



THROUGH THE AGES

JANUARY, 1924

In ancient days the builder knew
To stay the hand of ruthless time—
He monumental structures built
Of ageless marble, rock sublime.

J. S. H.



THROUGH THE AGES



VOL. 1

JANUARY, 1924

NO. 9

CONTENTS

	PAGE
THE CAPITOL OF WISCONSIN	<i>Frontispiece</i>
CREATING "ATMOSPHERE" WITH MARBLE	3
THE MARS HILL OF BALTIMORE	7
SAFETY SIGNS IN THE MARBLE QUARRIES	9
GOthic ARCHITECTURE IN FRANCE	13
MARBLE FOR DECORATIVE PURPOSES	20
THE WISCONSIN CAPITOL	27
LIST OF THE WORLD'S MARBLES	37
MEMBERSHIP DIRECTORY	42

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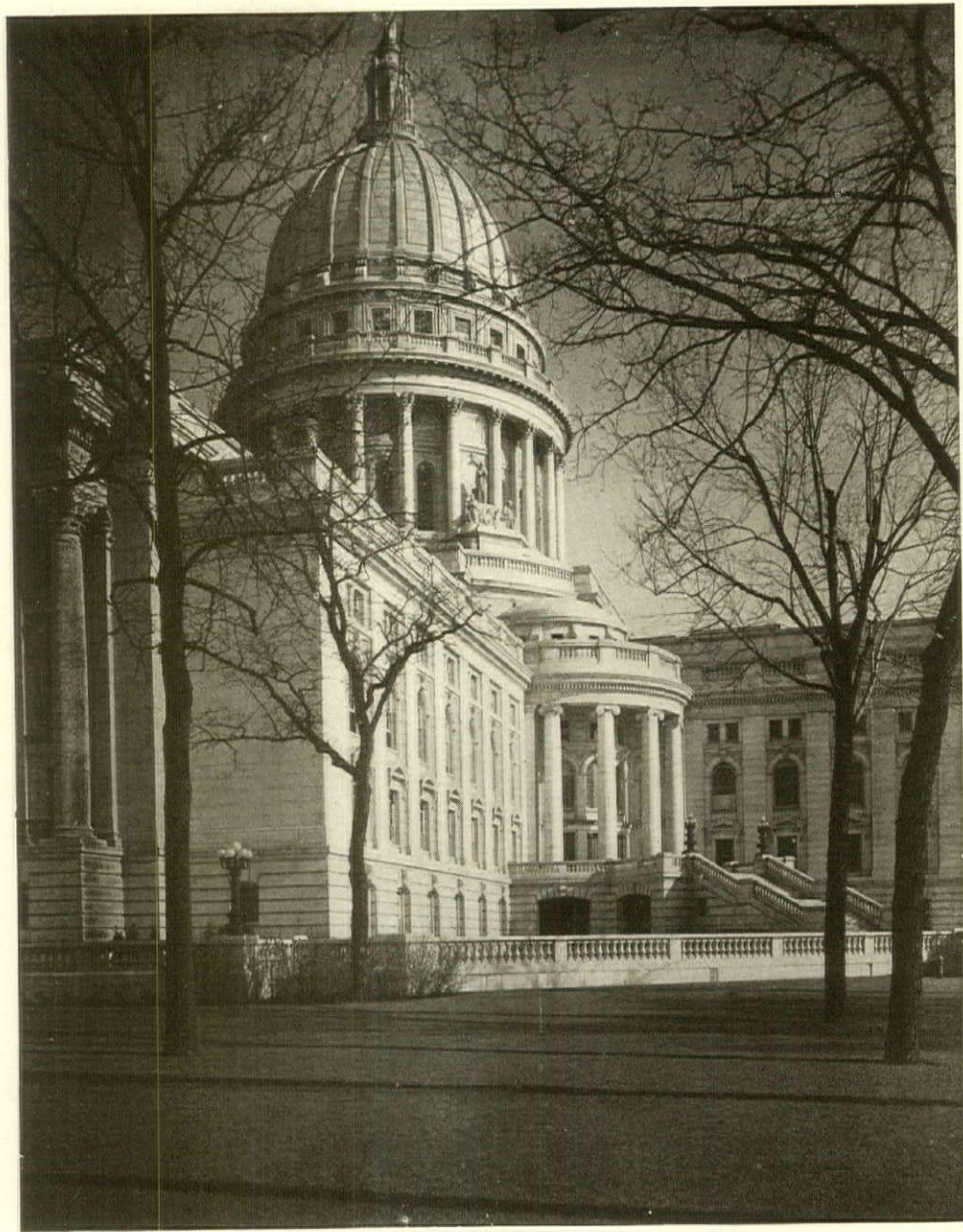
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View of the Capitol at Madison, Wisconsin, one of the most magnificent public buildings in the world. The city itself is in the midst of such unusual scenic beauty that Longfellow was inspired to write of the surrounding lakes:

"Four limpid lakes, four naiades,
Or sylvan deities are these,
In flowing robes of azure dressed,
Four lovely handmaids that uphold
Their shining mirrors, rimmed in gold
To the fair city of the West."

THROUGH THE AGES

A Monthly Magazine devoted to
the uses of Marble - its universal
adaptability, beauty, permanency
and economy.

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CREATING "ATMOSPHERE" WITH MARBLE

How a Famous Hotel in the "Nation's Playground"
Secured Unusual Interior Effects.

SOME time after the sinking of the *Lusitania*, the Roycroft Press brought out a little booklet by Elbert Hubbard, the leader of the Roycrofters, whose life had been sacrificed in that great disaster. It bore the title of "Art and Architecture of the World's Love of Stone." From cover to cover it is a plea for the best in building construction. One of its apt comparisons is set forth in the following paragraph:

"There is fashion in building as well as fashion in raiment. Some have a sentiment in favor of imitation stone or concrete. And in some instances such material serves the purpose. Barns, poultry-houses, sewers, culverts, roadways, factories and tenements have been made of artificial stone. As a cheap substitute and a convenient building material artificial stone has its distinct use. But he who has in mind the memories of the glory that was Greece and the grandeur that was Rome can never be satisfied with imitations. Just as in the world of morals there are a few things for which there are no substitutes, so in the realm of materials no substitute has ever been found, or can be found, for stone. It is God's own building

material. Stone is the primeval material that formed the world. Old Job calls it the foundation of the earth."

This view of Hubbard's is far from being the vision of an idealist. It is being substantiated daily by the men of business, those builders who look first to commercial success, and never allow their good judgment to be undermined by artistic theories. Thirty or more years ago, a certain American architect prophesied that the next twenty-five years would be an "age of marble." As it looks now he might safely have said the "next fifty years." Certainly the popularity of marble for the purposes of decorative architecture was never greater than it is today. And there is every prospect that the future will add materially to the prestige already acquired.

This appealing power of marble is made up of many factors, but among them all there is none more irresistible than the inimitable naturalness of its color effects. The value of this quality has been recognized by no less an authority than John Ruskin.

"It is notable," he says, "that the best



Part of Main Lobby of the Hotel Traymore at Atlantic City, N.J. All the standing marble is Verde Antique.

tints are always those of natural stones. These can hardly be wrong; I think I never yet saw an offensive introduction of the natural colors of marble and precious stones, unless in small mosaics, and in one or two glaring instances of the resolute determination to produce something ugly at any cost."

The color harmony of marble is at its best in the field of interior decoration. And it is in that field that the departure from the level of monotony has been most pronounced. This is the altogether logical outcome of the development of many varied types of American marble.

Nor has this study of the subject been limited merely to the working out of colorful combinations. A worthy effort has been

made to adapt the colors to the building, that it may have the needful environment for the work it has to do. This is well illustrated by the marble that has been installed in some of our more recent hotels.

The hotel has become an important factor in modern life. It serves as the transient or permanent home for vast numbers of our people, thus giving an opportunity for the creation of wonderful effects in architecture and craftsmanship. That the desired ends are being attained, is due in large measure to the quality and productiveness of the marble quarries. For it is undeniably true that both architects and owners of hotels are turning more and more to marble for the pleasing and satisfying

effect, for the desired note of aristocracy.

Take as an example the Hotel Traymore, erected a few years ago at Atlantic City. The architects, Price & McLanahan, of Philadelphia, realized that this structure was to stand in what has rightly been termed the Nation's Playground, the greatest hotel resort in the world. They knew that in order to take the place it was expected to fill, this hotel must have individuality and distinctiveness, and so it came about that marble was used extensively in the construction of this great hostelry.

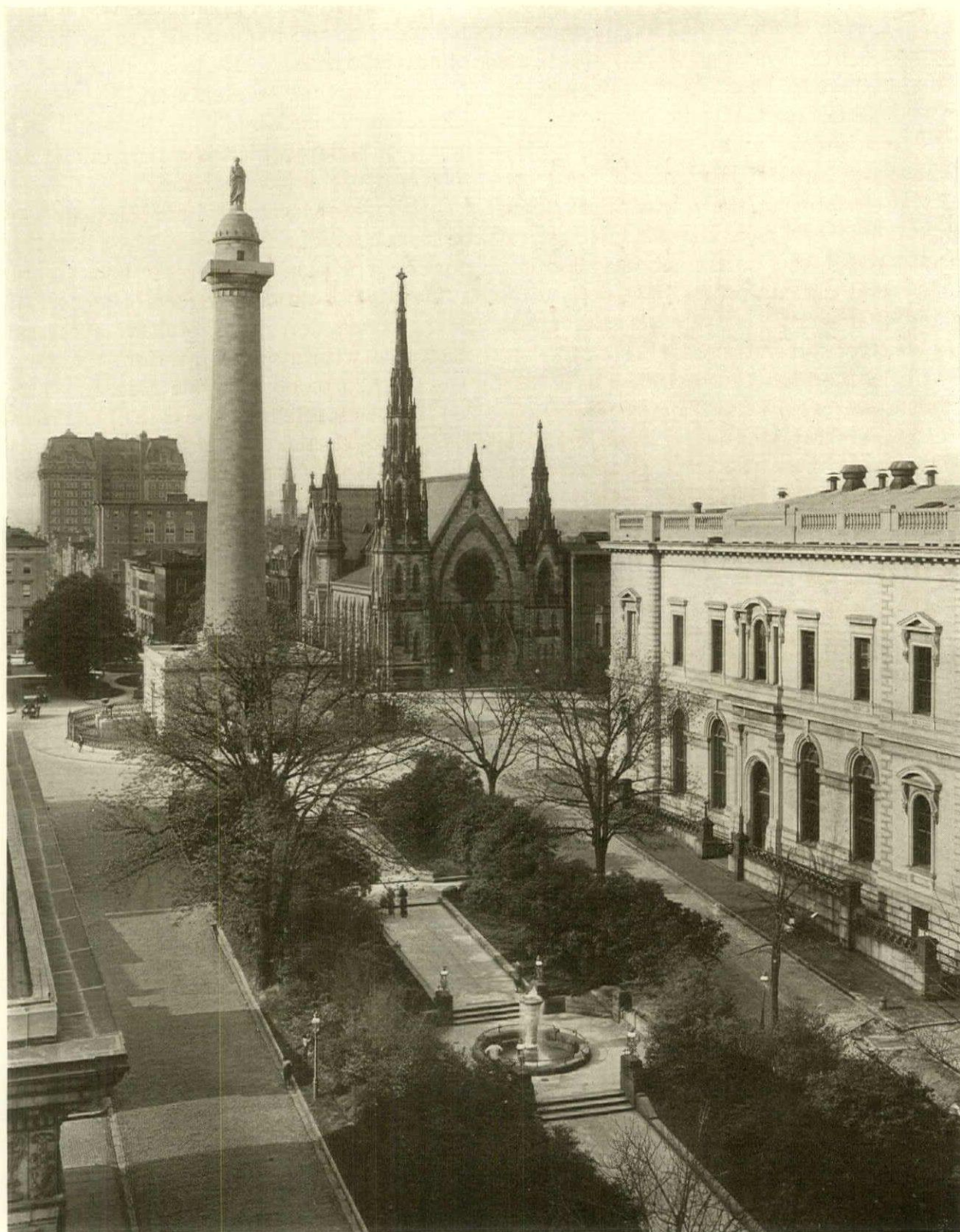
All the marble was provided at the Vermont quarries. In the floors the field is of Venoso, a sharply veined marble, and the tiles are laid with the veining at right angles, producing a warm tone which at the same time is full of life. The effect is quite unique. For the walls, Vermont Verde An-

tique is arranged in plain massive fashion, lightened to the required degree by panels of Special Sylvestre. By this means, and by the judicious use of plants and shrubbery, is the interior endowed with the deeply rich and cool feeling which is a part of the atmosphere of this famous hotel.

In that word "atmosphere" lies the key to the success of the Traymore as a building project. The plan and purpose back of the interior is not simply the idea of a hotel; it is the conception of a hotel for a certain place and with a special mission. Nothing was allowed to obscure the picture. This holds true especially in the case of the marble. It was chosen to meet the requirements of a specialized type of hotel, and only those who have seen the place can know how well it has adjusted itself to the inner life of the structure.



Another view of the Lobby of Hotel Traymore, Atlantic City.



An old view of Mount Vernon Place, Baltimore, looking north. The Peabody Institute is shown in the right center; the Mount Vernon Place Methodist Church in the center to the right of Washington Monument.

THE MARS HILL OF BALTIMORE

Mount Vernon Place, in the Monumental City, is the site
of many fine marble structures

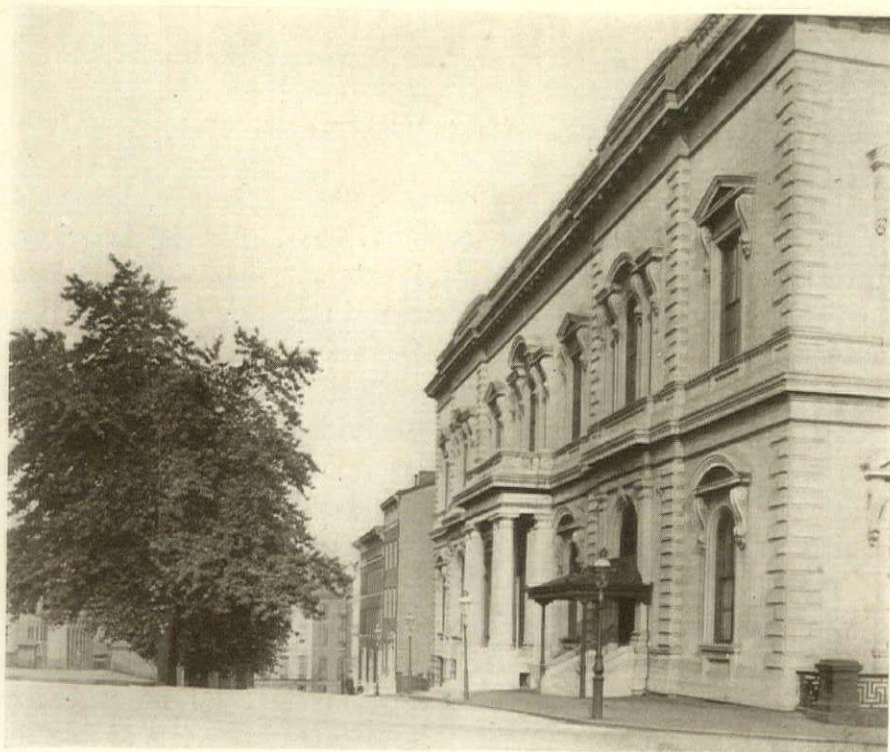
IN February of 1795 there was born at Danvers, Massachusetts, a boy who was destined to become the foremost philosopher of his time—one of whom it was afterwards said that "in the greatness of his benevolence, George Peabody stands alone."

At an early age he settled in Baltimore, where he engaged in business. Later, moving to England, he prospered exceedingly, and became one of the richest men in the world. In 1857 he bestowed a gift of money that in the end aggregated \$1,400,000 for the founding of the Peabody Institute in Baltimore. During his life he gave away from eight to nine millions of dollars. Among his gifts, besides that of the Peabody Institute, were the Institute at Danvers in Massachusetts, now the town of Peabody; the Islington poor-benefaction project, in London, in which some seven or eight blocks of tenements were built for rental on moderate terms to those in straitened circumstances; \$3,500,000 for the promotion of educational interests in the Southern States; and the museums at Yale and Harvard that bear his name.

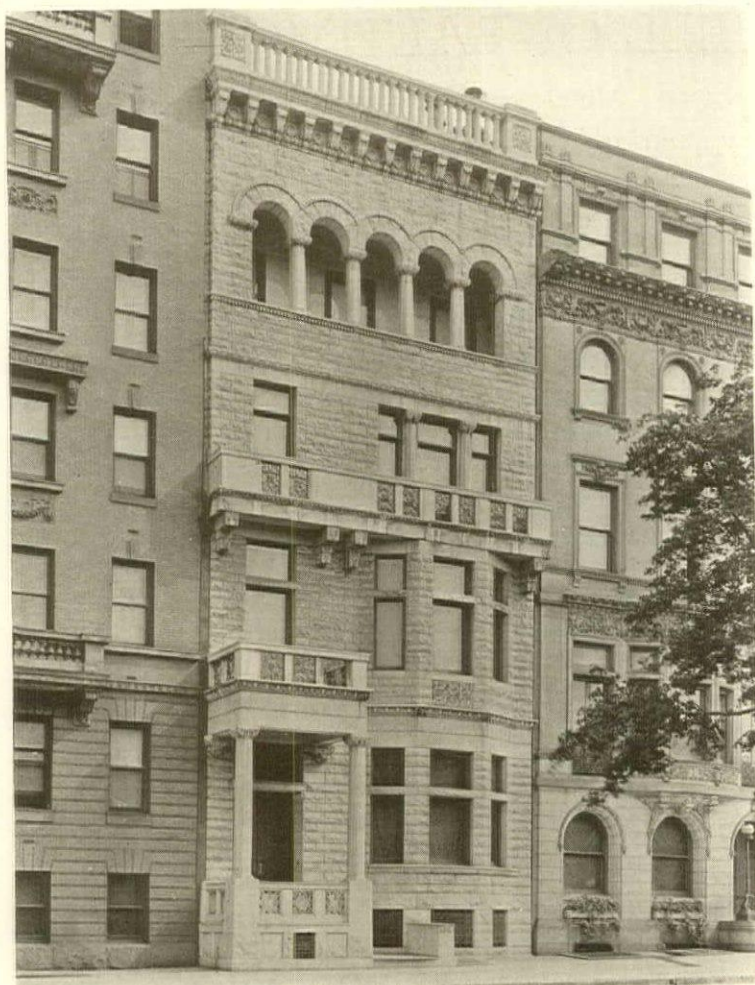
The location of the Peabody Institute of Baltimore is perhaps the most beautiful spot in the city. At the crest

of a hill that slopes sharply up from Center Street, its position at the southeast corner of Charles and Monument Streets makes it the dominant structure of the beautiful buildings that surround the marble shaft erected in the center of what is known as Mount Vernon Place. The immediate neighborhood is the finest residential section of the city—an oasis of fashionable homes belonging to the élite of Baltimore and set down in the very heart of the downtown area, between the shopping section and the automobile district farther north.

The Peabody was opened in October, 1866. The architect, Edward G. Lind, of Baltimore, followed the Roman style, but with many modifications. The exterior was



The north façade of the Peabody Institute.



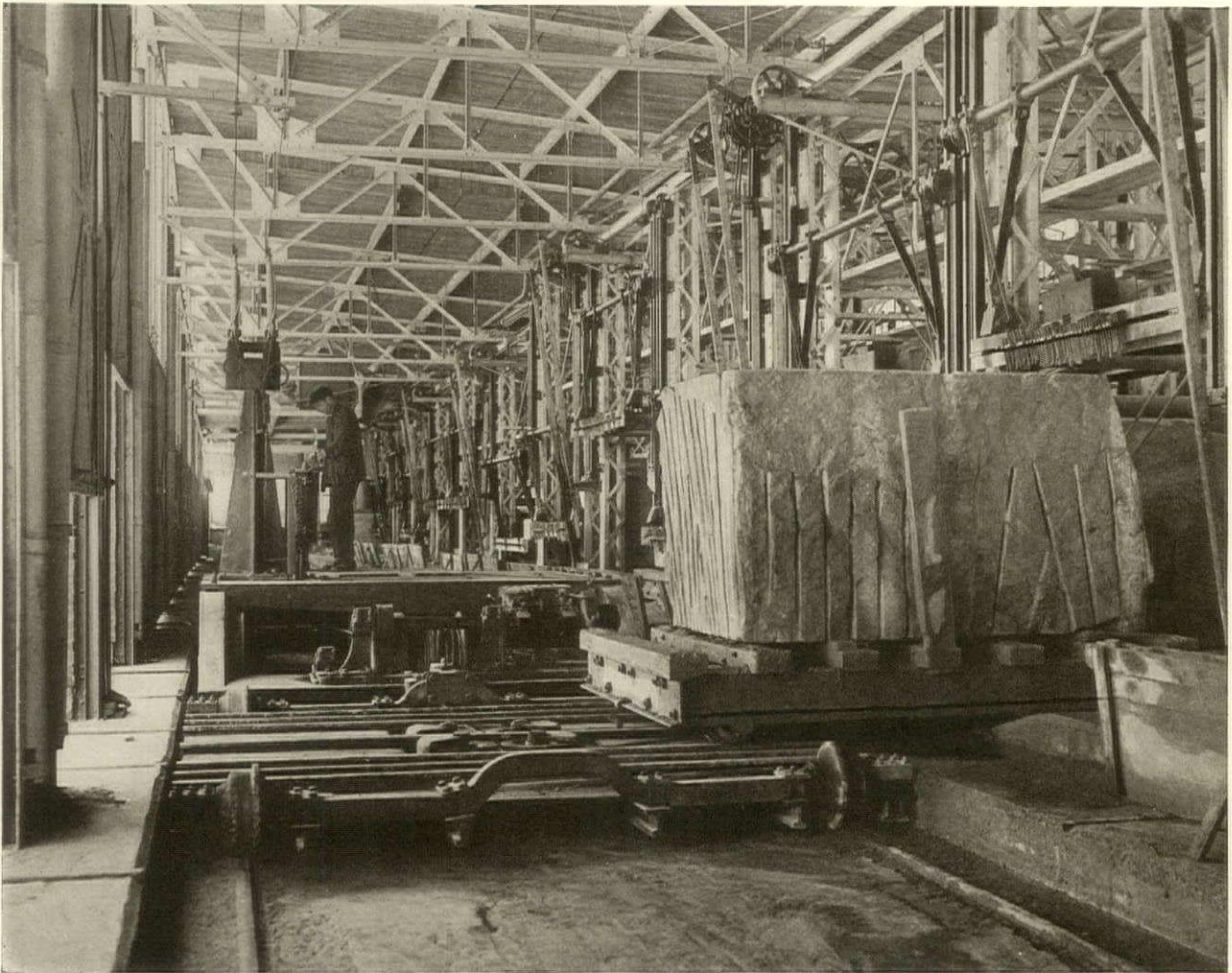
A marble-front residence on Mount Vernon Place.

built entirely of white marble from the nearby quarries at Cockeysville, Maryland. Two stories in height, with a basement, it extends for 175 feet on Mount Vernon Place and 152 feet on Washington Place, as Monument and Charles Streets are respectively called at these points. The north front is divided into two wings set twenty-four feet apart. The west wing contains the large Peabody Hall, music conservatory rooms and a picture gallery. In the east wing are the library, reading rooms, two art galleries and two small lecture halls. The entrance lobby has a marble floor of white and black squares, with a handsome white marble stairway leading to the second story. The interior is

treated in the Renaissance style. An unusual feature of the building is its hot-water heating plant, the first ever installed in Baltimore. It is still in active service. The library contains 211,739 books and nearly 50,000 pamphlets and maps.

The monument in the center of Mount Vernon Place is the first ever erected to George Washington. It was at first proposed to place the majestic column nearer to the Court House, but the residents feared that the tall shaft would attract lightning to their dwellings. At that time, early in the nineteenth century, the section where the monument now stands was a park belonging to Colonel John Eager Howard. This site was offered by the owner to the city at a nominal rental of thirty-five dollars a year, and, because of its seclusion, was quickly accepted. The corner-stone was laid on July 4, 1815, with im-

posing Masonic ceremonies. The cost was over \$175,000 and the designer was Robert Mills, of Charleston, S.C. In 1829 the placing of a sixteen-foot statue of Washington, executed by the Italian sculptor Henrico Caucici from a thirty-six ton block of marble from Cockeysville, completed the memorial. "The elevated place of its erection, carved out like so many of the city's choicest sites by the meanderings of Jones Falls, became the architectural Mars Hill of Baltimore, a site pre-eminent in beauty as the monument was first in time to the honor of the man called by Lee 'first in war, first in peace, and first in the hearts of his countrymen'."



In the modern mill the marble is moved by electricity, with a consequent gain in safety over the old method.

SAFETY SIGNS IN THE MARBLE QUARRIES

THE time was mid-afternoon, A.D. 1838. The place was a rocky, side-hill pasture in the little Vermont town of West Rutland. A hoarse voice was bawling out a warning for all to get under cover. Every last barefooted urchin was being chased down out of the danger zone. After that a moment of quiet. Then a booming like some old Fourth-of-July cannon and a clatter of falling stones. That was marble quarrying in the early days of the Green

Mountain State; the first real quarrying.

Even then the good people of Vermont could look back over fifty years of marble working. Operations has been carried on at other points as early as 1785. But at West Rutland was inaugurated a period of continued activity which led to the development of one of the most remarkable marble quarries.

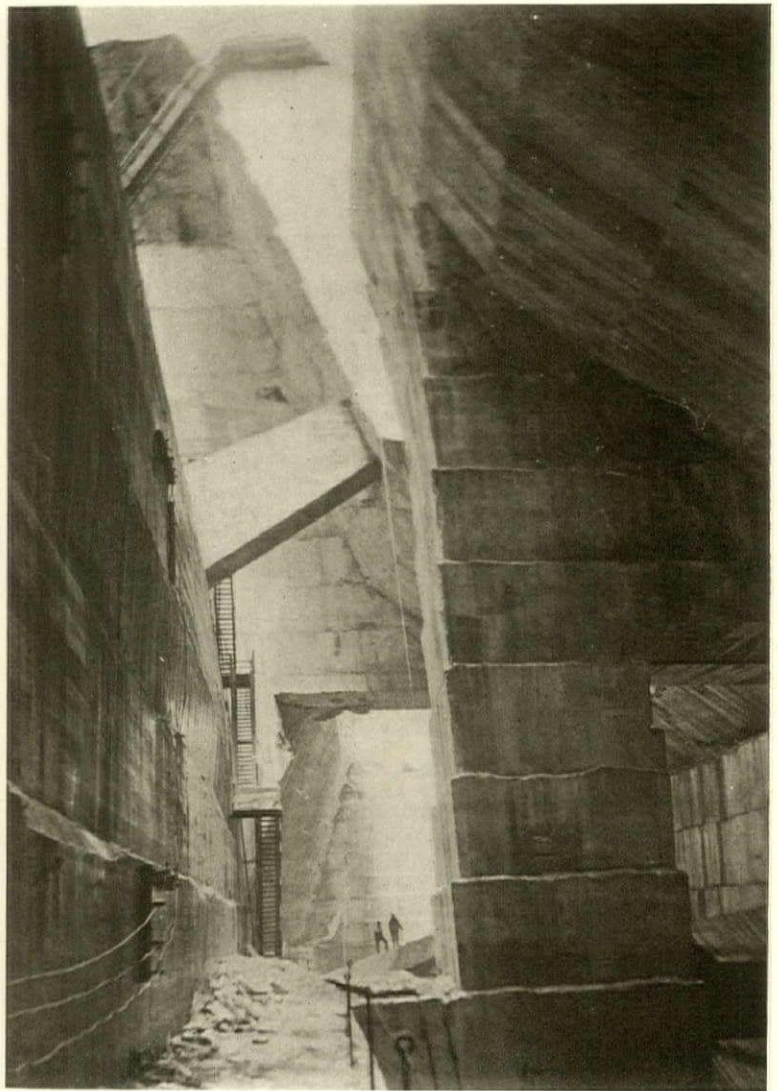
Unlike their brothers over the seas, the Vermont quarry owners soon became dis-

satisfied with the blasting game. It was too wasteful. They began to experiment with other ways of dislodging the marble from its unyielding bed. Men were set at work with drills and wedges in an effort to convert the upper layers into marketable slabs. For a time this clumsy method seemed to answer the demands of the producers.

As the excavations grew larger, more men were delegated to this muscle-building labor. To quote from an old report of sixty-five years ago:

"It was an interesting scene to behold two hundred quarrymen ranged in rows, each with his long sharp drill, steadily cutting deeper and deeper those grooves that are destined to sunder the fetters that bind those valuable blocks to their parent bed. The musical ring of the quarryman's drill, that reverberates to the ear from the depths of the quarry, is pleasing to the spectator as he stands and looks down into it; and to the proprietor it is a welcome harbinger of the good times coming."

Those good times which the optimistic observer had in prospect must have been enlivened by a vision of the steam channeler, an innovation of the year 1863. It was invented by George J. Wardell, of Rutland, and to him belongs the honor of building the first machine. Although this pioneer channeler became the property of the Sutherland Falls Quarrying Company, and spent its entire life in a Proctor quarry, others of similar pattern soon found their way into



In one of the quarries huge concrete piers have been built, that the side walls may be properly supported.

the neighboring quarries, and as a result the marble industry began to have less of waste and more of prosperity.

Today there is little to remind one of the antiquated steam channeler except the smoke-blackened walls of the older openings. The trail of the soft coal buckets is now marked by an extended system of electric wires. Yet the idea is unchanged. It is the same ceaseless hammering which Wardell started that has enabled the quarrymen of Vermont to follow the vein of marble, whether it goes straight into the earth or

swings off at some unaccountable angle.

Of the improvements and labor-saving devices which have come with these later years, little need be said. The story of electricity as it has been applied to marble quarrying is already a matter of common knowledge among stone men. There is the conviction, too, that, because of this linking of brains and electricity, the numerous holes in the ground are deeper than they otherwise would have been. The point that is less often emphasized is the problem of safety which is the natural handicap of greater efficiency in removing the marble.

How to make the quarry safe and how to keep it so. In wrestling with that question the producers spend not a little of their time and money.

The West Rutland opening in the beginning was not unlike other marble quarries. The vein to a depth of about 200 feet was almost vertical; then for no apparent reason it turned nearly at right angles and retrenched itself under the hill. Thereupon, the excavation ceased to be a quarry and became a mine, a system of underground tunnels which are still being extended and multiplied. On the roof of these tunnels rests the weight of the entire hill, and so, every now and then, the quarrymen leave behind them a marble pillar to hold up the load. Unlike most pillars, the work of building resolved itself into the labor of cutting out and removing the marble around them. By means of these supports and the careful pointing of the intervening roof spaces, the West Rutland quarries are being kept well out of the accident class.

In that part of the Vermont deposit which comes within the town of Pittsford, other difficulties were encountered. At the Florentine opening, a cement wall, 120 feet long and between 3 and 4 feet high, has been built for the sole purpose of safeguarding

the lives of the employees. At the Pittsford Valley Quarry, where there has been less of tunneling and more of driving directly downward, it has become necessary, in order to support the outer walls, to construct a series of concrete piers. These jut out between the east and west machine-made marble cliffs like the girders of a huge bridge. There are no less than six of these mammoth eight-sided piers, and, since the cavity increases in length and breadth as it grows deeper, each successive pier is correspondingly longer than the one above it.

The last of these concrete safeguards was 60 feet long and 10 feet in diameter. It is 150 feet below the surface and not quite half way to the bottom, the entire depth being more than 300 feet. Underneath it, is an unused section of the quarry partly filled with water. The feat, therefore, of molding those octagonal beams and pouring the concrete in mid air is not one to be lightly dismissed.

One of the Brandon quarries also has been fitted with concrete piers, but there they are vertical, designed to hold up a section of overhanging roof. In the Danby quarries, as in the tunnels at West Rutland, the vaulted underground dome rests on standards of solid marble. In still other places, there have been subtle peculiarities in nature's plan which have called for individual treatment, but these few examples are all that need be named.

All this leads to the conclusion that, in cutting marble out of the ground, it is not enough to get it out quickly and in blocks which meet the demands of the mills and shops. Of no less importance is the elimination of scaling and undermining. Even though human life were not endangered, any collapse of the quarry structure is almost sure to cause extended delay, and delays are always enemies of business.



Photo courtesy E. H. Glidden, Architect, Balto., Md.

Interior of the Cathedral at Rouen, built 1202 to 1220 A.D., showing the employment of the fully developed oblong vault.

GOTHIC ARCHITECTURE IN FRANCE

GREAT progress in the art of building had been made by the Romanesque architects on the Continent by the middle of the twelfth century, especially in the north and west. The styles which followed during the period that extended from 1150 to 1500 were only the outgrowth of the same fundamental principles. They were concerned with the same problems, and the chief of these was the problem of the roof.

The wooden roof was unsatisfactory and many a substantial building was destroyed by fire on account of such inadequate covering. The barrel-vaulting of the old Romans was too ponderous, for, even though there was no lateral pressure exerted by those solid concrete roofs with which they covered their vast buildings, it required massive walls to support their enormous weight. When masonry replaced concrete, the vault was even more difficult to support, for there at once developed the side thrust against the wall. The wall had to be made heavier and stronger to resist the strain, and the vaulting span had to be lessened in width. The solution of these difficulties evolved a new principle, one that brought about a revolution in the art of building.

This principle—that of ribbed vaulting—formed the structural basis of the style of architecture known as Gothic. It involved the recognition of two principles that had been partially understood by the Romans and Byzantines but never actually practised by them. These were the concentration of strains and balanced thrusts.

In ribbed vaulting there was carried a skeleton of ribs transversely and diagonally across the nave, forming a strong open framework. The weight of the roof was made lighter and the width larger, to span larger

areas. The wall needed only be strengthened at the points bearing the vault.

This was accomplished by the introduction of buttresses, and the wall between the buttresses became only of secondary importance, as it was relieved from the pressure of the roof. In time, it became practically suppressed, and immense windows filled with stained glass took its place.

As long as the churches were designed without aisles, the problem of dealing with the thrusts was a simple one. The buttresses were built directly against the outer wall, which in turn took the vault thrusts. When, however, the design presented aisles at the side of the nave, a new difficulty was presented. It was impractical to carry the buttresses straight down, for they would block up the aisles. This was overcome by building the buttresses on the outer wall of the aisle and bridging over the intervening space by means of a flying buttress. This led naturally to an increase in the height of the nave, since the nave piers and walls over them were no longer burdened with the more serious part of the weight of the roof, the lateral strains. This increase in height was accompanied by a more graceful and slender proportion of the parts, a distinguishing feature of the Gothic style.

While the necessity of the flying buttress hampered the exterior design in some respects, the possibilities of its use as part of the decoration of the building was quickly recognized. In fact, in some French Cathedrals it had the appearance of being purely an ornamental feature, placed in its position purely to give grace to the design. The outer buttresses, at first commonly topped with small gables, were adorned later with pinnacles like small steeples. Some authorities



Photo courtesy E. H. Glidden, Architect, Balto., Md.

St. Ouen, at Rouen, begun in 1318 but not finished until 1515.

have stated that these were added to give greater stability to the buttresses by adding to their weight, but their small size seems rather to point to their use as purely decorative. In one instance only, that in the Rheims Cathedral, is the size sufficient to give weight to the first theory.

"The pointed arch was adopted to remedy the difficulties encountered in the construction of oblong vaults"—(Hamlin, *History of Architecture*). At first introduced as the most convenient form for the ribs of the vault, to make them intersect in regular vertical plane curves, it was soon applied to other parts of the structure, especially the windows and pier-arches, which would not

otherwise fit the wall spaces under the wall-ribs of the nave and aisle vaulting. It would be an error to suppose the pointed arch the most characteristic feature of the Gothic style, as so commonly regarded. Rather was it merely an incidental constructional expedient. "Far more important," says Ferguson, "than the introduction of the pointed arch was the invention of painted glass, which is really the important formative principle of Gothic architecture; so much so, that there would be more meaning in the name if it were called the 'painted glass style' instead of the pointed-arch style. . . . We must bear in mind that all windows in all churches erected after the middle of the

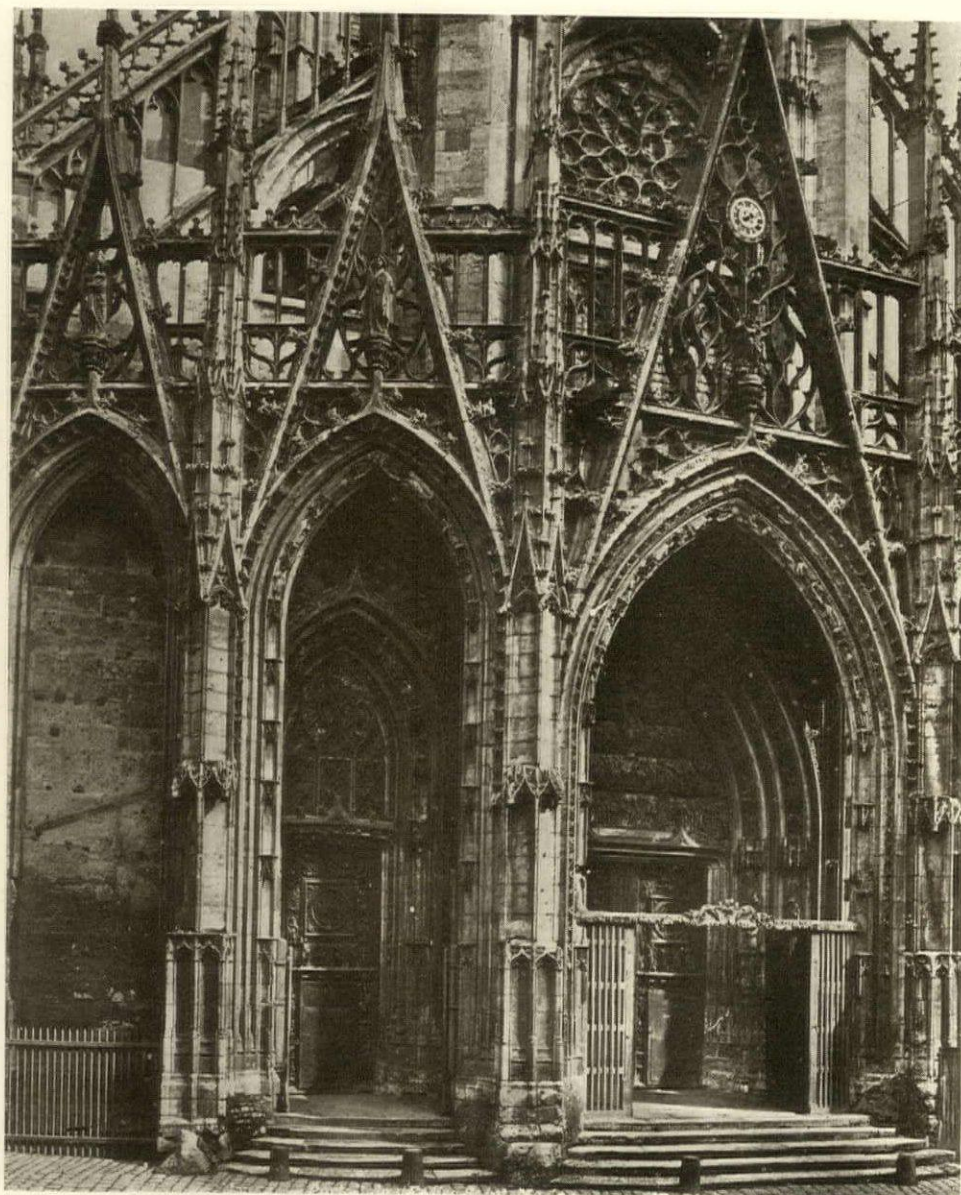


Photo courtesy E. H. Glidden, Architect, Balto., Md.

St. Maclou, at Rouen, finished in 1541, a Gothic Cathedral of the Flamboyant style, has portals with unusually elaborate details of tracery and carving. In the towers and spires, emphasis was laid upon the vertical elements.

twelfth century were filled or were intended to be filled, with painted glass, and that the principle and guiding motive in all the changes subsequently introduced into the architecture of the age was to obtain the greatest possible space and the best localities for its display."

With the growth in the size of the windows and the more extensive use of glass, there

developed another feature—window tracery. It appeared first in the clerestory windows. When the wall arch became pointed, the broad round-headed Romanesque window was given a pointed arch; and at Notre Dame, when the uselessness of the wall became apparent a little later, the window was enlarged to give a wider field for the display of stained glass. Since it was too big to

glaze in one light, a central colonnette was inserted carrying two small pointed arches, upon which rested a huge circle of stone nearly filling the space of the old window. An elaborate system of iron bars was used to give the required strength. This was in 1225. At Chartres there was used a hard stone easily split into thin slabs, and this circle was partly filled with these slabs pierced with quatrefoils and forming around the center a circle of cusps holding the iron ring which carried the glass. The wall arch was made semicircular, exactly to fit the rose. Beneath were two pointed lights, side by side, the whole design forming a bar-tracery of great beauty. At Rheims, the cusps were inserted into a groove in the large circle and had blunt ends into which was screwed the iron ring that supported the glass. At Amiens, the circle cuspings were trefoiled and the lower lights had cusps taken from the solid.

When it became necessary to fill such enormous spaces as those in the clerestory at Amiens, there was carried out the principle already adopted at Paris and Rheims, of two small pointed arches resting on a colonnette and carrying a circle above, simply repeating the design between the central mullion and the walls, and using in all the circles the Chartres system of cusping. In the transepts, the side lights were better proportioned to the main circle, and had trefoils instead of circles in the heads. These windows and those of Sainte-Chapelle of Paris, and St. Germain, are perfect examples of the Gothic window at the time of its fullest development in the thirteenth century. For a century following, French tracery stood still, until suddenly the circular and geometrical patterns employed were abandoned for more flowing and capricious designs. Flamboyant tracery in France was first used in 1370, in the façade

of the cathedral of Rouen and in some of the chapels of Amiens Cathedral. Because of the attention given to it by its designers, it is possible to trace the various periods in the history of Gothic Architecture more readily by the style of window tracery than by any other feature.

It is customary to divide Gothic Architecture in France into three periods: the Early Period began about 1190 and extended to the middle of the thirteenth century; the Middle Period lasted from then until the latter part of the fourteenth century; the Flamboyant or Florid Period began about 1370 and continued until about 1550.

The church builders of France surpassed all their contemporaries in the development of the Gothic principles during the Early Period. The close relations between the church and the state and the popular estimation in which the bishops were held, led to the rapid recovery by the episcopacy of its old power and influence. The rebuilding of many of the Romanesque cathedrals was an urgent necessity and new churches were needed on every side. Viollet-le-Duc says of this period: "Nothing today, unless it be the commercial movement which has covered Europe with railway lines, can give an idea of the zeal with which the urban population set about building cathedrals." As many as seventeen cathedrals were being built or entirely reconstructed at the end of the twelfth century, among them such structures as Bourges, Bayonne, Cambrai, Chartres, Laon, Tours, Poitiers, Lisieux, Troyes, Senlis, Soissons and Notre Dame at Paris. During the next twenty-five years were begun the cathedrals of Amiens, Auxerre, Rouen, Rheims, Séz and many others. Notre Dame at Paris (1163-1214) showed a perfectly symmetrical plan with a semi-circular east end, richly sculptured triple west-

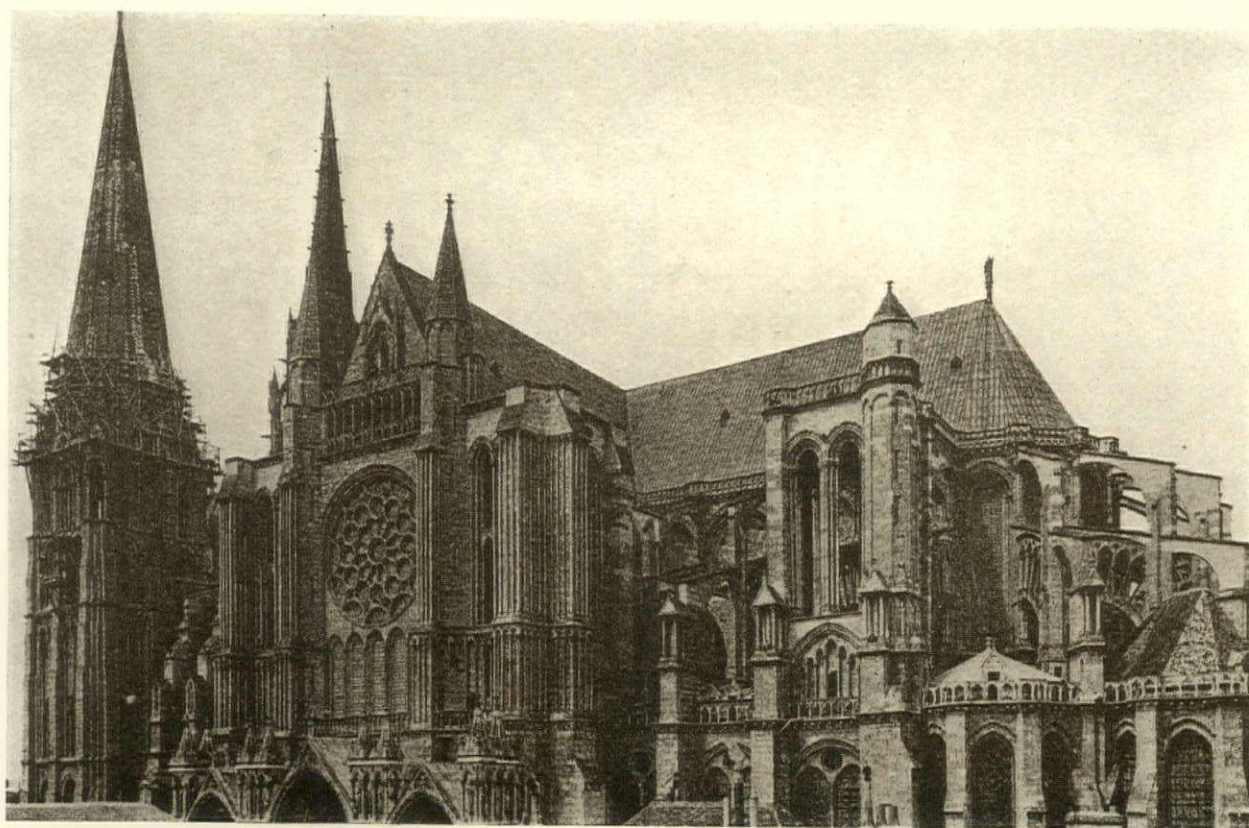


Photo courtesy E. H. Glidden, Architect, Balto., Md.

The system of vaulting on oblong bays by the adoption of groin ribs and pointed arches was probably first used in Chartres, begun in 1194.

ern portals, and rose-windows in the main gables. As usual with buildings of this date, there was a simplicity of treatment in the groined six-part vaulting, and arrangement of parts. Circular shafts were used between the central and side aisles. The side aisles were doubled and those next the center had two stories. The interior division into bays was marked on the exterior by a uniform series of pinnacled flying buttresses. Chartres (1194-1230) showed a simple southern spire, and such magnificent windows that the poet says of them that they were the—

“Pride of France,
Each the bright gift of some mechanic guild,
Who loved their city, and thought gold well
 spent
To make her beautiful with piety.”

Amiens (1220-1288) showed Gothic at its best. Ruskin says of this cathedral: “In dignity inferior to Chartres, in sublimity to Beauvais, in decorative splendor to Rheims, and in loveliness of figure-sculpture to Bourges. It has nothing like the artful pointing and moulding of the arcades of Salisbury—nothing of the might of Durham. And yet, in all, and more than these, ways, outshone or overpowered, the cathedral of Amiens deserves the name given to it by M. Viollet-le-Duc—‘the Parthenon of Gothic Architecture!’”

The east end usually showed a semi-circular arrangement; but at Laon and Poitiers the square end was used. The transepts were not fully developed and the west front usually had a triple portal surmounted by a

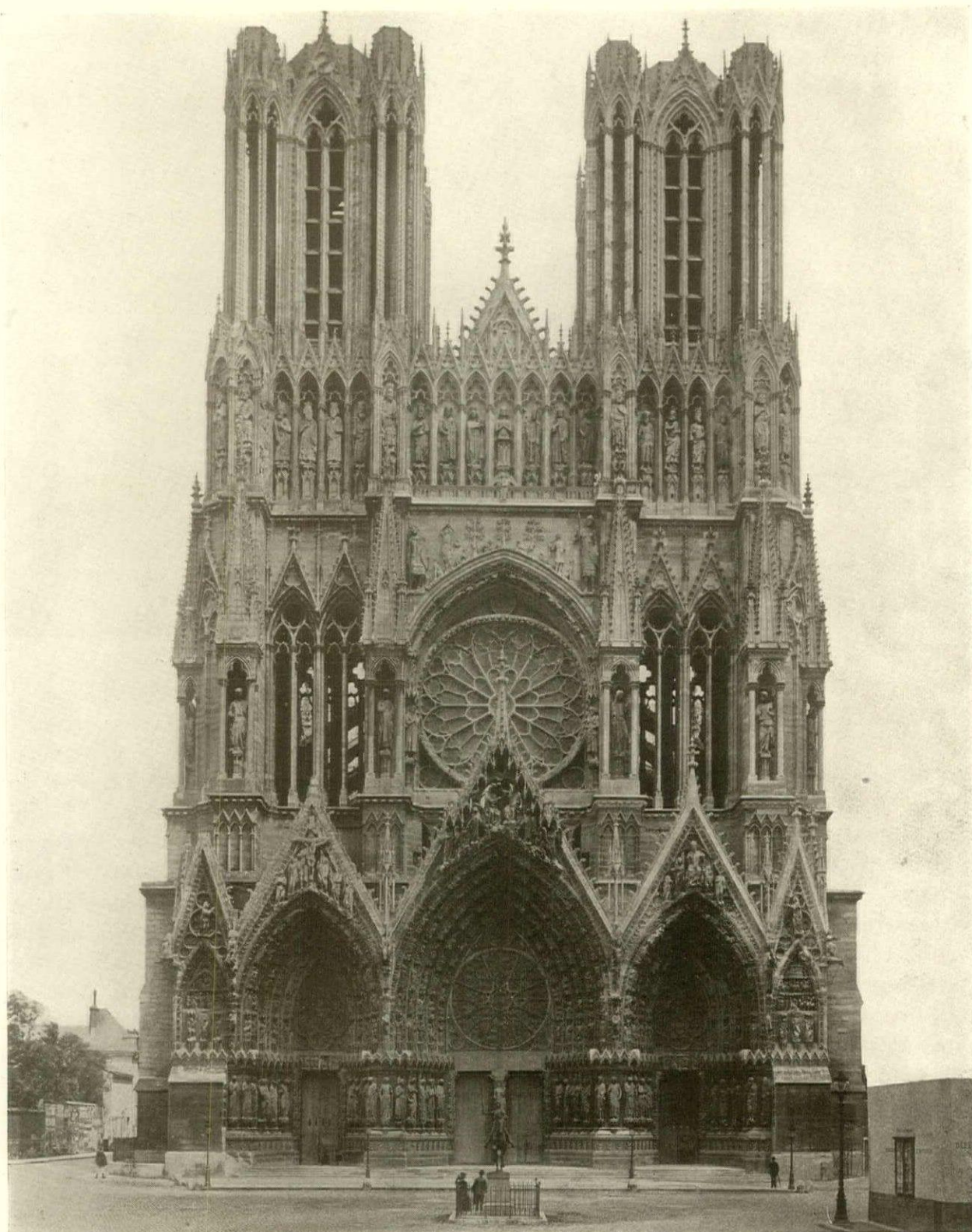


Photo courtesy E. H. Glidden, Architect, Balto., Md.

Rheims façade shows the general superiority of French Gothic carving and sculpture, especially figure sculpture, where it reached true nobility of expression, combined with great truthfulness and delicacy of execution.

series of niches filled with royal statues. Splendid porches, finely sculptured archways elaborately enriched with figures of saints and kings, are specially characteristic of French design. The cathedrals are generally larger than those of England, and on a much more vast and imposing scale. In length there was no considerable difference, Amiens being about 520 feet, only a little shorter than Winchester and Ely; but in width and area, and especially in boldness and loftiness of the vaulting, they surpassed the English structures. As a general thing, the height was from three to three and a half times the clear width of the nave or choir, tending to dwarf the great width of the central aisle.

The changes previously mentioned, by which the wall was practically suppressed, windows enlarged and every part made loftier and slenderer, resulted in a system of interior design well represented by the nave of Amiens. The gallery over the side aisle disappeared, but the aisle was very high. The triforium became, not a gallery, but a passage in the wall, richly arcaded, and generally treated like a lower clerestory stage. The whole space above in each bay was almost filled by the clerestory window with effective tracery over narrow mullions. The side aisles were lighted by windows which occupied practically all the wall space beneath the vaulting. The piers and shafts were clustered and exceedingly slender. Amiens, though it covered eighty thousand square feet, appeared light and graceful.

The Middle Period, beginning about 1250, was often called by the name of "Rayonnant," from the design of the window tracery. Few cathedrals were completed, for enthusiasm had waned. The unfinished church of Beauvais is the most noteworthy, as the Gothic principles were carried to the most daring extremes. In fact, the tenuous supports col-

lapsed in a few years, and the whole had to be reconstructed. As it stands today, the vault is 160 feet high from the pavement, as compared to the lengthy English Ely's 75 feet!

Other Gothic buildings of this period are: St. Ouen at Rouen, built about 1320-1350, but with additions of a later date; Limoges, begun in 1272 and still unfinished; Toulouse and Narbonne, both begun on the same date on a large scale and never completed; Meaux, Rodez and Alby, finished in the sixteenth century; and Clermont, 1248, completed under Napoleon III.

The Flamboyant style prevailed until the advent of the Renaissance. The logical development of forms ceased and was replaced by the tendency toward excessive richness of detail. The gables over the porches of St. Maclou at Rouen, and the older cathedral at the same place, were an open network of stone, suggestive of windows without glass. The cathedral of Alençon had portals with unusually elaborate detail of tracery and carving, while the unfinished façade of Rouen Cathedral (1509) surpassed all others in the lace-like quality of its open-work and ornamentation. Troyes and Rheims were notable examples, as were the churches of St. Jacques at Dieppe, St. Pierre at Louviers, St. Wulfrand at Abbeville and the façades of Tours and Troyes.

Gothic architecture in France was not confined to churches, but found expression in every branch of secular and domestic construction. Many fine specimens remain of the later Gothic buildings. The hospital of St. Jean at Angers and the Palais de Justice at Rouen are illustrations of the adaptations of the Gothic spirit to varied purposes. The Ducal Palace at Nancy (1476) and the Hotels de Cluny at Paris and Jacques Couet at Bourges, as well as the east wing of Blois, are extremely picturesque with their slender turrets and elaborate dormers.



Marble is used in the flooring and for the furniture in the Pompeian Bath aboard the Cunarder *Berengaria*.

MARBLE FOR DECORATIVE PURPOSES

WHEN we consider marbles for decoration, we approach a subject that has commanded the attention of builders for over two thousand years. The old Roman baths were plentifully supplied with marble flooring, wall-veneering, and even furniture of marble, often having columns, mouldings and doorways of the same material. The tourist in Italy, after seeing the splendid structures that remind him so forcibly of the glory that was Rome's; or the magnificent buildings of Ravenna, Florence, Pisa and Venice, comes away with a confused memory of wonderful marbles lavishly employed, "a multitude of pillars and white domes . . . and marbles, that half refuse and half yield to the sunshine, Cleopatra-like, 'their bluest veins to kiss'."

Today, the most common uses of marble for interior decoration are for lining wall-surfaces, for flooring, for stairways and columns. For wall-lining, the question of soundness and durability of the stone is not of paramount importance. The architect has the assurance that, if properly placed, the wall-panels will stand as long as the walls, and at the same time preserve all their original colors and textures. This immediately opens up to him his choice from among large numbers of variegated-colored marbles, and it is a most exacting taste that cannot be suited by the offerings of the American quarries, supplemented by the imported French, Belgium, Italian and other varieties. The marble is sawn into slabs seven-eighths inch, one-quarter inch and two



The vestibule of the Pan-American Building, Washington. The columns are Grande Antique, the floors and stairways of two kinds of Tennessee.

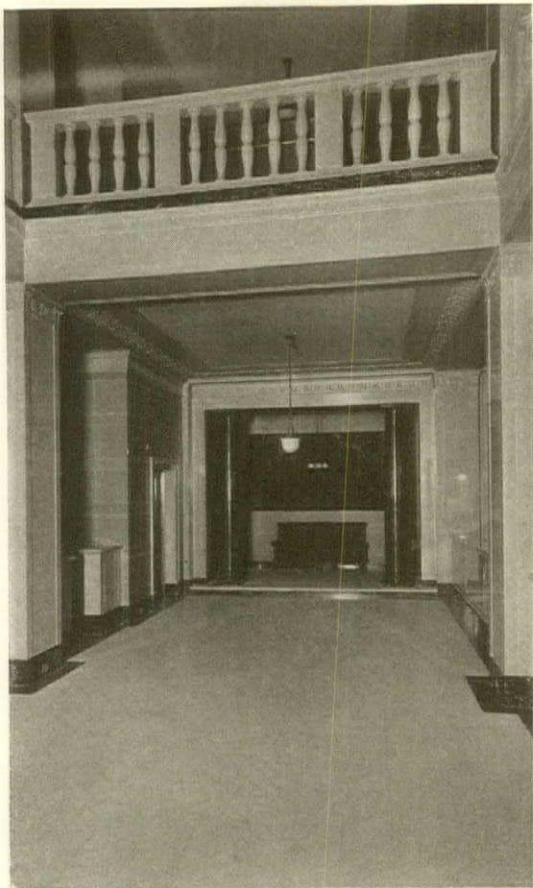
inches thick, the other dimensions averaging about five by ten feet, and occasionally running longer.

Marble for flooring and stairs should be selected with regard to its hardness and soundness. There are a great many of our American stones that are exactly suited to this purpose and these are shown in the "List of the World's Marbles" running serially in *THROUGH THE AGES*. It is usual in work of this kind to polish all vertical surfaces, except carved, and hone-finish or sand-

rub all floor-tile, treads and door-saddles. The degree of polish varies from a slight gloss to a high finish, the general rule being that the more highly colored and brecciated the marbles, the higher the polish, since the markings are accentuated in this manner.

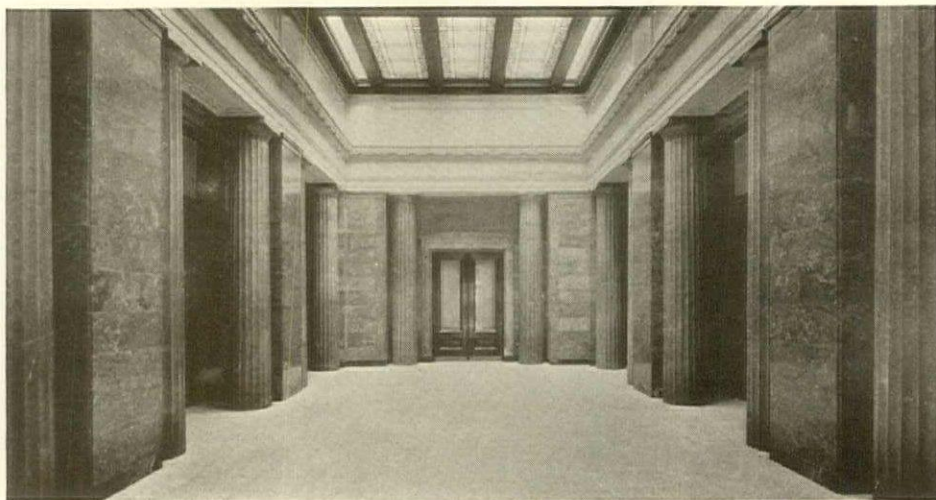
The method of putting the marble in place is told by Mr. David B. Emerson, in a recent article in *Architecture*. He says:

"The greatest care should be exercised in the setting of interior marble work, as, no matter how beautiful the marble may be, it



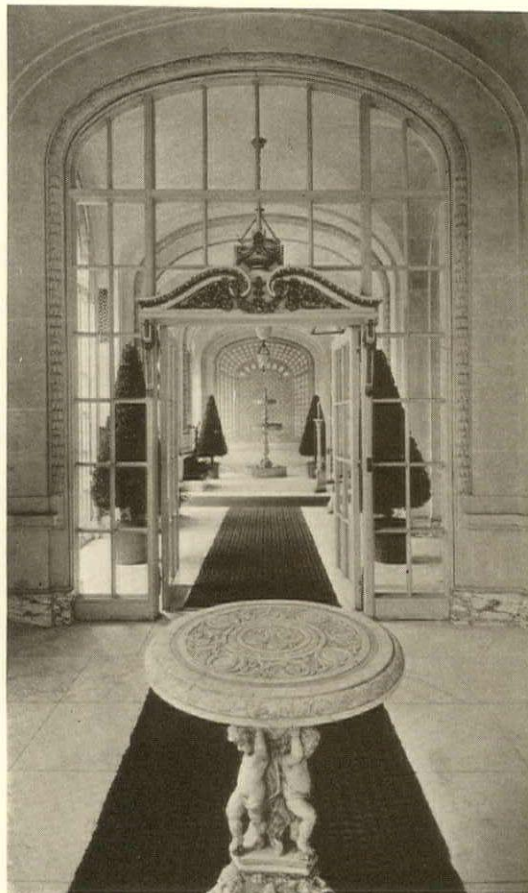
C. Howard Crane, the architect of this New York building, used French Hauteville, Black and Gold, and Pink and Gray Tennessee.

Another view of the same building—The American Bond and Mortgage Company structure at 345 Madison Avenue, New York.



Dark Utah Golden Travise with coarsed Ashlar of Utah Rouge Jasper, used in the Church Administration Building at Salt Lake City.

This corridor is in one of Washington's private clubs. The columns and pilasters, as well as wall panelling, are of Vermont.

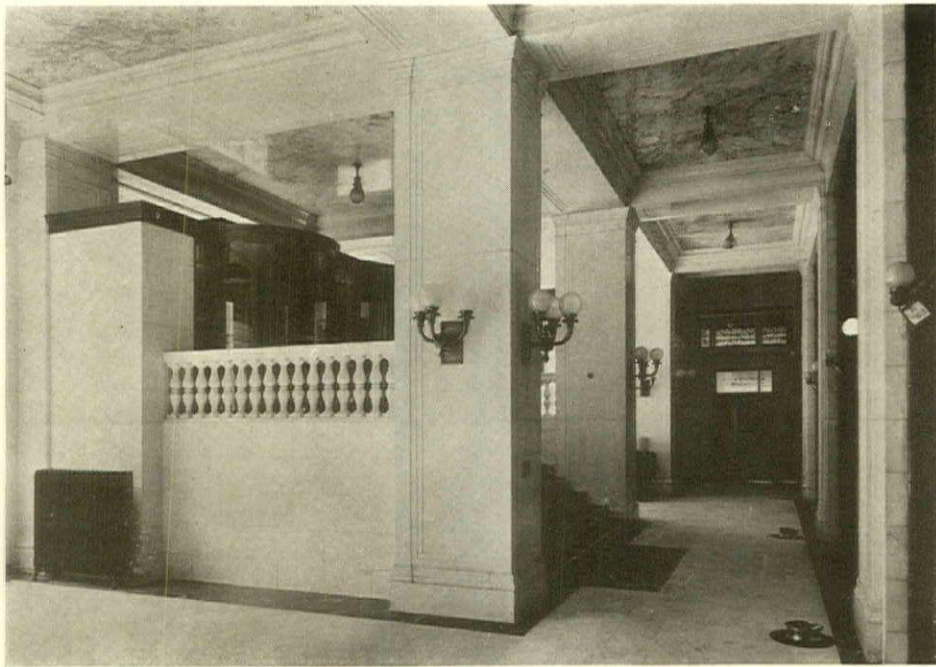


The Lincoln Terrace Apartment Building, one of Chicago's many fine structures, owes much of its beauty to its fine marble.

Italian marbles are used in the Bankers' Trust Company, 5 Place Vendome, Paris, the new and luxurious "American" Bank.



© Underwood & Underwood, N.Y.



The Frick Building, in Pittsburgh, Pa., has Second Statuary in walls, floors and balusters, and American Pavonazzo ceiling panels.

will never show to the best advantage if poorly set. It can be said with safety that 'a well-set job of cheap marble looks better than a poorly set job of expensive marble.' Interior marble work should always be set in plaster of Paris, using casting plaster. All slabs, mouldings, etc., should be anchored back to the walls by means of copper or brass wire anchors. Anchors should be made of No. 8 Brown & Sharpe's gauge copper, or brass wire, for seven-eighths-inch stock, and heavier for thicker stock. Anchoring should always be done on the edges of the slab when possible, and anchors should be well wedged in the wall and into the slab, and set in plaster of Paris. Door and window trim, where the edges are exposed and polished, should have V-shaped anchors drilled into the back of the marble. All columns should be secured with copper dowels from one-quarter inch to one-half inch in diameter, according to the size of the column.

The work of setting marble should always

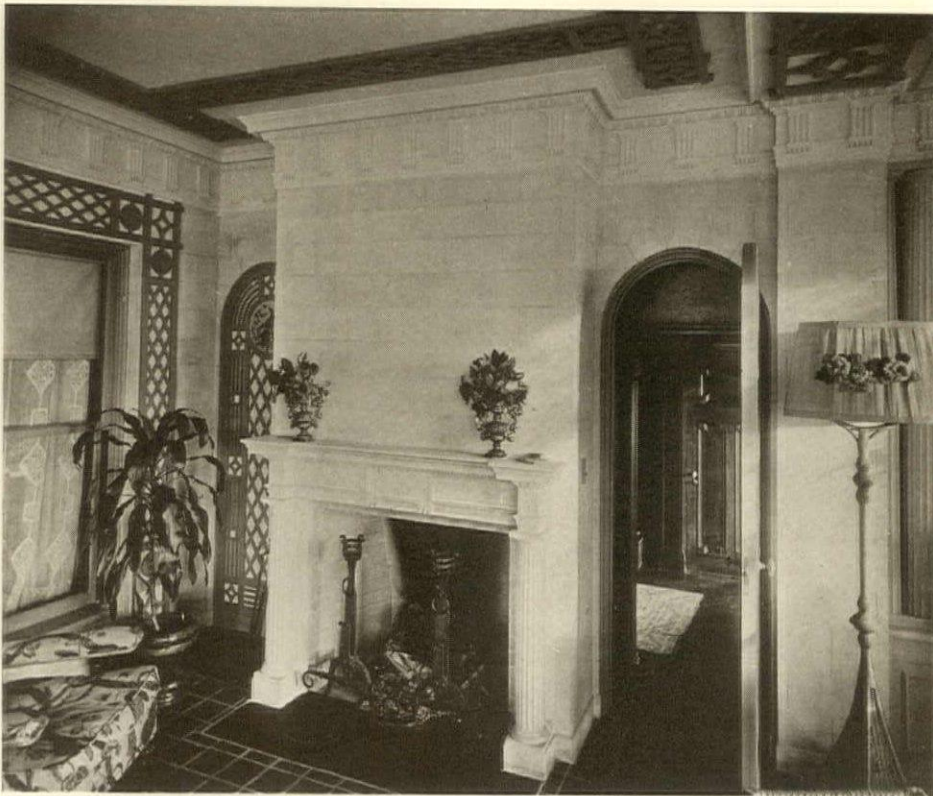
be started at the floor level, and the base, or first course, should be set before the finished floor is laid. Slab work should be set out from the walls at least three-quarters of an inch, so that any dampness which may be in the walls will not penetrate the marble, and the cement in the walls cannot stain it. The edges of all slabs at the top, bottom, and sides should be rubbed straight and true, with sharp arrises, so that the joints shall be neat and close. Marble floors should be laid on setting beds two inches thick, of one to three cement mortar laid on top of the concrete floor-slabs, or on concrete foundations, if the building is of wood-joist construction. The setting bed should be carefully spread and levelled off to a true plane to receive the floor-tile. The borders should first be laid and properly levelled up, then the main body of the floor should be laid, levelling with the borders, and, if the surface is large, spotting tile at intervals, carefully levelling them up, and then working to them. The

joints in floors should be as close and tight as is possible, and after laying should be grouted with non-staining cement mortar.

Marble mosaic makes a very excellent and not very expensive floor for public and semi-public buildings. Mosaic pavements have been in use so long that no one knows their origin, nor when or where they were first used. There have been many types of mosaic in the past, and the early mosaic-workers were true artists, as well as clever craftsmen, but the modern mosaic-worker is, at the best, merely an artisan, and his work is, therefore, merely mechanical. Modern mosaic floors are made up of small cuboids of marble, called tessare. These are set in a setting bed of cement mortar, which should be tempered with a small quantity of lime putty or hydrated lime. This setting bed should be at least one inch thick, and should

be reinforced with a galvanized wire mesh to prevent the cracking of the mosaic, due to settlements in the floors. Borders and designs which are to be laid in the body of the floor, are laid face downward and glued to drawings made on heavy paper, then reversed and laid in the setting bed. Floors should be well grouted with cement mortar and ground down to a level surface by means of electrically driven carborundum wheels. The best white tessare are imported from the Carrara district in Italy, although the American saccharoidal marbles may be used quite as well.

For borders, designs, inserts, etc., any of the sound colored marbles, such as Belgian or American black, serpentines, Belgian rouge, etc., may be used, but the softer marbles, such as Numidian, Siena, Breche Violette, etc., should be avoided, as they wear easily and are liable to disintegrate."



This is one of many fine rooms in the Bliss residence in Boston. The architect, A. Franklin Hanson, of New York, chose English Bath Stone as his medium.



Detail of dome and one of the entrance pavilions of the Wisconsin State Capitol. In the competitive drawings the architects indicated four tourelles or miniature domes at the base of the great dome, resting on the podium wall. These were later omitted and in their place the Capitol Commission substituted four groups of statuary overlooking the corner pavilions. These add materially to the pyramidal effect of the architectural composition.

THE WISCONSIN CAPITOL

A Building that Contains Much Marble and has the Second Largest Dome
in the United States

OF all the State Capitols, none has a more interesting history than that at Madison, Wisconsin; nor is there a single one that can surpass it in the variety and quantity of the marbles used. There are twenty-one foreign and twelve American marbles, coming from four countries of Europe, one country of Africa, and five states of the Union, and together forming a display that is unique in this country. Even the Pennsylvania State Capitol at Harrisburg, long noted for its generous showing of marble, does not contain such beautiful stones as may be seen at Madison.

The present building is the third capitol upon the same site and the fourth capitol used by the State. The first was a temporary two-story frame structure, known originally as "Noah's Ark," because it had housed so many families.

The place was Old Belmont, now Leslie, in Lafayette County. A long struggle took place over the location of the permanent seat of government, but finally Madison, then merely a town on paper, was chosen. This was in 1836. The stone for the first state house came from Maple Bluff and was ferried across Lake Mendota. Work was begun in 1837, but the stone structure was not fully completed until about 1848. The territorial legislature met there in 1837, under conditions of discomfort almost unbelievable. The halls were cold, the ink froze in the stands, and the members were compelled to adjourn for twenty days. After the floors had been carpeted, the session continued. This capitol was used until 1863, when it

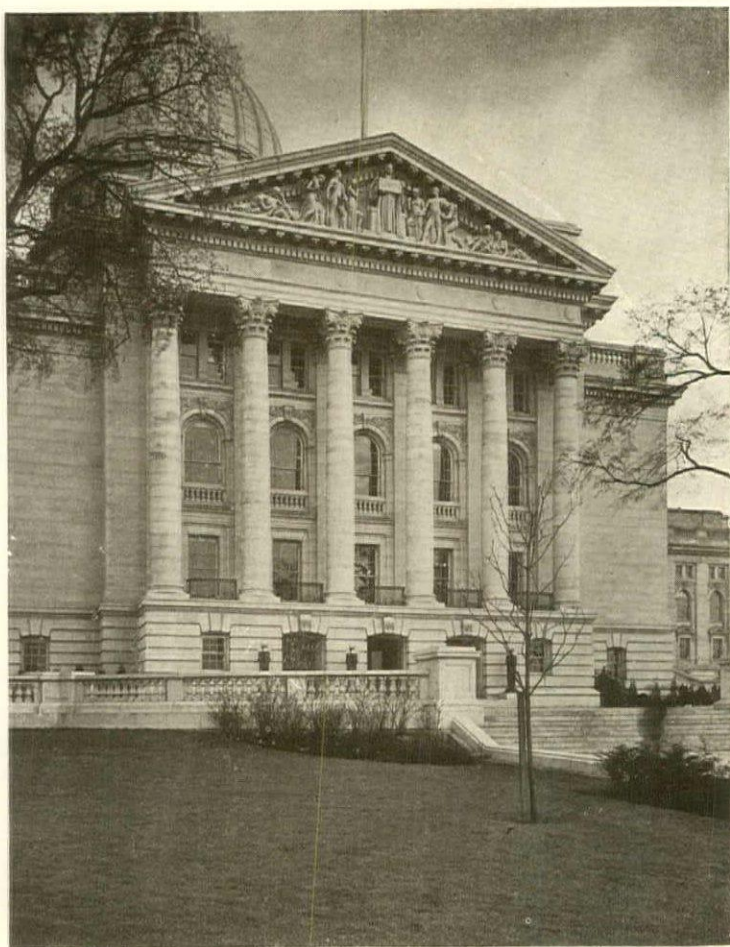
was finally removed to make room for the extension of the succeeding capitol.

The third building, made necessary by the increasing activities of the new State of Wisconsin, was begun by the erection of the east wing in 1857-59. The old structure was wrecked in 1863 to make room for the north and south wings. The total cost was about \$900,000. On February 27, 1904, a disastrous fire destroyed a large part of the interior. This damage was partly repaired, but plans were immediately prepared for an entirely new building and in 1906 the work was started. The building was so nearly completed in 1917 that all portions could be occupied, although even yet there is some work to be done before it is fully finished. The architects were George B. Post and Sons, of New York.

Madison lies in the charming Four Lakes country, in the south central part of the state. The country roundabout is rolling and the city itself is built on an isthmus whose sides are bathed by the waters of Lakes Mendota and Monona. Westward, on the first of these, is the University of Wisconsin; eastward is Monona Lake Assembly, modelled along Chautauquan lines.

In the heart of the city, within a park of fourteen acres at the summit of a hill eighty-five feet high, stands the Capitol. It is approached by eight wide avenues shaded with oak, elm and maple, running through beds of shrubbery and flowering plants. Cruciform in plan, the building is "Sumptuous after the Roman Renaissance manner, yet of an economy of means toward opulent

NOTE: Illustrations for this article were furnished by Mr. Albert H. Cook, Capitol Guide, of Madison, Wisconsin.



The North Portico.

effects that meets every requirement of good taste." It is placed on a formal terrace surrounded by a balustrade on which are pedestals for lights and statuary groups.

The four equal wings are each 125 feet wide, 187 feet long and 85 feet high, and they face the four diagonal streets leading from the cardinal points of the compass. At the extremity of each wing is a portico of Corinthian columns supporting pediments. The intersections of these wings form four angles, each the site of a flat-domed pavilion that provides a spacious vestibule that gives directly upon the rotunda. Leading to these pavilions are driveways terminating in porte cochères under grand staircases that ascend to the first story. These are the four

principal entrances, the porticoes at the extremity of each wing being for pedestrians only.

Above the pavilion domes is a podium wall that forms a base for the barrel of the great central dome, treated as a Corinthian circular arcade. The windows are arched and afford an entrance for the floods of mellow light that enter the rotunda. The podium, ninety feet high, has a balustrade that provides the first resting place for visitors ascending the dome, as well as a splendid view of the city spread out below. Sixty-five feet higher is a balustraded balcony that rests on the colonnade of the barrel. At an elevation of 235 feet is another balustraded balcony encircling the lantern. The statue of a woman on the lantern, 300 feet in the air, represents the spirit of Wisconsin.

The structural problem is an interesting one. A unit, independent of the wings, is formed by the dome and its supporting tower. From the podium, the ascent to the dome is by means of spiral stairways built within the walls of the barrel, fenestrated both exteriorly and interiorly, and disclosing more and more interesting glimpses of the surrounding country, as well as intermediate views of the rotunda. From the second level, two inclined stairways lead up between the outer and inner shells to the highest interior observation point, just below the crown of the dome. Here it is possible to look through the eye of the coffer dome, thirty feet in diameter, into the great rotunda below. Leading to the lantern, with its exterior balcony, is a single spiral staircase. The view from here is wonderful, but even



Looking into East Stair Hall from Gallery.

this is surpassed by the panorama unfolded from the platform within the lantern, fifteen feet higher and enclosed on all sides by windows. In order to attain this great height, 255 feet above the ground floor level,

visitors have to mount 252 steps above the last landing of the elevators of the attic story of the wings. The view, however, certainly justifies the expenditure of such muscular energy.



Lobby of Governor's Reception Room.

The building is enriched with sculpture, in the tympanums of each of the pediments of the wings, and on the podium wall over the flat domes of the pavilion entrances. For future additions, room has been reserved on

the pavilion stairways and on the terrace balustrades.

The dome is only exceeded in size in this country by that of the Capitol in Washington, and yet it appears much lighter look-

ing than its rival and certainly more beautiful. Indeed it is wholly admirable in its relation of height to width, of colonnade to vault, vault to lantern; while its soaring curve is both vigorous and subtle, a most perfect sweep of line.

Upon entering the building, the rotunda and staircase halls give the main effect. Standing in the center, you have an unobstructed vista down each of the wing corridors. The distance from the end of one wing across the rotunda to the end of the opposite wing is 434 feet, and the novelty of such long unbroken views is decidedly attractive. The four great arches opening into the vaulted stair halls of the wings are supported in the rotunda on Corinthian entablatures with friezes of dark rose Numidian marble from Algiers, Africa. These rest on columns and pilasters of green Tinos, imported from Greece. The decorations of the rotunda blend or pleasingly contrast with the colors of the marbles, as well as the full warm tones of the yellow Kasota stone from the quarries of Minnesota, close to the Wisconsin border. This Kasota stone is really a dolomite made up of almost half calcium carbonate and a third magnesium carbonate, the remainder, about 16 per cent, being insoluble silica chiefly. It is the only marble quarried in Minnesota, and has been used freely in the western states.

The transition from the octagonal form of the rotunda to the circular form of the dome is well provided for by the pendentive brackets over the piers and between the four arches. The floors of the corridors are laid with marbles, chiefly from the United States, though a goodly share came from abroad. Vermont, Missouri, Tennessee and the Lake Champlain region furnished most of these as well as the marbles in the supporting pillars of the ground floor halls. There are some very handsome designs;

particularly in the first floor in the pavilions and in the corridors by the entrance to the Department of Insurance, the Supreme Court, and the Treasury and Secretary of State Departments, have the architects arranged some very interesting combinations of color and form.

In the east wing is the Supreme Court room; the west wing contains the Assembly Chamber; the south houses the Senate; the north is the location of the Hearing Room. There is a lobby to each, besides parlors, private offices and consultation rooms.

The Governor's suite, with its Reception Room and its lobby, occupies the first floor of the east wing. The general color scheme was inspired by the Doge's Palace in Venice, the ceiling and mural paintings being the work of Hugo Ballin, who had already earned a wide reputation as a Venetian colorist. The Reception Room is twenty-two feet wide and forty-two feet long, and has a large fireplace with mantel of light and dark Botticino marble, with a fireback of Champville French marble. The floor is of teak wood from India, with a handsome border inlaid. Three very beautiful Persian rugs match in color the decorations of the room.

On the second floor of this east wing is the Supreme Court room, square in plan, about forty-two feet each way and thirty feet high, and lighted by a large central ceiling light of leaded glass work set in a flat coffered ceiling to prevent reverberation. The walls are finished in dark and light Botticino marble from Italy, with selected and matched panels of golden-veined Formosa marble from the quarries in Wetzlau near the River Lahn in Germany. The marble register faces are of Roseal Tennessee. The large pilasters are of Breche Corraline from Vigaun Quarry in Austria, a very beautiful grayish material with purplish veining matching most excellently the Formosa



Wall treatment at rear of Rostrum in Supreme Court.

panels. Behind the judges' bench in front of the wainscot is an interesting treatment that recalls the old choir stalls of the Italian Renaissance, the columns being of Benou marble from France, with caps and bases of beautiful Hagerstown statuary white marble from Maryland, whose resemblance to the celebrated Carrara statuary marble is

remarkable. On entering the room, one is impressed by its dignified character with its solid mahogany furniture and woodwork. It is a masterpiece of architectural art—chaste in style and indescribably beautiful in its pure simplicity. It is perhaps the most beautiful room in the building, and one of the most beautiful court rooms in America.

The marble panelling in the walls is a marvel in nature-coloring. No brush could produce such delicate tints nor such variety in shades and designs as are here displayed. The panels of Formosa marble give the observer a new insight into the beauties that the Creator has hidden in the depths of the earth ready to be revealed by the industry and skill of man. The four murals by Albert Hertel are handled in a masterful manner. Surrounding the Supreme Court room are the judges' suites, finished in oak, while the lobby is finished in light Botticino marble with decorative panels of yellow Siena.

In the north wing on the second floor is a room used by the State Railroad Commission, and for other gatherings that might be held otherwise in the Senate or Assembly Chambers—the Hearing Room. The color scheme here is brilliant, yet refined. The walls are of yellow Verona marble from Italy with selected Monte Rente Siena panels between pilasters. The wall base and

floor border are of Porte d'Or Italian marble, of black and gold. The coved ceiling shows decorations by C. Y. Turner.

The Assembly Chamber, on the second floor of the west wing, is seventy-three by sixty-eight feet, by forty-one feet high. On the four sides are very flat elliptical arches with pendentive bracketing between. Above the speaker's desk on the north side is a large canvas over thirty-six feet long by E. H. Blashfield, who also did the mural in the crown of the coffer dome of the rotunda.

The visitors' gallery occupies the space under the three arches, which are supported on Breche Violette Italian marble columns, which separate the main auditorium from the entrance lobby and corridors, which in turn give direct access to the loggia on the west front and the assembly parlor on the south side of the wing. The walls of the chamber are finished with South Dover marble, a soft creamy-white New York marble, the finish of the oak and furniture being a



Entrance to Hearing Room.

soft natural one. The decoration of this room as well as that of the Assembly parlor and its dependencies was by E. T. Garnsey.

The walls of the lobby are lined with Botticino Italian marble, with matched panels of light gray Siena. The whole length of the lobby is brought into correct proportion by the introduction of columns of Royal Tennessee marble.

The Assembly parlor is finished in Circassian walnut panelling, with mantels of Siena marble at the ends and a floor of White Rutland from Vermont, with wall bases of green Verde Antique from the same place.

In the south wing is the Senate Chamber, a room circular in plan, about thirty-one feet across and more than that in height, with galleries for visitors ranged around most of the room. It appeals to the visitor as a model in proportion and in the handsome marbles of its massive pillars and its beautiful walls. The walls are of Italian Tavernelle Fleuri marble, a soft tone, cream yellow, with a great deal of texture, but very little veining. The columns and pilasters are of Escalette marble from France, very rich and beautiful, in which many colors are harmoniously blended. Behind the president's platform there are three panels, between the free standing columns, in which are mural paintings by Kenyon Cox, each being eleven feet six inches by seven feet two inches.

The Senate Parlor contains a fine mahogany treatment, both furniture and walls. Especially noteworthy are its decorations and its mantels and plinth of Greek marble. This is akin to the Greek marble in the dome, but is more distinctive and of a finer grade. It is hard to conceive anything in the way of marble more strikingly beautiful than this.

The marble treatment throughout the Capitol is of such infinite variety that it is

interesting to quote from a letter written by the architects to the State Geologist of Wisconsin concerning the stones used:

"The Kasota stone which comes from Minnesota not far from the Wisconsin border is the most extensively used material in the building. It is beautiful in color and texture and of great decorative value, and has the additional merit of being the cheapest stone procurable at Madison, which is suitable for this purpose. The Mankato stone which also comes from adjacent quarries in Minnesota was used in the entrance corridor of the west wing only, and although somewhat cheaper than the Kasota stone is not so pleasing in color or texture, and was not used in any other part of the building. The walls of the principal corridors, grand stair halls, and great rotunda are therefore finished in Kasota stone. As this material is too soft for carving and is easily soiled if it comes in contact with water, we have used for the door trims and wall bases the French Hauteville marble which closely resembles Kasota stone in color, although more durable and suitable for carving of mouldings and ornaments, etc. In the entrance corridors of the wings the wall base is made of Napoleon marble from Missouri, which material is also used in the columns between the entrance lobby of each wing and the main corridors; the columns separating the main corridors from the stair halls are of Roseal Tennessee marble, beyond which the Hauteville base occurs, which is also used in all the principal corridors of the first and second floors in connection with the Kasota stone.

"In the grand stair halls on the ground floor the piers supporting the connecting gallery are of Wisconsin green granite from the Marathon Quarries, which granite is also used for pilasters in the corridor encircling the rotunda. Above the Wisconsin green

granite on the first floor are piers of Wau-paca red granite, with piers of Athelstane gray granite in the connecting corridor about the rotunda. On the second floor flanking the stairs are pilasters of Pike River red granite. At the entrance to the lobbies of the various legislative chambers are columns of Wausau red granite, and in the cornice above is a frieze of pink Numidian Algerian marble, and over the entrance doorways, plaques of Italian gray Siena marble bearing the inscriptions. The balustrades in the grand stair halls and also in the rotunda itself are made of Hauteville with balusters of rich brown Tennessee marble from Hawkins County. Balusters in circular balustrade in the rotunda, first floor, are of Levanto Italian marble. The treads and risers of the staircases are of Meadow gray Tennessee marble.

"The secondary corridors which give access to the elevators and secondary stairs are similar in treatment to the main corridors, but on the first floor there are wall panels of matched light Siena marble from Italy. The walls of the secondary stairs are finished in plaster with a wall base of gray Tennessee marble with stair treads and risers of the same material.

"The minor or office corridors of the wings are finished in plaster, with a wall base of Napoleon stone on the ground, first and second floors and gray Tennessee marble on the third and attic floors. The floor tile used in the entrance lobbies, the main and secondary corridors on the ground floor have borders of Joliet limestone (or Athens stone) from Ohio, with secondary borders of red Lyonaise Vermont marble surrounding the field of white Rutland Vermont marble, with alternate panels of various foreign and domestic marbles selected to give the desired color effect.

"On the first floor the treatment of the

floor tile is similar with the exception that the secondary border is of Sylvan green marble.

"The floor tile of the second floor is also similar with a small border of Verde Antique marble. In the floors of the secondary corridors glass floor tiles are inlaid to light the floor below.

"The floor tile of the minor office corridors is of limestone with pink Tennessee borders on the ground, first and second, and gray Tennessee on the third and attic floors.

"The toilet rooms are finished with a high marble wainscot of Tennessee marble; also the laboratory of the Dairy and Food Commission in the west wing.

"On the ground floor of the Rotunda the sixteen piers supporting the circular gallery of the first floor are of Berlin Rhyolite* behind which are pilasters of Montello granite against the Kasota stone.

"In the center of the ground floor of the rotunda is a decorative design executed in various shades of Siena marble with borders of dark Italian Monterente Siena marble imported from Italy. Surrounding the star of Siena marble is a border which has a field of Ross Silver Gray Tennessee marble, with panels of various shades of Formosa marble from Germany. The rest of the floor tile is similar in treatment to that of the wings, with panels of various selections of foreign marbles of harmonious colors.

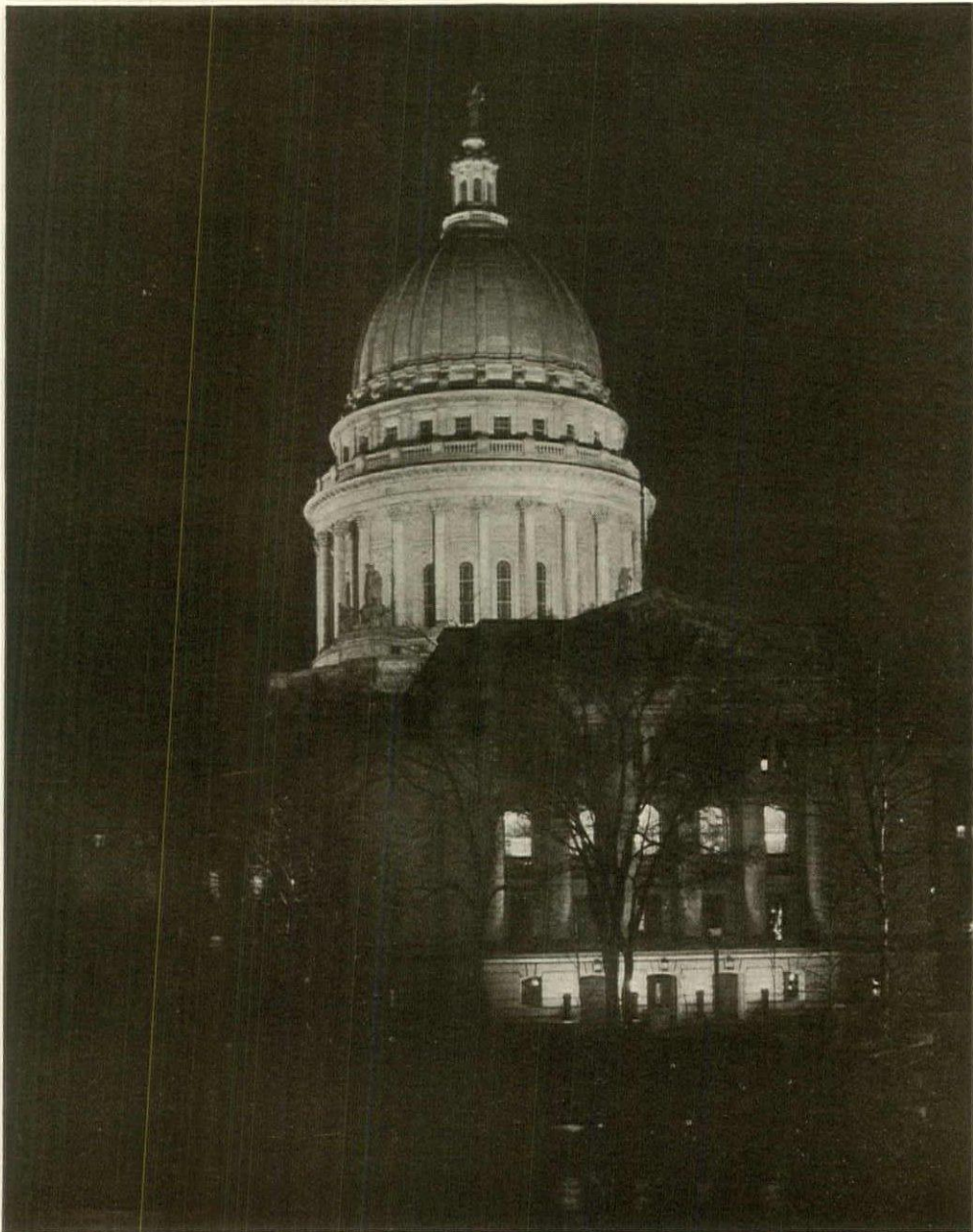
"The large columns and pilasters in the rotunda supporting the main cornice, in which the frieze is of rose Numidian African marble from Algiers, are of Greek green marble known as Tinos No. 3, which is selected on account of its color and texture to harmonize with the beautiful Wisconsin granites which form so important a part in the dec-

*NOTE — In the fall of 1916 on account of surface failure of the Berlin Rhyolite, it was replaced by Labradorite from Norway.

orative scheme of the great rotunda and grand stair hall."

The cost of the Capitol, including power plant, furnishings, tunnel, etc., was about seven and a half millions of dollars. It is said to be the lowest unit cost building of its character in this country. The cubical contents are almost nine million feet, and it is

reckoned that to reproduce the structure today would involve a total of close to twenty million dollars. The Capitol Commission as well as the architects deserve great commendation for the creation of what is both architecturally and artistically one of the finest public buildings in the United States, if not in the whole world.



Night illumination, Wisconsin State Capitol.

A LIST OF THE WORLD'S MARBLES

By J. J. McClymont

Note—In a past issue, Mr. McClymont proposed, for the sake of convenience, to divide the different marbles into four groups. These arbitrary groupings were as follows:

GROUP A — Any marble or stone sold to the trade in fair-sized slabs or blocks of commercial size, rectangular shape and guaranteed by the seller to be sound, free from natural defects, that can be finished at a minimum cost, and sold to the consumer as sound marble.

GROUP B — Any marble or stone sold to the trade in slabs or blocks of fair or medium size, generally rectangular shape, guaranteed to be sound and free from natural defects, the finishing of which, because of texture, the size of slabs, the shape and size of blocks, is somewhat more expensive than those in Group A.

GROUP C — Any marble or stone that cannot be sold as sound but contains a minimum amount of natural defects, such as dry seams, old fractures, partially or completely healed surface voids, etc., to be treated by the manufacturer in the most approved manner, reinforced where necessary by liners on back or metal inlays and sold to the consumer as semi-sound marble.

GROUP D — All marble, stone and so-called serpentine marbles, and Onyx, which, by their peculiar formation are known to be fragile, such as Breccias and nearly all highly colored marbles and serpentine, and that are sold to the trade in irregular shaped blocks or slabs without a guarantee as to their soundness, treated by the manufacturer in the most approved manner, reinforced where necessary by liners on back or metal inlays and sold to the consumer as unsound marble.

Caam Stone—Same as Caen Stone.

Cadon Stone—Same as Caen Stone.

Caen Stone—Group A.

Quarried near Caen, Colvados, France.
A general term used for an oolitic limestone.

See Allemacne Stone, Aubicny Stone and La Maladrerie Stone.

Similar stones are quarried in the same district at Orival, Fontaine-Henry, and Quilly.

All of the above pass as Caen Stone.

Bath stones of England are sometimes sold as English Caen Stone.

Cahem Stone—Same as Caen Stone.

Cahors—Group C.

Quarried at Cahors, Lot, France.
Red with white and bluish gray veins.
Another variety from this vicinity is black.

Cahus

Cahors Quarry in Lot, France.
White, green and black.

Caia di Mugnione (Breccia)—Group D.

Quarried near Mugnione, Tuscany, Italy.
Olive yellow with small specks of bright yellow.

Cajarc

In the Commune de Cajarc, Lot, France, several gray brecciated marbles are quarried.

Calabresian Marble

General name of marbles produced in the Province of Calabria, Italy.

See Agrillei, Calderano and Torrevarata.

Calacata—Group A.

Quarried near Seravezza, Tuscany, Italy.
Creamy white with broad parallel veins of slaty gray color.
Takes good polish.

Calacata Breccia or *Breccia Calacata*—Group D. (Comes from the same quarry as Calacata).

Quarried near Seravezza, Tuscany, Italy.
Slaty gray filler with large white fragments of Calcite.

Calcaire—Limestone.

Calcareous—Containing lime.

Calcareous Spar—Same as Calcite.

Calcite or *Calcareous Spar* or *Calc Spar*.

As it occurs in marble it is a crystalline carbonate of lime.

The translucency of certain marbles is generally due to the presence of this material.

Calcite when pure is white in color and soft enough to be cut with a knife.

Calcium or *Lime*.

A soft silver-white metal.

Calcium Fluoride—See *Fluor Spar*.

Calc Sinter—Same as *Travertine*.

Calc Spar—Same as *Calcite*.

Calcutta—The so-called *Calcutta Marbles* are quarried in Siam.

Caldana

Marmiere Quarry, Tuscany, Italy.

Dark violet with white fossils.

Calderano (Brecciated) or *Calabresian* — Group D.

Quarried near Pallizzi, Calabria, Italy.

Greenish buff filler or paste with fragments of fossilized limestone.

Calera—Group C.

Quarried near the village of Calera, Argentina, about fifteen miles from Cordoba.

Dullish white.

Caleula (Dark)—Group C.

Quarried near Orange, N.S.W., Australia.

Dull white ground mass with slender red veins and markings.

Caleula (Light)—Group C.

Quarried near Orange, N.S.W., Australia.

Pale, nearly white background with slender veins and markings of red.

Calico Marble—See *Potomac*.

California Marbles

Of the marbles of California the Tenth Census, 1880, page 279, says:

"It has been stated that owing to the violent geological agencies that have been in operation since the formation of the marble deposits in this state the stones are found to be so broken and shattered in nearly every case that it is impossible to obtain blocks of large size free from cracks and flaws."

Notwithstanding the above statement, marble was produced in 1921 from at least four localities. At Keeler, Ingo County; at Columbia, Tuolumne County; near Sonora, Tuolumne County; and at Warners Springs, San Diego County. No serpentine for interior work was quarried in 1921.

California Marbles of which we have a record are: Barstow Breccia, Dark Blue Columbia, Dark Columbia, Licht Blue Columbia, Licht Columbia, Portola, Victor Serpentine, White Columbia.

California Onyx

Quarried near Musick, San Luis, Obispo County, California.

Onyx or Onyx Marble has been quarried on a small scale at above point, but no description is available.

Pedrara Onyx is sometimes called California Onyx.

California Serpentine

California has large deposits of serpentine located in various parts of the state. The deposit on Santa Catalina Island has been worked in a small way for nearly fifty years and according to Mining in California by the State Mining Bureau of September, 1922, is now the only quarry producing serpentine.

For serpentine marble formerly quarried in San Bernardino County see Victor.

Calvados Stone—Same as Caen Stone.

Cambovin—Same as Chartreux.

Cambria Green—See Cardiff Green.

Cambrian—Marble or limestone belonging to the Cambrian Age or period.

Cambro Silurian—Geological name for a certain formation.

Camonica

Quarried in Camonica Valley, Brescia, Italy.

Gray mottled with black and white.

Campan Griotte—See Griotte Campan.

Campan Isabella—Group C.

Espiadet Quarries in the Campan Valley, Hautes-Pyrenees, France.

Delicate rose which in some places merges into a dark red with a few white spots and pale green veins.

Takes high polish.

Campan Melange—Group C.

Espiadet Quarries, Hautes-Pyrenees, France.

Light green with broad chocolate bands; also green with bands of pink, brown, white or darker green.

Takes high polish.

Campan Rose or Rose Campan—Group C.

Espiadet Quarries, Hautes-Pyrenees, France.

Pink and white with slender green and white veins.

Takes high polish.

Campan Rouge or Rouge Campan—Group C.

Espiadet Quarries, Hautes-Pyrenees, France.

Green filler or background with spots and oval fragments of red, violet and white.

Takes high polish.

Campan Valley

Marbles quarried in this valley in Hautes-Pyrenees, France, are:

Campan Isabelle, Campan Melange, Campan Rose, Campan Rouge, Campan Vert.

Campan Vert or Vert Campan—Group C. Espiadet Quarries, Hautes-Pyrenees, France.

Light green with small gray and white veins.

Another variety from same quarry is dark green marked with numerous pink and light green spots and thin veins.

Takes high polish.

Canadian Labradorite—See Labradorite.

Canadian Marbles

Argent Vert, Emerald, Labradorite, Province Clair, Regina. Sea Green, Vert Gris, Vert Nuage, Vert Rose.

Canadian Rose Breche—Same as Breche Rose (Canadian).

Canadian Serpentine

The Geological Survey of Canada mentions deposits of a pale green serpentine occurring in various parts of Canada.

The only record we have is of Cipollino Canadian.

Canarino—Same as Numidian Yellow.

Candoglio

Quarries at Candoglio, Novara Province, Piedmont, Italy.

Light salmon colored.

This marble is not available to the trade and is included because it was used as early as the beginning of the fifteenth century in the Cathedral of Milan.

Canelle

Taveau Quarry, Nièvre, France.

Dark reddish brown.

Cape Girardeau Stone

Undeveloped beds of purple, yellow, red, pink, gray and greenish are mentioned by Merrill.

Capelle—See La Capelle.

Carbonate

A salt or ester of carbonic acid or a rock impregnated with carbonic acid.

Carboniferous—A geological period or era.

English geologists place this period to correspond with what the U.S. Geological survey classes as subcarboniferous.

Carcassonne Marble—See Griotte D'Italie

Cardiff Green (Serpentine) or Cambria Green or Maryland Green—Group D.

—Quarry at Cambria, near Cardiff, Maryland.

Dark grass green, with mottles and veins.

Carew Newton—See Pembroke.

Cargoloin—Group C.

Cargoloin Quarry near Nuits, in Cote d'Or, France.

Yellow, with purple veins.

Carinthia—See Crastaler.

Carleon Cove Quarry

One of the quarries producing Cornish Serpentine.

Carlisle Stone (Sand Stone).

Quarried in various parts of Scotland and used as a decorative stone.

Carlow County Marble—See Irish Black.

Carnarvonshire Marble—See Jasper Stone.

Carniolo—Group C.

Quarried in the Province of Carniolo, Austria.

Flesh red, veined and shaded with white.

Carn Kennack Quarry

One of the quarries producing Cornish Serpentine.

Carn Spernie or Carn Spernic.

One of the Cornish Serpentine quarries is located near this place.

Caroline Breche—Same as Breche Caroline.

Carrara Marbles

A general name given not alone to the marbles quarried in the vicinity of Carrara, but to all white and veined Italian Marbles. Originally, however, the name was restricted to Statuary Italian Marbles, which was probably due to the fact that earliest Italian quarries were worked for Statuary only.

Carrara Statuary—See Statuary Italian.

Carrick Marble—See Irish Drab.

Carthage Colonial Gray Veined or Colonial Gray Veined—Group A.

Steadley Quarry, near Carthage, Jasper County, Missouri.

Dark Gray with markings of darker shade and slightly wavy veins at irregular intervals. Sawed across the bed.

Takes high polish.

Carthage Colonial Gray Veinless or Colonial Gray Veinless—Group A.

Steadley Quarry, near Carthage, Jasper County, Missouri.

Light Gray with occasional clouds of darker shade. Sawed with the bed.

Takes high polish.

Carthage Imperial Gray or Imperial Gray—Group A.

Carthage Marble and White Lime Company Quarry, near Carthage, Jasper County, Missouri.

Light shade of gray slightly clouded with darker shades.

Takes high polish.

Carthage Marbles—Group A.

Colonial Gray, Jasper Gray, Ozark Gray, Roosevelt Gray, Seneca Gray.

Carthage Ozark Gray Veined—Ozark Gray Veined—Group A.

Ozark Quarry, near Carthage, Jasper County, Missouri.

Dark Gray slightly mottled and marked with slightly waving veins. Sawed across the bed.

Takes high polish.

Carthage Ozark Gray Veinless—Ozark Gray Veinless—Group A.

Ozark Quarry, near Carthage, Jasper County, Missouri.

Light Gray slightly mottled monotone. Sawed with the bed.

Takes high polish.

Carthage Quaker Gray Veined—Quaker Gray Veined—Group A.

Spring River Quarry, near Carthage, Jasper County, Missouri.

Light Gray with markings of darker shade and slightly waving veins at irregular intervals. Sawed across the bed.

Takes high polish.

Carthage Quaker Gray Veinless—Quaker Gray—Group A.

Spring River Quarry, near Carthage, Jasper County, Missouri.

Dark Gray with occasional clouds of darker shade. Sawed with bed.

Takes high polish.

Carthage Seneca Gray Veined—Seneca Gray Veined—Group A.

Consolidated Quarry, near Carthage, Jasper County, Missouri.

Dark Gray with markings of darker shade and slightly waving parallel veins at irregular intervals. Sawed across the bed.

Takes high polish.

Carthage Seneca Gray Veinless—Seneca Gray—Group A.

Consolidated Quarry, near Carthage, Jasper County, Missouri.

Light Gray with occasional clouds of darker shade. Sawed with bed.

Cartrare

Cartrare Quarry, in Cotes-du-Nord, France.

Blackish Gray veined with grayish white.

Carystium — Roman name for Cipollino Greek.

Carystus or *Karystos*.

Near this city on the Island of Euboea are located the quarries that produced the marble known to the ancients as Marmor Carystus. The quarry was abandoned and completely lost for many centuries, rediscovered and put in operation about 1890 and the marble now produced is known as Cipollino Greek.

Carystus Marble—Same as Cipollino Greek.

Casabet

Quarried at Casabet, Ariege, France.

Watson's description: "It slightly resembles the Escalette variety in color, but darker generally and of a redder shade throughout."

Casambala or *Casambala Verde Antico*—See *Verde Antico* (Greece).

Caserta

Quarried at Caserta, Italy.

Pale fawn, with crimson patches and interlacing white veins.

Cassis—See *Marbre De Cassis*.

Castel-Franco or *Verde di Castel-Franco*.

Quarried near Castel-Franco, Tuscany, Italy.

Olive green with bands of black.

Castellina Alabaster—See *Florentine Alabasters*.

Castelnau Marble—See *Grand Antique* and *Rose De Pyrenees*.

LIST OF QUARRIES AND MARBLE MANUFACTURERS

REPRESENTED IN THE MEMBERSHIP OF THE
NATIONAL ASSOCIATION OF MARBLE DEALERS

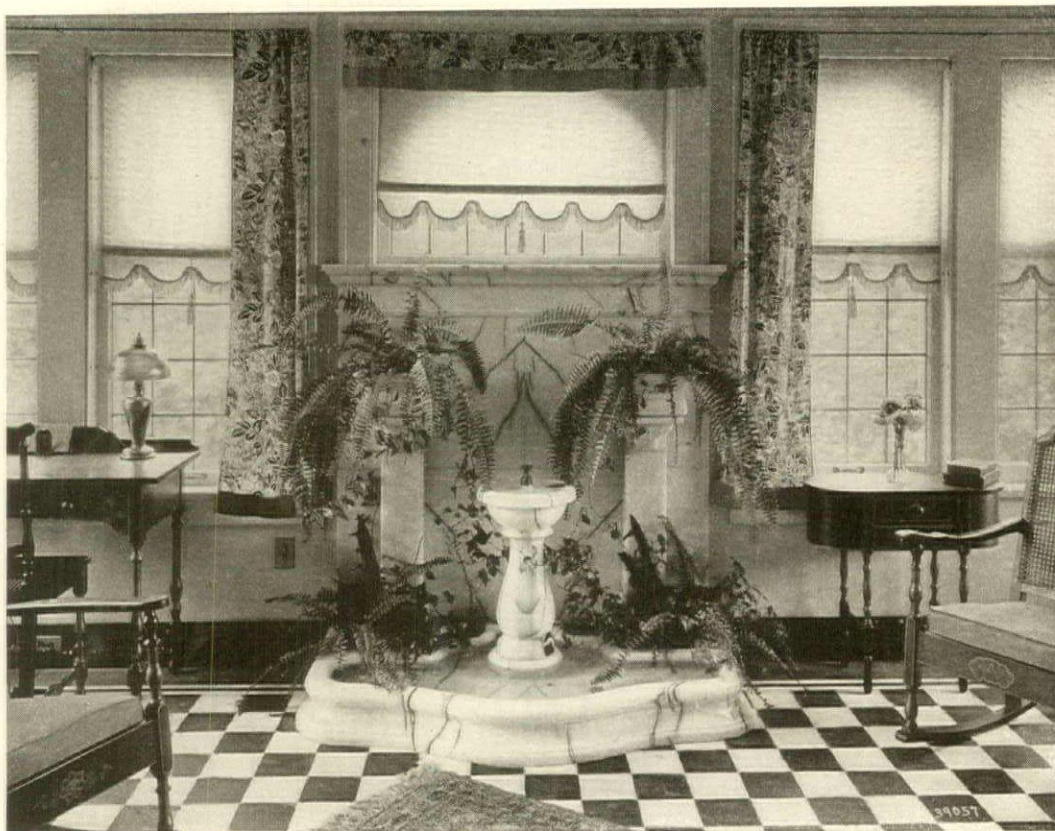
<i>City and State</i>	<i>Company</i>	<i>Representative</i>
Akron, Ohio	Flower Marble and Tile Company	Jas. T. Flower
Atlanta, Ga.	Reeves Marble Company	Alex. Reeves
Baltimore, Md.	Hilgartner Marble Company	A. H. Hilgartner
Baltimore, Md.	Jos. B. Dunn & Sons, Inc.	Chas. Scheidt
Baltimore, Md.	P. B. and W. Marble and Tile Co., Inc.	Richard T. Salter
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Buffalo, N. Y.	Lautz Marble Corporation	R. K. Glass
Carthage, Mo.	Arnosti Marble Co.	A. Arnosti
Carthage, Mo.	Carthage Marble and White Lime Co.	Geo. S. Beindiek
Carthage, Mo.	Consolidated Marble and Stone Co.	Millard Bryan
Carthage, Mo.	Ozark Quarries Co.	T. R. Givens
Carthage, Mo.	F. W. Steadley & Company, Inc.	K. D. Steadley
Carthage, Mo.	Lautz Missouri Marble Company	F. J. Lautz
Carthage, Mo.	Spring River Stone Company	John E. O'Keefe
Chicago, Ill.	American Marble Mill Company	T. J. Murphy
Chicago, Ill.	Black & Gold Marble Company	J. J. Bauer
Chicago, Ill.	C. N. Marthens Marble Company	C. N. Marthens
Chicago, Ill.	Corley-Meservy Marble Company	Wm. P. Corley
Chicago, Ill.	Davia Bros., Marble Company	Humbert Davia
Chicago, Ill.	Enterprise Marble Company	Thos. A. Knudson
Chicago, Ill.	Flavin Marble Mill	F. A. Flavin
Chicago, Ill.	Frank P. Bauer Marble Company	Frank P. Bauer
Chicago, Ill.	Henry Marble Company	H. K. Townsend
Chicago, Ill.	Jas. B. Clow & Sons Company	Jos. Little, Jr.
Chicago, Ill.	M. Keating & Sons Company	Thos. F. Keating
Chicago, Ill.	Naughton Marble Company	Thos. Naughton
Chicago, Ill.	Peerling Marble Company	Frank J. Peerling
Chicago, Ill.	Standard Mosaic Tile Company	C. R. Borchardt
Chicago, Ill.	Taylor Marble Company	Geo. W. Bower
Chicago, Ill.	National Mosaic Tile Company	George Wilde
Cicero, Ill.	Cincinnati Marble Company	H. L. Pike
Cincinnati, Ohio	Allen Marble Company	R. M. Allen
Cleveland, Ohio	Empire Marble Company	Frank C. Smith
Cleveland, Ohio	Haworth Marble Company	W. J. Haworth
Cleveland, Ohio	Interior Marble and Stone Co.	E. M. Fritz
Cleveland, Ohio	Prospect Mantel and Tile Company	S. J. Weingarten
Cleveland, Ohio	Roy-Cliff Marble Company	L. G. Yeau
Columbus, Ohio	Wege Marble and Tile Company	C. F. Wege
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Dallas, Texas	Southwest Marble Company	J. Desco
Dallas, Texas	McElhinney Tile and Marble Co.	William Jessop
Denver, Col.	Denver Mantel and Tile Company	D. C. McElhinney
Denver, Col.	Des Moines Marble and Mantel Co.	W. D. Watson
Des Moines, Iowa	Holbrook Marble and Tile Company	J. R. Golden
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Detroit, Mich.	Detroit Marble Company	E. L. Leavenworth
Detroit, Mich.		B. L. Cummins

THROUGH THE AGES

<i>City and State</i>	<i>Company</i>	<i>Representative</i>
East Cambridge, Mass.	Johnson Marble Company	T. J. Johnson
Fort Worth, Texas	Good Marble Company	H. G. Good
Houston, Texas	Salt Lake Marble and Supply Co.	Geo. E. Rieder
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Kansas City, Mo.	Kansas City Marble and Tile Co.	G. F. Keller
Kansas City, Mo.	Phenix Marble Company	Mastin Simpson
Kansas City, Mo.	Sutermeister Stone Company	C. O. Sutermeister
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Kasota, Minn.	Breen Stone and Marble Co.	Tyrell S. Willcox
Knoxville, Tenn.	Candoro Marble Company	T. O. Couch
Knoxville, Tenn.	Gray Eagle Marble Company	E. F. Klein
Knoxville, Tenn.	Gray Knox Marble Company	J. B. Jones
Knoxville, Tenn.	John J. Craig Company	John J. Craig
Knoxville, Tenn.	Knoxville Marble Co.	John M. Ross
Knoxville, Tenn.	Ross & Republic Marble Co.	W. E. Moses
Knoxville, Tenn.	Salomone-O'Brien Marble Company	Walter O'Brien
Knoxville, Tenn.	Tennessee Producers Marble Co.	B. L. Pease
Little Rock, Ark.	Southwestern Tile Company	R. E. Overman
Long Island City, N.Y.	Clarendon Marble Company	Alexander Thomson
Louisville, Ky.	Peter & Burghard Stone Co.	Jos. E. Burghard
Memphis, Tenn.	Central Mosaic and Tile Co.	Louis B. Marus
Milwaukee, Wis.	Andres Stone and Marble Company	Edgar Andres
Milwaukee, Wis.	Breidster Marble Company	Fred. W. Breidster
Milwaukee, Wis.	McClymont Marble Company	J. J. McClymont
Minneapolis, Minn.	Twin City Tile and Marble Co.	F. O. Streed
Minneapolis, Minn.	Northwestern Marble and Tile Co.	Chas. N. Gramling
New Orleans, La.	Albert Weiblen Marble and Granite Co.	Albert Weiblen
Oklahoma City, Okla.	Taylor Marble and Tile Company	G. W. Taylor
Omaha, Neb.	Sunderland Bros., Company	J. P. Williams
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St. Louis, Mo.	Pickel Marble and Granite Co.	H. A. Feldman
St. Louis, Mo.	St. Louis Marble and Tile Co.	R. C. McDonald
St. Louis, Mo.	Shaw Marble and Tile Company	A. Coerver
St. Louis, Mo.	Union Marble and Tile Company	W. C. Fox
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St. Paul, Minn.	Drake Marble and Tile Company	W. E. Andrews
Tate, Ga.	Georgia Marble Company	Sam Tate
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Vermont Marble Company, Proctor, Vermont.



THIS illuminated mantel aquarium installed in a Milwaukee residence, is a combination of mantel, flower vases and fountain. Electric lights concealed in the fountain-stem furnish a soft light sufficient for ordinary use. It was made of Pedrara Onyx by the McClymont Marble Company, Milwaukee, Wisconsin.

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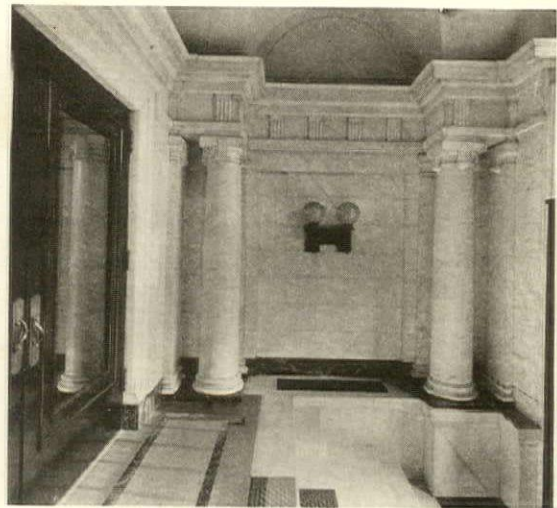
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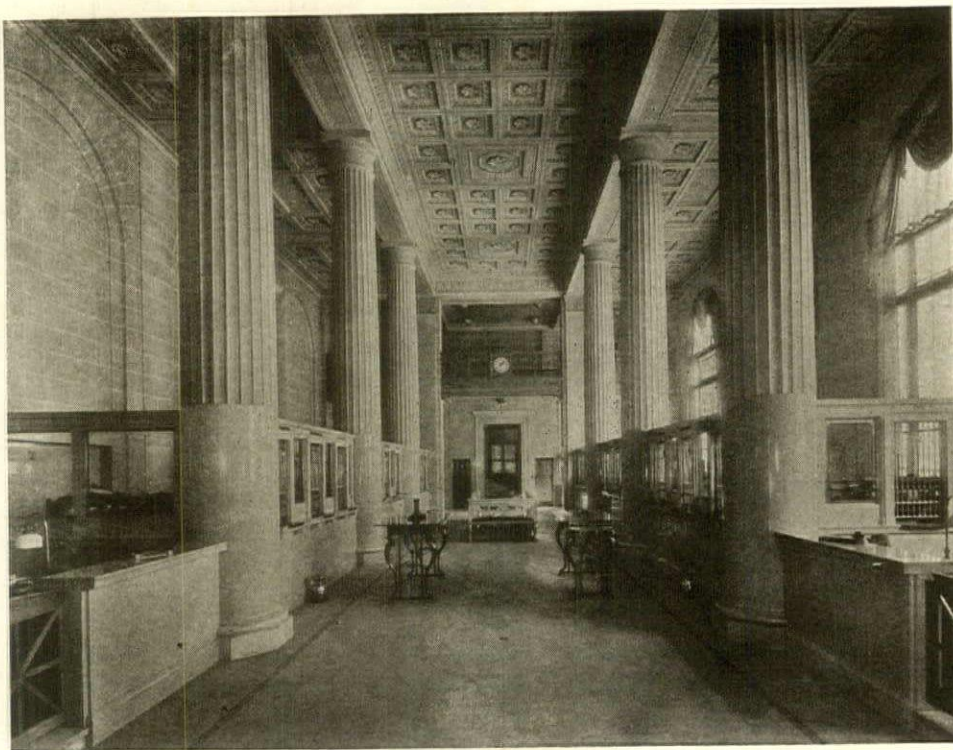


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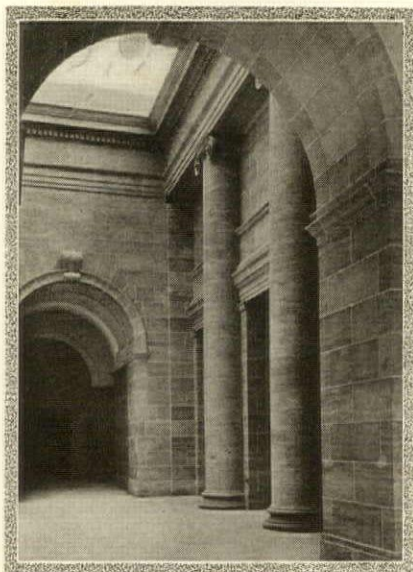
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Napoleon Gray Marble walls and columns
in Missouri State Capitol
TRACY & SWARTOUT, Architects

Napoleon Gray Marble

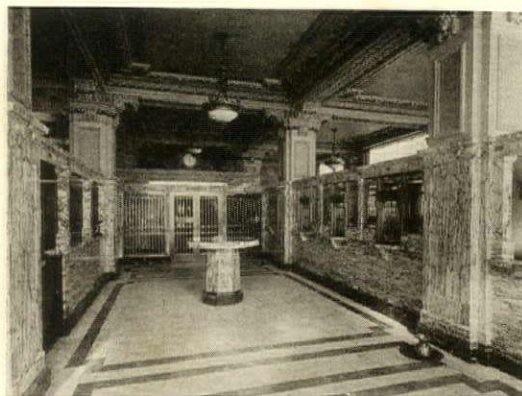
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AMERICAN BANK & TRUST COMPANY
NEW ALBANY, INDIANA
Architects, JOSEPH & JOSEPH, Louisville, Ky.

THE marbles used in this treatment were Grecian Skyros, Belgian Black and Verde Antique.

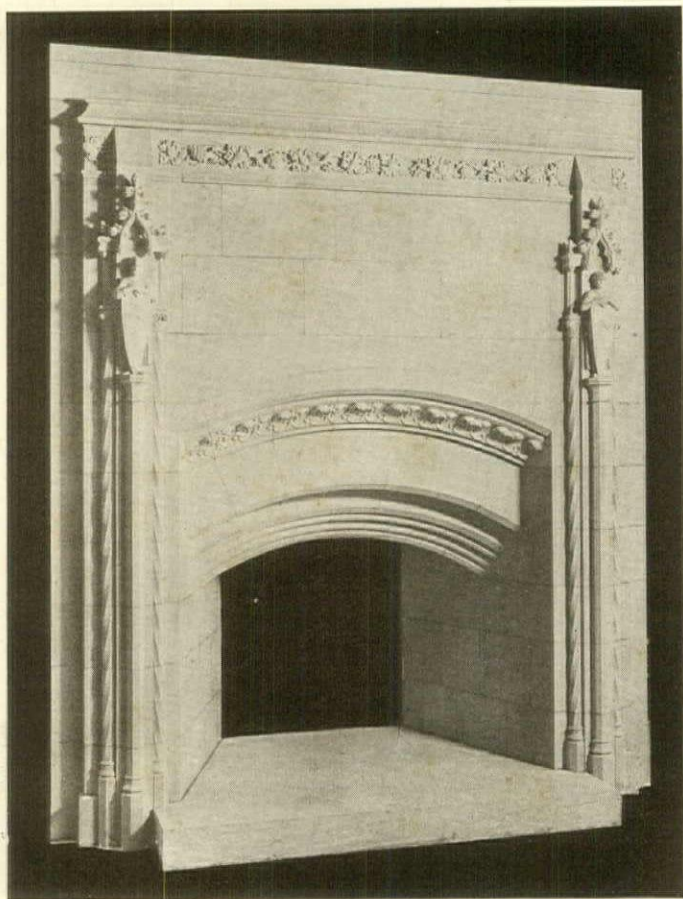
PETER & BURGHARD
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Operators of Up-to-date Marble Mills at
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Main Offices, SUNDERLAND BLDG., OMAHA, NEBRASKA



This striking Gothic mantel of Hauteville marble was made for the residence of D. S. Blossom, Cleveland, Ohio. It was designed by the architect, Abram Garfield, of Cleveland, and fabricated in this plant.

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