SOUTHERN ARCHITECT *and* BUILDING NEWS

APRIL
1930

CIRCULATION IN THE SEVENTEEN SOUTHERN STATES
2 TO 5 TIMES LARGER THAN ANY ARCHITECTURAL JOURNAL

Entered as second-class matter January 15, 1928, at the Post Office, Atlanta, Ga., under Act of March 3, 1879
General Office, 402-404 Trust Company of Georgia Building, Atlanta, Ga.

The Editor's

ANNOTATIONS

WE are passing through an economic cycle in the building industry today which should cause the architectural profession no little concern. The situation in the South is no different from existing conditions throughout the country. Frankly, we feel there is at this time a great opportunity offered the construction industry in all its branches for a co-ordinated effort, under the leadership of the architectural profession, towards the elimination of one of the most distressing problems which has confronted the industry during the past several years. We refer to the great waste in money, materials, time and human effort expended in speculative building in the field of residential and apartment house construction by private enterprise from inadequate plans and poor construction at the hands of individuals wholly unfamiliar with good practice in design, planning and construction.

We have before us a report made by Thomas S. Holden, Vice-President, the F. W. Dodge Corporation, in charge of building statistics, to the National Building Survey Conference which brings out some facts of timely interest. We quote Mr. Holden: "During past twelve months new residential building in thirty-seven eastern states one billion dollars less than average for years nineteen twenty-five through nineteen twenty-eight. Other classes building and engineering work have increased. Entire building recession due to residential slump mainly speculative apartment and development projects. Some of the apartments and houses built last boom and now vacant or unsold reported to be inferior in design and construction. Unregulated private initiative has resulted in economic waste with adverse reaction on all business. Trend today in large commercial building projects and highest grade residential developments toward close co-operation of architects, contractors, real estate experts and owners in advance planning. Similar co-operation lacking in most speculative residential work. Could not Building Survey Conference recommend American Institute of Architects, National Association of Real Estate Boards and United States Chamber of Commerce co-operate in calling series of local conferences of architects and realtors under leadership of local chambers of commerce to investigate matter of unsold houses and vacant apartments? I believe these groups will find architect planned and supervised residential developments sell better than private plan operations. Local conference should further consider permanent organization of architects and realtors for advance research on housing needs, advance planning of community development, promotion of better standards of housing construction. Let us not forget construction activity is first step to increased employment and prosperity. Now apparent right kind of residential building should be accelerated."

We do not believe the different chapters of the American Institute of Architects in the South could do a more valuable work at this time than to undertake immediately a complete survey of residential and apartment house vacancies in each city and section due to poor construction and inadequate planning and in co-operation with their local chamber of commerce, real estate boards, and other organizations concerned with the construction industry and better housing developments, bring to light the false economy of speculative building from private plans.

BALTIMORE TRUST BUILDING, BALTIMORE, MD.
TAYLOR & FISHER AND SMITH & MAY, ARCHITECTS

VOLUME LVI
No. 4

SOUTHERN
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and BUILDING NEWS

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The Baltimore Trust Building

BY

ERNEST RAY DENMARK

WE wonder some time if we Americans have not come to judge all architecture by the bigness of the thing . . . there are so many mammoth structures of concrete and steel, brick and stone, glorifying as they do the skill and ingenuity of modern man . . . that when we come to consider the true æsthetic merits of any one of these cathedrals of commerce and industry we immediately lose our right perspective of the subject under judgment in our enthusiasm for and worship of this New World Architecture to which we in America have given birth?

Perhaps the Directors of the Baltimore Trust Company were thinking along this line when they decided upon their architects . . . by awarding the commission to two firms, Taylor & Fisher and Smith & May, collaborating, would they not stand a better chance of securing the desired results . . . a building which would be, when completed, judged frankly upon its merits of architectural beauty and structural unity without thought of or comparison with any other similar building in the country? And, no doubt the architects felt the same way when they decided to call in such artists as Hildreth Meiere, who did the exceptionally fine mosaic designs of the main banking room floors; R. McGill Mackall, who is doing the mural decorations; and such craftsmen as Samuel Yellin, who executed the many fine examples of wrought iron; G. Owen Bonawit, the leaded glass in the Board Room, and Mack, Jenney and Tyler the decorated ceilings. It is seldom that an architect or architects are privileged to do a building where they are at liberty to associate themselves with such outstanding artists and craftsmen. That they have obtained a singular success is evidenced by the completed structure as you look at ti from every critical angle.

Rising majestically on the ground that only a quarter century ago was swept by a devastating fire, the new Baltimore Trust Building, at Baltimore, Light and Redwood Streets, occupies a commanding position in the very center of the city's business and financial district.

Its skyward reach to a lofty tower five hundred feet above the street suggests that the smouldering fires of Baltimore enterprise were fanned by an inspired vision into this very definite expression of confidence in the city's future. It is some 112 feet in breadth and 192 feet in length, and contains thirty-four stories above the street level, with three stories below ground.

There was a very definite engineering problem involved in erecting this building. Its site is in a district of the city that is furously alive with traffic so that the problem of unloading and moving into place the enormous quantities of materials required by the huge mass was one that could not be lightly considered. It is no small feat to work out the plans for the assembling of such items as 7,600 tons of structural steel; 6,000,000 bricks, 16,500 cubic feet of marble; 1,000,000 feet of wire for the conduits, cables and light connections; besides the thousands of feet of stone for the exterior trimmings, and such things as the 15,000 gallons of paint, the 1,600 door frames and as many doors, not to mention the windows, ornamental ironwork, plaster, sheet metal, hardware, etc. None of these could be moved into place before they were needed, for there was no space to store them; and when they were lifted, it was by means of hoists traveling at a rate of 1,000 feet a minute. It is of interest to note that whereas such lifts usually do not carry a man, on account of the supposed danger, the engineers on the Baltimore Trust Building decided to have a man ride on each hoist, in preference to having workmen up above leaning out over the shafts yelling down instructions. The results were satisfactory—no accidents occurred.

The rugged profile tower leads the eye upward to a rich capping of carved buttresses topped by a steep ribbed roof that flashes copper and gold in the sun.

Taylor & Fisher : Smith & May
Architects

The bold architectural sculpture . . . symbolic beasts and birds and conventional ornaments executed in blocky massive technique carry great distances.

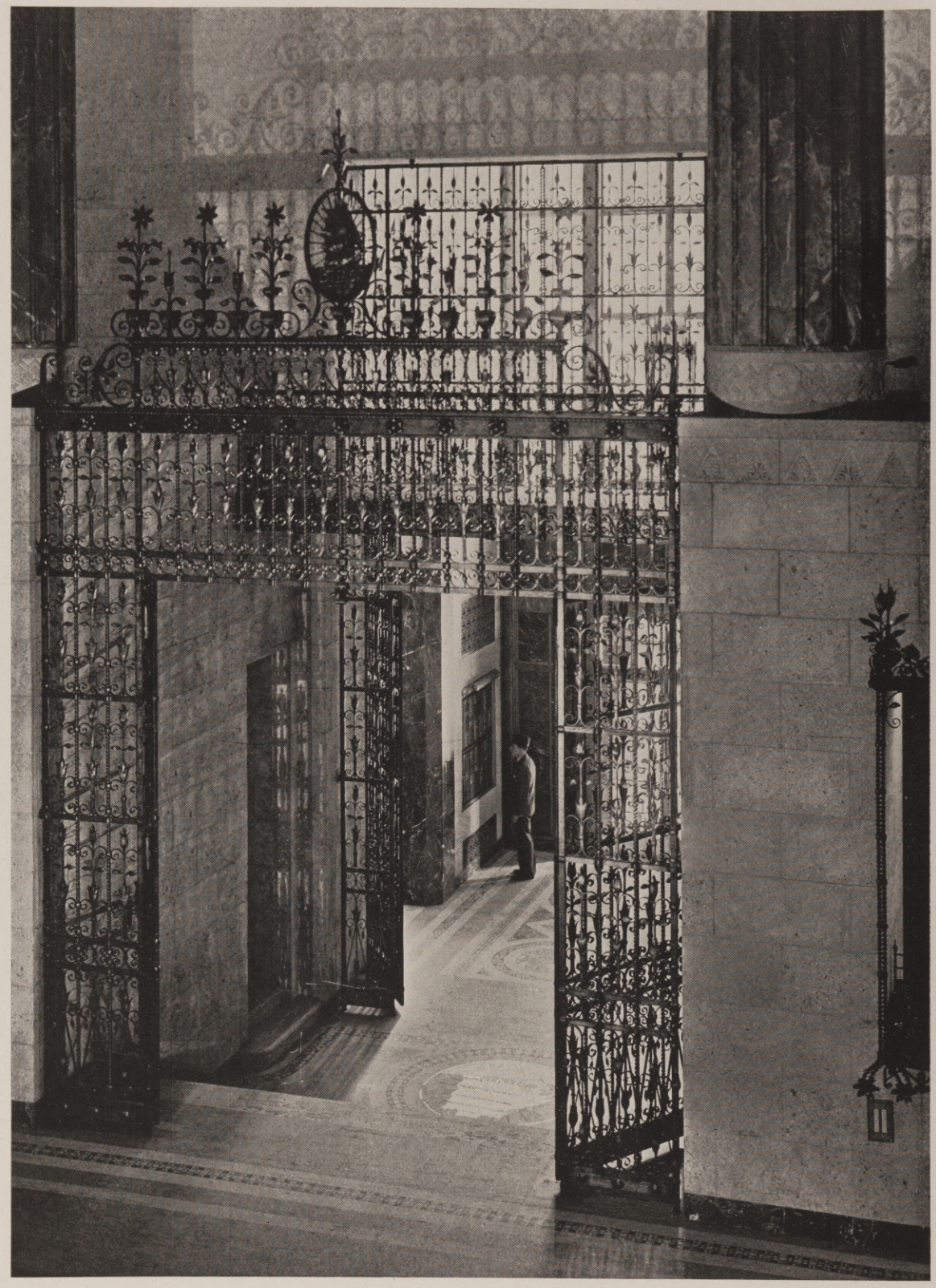
Taylor & Fisher : Smith & May
Architects

From a high-vaulted lobby the visitor enters from the Light Street side thru impressive wrought-iron day gates.

Taylor & Fisher : Smith & May
Architects

Detail showing wrought - iron day gates leading from the lobby of the Light Street entrance.

Taylor & Fisher : Smith & May
Architects



The iron day-gates as seen from the banking room. Here Samuel Yellin has recaptured the craftsman's spirit of the Middle Ages.

Taylor & Fisher : Smith & May
Architects

The elevator lobby showing specially designed mail box and elevator doors in cast bronze.

Taylor & Fisher : Smith & May
Architects

A bold stone base, surmounted by a heavy corbelled cornice near the fifth-floor line, forms the treatment of the bank's own portion of the building. Above this a plain brick shaft, with powerful vertical lines formed by the piers, rises to the tower cresting—the stone-carved, richly ornamented twentieth story. Above this point the structure, reduced to a tower form, rises with rugged profile and an upward, soaring quality to a rich capping of arches and winged buttress caps, surmounted by a steep, groined roof of copper and gold.

The exterior ornamentation is highly original. The two main entrances, one on Light Street leading to the elevator lobby, and one on Baltimore Street leading directly into the main banking room, are archways having their architraves filled with symbolic carvings representing either some of the crafts which have contributed to the city's progress or several of the outstanding events in her history.

At the top of the corbelled stone cornice, near the fifth floor line, a frieze of carved ornament extends around the building. Between panels of conventionalized animals typifying Wisdom and Patience, sculptured discs are introduced to represent certain activities specially connected with Baltimore.

High up in the tower are many examples of bold architectural sculpture—symbolic beasts and birds and conventional ornaments executed in the blocky, massive technique with which the modern sculptor has learned to make his modeling carry great distances, and strong in that quality of the grotesque which is so marked a note in all modern art.

The principal entrance to the building is at the center of the Light Street front. Here one finds a noble arched portal fifty feet high and twenty feet wide, through which the visitor passes to enter a high vaulted entrance hall. From this lead off to right and left the elevator lobbies, with directly in front a flight of steps ascending to the side portal of the main banking room. A huge day gate of ornamental metal screen separates the building lobby from the bank, and makes it possible to close the bank to the public on Sundays and holidays, while at the same time permitting the visitor to the building to have a glimpse of the enormous banking room.

To pass through the day gates into the main banking room, is to enter a room that is decidedly different from any other in the country. The lower floor, for instance—the full area is three stories high, and nearly 200 feet long—is treated as a base, with the chief architectural motif of multi-colored marble columns beginning at the top of this base, at the level of the first mezzanine floor. Also, instead of the usual column capitals of more or less pretentious design, there is used a group of gilded and colored ceiling beam brackets over a simple neck of Tennessee marble, so that the polychrome ceiling itself, strongly reminiscent of Italian ceilings of the coffered type, is tied to the column treatment in a logical manner. Finally—and this is perhaps the most pleasing feature of the whole composition—the color scheme is one of amazing softness, and perfect harmony, a unity of subdued conformatory tints hardly credible when one considers the multi-range of materials employed, and the diversification of their hues.

This is one of the largest undivided banking rooms in the world. But the impression that you gather, as you enter from either Baltimore or Light Streets, is not so much of size. Rather it is a sense of the striking architectural conception and the rare beauty of treatment.

It is a veritable temple of finance, with its varicolored columns of rare marble—Pyrenees, Levanto, Rouge Reja, Verde Antique and Marion—supporting a beamed ceiling richly polychrome in character, vaguely reminiscent of the Italian.

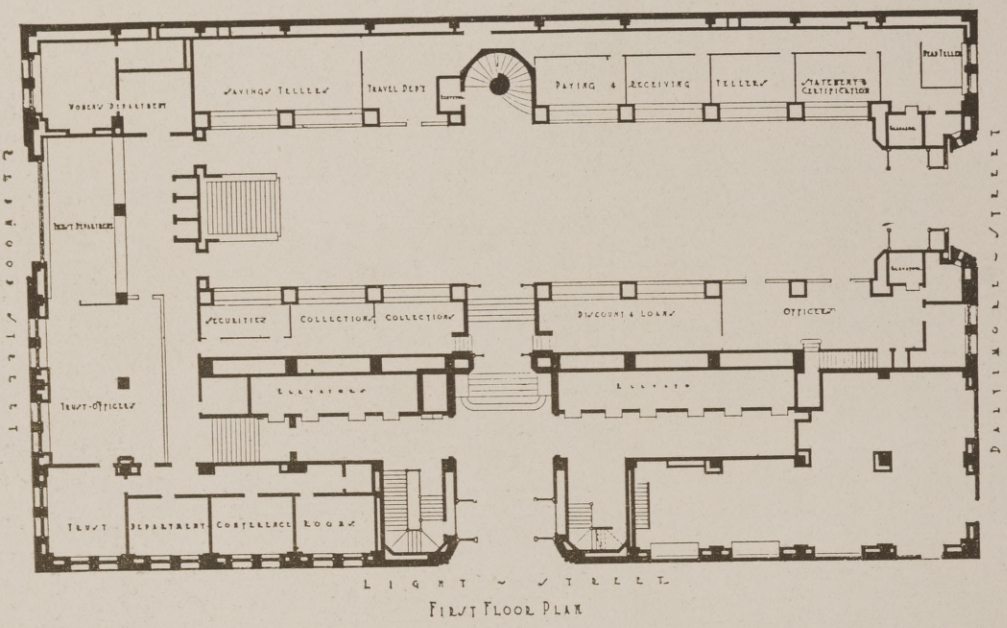
In the floor, too, an unusual motif is employed in the marble mosaic which is most interesting in its symbolism. Conventional borders weave a pattern into which are set several distinct features. The most striking of them is a group of four figures representing those special human virtues—Vision, that quality which enables one to see great things; Courage, the nerve to undertake a task; Industry, the determination to carry on, and Co-operation, the ability to work with others.

Samuel Yellin, a craftsman of rare technique, has contributed one of the most artistic features of the banking room in the great iron day-gates that stand guard at the Light Street entrance. The same skillful hand designed and wrought the ornamental screens over the banking counters and the iron supports for the customers' desks. In the twisted stems and vine-like tendrils, forged and welded by hand, the artist has recaptured the spirit of the Middle Ages.

A sweeping stairway leads to the wide mezzanine floor, where the officers' desks and executive offices are located.

The Board Room is on the third mezzanine floor. Here Baltimore financial history will be made against the background which history has bequeathed. This room, in its feeling, creates a reverence for the tradition of banking, the inspiration for its treatment coming from those Florentine palaces where modern banking was born, under the Medici and the merchant princes of Tuscany.

THE BALTIMORE TRUST BUILDING, BALTIMORE, MD.
TAYLOR & FISHER AND SMITH & MAY, ARCHITECTS



FIRST FLOOR PLAN

THE BALTIMORE TRUST BUILDING, BALTIMORE, MD.

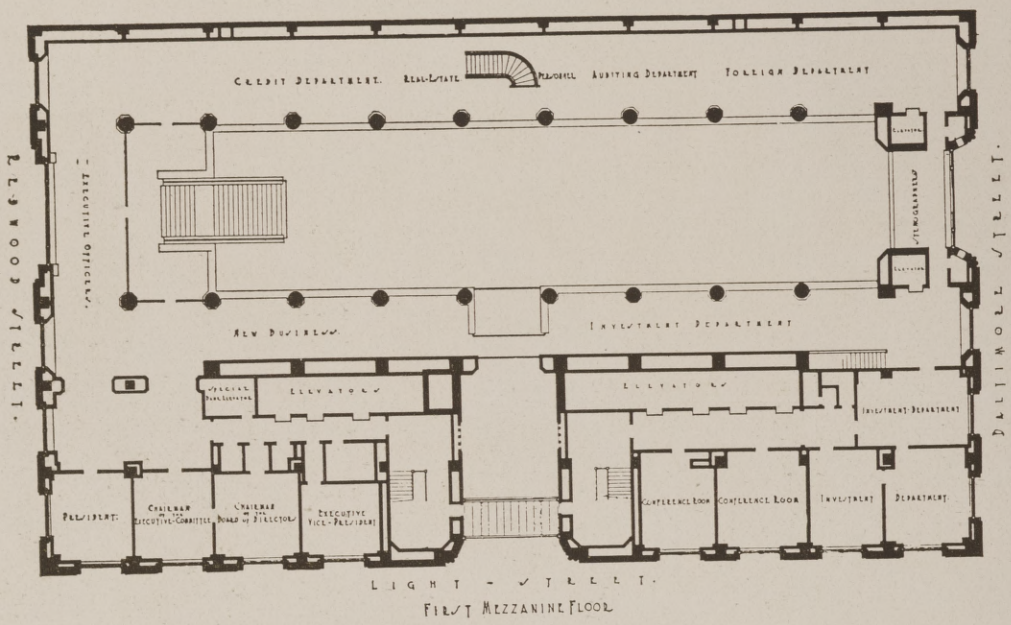
TAYLOR & FISHER AND SMITH & MAY, ARCHITECTS

Photos: By Holmes Mettee

ENTRANCE DETAIL

THE BALTIMORE TRUST BUILDING, BALTIMORE, MD.

TAYLOR & FISHER AND SMITH & MAY, ARCHITECTS



FIRST MEZZANINE FLOOR

FIRST MEZZANINE FLOOR PLAN

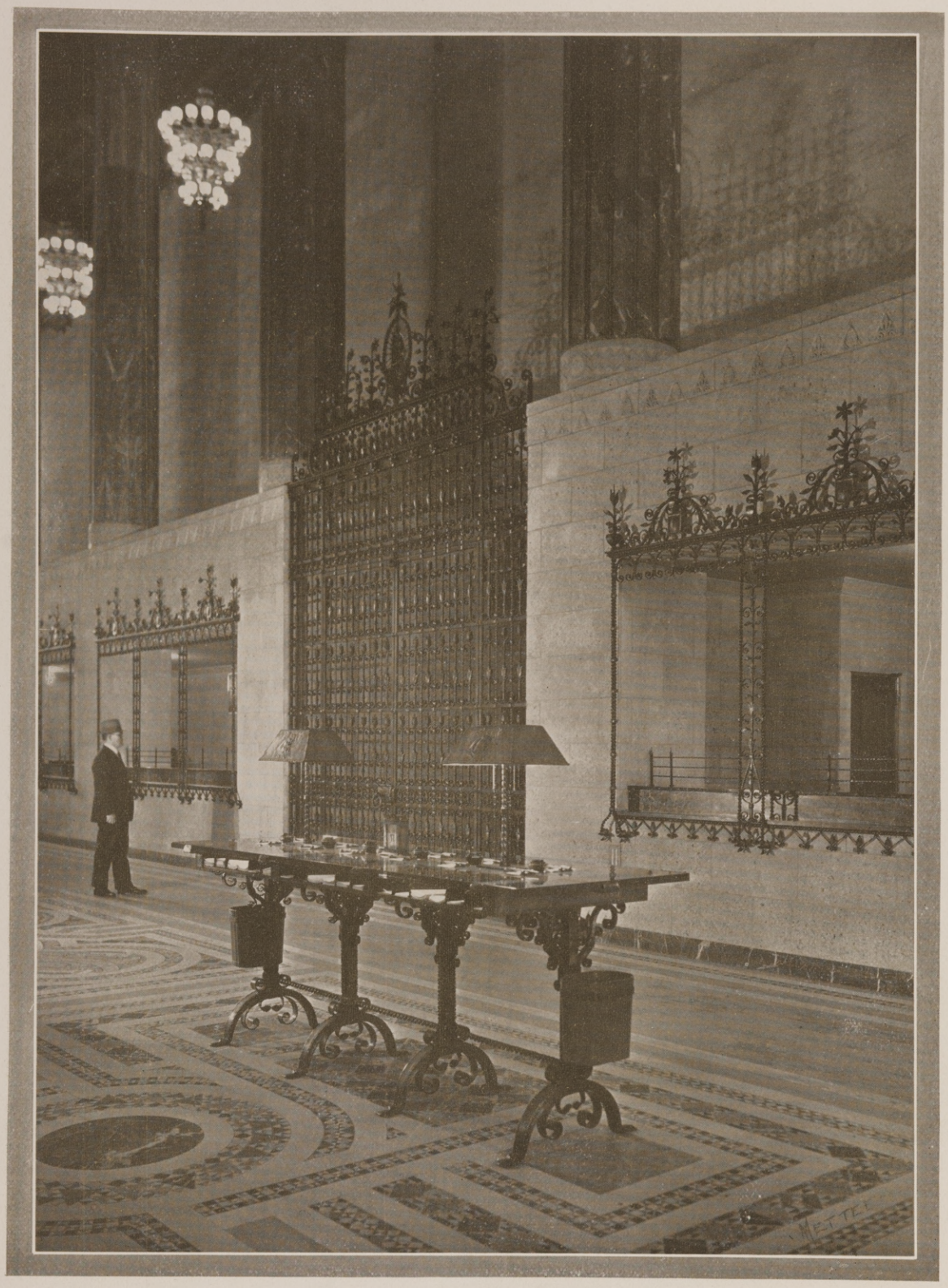
THE BALTIMORE TRUST BUILDING, BALTIMORE, MD.

TAYLOR & FISHER AND SMITH & MAY, ARCHITECTS

MAIN BANKING ROOM

THE BALTIMORE TRUST BUILDING, BALTIMORE, MD.

TAYLOR & FISHER AND SMITH & MAY, ARCHITECTS



DETAIL IN BANKING ROOM

THE BALTIMORE TRUST BUILDING, BALTIMORE, MD.

TAYLOR & FISHER AND SMITH & MAY, ARCHITECTS

URN, on balustrade of Niels Esperson Building, Houston, Texas

John Eberson Architect

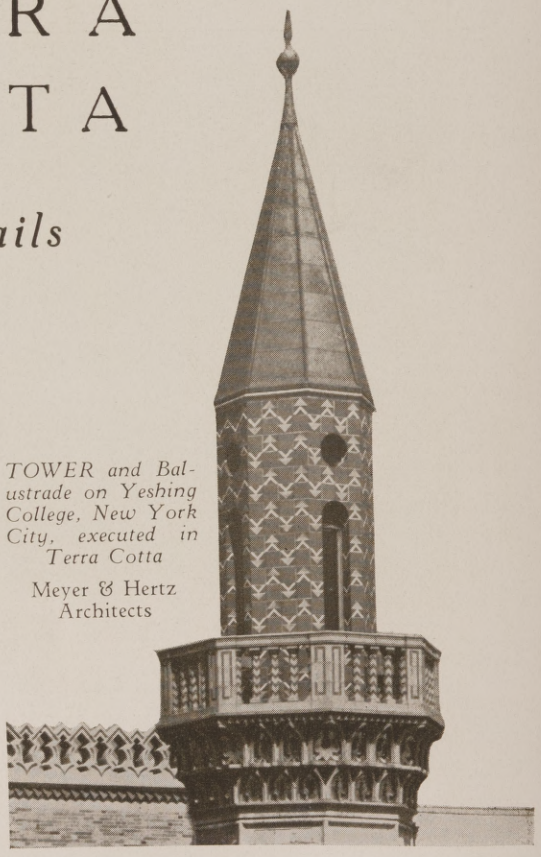
BAY WINDOW, tower story, Niels Esperson Building, Houston, Texas

John Eberson, Architect

a page of TERRA COTTA *details*

MODERN ORNAMENT, on facade of Hotel New Yorker, executed in Terra Cotta

Sugarman & Berger, Architects



TOWER and Balustrade on Yeshing College, New York City, executed in Terra Cotta

Meyer & Hertz Architects

Photos: Courtesy Federal Terra Cotta Co.

New Dining Hall
GEORGIA SCHOOL OF TECHNOLOGY

Planned as Central Motif in Dormitory Group to Meet Future Expansion Problem

IT is most fitting that a technical school with the high standard of Georgia Tech should produce for its new dining hall a building of character, complete in every detail of efficiency and beauty.

Looking toward the future expansion of the school, this building is part of a carefully studied dormitory group, occupying the block between Techwood Drive and Williams St. and directly opposite the Athletic Field.

The design of the dining hall was carried out by members of the Architectural Department, Harold Bush-Brown, Architect, and J. H. Gailey, Associate Architect. The dining hall and the adjoining dormitories are constructed of brick and limestone in the style of English Collegiate architecture. Leading up to the tower, on either side, is a covered arcade or cloister which is intended to connect with the dormitories and enable the students to pass from the dormitories to the dining hall under shelter.

Inside, the high proportions of the hall give the sense of spaciousness, with plenty of light and air, and tend to diffuse any noises in the hall. The richly painted wood trusses, open timber roof and traceried windows carry out the essential characteristics of the English mediæval baronial banquet hall.

The purlins and rafters are rough hewn, stained a vermillion color slightly grayed down for maximum brilliance. Between the rafters in the ceiling Celotex has been used on the under side of the roof in a light blue green gray color. The walls are plas-

ENTRANCE DETAIL

DINING HALL, GEORGIA SCHOOL OF TECHNOLOGY, ATLANTA, GA.

HAROLD BUSH-BROWN, ARCHITECT
J. H. GAILEY, ASSOCIATE

FRONT ELEVATION, DINING HALL, GEORGIA SCHOOL OF TECHNOLOGY, ATLANTA, GA.

ter, textured a slightly wavy surface and in warm buff color. The walls below dado are imitation stone in gray. The floors are terrazzo of Tennessee and Georgia marble chips with dark green border. The windows are steel sash with leaded panes, transparent glass but not perfectly smooth and of varying light colors. Ridge ventilators have been used and Heatovent heaters installed.

The plan of the dining hall was worked out with the same degree of thought that characterizes every detail of the building. Realizing that at times only a portion of the hall would be in use, a double system of cafeteria counters was installed, each supplied directly from the kitchen and serving half of the hall.

The cafeteria counters are not visible from the hall itself; they are in separate corridors approached from the main entrance beneath the balcony. This separation of the counter from the dining hall eliminates to a great extent the general noise accompanying the cafeteria system.

Returning to the decorative features of the building, we find motifs appropriate to the school and state incorporated in their design; for example: the Georgia shield is inscribed over the oriel window in the facade of the tower, the Army and Navy shields are represented over the main entrance, and Yellow Jackets, the emblem of Tech athletic prowess, are carved in the stone spandrels on either side of the entrance arch.

In the terra-cotta tile, inserted in the floor of the entrance vestibule, there are used in its design the shields of the State of Georgia and the City of Atlanta, and one recognizes the graduate engineer idealized by the youth in the central panel. This tile was made and glazed at the school under the supervision of the Ceramics Department. The massive wrought iron light fixtures, which hang from the trusses in the dining room, were designed by the architects and executed in the Mechanical Shops of the school.

In the large window at the south end of the hall, there is a stained glass memorial window. The numerous panels in this window represent the various departments of the school: mechanical, electrical, civil, textile, ceramic and chemical engineering, architecture, commerce and science, as well as the Army and Navy.

INTERIOR DETAIL

DINING HALL, GEORGIA SCHOOL OF TECHNOLOGY, ATLANTA, GA.

H. BUSH-BROWN, ARCHITECT

J. H. GAILEY, ASSOCIATE

In the Restrained Use of Late Georgian Detail We Find a Note of Distinction in This

HOUSE OF MRS. A. H. GALLOWAY

By

R. J. King

Browne Decorating Company

IN both its design and materials used, the residence of Mrs. A. H. Galloway of Winston-Salem, N. C., follows the style of the late Georgian country type house. The most notable features of this house are the nicely detailed wrought iron executed by Samuel Yellin, and the typical hooded doorway.

Built of hand pressed brick, similar in size and texture to the old brick and then painted a greyish white which gives the impression of having been white washed. Additional interest is given this texture, as the paint is rubbed away in places which gives the effect of being a very old house that time has softly mellowed.

Surrounding the place are stately pines, which contrast themselves against the house and create an admirable effect, including a well arranged planting plan.

The Entrance Hall, which is formal, extends the entire length of the house—is painted hydrangea blue with mouldings painted a darker tone of blue.

DETAIL IN HALL

HOUSE OF A. H. GALLOWAY, WINSTON-SALEM, N. C.

NORTHUP & O'BRIEN, ARCHITECTS

ENTRANCE FRONT, HOUSE OF A. H. GALLOWAY, WINSTON-SALEM, N. C.

Further interest and importance has been given the wall treatment by placing in the three large panels, French blocked paper done in Grisaille depicting various scenes of the mythological legend "Cupid and Psyche." On each side near the entrance door, are mahogany Empire console tables, as illustrated on page 46, fitted with grey marble tops, which hold antique wire baskets, painted white and gold, filled with laurel. Under the larger panel is an Italian Directoire sofa covered in red moire trimmed with fringe of red and gold—the mahogany pedestals on either side were reproduced from an original Adam design. Antique oriental rugs repeat the tones of the general color scheme.

On the right of the hall is the living room—painted the same shade of blue, with a collection of XVIII Century English and French pieces covered in damasks, silk velvets of appropriate designs, antique Wedgewood urns in blue and white designs are used as lamps. Other accessories in the room were chosen with due consideration of the color scheme and general character of the room.

Beyond the Living Room is a Library panelled in walnut in the late Georgian manner where a splendid collection of books including many rare volumes is to be found.

To the left of the Library is the Owner's Boudoir panelled and painted canary yellow. The windows are curtained with yellow and blue striped taffeta. The curtains are made very simply and looped back with silk cords. The furnishings are mostly XVIII Century French pieces appropriately covered in chintzes, damasks, and silk velvets. Adjoining this is the Owner's Bed Room painted coral color—with an antique Louis XVI walnut bed canopied in green taffeta. Included in the furnishings of this room are some very fine original antique prints.

Leading from the Owner's Bed Room is the Dressing Room and Bath. The Dressing Room is painted same coral color as the Bed Room and is

ENTRANCE TO GARAGE, HOUSE OF A. H. GALLOWAY, WINSTON-SALEM, N. C.

carpeted in green carpet with a laurel leaf design. This room deserves special mention because here the Architects have created a very practical closet arrangement and at the same time it is cleverly panelled in a way that does not bespeak its primary object—of concealing shoes, wraps, hats, etc. Another unusual feature is the arrangement of mirrors which are set in panels, the reflection creates an impression of a much larger room and also provides an excellent arrangement for one using the built-in dressing table, because it affords side and back views for the careful arrangement of one's garments.

On the left of the Hall is the Dining Room furnished in XVIII Century antique mahogany pieces —an excellent and interesting background is provided for these important pieces by the Scenic wall paper with woodwork painted a straw color. Reproduction Waterford crystal chandelier and brackets are used in this room which also contrast themselves most effectively against the colorful paper. The windows are effectively, though simply treated—swag valances of red taffeta are used, trimmed with red spike silk fringe. These valances are supported by brass rosettes—sheer bobbinet is used for glass curtains which softly tempers the light and at the same time affords a splendid view of the long sloping terrace.

Beyond the Dining Room is a Pantry, Kitchen, and Service; connecting this wing is the Garage and Servants' Quarters above. For lack of space I will not attempt to offer descriptive detail of the four upstairs Bed Rooms and Sleeping porch—the arrangement, however, is a very practical and convenient one.

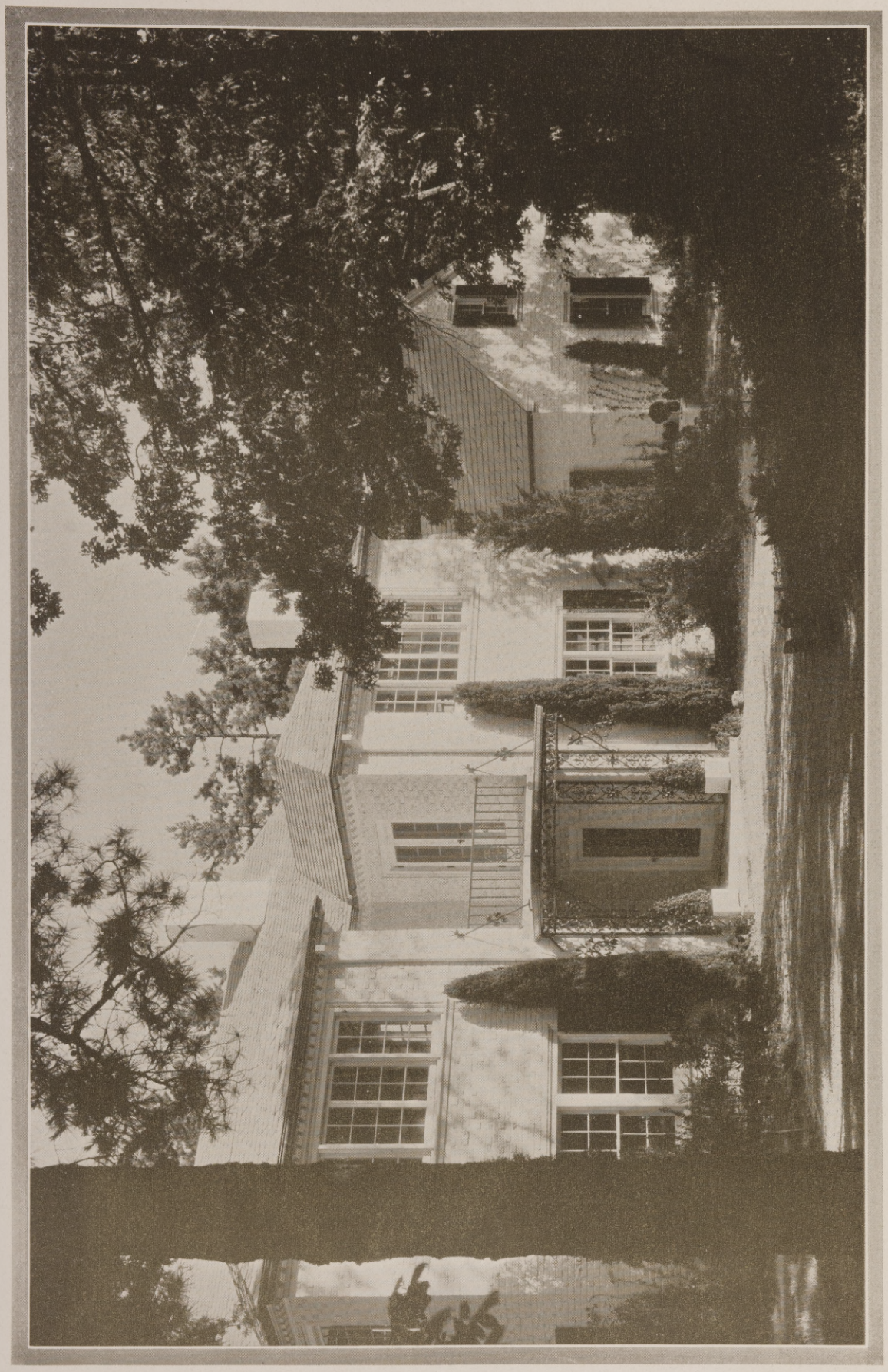
Much credit is due to the Architects, Northup & O'Brien, for designing a house which possesses such fine architectural qualities and at the same time fits in so perfectly with the location and is so practical for our present day mode of living.

Photos: By Tebbs & Knell, Inc.

ENTRANCE FRONT

HOUSE OF A. H. GALLOWAY, WINSTON-SALEM, N. C.

NORTHUP & O'BRIEN, ARCHITECTS



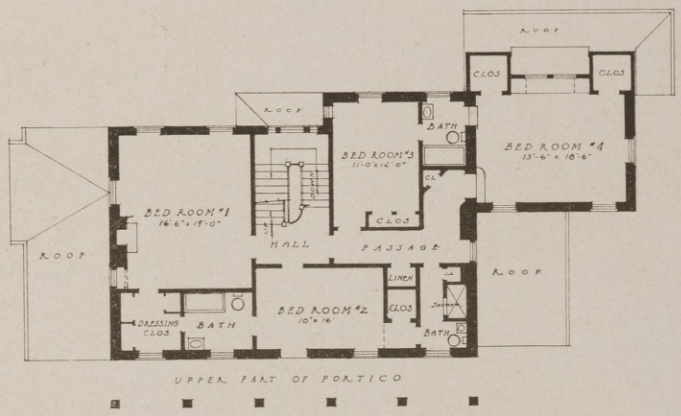
REAR VIEW

HOUSE OF A. H. GALLOWAY, WINSTON-SALEM, N. C.

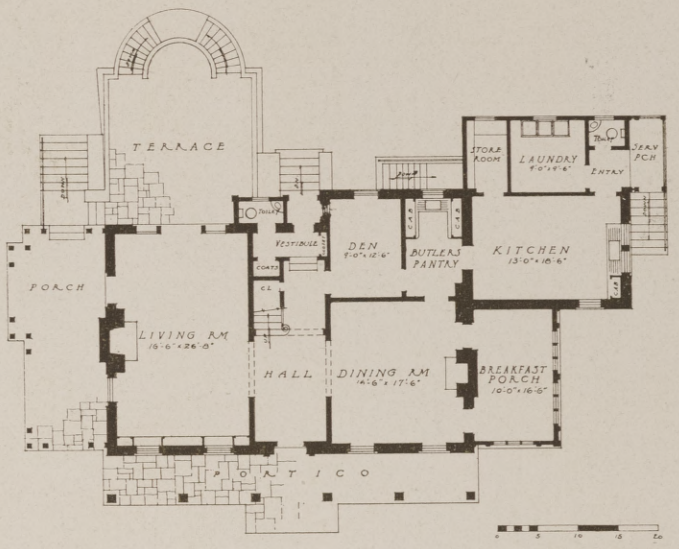
NORTHUP & O'BRIEN, ARCHITECTS

HOUSE OF LANIER BRANSON, AIKEN, S. C.

SCROGGS & EWING, ARCHITECTS



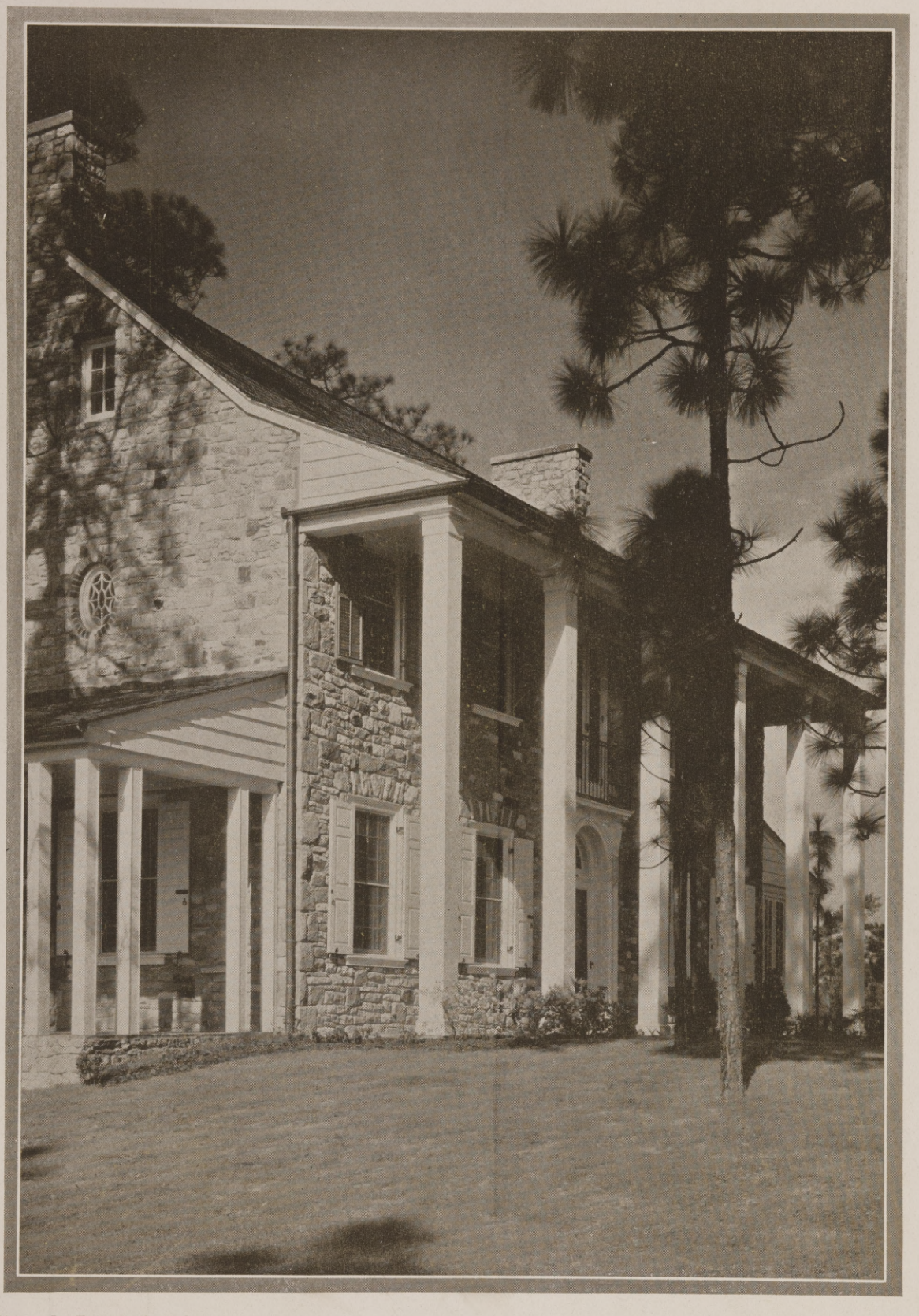
SECOND FLOOR PLAN



FIRST FLOOR PLAN

HOUSE OF LANIER BRANSON, AIKEN, S. C.

SCROGGS & EWING, ARCHITECTS



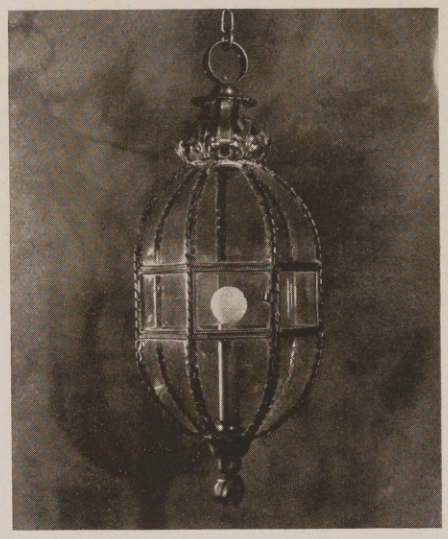
Photos: By Tebbs & Knell, Inc.

HOUSE OF LANIER BRANSON, AIKEN, S. C.

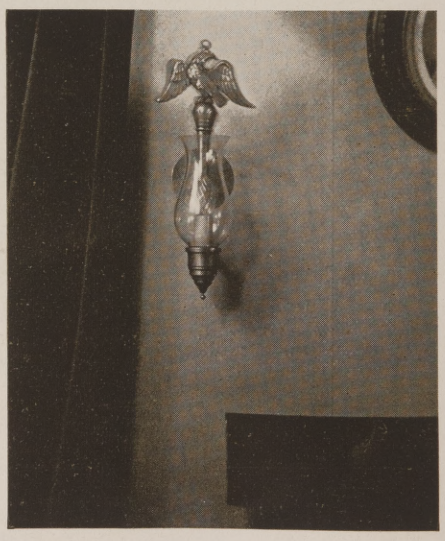
SCROGGS & EWING, ARCHITECTS

a page of

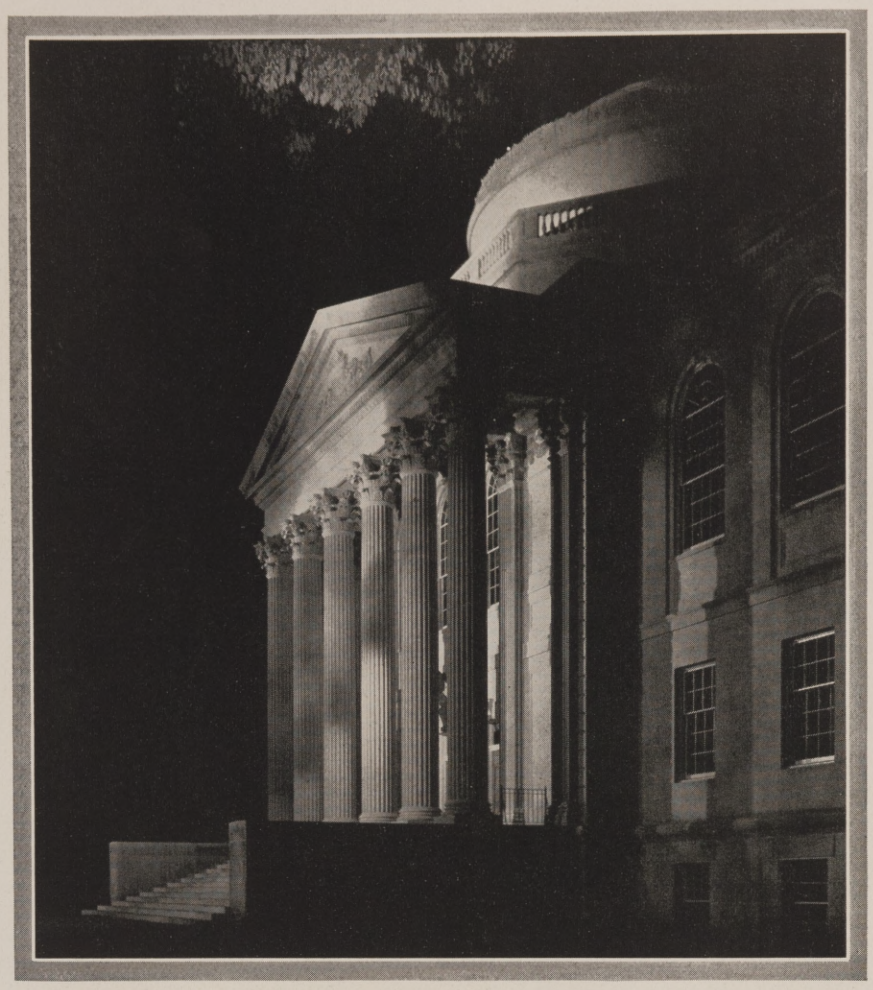
Lighting Fixture Details



Designed in Good Taste



Photos: Courtesy Blumenthal-Kahn Co., Baltimore



University of North Carolina's NEW CLASSIC LIBRARY

By Lindsay M. Gudger

THE Architects for the new Library at the University of North Carolina were concerned in its design not only with the practical requirements of the building and the desire to create in it a logical and proper interpretation of a library structure but were also confronted with the problem of fittingly terminating a long quadrangle composed of classically precidented class room buildings, done in the Colonial manner, which form that portion of the University known as "South Campus."

The steadily growing student body and the increasing prosperity of the State necessitated considerable additions to the original campus which took the form of many new dormitory structures and a more than doubling of the class room capacities. Formerly the campus was terminated by "Old South," a building erected in the latter part of the eighteenth century, which now occupies the exact center of the area occupied by the University buildings. When the new program of expansion was announced it was decided to develop that portion of the University holdings lieing to the south of "Old South" and sketches for this portion were prepared by the Architects. This new development took the form of a long expanse of gently sloping ground, set with the old trees for which the University is famous, and flanked on both sides by a symmetrical arrangement of dormitories and class room buildings. At the end of this slope the site for the new Library was selected.

The problem of the design of the Library was not an easy one. It was, of course, necessary that the building be in harmony with the other structures, both new and old, and that it also be expressive of the spirit of the new University and an epitomization of the attitude of the State toward education.

LIBRARY, UNIVERSITY OF NORTH CAROLINA, CHAPEL HILL

ATWOOD & NASH, ARCHITECTS

MAIN READING ROOM, LIBRARY, UNIVERSITY OF NORTH CAROLINA, CHAPEL HILL

The new building will more than quadruple the book capacity of the old Library, now being converted into a music building, and is modern in every respect, thought being given to the future growth of the University and its steadily progressing library requirements.

The site lent itself admirably to the requirements. The rear portion, being one more story above ground than the front, contains the book stacks and other utilitarian and service rooms and lends itself nicely to future developments.

The building, done as it is in limestone and approached by means of monumental granite steps, fulfills in every way the expectations in its ability to prove a fitting termination of the campus. The limestone sets it sufficiently apart from the surrounding brick Colonial buildings to mark it with distinction and the spirit of the mass and detail pleasingly harmonizes it with the other buildings of the campus. The dome and the portico, given much study by the architects, plainly mark the purpose of the central portion of the building, i.e., the means of entrance and the orientation rotundas.

The interior carries out the same classic spirit of the exterior, the plaster and travertine being ornamented conservatively with carefully studied classical ornament. The treatment of the reading rooms, the distribution rooms and the rotundas was especially studied to give the proper æsthetic and acoustical effects.

The mechanical and practical equipment of the building is modern in every way. The metal book stacks, the book lifts and other equipment were the objects of much research and study on the part of the Architects and was considered to be of as much importance as the æsthetic considerations.

The building was designed with the future in view and the library needs of the University will be easily handled in this new structure for many years to come.

A striking example of the adaptability of concrete to highly ornamentated design. With the exception of the Spanish Tile used on the dome this structure is entirely of concrete.

Kenneth McDonald, Jr.
Architect

Architects Discover CONCRETE

By Wyatt Brummitt

MEN and materials—these are the ingredients of architecture. For architecture, as a fine art, has always depended on the skill of architects and on the nature of the materials they used to materialize their designs.

The man who first realized that mud and thatch might be made to produce a better shelter for his family than nature had provided was an architect. His success was the result of his appreciation of the materials with which he worked. And architecture grew as men increased their appreciation of useful materials. Marble, wood, steel and stucco came under the scrutiny of architects, and architecture benefited richly.

Within the last few years architects have discovered concrete, a material which was first considered almost exclusively as the rightful property of engineers. The alliance between engineers and concrete has grown and is still growing, but simultaneously the architects have come to an appreciation of this ancient material which was re-born in the scientific development of portland cement.

The fundamental consideration on which architectural development in concrete depends is that concrete is to be treated as an individual, self-respecting material—not merely as a substitute for anything else. Stone is stone, wood is wood and concrete is itself, not a makeshift to be painfully forced into simulations of other materials. For concrete has, in itself, qualities of strength and rigidity plus the ability to express grace of line, variety of texture and intricacy of decoration. It is three di-

An example of bold use of monolithic concrete construction. Buff colored cement stucco, scored as masonry has been used.

CURLETT & BEELMAN, ARCHITECTS

mensional, combining beauty of exterior and ruggedness of inner structure.

Concrete lends itself to decorative effects principally because of its originally plastic nature. The limit of ornament or artistic expression in it is governed entirely by the ability and ingenuity of the architect and actual worker with the material.

Concrete, while plastic, takes the shape or form of any mold in which it may be cast; hence, skill in using concrete depends largely on the individuality displayed in making the molds or forms in which it is placed and in giving the object so cast an appropriate place in the harmony of the whole design.

The architect requires not only a medium which will express in body and form the artistic creations of his mind but one which, also, will put the stamp of reasonable permanence on his work. The artistic is seldom worthy of endeavor unless it endures. Designing a structure of concrete is more than the mere combining of effects. It offers to the architect of ambitious ideals a medium for the enduring embodiment of his artistic conception.

Concrete offers the architect unlimited latitude of shade and surface treatment. He may develop the simple, gray surface so attractive in a country home with its background of foliage; he can duplicate various panels to relieve the monotony of plain surfaces; he can make these in bas-relief or intaglio, can cause the surface to be modeled as desired and can secure in it almost any color. The surface finish may be smooth, or be roughened by any one of a number of easily applied methods.

The texture of a building material is a factor of the greatest moment and one which requires very careful attention at the hands of the architect. A finish that harmonizes with one design may prove both undesirable and unconvincing in another. To attract and please, a structure must have individuality. Surface treatment must strengthen the impressions created by the lines of the structure, and in

This church is entirely of monolithic concrete including the exterior ornamentation. A little cast stone was used for the high relief work. The structure was given a brush coat of stucco to subdue but not to obliterate the form markings

ALLISON & ALLISON, ARCHITECTS

concrete the great variety of surface textures possible makes the development of this phase of expression practically unlimited.

Much of the ornamental in concrete can be obtained through the medium of precast units. Panels, spandrels, lintels, sills, columns, the various parts of balustrades, sundials, lawn vases, etc., are examples of such units. These are made either plain or ornate by varying the forms in which the units are cast and the aggregates used in their making.

Some surface finishes are produced entirely after casting has been completed. Others are partly arranged for when the materials are being selected. Colored sands and selected aggregates, such as marble chips and granite screenings, are often used in place of the ordinary sand and pebbles or broken stone. After the concrete has hardened and the forms are removed, the surface of the concrete is treated in one of a number of different ways to bring out the full effect of the selected materials.

The simplest form of concrete surface finish is that secured by properly placing the material in well made forms and insuring that coarse particles will not be exposed on the surface. Spading the concrete while placing it next to the form and tapping or vibrating the molds help to remove air bubbles that might form holes on the surface. This also causes coarse particles to settle back away from form faces, leaving a surface as smooth as the forms themselves.

There is at present a pronounced tendency to leave the surface as it was when the forms were stripped off. An untreated concrete surface has a color due almost entirely to the cement and the almost inevitable form marks give an informal texture which may be left "as is" or, if a smoother, more formal surface is desired, the concrete may be gone over with a portable grinding machine to reduce irregularities.

Some of the most attractive surface finishes that can be given to concrete are those which are in a

This Community Play House constructed of Monolithic supports and tile filler walls. Reinforced concrete trusses over the auditorium and the exterior of white stucco.

ELMER GRAY, ARCHITECT

large part pre-arranged when preparing the concrete mixtures. Selected aggregates used instead of conventional sand and stone will control the color of the finished surface. Marble chips, granite screenings, crushed feldspar, mica spar, crushed slag, white sand and white cement in various combinations permit an endless variety of tone. Such concrete mixtures are prepared and placed in the usual way. When the concrete has hardened so that forms may safely be removed the surface of the concrete is gone over in one of several ways to expose the aggregates.

When selected aggregates are used, the surface finish is obtained by washing off the film of cement that coats the particles, thus exposing them in the surface of the concrete, and in that way revealing their color. If the forms are removed within twenty-four hours after placing the concrete in the mold, it is usually possible to wash off the surface film of cement merely by scrubbing the surface with a stiff bristle brush, kept wet with water. If, however, the concrete has become too hard to permit exposing aggregate surfaces in this manner, an acid wash is used. Generally a solution consisting of one part of commercial muriatic acid in three or 4 parts of water is applied with a brush and light scrubing given until the film of cement is removed from the aggregate particles. When this has been done the surface must be washed immediately and thoroughly with clean water so that all trace of acid will be removed and its further action prevented.

Surface finish is also obtained by using facing mixtures; that is, if a surface of colored aggregate is desired, the concrete mixture containing such aggregate is used only for the face of the object, and back of this mixture ordinary concrete is used. Lintels and concrete block are often faced this way, effecting a reduction in cost. Variations in color and texture of surface which are to be secured by washing or otherwise exposing the aggregate can be made almost without number by combining two or more selected aggregates. For example, a mixture of yellow and white marble chips or a mixture of gray

This Library was constructed of reinforced concrete with Monolithic walls. Light buff stucco applied by gunite process

BERTRAM GOODHUE, ARCHITECT CARLTON WINSLOW, ASSOCIATE

granite screenings and black crushed slag, with a little mica spar or mica, are examples of possible variations. Concrete made of such mixtures has a beautiful and individual surface texture.

Variation in surface finish of concrete can also be obtained by means of colored pigments, and colored pigments can be combined with selected aggregates. Washing, scrubbing, tooling or otherwise treating the surface to remove the surface film of cement reveals the desired color.

In aiming at color effects secured in part by mixing colors with the cement, it is essential that only reliable pigments be used. The cement, sand and coloring matter are mixed together dry, and it is advisable to experiment a little to find out how much color is needed to give the desired shade. When water is added to such a mixture, the mortar will appear considerably darker than the final surface will be when thoroughly hardened. In general only mineral colors are recommended; organic or non-mineral pigments tend to fade.

Sometimes a concrete surface is finished by sand blasting. This method consists of impinging against the surface a stream of fine sand from a jet or nozzle under high air pressure. The small sand particles striking the surface wear from it the fine film of cement, thus exposing the color and texture beneath.

By proper preparation of the surface, concrete may be painted, stencilled or otherwise decorated as easily and effectively as any other material. But concrete, as an architectural entity, is so easily capable of artistic expression by itself that architects are increasingly interested in designing buildings, the beauty of which is more than skin deep.

Contemporary architecture is direct, bold and simple. It has its subtleties, but they are the subtleties of design, not of applied decoration. And concrete affords the modern architect an excellent medium in which to express the structural significance of the present, with its emphasis on utility and its realization that architectural beauty is not achieved through superficial prettyfying.

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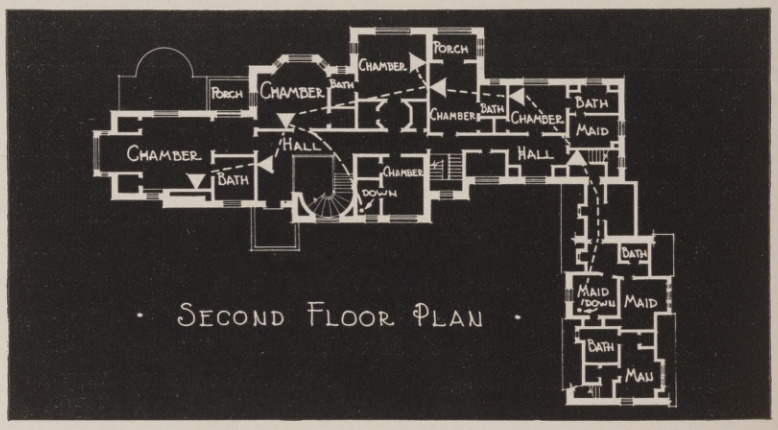

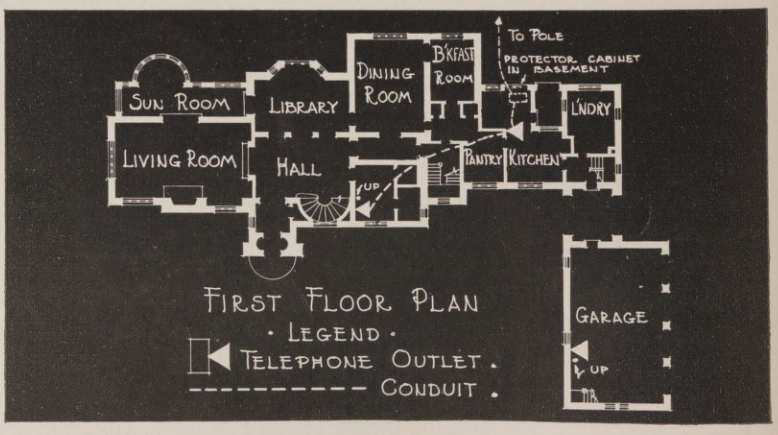

Effect of Seating on THEATRE ACOUSTICS

By

W. Keith Friend, *Acoustical Engineer*
American Seating Company

PART I

USUAL ACOUSTICAL DEFECTS. The acoustical conditions surrounding a talking movie in a theatre can be no better than the acoustics of the room itself. By faulty acoustics in the room, the best talkie may sound poor; also, any recorded defects in the talkie, due to improper studio conditions, are reproduced and show an additive effect upon the auditors. This discussion will be limited to the acoustics of the room alone. It is assumed that reproduction, as such, is satisfactory.

The usual acoustical defects in a theatre are—first, improper distribution of the sound energy in the room and second, excessive reverberation, which will be defined later.

DISTRIBUTION. There are several things that may cause improper distribution of the sound energy in a room. First to be considered are such defects as echo, dead spots and sound foci. Echoes arise by regular reflections of sharp quick sounds from hard smooth walls, ceilings or proscenium arches of considerable area. There is a lapse of time before an echo is heard, which is due to the fact that the reflected sound has traveled a longer path than the direct sound. In the case of speech, this difference in time may cause much disturbance and confusion to the listeners. Due to the more continuous nature and blending qualities of music, an audience is less disturbed by echoes when listening to this form of sound than when listening to speech.

Dead spots and sound foci are produced as a result of concentrated echo producing conditions. Curved walls or ceilings are often of such a nature as to focus or concentrate sound energy directed upon them, to a central point. This is undesirable. Sound travels through the air in spherical waves of alternate compressions and rarefactions. It may so happen that a compression of the direct sound wave, coming from the sound source and a rarefaction of the reflected wave meet at the ear at the same time and thus tend to nullify each other, causing a lessening of intensity. If the reflected sound is retarded a little more, it may happen that two compressions or two rarefactions coincide, thus tending to reinforce each other, producing unusually loud sound. This is termed interference. It is impossible to avoid distortions of the original sound in a room due to interference because of the infinite paths of reflection. The distribution of the intensity of a steady sound in a room is called the interference pattern. Sabine showed that there were pronounced maxima and minima of sound intensity throughout the entire interference pattern due to the form of the waves as pointed out above. This interference pattern, he showed, shifts with each change of intensity or pitch of sound. Unless there is good distribution of the sound energy, it can be easily visualized how pronounced maxima and minima, shifting with each slight change of sound from the sound source, would cause undue modulation of the original sound with consequent poor hearing conditions.

The most usual causes of poor distribution are hard curved walls and ceilings. Floors should be sloped so that each auditor is well located in the direct path of sound; balconies should be arranged so that the openings at the front between floors are adequate for the entrance of sufficient sound energy to the auditors. Domes have been generally condemned but there are conditions under which they can be used with fair results. In general, if curved surfaces are used, they should have a radius of cur-

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vature, either less than half or more than twice the ceiling height, and should be covered with a sound absorbing material of high efficiency.

REVERBERATION. The second acoustical trouble mentioned was that of excessive reverberation. Excessive reverberation is the cause of probably ninety per cent of the acoustical troubles in the auditorium and theatres of today. When a sound is produced in a room and spreads out, striking the interior surfaces, not all of it is reflected but a portion is absorbed at each impact. The amount of the sound energy absorbed depends upon the nature of the reflecting surfaces. The sound, however, continues to reflect back and forth between the walls, ceilings, chairs, floor, etc., until its intensity is so reduced that it becomes inaudible. Owing to the high speed of sound, which under ordinary conditions, is around 1,120 feet per second, or about that of a rifle bullet, there may be many of these reflections in the course of a single second in a theatre or auditorium of ordinary size. The effect is to prolong the sound in a room after the actual source of sound has ceased. This accumulation of continued reflections is termed "reverberation." If the reverberation is excessive, the trail of sound, following one syllable of speech or tone of music, will not die out before succeeding syllables or notes are uttered. The result is a confusion of sounds in which nothing appears clear and distinct, and audition is difficult and tiresome. In this discussion, it has been assumed that the reverberation period of the room in question is excessive and needs to be reduced in order to give good hearing conditions. This is always the case in ordinary theatres and auditoriums.

There is a time to which or below which the reverberation period for each particular room should be reduced in order to have most satisfactory hearing conditions. This maximum time allowance for the continued reflection of the sound for good hearing is termed the optimum or satisfactory reverberation period. The remedy for an excessive reverberation period is found in placing the necessary amount of sound absorbing materials in the room such as absorbent wall coverings, heavy drapes, carpets and upholstered seating, to make the sound stop reflecting or, in other words, become inaudible in the desired or optimum length of time.

Sabine concluded that the period of reverberation in a room is almost independent of the location of the sound absorbing materials and of the source of sound. Mr. Wallace Waterfall of The Celotex Company, however, has shown that Sabine was discreet in qualifying this statement, by pointing out cases where the reflections of sound back and forth between non-absorbent parallel surfaces continues after the normal reverberation of the room. These continued reflections Waterfall pointed out appear as a localized "flutter" and may or may not be disturbing, depending upon its location relative to the auditors. In these cases, additional absorption in the "normal" parts of the house does not reduce the flutter proportionately. These cases are not frequently found.

Professor F. R. Watson of the University of Illinois, in some recent experiments, has shown that musicians, particularly enjoy reflecting surfaces about them to intensify the sound. This probably, Watson states, also applies to the speakers as they usually dislike to stand directly in front of absorbent stage curtains. The important point of his findings, however, is that listeners, on the other hand, seem to want to be near absorptive material. In general concordance with Sabine's and Watson's conclusions, it is possible to please both performers and audience and, at the same time, maintain the same period of reverberation in the whole room by placing the acoustical material near the audience. This can be very conveniently and efficiently done by installing the right type of theatre chairs. In the smaller theatres, all the necessary acoustical treatment can usually be obtained by installing the proper chair. In the large theatres, this is not the case. The reason for this will be pointed out later.

SABINE'S FORMULA FOR REVERBERATION TIME. Professor Sabine developed a formula for the reverberation time in a room which holds the following relation:

$$t = \frac{.05\,V}{A}$$

where t=Reverberation time in seconds.
V=Volume of room in cubic feet.
A="Total Absorption" of the room.

The only point that needs explanation in this formula is the quantity "A." One square foot of open window has been adopted as the unit of absorption and has been arbitrarily assigned the value of "1." In other words, it may be said that an open window absorbs (i. e., transmits) all the sound that falls upon it, its coefficient of absorption being 1.0. All other materials whose sound absorption coefficients have been determined are expressed in terms of this open window unit. For instance, if a material has an absorption coefficient of .5, it means that it is equivalent, in absorption power, to one-half a square foot of open window.

It is seen from the equation that the reverberation time is inversely proportonal to the absorption and directly proportional to the volume. Because of this relationship, and since, as a theatre is increased in size the volume increases faster than the floor area, there is obtained a size beyond which there cannot be enough practical absorption material placed on the floor to obtain satisfactory hearing conditions. This is why enough treatment cannot be obtained through the use of proper seating except

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in the smaller theatres. In the larger theatres, wall treatment is consequently necessary in addition to proper seating to bring the reverberation period down to optimum.

TREATMENT NECESSARY. The amount of acoustical treatment, in the form of absorption material, in a room can be computed from the above equation in two ways. First, the reverberation period in the room can be accurately timed by observing with a stop watch the length of time necessary for the sound from an organ pipe to die out after the source of sound has stopped. This must be corrected for intensity and initial sound level in the room through suitable computations. The value of "t" thus obtained, together with "V," substituted in the equation, gives, "A," the amount of absorption in the room. Professor F. R. Watson of the University of Illinois has worked out a set of optimum periods of reverberation for good acoustics in rooms for various room volumes. This table is given below:

OPTIMUM PERIODS OF REVERBERATION. The following table is prepared from published data compiled by Professor F. R. Watson.

	Secs.		*Secs.*
Below 7,000 cu. ft.	1.0	145,000 to 225,000	1.5
7,000 to 20,000	1.1	225,000 to 330,000	1.6
20,000 to 45,000	1.2	330,000 to 465,000	1.7
45,000 to 85,000	1.3	465,000 to 630,000	1.8
85,000 to 145,000	1.4	630,000 to 835,000	1.9
		835,000 to 1,100,000,	2.0

The optimum reverberation period for the room in question can be taken from this chart. If this new value is substituted in the equation, a new and larger value will be obtained for "A" and the difference between these two values for the absorption will give the necessary amount which must be placed in the room to give the desired optimum conditions.

The second method, in arriving at the amount of treatment necessary, is first to compute the absorption already in the room. Professor Sabine and others have worked out the coefficients of absorption for various building materials, furnishings, etc. By computing the various areas of materials of different kinds and multiplying them by their corresponding coefficients, the absorption for the various interior surfaces and furnishings of a room are found, the summation of which gives the total absorption in the room. Having computed the volume and having found the absorption, the existing reverberation time can be computed. Then, as in the first method outlined, the desired optimum time can be taken from the chart and the suitable computations made to determine the additional absorption necessary in the room.

A word might be said about the optimum values given in the table above. These values are somewhat lower than the values for similar volumes computed by other investigators. Professor Watson, however, has recently gone into this matter very thoroughly from the standpoint of the needs of the talking movie. In view of his findings, the reverberation times given by him have been generally adopted for theatre and auditorium corrections.

THE EFFECT OF UPHOLSTERED CHAIRS. It was pointed out earlier that, in general, the reverberation period in a room is independent of the location of the sound aborbing material, providing the other conditions necessary were fulfilled. There is, however, an advantage in placing absorption in the theatre chairs for reasons which will be pointed out further. Thus far, nothing has been said about the size of audience for which optimum conditions should be obtained. Human beings are high absorbers of sound energy, and, for this reason, the reverberation period in a room decreases rapidly with increasing audience. In view of this, it is necessary to choose an audience for which optimum conditions are to be obtained. Correction is usually given which will produce optimum conditions somewhere between one-third and one-half maximum audience.

The ideal theatre, acoustically, would have an unvarying reverberation period; that is, the optimum would exist regardless of the size of audience. Upholstered seating of the right type tends toward this constant reverberation time because the absorption built into the theatre chair is practically all cancelled when the chair is occupied, the absorption of the chair being replaced by the absorption of the auditor occupying the chair. This prevents the absorption from piling up rapidly with increasing audience and thus tends to maintain a more balanced and uniform sound condition, independent of the size of the audience. It will be readily seen that this treatment has an advantage over wall treatment. In the case of wall treatment, there can be no cancellation of its absorption with increasing audience and there is consequently a rapid accumulation of absorption. Sabine found that the average absorption of an auditor seated is 4.7 units or, in other words, equivalent to 4.7 sq. ft. of open window. The ideal chair, acoustically, would possess 4.7 units of absorption unoccupied and occupied. This requirement has been very nearly fulfilled and with the latest type chairs, there is very little additional absorption obtained through increasing audience. The proper chair, acoustically, is scientifically designed with due consideration given to its effect on sound when both occupied and unoccupied. In addition, it has the correct shape and distribution of materials, and possesses the proper amount of porosity and compressibility. It is a fortunate coincidence that these last two features are both obtained through the use of correct upholstering materials, which give added comfort and luxury as well as acoustical properties.

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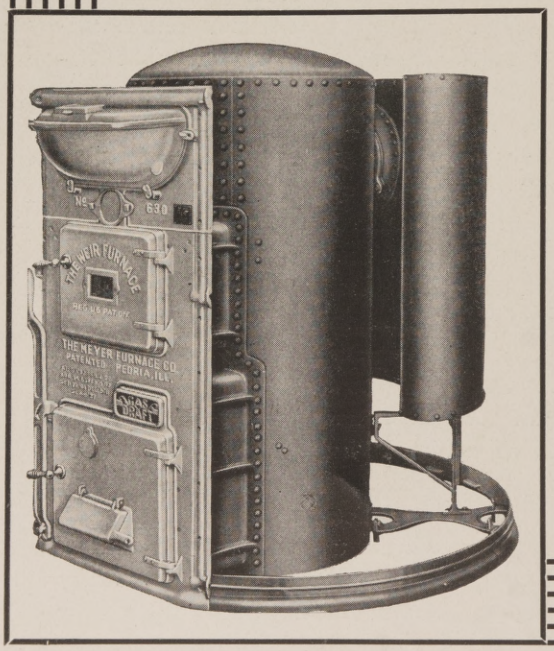

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