

*A pioneer in the use of exposed aggregate concrete*

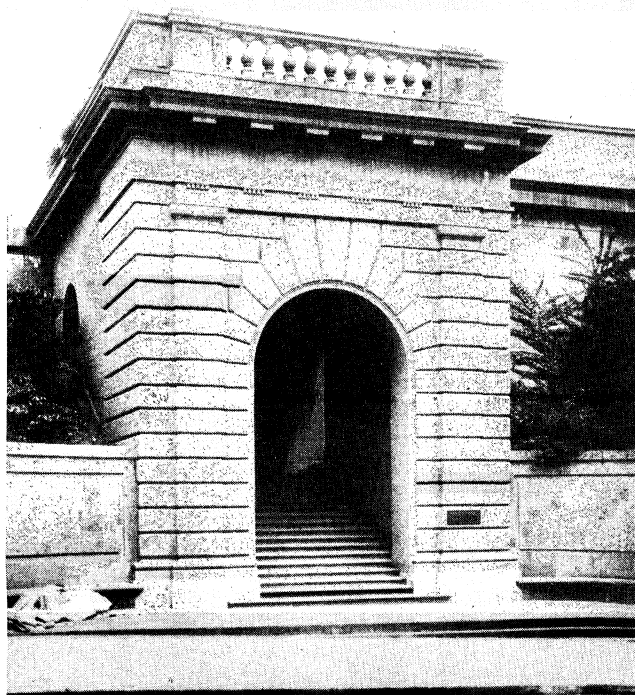
# Meridian Hill Park — Circa 1916

by James W. Mann

*H. W. Peaslee and ACI member John J. Earley were pioneers in the use of exposed aggregate concrete in the Washington, D.C. area. One of the first major projects in the early 20th Century was Meridian Hill Park. These early developments and techniques are explained.*

**Keywords:** concretes; colored concrete; exposed aggregate concrete; history; mix proportioning; structural design.

**B**uilt in an era of stucco popularity, Meridian Hill Park was a pioneer in the use of exposed aggregate concrete for architectural expression. Concrete construction began in 1916 and was completed in 1929 in a series of seven competitively bid contract awards to Chas. H. Tompkins Co. At that time, each



*16th Street entrance with architectural detail well executed in concrete, constructed in 1916.*

contract was dependent upon the generosity of Congressional appropriations for scope.

Some say it was the first exposed aggregate job. Today, Meridian Hill Park, located at 16th Street, N.W., between W Street and Euclid Street in Washington, D.C., remains unsurpassed for quality of workmanship and design.

The 12 acres (5 hectares) of park land was bought by the Federal Government in 1910 and in 1912 to 1914, plans were drawn for a formal garden with stone retaining walls, staircases, railings, cascades, and fountains.

The story is told that Congress refused to appropriate sufficient money for stone, so it became a problem to make concrete acceptable in a park designed in the Italian Renaissance style as desired.

The first attempt to construct a reinforced concrete wall with a stucco finish resulted in a plastered gray wall, a total failure. By experimentation, it was determined that forms could be removed while the concrete was still green, or in a plastic state, and the surface brushed to expose the aggregate.

Imagine the excitement this discovery created. The dull gray cement color was miraculously changed to a cream color and the monotony was relieved by variations in color of the Potomac River pebble aggregate.

Early studies of experimental stucco panels at the National Bureau of Standards led to the general conclusion that by adherence to well-established practice, structurally sound and durable stucco could be secured, but that a great deal could be, or ought to be, done to improve its appearance. Cracking and map cracking are common to most stuccos, and are especially objectionable on surfaces of fine texture. The monotony of the cold, gray cement color was objectionable, and was only partially relieved by the use of white cement and mortar colors. Finally, the muddy appearance was objectionable from an artistic standpoint.

Consideration of these matters suggested at once the use of less cement, and it became evident that this might improve the appearance. The obstacle en-

countered from this departure from usual practices was the lack of plasticity in the leaner mixtures. Other experiments were made to overcome this problem. However, these experiments were never carried very far for it did not seem possible that any method which might be devised for retaining plasticity would also eliminate the other objectionable features.

John J. Earley began extensive experimentation, too, in collaboration with the U.S. National Bureau of Standards. Test panels proved the color was determined by the sand and aggregate in exposed aggregate and cement color made little difference. Five different textures were developed and utilized for architectural emphasis in the overall project design. These five finishes are described as follows:

"FINISHES — Surfaces shall be executed in the various textures detailed below.

Texture 1. — A trowelled surface shall be used for top and drip of wall coping, for back of post joints and for top of base; matching work now in place in the 15th Street wall.

Texture 2. — A tooled surface shall be used for panel border; matching work in place in the 15th Street wall.

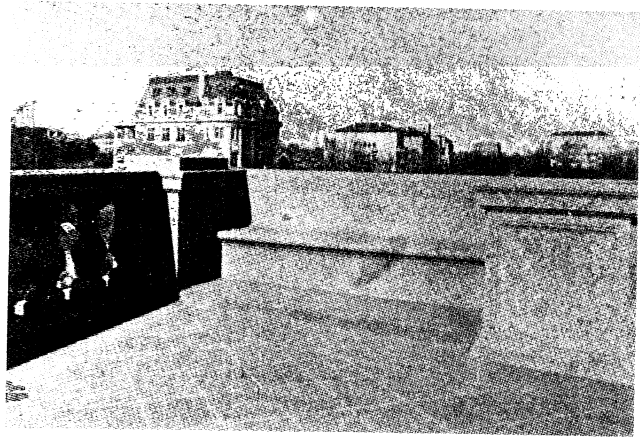
Texture 3. — A fine aggregate surface shall be used for moulded coping, balusters, and panelled piers, for obelisks and vases; matching work in place on the niches of the Euclid Street wall.

Texture 4. — A coarse aggregate surface shall be used for the panel centers and for bases of walls; matching work now in place in the 15th Street wall panels.

Texture 5. — A crushed stone aggregate surface shall be used for walks within the park walls; matching the crosswalk at the point of joining."

According to a report by J. C. Pearson and J. J. Earley in 1920, "Before color in concrete surfaces can be under artistic control, a technique must be developed which has for its medium the elements of the concrete itself. Although in problems involving appearance, aggregate is by reason of its greater bulk the major element, and cement the minor, it is, nevertheless, the color of the cement which is the natural color of normal concrete. The reason for this is that the cement is finely ground and deposits itself, paint-like, over the surfaces of the aggregates and colors the whole mass.

"If, therefore, concrete is to receive its color from the cement paste, variation must be obtained by the addition of pigments to the cement following the well-established practice of mixing paints; but if the aggregate is to be the source of color, the concrete must be so designed and manipulated as to deposit in the surface the greatest possible amount of aggregate. Any great degree of success can hardly be expected in coloring concrete through the cement. The choice of colors is restricted by chemical reaction with the cement, which causes them to fade or change; depth of color is restricted by strength re-

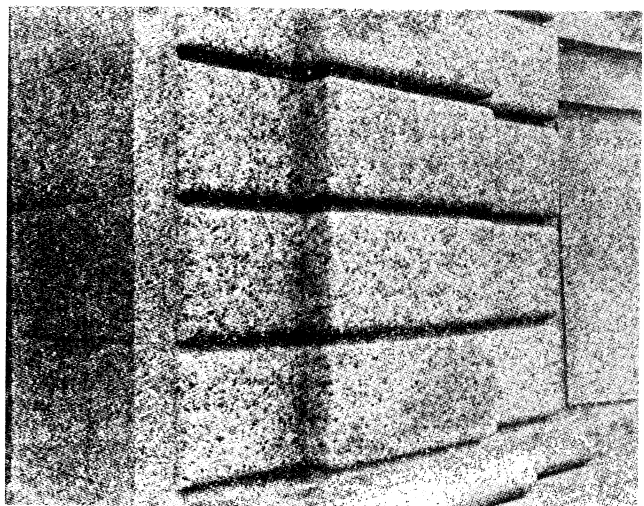


*Upper level of the main entrance with precast concrete balustrades, seats, and planting boxes.*

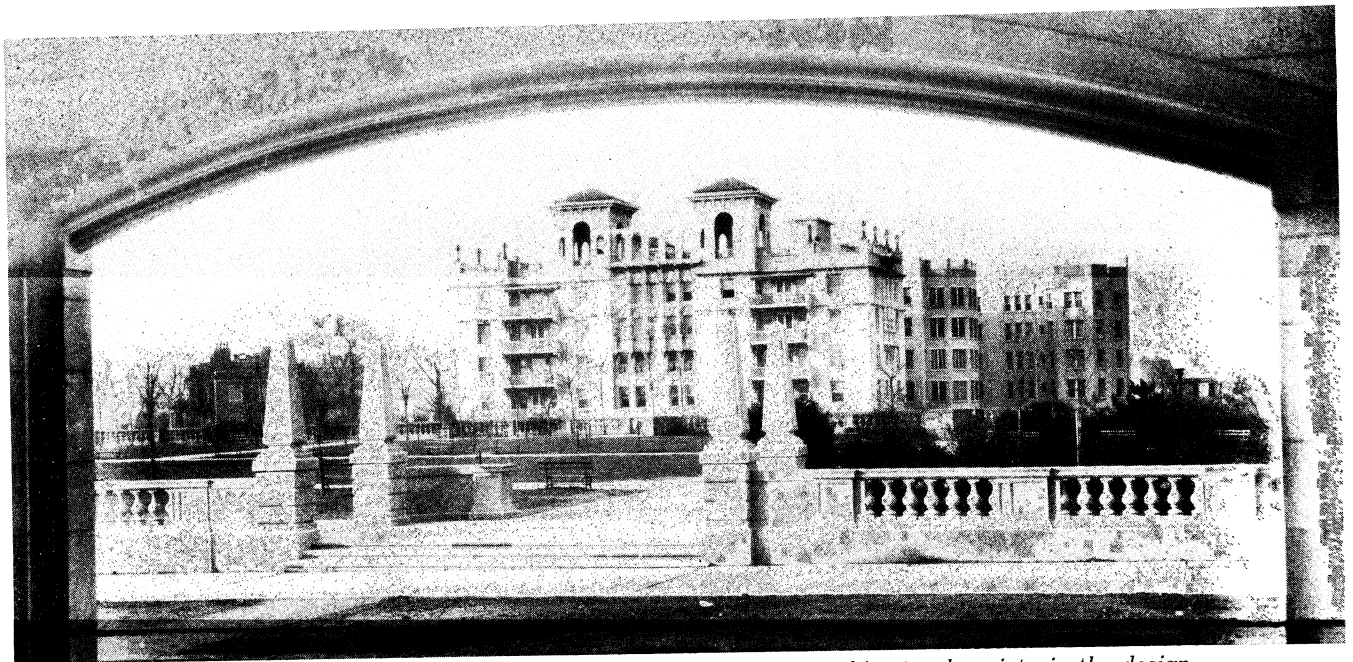
quirements of the concrete which limits very closely the amount of pigment which may be added to the cement. Therefore, with the choice of color limited by one requirement and the depth of color by another, the cement itself must remain dominant.

"On the other hand, in coloring concrete through the aggregate all such restrictions are removed, and colors may be obtained from white to black through all the range of possible aggregates. The results obtained in practice bear out the theory [art coloring with hard pastels or impressionist paintings], and there is every reason to believe that the aggregate is the proper source of color for concrete."<sup>2</sup>

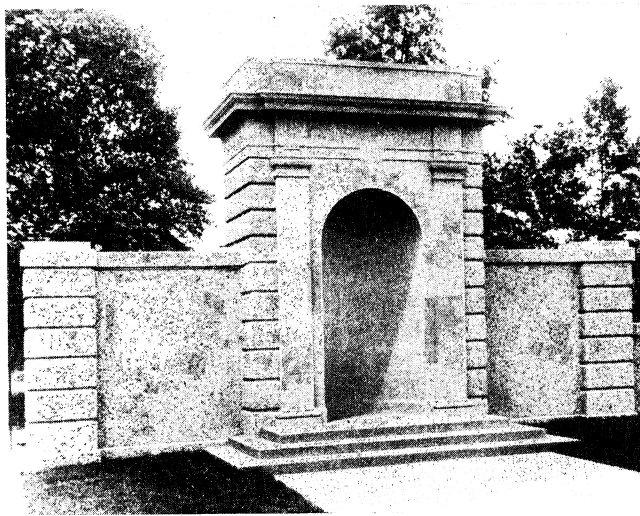
On the Meridian Hill Park project, the mixture of structural concrete was spelled out. Specifications required a mixture of one part cement, two parts sand, and four parts gravel with hydrated lime equalling 10 percent of the cement by volume. Water content shall be just sufficient to make the con-



*Three textures of exposed aggregate: fine on the reveal of the arch, left; medium on the panel of the wing wall, right; coarse on the rusticated blocks, center. The blocks are precast and set, the wing wall is monolithic, cast-in-place, and the color is uniform throughout.*



The 15th Street, street-level entrance shows the exposed aggregate and architectural variety in the design.



View of the Euclid Street wall between 15th and 16th Street reveals how J. J. Earley achieved the Italian Renaissance style by exposing the aggregate and maintaining a uniform color of the finished concrete.

crete plastic enough to flow sluggishly around the reinforcement when properly spaded.

*"Attention is directed to the fact that structural concrete must be cast integrally with the scrubbed surface concrete.*

"The contractor's procedure and methods of construction may be of his own selection, provided they secure results which satisfy the requirements of the plans, specifications, and supervision."

Think about it. Five different textures of scrubbed aggregate were required to be placed monolithically with each other and with structural concrete in the same placement. What a challenging way to start a new industry! Be assured that the specifications were met and the walls were cast in the existing

vertical position. It will whet your imagination to figure out how it was accomplished. If you can't solve the puzzle and are inquisitive enough, I will share the secret with you.

Specifications cannot account for the quality of construction found in the Park. Chas. H. Tompkins Co., developed techniques of construction along with the development of the concrete design by John J. Earley so all parties to the construction effort understood the problems and could work together to effect successful solutions.

Martin Grieve, Tompkins' superintendent, told me 25 years ago: "We learned to coat the form surface with sugar syrup just prior to placing the concrete. That delayed setting up of the surface. As soon as concrete set up enough, we stripped the forms and scrubbed the surface the same day it was placed. We even cast the obelisks in place."

Time has been kind to Meridian Hill Park in the half century since it was built. Only a light acid wash would be needed to make most of the work as brilliant as it was originally when completed in 1929.

Credits for 1929: architect, H. W. Peaslee; architectural sculptor, John J. Earley; contractor, Chas. H. Tompkins Co.; owner, U.S. National Park Service.

#### References

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4. Photos supplied by Chas. H. Tompkins Co., Washington, D.C.