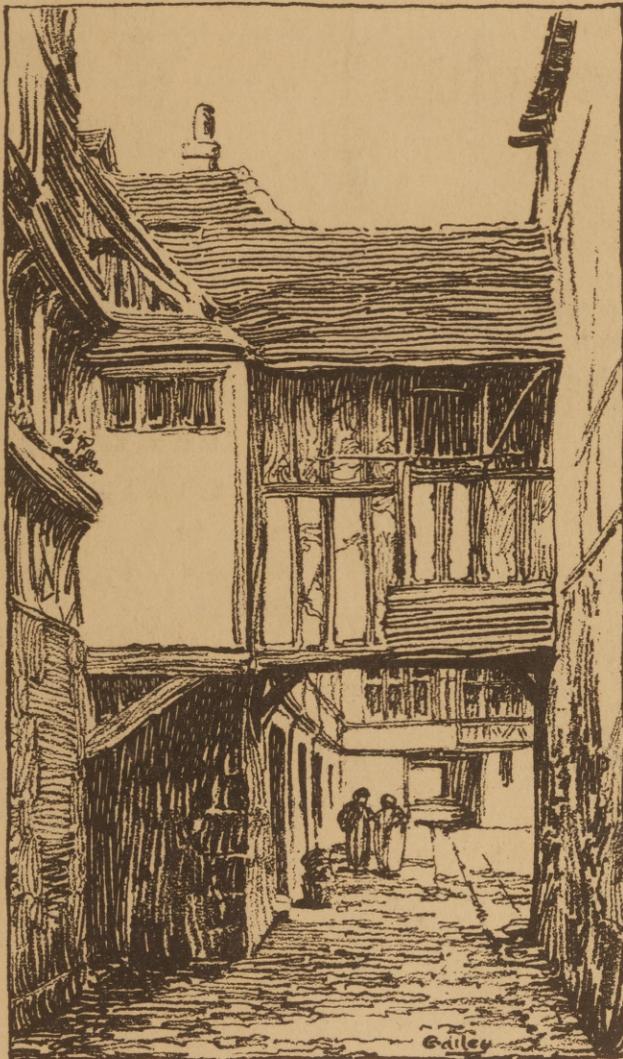


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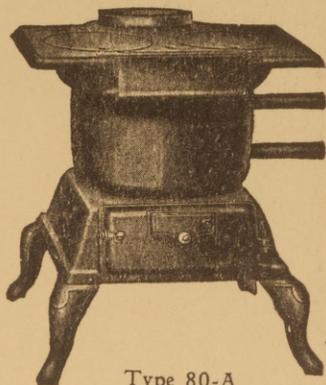


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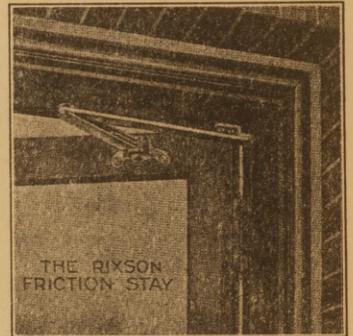
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The Editor's Annotation's



RECOGNITION OF CRAFTSMANSHIP

AT NO time in the history of American building has the recognition of craftsmanship been more important than at the present moment. We are doing buildings today of such magnitude as to make men think in terms that were only dreams a score or two years ago. The problems of the architectural profession have reached that point where only through the wholehearted co-operation and co-ordination of every branch of the building industry can a successful building be carried to completion. The craftsman—the plasterer, the bricklayer, the steel worker, the lather, the roofer and the hundred of others contributing their share to the modern building project deserve as much recognition as the architect, the builder or the engineer. A building no matter how large or how small is no better than its masonry walls, its roof, the plumbing equipment—all the details of construction that make for a better building. It is the craftsmen in whose hands these details must rest that we plead for recognition of their talent, their loyalty and their service to the industry. They are the lieutenants in an army that is making American Architecture the greatest of all architecture the world over.

Revival of craftsmanship in the building industry remained a Utopian dream until a few years ago. In Portland, Oregon, in Philadelphia and in New York the Building Congresses were inspired to seek measure to bring back the love of work for its own sake and in that attempt to point out the fundamental character molding values of thoroughness, intelligence, reliability, loyalty and co-operation that distinguish the artisan.

The New York Building Congress created a Committee on Recognition of Craftsmanship to find ways and means of carrying out this ideal. In spite of mass production and ever increasing standardization, craftsmanship was still to be found in the building industry.

The first problem was to direct attention to it by giving it public recognition. Happily, this endeavor has been well received by owner, architect, builder and organized labor. Recognition of Craftsmanship therefore has become a practical step in a revival of the spirit of the artisan in the larger cities of this country.

While our problems in the South are not so large as those in New York, Philadelphia, Chicago and elsewhere where towering skyscrapers are reaching almost to the high heavens, nevertheless, the recognition of craftsmanship in the building industry in this section should be given equal thought and con-

sideration. On this movement hinges the welfare of the future of architecture and building in the South. As time goes on our buildings will surely become larger, our problems greater and mass production a thing to cope with. It is high time the architects of this section should begin looking beyond today and recognizing the fact that a revival of craftsmanship, a revival of the spirit of the artisan is of paramount importance at this time.

As Mr. E. J. Mehren of the New York Building Congress so well expressed it in a recent address, "We want again to have the industry in full health, dominated by the spirit of craftsmanship, by the spirit which has made the building industry down through the centuries one of the means by which civilization has written its story for the inspiration of succeeding ages. In the spirit of the finest traditions of the building industry, let us carry on with all the energy which characterizes us as Americans and representatives of this, the Twentieth Century."



SOUTHERN ARCHITECTS SHOULD EXERT THEMSELVES

WE ARE pleased to call your attention to the announcement carried elsewhere in this issue concerning the meeting held in Atlanta on December 15th for the purpose of discussing the advisability of holding during this year a Traveling Exhibition of southern architectural work.

It was the unanimous opinion of those present at this meeting that this was the greatest movement ever started by the architectural profession in the South. With this expression in mind we are more than concerned with seeing this movement carried to completion.

While the architects in the East and West are exerting themselves and therefore being recognized as the leaders in American architecture, our southern architects as it would seem are content to hold themselves aloof from any movement that in the least smacks of publicity. While publicity egotistically expressed is one thing, and has no place in the profession of architecture, there is a difference in a sensible presentation of facts—a pictorial review of the best architectural subjects being done in the South and, as such, an architectural exhibition along the lines proposed and agreed upon by the members of the American Institute of Architects at this meeting in Atlanta would bring to the attention of the public and the architects in general inspiration that would lead to a recognition of the work of architects such as no other one movement could possibly do.



Photos: Tebbs & Knell, Inc.

OFFICE OF VICTOR H. HANSON

PUBLISHER, BIRMINGHAM AGE-HERALD, BIRMINGHAM, ALA.

WARREN, KNIGHT & DAVIS, ARCHITECTS

SOUTHERN ARCHITECT *and* BUILDING NEWS

JANUARY, 1929



VOLUME 55

NUMBER 1

Office of Victor H. Hanson, Birmingham, Ala.

Warren, Knight & Davis, Architects

THERE is no little significance in the change of thought which has come over the more progressive American Business executive towards architecture and more particular towards interior decoration as applied to the working offices. For quite some years now big business men have looked upon architecture, exterior architecture, with keen delight and have recognized the work of architects as being a necessary requisite in the creation of monumental buildings, buildings that within themselves place upon the business organization the stamp of success. However, until more recently has the same idea that prompted the commercial world to call upon architecture to serve it on the exterior been put into force on the inside—spaces that the general public do not always see or even know about. Today, we find that art and beauty is fast becoming wedded to commercialism—there is no prejudice towards art—the progressive business man is willing to make use of it as of anything else which serves his purpose.

The history of architecture reminds us that every forward step in the art has been made through necessity or due to some awakening which prompted a desire for certain things which did not exist. So, we have come to understand that every movement which brings art and beauty closer to the people must be followed by a similar movement that will reach even closer the lives and desires of those people. The average business man of today lives in a home that is cheerfully furnished, a home with comforts that even his father did not know, and having become accustomed to these surroundings he is not satisfied with the old offices of a few years ago. The four walls from which the working girl of a decade ago departed each morning for her daily service to commercialism is not the kind of four walls she leaves today. Every phase of American life has become more human and living conditions are vastly different from what they were even a short time ago. To-

day, the commercial world is asking this question, "Is it profitable to force people to work, for the greater part of their waking hours, in bleak, cheerless, badly proportioned offices with bare walls and clumsy furniture, when elsewhere, in home or club or church, they are becoming accustomed to beautiful surroundings?"

There is an age old maxim, "Work while you work and play while you play," and the old school of a generation ago might have added, "People who work should keep their minds on the job and not be looking at the walls." But, since that day American civilization has undergone changes that could have hardly been more than dreams with the old school of business executives. Our problems are far different, our ideals more advanced and our minds react more forcefully to conditions about us than was the case a generation ago.

Wherever the buying public is involved there we find architecture most pronounced—look at our great banking houses, our railway stations, our hotels and even our retail shops are taking on new beauty. We are selling art along with merchandise and service. Let us apply some analogy here—a little logical reasoning. Is it not this same buying public which makes up the working forces of our American business institutions? Then, why would it not be profitable to house these people who constitute the production forces of business in the same beautiful surroundings? This is a day of mass production with short but intelligent working hours when each individual must give fully of his or her energy. With such demands imposed upon working people environment means much towards increased efficiency.

We have seen the effect of a new order of hygiene—of saner working conditions made possible by increased heating, lighting and ventilating efficiency and now we are coming to not the least important of all, the matter of making the surroundings



DETAIL IN PRIVATE OFFICE OF VICTOR H. HANSON, BIRMINGHAM, ALA.
WARREN, KNIGHT & DAVIS, ARCHITECTS

more cheerful, more beautiful and more home like—places where we spend three-fourths of our lives are being fitted and decorated to create an harmonious atmosphere. Today, the impulse is to make business more human.

The private office, the board room, the reception room and public spaces are receiving their share of attention, and decoration—interior architecture—is

becoming just as important and as impressive here as in the finest homes. Anent the examples shown in this issue of the office of Victor H. Hanson, publisher of the *Birmingham News and Age-Herald*, Birmingham, Ala. Warren, Knight & Davis, the architects, have created for their client rooms of Tudor splendor that are reminiscent of the best seventeenth century precedent. The plaster ceiling is interesting



DETAIL IN OFFICE OF VICTOR H. HANSON, BIRMINGHAM, ALA.
WARREN, KNIGHT & DAVIS, ARCHITECTS

for its exactness as a reproduction of that in the dining hall of the London house of Sir Paul Pindar whose date of erection is established as 1640. This was the house whose front facade, or part of it, is now in the Victoria and Albert Museum, as a notable example of Early Tudor Wood-carving. The panelled walls and furniture are replete with all the character and charm of Early Tudor work.

That we are giving some time and thought to ex-

ecutive offices and show rooms is a good sign, but we must go forward towards encouraging our clients to spend more money for the interior working spaces inhabited by those hundreds who are making big business possible through their loyalty and service to their employers—to the details that make for better business. Business architecture is and should become more democratic. This is a problem for the architect as well as the business man.



Antique Finish In Stucco

BY E. LYNN DRUMMOND, A.I.A.

Scroggs & Ewing, Architects

STUCCO in its infancy, being a purely utilitarian process, involved two elements, labor and material. With its development through practice and systematization a third element appeared, craftsmanship, and stucco became a recognized building adjunct, a trade or craft. Even in Mediæval times, though the element of art was sometimes introduced in the formation of figures and patterns in cast and moulded plaster, the plain surfaces belonged to craft rather than to art. The work was simple and plain and much of the present beauty of the old walls is due to the action of the weather that has softened and enriched the surfaces and made them charming and beautiful.

The attempt of American artists and architects to copy the old surfaces has introduced into stucco work the fourth element, art. In our day no building process is more flexible, offers more to an active imagination or a greater opportunity for self-expression. Its possibilities are almost unlimited.

When the idea of texture crept timidly into building, stucco came in for its share of attention and the history of its development, its use and abuse is generally known to the architectural profession. It is common knowledge also that many advances are being made, many of them through the exhaustive study, research and missionary work of the Portland Cement Manufacturers' Association, but the many beautiful textures that the education and training of the modern plasterer make it possible to obtain belong more to craft than to art inasmuch as they depend more on training than on imagination for success.

Antique stucco on the other hand, since it depends on imagination, involves the element of art. There must be a definite reason for it. Certain harsh lines of a design must be softened. There are certain optical effects to be created. There must be certain graduations and blending of tones and color values to tie in the various parts of the building and bind it to the landscape, and even the apparent carelessness of its execution is the result of conscious effort. These effects can not be worked out on the drawing board, in specifications, or through the usual architectural supervision. The architect must give his personal attention to the work, must dip his hands into it and spend a good part of the day on the same scaffold with the man in overalls.

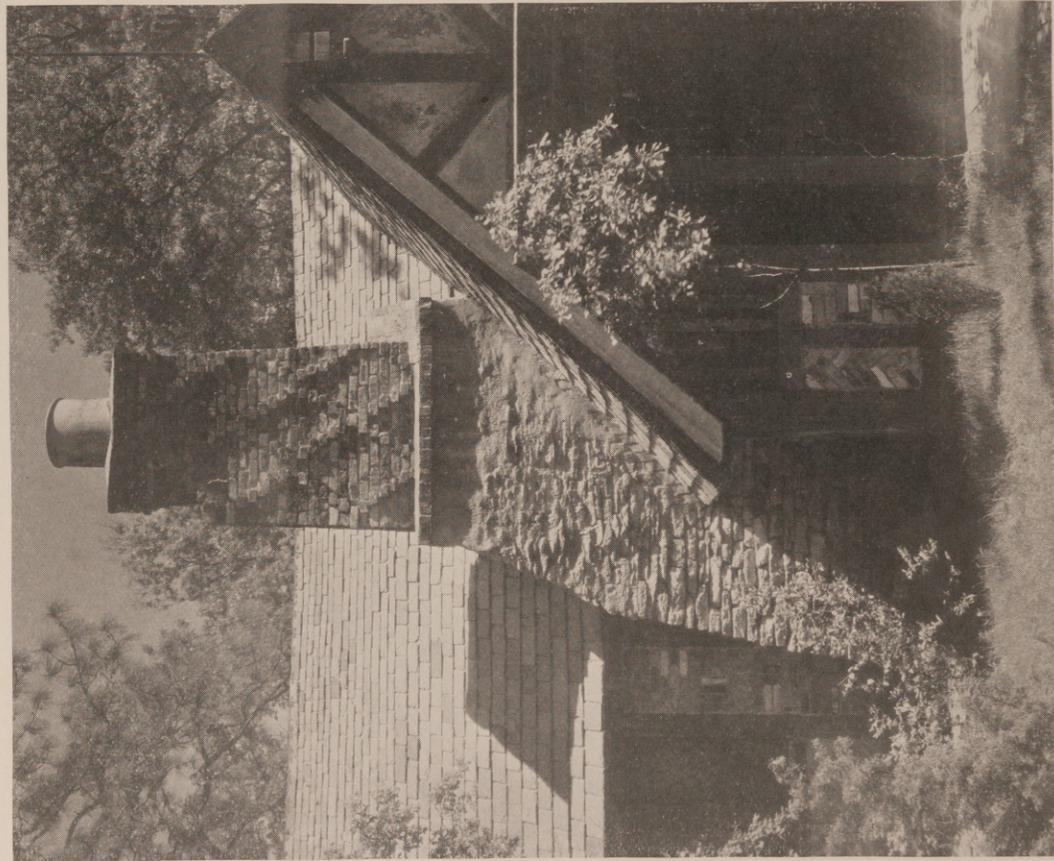
We have recently finished a large rambling house based on the Tudor style that offered certain difficulties to the designer of the facades in that the front of the living room wing at one end of the building

was wider, higher, and projected more to the front than the dining room pavilion which was the logical center of the plan, thereby throwing the whole front out of balance. To correct the fault certain things were done on the drawing board, the effect of which was to subordinate this living room wing to the other, but it was necessary to work with color value to perfect the illusion. A dark, and consequently a heavy value was given to the dining room projection by facing it with old brick, and the owner's request for antique finish furnished opportunity to quietly tie this dark mass in with the relatively light stucco of the rest of the facade.

The general tone of the stucco was a light buff. We worked this down into dark "weatherstained" effects near the ground and in the corners at the brickwork, with the results desired, the method being as follows:

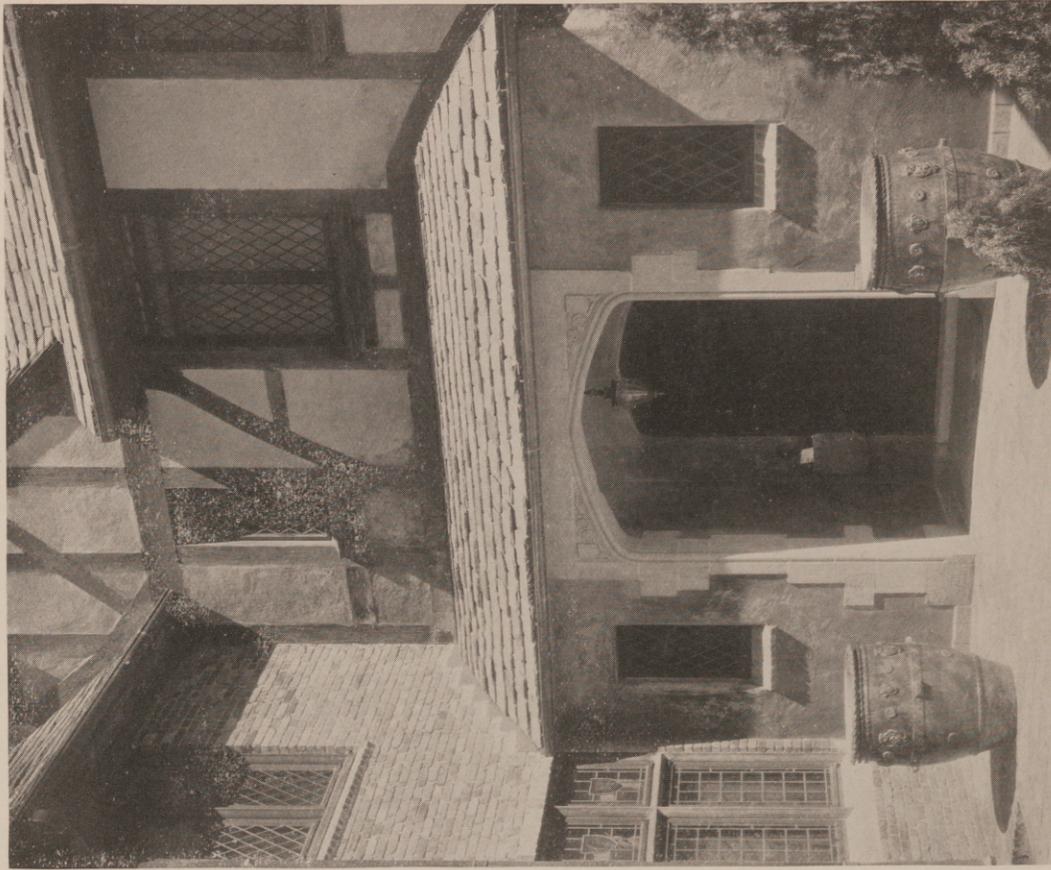
The general stucco was of one-third gray Portland cement to two-thirds white cement, the cement mixed with sand, one to three with ten per cent of hydrated lime. Ordinary commercial dry raw sienna was added in just sufficient quantity to obtain a warm pale gray buff. A small quantity of the mixture was taken out and tinted somewhat darker, by the addition of a little more sienna and a little burnt umber, this being added in small quantities to the lighter stucco on the hawk, the two being troweled on together without thorough mixing. As the darker areas were approached the proportion of the darker mixture was increased.

The "mud" was simply troweled on with large free strokes. Screed, straight-edge, darby and float were eliminated entirely. All corners were rounded, the entire surface kept free and slightly wavy, and when done down to the scaffold level, was brushed down with a wet brush, this blending the color tones. This much of the work was done by the plasterer under the architect's direction. The next operation was the "dirt," and this, consisting of raw sienna and burnt umber was thrown on dry on the wet stucco, in such corners and at such points as it might be imagined would in time become naturally weatherstained, a sprinkling here, a handful there, heavy masses in the corners and near the ground, then the wall was gone over with the brush so wet that water ran down the wall in streaks, these streaks later smoothed and blended out till the soft graduations of color desired were obtained. The craftsman often thinks he can function well here, but he soon gives in and is content to stand by and await with many misgivings and much interest, the final outcome. The



Photos: Tibbs & Knell, Inc.

No. 2. Chimney Detail of John W. Herbert Tea House, Augusta, Ga., showing the second effect described. Scroggs & Ewing, Architects

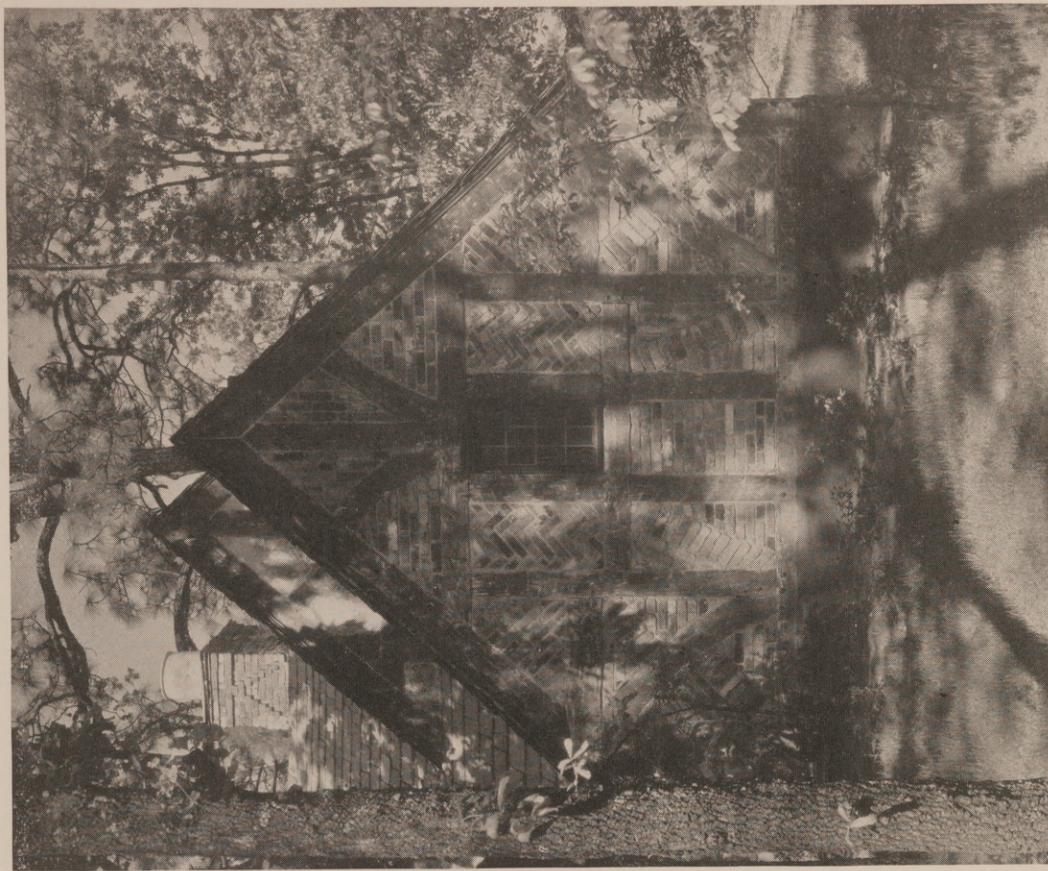


No. 1. Entrance to John W. Herbert House, Augusta, Ga., showing "wethered" stucco. Scroggs & Ewing, Architects



Photos: Tebbbs & Knell, Inc.

No. 3. Detail of John W. Herbert Tea House, Augusta, Ga., showing the third texture described. Scroggs & Ewing, Architects



No. 4. Detail of Gable End; John W. Herbert Tea House, Augusta, Ga., showing harmonious effect of brickwork and stucco on upper gable. Scroggs & Ewing, Architects

work can not be hurried. There is a tendency toward strokes in two directions, back and forth or up and down. For proper results the brush must be carried one way, then dipped in clean water before another stroke as otherwise dark color will be streaked over lighter surfaces.

When the wall had so set that it could be pressed with the finger without yielding and was yet so that the surface would sand off on being rubbed we put on the finishing touches, this being a good job for a black laborer with a strong arm and a good disposition. We had just such a man on this job, a burly young darky named Bill who handled a particularly effective piece of burlap. The sack was rolled up and applied to the wall with a circular motion varied with strokes from side to side, the rubbing continued over the entire surface. The operation removed all evidence of recent tool or brush work and rubbed through the dry color in spots while leaving it in others, brought out all sorts of interesting patches and textures, the final effect being one that was not altogether foreseen but that was the more interesting because of it. This effect is shown in illustration No. 1.

Another effect was that of a stone wall that had been stuccoed but had lost some of its stucco through the action of the weather. (See illustration No. 2.) Such an effect was obtained at the top of the chimney base illustrated in the second picture.

The stones were covered with a thin layer of stucco mixed about the same as the buff tone above described, this brushed out with the wet brush to a feather edge at the lower edges and allowed to set for some fifteen or twenty minutes after which it was sprayed with a fine spray from a hose till the entire surface was pitted and chunks fell out. The washing was continued down the stonework to the ground, to clean the stones of mortar stains. The stones, of course, showed weathered surfaces everywhere, and in this case were sandstone laid in cement mortar raked back and finished with the hose to appear naturally weathered.

When the stucco was perfectly set and dry, a few handfuls of dry color, raw sienna, burnt umber and medium chrome green were sprinkled along the brick ledge above and a stream was turned on the brick chimney top, the water running down through the color and streaking it over the stucco below. This was evened up a bit with a fine spray and the work was finished.

The third effect, to my mind the most interesting, was that of weathered whitewashed stucco used in connection with antiqued half timbering as in the gable illustrated. The stucco was applied complete

as described in the first effect, allowed to set for about an hour after rubbing, then given a thick coat of lime whitewash mixed to about the consistency of enamel. This was almost immediately stained with raw sienna and burnt umber put on with a dry brush and blended in to obtain "natural" weather stains and allowed to stand for about half an hour. Our old friend the hose was then turned on, the nozzle halfway between a stream and a spray till the effect shown was obtained. A few seconds was sufficient. (This texture is shown in illustration No. 3, also at the extreme right of illustration No. 2.)

A word now in explanation of antique finish. I do not say defence for the word does not apply: Time was when the imitation of the antique was done with deliberate attempt to deceive, still is in many cases. Certain temperaments have sought made to order heirlooms to go with their made to order coats-of-arms, and the demand was quickly met by an unlimited supply. Today, however, the deceptions deceive, generally, only as do conjurers' tricks. One knows they are tricks, wonders at the method employed, considers the art of painting in building materials as legitimate and worthy as the art of reproducing a landscape on a canvas, and buys the objects for their artistic value.

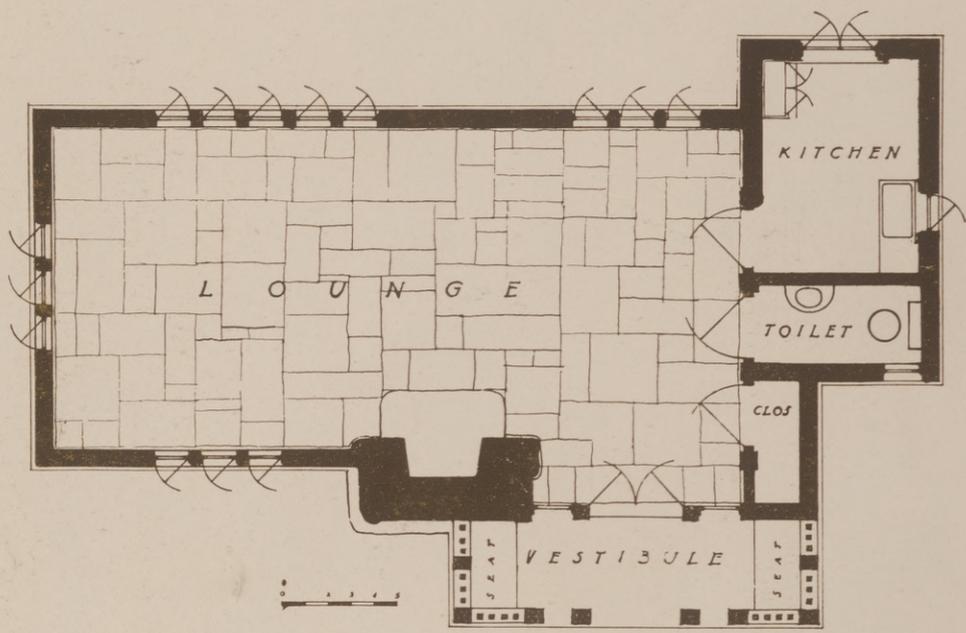
To house his furniture that is beautiful not because it is old but because it is soft in line and mellow in tone, he builds a house that is also soft and mellow, has his ornamental iron rusted by a bath in the ocean, his pecky cypress ceiling "aged" and "rotted" by a clever combination of stain and oil and quicklime, and his stucco "weathered" and battered up by every trick in the artist's box. And the cause of all this effort is that it was found that a Tudor Manor House or a Spanish Palace copied line for line in new materials was cold and uninteresting and that to reproduce the spiritual image of the old it was necessary to reproduce its softened line and surface. America is not yet old enough to give us many of those stately aristocrats in brick and stone and the better woods that are the more lovable for their very age, and while the straight line and the harsh cold surface and dazzling newness may appeal to many temperaments, to the man who if he were a painter would select as his subject the old homestead and not the new bank building there is something essentially spiritual and lovable about a rugged old slate roof that is all sagged and broken, something about mellow old brickwork with which his nature is at peace, something somewhere around old ivy and leaded glass about which he can build his day dreams, something that perhaps he can not define or understand, but he builds his house so and is at home.



Photos: Tebbs & Knell, Inc.

TEA HOUSE ON ESTATE OF JOHN W. HERBERT, ESQ., AUGUSTA, GA.

SCROGGS & EWING, ARCHITECTS



FLOOR PLAN

TEA HOUSE ON ESTATE OF JOHN W. HERBERT, ESQ., AUGUSTA, GA.

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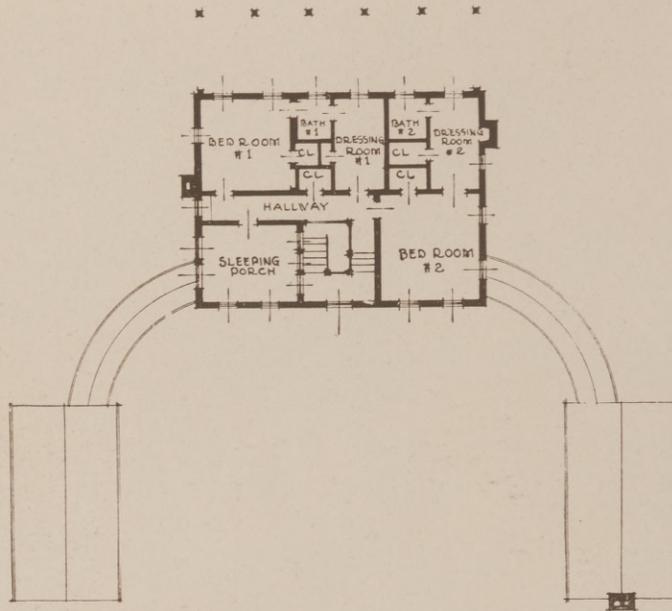


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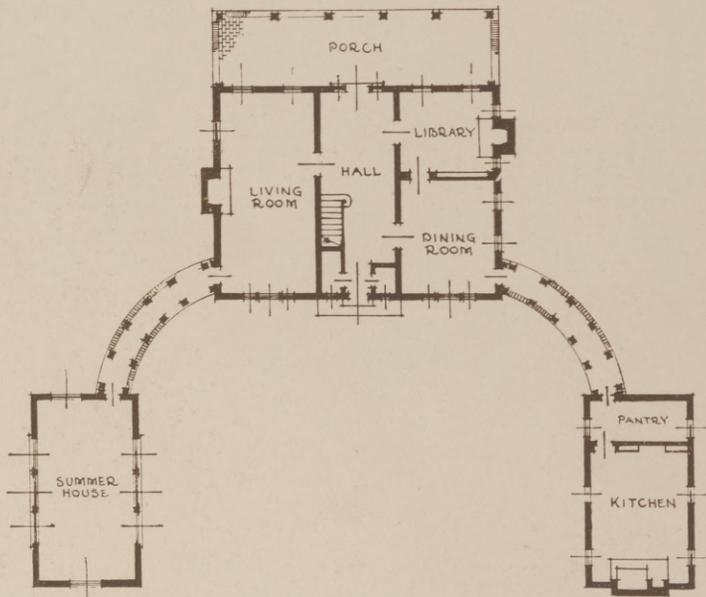
FRONT ELEVATION

HOUSE OF W. L. CLAYTON, ESQ., HOUSTON, TEXAS

BIRDSALL P. BRISCOE, ARCHITECT



SECOND FLOOR



FIRST FLOOR PLAN

HOUSE OF W. L. CLAYTON, ESQ., HOUSTON, TEXAS

BIRDSALL P. BRISCOE, ARCHITECT

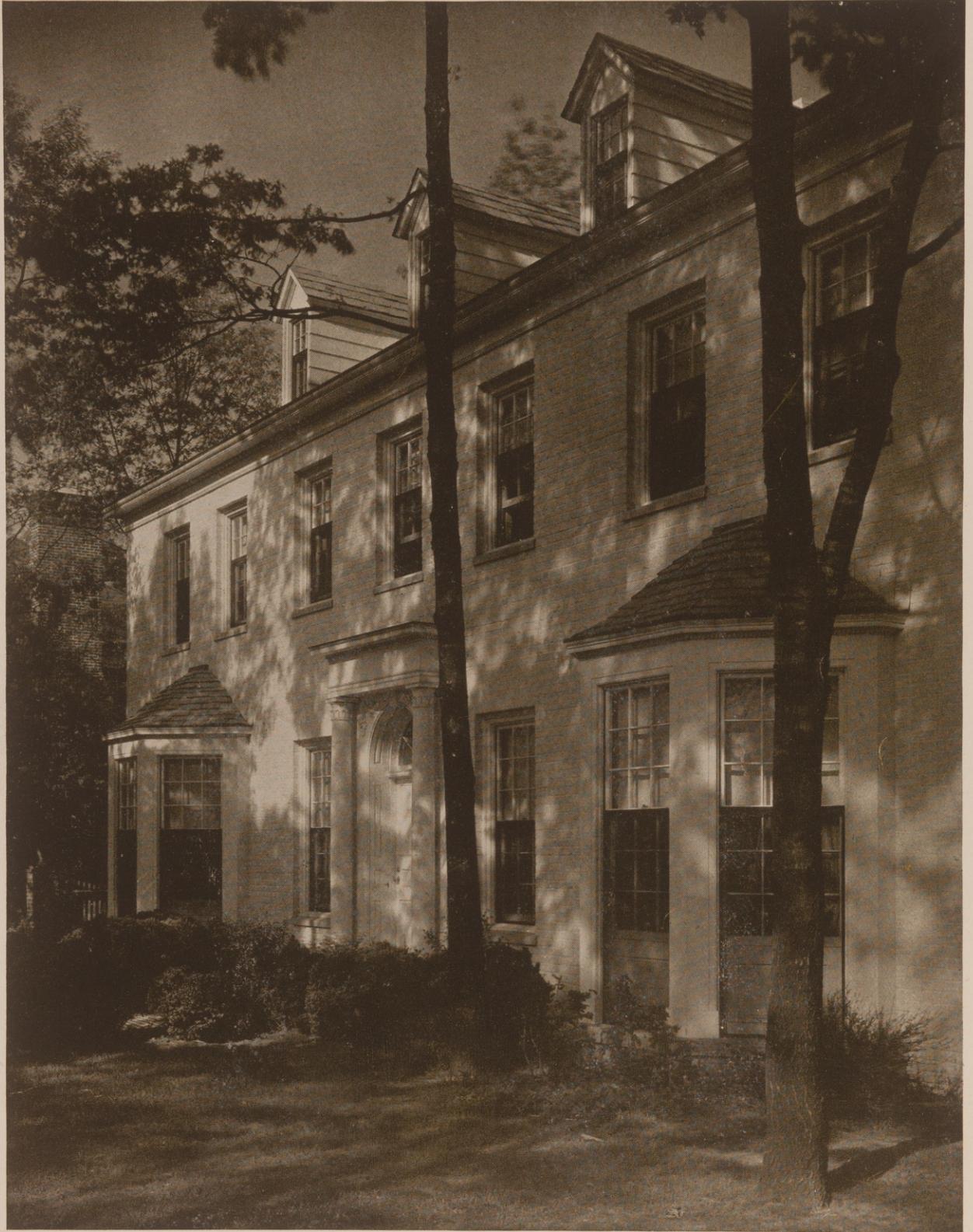


DETAIL REAR ENTRANCE



REAR ELEVATION

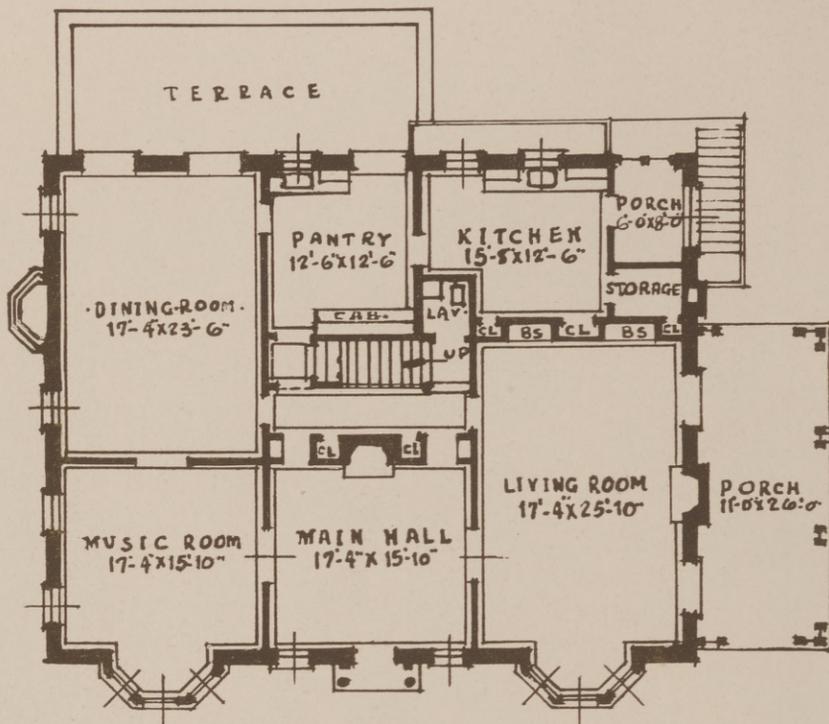
HOUSE OF W. L. CLAYTON, ESQ., HOUSTON, TEXAS
BIRDSALL P. BRISCOE, ARCHITECT



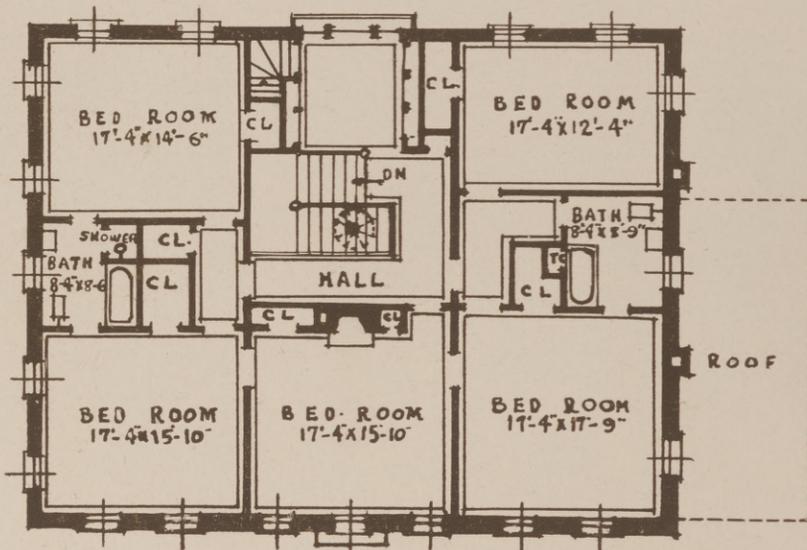
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HOUSE OF R. W. STOKES, ESQ., CHARLOTTE, N. C.

M. E. BOYER, JR., ARCHITECT



FIRST FLOOR PLAN



SECOND FLOOR PLAN

HOUSE OF R. W. STOKES, ESQ., CHARLOTTE, N. C.

M. E. BOYER, JR., ARCHITECT



LIVING ROOM MANTEL

HOUSE OF R. W. STOKES, ESQ., CHARLOTTE, N. C.

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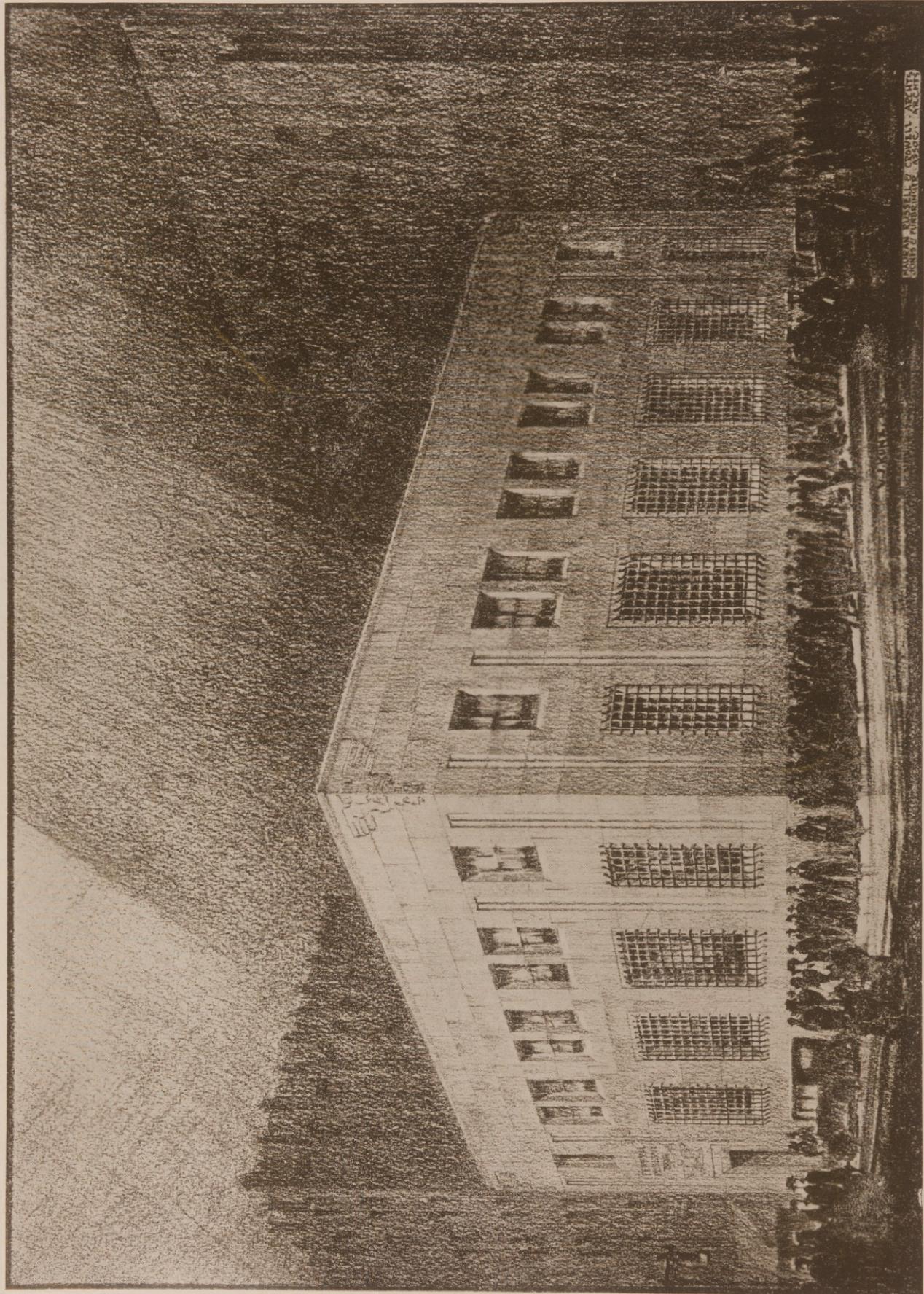
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Auditorium Acoustics Part II.



By A. F. HENRY AND DON QUISENBERRY, *Engineers*

REVERBERATION—The length of time required for multiple reflections to become inaudible in an inclosure is known as the time of reverberation of that interior. Let us see how reverberation affects speech. A speaker utters an average of five syllables per second. It is hardly possible to reach a condition in which every syllable is heard correctly, but if less than 70% of the syllables are heard correctly, audition is difficult. It is necessary, therefore, that the sound of each syllable of speech be absorbed quickly enough after it reaches the audience so that each syllable stands out by itself and the sound of succeeding syllables do not greatly overlap; otherwise, speech will be indistinct and blurred even though adequately loud. In fact, the louder the sound made, the longer it will persist and the greater will be the overlapping. Ninety per cent of the acoustical difficulties in auditoriums are due to reverberation and it is one factor that must be considered and adjusted in every auditorium.

A formula for calculating the time of reverberation in an interior was developed by Prof. Wallace C. Sabine of Harvard University. This formula is

$$t = \frac{V}{aK}$$

where t is the time of reverberation, V is the volume in cubic feet, a is the absorbing power of the interior expressed in units, and K is a constant .05. The constant .05 in the above formula is based on an initial intensity of sound of 1,000,000 times minimum audibility (a sound that can just barely be heard.) This initial intensity is called the Standard Intensity in reverberation calculations and tests. In order that reverberation calculations may be of value, it is first necessary to know the best degree of reverberation. From a large number of tests made and data as to the best reverberation, Prof. Watson has determined that the following periods of reverberation in varying sized auditoriums are the best for all purposes:

Volumes in Cubic Feet	Time in Seconds
Below 1,2719
1,271— 7,042	1.0
7,042— 20,797	1.1
20,797— 46,012	1.2
46,012— 86,159	1.3
86,159— 144,708	1.4
144,708— 225,124	1.5
225,124— 330,915	1.6
330,915— 465,484	1.7
465,484— 632,618	1.8
632,618— 835,098	1.9

835,098—1,076,890	2.0
1,076,890—1,367,631	2.1

It should be noted that a higher period of reverberation is permissible in a larger auditorium for the optimum condition. It can readily be appreciated, however, that the clearness and distinctness of speech in larger auditoriums is sacrificed for increased loudness, and it is desirable therefore to keep the cubical contents of an auditorium as low as possible.

Let us make an analysis of an ordinary school auditorium (see Figures 2 and 3) so that we may

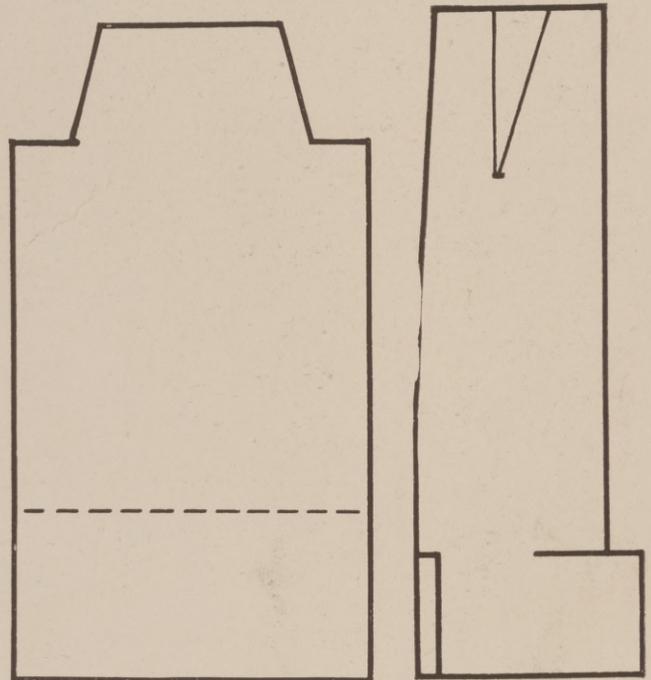


Fig. 2
Scale: $\frac{1}{32}'' = 1'-0''$

Fig. 3
Scale: $\frac{1}{32}'' = 1'-0''$

better understand the use of the formula for determining the reverberation. The unit of measurement of sound absorption is one square foot of open window. A sound wave strikes the open window area and all the sound energy is absorbed, 100% absorption. A square foot of material that absorbs only 5% of each sound wave that is impinged upon it, is said to have a coefficient of absorption of .05 and 20 square feet of such material is required to furnish one sound absorbing unit. The coefficient of absorption of various building materials and furnishings which are generally used are as follows:

ABSORPTION COEFFICIENTS OF VARIOUS BUILDING MATERIALS

Material	Authority	Coefficient
Brick Wall, 18" thick.....	Watson	.032
Brick Wall, painted.....	Watson	.017
Carpets, unlined	Watson	.15
Carpets, lined	Watson	.20



MANN and BAUMANN
 Architects
 KNOXVILLE, TENNESSEE

Schell Lewis, Delineator

TENNESSEE TERRACE HOTEL, KNOXVILLE, TENN.

BAUMANN & BAUMANN, ARCHITECTS

Carpets, rugs -----	Watson -----	.20
Concrete -----	Watson -----	.015
Cement -----	Sabine -----	.025
Cork Tile -----	Watson -----	.03
Curtains -----		
Velour, heavy folds-----	Knudsen -----	.40 to .75
Glass, single thickness-----	Watson -----	.027
Floors		
Linoleum -----	Watson -----	.03
Marble -----	Watson -----	.01
Oil Paintings (including frames)-----	Watson -----	.28
Openings		
Open Window -----	Sabine -----	1.00
Stage Openings, including settings -----	Watson -----	.25 to .40
Ventilators, (50% open space)-----	Watson -----	.50
Plasters		
On wood lath-----	Watson -----	.034
Lime -----	Knudsen -----	.03 to .04
On wire lath-----	Watson -----	.033
On tile -----	Watson -----	.025
Wood		
Sheathing -----	Watson -----	.061
Varnished -----	Watson -----	.03
Soft -----	Knudsen -----	.05
Seats		
Wood -----	Knudsen -----	.15
Wood, for Auditoriums-----	Watson -----	.10
Church Pews -----	Watson -----	.20
Upholstered -----	Watson -----	1.00 to 2.50
Upholstered -----	Knudsen -----	.75 to 2.00
Leather Covered -----	Watson -----	1.50
Cushions		
Cotton covered with corduroy-----	Watson -----	2.16
Hair covered with canvas and light damask-----	Watson -----	2.27
Persons		
Audience per person-----	Watson -----	4.70
Adult -----	Knudsen -----	4.20
High School Child-----	Knudsen -----	3.80
Junior H. S. Child-----	Knudsen -----	3.50
Grammar School Child-----	Knudsen -----	2.80

Using the above referred to Sabine Formula, the calculated values of "a" and "V" are as follows:

$$V=90 \text{ ft.} \times 60 \text{ ft.} \times 30 \text{ ft.} = 162,000 \text{ cu. ft.}$$

Plus stage
 34 ft. x 20 ft. x 34 ft. = +26,400 cu. ft.
 Less balcony
 60 ft. x 28 ft. x 5 ft. = — 8,400 cu. ft.

$$180,000 \text{ cu. ft.}$$

a=Concrete floor	—7380 sq. ft. @ .015=	111 units
Plaster on tile walls	—8080 sq. ft. @ .025=	202 units
Plaster on M.L. ceiling	—7080 sq. ft. @ .033=	234 units
Wood floor	— 780 sq. ft. @ .03=	23 units
Stage ceiling, concrete	— 780 sq. ft. @ .015=	12 units
Stage walls, brick	—3030 sq. ft. @ .03 =	90 units
Seats	—1000 sq. ft. @ .20 =	200 units

Stage curtains		
(16'x40') —	640 sq. ft. @ .40 =	256 units
Stage drops 2		
(16'x40') —	1280 sq. ft. @ .14 =	180 units
		1308 units

(Note: Glass windows usually taken same as plaster on tile as coefficient is nearly the same.)

$$\text{Then, } t = \frac{.05 \times 180,000}{1308} = 6.9 \text{ sec.}$$

		9000	
(1/3) 333 Aud.	=	$\frac{9000}{1308 + (4.2 - .2) 333}$	= 3.4 sec.
(2/3) 665 Aud.	=	$\frac{9000}{1308 + (4.2 - .2) 666}$	= 2.3 sec.
(Full) 1000 Aud.	=	$\frac{9000}{1308 + (4.2 - .2) 1000}$	= 1.7 sec.

(Note: Absorption coefficient of seat deducted when absorption of person is added.)

The Optimum value for this interior is 1.5 seconds which is not reached with a maximum audience present. It will be noted, however, that the reverberation varies with the audience and the question arises of just how high the reverberation can be before the hearing conditions get noticeably bad. The following rule is given: reach the Optimum value with a two-thirds to maximum audience present, providing the reverberation of the room when empty does not exceed the following values:

Volume of room in cubic feet	Seconds
Up to 20,000	1.5
20,000— 50,000	1.9
50,000— 100,000	2.4
100,000— 150,000	2.7
150,000— 250,000	3.1
250,000— 400,000	3.4
400,000— 600,000	3.6
600,000— 800,000	3.8
800,000—1,000,000	4.0

This rule has been proven by practical experience and insures entirely satisfactory hearing conditions when 1/3 maximum audience or more is present; also, acceptable acoustical conditions for rehearsals or small audiences.

It is to be noted that the Optimum value of this auditorium is only reached with a maximum audience present and the reverberation rises rapidly as the size of the audience diminishes. The reverberation will be too excessive for good hearing conditions when an average sized audience is present, or intolerable when the auditorium is used for rehearsals or other small gatherings. To adjust the reverberation in this auditorium to the most acceptable values so that the Optimum will be reached with



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slightly more than a two-thirds maximum audience present, it will be necessary to have approximately

$$.05 \times 180,000$$

5700 units present, ($\frac{\quad}{1.6} = 5700$.) There are

3972 sound absorbing units present in the natural absorption of the auditorium and 666 people in the audience. $5700 - 3972 = 1728$ sound absorbing units necessary to be added to this interior. The ceiling is usually the most practical place for acoustical treatment, so assuming there are 3850 sq. ft. of area available for treatment on the main ceiling, a material

would be required that has a coefficient of $\frac{1728}{3850}$,

or approximately .45. It should be mentioned that in using the advertised coefficient of a commercial material, the coefficient used for the area to be covered by such material should be deducted from it to arrive at the net coefficient. With such an amount of absorption added, the reverberation will be as follows:

	9000	
Empty	$\frac{\quad}{\quad} =$	3.0 seconds
	3008	
	9000	
333 Audience	$\frac{\quad}{\quad} =$	2.1 seconds
	4340	
	9000	
666 Audience	$\frac{\quad}{\quad} =$	1.6 seconds
	5672	
	9000	
1000 Audience	$\frac{\quad}{\quad} =$	1.3 seconds
	7004	

In Part I., Auditorium Acoustics, appearing in the December, 1928, issue, Messrs. Henry & Quisenberry discussed at length Perfect Acoustic Conditions, Design and Its Effect Upon the Distribution of Sound, and Echoes and Regular Reflections. Part II. in this number concludes the discussion. This article is being prepared for your A. I. A. Files and a copy will be mailed upon request to the editor.

Percentage of Error—A word or two should be said regarding the accuracy of reverberation calculations; the reverberation in an interior can be varied approximately 5% before any change can be detected in the hearing conditions. It is usual in making reverberation calculations to work to a 5% accuracy, but a 5% error in calculating the volume will result in a 5% error in the calculated period of reverberation. Such an error in wall and other areas would only show a 1% or 2% error in the period of reverberation.

Reverberation periods as calculated above can be accurately checked by the use of a calibrated organ pipe (calibrated to Standard Intensity) and a stop watch. Architects should insist upon such tests being made in checking the efficiency of acoustical materials for treatment.

CONCLUSION

“The preceding discussion shows that the chief acoustic defect in auditoriums is the excessive reverberation, which can be corrected by installing a calculated amount of sound-absorbing material. A second defect is the echo, and this is likely to be present if the auditorium has curved walls or ceiling. To correct this trouble, it is desirable to change the form of the walls, or to make rather deep coffers in it and to add considerable sound-absorbing material to minimize its reflection. A third defect is the blurring of speech when the reflected sound reaches the auditor more than .05 seconds after the direct sound. In this case, it is desirable to deaden the reflecting wall that produces the troubles of reflection.”

A. I. A. Presidents Approve Southern Architectural and Allied Arts Exhibition for 1929

SEVERAL months ago there appeared an editorial in the SOUTHERN ARCHITECT AND BUILDING NEWS, sponsoring the idea of a Traveling Exhibition of Southern Architectural Work. This editorial was responded to, among others, by the president of the Tennessee Chapter, American Institute of Architects and the editor of this journal was invited to address a meeting of this body on the subject at their annual convention in Chattanooga, Tennessee. This chapter of the A. I. A. endorsed the idea and placed in the hands of its president, Mr. M. H. Furbringer, the responsibility of bringing this matter to the attention of all southern chapters. As a result there was held in Atlanta on December 15, 1928, a meeting of the presidents of the several southern chapters for the purpose of discussing the advisability of holding an Architectural and Allied Arts Exhibition. At this meeting the following were present: Mr. Philip S. Mewhinney, representing the Alabama Chapter, Solis Seiferth, the New Orleans Chapter, Hal F. Hentz, the North Georgia Chapter, George R. Berryman, the North Carolina Chapter, M. H. Furbringer, the Tennessee Chapter and E. R. Denmark, the SOUTHERN ARCHITECT AND BUILDING NEWS.

After a few moments of discussion relative to the object of the meeting, Mr. Furbringer was elected chairman of the temporary organization and E. R. Denmark as temporary secretary.

A complete resume of the results to be attained by holding an exhibition of the work of Southern Architects was presented by the chairman, after which the discussion was confined to the methods to be adopted and plan formulated, it being the unanimous opinion of those present that the exhibition should be held and that a letter should be sent to all Southern Chapters of the A. I. A., advising them of the action taken and soliciting their co-operation.

A motion was made and carried that a committee of three be appointed to work out the details, the members of his committee being Hal F. Hentz of Atlanta; Solis Seiferth of New Orleans; M. H. Furbringer of Memphis, and this committee with the assistance of E. R. Denmark, editor of the SOUTHERN ARCHITECT AND BUILDING NEWS, were then instructed to write a letter to all Southern Chapters of the A. I. A.

This committee was likewise instructed to communicate with some organization equipped to handle an allied arts exposition and ascertain what arrangements could be made by which they would assume all financial obligations, publicity and direction of the

allied arts exhibit, under, however, the control of the Southern A. I. A. Chapters.

When this information has been obtained it will be forwarded to all chapters and each chapter will then determine if they wish to hold an Architectural and Allied Arts Exhibition or only an architectural exhibit.

The Architectural Exhibit will consist of drawings and photographs of the work of Southern Architects and each chapter will send their exhibit to the first city on the circuit from which it will then be sent to the next city, and so on, and after having completed the circuit the drawings, photographs, etc., will be returned to the owners from the last city holding the exhibition.

The Allied Arts Exhibition will consist of the display of building materials, examples of craftsmanship, interior decorating, furniture, etc., and after the information has been obtained relative to some organization assuming the responsibility for the undertaking of this, then it will be a matter for each chapter to determine if they have the necessary facilities for an exhibition of the allied arts or if they for other reasons wish to confine themselves to an architectural exhibition only.

This committee would like to receive at an early date an expression from all Southern Chapters of the A. I. A., regarding the sentiment of your members concerning an exhibition, it would also like to know if your chapter will assume its portion of the expense, based upon a pro rata basis according to membership, for such expenses as may be incurred by the committee in its preliminary negotiations, which amount at most would be very small.

When this committee has received the information requested from all the chapters it will then formulate a plan of action, it will establish tentative dates for the exhibit to be held in each city, subject to such revisions as are found necessary to suit individual chapter requirements and if after careful investigation it is found feasible and desirable to hold an Allied Arts Exhibition in connection with the architectural exhibit in some of the cities desiring, the same tentative arrangements will be made with some reliable organization equipped to handle such an undertaking, with full assurance, however, that any agreement entered into will be subject to the control and direction of the chapters so that the ideals which prompt us to undertake this plan will be safeguarded and thereby avoid any possibility of the architectural character of the exhibition being lost in a commercial enterprise.