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Inside the Stradivarius

St. Louis' Powell Hall gets a major addition and an interior upgrade, without losing its finely tuned acoustics

By: David Barbour

Powell Hall, the longtime home of the St. Louis Symphony Orchestra, recently received a facelift that is both stunning and remarkably subtle. Thanks to a bold new addition, the gorgeous Beaux-Arts building has been dramatically expanded to increase patrons' comfort, better accommodate its musicians, and increase its community outreach. At the same time, an auditorium sometimes described by musicians as rather like being inside a Stradivarius has had

its essential quality preserved despite numerous changes. Powell Hall opened in 1925 as The St. Louis Theatre, a movie palace designed by the noted firm Rapp & Rapp, responsible for similar grand structures from coast to coast. (In New York, Rapp & Rapp designed the storied Times Square venue The Paramount Theatre, and Loew's Kings, itself the object of a renovation covered in LSA's November 2015 issue.) The St. Louis closed in 1966, following an



Above and opposite: The Jack C. Taylor Music Center is, according to CannonDesign, "inspired by the spatial language of historic concert halls and the forms of musical instruments."

engagement of the film *The Sound of Music*. Happily, the sound of music was heard once more a couple of years later when the symphony moved in.

Powell Hall was an instant success. *New York Times* music critic Harold Schonberg, noting the contribution of the acoustician Cyril Harris, wrote, “Working with traditional means, [he] managed to obtain traditional sound—rich, full, detailed, with plenty of bass and extraordinary presence...a hall in which it is a pleasure to listen to music.” None other than Isaac Stern compared it favorably with Boston’s Symphony Hall and New York’s Carnegie Hall.

And, as the writer Jeannette Cooperman notes, “Powell Hall reflects European elegance in the classic red, gold, and cream decor of the Wightman Grand Foyer, modeled after the royal chapel at Versailles. The stained-glass window in the front facade features an image of Saint Louis IX, King of France, on horseback—a spectacular sight on concert evenings, when it is illuminated. The genuine feeling of tradition throughout the hall is appropriate for the nation’s second-oldest symphony orchestra.”

But, as Cooperman points out, time had its way with Powell Hall, making it less than optimal for audiences and artists: “When [the orchestra’s] president and CEO Marie-Hélène Bernard arrived in 2015, she saw men—men!—lined up outside the restroom at intermission. People had to choose between a glass of champagne and the loo queue. Backstage, female musicians were using a converted women’s restroom because when Powell became a concert hall, the orchestra included far fewer female musicians than today.” She adds, “Musicians had to practice in the (oft-flooded) basement and lug their instruments up and down the stairs. There was no proper storage backstage, so pianos were pushed to the side, and percussion went 30’ up, in the fly space for the old theatre curtains.”

To address these issues, a team was assembled that included the international architecture firm Snøhetta, St. Louis-based Christner Architects (now part of CannonDesign), theatre consultants Schuler Shook, acousticians Kirkegaard, BSI Constructors, TheatreDNA (which specified lighting gear and infrastructure), and AV specifiers WSDG. The solution was a bold masterstroke that reshapes Powell’s footprint, combined with intensively detailed work to improve the original building’s overall functioning.

Jack C. Taylor Music Center

Taking advantage of a parking lot sitting adjacent to Powell Hall, Snøhetta designed an addition that includes an expanded lobby, a new Education and Learning Center, recording suites, rehearsal rooms, storage areas, and new backstage facilities. Named the Jack C. Taylor Music Center, it is, according to CannonDesign, “inspired by the spatial language of historic concert halls and the forms of musical instruments. The entry into the new addition unfolds as a composition of angled shells in raked masonry. These inclined planes and arched openings define a new front-of-house presence, while large arched windows animate the façade, offering moments of delight and a preview of the creative energy inside.”

“The new expansion was conceived not as an add-on, but as a complementary ‘dance partner’ to Powell Hall—gently leaning against it and smaller in scale, to preserve the original building’s iconic silhouette,” Snøhetta director Takeshi Tornier says in the architectural journal *Dezeen*. The new triple-height lobby space accommodates patrons without crowding: “The building was meant to be a movie theatre. In and out,” Tornier adds. Now there is plenty of space, and the sinuous curving staircase and layered terraces facilitate the all-important ability for patrons to see and be seen.

In addition, each landing has its own bar and restrooms, and a quiet space for neurodiverse patrons has



been added. “Audiences will be enjoying music not as a transaction—buy a ticket, park, and get to your seat—but as an extended experience with a before, during, and after,” Bernard says. “We’ve created an extraordinary space where you can linger, reflect, pause, admire, and



Above and opposite: The new triple-height lobby space accommodates patrons without crowding, and the sinuous curving staircase and layered terraces facilitate the all-important ability for patrons to see and be seen.

savor the music you just heard. Social interactions will be so much better. And we'll have the ability to bring our musicians to our audience and vice versa."

The auditorium

As Christopher Sprague, a principal at Schuler Shook, notes, there was much room for improvement at Powell Hall. "The musicians' lounge and locker rooms were in the basement. Folks were warming up in the basement boiler room." Still, echoing his colleagues, he identifies the project's watchword as to do no harm: "The building is beloved in St. Louis; everyone has memories of coming to it, and it was important to honor that."

At the same time, he says, "There definitely were spots in the room that didn't work. The balcony is considered one of the best acoustic spots, but it was impossible to get to and was uncomfortable if you were over 5'5". New elevators make the balcony much more accessible. We also heard consistently about helping patrons deal with the staircases in the balcony. For example, there weren't many handrails, so we added new spots for them to grab onto." The sleek, black supports were finished with details that

match the auditorium's aesthetic. The new seats, supplied by Series Seating, retain their predecessors' distinctive red hue. Overall, the auditorium's seat count was slightly reduced to allow for better patron amenities, improving sightlines and making audience navigation easier thanks to the addition of internal aisles and a cross aisle on the main floor. (Also, the donor lounge, previously located in the basement and largely inaccessible during intermissions, was moved to the box seating level.)

Other features include new wheelchair positions and accessible seating on all levels. Reshaping the auditorium, Sprague notes, came with extra benefits. "The back wall of the auditorium came in about 8", which helped us install sound and light locks," a feature that, amazingly, Powell Hall was lacking until now. "Anytime the symphony was rehearsing onstage, nothing could happen in any of the lobbies," Sprague says. Brian Corry, a principal consultant at Kirkegaard, adds that loud passing street traffic, including police cars and fire engines, was audible enough to be jokingly referred to as "soloists" by members of the symphony. These issues have been resolved, at least in part, thanks to the addition of the locks. "Now," Sprague says,



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"they can have functions happening elsewhere in the building while the orchestra rehearses."

Other additions include a lighting/sound control position on the main floor. Michael Ferguson of TheatreDNA notes that his firm was hired by Reed Burkett Lighting Design, in charge of the building's architectural lighting, to specify performance lighting gear. Before the renovation, the theatrical dimming system consisted of first-generation ETC Sensor dimmers. "As a cost consideration," Ferguson says, "we offered to keep the original chassis, with an ETC dealer refurbishing everything inside it and giving it a new warranty. They now have Sensor 3 modules." New data distribution was installed as well.

Overhead onstage, the symphony was largely lit using first-generation L&E mini-strips. "They had this really lovely quality of blasted light," Ferguson says. "For us, the biggest challenge was to replace them with something that produced a foot candle that would look really great on camera and would give them great coverage." One major concern was providing "enhanced concert lighting," for when the symphony accompanies the screenings of hit

Hollywood films (*The Sound of Music*, entries in the *Harry Potter* series). "They wanted to get nice, saturated colors," says Ryan Mueller of TheatreDNA, noting that ETC Desire D60 Lustrs were chosen for their quietness and color-changing capabilities. These units represented a change in coverage from the linear look of the L&E mini-strips, but a shootout convinced the symphony staff that the D60s would perform well. Lighting is controlled by an ETC Ion Xe, which also interfaces with the ETC Paradigm architectural system.

Onstage, the floor was replaced, although Sprague notes, "It was put back pretty much as it was, because it is critical to the symphony." Stacey Wehe, of Christner Architects, oversaw the installation of new auditorium carpeting, also, according to *St. Louis Magazine*, "repainting the entire building interior with PPG's Duration Satin in Soleil 1093, and cleaning the chandeliers and gold-leaf moldings. 'We live and breathe Missouri,' she said. 'We know exactly where to get materials for building, finishes, and exteriors. We have an architect on staff who actually cast the concrete for the floors. We worked with St. Louis-

based Niehaus Building Services, who duplicated, on-site, much of the ornate plasterwork trim in the symphony hall for the expansion.”

Auditorium acoustics

“When we were first brought in, ten years ago,” Brian Corry recalls, “we were told, ‘Everybody loves the acoustics; whatever we do, we want to make sure we preserve them.’ Those were our marching orders. We had to go through a lot of testing to figure out why the room was loved, and why the acoustics worked so well. Through that process and interviews with the symphony, we learned that the balcony was where everyone loved the acoustics, and, as a matter of fact, the main floor was less desirable, and the stage had issues with hearing conditions.”

Meanwhile, Corry and his colleagues “introduced ideas for making the main floor more uniform and enveloping acoustically for natural sound. The symphony, rightfully so, was skeptical of these changes. We produced 3D billiard-ball studies, demonstrating how sound reflections coverage from the stage could improve on the main floor, but even so they were nervous.”

A piece published by the symphony describes these studies, which “included 3D mapping of sound movement in the auditorium, using ‘blasts’ like popping balloons to chart the path of sound waves throughout the space. Imagine a series of billiard balls hit with force.” From the cue stick, the balls react to the edges of the table, bounc-

ing again and again until they dissipate their energy and come to rest. Similarly, Kirkegaard’s modeling created a 3D animated graphic of how sound reacts to the surfaces in Powell Hall, both with the existing architecture and with the proposed modification. The results, which look like a laser light obstacle course from a spy movie, revealed a significant and useful change in the sound reflection pattern on the main floor.

“So,” Corry continues, “we worked with BSI Construction and the symphony to mock up the proposed acoustical changes: BSI built lightweight temporary walls along the lines we were suggesting that were able to be lifted and lowered into our proposed locations. Then, during a specified rehearsal, the symphony played, and everybody was able to listen to both conditions. In the existing condition, the sound was coming off the stage and being reflected towards the back corners of the main floor. With the new curved walls, we now direct sound more evenly across the seating area. This was most noticeable for instruments downstage such as the strings and soloist. The feedback was very positive, and we were given direction to implement the new lower cheek walls flanking the stage into the final design.” In addition to the function, the panels had to be carefully designed to match the look (and, in some cases, the curvature) of the wall.

The other big change was the previously mentioned decision to move the auditorium’s rear wall. “They were looking for a seat reduction, anyway,” Corry says, “so it



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wasn't a problem. Those lost seats weren't in the best place acoustically, and the move allowed us to change the shape of the rear wall, because as the sound made its way into the hall, it would slap back, like an echo to stage, which would create confusing sounds for the conductor and musicians. "The original shape of the rear wall took the overall form of a focusing concave surface, and the applied smaller panels were curved from side to side to attempt to break up that geometry; the new custom solid plaster panels instead curve both vertically and horizontally," he adds. "It helps direct some of the energy back to the audience."

In addition, setbacks built into the rear wall "change the timing of the sound coming back into the room and where it goes," Corry says. "The combination of the new applied panels and the setbacks lessens the amount of sound that gets back to the stage." Finally, the building's HVAC system was retrofitted, making it more suitable for the demands of a concert hall. Musicians noticed equipment noise onstage, and many systems had to be turned off when the orchestra recorded music. Kirkegaard assisted McClure Engineering in selecting quieter, more efficient systems with noise attenuation. Much of the equipment was relocated to the basement and roof of the new backstage expansion.

"The moment of truth for the team came during the first private rehearsal when the orchestra got to hear how the updated hall sounded for the first time since the doors closed for construction two years earlier," Corry says. "It was a touching moment, and we all felt a sigh of relief when music director Stéphane Denève came down from the balcony to proclaim that the acoustic sound was still there. Simultaneously, we received the ultimate seal of approval from Leonard Slatkin, the music director emeritus and one of the most eminent living names in classical music. I watched him as someone who knows the sound of the room better than anyone. His face said it all. The changes made a significant difference in what you could hear on the main floor."

Backstage

Many aspects of the backstage area were rationalized and made more efficient. The renovation consolidates the lounge, dressing rooms, locker rooms, and instrument storage at stage level. Room was made for a second music library located just offstage. When it comes to restrooms, women musicians now have parity with their male counter-



The Wightman Grand Foyer, part of the original building, is modeled after the royal chapel at Versailles.

parts. In the back of the building are new loading docks, Sprague says, adding that the consolidation of dressing rooms made space for practice rooms and administrative spaces, which have been treated with new finishes.

Also, according to Eric Dundon, the symphony's public relations director, Powell Hall's catwalks were in dire need of renovation. He quotes Lee Krueger, project director for ACME Constructors, as saying, "The top priority for the catwalks was to bring them up to modern standards. The previous catwalks were designed and implemented decades ago and posed navigational challenges." A big issue was the implementation of infrastructure above a ceiling that couldn't support the added weight.

Thus, Dundon writes, "After scanning the existing roof structure to create a 3D model and testing solutions, Anvil Engineering decided to secure the new catwalks to the roof trusses of Powell Hall with a cable system a few stories above the auditorium ceiling. Anvil Engineering conducted many stress tests for the new plan to evaluate where to hang the new catwalk supports that wouldn't overstress the existing structure.

"These new catwalks are a game-changer," says Maggie Bailey, the SLSO's senior director of production. "The safety enhancements give great confidence to staff and crew who provide technical enhancements to concerts with little room for error."

Education and learning center

"The Education and Learning Center is accessible from the back of house and the lobby," Sprague says. "They have pre-show concerts there, and lectures. The youth orchestra and some of the chorus ensembles use it for rehearsals." Corry adds, "The room has a lower base of wood that is a fixed acoustic treatment that varies from sound reflective and sound absorptive. Where the wood is perforated, in the middle zone, is acoustically transparent

fabric through which sound passes.” Behind the visual upper walls are acoustic curtains that can be retracted for a more reverberant sound with the option of being deployed for more control and better speech intelligibility; IWEISS provided a 40'-by-50' suspended A-53 Grade B seamless pipe grid and six automated curtain systems comprised of over 230' of 12-gauge powder-coated steel channel track. Each automated curtain system is powered by the IWEISS ViaTraveler Zero Fleet Curtain Machine with an encoder for programming positions. Control of the six automated curtain systems is integrated into one ViaControl Touch Screen Controller.

“The room also has a 40' ceiling to allow for loudness control and an acoustical reflector array providing supportive reflections to the ensemble, hanging down at about 25' off the floor,” Corry says. The flexible space serves as a rehearsal hall for the SLSO's Symphony Chorus, IN UNISON Chorus and Youth Orchestra. Previously, these ensembles rehearsed and warmed up in nearby buildings including the Third Baptist Church and the Grand Center Arts Academy.

AV systems and infrastructure

“Coming to this project at the beginning of 2020,” Sprague notes, “the expanded use of video streaming and capture was high on everyone's mind.” Sergio Molho, senior partner and co-CEO of WSDG, concurs, adding, “During COVID, they created a robust webcast system. And, to make it happen, they did it in all sorts of crazy spots all around the building. Offices were converted into control rooms; the audio guys were in a funky space like a closet.” Thus, when the renovation began, WSDG was hired “to coordinate with the local team to bring the entire building into this century.”

One major aspect of WSDG's brief involved the installation of the “tech bar,” an area behind the stage of Powell Hall that includes a production studio, audio recording control room, and a video master control room. In addition, Molho says, “We added a new audio and video distribution system throughout the building, including the offices, rehearsal rooms, and operational rooms.” Commenting on these changes, Sprague notes, “The building is heavily wired and ready for capture.” He adds that the consolidation of the rooms mentioned above is another example of how the building's functioning was streamlined: “The old radio broadcast studio was on the ninth floor. When the artists did interviews at intermissions, they'd have to run up in a little elevator to get there.” Kirkegaard also designed the acoustic isolation assemblies for the recording suites, podcast production room, and warm-up rooms.

In the auditorium, the existing Danley Sound Labs loud-speaker system was expanded with the addition of the company's Nano 3"/20W units, their tiny dimensions surely considered a plus factor here, and SHMicros, also known

for their unobtrusive profile. Sound in the auditorium is controlled by a Yamaha CL5 console. The system is essential for other planned programs featuring musicians like Branford Marsalis, Dianne Reeves, and Jeff Goldblum with the Mildred Snitzer Orchestra.

Also in the auditorium, Panasonic AW-UE150A PTZ cameras were installed to capture performances with video infrastructure supplied by Blackmagic Design. A new Barco projection system was implemented for film screenings. Getting the infrastructure in place, Molho adds, was an ongoing challenge. “It was detective work,” Molho says. “I've spent hours inspecting how we could move [the system] from one place to another. Also, we had to connect a new building with an existing building.” Part of the task, he says, involved “learning exactly how they wanted to operate, day to day.”

Molho notes that the name “Education and Learning Center” is something of a misnomer. It is in fact a rehearsal room and performance space, although it does also accommodate lectures and workshops. “In reality, it can be used as a black-box theatre. That's when the ideas of 360° projection and immersive audio came. What if we could project on the four walls of the room?” He notes that the technology is hidden: “We have embedded speakers hidden behind the fabric walls. The [Barco UDM-4K22] projectors are motorized to lower in. The main projector is behind a wall.” Audio is delivered via Danley SM96 and TH212 speakers, controlled by a Yamaha QL5 console.

Molho notes that, with so many teams involved in the project, “We designed all our audio and video systems in [Autodesk] Revit, to communicate with the architects and other members of the team. That way, everyone understands.” He notes that the media distribution system, including video in the box office, offices, and public spaces, is by Crestron. Communications are handled by a Clear-Com FreeSpeak II system.

Following a summer season of movie screenings accompanied by the orchestra, the new season opens in September with a program titled *Italian Splendor*, featuring selections by Hector Berlioz, Franz Liszt, Andrea Tarrodi, and Ottorino Respighi.

By all accounts, the renovation has achieved the goal of upgrading Powell Hall in many ways while retaining its unique qualities. “Powell Hall has a soul,” says Stéphane Denève, the current music director. “A strength of this hall is that you have a feeling it adds a certain glow to the sound with its distinct character. I am so happy that this renovation will add to Powell Hall's poetic sound.” 🎧