance Portico
Town Hall, Kennebunk, Maine
J. D. Leland & Company, Architects

the quality is steadily increasing. School boards are beginning to realize that good architecture is as much of an asset as a good plan, and there is more freedom and originality shown. There have been some notable examples done on the Pacific Coast, which are unfortunately not included in the *Forum*, but Mr. McCornack and Mr. Fox show some photographs of a model of the Handley Schools at Winchester, Virginia, which are extremely good, as is also their Miles Standish School at Cleveland; and Mr. Ittner, who has probably done more schools than anyone else, has tried a very interesting experiment in Savannah, apparently endeavoring to get twice as many windows in a Colonial building as there should be, and the queer thing about it is that it really looks very well indeed. Mr. John Bright presents an original solution of the city school, the class rooms being arranged in polygonal form around a central auditorium and the whole raised upon a square plinth one story in height. Such a building would mass well, and seems economical in cubage. The whole number of the *Forum* is well presented and the articles excellent and worth preserving.

Mr. C. Stanley Taylor, in writing of the architect's relations with School Boards, instances the sad case of an architect who "by correspondence offered, for a certain lunacy board, to examine the site and then to prepare all requisite probationary drawings for the approval of the committee, and all other drawings and details to be submitted to the commissioner of lunacy, and subsequently to draw the whole of the working drawings and specifications for $2,000. The board accepted the offer through its clerk and the architect started his work. His first set of plans was disapproved;

From "The Architectural Record"

A scene from the first act of Mr. Geddes' "Erminie" production, transported without change to his new type of theatre. Every spectator sees everything on the stage at all times. The entire scene yields a sense of luminous space and distance impossible in the existing type of stage. The point of sight in this drawing is from the seat farthest from the stage

XUM

his second set was rejected as too costly and ornamental; his third set was disapproved, and then the board decided to engage another architect." And when in desperation the architect sued to recover his fee the Court held that if he "chose to agree with them that he should not be paid anything for his drawings unless they should be approved by them, I think he ought to be satisfied with their judgment." It would seem the lunacy board were not only keeping well up to their title, but that the architect had qualified as an inmate.

In the *Forum* for September, William Roger Greeley has an interesting article on Memorial Town Halls in New England. The design of his firm for the Tewksbury Town Hall is simple and good, as is their sketch for the little Hall at Dover, Mass. There is some of the usual good work of Clipston Sturgis, and some good examples at Peterborough by Little & Russell, and a good portico of a Town Hall at Kennebunk, Me., by J. D. Leland & Co.

From "The Architectural Forum"

Town Hall, Tewksbury, Mass.
Kilham, Hopkins & Greeley, Architects

The Architectural Record of August has as a frontispiece two color reproductions of an entablature with pilaster and column caps of some building now in course of construction. The scheme is good and it will be interesting to see the completed result, but the caption of Plate II makes the curious statement that "As the pilaster caps are not structural members but are essentially ornamental features, it was permissible to develop polychrome effect to the maximum extent" etc. While we cannot agree with Mr. Solon's theory as to the logical necessity for limiting color on structural members, we would point out that pilaster caps are most certainly structural.

Lawrence Kocher writes of Iron Work in the Early Architecture of Pennsylvania. The illustrations are good but the detail drawing on page 124 gives a very poor idea of the real beauty of the balcony rail on the Stephen Girard warehouse. There is also an article on the Mosaic Work recently executed in St. Aidan's Church in Leeds from the designs of Frank Brangwyn, an apsidal wall treatment in the characteristic style of this great English painter. I had this summer the privilege of seeing a good deal of Brangwyn's work in his studio at Hammersmith, and I wish it were possible here to reproduce some of his original sketches. They are really remarkable in their power and freedom and in their composition.

There seems to be some sort of fatal attraction in squares; Mr. Hambidge favors whirling squares as a sure basis of all design, and now Mr. Ernst Jonson has discovered the Law of Squares and writes about it, fortunately not at length. It appears that if you take the square root of the height of your building and multiply it by 0.32 you obtain immediately the depth of your cornice; in other words, the cornice of the Woolworth Building, should be—well, it's hard to do square root, but anyway it ought to be two or three stories high. Mr. Gilbert should have known of this law earlier.

In *The Architectural Record* for September, Claude Bragdon writes "Towards a New Theatre," "Being" as he says "a Description, with Commentary, of a New Type of Theatre Building designed by Norman-Bel Geddes." There is one sentence, or a portion of one, in this article with which we heartily agree, "Because he (Mr. Norman-Bel Geddes) is neither an architect nor an engineer," the truth of which can easily be seen by referring to the accompanying cut. Walter McLeish Dunbar has some very good photographs of a fraternity house at Cornell and there are two illustrations of the charming iron work of Samuel Yellin, and a photograph of the Memorial to Quentin Roosevelt at Chamery, Marne, by Paul Phillippe Cret, which is simple, restrained and good.

The feature of the August number of *Architecture* is a library in Camden by Walter T. Karcher and Livingston Smith and the October number has an office building in Wisconsin by Childs and Smith which has some novel detail; and there is a continuation of Prof. C. R. Morey's excellent article on Byzantine Art.

The Architectural Review (London) for August

has an interesting and well illustrated article on Modern American Architecture with particular reference to the recent exhibition given in London under the auspices of The American Institute of Architects. And there is an article on Modern

From "The Architectural Forum"

Handley Consolidated Public Schools, Winchester, Va.
W. R. McCormack, Architect George Fox, Associate Architect

Dutch Architecture which is a distinct shock to anyone with Dutch blood in his veins. It is impossible to imagine that all the new work in the Netherlands exhibits such nonsensical Bolshevistic tendencies as are shown in the reproduced work of one Mr. De Klerk. It is bad enough to paint pictures of such rot, but it is a crime to build them in brick and mortar.

The September number of the same magazine illustrates profusely the unsuccessful new building for the London County Council and as a sort of palliative for that stodgy work reproduces some drawings and photographs of a very interesting Georgian Church at Deptford which was designed by William Archer and built in the early part of the 18th Century. The plan is unusual, and the spire, while perhaps a trifle small in diameter for the encircling portico, is good and quite out of the ordinary. The large clock faces are unfortunate and are probably later additions.

In the *Journal of the American Institute of Architects* for August, Mr. Irving K. Pond gives the first of a series of reviews of foreign architectural periodicals. Mr. Pond's remarkable personality is widely known to all the profession here and it is pleasant to find that personality so well expressed in his writings. Except for this review there is little of interest with the exception of a photograph of the Greek statue recently discovered in Italy which is beautiful, and some woodcuts which are hideous. In the September number are some very fine photographs by H. Van Buren Magonigle illustrating his article; and the October issue has a number of housing articles which, if read, would probably prove valuable, and which might explain why it seems essential to house the sturdy Dutch workingman in structures that violate every rule of construction and every canon of good taste. Influenced perhaps by contemplation of this free art, the Editor clutches at a straw, or says he does, the straw being the "very intelligent opinion" handed down by some magistrate in New York, dismissing the application of the Society for the Suppression of Vice to prevent the publication of three books on the ground of obscenity. Just what books they were does not appear, but there is a vague memory that among them was one Petronius. What Magistrate Simpson's intelligent opinion of Petronius was, or why the Editor should rejoice at it, or what the editorial column of the *Journal* of the American Institute has to do with such things, is not clear; all that seems clear is that censorship or restraint of any kind is considered galling. Think what censorship might do to the *Journal!*

London County Hall Competition

A Communication from Francis S. Swales

The Editor, The American Architect,
Sir:

I have read with the usual great interest I find in all of Mr. Egerton Swartwout's articles, his contribution to your issue of October 11, entitled Some New Buildings in London and Some Old Ones, and in the interest of open competitions, upon which imputations are cast, but which I consider to be preferable as a means of selecting an architect to the method of competition among "the favored few," I venture to correct some erroneous impressions which Mr. Swartwout has expressed with regard to the competition for the new London County Hall. Referring to that building, Mr. Swartwout states:

"As I recall it, there was a competition held for this building some fifteen years or so ago, and this competition, like many of the English competitions, was an open one, and was won by a very young architect of little practical experience; and the execution of this important and expensive structure, costing, I think, over ten million dollars, was entrusted to the successful architect without association with an older or more experienced firm. If this statement is correct, I regret I have no means of verifying it as I write; if conditions were as I stated, then the whole proceeding is a distinct example, not of the evils of competitions in general, but of the evils of open and unrestricted competitions in particular. It is conceivable, of course, that a young and inexperienced architect might design and execute a highly successful monumental building; Elmes did it on the exterior of St. George's Hall in Liverpool and there may be other examples, but the chances are that he won't. There is a great deal of difference between a projet and a working drawing. I have no way of knowing whether the building as built is similar to the original sketch, but I assume it is. I can see no other reason for the steep, bare, tile roof than that it was a competition stunt, nor for the curious circular recess in plan in the center of the facade. A circular recessed front, where it leads up to a central dominating feature, can be most successful, as is shown in the Palais de l'Institut in Paris, but the London County Council Building has no dome as the Paris example has, and consequently the steep roof in silhouette looks as if some modern Gog or Magog had taken a huge bite out of it."

XUM

The facts are that the competition for the London County Hall was a "mixed" one. It was a "two-stage" affair—an "open" competition for all who desired to join in the scramble, of which there were about one hundred and a group of "specially invited" or "favored few" consisting of perhaps ten or twelve of the older firms.

The design by Mr. Ralph Knott which won the final award in the mixed competition, was among those first selected in the "open" competition. While it is common English parlance to describe any architect who has not quite reached his dotage as being "very young," Mr. Knott was not in "the juvenile class" to which Elmes and Renwick belonged when they won their spurs in important competitions. My memory, usually dependable, is that Mr. Knott at the time he won the London County Hall competition was four or five years younger than Raphael was at the time of his death, and about the same age as Brunelleschi at the time he won the competition for the dome of the cathedral at Florence. I happen to know that Mr. Knott was an architect of greater accomplishments than his final performance with the County Hall seems to verify. The amount of money provided was niggardly for a building of such vast extent and I recall that, at the time of the competition, I was of the opinion at least twenty per cent additional would be necessary to provide for a structure fit to hold a respectable place among even the modern public buildings of London.

The terms of the competition saddled upon the winner as an associate architect the official architect of the London County Council, Mr. W. E. Riley, who by the same token was to receive one-half of one per cent, which was to be deducted from the fee of the architect. Mr. Riley was also one of the three members of the Jury, the others being the late Norman Shaw and Sir Aston Webb.

The contention which Mr. Swartwout makes against open competitions, based upon results with the London County Hall, therefore fails by errors of hypothesis. Also, his assumption that the building is similar to the original sketch is not correct. The original plan was an approximately straight facade toward the river and was rectangular—it did not follow the boundaries of the site as it does now in execution. A recessed curve formed a central feature of the rear elevation, but within and concentric with it, was placed a circular public hall, which seems to have been eliminated altogether from the plan as built. The "bite" of the "Magog" was not, therefore, "a competition stunt" but was probably introduced due to the older associate architect who was grafted upon the successful architect by the terms of the competition. It was reported in London at the time of the competition that Mr. Riley greatly admired the "crescent front"—or back—of Mr. Knott's plan. The evil, if any, resulting from the competition was the same as in the cases of Liverpool Cathedral and the Duomo at Florence, namely, that of handicapping the winner of the competition with the undesirable help and interference of an older associate. The evil in the conduct of the competition apart from an insufficient money appropriation, lay in the action of the jury in selecting not the *best,* or even one of the best designs architecturally considered, but the *cheapest,* and the result, judging from the illustration in your issue of October 11, seems to be, as Mr. Swartwout describes it, "deplorable."

FRANCIS S. SWALES.

Mr. Goodhue on Liverpool Cathedral

IT is pleasant, in the face of less competent criticism, to know that Mr. Bertram Goodhue considers Liverpool Cathedral to give every promise of being one of the finest cathedrals of the world, it is stated in a recent issue of *The Architect,* London. Mr. Goodhue has himself carried out some of the best churches which have been built in modern times, and is in an unusually good position to arrive at a sound and considered opinion. It is interesting to know that in his view the English architect is less hampered by his clients' wishes than his American cousins. In America, he says, an architect receives a commission to design a church of a given period, while here after the commission is given the architect is given a free hand. We doubt whether this is always the case, but it certainly should be, and we hope that those about to build will give weight to the opinion expressed by one of the most eminent of contemporary American architects.

Find Ruins of Old Monastery

AFTER having been lost for centuries, the remains of the ancient monastery of Nendrum, on Mahee Island, Strangford Lough, have been brought to light through the agency of the Archaeological Section of the Belfast Natural History and Philosophical Society.

The foundation of the monastery is generally dated at A. D. 450, and before that it is practically certain that it was a pagan settlement. It is first mentioned in Muirchi's "Life of Saint Patrick," which was written before 699. It held an important place in the Celtic Church for centuries. After the Norman invasion it was carried on for a time by monks from England, and in later years it appeared as a parish church. Then it became so neglected that the very site was unknown and but recently identified. Effort to preserve the ruins is now being made by the Belfast Society.

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Publishers, The American Architect and The Architectural Review.

Bulletins Issued and In Preparation

Bulletins Issued

No. 1—General Specification Outline (Discontinued)
2—Suggestions Re Card Indexes
3—Specification Outline (Discontinued)
4—Specification Outline
5—Analysis of A Specification
6—Specification for Concrete (Discontinued)
7—Not issued
8—Standard Specification for Concrete
9—Tentative Specification for Reinforcement Steel (Discontinued)
10—Tentative Specification for Testing of Concrete Materials (Discontinued)
11—Survey Questionnaire
12—Not issued
13—Standard Specification for Structural Steel, Cast Steel and Cast Iron for Buildings (Furnishing of)
14—Standard Specification for Structural Steel, Cast Steel and Cast Iron for Buildings (Erection of)
15—Explanatory Notes in Reference to the Form of Specifications to be Issued by The A. S. I.
16—Tentative Specification for Reinforcement Steel
17—Tentative Specification for Composition Roofing (In preparation)
18—Tentative Specification for Oolitic Limestone
19—Tentative Specification for Testing of Concrete and Steel for Buildings
20—Tentative Specification for Architectural Terra Cotta

Bulletins in Preparation

21—Tentative Specification for Water Tube Boilers
22—Tentative Specification for Steel Water Tank and Tower
23—Tentative Specification for Swedish Iron Wire Rope
24—Tentative Specification for Wet Automatic Sprinkler System
25—Tentative Specification for Steel Breeching
26—Tentative Specification for Setting of Oolitic Limestone
27—Tentative Specification for Setting of Architectural Terra Cotta
28—Tentative Specifications for Steel Smoke Stacks
29—Tentative Specification for Excavation
30—Tentative Specification for Fire Brick
31—Tentative Specification for Interior Marble

In addition to the above list there should be added the remaining subjects published in these columns in the October 11 issue and on which work has not been commenced except in a general way in the accumulation of useful data.

Bulletins Nos. 18, 19 and 20 have been mailed to all members. The outlines for these bulletins follow:

Tentative Specification for Furnishing of Oolitic Limestone

I. CONTRACT AND LEGAL

1. Parties:
2. Agreement:
3. Terms:
4. General Conditions:
5. Regulations and codes:
6. Standards:

II. ECONOMIC

Scope of Contract:

7. Drawings:
8. Work Included:

Method of Analysis and Comparison of Bids:

9. Method:
10. Basis:

III. GENERAL DESCRIPTIVE

11. Characteristics, Service Conditions and Ultimate Requirements:

IV. PRELIMINARY PREPARATIONS

12. Shop Drawings:
13. Samples:
14. Models:

XUM

V. MATERIALS

PROPERTIES, CHEMICAL AND PHYSICAL:

15. Source:
16. Description of Stone:

VI. METHODS

SHOP WORK:

17. Carving:
18. Accuracy:
19. Flexural Strength:
20. Washes, Drips, Raglets:
21. Checking:
22. Lewis Holes and Sinkages:
23. Entasis:
24. Moulded work:
25. Finish:
26. Co-operation with other contractors:

VII. SCHEDULES

27. Schedules:
28. Delivery and Completion:
29. Marking and Shipment:

VIII. RESULTS

30. Inspection and Performance:
31. Guarantee:
32. Tests:
33. Rejection:

TENTATIVE SPECIFICATION FOR TESTING OF CONCRETE AND STEEL FOR BUILDINGS

I. CONTRACT AND LEGAL

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

II. ECONOMIC

SCOPE OF CONTRACT:

7. Drawings:
8. Work Included:

METHOD OF ANALYSIS AND COMPARISON OF BIDS:

9. Methods:
10. Basis:

III. GENERAL DESCRIPTIVE

11. Characteristics, Service Conditions and Ultimate Requirements:

IV. PRELIMINARY PREPARATION

12. Samples:

V. MATERIALS

SIZES, WEIGHTS, GAUGES:

13. Sieves:
14. Molds for Concrete Test Specimens:
15. Mold for Slump Test:

QUANTITIES:

16. Sieves:
17. Molds for Concrete Test Specimens:
18. Mold for Slump Test:

VI. METHODS

SHOP AND FIELD:

19. Portland Cement:
20. Sieve Analysis of Aggregates:
21. Decantation Test of Fine Aggregate:
22. Test for Organic Impurities in Fine Aggregate:
23. Reinforcement Bars:
24. Reinforcement Wire:
25. Concrete Test Specimens:
26. Structural Steel:
27. Cast Steel:
28. Cast Iron:
29. Mill Inspection:
30. Shop Inspection:
31. Field Inspection:

VII. SCHEDULES

32. Schedules of Operation:
33. Delivery and Completion:

VIII. RESULTS

TENTATIVE SPECIFICATION FOR ARCHITECTURAL TERRA COTTA

I. CONTRACT AND LEGAL

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

II. ECONOMIC

SCOPE OF CONTRACT:

8. Drawings:
9. Work Included:
10. Methods of Analysis and Comparison of Bids:
11. Conditional Payments:

III. GENERAL DESCRIPTIVE

12. Characteristics, Service Conditions and Ultimate Requirements:

IV. PRELIMINARY PREPARATION

13. Field Measurements:

SHOP DRAWINGS:

14. Contours:
15. Working Drawings:
16. Setting Drawings:
17. Examination of Architect's Drawings:
18. Joints:
19. Beginning of Manufacture:

SAMPLES:

20. Work Samples:
21. Record Samples:

MODELS:

22. Execution and Approval:
23. Photographs:

V. MATERIALS

PROPERTIES, CHEMICAL AND PHYSICAL:

24. Quality:
25. Sizes, Weights, Gauges:
26. Quantities:

VI. METHODS

27. Processes:
28. Workmanship:

SHOP AND FIELD:

29. Joints:
30. Washes:
31. Cutting and Fitting:
32. Overs:
33. Anchors:
34. Expert Setter:
35. Authority of Setter:

FINISH:

36. Color and Finish:
37. Inscriptions:
38. Co-operation with other Contractors:
39. Protection of Work:

VII. SCHEDULES

40. Delivery and Completion:
41. Marking and Shipment:

VIII. RESULTS

42. Inspection and Performance:
43. Guarantees:

TESTS:

44. Checking:
45. Rejection:

REQUIREMENTS FOR MEMBERSHIP

Membership in the Institute shall consist of the following grades: Active, Associate and Honorary members and Patrons. No persons who are engaged in the production, manufacture or distribution of materials that are purchased or used under specifications shall be eligible to membership.

Active members shall be not less than twenty-five (25) years of age and shall be persons who devote their entire time or a part thereof to the writing of specifications.

Associate members shall be not less than twenty-five (25) years of age and shall be (a) testing and laboratory engineers who are engaged in research relating to materials or methods that are subject to or included in specifications and (b) instructors in specification writing in architectural and engineering schools.

Honorary members shall be persons who have rendered distinguished service to the art or science of specification writing.

Patrons shall be persons who have contributed to the financial support of the Institute.

With the exception of Honorary members, all members shall have the privilege of voting and shall be eligible to hold office. Honorary members shall not be entitled to vote or hold office but shall be entitled to all other privileges.

PERSONALS

B. Leo Steif & Company announce the removal of their offices to the Garrick Building, 64 West Randolph Street, Chicago, Ill.

Arthur T. Remick, architect, has moved his office from 52 Vanderbilt Avenue to 135 East Forty-third Street, New York City.

F. J. & W. A. Kidd, architects, announce the removal of their office from 232 Delaware Avenue to 524 Franklin Street, between Allen and North Streets, Buffalo, N. Y.

Thomas Ware, architect, formerly at 530 West Twenty-sixth Street, Norfolk, Va., is now located at 1507 Granby Street, that city. Manufacturers are requested to send catalogs and samples.

The H. H. Winner Company, bank architects and engineers, announce the removal of their offices to more suitable quarters on the Third Floor of the Sharon Building, 55 New Montgomery Street, San Francisco, Cal.

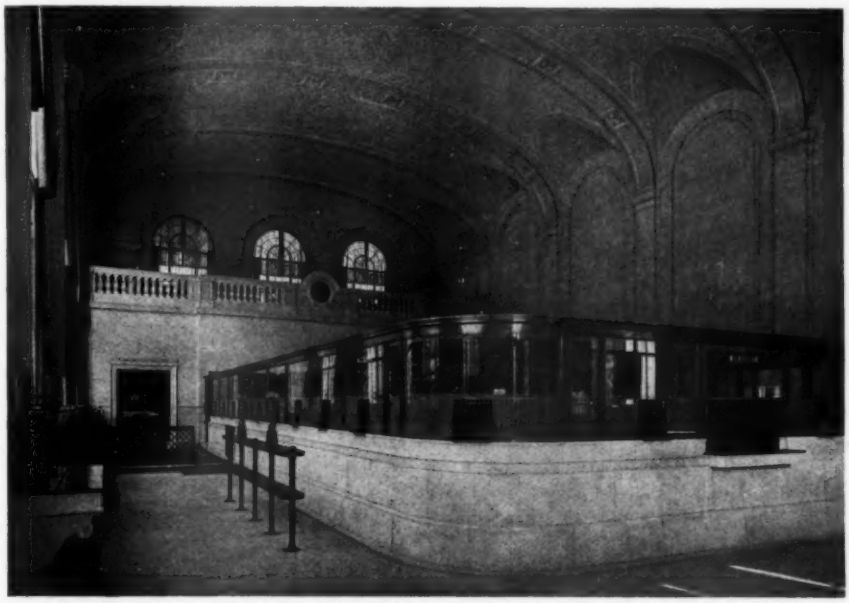
Henry Calder Thorne, formerly with Gibb & Waltz, architects, announces the opening of offices at 139 East State Street, (Sage Block) Ithaca, N. Y., for the general practice of architecture and landscaping. Manufacturers' catalogs and samples are requested.

The Pittsburgh Architectural Club announces its annual exhibition to be held in the Carnegie Galleries from December 3 to 24, 1922. Entry slips will be mailed during this month.

H. W. Goetz, architect, has moved his office from 210 Falls Building, Memphis, Tenn., to the First Merchants National Bank Building, Middletown, Ohio. Manufacturers are requested to send catalogs and samples.

R. Clipston Sturgis, F. A. I. A., announces that William Stanley Parker, F. A. I. A., William B. Coffin, A. I. A., William Adams, A. I. A., S. Winthrop St. Clair, A. I. A., and Alanson H. Sturgis, A. I. A., are now associated with him in the practice of architecture, the organization being known as the office of R. Clipston Sturgis, architect, 120 Boylston Street, Boston, Mass.

The University of Illinois, Urbana, Ill., announces the following accessions to the instructional staff in the Department of Architecture: La Force Bailey as Assistant Professor of Architecture; Claude A. Patterson as Associate in Freehand Drawing; Edgar Green Shelton as Instructor in Architecture; Ernest Pickering as Instructor in Architectural Design; Everett Stanley Meder and Thad C. Epps as Half-time Student Assistants.



Interior View

East Brooklyn Savings Bank, Brooklyn, N. Y.

Koch & Wagner, Architects

XUM

Start Biggest Mausoleum

THE cornerstone of what is said to be the largest mausoleum in the United States was recently laid in Fairview Cemetery, Fairview, N. J. The mausoleum, which contains 5,000 crypts, is 45 feet high, 275 feet long and 125 feet wide.

New Head for M. I. T.

DR. SAMUEL WESLEY STRATTON, for the last twenty-one years director of the Federal Bureau of Standards, was recently elected president of the Massachusetts Institute of Technology. He will take office January 1, 1923, filling the place made vacant by the death of Dr. Richard C. MacLaurin, in January, 1920.

Dr. Stratton was born in Litchfield, Ill., in 1861, and was graduated in 1884 from the University of Illinois. From 1892 to 1901 he was with the physics department of the University of Chicago.

School of American Sculpture

W. FRANK PURDY, long president of the Art Alliance in New York and for thirty years in charge of the department of sculpture at Gorham's, New York, has recently relinquished that connection in order to undertake the management of the School of American Sculpture. This school was founded by Solon H. Borglum about four years ago. It was reopened in Fifty-ninth Street, New York, on October first, last. Mr. Purdy will be assisted by a committee of distinguished governors, including Daniel Chester French, Herbert Adams, Robert I. Aitken, Frederic W. MacMonnies, Hermon A. McNeil, George Grey Barnard, Anna Vaughn Hyatt, Frances Grimes and Mahonri Young.

Philadelphia Sesqui-Centennial Exhibition

ON recommendation of the Engineers' Club of Philadelphia and the Philadelphia Chapter of the American Institute of Architects, Dr. Paul Philippe Cret and Mr. E. B. Temple have been designated as Architect and Engineer, respectively, to take charge of the preliminary planning of the Sesqui-Centennial Exhibition to be held in Philadelphia in 1926 in celebration of the 150th anniversary of the Signing of the Declaration of Independence. In explaining the action of the Committee on Grounds and Buildings, headed by General Atterbury of the Pennsylvania Railroad, Colonel Franklin D'Olier, President of the Association, said: "The purpose of this move is to work out a tentative plan of grounds and buildings on the Parkway-Fairmount Park Site. Mr. Temple, in consultation with the Engineers' Committee, and Dr. Cret, in consultation with the Architects' Committee, and also with the approval of our Association, will select their associate engineers and architects. They will form a small, compact, rapidly-working group of engineers and architects who will submit this plan at the earliest possible moment. Dr. Cret and Mr. Temple have volunteered their services as a matter of civic pride and will act without compensation for this preliminary work."

London's Greatest Architects

SOME time ago, *The Building News*, of London, desiring to name the twelve greatest architects of London buildings in the 17th, 18th and 19th centuries, offered three prizes of £25, £10 and £5, respectively, to the three competitors sending in the most complete lists and most nearly placing the names in rotation which the consensus of opinion has allotted to them.

This competition has now been closed, and the following list awarded the prize:

1. Sir Christopher Wren
2. Inigo Jones
3. Sir W. Chambers
4. Sir Charles Barry
5. Sir John Soane
6. Robert Adam
7. R. Norman Shaw
8. Sir Gilbert Scott
9. George Edmund Street
10. Sir Robert Smirke
11. James Gibbs
12. John Nash

Mark Twain's California Cabin Dedicated

THE Mark Twain memorial cabin at Jackass Hill, near Sonora, Cal., was recently dedicated with Governor William D. Stephens delivering the dedicatory address. Twain slept and ate in the cabin, which has been restored, during the time he prospected for gold in California. He gave up prospecting and left this district in 1865.

The Governor recited events of Twain's arrival at Jackass Hill in December, 1864, his prospecting days, and his life in the cabin, which has been restored.

"The beginning of Twain's career of making men's tasks easier to bear," the Governor said, "is indelibly associated with his days in the mining country of Tuolumne and Calaveras Counties. In his cabin the sick were made well and the well made better as the result of his cheerfulness and humor."

XUM

CHURCH OF ST. CATALINA, SEVILLE