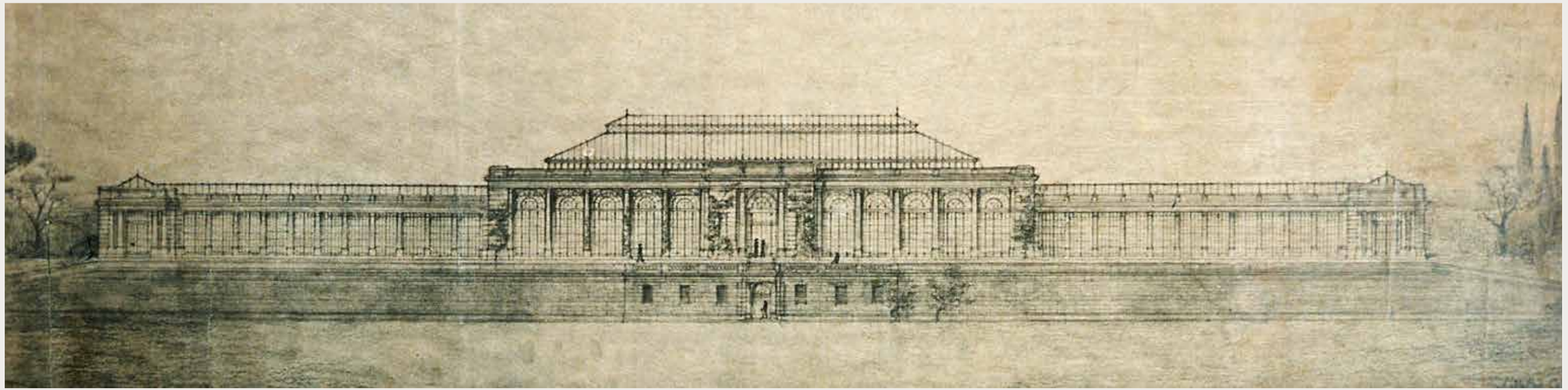
The Orchid House Restoration

A Legacy Reimagined

Longwood Reimagined / A New Garden Experience



An Evolving History of Orchids at Longwood

1919–1921: The Orchid House, designed largely by J. Walter Cope and variously named the West Display House, the Economic House, and the Orchid and Banana House, is constructed as part of the original complex of conservatories on the Longwood estate.

1921–1944: The du Ponts become founding members of the American Orchid Society. Alice B. du Pont serves as vice president in 1924 and continues until her death in 1944, at which time Pierre S. du Pont takes her place as honorary vice president until 1949 when he resigns as an honorary officer.

1922–1924: The du Ponts' interest in orchids continues to grow; some accounts indicate Alice is charmed by a gift of 12 *Cattleya* from a friend in 1922. In 1923, Pierre purchases 100 plants each of *Galearis spectabilis*, *Platanthera blephariglottis*, *P. ciliaris*, and *P. psycodes* from Mr. E. C. Robbins in Pineola, NC—a purchase of native orchids that will become an inspiration for present-day orchid research conservation efforts. Pierre and Alice begin purchasing orchids from Europe, Southeast Asia, the Caribbean, and South America. Louis Jacoby is hired to grow the orchids, marking the unofficial start of a dedicated orchid collection.

1926–1929: New heating systems and a bronze orchid case are installed to accommodate a growing display of tropical orchids in the Orchid House. Behind the scenes, three non-public orchid growing houses are built.

1933: Pierre and Alice host the Fifth National Orchid Show at Longwood.

1945: Preceding Alice's death, Pierre notes that Longwood's collection was assembled largely by Alice; he takes on all ordering and paperwork tasks.

1951: Ethel du Pont's heirs donate her collection of 2,314 orchids to Longwood, nearly doubling the size of the collection. Bruce Scott, her former grower, begins working at Longwood.

1955–1965: Dr. Russell Seibert becomes the first director of Longwood, charged to "transform a private estate into an internationally recognized horticultural display." Seibert oversees important new research and conservation initiatives including a plant exploration program and the first documented flowering of *Disa uniflora* in the United States, a milestone in the growing significance of this collection. Additional space is required to support the orchid display, breeding, and conservation.

1983: With a growing collection, the orchid cases are relocated and the original footprint of the orchid display is expanded. In the mid-80s, Dr. Sam Breit gifts Longwood 184 orchids, including a large *Dendrobium speciosum* var. *grandiflorum* from Australia.

2001: The collection grows by gift again, with the addition of Pamela C. Copeland's award-winning orchids from Mt. Cuba.

2006: Waldor Orchids of Linwood, NJ, names an orchid after Alice B. Du Pont - *Cattleya* Alice B. du Pont (*C.* Sunrise Chalet × *C.* Louise Georgianna).

2015: The Orchid Conservation Program launches at Longwood, focusing on original research to develop previously unknown methods for germination and production of native orchids. Longwood receives additional gifts of *Restrepia* and *Zootrophion* from Duane Erdmann, a dedicated Longwood volunteer.

2017: The estate of Dorrance "Dodo" Hamilton, an avid supporter of the Pennsylvania Horticultural Society, gifts Longwood a selection of her award-winning specimen plants, including 50 orchids.

2018: Partnerships in Vietnam focus on endangered orchid scouting, field research, conservation assessment, and collections development.

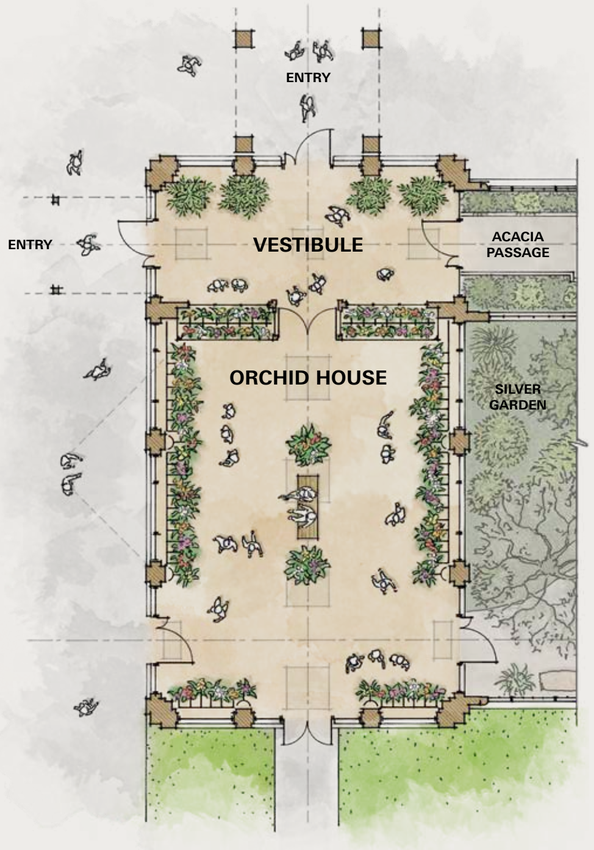
2021: Longwood develops propagation and production protocols for half of every US native orchid species, setting a goal to complete this project by 2025. This same year, the Orchid House closes for preservation.

2022: A renewed and restored Orchid House reopens to continue Longwood's mission to steward our growing orchid program.

The Orchid House was constructed more than 100 years ago, one of two classically styled glasshouses that flank the historic Main Conservatory. In 2022, in partnership with John Milner Architects, Inc., Longwood completed the preservation and restoration of this storied space.

The crystalline beauty of the restored Orchid House honors the legacy of Pierre S. and Alice B. du Pont, whose early efforts lay the groundwork for today's distinguished orchid program. In an exquisite setting that showcases orchids from our collection, including plants from our breeding and conservation programs, hundreds of orchids from around the world are on view, inspiring a deeper appreciation of the delicacy and tenacity of these plants and a lasting interest in their stewardship.

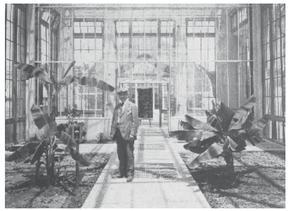
An early rendering of the Conservatory complex by J. Walter Cope, c. 1920. The restrained classicism of this elegant drawing, one of the first to imagine extended wings ending with two glass display houses, won Cope a spot on the Conservatory design team. The Orchid House, on the far left of this rendering, has been restored and returned to its original design. Image courtesy of Louise and Walter E. Cope.



The restoration plan shows the Orchid House's return to its original 1920s configuration. A new north vestibule controls fluctuating temperatures as guests enter the building and provides even more gallery space for innovative orchid display. Illustrated plan by John Milner Architects, Inc.

Renewal and Restoration

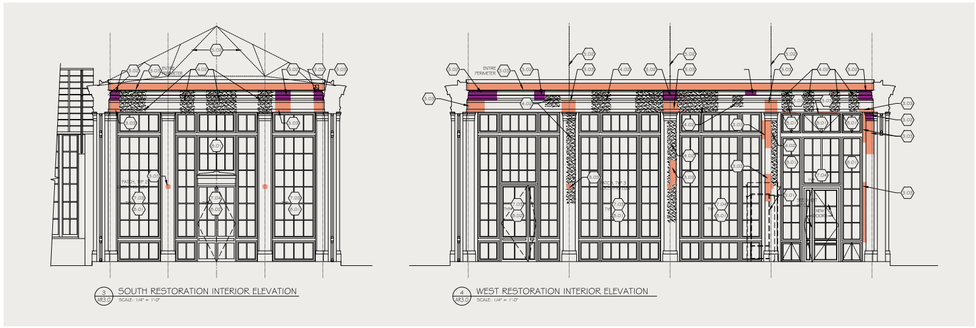
John Milner Architects, Inc., experts in historic preservation and design, performed an extensive analysis of the existing structure, consulting original drawings and construction plans to return the Orchid House to its original configuration. Restoration of this historic structure preserves its character-defining features while renewing critical infrastructure, providing a stunning space for visitors to appreciate these magnificent plants.



Above: As shown in this 1920s photo, the original Orchid House was filled with light. Returning the Orchid House to its original beauty involved removing features that blocked the sun and designing better heating systems so that more glass could be exposed. Image courtesy of Longwood Library & Archives.

Left: Emptied of its orchid display, the Orchid House still retains its classic lines. Photo courtesy of John Milner Architects, Inc.

Below: John Milner Architects performed a site evaluation to identify and detail critical restoration work. Drawing by John Milner Architects, Inc.

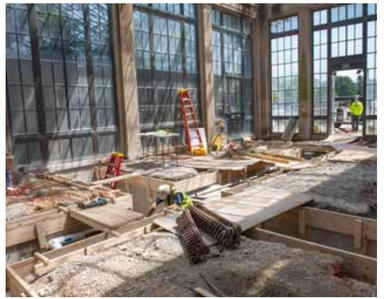


An aerial view of the Orchid House restoration shows the roof's graceful pyramidal structure. A new glazed roof was constructed and installed by Rough Brothers Inc. using this original steel frame. Photo courtesy of Bancroft Construction.

Structural Renewal

Restoring the structural integrity of the Orchid House and managing its transition to a grander display of orchids required reconfiguring mechanical, electrical, and heating systems; repairing the tunnel walls beneath the house; and pouring a new concrete floor. Repairs were also made to the concrete and steel structure on the building walls, and a new glass roof was installed on the existing steel frame.

Above: The new roof features treated glass to temper harsh sunlight. Aluminum glazing bars were replaced and cast iron gutters were repaired. New flashing was installed to prevent water damage to the concrete structure and a fall-protection system was added. Photo courtesy of John Milner Architects, Inc.



Early in the process the concrete floor was excavated, providing access to parts of the tunnel system that accommodate mechanical, electrical, and plumbing systems. Bruce Brooks and Associates led the reconfiguration of these new systems, including the installation of heating systems under the floor and along the perimeter glass walls to help create a perfect climate for the orchid display. Photo by Hank Davis.

Below: A new concrete floor was poured and new iron grates were installed. Photo courtesy of John Milner Architects, Inc.

Historic Restoration

Preserving and restoring the historic beauty of the Orchid House required the support of metal and concrete experts. Bronze framing the windows and doors was restored and repatinated. Decorative concrete patching and repairs were carefully calibrated to match existing concrete that had weathered naturally. The restoration was also an opportunity to take advantage of new advances in materials and craftsmanship.

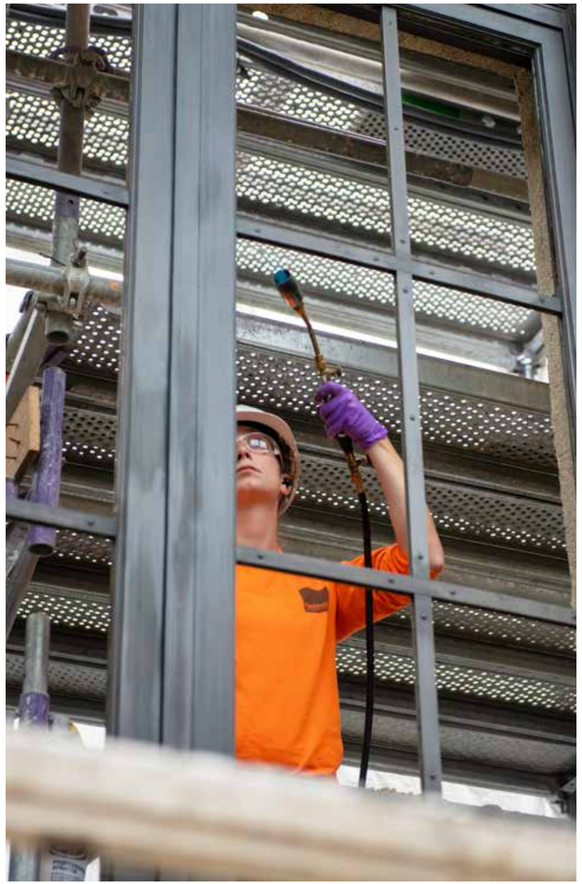
With structural issues addressed from top to bottom, work began on restoring metal windows, cases, and frames as well as the Orchid House's historic mosaic concrete. Photo courtesy of John Milner Architects, Inc.

Bronze Metal Restoration

Repairing and restoring the building's important metal features, on the interior and exterior, required meticulous work. In addition to repairs to the roof, metal specialists restored the dramatic bronze orchid cases, window frames, and doors integral to the Orchid House's appeal. Deteriorated metal was identified, repaired, and reassembled. Corrosion was removed using mildly abrasive methods and chemical washes, and surfaces were repatinated and treated with a protective coating.

Left: Prone to discoloration and corrosion, bronze features of the Orchid House were repaired and restored. Bronze features on the north side of the building were replaced to accommodate architectural changes. Photo courtesy of John Milner Architects, Inc.

Right: The bronze was stripped back to its bare metal and then repatinated, a process that uses various chemicals to achieve an appropriate color. In a final step, heat is applied to achieve the finish. Photo by Hank Davis.



Mosaic Concrete

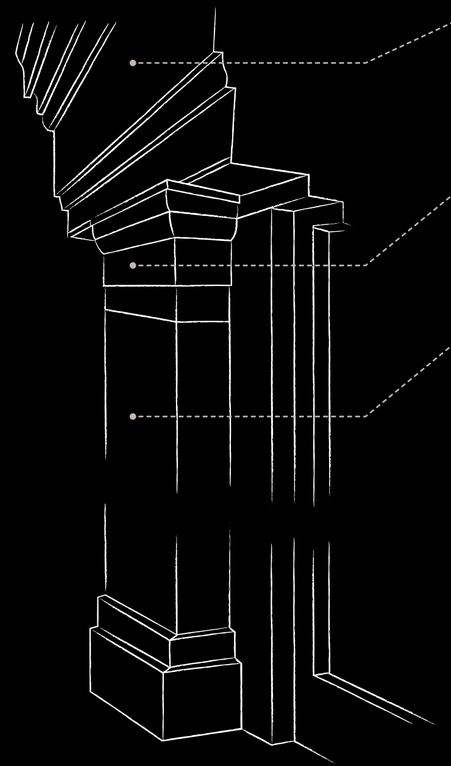
Mosaic concrete is a notable feature of the Orchid House (as well as the adjacent Main Conservatory and Camellia House). These buildings were among the first projects that were undertaken by the John J. Earley studio in Washington, D.C. Known as the "man who made concrete beautiful," John Joseph Earley (1881–1945) was a pioneer in the field of decorative, exposed aggregate concrete. Inspired by the mosaic pavements of Europe, Earley's new technique exposed pebbles–or aggregate–in the surface of concrete to create decorative architectural elements, a much faster and more economical way to produce a mosaic effect.

Renewing the decorative mosaic concrete on the interior and exterior of the house on columns, balusters, cornices, and other architectural details required the expertise of Robert Armbruster, a leading specialist in mosaic concrete. Armbuster had to decode how Earley installed the original mosaic concrete before he could design a plan for its repair. Some had been cast in place, some had been precast and brought to the site for installation, and in some cases, stucco had been applied. Addressing each of these techniques required a deep understanding of the processes involved, including matching new aggregate to historic samples.

Left: Reproducing mosaic concrete required evaluating materials, molds, placement, and finishes. These precast mosaic concrete samples were evaluated onsite to assure consistency of appearance. Photo by Hank Davis.

Above: Cast-in-place or stucco mosaic concrete restoration required several onsite steps including cleaning and removing deteriorated concrete, curing new concrete, and exposing the aggregate mix by washing or brushing the surface of the concrete. Photo courtesy of Bancroft Construction.

Finding the right aggregate mixture to match the existing mosaic concrete for each repair required a discerning eye. Photo courtesy of John Milner Architects, Inc.



Mosaic concrete units to be patched or replicated included column capitals, bases, moldings, cornices, pilasters, balustrades, parapets, and other architectural features. Photo courtesy of Longwood Library & Archives.

Orchid Display

Restoration of the Orchid House provided Longwood with an opportunity to expand the display of the growing orchid collection, which serves both as a gallery of unique specimens from around the world and a resource for their protection and conservation. The elegant metal mountings and frames were restored or replaced. By moving the orchid cases to their original position, the gallery was enlarged to display even more orchids than ever before.

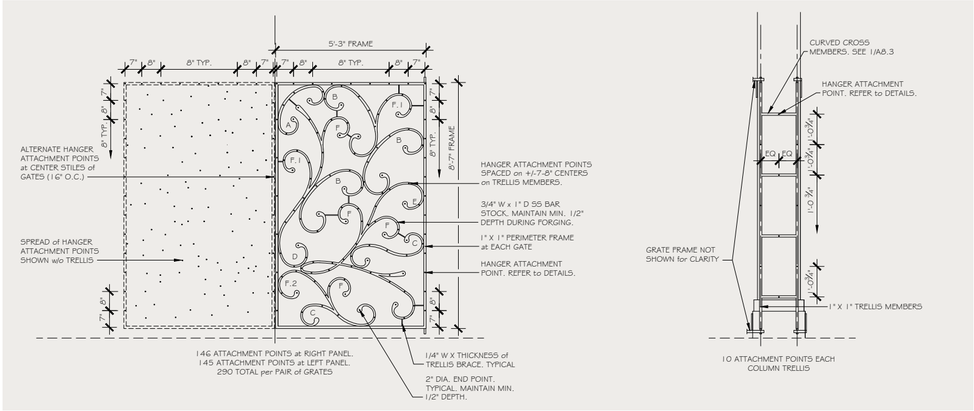
Restoring the original iron display grates that sit inside the orchid cases revealed lovely details that had been obscured with layers of paint over the years. Photo courtesy of John Milner Architects, Inc.

Bronze orchid cases installed in the 1920s were restored and moved back to their original location. In this architectural elevation, new doors are added in the central opening of the orchid cases between the orchid display and the vestibule. Rendering courtesy of John Milner Architects, Inc.

Above: Orchid case restoration included steel structure and bronze repairs, new lighting, and more. Photos by Hank Davis.

Right: Looking through the orchid cases into the display, orchids hang on the restored grates. Photo courtesy of Longwood Library & Archives.

New painted steel trellises now reach from the floor to the tops of the doors. The windows behind them, which had been covered in an insulating panel, are now exposed, providing glimpses of the exterior gardens. Photo by Hank Davis.



Restoration of the Orchid House provided an opportunity to design a better display system to accommodate our growing orchid collection. Flexibility was paramount, and new attachment points were incorporated into all aspects of the design, which uses Longwood's iconic logo. Drawing courtesy of John Milner Architects, Inc.

Opposite: The orchid display team makes display changes every weekday, transforming the display into a dynamic work of art. Photo by Daniel Traub.

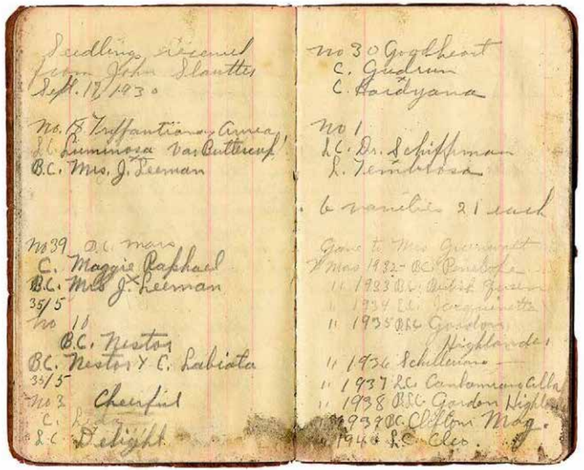
Orchid Display, Breeding, and Conservation

One of the largest and most diverse families of flowering plants, the Orchidaceae owes its complexity to unique adaptations that have allowed it to thrive on every continent except Antarctica.

Display, breeding, and conservation are all key elements of the orchid program at Longwood Gardens. Orchids were among the earliest plants collected by Pierre S. and Alice B. du Pont, whose passion for these unique blooms sowed the seeds for a distinguished collection that inspires a deeper appreciation of their beauty and stewardship.

A Growing Collection

An early champion of orchids, and vice president of the American Orchid Society from 1924 to 1944, Alice B. du Pont is largely responsible for the early growth of Longwood's tropical orchid collection. In 1922, by some accounts, Alice was charmed by a gift of 12 *Cattleya*. By 1924, the du Ponts began ordering orchids from Europe, Southeast Asia, the Caribbean, and South America. That year, they hired Louis Jacoby, the first of several trailblazing orchid growers at Longwood, marking the unofficial start of a dedicated orchid collection. In 1951, Ethel du Pont's heirs presented her renowned collection of orchids to Longwood, a legacy that continues to grow. Today, we acquire and breed orchids for their beauty, diversity, and rarity, adding to the educational, conservation, and display value of our current collection.



Left: Pages from Louis Jacoby's notebook; Longwood's first orchid grower and the first of many staff dedicated to stewarding our growing orchid program. Photo courtesy of Longwood Library & Archives.

Left: Pierre S. and Alice B. du Pont started our orchid program in the early 1920s. Photo courtesy of Longwood Library & Archives.

Right: Early photo of the orchid display. Photo courtesy of Longwood Library & Archives.

Ethel du Pont's heirs donated her collection of 2,314 orchids to Longwood Gardens in 1951, nearly doubling our collection at the time. This photograph—a black and white silver gelatin print—of *Anguloa clowesii* was taken for Ethel du Pont by Gottlieb Hampfler in 1940. Photo courtesy of Longwood Library & Archives.

Orchid Research & Conservation

The story of our work with native orchids dates to 1923 when Pierre S. du Pont purchased showy orchids (*Galearis spectabilis*) and three types of fringed orchids (*Platanthera*), all of which grow naturally on the grounds. This early history served as an inspiration for our Orchid Conservation Program. Today, we work to preserve and cultivate rare or endangered native species, helping to reintroduce them to their original habitats and to our outdoor gardens.

Our collection of tropical orchids on display in the Orchid House serves as a conservation and education resource by protecting rare or over-collected species and inspiring a new respect for their distinct habitats.

Orchid Breeding

In 1963, our successful flowering of *Disa uniflora*—the first such success in the United States—sparked an orchid breeding program that today works to develop exemplary hybrids across a number of genera. Hybrids from our long-standing *Disa* orchid breeding line, such as *Disa* Longwood Renaissance Horizon, with its beautiful sunset-toned flowers, can be found on display in the Orchid House during the summer months. Today, we successfully breed more than 20 genera including *Oncidium*, *Masdevallia*, and *Paphiopedilum* in three climate-controlled greenhouses that mimic orchid habitats.

Left: A variety of orchid seedlings in test tubes, including examples of native genera such as *Cypripedium*, *Goodyera*, *Platanthera*, and *Tipularia*. The orchid seedlings remain in these test tubes for 12 to 18 months before they are removed and transplanted to the greenhouse or nursery. Photo by Daniel Traub.

Right: We have been cultivating *Disa* at Longwood Gardens for more than 50 years, and we breed our own plants, such as the beautiful *Disa* Longwood Renaissance Horizon. Photo by Duane Erdmann.

Notable Genera in Our Collection

Cattleya (*Cattleya* Alice B. du Pont)
A favorite of Alice B. du Pont's, *Cattleya*, commonly known as the "corsage orchid," are native to Central and South America. Our storied collection includes antique hybrid and cultivar selections from the first half of the 20th century, many of which are no longer available commercially. With the potential to live forever, some of our *Cattleya* are surpassing 100 years in age, and will continue to be here for decades to come.

Collection status: limited breeding; 40% of collection
Light: high (3000–5000 footcandles)
Temperature: warm (60–80 F)
Water: dry

Cymbidium (*Cymbidium* Nandi 'Green Giant')
Cymbidium, natives of Asia, are easily identified by grassy leaves and tall stems with large, colorful flowers. *Cymbidium* are both terrestrial and epiphytic. The more common cool-flowering *Cymbidium* require cool winters to initiate blooming and are often used as cut stems in flower arrangements. Warm-growing *Cymbidium* flower in the summer and reward growers with showy blooms that can last for up to two months.

Collection status: representing the best hybrids of every color
Light: medium to high (2500–5000 footcandles)
Temperature: warm (60–85 F), warm with cold winter [60–85 F, 45–60 F]
Water: evenly moist

Dendrobium (*Dendrobium* Burana Blue Sapphire)
A large genus of orchids with more than 1,000 species, *Dendrobium* is stunningly diverse, ranging from cool-growing miniatures to warmth-loving giants that grow to more than 10 feet tall. *Dendrobium* are epiphytic plants often found growing on rocks or trees. A group of *Dendrobium* hybrids called den-phals are the most common cut-flower orchid, due to their long-lasting flowers and their ability to flower multiple times over several years on the same pseudobulb, or swollen stem.

Collection status: 5% of collection; includes many major species and hybrids
Light: low to high (1000–5000 footcandles)
Temperature: cool to warm (50–75 F) (60–85 F)
Water: intermediate

Disa (*Disa* Longwood Dawning Ever New)
Disa is a unique genus of orchids native to South Africa that arrived at Longwood Gardens in 1963. We were the first institution in the United States to flower *Disa uniflora* successfully and today we are one of a small number of public gardens around the world who breed and display this genus. *Disa uniflora* is a terrestrial orchid that thrives in wet conditions. In 2020, Longwood registered three new *Disa* hybrids, each of which brings with it new and valuable traits, such as *Disa* Longwood Dawning Ever New, which anchored the genes for a pink and red bicolor flower.

Collection status: actively breeding; 10% of collection (400 adult plants, 700 young plants, and more than 1,000 seedlings)
Light: high (3000–5000 footcandles)
Temperature: cool (50–70 F)
Water: evenly moist

Jewel Orchids (*Ludisia discolor*)
Jewel orchid is a common term that refers to a large grouping of diverse orchids prized not for their flowers, but for their strikingly variegated and patterned foliage. Easily grown as a houseplant, the most common, *Ludisia discolor*, has pinstriped leaves and small, white flowers. Some jewel orchids feature iridescent veins that sparkle in the sunlight. Some smaller species of jewel orchids are especially popular as terrarium plants.

Collection status: actively collecting
Light: low (500–1000 footcandles)
Temperature: warm (60–80 F)
Water: evenly moist

Masdevallia (*Masdevallia* Gypsy 'Johnny Angel')
Native to the cloud forests of Central and South America, *Masdevallia* flower profusely with blooms characterized by sepals (the outer petals) that unite at their base, sometimes forming a tube that often hides the inner petals and lip. *Masdevallia* are fast-growing plants that thrive in cool temperatures and high humidity.

Collection status: actively breeding
Light: low (800–1500 footcandles)
Temperature: cool (48–68 F)
Water: evenly moist

Miltoniopsis (*Miltoniopsis* Evergreen Joy 'Mill Valley')
These orchids carry large, ornately patterned flowers on stems with five to seven blooms. *Miltoniopsis* grow in cool temperatures across parts of Central and South America. White, yellow, pink, and red flowers have a lip that might feature a cascading waterfall pattern or a small spot of color at its center. You can often experience their sweet, citrus fragrance early in the morning.

Collection status: actively collecting
Light: 1500–2000 footcandles
Temperature: cool (50–75 F)
Water: evenly barely moist

Oncidium (*Oncidium* Volcano Hula Halau 'Volcano Queen')
Native to Central and South America as well as the Caribbean, *Oncidium* are generally characterized by masses of small- to medium-sized, often-fragrant flowers carried on a branched stem. *Oncidium* and related tropical orchids hybridize freely to create many intergeneric hybrids in the *Oncidium* Alliance.

Collection Status: actively breeding; 10% of collection
Light: medium (2000–3000 footcandles)
Temperature: medium (55–75 F)
Water: intermediate

Paphiopedilum (*Paphiopedilum* General Wavel)
Commonly known as lady's slipper orchids, *Paphiopedilum* have a recognizable "pouch," or modified lip, which they use to achieve pollination. Most *Paphiopedilum* carry a single flower per stem, varying in size, shape, color, and pattern. The *Paphiopedilum* on display in the Orchid House are native to tropical Asia. You can find its hardy cousin, *Cypripedium*, a genus native to North America and parts of Asia, in the Hillside Garden, Peirce's Woods, and Forest Walk during the spring and summer.

Collection status: actively breeding; 15% of collection
Light: low–medium (800–500 footcandles)
Temperature: warm (60–80 F)
Water: evenly moist

Phalaenopsis (*Phalaenopsis* Pink Bubbles)
One of the most recognizable orchids today, *Phalaenopsis*, commonly known as moth orchids, feature wide flat flowers that can last three or more months. *Phalaenopsis* were first collected from South Asia in the mid-19th century and were typically grown in greenhouses and conservatories. By the 1970s new advances in tissue culturing led to the wide availability of this stunning orchid and new hybridization techniques have produced an endless array of colors and forms.

Collection status: 3% of collection
Light: low (800–1500 footcandles)
Temperature: warm (60–80 F)
Water: evenly moist

Vanda (*Vanda* Sansai Blue)
Vanda is an epiphytic genus native to tropical and subtropical Asia and Australia. With large, brightly colored flowers, strap-like leaves, and roots that like plenty of air, *Vanda* is a favorite for hanging basket culture. A standout of the genus is *Vanda coerulea*, whose pale lavender flowers have generated several blue-flowered breeding lines.

Collection status: 2% of collection
Light: high (3500–4500 footcandles)
Temperature: warm–hot (60–85 F)
Water: intermediate

LONGWOOD GARDENS

John Milner Architects
Design & Preservation

John Milner Architects, Inc. was the architect requisitioned for the restoration of the Orchid House, and has been responsible for directing and implementing numerous new design and preservation projects recognized for their excellence on local and national levels.

Located in Chadds Ford, PA, John Milner Architects, Inc. is a collaborative team of design professionals that honors the continuum of architecture by creating new buildings inspired by classic American and European traditions, and by preserving historic buildings which connect us to our unique and diverse cultural heritage.

Cover image: An architectural drawing from the 1920s illustrating original details for the construction of the Orchid House. Image courtesy of Longwood Library & Archives.