

# Smithsonian BIM Wiki Articles

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## **National Museum of African Art**

The National Museum of African Art is entered through an above-ground pavilion in the Enid A. Haupt Garden on the south side of the Smithsonian Castle. During the construction of the museum, Jean Paul Carlhian of Shepley, Bulfinch, Richardson, & Abbott added rounded domes atop the pavilion that alluded to the wave and arch motifs of the neighboring Freer Gallery. The granite structure subtly references the classic style of the Mall, and the reddish hue of the granite complements the Castle and the Arts and Industries Building.

Concrete slurry walls were used in the museum's foundation to protect the structure from the city's water table, as well as to support the weight of the Haupt Garden above. High ceilings, blue stained-glass windows, and skylights were utilized to create an elegant, naturally-lit entrance into the underground museum. The rounded staircase also mimics the curved design of the roof. At the base of the staircase, a sparkling water effect reflects light from the skylights above. The museum opened to the public in 1987 after nine years of planning, design, and construction.

## **Arts and Industries Building**

The Arts and Industries Building has a special role among Smithsonian buildings as the original home of the National Museum. The structure was designed by Adolf Cluss and Paul Schulze in 1879. The building's design was remarkably advanced for its day with flexible, open spaces and windows that wrap the building and roof, providing ample natural light and ventilation. Even the materials used to construct the building were state-of-the-art: wrought-iron trusses were used to support the roof, bricks were fabricated with a new hydraulic pressed-brick method, and the building even had a burglar alarm at the time of its opening.

The building's unique style is based on modern principles of construction inspired by the writings of French theorist J.N.L. Durand and the use of contemporary materials in colors derived from nature. Strong horizontal bands of black brick indicated which walls were structural elements, and smooth blue and yellow basket weave patterns in the brick indicated non-load-bearing curtain walls. To complement the Castle, Cluss and Schulze used rounded arches both inside and outside the building, which also mimicked the Romanesque style of the original Smithsonian building.

The building, then called the National Museum, was completed in 1881; however, because of its spectacular appearance and innovative design, President Garfield's inaugural ball was held in the museum before it was opened to the public.

From 1897-1902, balconies were added to the four corner courts by local architects Hornblower and Marshall. The National Museum was renamed the Arts and Industries Building in 1911 to better reflect the treasures it held inside. After almost a century of use, the structure was rehabilitated in the 1970s under the direction of local architect Hugh Newell Jacobsen. During this rehabilitation, the internal courts were filled to provide additional office space, and the building systems and roof were upgraded. In 1976, the newly renovated space hosted a popular exhibition recreating the 1876 Philadelphia Centennial Exhibition. After this exhibition, the museum was used for multiple temporary exhibitions until it was

closed to the public in 2004 due to structural deterioration. Today, the Arts and Industries Building stands as one of the finest examples of nineteenth-century exposition architecture in the nation. The Smithsonian Institution plans to rehabilitate and reuse the space in the future.

### **Anacostia Community Museum**

In the mid-1960s, the Smithsonian began seeking out a place to expand beyond the National Mall. Newly-appointed secretary S. Dillon Ripley wanted to reach out to new and underserved audiences in the District. Thus, the Smithsonian partnered up with the urban neighborhood Anacostia to build the first locally-oriented museum in the Smithsonian.

The first home for this unique museum was opened in the Carver Theatre in 1967. The theater was designed in 1948 by John J. Zink, who designed over four hundred theaters in the Mid-Atlantic region. Opening exhibits included a 1890s general store and a do-it-yourself art area. Another popular feature of the museum was a fiberglass triceratops sculpture by Louis Paul Jones named "Uncle Beazley". This sculpture now lives at the National Zoological Park.

Quickly outgrowing the theater, the Anacostia Community Museum moved to its current home, nestled in the trees of Fort Stanton Park, in 1987. The building was constructed in 1984, incorporating an existing metal building erected in 1973 as a storage facility for the museum. The local architecture firm Keyes Condon Florance created a brick addition to the existing building, which included exhibit space and offices.

In 2002, architrave p.c. and Wisnewski Blair partnered up to renovate the building. The two architecture firms worked together to create a space that both maximized the utility of the original building and added features that speak to the history of African Americans. On the front façade of the structure, the firm architrave p.c. took advantage of the museum's naturalistic setting by adding large picture windows both at the entrance and in the side galleries. African motifs are prevalent in the unique look of red brick, suggesting woven Kente cloth. Concrete cylinders punctured with glass block and blue tile flank the entry, evoking the conical towers of the 11<sup>th</sup> century city of Great Zimbabwe, the largest complex of ruins in Africa. The rear of the building, designed by Wisnewski Blair, is defined by glass, metal, and brick. This area is home to offices and other support facilities for the museum. Both firms worked to ensure that the front and back sides of the museum meld together seamlessly. Throughout this renovation process, much of the original building was demolished; however, traces of it can still be found in the exhibition area. This renovation won the 2002 Vision Award from the Committee of 100 on the Federal City, which cited the building as "an architectural tour de force symbolizing African crafts and design."

### **Capital Gallery**

Capital Gallery is located between 6th and 7th Streets on Maryland Avenue, S.W. near to the National Mall and national museums. Capital Gallery features two towers - an eight-story east tower and a ten story west tower. The complex features a three-story main lobby atrium with a ground level retail arcade, large landscaped plazas and underground parking garage. The West Tower was expanded in 2006

by SmithGroupJJR architects. This plan added 318,557 square feet to the original 1987 complex and a glass façade.

### **Cooper Hewitt Design Museum**

The Cooper Hewitt Design Museum lives in the former home of steel magnate Andrew Carnegie. The elegant 1901 Georgian-style mansion was designed by the New York firm Babb Cook and Willard. The house, wrapped in smooth limestone and decorative detail, contained sixty-four rooms and was equipped with the most modern technology of the day. The building, which cost \$1 million to construct, was the first private residence in New York City to use a structural steel frame. It was also one of the first residential homes to have an Otis passenger elevator (this elevator has since been moved to the Smithsonian's National Museum of American History.) Other modern technological advances in the home included a generator, central heating, and a unique air-conditioning system. Coal-fueled boilers were housed in a hygienic white-tile room, and miniature railroad tracks where the coal car traveled to this room are still visible today.

To enter the house, visitors pass through a portico with a copper and leaded-glass canopy, designed in the style of Louis Comfort Tiffany. Scottish oak is used in the main hall and the grand staircase, serving as a reminder of Carnegie's ancestry. Many of these details, as well as stained glass, ornate plasterwork, and carved mantels, still remain in the museum today.

After Carnegie's widow passed in 1946, the home was turned over to the Carnegie Corporation, who leased it out to Columbia University, and ultimately to the Smithsonian in 1972. The mansion became a museum for the newly acquired collection and library of the Cooper Union Museum for the Arts and Decoration. The New York architecture firm Hardy Holzman Pfeiffer adapted the mansion to be used as a museum, while retaining the magnificent details of the former Carnegie home.

The museum opened to the public in 1976 with a highly popular exhibit named MAN transFORMS attracting five thousand visitors a week. The museum quickly outgrew the space, so the Smithsonian acquired two townhouses close by, and in 1996 Polshek and Partners designed a major renovation to connect the two spaces to the original museum location. In the process, the boiler system of the house was dismantled and dispersed across the country to various museums. In 2000, another renovation was done to convert the fourth floor into a storage facility.

Today, Carnegie's house, with its many original architectural features, is home to the Cooper Hewitt National Design Museum in the Carnegie Hill Historic District on the upper east side of New York City. Over 250,000 objects are on display, ranging from textiles and wall coverings to drawings, prints, applied arts, and furniture. Future plans for the space include relocating office and support areas that are within the museum, as well as expanding the gallery on the third floor.

### **Freer Gallery of Art**

The Freer Gallery of Art resembles an Italianate palazzo with its granite façade and interior open courtyard. In true Renaissance style, Doric pilasters, surface rustication and a decorative cornice greatly

enrich the modest façade. Natural light evenly brightens the gallery through skylights made of Luxfer glass.

The gallery was commissioned in 1904 by Charles Lang Freer; the first donor to give the Smithsonian both a collection and a building for its display. In his bequest, Freer added funding for study and research; thus, space for a library and laboratories was added below ground to fulfill his wishes. This underground space is illuminated with sunlight from windows inserted beneath the wave-patterned belt course on the exterior. Nature also interacts with art in the courtyard where Freer suggested facing the building with white Tennessee marble. The courtyard, with its arcaded cloister and central fountain, contributes to this integral aspect of Asian art.

Freer chose Charles A. Platt to design the building and construction began in 1917, but was delayed because of the United States' entry into World War I. The gallery opened to the public in 1923, sadly after Freer's death.

In 1981, a stone sculpture named *Twisted Form* by Shiro Hazami was added to the north entrance. Its shape echoes the arched entrance to the Gallery. The Freer itself has remained mostly unchanged aside from a 1988 restoration project that added storage and study rooms under the courtyard and an impressive underground connection to the Sackler Gallery. Around this time, a major renovation was done to retain and restore the skylights, benches, and exhibit cases in the Gallery.

### **Hirshhorn Museum and Sculpture Garden**

Secluded from its surroundings by rough concrete walls, the Hirshhorn is focused entirely to the interior. The massive concrete cylinder is an imposing figure, unique among its straight-edged neighbors. While the final structure is a stark contrast to the rest of the Mall, the first draft for a Smithsonian modern art museum, designed by the father-son team of Eliel and Eero Saarinen in the 1930s, seemed too modern for the time and was abandoned at the beginning of World War II. Eventually, after President Lyndon B. Johnson convinced the Hirshhorn family to donate their modern art collection to the United States, a second design was drafted for a modern art museum, this time by Gordon Bunshaft of Skidmore Owings and Merrill. The design was approved and construction began despite public opposition to the deviation from the classic style on the Mall.

The Hirshhorn is like a modern-day fortress, protecting the modern and contemporary art within its walls. The walls are made of a precast concrete with a crushed aggregate of pink granite mixed in. Once inside the fortress, though, the art dominates and the architectural presence, deliberately muted, recedes to the background. The building itself floats above its plaza, resting atop four massive piers. The underside of the building has deep concrete coffering, creating a pattern of ribs above the plaza that emphasizes the drama of the architecture. The elevated building allows for the four acre plot to be used to its fullest ability to display and enjoy sculpture and art. At the center of the ring lies a circular fountain, which is a signature feature of the museum. While windows surround the interior courtyard and its fountain, only one window punctures the exterior shell on the third-floor balcony. A full 180 degrees from the entrance, this expanse of glass provides a panoramic view of the Mall. Inside the museum, carpeted

galleries rim the outer ring and terrazzo-floored corridors line the windowed inner ring, with sculpture displays and benches overlooking the fountain.

The museum was dedicated in 1974 as home to the collection of Joseph Hirshhorn. The only major alteration to the building was in 1985, when a glass-encased gift shop was added on the lower level. Other, smaller additions include black box spaces in the basement that allow for exhibitions of video and other new media art.

In addition to the museum, the Hirshhorn also includes a sunken sculpture garden that lies across Jefferson Street. The original garden proposed by Bunshaft stretched across the entire width of the Mall and included a 350-foot-long reflecting pool. This massive garden was meant to emphasize the special location of the Hirshhorn. However, the version of the garden that was executed was designed in 1971 by Bunshaft after architecture critic Benjamin Forgey of the *Washington Star* suggested a smaller design that placed the sunken garden closer to the Hirshhorn.

The austere, pebble-surface garden was reconfigured in 1981 by Lester Collins. Collins' additions include wheelchair access, lush areas of lawn, shade and ornamental trees, and additional plantings. The *Washington Post* wrote that this redesign made the garden a "jewel-like park within a park," which exemplifies the public's eventual enjoyment of the tradition-breaking structure that is the Hirshhorn. In 1993, James Urban and Associates redeveloped the plaza underneath the museum ring to add plantings and parterres. A sculpture to honor the architect of the museum itself, Gordon Bunshaft, was added to the garden in 2008.

### **Museum Support Center - Suitland**

The Smithsonian's innovative Museum Support Center opened in 1983 and was designed by the Washington, D.C. firm Metcalf/KCF. Located in a wooded area of land, the center is made up of a series of rectangular storage buildings in precast concrete, known as pods. Each pod contains storage units in all shapes and sizes that are climate-controlled for optimum preservation of the different collections. The original four-pod structure was designed in a zigzag shape to enable additions without compromising the design concept. Opposite the pods is a smaller building that mirrors the form of the pods and houses offices and research facilities. The two buildings are connected by a covered walkway, which provides two points of access: one for visitors and one for collection items, keeping them separate from circulation corridors and adding an additional layer of protection.

In 2007 a fifth pod, designed by Philadelphia firm Ewing Cole, was opened. This Support Center serves as a model for museums throughout the world.

### **National Air and Space Museum - Dulles Steven F. Udvar-Hazy Center**

Between the 18<sup>th</sup> century Sully Plantation and the 20<sup>th</sup> century Dulles Airport looms the 21<sup>st</sup> century Steven F. Udvar-Hazy Center. Designed by Helmut Obata and Kassabaum, the same firm who designed the National Air and Space Museum on the Mall, the mammoth Udvar-Hazy Center houses the largest aviation and space artifacts in the Air and Space collection.

There are three main components to the center: the barrel-ceilinged Boeing Aviation Hangar, the James S. McDonnell Space Hangar, and a 164-foot-high observation tower. The design of the expansive central hangar (a half-cylinder of steel trusses) was influenced by the immense structures used in the 20<sup>th</sup> century to house dirigibles. In fact, the entire Air and Space Museum on the Mall could fit inside the Udvar-Hazy's Boeing Aviation Hangar.

Both the Boeing Aviation Hangar and the McDonnell Space Hangar were designed to ensure conservation of the artifacts using a minimum of direct natural light; the aviation hangar illuminated by a clerestory window, and the space hangar featuring a darkened ceiling to mimic outer space. The hangars also feature multiple visitor vantage points: on the ground at eye level and in the air with elevated walkways to ensure optimum viewing. The railings around the exhibit areas and catwalks are punctuated with benches so that visitors can rest and enjoy the space. Air ducts are cleverly curved to blend in with the trusses that hold up the aircraft, allowing the exhibitions to be the star of the museum.

The observation tower, designed similar to an airport control tower, is named in memory of Donald D. Engen, who died in a gliding accident in 1999 while he was director of the Air and Space Museum. Its glass exterior allows for visitors to have a panoramic view of the surrounding area. The high-tech building opened in 2003 to great acclaim.

Plans are under way to create a new hangar for the museum's conservation program in Virginia. This modern facility will be named in honor of Donald Engen's late wife, Mary Baker Engen.

### **National Air and Space Museum - Mall**

The National Air and Space Museum, designed by Gyo Obata of Helmut Jentzsch and Obata, is a series of alternating masses of Tennessee marble (which is actually classified as limestone) and glass. Four sections are clad in this marble, chosen to complement the National Gallery of Art's west building that lies across the Mall. The modern design of the museum reflects the modernity of the technology during the space race era in which it was built, while still fitting in with the national grandeur of the Mall.

Obata took care to align the structure with the existing Hirshhorn Museum and the National Gallery of Art's west building. The recesses of the Air and Space Museum "align with the projecting portion of the National Gallery's south elevation as if the buildings might fit together like two pieces of a puzzle." The marble alternates between glass in three recessed exhibit bays; flooded with even, north-facing light, these glass areas feature heavy truss systems to support the planes suspended above. Window walls were placed at the end of each building to bring in large artifacts; the one at the west end is still active. The exhibition spaces display airplanes suspended in air against the natural backdrop of the sky. Wing-shaped sculptural bollards provide an unobtrusive security element at the museum's north entrance.

In 1988 the original architects designed a restaurant at the east end with panes of glass to echo the original building. The geometrically designed roof of the restaurant could be said to resemble a lunar landing vehicle. In 2000, the building's skylights, which had been executed in acrylic plastic as a cost-cutting measure, were replaced with glass, as Obata had intended in the original design. Windows were replaced with tinted glass to better protect the objects. New perimeter vestibules were added to the north

and south entrances, which provide an extra layer of climate control between the exhibits and the outside elements.

The grounds of the museum contain several sculptures: *Delta Solar* by Alejandro Otero (1921-90), *Continuum* by Charles O. Perry (b.1929), and *Ad Astra* by Richard Leopold (1915-2002). *Delta Solar* was a gift to the museum from the people of Venezuela. Its triangular-shaped stainless-steel panels move gently in the breeze, reflecting onto the water feature below. *Continuum*, which lies at the south entrance of the building, depicts the cosmos. *Ad Astra* evokes various air and space vehicles and is notable for its delicate starburst and slim vertical tapers.

### **National Postal Museum**

This philatelic treasure trove is housed in part of the former City Post Office building, designed by Daniel Burnham and adjacent to his other grand creation, Union Station. The building opened in 1914, just a year after Burnham's death, and over time saw a variety of changes. Burnham's neoclassical architecture reflects the City Beautiful movement, which dominated American design in the early 1900s. Architects at the time sought to use beauty and classical order to help ease the unrest of living in a time of tremendous social upheaval. Burnham actually spearheaded this progressive movement in Washington, D.C.; he headed the McMillan Commission of 1901, which reimagined the Mall as a grand, open space that echoed back to the L'Enfant's original plan for the city. He also helped design the dome of the Natural History Museum, which was intended to be a model for future buildings in the city.

This historic building's original features – the coffered ceiling, torchères, bronze chandeliers and ornate plasterwork – were recreated for the National Postal Museum's opening in 1993. The torchers, originally made of marble, proved too costly to recreate, so they now exist in bronze. The museum exhibitions are located behind the public lobby, allowing visitors to see what was never seen when the building served as a post office. The Washington-based firm Florance Eichbaum Esocoff King was the architect for the museum renovation. The renovation of the entire building was by local architect Shalom Baranes.

The architects incorporated different postal-themed elements into the museum's interior design. The baluster detail on the escalators alludes to a cancellation mark. A silkscreened stamp design, featuring the famous 1901 Empire Express upside-down stamp, appears on the entrance hall ceiling. The central space of the museum contains envelope-design tiles in the flooring, and the light fixtures recall the rural towers used by postal pilots to make mail drops. These details contribute to the overall atmosphere of the museum. Today, the building not only houses the National Postal Museum, but other government offices as well, and is owned by the United States Postal Service.

### **National Museum of American History**

The first post-World War II building of the Smithsonian, the NMAH Kenneth E. Behring Center captures the cautious, introverted mood of its time. Its existence on the Mall also depicts the "exuberant time of national pride after World War II", when "the need to describe a national museum of the history of the United States became urgent," as director Frank Taylor stated. The structure was conceived by Walker



O. Cain of McKim, Mead and White as a link between the classical architecture of the existing buildings and modern structures yet to be. Opened in 1964, its straight-edged, rectangular simplicity predicts the modern era, yet it blends in easily with its grand environment. The marble façade is clean and symmetrical, void of traditional ornamentation, but the repetition of bays and cornices are reminiscent of the colonnades of the surrounding buildings.

Green landscaping cleverly hides the entrances for museum parking and the loading dock, taking advantage of the elevation change between the Mall side and Constitution Avenue. A fountain was installed in front of the museum entrance on the Constitution Avenue side. This fountain, seen as integral to the building by Cain, was once known for its display of lights and dancing waters. On the Mall side, Louisiana-born José de Rivera's *Infinity* was installed in 1968. Frank Taylor saw this as an "essential part of the architectural concept of the museum." Another sculpture that was designed for the museum – the *Gwenfritz* by Alexander Calder – is placed at the west end of the museum.

Originally, the museum's main entry hall had a dual focus: the Star-Spangled Banner to represent history, and a Foucault pendulum to represent technology. The pendulum hung through an oculus to swing over the tile on the first floor, connecting the first and second levels of the museum. The first contained technology and science themes, such as transportation and medicine, while the second was devoted to American history, such as First Ladies' gowns, political ephemera, and period domestic settings. The museum also has a third floor, where a wider range of exhibitions were contained. Although the separation of exhibitions by floor still remains, the pendulum was removed in 1998.

The interior space contains few permanent walls, allowing the museum to be flexible, which was considered ideal by contemporary museum standards. Cain strongly believed that a museum without windows would disorient visitors, so he inserted partially-hidden windows into the sides of the projections on the outer walls. Importance was placed on guiding visitors through information-filled exhibitions in a pleasant, easily navigable environment. Sleek, color-coded escalators carry visitors between floors, and visitor fatigue is eased by the alternating use of terrazzo and wood flooring materials. Lounges were placed at either end of the museum so that visitors could rest while overlooking the Mall. The basement contains a place for visitors to dine and access to an outdoor patio on the west side.

Eventually, the windows that were in the façade's projecting bays were bricked up to prevent temperature fluctuations, and four of the escalators connecting the first two floors were removed. In 2006, the building was closed for a major renovation. The Smithsonian hired Skidmore, Owings and Merrill, the same firm that designed the Hirshhorn Museum and Sculpture Garden, to redesign the museum's central core.

The interior core has been altered by the 2008 insertion of an atrium, also designed by Skidmore, Owings and Merrill which features a grand staircase. These renovations reflect today's style and exhibit practices. They created a three-story atrium, lighted from a new skylight designed to bring light into the building, as Cain originally desired. During the renovation, a special exhibition space for the Star Spangled Banner was made, using the most modern conservation techniques to house one of the museum's finest

treasures. To note this change, an abstract mirrored polycarbonate representation of the flag was attached to the marble wall facing the atrium.

### **National Museum of the American Indian - Mall**

The curvilinear asymmetry of the American Indian museum provides a strong visual contrast to the regularity of the rest of the National Mall. Designed through consultations with the diverse Native groups of the Americas, the building reflects the broad commonalities in Indian tradition that emerged from those meetings. The incorporation of nature is seen throughout the structure of the museum, which was done by Douglas Cardinal of the Canadian Blackfoot tribe and Philadelphia-based architecture firm GBQC and Polshek Partnership. In its sculptural form, the building illustrates the force of nature's energy through its effect upon the Lakota limestone.

The building's welcoming center, named the Potomac, is full of architectural symbolism. The floor is laid with a circle of red Seneca sandstone, which is the same material used for the Castle. This ring is surrounded by maple and granite rings that are set in quadrants and separated by metal strips that are aligned with the directions of the compass. A patterned copper screen wraps around the entire area. Inside the museum, the spaces use colors and themes from Native American landscapes, motifs, food, and culture.

The exterior of the building also reflects traditional Indian culture. The landscaping contains indigenous plants to areas where Indians once inhabited. Water flows around three sides of the building, adding to the illusion of water-worn limestone on the curved exterior. Over forty boulders surround the museum, resembling ancestors of the Native Americans. The building faces east toward the rising sun, reflecting Native American tradition. The museum opened in 2004 to the public and was launched with a week of festivities that were attended by over twenty thousand Indians from tribes across the Americas.

### **National Museum of the American Indian - NYC**

Housed in the gloriously grand 1907 Alexander Hamilton U.S. Custom House in New York City, the George Gustav Heye Center is named for the man whose vast collection now forms the National Museum of the American Indian. The U.S. Custom House was designed by Cass Gilbert in 1899, when Gilbert beat out his mentors in a design competition for the building. The mammoth 450,000-square-foot building is a symphony of ornament and architectural detail, first announced by Daniel Chester French's *The Four Continents*. The building also features Guastavino-tile vaulting similar to that of the National Museum of Natural History, 1936 murals of New York harbor by Reginald Marsh, and spaces indicative of the building's rich history as the headquarters of the Port of New York.

The building was completed in 1907, but was vacant and crumbling when the Smithsonian Institution took over the space in 1989. Ten years prior, Senator Daniel Patrick Moynihan saved this National Historic Landmark from demolition. Thankfully, the Smithsonian found a good use for the building, as the new American Indian Museum needed a New York presence to honor the original New York City home of the Heye Collection. The basements, first and second floors of the building were leased to the Smithsonian by the U.S. General Services Administration. The New York architecture firm

Ehrenkrantz, Eckstut, and Kuhn worked with the Smithsonian to design the space and conduct a complete exterior and interior restoration.

Special care was taken to insert the George Gustav Heye Center into this National Historic Landmark building. The modern exhibit galleries, for example, were designed as windowless black boxes, behind which the historic architectural finishes and the original windows are protected. Since its opening in 1994, the Heye Center provides a welcome respite from the business of lower Manhattan.

### **National Museum of the American Indian - Suitland**

The architecture firm Polshek and Partners of New York City, in partnership with the Native American Design Collaborative Tobey and Davis, was selected to design this storage and conservation facility. Construction of the 164,000-square-foot building began in 1996 and was completed in the fall of 1998.

The structure's radial steel roof in a nautilus shape references many Native American forms, such as cone-shaped tipis and medicine circles; it also expresses circular movement that are found in tribal dances.

Special handling areas and ceremonial spaces are located both outside and inside the building, so that tribes can use their objects in private. Storage rooms are designed to place the most sacred objects nearest the ceiling – close to the sky. The collections are respectfully housed in this unique structure.

### **National Museum of Natural History**

After being selected to design a museum which reflected the ideas of the 1901 McMillan Commission, principle design architects Hornblower and Marshall made a tour of European museums to study the latest ideas for museum display, lighting, and public spaces. However, the designs the firm presented to the Smithsonian were continually rejected. After a year-long impasse between the Smithsonian and Hornblower and Marshall, Charles McKim of McKim, Mead and White and Daniel Burnham helped the original two architects refine their Beaux Arts design to feature a low Roman dome and a columned portico facing the Mall. Burnham and McKim were key members of the McMillan Commission, and thus were able to help the museum's design better approach its ideals. Their design was a prototype for the classical buildings of Washington's monumental core.

As befits the first Smithsonian museum of the twentieth century, this building is supported on a steel frame and includes two-story-high steel windows with decorative rosettes on the mullions. In contrast to the classical severity of the granite-faced exterior, the interior central pavilion contains a dramatic, three-story octagonal domed rotunda. The subtle dome was constructed in the thin-shell technique devised by Catalan architect Rafael Guastavino, as was the ceiling of the auditorium below. The building expands from the rotunda in three directions with grand, three-story-high halls lighted by skylights. When the construction of the building was completed in 1911, the *Washington Post* hailed the museum as "the most remarkable structure of its kind in the world." In fact, the museum was so highly anticipated that it opened to the public a year before construction even ended. The Natural History

Museum was also the first Smithsonian museum to offer Sunday hours to accommodate for the large number of interested visitors.

### **Addition of Wings:**

Even though at its opening, the museum was the second largest building in Washington, the museum's activities quickly outgrew its walls. In 1930, Congress authorized the construction of wings, though this project was not funded for another thirty years. These wings were designed by Mills, Petticord and Mills, and stood six stories high, becoming home to various collections and offices. The architects took two review standards into account when creating the wings: one, that additions to historic buildings avoid exactly copying the original design; and two, that the wings be set back from the main façade. This expansion nearly doubled the square footage of the museum, bringing it to almost two million square feet.

### **Renovations:**

During the 1950s and 1960s, the entire Smithsonian Institution embarked on a campaign to modernize its exhibitions. Air conditioning and fluorescent lighting was added at the time of the addition of the wings, eliminating the need for natural light and open windows. Curving, modernistic display cases and dioramas were added in as well, which hid neoclassical details and skylights of the original building's design. Around this time, the Natural History Museum freed up a lot of square-footage as other museums opened to display exhibitions that once had a home in the its space, allowing the museum to be mainly used for its intended purpose.

The museum's original T-shaped plan had incorporated two courtyards, which were infilled in the 1990s for more office space, a public cafeteria, and an IMAX theatre. Other renovations in recent decades include replacing the 1960s windows of the east and west wings with replicas of the original windows to give the structure a more uniform look. Penthouses were added to the wings to accommodate new mechanical equipment and a chiller plant on the southeast corner of the property. Many of these renovations have taken their inspiration from the original Hornblower and Marshall design.

### **National Zoological Park**

Since 1891, various architects – including Olmsted Associates – have created the National Zoological Park as we know it today. In contrast to earlier zoos that focused on displaying caged animals to the public, this zoo in Rock Creek Park was formed for the care and conservation of endangered species in a more naturalistic habitat. For this purpose, landscape architect Frederick Law Olmsted (of Central Park, New York City fame) was chosen to plan a system of paths winding gently through the steeply sloped, verdant park. William Ralph Emerson deigned a number of the early animal houses, such as the Buffalo Barn and the first Lion House. These buildings, made of rustic, local stone or wood, capitalized on the natural features of Rock Creek Park and were meant to evoke ideas of the American wilderness. This design approach ensured that zoo patrons truly were visitors in a habitat focused on the animals.

When William Mann served as the National Zoo's director (1925-1956), he traveled the world on expeditions, bringing thousands of new animals to the zoo. Many of the major animal houses were built during these years, including the Reptile House, Bird House, Elephant House, and the Small Mammal

House. These buildings, designed by the municipal architect of Washington (first Albert Harris, and then Edward Clarke), were full of whimsy and architectural decoration. The structures have a Byzanto-Romanesque style and incorporate animal imagery and sculpture both inside and out, often in new, unusual mediums, such as aluminum and colored concrete.

### **1972-1990 Renovations:**

In the late 1950s, the zoo's physical structures were deteriorating, and the Smithsonian created the Friends of the National Zoo after a fatal accident at the Lion House. FONZ's first achievement was to persuade Congress to fund the zoo's entire budget (it had been funded by the city), which allowed for much-needed repairs to begin. From 1972 to 1990, an extensive new plan created by Faulkner, Fryer and Vanderpool began. Buildings constructed during this time include the new Lion and Tiger House, the Great Ape House, and the administration building at the Connecticut Avenue entrance. These concrete structures were woven into the earth, which signified the period's growing environmental awareness and emphasis on conservation.

### **1980s-2000s Renovations:**

Further working alongside the environment, the zoo introduced the idea of a BioPark in the late 1980s. These installations show plants and animals living together in their native environments. Amazonia, which was constructed in 1992, reflects this new approach. Even more recently, the zoo's new master plan works to upgrade visitor facilities and animal habitats to reflect contemporary advances in knowledge of animal health and well-being. The Asia Trail, which debuted in 2006, leads visitors through a series of habitats and encounters with seven species, including the famous giant pandas. Elephant Trails is now a reconfiguration of the old Elephant House, but allows elephants to live as a herd and range more freely over a larger area.

## **The Quadrangle**

The Quadrangle is a complex that is flanked by the Castle, the Freer Gallery, and the Arts and Industries Building. The complex, which consists of the Arthur M. Sackler Gallery, National Museum of African Art, and the Enid A. Haupt Garden, is actually ninety percent underground. This concept was developed by Japanese architect Junzo Yoshimura in 1978, and was later executed by Jean Paul Carlhian of Shepley, Bulfinch, Richardson, & Abbott beginning in 1980.

At the northwest entrance to the complex lies the copper-domed kiosk entry to the S. Dillon Ripley International Center. The pagoda-like pavilion was adapted from a drawing by the great English garden designer Humphry Repton, and is intended to mimic the design of eighteenth-century English garden follies. A limestone spiral staircase, inspired by the famous Renaissance chateau of Blois in France, brings visitors underground to the concourse, where there are exhibitions, classrooms, and offices connecting the three underground buildings in the complex.

Behind the Ripley Center, a winding path leads visitors back to the Haupt Garden that tempts visitors into the 4.2 acre complex. Once inside the lush, Asian-Moorish-Victorian influenced garden, the landscape opens onto views framed on either side by the entrance pavilions of the Sackler Gallery and the

African Art Museum. The distinct rooftops of each pavilion, echoing the classical style of the Mall, create an illusion of small, independent buildings. Each building has its own section in the garden: the Fountain Garden outside the Museum of African Art features water effects evocative of North-African influenced designs in Andalusia, and the Moongate Garden outside Sackler has pink granite moon gates inspired by the Temple of Heaven in Beijing. The original, unexecuted design for the Haupt Garden, which was drafted by James Renwick, is honored by the red sandstone gates at the Independence Avenue entrance on the south side of the complex. The gates were carved by Constantine Seferlis, who also worked as the stone carver for the Washington National Cathedral.

After entering any of the three pavilions in the Quad, visitors are surprised to discover the buildings lead to a three-story underground complex as they descend the grand staircases into the complex of galleries, classrooms and offices below. Since its opening in 1987, much of the underground complex's original plan has been infilled with more offices.

### **Renwick Gallery**

The Renwick Gallery is a rich example of mid-19<sup>th</sup> century architecture, with its vivid display of contrasting white stones on red brick, mansard roofs, corn-topped "Columbia Capitals" and ornamental details. William Wilson Corcoran commissioned architect James Renwick, Jr., (designer of the Smithsonian Castle) to build Washington's first public art gallery. The museum opened in 1874 as the Corcoran Gallery. Nearly 100 years later, after serving as home to the U.S. Court of Claims, it was rescued from demolition by First Lady Jacqueline Kennedy and restored as a gallery of American craft and design. This National Historic Landmark opened as a branch of the Smithsonian American Art Museum in 1973. Interior features include a grand staircase and a rectangular room at the rear known as the Grand Salon. Recently, the building has undergone a two year renovation and re-opened in 2015.

### **Donald W. Reynolds Center**

Praised by Walt Whitman as "that noblest of Washington buildings," the Old Patent Office as this National Historic Landmark is known, is a masterpiece of Greek Revival architecture. It was the third major government building constructed in the fledgling U.S. Capitol (after the White House and the Capitol Building). Construction of the building began in 1836, but was delayed by the Civil War, when the building was used as barracks and a hospital for wounded soldier. It was at this time that Whitman praised the building, as he traveled from hospital to hospital in the District to visit soldiers. Once completed in 1863, it stood as the largest building in the United States. On March 6, 1875, President Abraham Lincoln held his second inaugural ball there.

Despite many distinct construction phases, the exterior of the building has a largely unified appearance. However, the interior spaces vary greatly, from the low vaults of the ground floor to the sky-lit storage hall on the top floor. Architects Town and Elliott, Robert Mills, Thomas Ustick Walter, and Edwin Clark all worked on the building at various times.

This monumental building, spanning two city blocks, is comprised of four wings that surround a courtyard. Robert Mills constructed the south wing, which features a majestic neoclassical portico with

eight fluted Doric columns on its exterior. He used local Aquia Creek sandstone (which was also used in the White House), which contrasts the other three wings, where a more durable granite was used. The interior is dominated by Mills' dramatic vaulted ceiling and double staircase, creating a grand place for the Old Patent Office to showcase the nation's collection of patent models. While Mills oversaw the construction of both the south and east wings, and Thomas Walter oversaw the west and north. Walter used more modern structural framing ideas than Mills, employing iron beams and shallow jack-arch construction in his wings.

In 1877, Adolf Cluss joined the list of architects to work on the building when he reconstructed two wings lost in a disastrous fire. The iron beams of Mills' wings failed, and the top floors of his wings had to be rebuilt. Cluss used an exuberant "modern Renaissance" style of architecture in his remodeling, where he added railings to Mills' double staircase, skylights to the ceilings, and stained glass to the windows. Even the flooring reflected this colorful approach to the redesign with English Minton encaustic tiles laid out in geometric patterns.

In 1958, the Smithsonian saved this historical building from demolition. The building became home to the American Art Museum and the National Portrait Gallery a decade later, after an extensive restoration by the Washington firm Faulkner, Kingsbury and Stenhouse. Great care was taken to preserve the detailing from the building's original architecture: Mills' original groin vaulting can be seen in the Lincoln Gallery, and the original marble flooring was removed and reinstalled in its exact position after being cleaned.

Another renovation of the building began in 2000, spurred by the aging infrastructure and the changing neighborhood surrounding the museum. This renovation, completed in 2006 by Hartman Cox, integrated the building's two museums through public spaces used for educational programs. In 2007, a canopy roof of floating glass and steel, designed by Norman Foster, was added above the courtyard. To protect the historic building, this canopy rests atop steel columns rather than the building itself. Katherine Gustafson redesigned the courtyard to complete the transformation.

### **Sackler Gallery**

The Arthur M. Sackler Gallery is contained within the Smithsonian's Quadrangle complex. The museum itself is hidden underground with its entrance inside an above-ground pavilion in the Enid A. Haupt Garden on the south side of the Smithsonian Castle. The Asian art collection of Arthur M. Sackler is connected to the Freer Gallery of Art through a tunnel. When designing the gallery, Shepley, Bulfinch, Richardson, & Abbott's Jean Paul Carlhian used the same Victorian skyline style of the Castle and the Arts and Industries Building by adding pyramidal roofs on top of the Sackler Gallery entry pavilion. The warm gray granite color of the Sackler was adopted from the arch and wave motifs of the Freer Gallery, which also captures the classic style of the buildings on the Mall.

Since one-third of the Quadrangle complex lies below the city's water table, concrete slurry walls were used in the museum's foundation to protect the structure, as well as to support the weight of the Haupt Garden above. The pavilion contains amber stained-glass windows, clear glass skylights and a

diamond-shaped stairway which echoes the pyramidal form of the roof. At the bottom of the staircase is a sparkling water effect that reflects light from the skylights above, bathing the underground floors in natural light. The gallery opened to the public in 1987 after nine years of planning, design, and construction.

### **Smithsonian Astrophysical Observatory**

The original SAO was opened in 1890 as third secretary Samuel P. Langley's fulfillment of original secretary Joseph Henry's desire to have an astrophysics observatory on Smithsonian grounds. This structure began as a simple wooden shed in the Castle's South Yard. Several field stations were set up in the observatory's early years to supplement this facility, and they all were rudimentary and located in desolate areas both in and out of the country. In 1955, the Smithsonian partnered with Harvard University, and the SAO was moved to Cambridge, Massachusetts.

Other observatories opened shortly after; one of particular note is the Fred Lawrence Whipple Observatory on the summit of Mount Hopkins, Arizona. Opened in 1968, this multiple-mirror telescope is encased in a boxlike structure, which turns itself with the telescope mount. At the time, it set a new standard for telescope design. The actual telescope was replaced in 1991 with newer technology but the building still retains its original character.

The most recent addition to the SAO collection is the Submillimeter Array at the summit of the Mauna Kea volcano in Hawaii. This telescope system is near Hilo, where the institution has another operations and support facility, designed by Urban Works, Incorporated. The station uses state-of-the-art technology to study the birth and death of stars.

### **Smithsonian Environmental Research Center**

Devoted to the study of the Chesapeake Bay watershed, this center in Edgewater, Maryland is located in 2700 acres of land adjacent to the Rhode River, a sub estuary of the Chesapeake Bay. Originally a 365 acre dairy farm the property was bequeathed to the Smithsonian in 1964. Only the cow bar, which today serves as the library, survives from the original farm. Over 20 buildings are scattered around the property. The gabled roof Reed Educational Center is a modern version of the eighteenth-century colonial architecture prevalent in the area. The Homestead House on the property is a good example of the area's rich colonial architectural history. Of all the buildings at SERC, it is the expansion of the Mathias Laboratory which is a national model for sustainable design. Ewing Cole of Philadelphia remodeled the existing 1991 Mathias Laboratory and it was the first Smithsonian building to receive a LEED Platinum rating by the U.S. Green Council.

### **Smithsonian Institution Building ("The Castle")**

The Smithsonian Institution Building, commonly called "The Castle," was the first home of the institution. Its nine dark asymmetrical towers and its fortress-like embattlements represented a powerful departure from the neoclassical norm of the District. This stark contrast was deliberate – it visually captured the unique mix of public function and private monies, as well as the English origin of the



Smithsonian, represented by James Smithson's bequest. This distinction is also represented in the building material chosen: the red sandstone, quarried in Maryland, stood in striking contrast to the pale Aquia Creek sandstone used for previous buildings in Washington. This impressive building was commissioned by James Renwick Jr., who won the Smithsonian building committee's 1946 competition. The building model he designed was intended from the beginning to be a model for the nation. The large, showy structure had to allude to its many functions as a laboratory, library, lecture hall, gallery, and more.

In 1849, the Castle's stout eastern end, with its heavy crenellation and contrastingly delicate chimney-pot piers, was completed. The Smithsonian's first secretary, Joseph Henry, lived in this section for twenty-three years. The section also housed all of the Smithsonian's operations until the rest of the Castle was completed in 1855. In the early 1880s, the east end underwent a major renovation that was spearheaded by Adolf Cluss and Paul Schulze (who also designed the Smithsonian's second building, the Arts and Industries Building). These architects added new floors of office space, using fireproof materials in the construction as a precautionary measure after the fire of 1865.

The Castle's west wing resembles a chapel – it even had a cloister along the north façade of the connecting range. Beautifully lighted, with skylights and a rose window as well as clerestory windows, the west wing was originally intended to serve as one of the building's lecture halls. It was also ideal for a gallery of art, and later served as exhibition space. However, when the building first opened, this wing contained the Smithsonian's library.

The central block of the Castle, with its giant two-story rounded windows, held the museum galleries and other public functions. The Great Hall on the ground floor is dominated by two rows of immense arched piers, each consisting of clusters of slender columns culminating in delicate, ornate capitals. Above this, the block contained a lecture hall, an art gallery, and an apparatus room where scientific experiments were demonstrated. The upper level was destroyed in the 1865 fire, and was rebuilt using fireproof materials. The rebuilt space was put to new use, housing a museum gallery home to many of the items that now belong to the National History Museum.

At the start of the twentieth century, a Children's Room was created in the South Tower. This room, designed by Grace Lincoln Temple, had display cases at eye level and objects labeled in English rather than Latin. Throughout the century, other museums began their collections in the Castle. As the institution expanded and new museum buildings were constructed, the role of the Castle changed. In the 1960s, the upper hall was divided into two floors to accommodate the Woodrow Wilson International Center for Scholars. It is furnished with Victorian furniture and decorative arts from the Castle Collection, one of the country's few collections of historic furniture to be actively used.

Since 1972, a welcome center has been housed in the Great Hall, providing visitors with an orientation to the many museums that grew out of the Castle.

### **Smithsonian Tropical Research Institute**

The Smithsonian has become one of the leaders in the field of biological diversity, and its Tropical Research Institute has helped the institution continue and grow its research efforts. The Smithsonian

Tropical Research Institute, a collection of sites located on both coasts and in the middle of the Republic of Panama, developed as an outgrowth of the 1910 Smithsonian Biological Survey of the Panama Canal Zone. The architecture here is rich and varied and reflects the center's tropical location: louvered windows, verandas and a mixture of wood and concrete predominate. The simplicity of these building's vernacular designs belies their functionality in humid climates. When the Canal Zone was returned to Panama under the 1977 treaty with the United States, several former U.S. military buildings were acquired by the institute and converted into offices, exhibit space and laboratories. The Italianate-style Ancon Building of 1916, originally part of the Gorgas Army Hospital in Panama City's Ancon area, was attached to the hospital's former mortuary and had a fully equipped operating room.

The institute's administrative center is the Earl S. Tupper Research and Conference Center, located on Ancon Hill. This building, which includes a library, lecture hall, laboratories, and offices, was designed by the Panamanian architect Octavio Mendez Guardia and dedicated in 1989. It was built on the site of the historic 1906 Tivoli Hotel, where visitors came to view the construction of the Panama Canal. The hotel was demolished in 1975 because of termite infestation, but a small one-story building once used as a kitchen remains and used for office space.

In 2003, the institute opened a new laboratory at its field station Bocas del Toro on Panama's Caribbean coast. Designed in a tropical style by the firm Kiss and Cathcart, the building champions sustainable design elements. The solar roof, for example, collects rainwater, provides shade, and produces most of the laboratory's electricity.

Planning is under way to consolidate some of the research facilities and incorporate land recently purchased in the nearby town of Gamboa.

### **Victor Building**

Named for successful patent attorney Victor Justice Evans, the Victor Building's original architect was Appleton P. Clark, who designed many buildings in Washington, D.C. The building opened in 1909, and was expanded in 1925 with a rooftop addition by Waddy B. Wood, another prolific architect in Washington, D.C. The Smithsonian purchased the building from John Akridge Company in 1995, and sold it back to the company in 2005. Only the original façade remains, the interior was gutted and redesigned by Einhorn Yaffee Prescott for new office areas. The Smithsonian currently leases office space from John Akridge Company.