

# THOLOS

**FEATURE: REVEALING  
A TILED TREASURE**

**EMPOWERED WORKFORCE:  
RECLAIMING AN ORDINARY DAY**

**PROJECT UPDATE:  
CAPITOL POWER PLANT**

**8 FEATURE:** How a successful immigrant family left their mark on the Capitol campus, and the AOC's work to clean and preserve a historic treasure. *Photo by Chuck Badal*



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### EMPOWERED WORKFORCE:

A story of employees coming together to improve safety on campus for everyone.

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Read how this cool tool is transforming how we identify underground utilities.



**COVER:** A bowler hat was discovered during the renewal of the Cannon House Office Building. *Photo by Chuck Badal*

# One of My Favorite Things



Left, middle right photos by Dewitt Roseborough; Middle left photo by James Rosenthal; Right photo by Luke Walter

While I often use this space to write about some of my favorite architectural features found on Capitol Hill, I want to use this Architect's Notebook to write about my favorite and most important part of this organization: you! More specifically, your spirit and your giving and generous spirit, to be exact. I am often asked what the favorite part of my job is, and I always respond that it's the opportunity to work with people that have such a generous spirit.

I always love to see and hear how you regularly give of your time, talents and treasure as you volunteer throughout the agency. I appreciate the happiness and contentment on the faces of those volunteering with the students at the Phelps Architecture, Construction and Engineering High School in Washington, D.C. Our volunteers have played an integral role in educating these future mechanics, architects, engineers and construction professionals. I feel the excitement and pride our employees have in sharing their jobs with children on "Take Our Daughters and Sons to Work Day." And, I watch how you enthusiastically support others through your events and contributions to the Combined Federal Campaign.

Your giving spirit extends to your jobs as well. Your welcoming smiles create a warm and hospitable

atmosphere for our visitors. Your passion is obvious, whether in teaching a young child about plants or educating visitors about the history of our great nation. Your generous spirit shows up in how you treat each other and help each other, in generating new ideas, training each other, and making sure you and others work safely. You give careful attention when working in our historic and iconic spaces. You go out of your way to take care of people, whether our customers, lost employees in the hallway or our visitors.

When people compliment you on your work, I see the happiness it brings to you. And when you are leaving for the day, I can see that you are content and pleased with your work.

I want you to know how proud I am of all of you and the work you do every day. The Architect of the Capitol is a better organization because of you. ❁

Handwritten signature of Stephen T. Ayers.

Stephen T. Ayers, FAIA, LEED AP  
Architect of the Capitol

The HRSG's long road trip comes to an end in the nation's capital. Photo by Christopher Potter





**LEFT:** The HRSG, still angled on its side from transportation across the country, is lifted off the trailer and toward the East Refrigeration Plant. *Photo by Chuck Badal* **MIDDLE:** Cogeneration electrical equipment enters the turbine hall using the existing overhead crane. *Photo by Chuck Badal* **RIGHT:** The HRSG makes its way into the East Refrigeration Plant. *Photo by Dewitt Roseborough*

# Capitol Power Plant

WRITTEN BY JUSTIN KIEFFER

In October 2015, the Architect of the Capitol (AOC) began its Cogeneration project at the Capitol Power Plant. The goal of Cogeneration for the AOC is to use a single fuel source, natural gas in this case, to generate electricity and capture the heat by-product from combustion to generate steam. The electricity will be used to supplement plant electrical requirements, while the steam will heat the Capitol campus. Cogeneration will allow the Capitol Power Plant to decrease its dependency on the unreliable boilers that currently provide heat, but date back to the 1950s.

The two major pieces for Cogeneration are the combustion turbine generator and the heat recovery steam generator (HRSG). Detailed planning, design and construction was required to carefully fit these large pieces of equipment into the Capitol Power Plant's historic East Refrigeration Plant prior to their delivery in July 2017. Both pieces were oversized loads and required special permits to be transported across the country.

A massive 550-ton-capacity crane — that's enough to carry about 84 African elephants at the same time — was on hand for the arrival of the equipment and was used to unload each component. The 550-ton-capacity crane lifted the equipment in the air, while a second 165-ton-capacity crane rotated the HRSG 90 degrees in midair to the upright position — a very slow Cirque de Soleil show. Both pieces of equipment were then rigged using a special motorized dolly to get them into the building and placed on their permanent foundations.

Following the successful delivery of this critical equipment, the project team proceeded to install the complicated electrical, plumbing and mechanical elements that make the system work. The final phase of this project included a 30-day reliability run to ensure the machinery was properly commissioned and in working order. The reliability run was successfully completed on August 17, 2018, and work on the project is complete. ❁

Timothy McClennon carefully checks the undercarriage of an AOC vehicle.



# Reclaiming an Ordinary Day

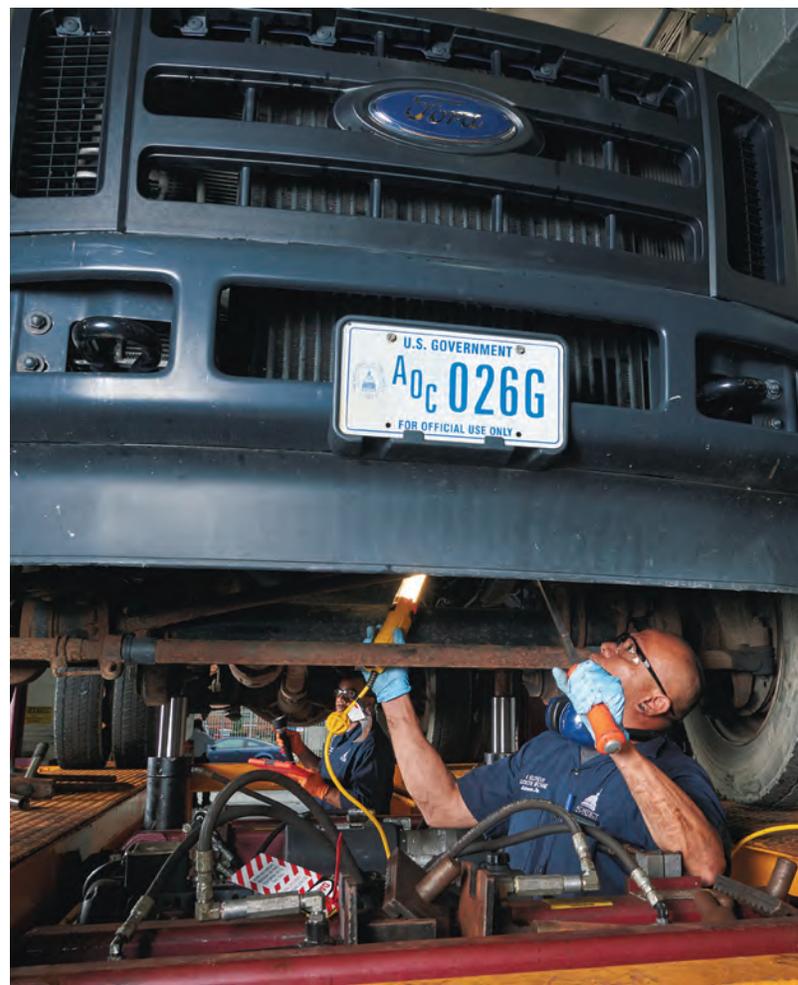
WRITTEN BY ERIN COURTNEY • PHOTOS BY LUKE WALTER

It is easy to take for granted an ordinary day strolling across the beautiful landscaped grounds of the U.S. Capitol. Chirping birds, chattering squirrels, humming lawnmowers and the excited voices of children on their first visit to Washington, D.C., make up the soundtrack of the Capitol campus. In between, there might be a muffled clanking of a hammer or the scratching of a stone mason hard at work preserving the area so it can continue to inspire generations to come.

What I love most about Capitol Hill is that its vibrancy is infectious. There is always something happening here. Shuttles whizzing up the Hill ferrying visitors; rallies for or against various causes; members rushing to vote; staff shuffling papers and binders; and projects — lots of projects.

Construction projects on the Capitol campus are as constant as the ringing of the bells that summon lawmakers to the chambers for votes. And with projects come contractors making deliveries. Last spring, a truck approached a security checkpoint with a load of lumber. The contractor exited the truck to present paperwork to police officers manning the screening area. While inside, the brakes on the vehicle failed. The truck, driverless, drifted down the hill and smashed into the Summerhouse. This would be no ordinary day.

Minutes after the accident, Lee Dennis, Facilities Operations supervisor with Capitol Grounds and Arboretum, arrived at the Summerhouse to help. “I was standing next to the Summerhouse looking at the truck when 20 toddlers holding a rope walked past me. I started to shake when I realized that they would have never heard the contractor’s drifting truck and likely would have been hit had they passed by minutes earlier.”



Garry Belotindos methodically inspects an AOC vehicle.



Members of Capitol Grounds and Arboretum inspect vehicles operating on the Capitol campus.

Dennis, who knew that the Architect of the Capitol (AOC) had a couple of vehicles with braking systems similar to those of the contractor, immediately recalled those trucks for reinspection. In the process, he coordinated with the Property Management Branch to ground vehicles that did not pass inspection.

“We were really committed to getting the AOC fleet program in better shape,” said Percell Artis Jr. the property management supervisor in the Acquisition and Material Management Division (AMMD). “Capitol Grounds, with their on-site mechanics, was a great partner,” he said. Henry Makwakwa, AMMD fleet manager, worked on adding verbiage to the fleet manual that provided clearer guidelines for annual inspections. “We instituted

an inspection period from April through July. Including the language in our manual helps us hold property officers across the agency accountable. We want all of our vehicles to be safe and roadworthy,” said Makwakwa.

With the Property Management Branch’s support, Dennis leveraged the Summerhouse experience to implement a management tool to track vehicles owned and operated by the agency. The team inspected, stickered and now tracks all vehicles from dump trucks to a tiny one-seater cart. Vehicles identified as “in need of inspections” are shared at executive staff meetings. “From top to bottom, the AOC team supported our efforts to ensure the safety of the vehicles we operate on campus. The tracker is a tool to encourage responsibility for our



“There are so many people walking around our workplace, and the degree of difficulty to traverse campus has become much more challenging, making good brakes, safety lights and mirrors a must. I want to know that I have done everything I can do to make AOC, and the people who visit the nation’s capital, safe.”

Stevan Boozer (left) and Lee Dennis (right) check the paperwork on a recently inspected vehicle.

assets, both human and mechanical,” said Jim Kaufmann, director of Capitol Grounds and Arboretum. In a two-month period, the entire fleet was inspected and certified safe to operate.

Indeed, with rapidly climbing visitor rates — 5 million visitors were welcomed to the Capitol campus in Fiscal Year 2018 — supporting and operating well-maintained vehicles is even more urgent. “There are so many people walking around our workplace, and the degree of difficulty to traverse campus has become much more challenging, making good brakes, safety lights and mirrors a must. I want to know that I have done everything I can do to make AOC, and the people who visit the nation’s capital, safe.” said Dennis.

Even with the success of the fleet tracker, Dennis is convinced that he and his team can do better. He wanted the inspection process to be more proactive, so now he is working with Andrew Glendening, management and program analyst in Safety, Fire and Environmental Programs on a computer-aided facility management system that will provide automated alerts to vehicle owners or custodial managers when it’s time to get a vehicle inspected.

“At the start of this process, I was surprised at the condition of one of our trailers and thought to myself, ‘I’ve given away better stuff,’ but now I am proud of the progress we’ve made in vehicle maintenance. To me, safety is non-negotiable.” And we can all agree that an ordinary day is the best kind of day. ❀

# REVEALING A TILED TREASURE

BY KRISTEN FREDERICK  
PHOTO BY CHUCK BADAL







Superintendent of the Capitol Building and Grounds Elliott Woods (left) and Speaker of the House Joseph Cannon oversaw the development and construction of the first House office building in the early 1900s.

**T**he year is 1881. In September, U.S. President James Garfield has unexpectedly died due to complications from a thwarted assassination attempt that occurred in July. A day later, Chester A. Arthur is sworn in as president. The population of the United States is just north of 50 million people, and the country consists of 38 states.

This same year, a Spanish man and his young son will set foot on a ship bound for New York. Though the man speaks no English, he carries with him \$40,000 and his ticket to success — his extensive knowledge of a medieval construction technique that he will introduce to the American architectural community. In the following decades, his method will be utilized on hundreds of prestigious buildings across the United States and transform him into a true American success story.

## THE GUASTAVINO INFLUENCE AND LEGACY

While his name is not well known, his work and legacy graces hundreds of buildings across the United States. Born into a large family in 1842 in Valencia, Spain, Rafael Guastavino Sr. (pronounced “gwah-stuh-veeno”) at first desired to be a musician but showed an aptitude for architecture and began pursuing his passion as a teenager. With the help of a wealthy uncle, he was able to further his education in Barcelona, eventually graduating with the title of “master builder.”

Guastavino’s training had stressed practical, hands-on building techniques and led to his use of tile vaulting, a traditional technique that was common in his Spanish region of Catalonia. Tile vaulting, a masonry construction method, uses multiple layers of thin ceramic tiles and mortar to create an arched structure, such as a ceiling or dome. This quick and economical building system was a way to replace the stone vaulting method traditionally used in buildings, which was time-consuming, labor intensive, heavy and expensive. After finding success by incorporating tile vaulting into many of his building projects in Barcelona, Guastavino left Spain, never to return, on a mission to bring the region’s tile vaulting technique to North America.

By the 1880s, construction methods in the United States were undergoing a transformation. Safety was a top concern, especially after several devastating fire incidents such as the Great Chicago Fire in 1871 that burned more than

six square miles of the populous American city. The demand for improved safety standards fueled construction innovation and paved the way for Guastavino to introduce his fireproof tile vaulting technology to the architects of the time.

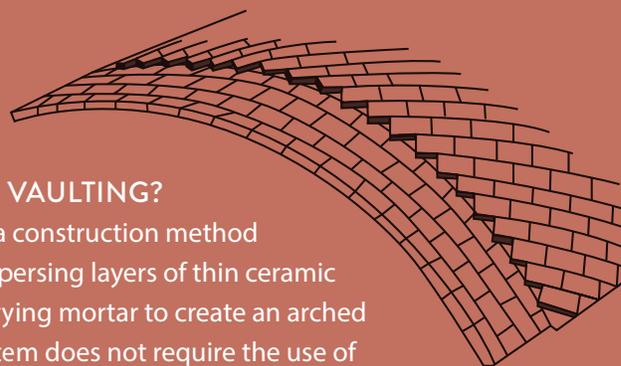
He soon found his footing as a vault builder, rather than an architect in charge of designing an entire building. In 1885, Guastavino filed three patents and ushered in an era in which his company dominated the field of tile vault construction. The burgeoning Beaux Arts architectural movement in America was a perfect match for Guastavino’s impressive and graceful tile vaulting system. Beaux Arts, with its use of artistic craftsmanship and elegantly ornamented classical style, could be matched in spectacle by Guastavino’s elaborate tilework designs.

Major success for Guastavino’s expanding company soon followed, including the design and construction of tile vaults for the Boston Public Library, now considered one of

the most influential projects of Guastavino’s career. By the early 1890s, the Guastavino Company was simultaneously working on major projects in Boston, New York, Chicago, Minneapolis and Providence. It was in the city of Providence, Rhode Island that the Guastavino Company first collaborated with the esteemed Beaux Arts architectural firm of John Carrère and Thomas Hastings, signaling the beginning of many partnerships between the two companies. One such collaboration would have an enduring impact on Capitol Hill.

## DESIGN OF THE CANNON HOUSE OFFICE BUILDING

At the turn of the 20th century, the population of the United States had grown to more than 76 million people and a total of 45 states. The U.S. Capitol Building in Washington, D.C., was bursting at the seams with 391 members of the House of Representatives. With severely limited office space in the



### WHAT IS TILE VAULTING?

Tile vaulting is a construction method that uses interspersing layers of thin ceramic tiles and fast-drying mortar to create an arched ceiling. The system does not require the use of iron beams or extensive support during construction.

The end result is a graceful, elegant dome that can handle a high load capacity. During the Guastavino Company’s peak, an average-sized tile vault could be assembled by skilled craftsmen in a matter of weeks.



### NAMING OF THE CANNON HOUSE OFFICE BUILDING

When the Cannon Building opened in 1908, it was known simply as the House Office Building. After the completion of a second House office building in 1933, the 1908 building became known as the “Old” House Office Building. On May 21, 1962, Public Law 87-453 retitled the three House office buildings and named the “Old” House building for Speaker Joseph Gurney Cannon, who served as an Illinois House representative for 46 years and was speaker during the construction of the building.

U.S. Capitol, most members worked at their desk in the House Chamber.

To relieve the U.S. Capitol’s overcrowding problem, Superintendent of the Capitol Building and Grounds Elliott Woods was given the responsibility of spearheading an effort to plan and oversee the construction of the first House office building. Woods requested permission to hire a consulting architecture firm to design the building, along with the assistance of his staff of architects and engineers. He soon became acquainted with the prestigious New

York firm of Carrère and Hastings, which agreed to design a building with the appropriate architectural effect that would complement but not compete with the neighboring U.S. Capitol. By the summer of 1904, excavation on the chosen site south of the U.S. Capitol was well underway. (The Senate would soon follow suit with the construction of their own office building to the north of the U.S. Capitol, also designed by Carrère and Hastings.)

Continuing their Beaux Arts design tradition, Carrère and Hastings created an elegant yet

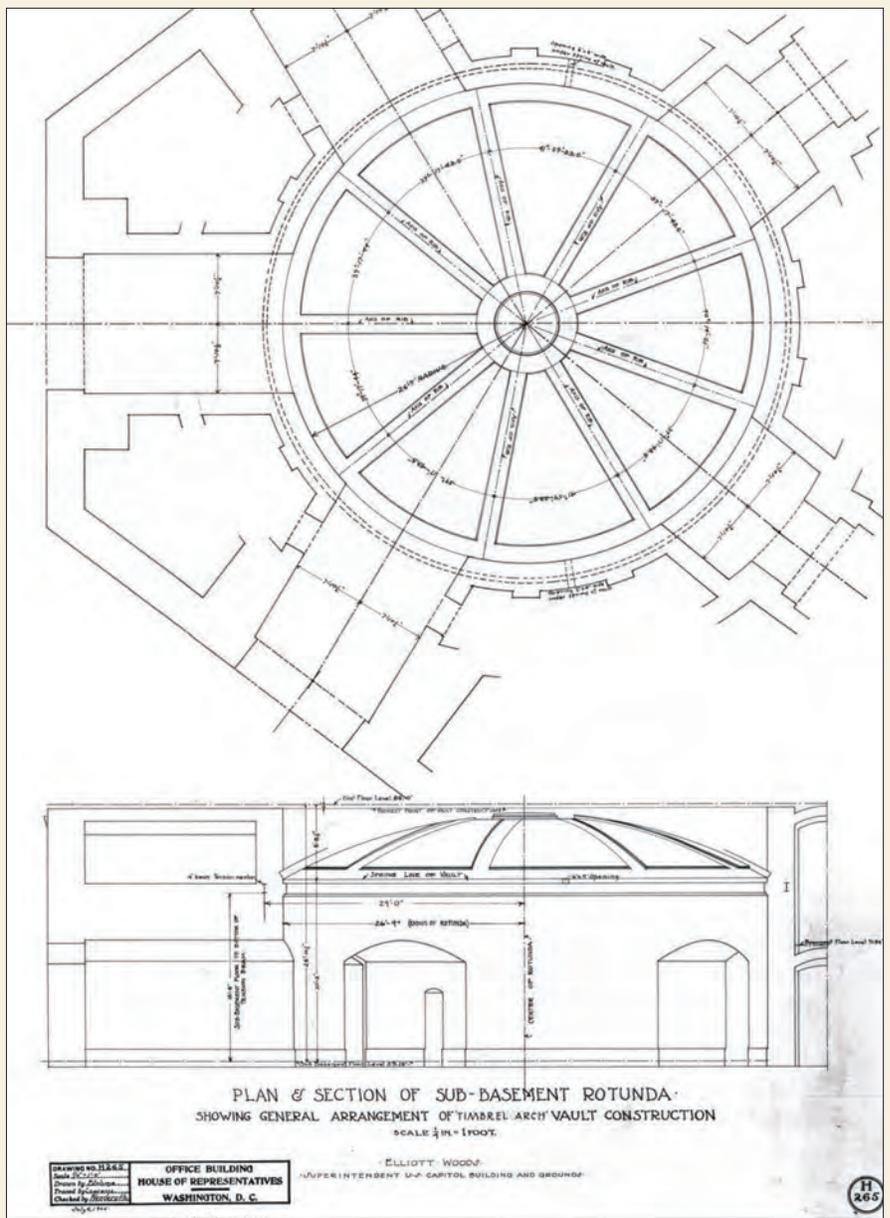
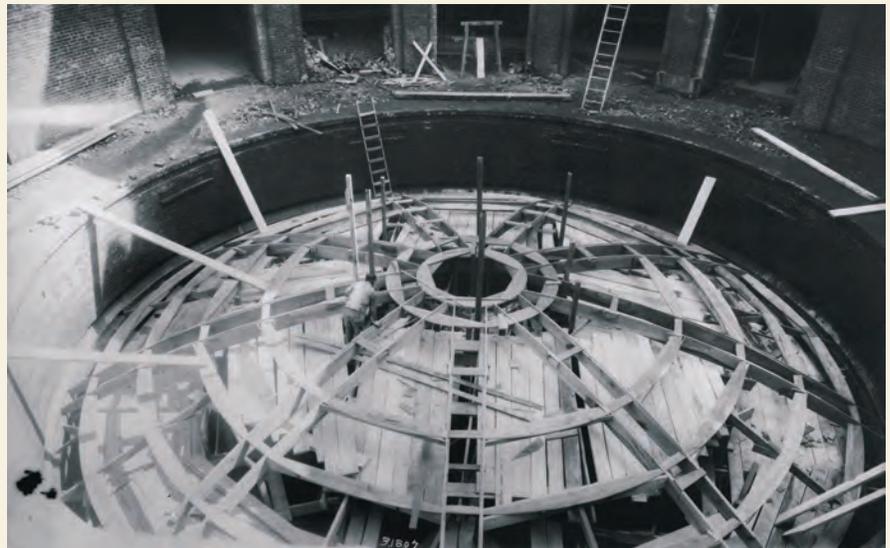
deferential design with an interior rotunda that functioned as the building’s main lobby. Ringed by 18 Corinthian columns supporting a coffered dome, this grand circular vestibule was an unexpected but compelling welcome to visitors and members alike. Located on the first floor of the building (now known as the second floor), the rotunda required a structurally sound dome below that could handle its load of stone and plaster. There seems to have been no debate among the architects: the Guastavino Company would be the perfect fit for the job.

## GUASTAVINO'S CONTRIBUTION TO CAPITOL HILL

While records of the Guastavino Company's work in the Cannon Building are sparse, the Guastavino name can be found on a number of the original drawings. The plans called for a sub-basement (now basement) rotunda with a "timbrel arch" vault ("timbrel" being the name coined by Guastavino to distinguish his patented tile vaulting design). Full-fledged construction of the building commenced in 1905 and while few records of the Guastavino arch's building process exist, archival photos taken on March 28, 1907, show the construction of the Guastavino Company's wooden arch forms spanning the sub-basement level.

The tile dome's design was as simple as it was graceful: nine sunken wedges containing cream-colored laminated tiles styled in a herringbone pattern, separated by radiating ribs, and all joined by a center ring. Using four layers of tile and Portland cement (a quick-setting mortar), the vault was most likely constructed in only a matter of months. Work on the grand rotunda above then continued with the pouring of a concrete bed for the marble floor.

**TOP:** Very few photos and drawings exist from the construction of the Cannon Building's tile vaulted ceiling. This March 1907 photo shows the Guastavino Company's building of the wooden arch forms over the sub-basement rotunda. **BOTTOM:** July 1905 section drawing showing the general arrangement of the "timbrel arch" vault construction, which has been preserved in the AOC's archival collection.





After workers sprayed a latex poultice on the tiles and let it dry, the poultice adhered to the accumulated dirt and dust. Once the latex was peeled back, it revealed the original color of the Guastavino tile. *Photos by Chuck Badal*

With Guastavino Sr.'s unexpected death in early 1908, he would have never seen the completed Cannon Building, which officially opened its doors on December 12, 1908.

### A REVEALING CLEANING

Dirt. Dust. Stains.

By the start of the Cannon Renewal's Phase 1 in 2017, the United States had more than 308 million people and a total of 50 states. In the Cannon Building, after more than 100 years of use, layers of grime had accumulated on the tile vaulted ceiling of the Guastavino basement rotunda. Cigarette smoke, grease from a nearby kitchen and constant daily use of the historic space had taken their toll. Over the years, the cream-colored tiles had faded to a

dingy kaleidoscope of browns, and the original color was lost to history. Despite the overall discoloration, the basement rotunda dome was found to be structurally sound at the start of the Renewal project.

While much of the Renewal project focuses on upgrading the failing infrastructure systems, the historic preservation of the building's original elements is a key objective of the Renewal's mission. The essence of historic preservation is the process of retaining, restoring and rehabilitating a building's historic fabric to allow future generations to learn from the past and preserve history. This important work includes restoring historic elements such as the Cannon Building's Guastavino rotunda ceiling.

"The Guastavino tile vaulted ceiling remains intact as it was originally constructed in 1907," explained AOC Historic Preservation Officer Mary Oehrlein. "As part of the Cannon Renewal, the ceiling tile was cleaned and minor repairs were made. Additionally, the cove lighting was replaced with LEDs and the rotunda walls were repainted."

After conducting extensive research on how to safely clean the porous terra cotta tile, the Cannon Renewal project team directed the contractor to test the cleaning method on a small section of the ceiling. The results were dramatic.

"The workers sprayed a latex poultice on the tiles, then once dry, peeled it back from the tile," said Cannon Renewal Senior

The historic character of the Guastavino rotunda dome has been preserved for future generations. *Photo by Chuck Badal*





**TOP:** As senior project manager for the Cannon Renewal, Donna Klee is intimately familiar with the historic aspects of each space in the Cannon Building. *Photo by Chuck Badal*

**BOTTOM:** Before the start of Phase 1, Marty Shore gave entertaining talks on the Guastavino rotunda dome's construction history. The story of the Renewal's cleaning and preservation work will soon be a part of his future presentations. *Photo by Dewitt Roseborough*

Project Manager Donna Klee. Klee has supervised the Renewal's historic preservation work for the past four years.

"It was amazing to see how the poultice was able to remove those 100 years of grime without disturbing the texture of the tile or the original grouting system," she said. "I think everyone who walks through that space will be really impressed."

Ultimately, the Cannon Renewal project was able to achieve its goal for the Guastavino rotunda dome: safely preserve a priceless piece of America's cultural heritage using the latest historic preservation technology.

"The brilliance of the Guastavino rotunda dome cannot be understated," said AOC Preservation Architect Marty Shore. Shore has studied the dome extensively and has given presentations on its history and construction. "The dome the Guastavino Company created for the Cannon Building is an excellent example of the skilled craftsmanship and technology of that time. The design was both economical and beautiful. Simply put, we could not do this as easily today."

After a steady decline in business due to changing tastes and new building practices, the Gustavino Company closed in 1962. While the art of structural tile vaulting may be considered a relic of history, the Guastavino legacy lives on throughout the United States and especially in the nation's capital. The work of the Cannon Renewal project ensures that legacy will continue to shine in the Cannon Building. ❁



House curator Farar Elliott and AOC curator Michele Cohen review the historic items that were found during the initial phase of the Cannon Renewal project.

# Cool Cannon Construction Finds

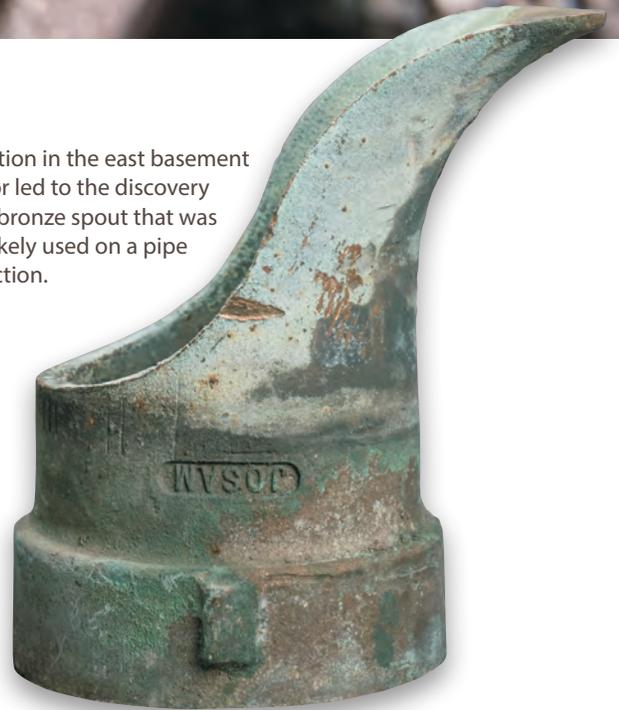
WRITTEN BY KRISTEN FREDERICK • PHOTOS BY CHUCK BADAL

During the process of renewing the Cannon House Office Building, workers have found hidden treasures that had been lost or discarded by the laborers who constructed the building more than 100 years ago. Here's a small sampling of what has been discovered since the start of the Cannon Renewal project in 2015.



Nestled in a first-floor crawlspace near the southwest elevators, an electrician discovered a bowler hat that may be from the days of the Cannon Building's original construction. Before the ubiquity of hard hats on construction sites, it was common for workers in the early 1900s to wear felt bowler hats.

Excavation in the east basement corridor led to the discovery of this bronze spout that was most likely used on a pipe connection.



Discarded and crumpled newspapers, some 100 years old, have been found behind the walls and in the ceilings.



Construction materials used during the original building construction in the early 1900s have been a common find.



Bottles of all shapes and sizes were found hidden behind walls during demolition.





AOC employees test an underground utility locator on the West Front lawn of the U.S. Capitol Building.



# RIGID SEEKTECH SR-60 Locator

WRITTEN BY ERIN COURTNEY • PHOTOS BY SUSANNE BLEDSOE

Under a bright blue cloudless sky, Ronnie Pfiffer, Capitol Grounds and Arboretum pipefitter, stood on the West Front looking down with the focus and concentration of a Jedi. In his hands, he held not a lightsaber but a RIGID SEEKTECH SR-60.

The black and gold underground utility locator emitted sounds reminiscent of an anxious R2-D2 trying to deliver a message to Obi-Wan Kenobi. Upon closer inspection, the device even included two black orbs shaped like the Death Star.

**P**ffiffer, his Capitol Grounds colleagues as well as staff from the Construction Division, High Voltage Section and the Office of Security Programs (OSP) gathered for a briefing on the RIGID SEEKTECH device and to practice using it in a real-world setting. “We don’t know what we have in the ground and usually find out when we dig it up,” said Jason Vandervliet a facility management specialist in OSP.

The SR-60 has eight receiving antennas making it easier for the person operating the locator to get a signal from buried utility lines as deep as 15 feet. Location, direction and depth of utility lines can be seen on the large graphical screen to easily trace their paths. Use of the device makes locating utilities faster and more accurate in the field.

The SR-60 also enables the Architect of the Capitol (AOC) to quickly respond to requests to dig on the U.S. Capitol Grounds. An individual who petitions to hold an event on the grounds, must now complete a Capitol Grounds Utility Permit to Dig that identifies the worksite, describes the work being done and provides contacts for the AOC stakeholders with utilities that might be in that area.

The AOC’s version of Miss Utility, this step is important to ensuring the safety of those digging and the utilities under the ground. Mark Woolridge, Capitol Grounds and Arboretum pipefitter supervisor, says that much of the irrigation on Capitol Square is a 1932 system that the AOC has upgraded intermittently. Spikes driven into the ground in support of Capitol Concerts and other events have created holes in copper pipes that the team must patch. Using the SR-60 and the Capitol Grounds Utility Permit to Dig to mark the lines prior to disturbing the soil, should help decrease the number of utility intrusions.

Previously, the AOC had to rely on the institutional memories of its team. “I was on vacation and got a call from a colleague who needed to find a waterline as soon as possible. Over the phone, I told him to stand in Senate Park, find the third window on the Russell Building to the north of Constitution Avenue, go to the second bench and the line should run behind the first oak tree,” said Woolridge. The addition of the SR-60 should make calls like that a thing of the past.

In the words of Jedi Master Yoda, “Always pass on what you have learned.” And remember to charge the SR-60! ❁



Communications and Congressional Relations  
U.S. Capitol, Room SB-16  
Washington, DC 20515

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**ANSWER:** This beautiful corridor can be found on the second floor of the Thomas Jefferson Building.

*Photo by James Rosenthal*

