

David Geffen Hall and the Evolution of Acoustics at Lincoln Center

Paul H. Scarbrough

In 1962, Leo L. Beranek published *Music, Acoustics and Architecture*, the landmark book documenting his study of 54 famous concert halls and opera houses around the world. In this pioneering work, Beranek sought to understand and frame a set of criteria that would correlate subjective judgments of acoustic quality with the physical principles at work in the concert hall. He had used the findings in his study of famous concert halls and his designs for buildings like the Koussevitzky Music Shed at Tanglewood, Lenox, Massachusetts, to inform designs for the new Philharmonic Hall at Lincoln Center, New York, New York. At the time, Leo believed Philharmonic Hall would validate his findings and lay the foundations for successful acoustical design long into the future (Beranek, 1962). Sadly, forces beyond Beranek's control would undo his thoughtful designs for the hall and set in motion one of the most famous acoustic failures of the twentieth century. It would take another 60 years, multiple minor renovations, and two major reconstructions before the hall would finally possess acoustics worthy of the New York Philharmonic Orchestra.

Genesis of Philharmonic Hall

Lincoln Center was conceived in the 1950s as a way to secure New York City's preeminence as the cultural capital of the United States. John D. Rockefeller III, Robert Moses, and Mayor Robert Wagner identified Lincoln Square at the intersection of Broadway, Columbus Avenue, and West 65th Street in Manhattan as the site for their new performing arts center. Despite protests from the residents of the vibrant neighborhood, the city acquired over 16 acres of land, evicted the residents, and demolished much of the neighborhood.

With the site secured, Lincoln Center selected a star-studded board of architects to design the center, including Wallace Harrison, Max Abramovitz, Eero Saarinen, Philip Johnson, and Pietro Belluschi. Harrison chaired this

board and parceled out the projects, keeping the design of the new Metropolitan Opera House for himself, while giving the design of Philharmonic Hall to his partner Max Abramovitz.

Lincoln Center designated Philharmonic Hall as the first building to be erected on the campus. Carnegie Hall, the world-famous New York City concert hall and home of the New York Philharmonic, had previously announced plans to demolish the 1891 icon, leaving the Philharmonic, founded in 1842 and the world's third oldest orchestra, homeless, lending some urgency to the work.

Abramovitz collaborated with Beranek to develop the designs for the new hall, which were unveiled to the public in May 1959. Drawing on a long familiarity with and affinity for Symphony Hall in Boston, Massachusetts, Leo had designed a shoebox hall seating 2,400 people (Parmenter, 1959). This was when the trouble began, with some newspaper editorial boards criticizing Lincoln Center about the seat count. Here, they argued, was proof that Lincoln Center was not really for the masses because the new hall would seat some 400 fewer people than Carnegie Hall. Explanations that the seat count had been driven by acoustical considerations left the press unmoved, noting that many famous and well-regarded halls like Carnegie Hall and Symphony Hall sat more than 2,400 people.

Lincoln Center, concerned that their entire endeavor was in jeopardy, directed Abramovitz to add at least 200 seats to the hall over Beranek's objections. With the foundations for Philharmonic Hall already being poured, adding seats would be no easy feat. To increase the seating area, Abramovitz first relaxed the geometry of the sidewalls of the hall, breaking out of the straitjacket of Beranek's shoebox concept so that the hall could get wider at the rear than it was near the stage. Abramovitz seized the opportunity

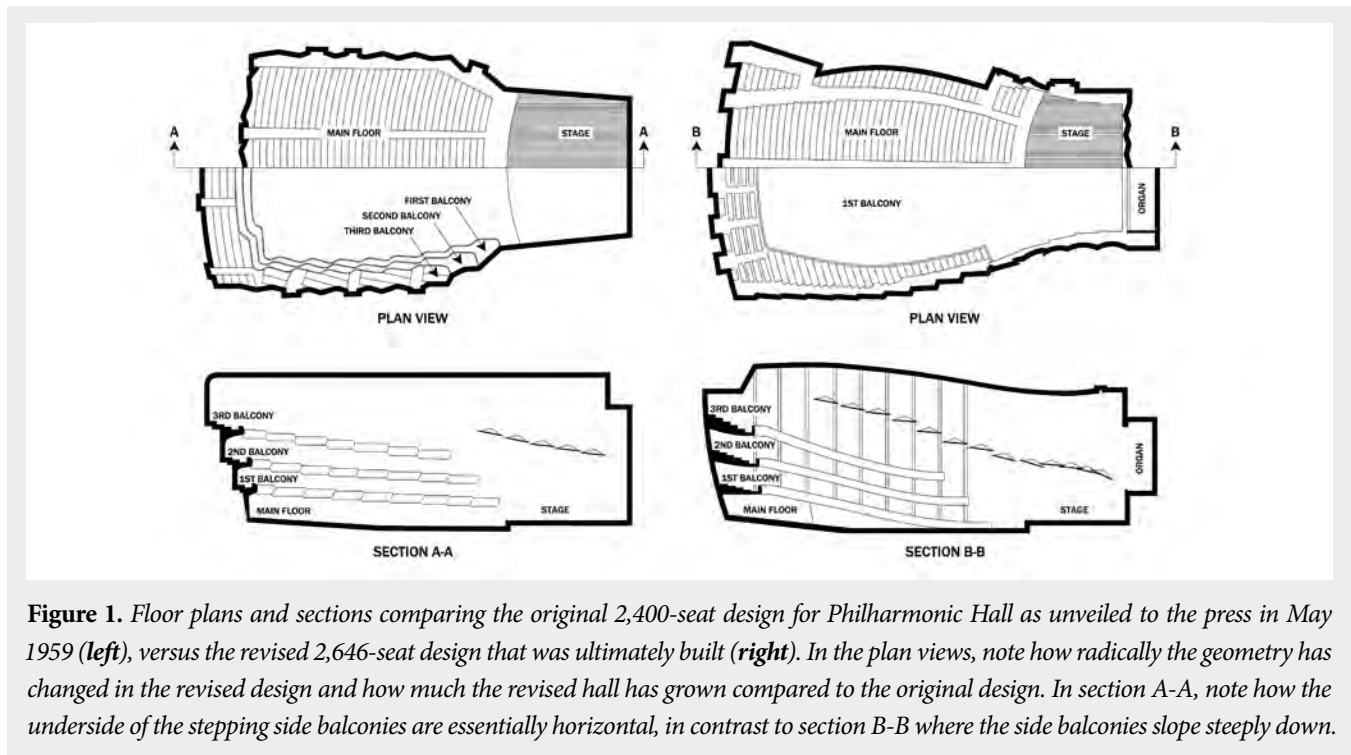


Figure 1. Floor plans and sections comparing the original 2,400-seat design for Philharmonic Hall as unveiled to the press in May 1959 (left), versus the revised 2,646-seat design that was ultimately built (right). In the plan views, note how radically the geometry has changed in the revised design and how much the revised hall has grown compared to the original design. In section A-A, note how the underside of the stepping side balconies are essentially horizontal, in contrast to section B-B where the side balconies slope steeply down.

to make other important changes to the designs. The side tiers, which had originally been horizontal, now sloped sharply down, so that the first balcony sloped down to connect to the main floor, the second balcony down to the first and the third balcony down to the second (see **Figure 1**).

Philharmonic Hall: The Early Years

Acoustics in the new Philharmonic Hall got an icy reception from music critics and musicians. The hall was found particularly lacking in bass warmth. Beranek's studies of the finished hall revealed flaws in the design of the overhead hexagonal acoustical canopy panels and indicated that the panels, if increased in size and rearranged, could correct the poor bass response in the room. The total cost of the revamp was estimated to be \$60,000. Unfortunately, some music critics and conductors were unrelenting. Harold C. Schonberg, the powerful music critic of *The New York Times*, was quite critical (Schonberg, 1962a,b). So too was George Szell, the longtime music director of the famed Cleveland Orchestra, Cleveland, Ohio, whose advice to the Lincoln Center Board comprised three recommendations: tear the hall down, start all over, and fire Beranek.

Lincoln Center and the Philharmonic formed a committee of advisers including Vern Knudsen (a physicist and

former chancellor of the University of California, Los Angeles, and third president of the Acoustical Society of America), Paul Veneklasen (an acoustical consultant), Heinrich Keilholz (a former Deutsche Grammophon Tonmeister), and Manfred Schroeder (from Bell Telephone Laboratories, Murray Hill, New Jersey) to study the hall and opine on Beranek's remediation plan. Initially, the relationship between Beranek and the committee seemed collegial but that would soon change. By May 1, 1963, Beranek thought that he and the committee had come to a consensus on a plan of improvements for the hall that largely reflected the recommendations he had made to Lincoln Center in December 1962. Sometime between early May and June, the situation evolved, and Abramovitz informed Beranek that he was adopting the committee's plan. Knudsen summarized this plan in the meeting minutes of the Building Committee on August 22, 1963 (NYPhil Digital Archives, 1963):

- Eliminate echoes from the back of the audience chamber by reprofiling the fascias of all three balconies and adding sound absorptive material on the rear walls of the second and third balconies.
- Extend the canopy to within six inches of the rear wall of the stage and add infill panels at the upstage rear corners.
- Build new risers for the orchestra on stage.

Table 1. Octave-band reverberation time: Philharmonic Hall with simulated audience

Octave-band center frequencies, Hz					
125	250	500	1,000	2,000	4,000
Reverberation time, s					
3.0	2.6	2.2	2.2	2.1	1.6

Data from Beranek, 1962.

This plan was apparently so at odds with what he had proposed that, on the September 18, 1963, Beranek formally disavowed any association with the ongoing efforts to improve the hall’s acoustics (Beranek, 1963).

In all of these deliberations, there was no consideration of how Abramovitz’s changes to the design of the hall might have impacted the acoustics, particularly the perception of reverberance in the hall. Toward the end of the tuning process for the hall, Beranek had collected the octave-band reverberation-time data shown in **Table 1**.

These data suggested that the hall should have been quite reverberant, but many observers described the sound as dry. Over the past 60 years, acoustical designers have developed a firmer grasp of how the shape of a hall can impact its reverberance. Shoebox concert halls (with long parallel sidewalls) are acknowledged to create reverberant fields that are quite strong relative to the direct sound, whereas fan-shaped auditoria of equal cubic volume and sound-absorptive properties are known to have weak reverberant fields relative to the direct sound of the sound source. The final floor plan of Philharmonic Hall was actually more fan shaped than shoebox shaped, which undoubtedly reduced the perceived reverberance of the hall.

By late 1963, Keilholz had emerged as the key voice directing the work. Although Knudsen remained the titular head of the committee, his reports and letters to the Building Committee increasingly refer to Keilholz’s recommendations. Keilholz was a curious choice, being an engineer with little knowledge about architectural acoustics (Fantel, 1976). He was, though, held in high regard by the conductor George Szell and by spring 1965,

the ongoing acoustical work at Philharmonic Hall was under his direction.

In 1969, Keilholz made his final changes to the hall, removing all of Beranek’s acoustical clouds and replacing them with a stepped wood ceiling. **Figures 2** and **3** show how the hall had changed from 1962 to 1969. Keilholz also replaced the original audience seating with new chairs featuring thinner upholstery, allowing the seat count to grow to 2,836 seats (Henahan, 1969). The results seemed to assuage some of the hall’s most severe critics, most notably Schonberg who, on October 12, 1969, called the renewed acoustics “a complete success.” He did note, however, that the bass was still weaker than desired (Schonberg, 1969). With Schonberg now quieted, leaders around Lincoln Center could breathe more easily.

The hall remained largely unchanged until 1976, with the exception of some experimental concerts that Philharmonic Music Director Pierre Boulez instituted in June 1973. These concerts, referred to as the “Rug Concerts,” involved temporarily removing seats from the orchestra floor, pushing the Philharmonic downstage, and allowing the audience to lounge on carpets (Ericson, 1973). The concerts were popular with the public, but the costs to stage them, coupled with the reduced revenue occasioned

Figure 2. Philharmonic Hall as it appeared shortly before opening in 1962. Photograph by Ezra Stoller, courtesy of the New York Philharmonic Shelby White & Leon Levy Digital Archives.





Figure 3. *Philharmonic Hall after Keilholz completed the last of his renovations in 1969. Photograph by Sandor Acs, courtesy of the New York Philharmonic Shelby White & Leon Levy Digital Archives.*

by removing so many seats, made this a short-lived experiment, surviving for only five seasons. However, one finding endured with more than a few observers noting that the Philharmonic sounded distinctly better when it moved off the stage and into the auditorium. This observation would surface many times in the coming decades.

Avery Fisher, Philip Johnson, Cyril Harris, and the 1976 Reconstruction

By the mid-1970s, grumbling had resumed about the hall's acoustics. In 1975, Avery Fisher made a \$10,000,000 gift to the New York Philharmonic and the building was renamed in his honor. After securing Lincoln Center approval, the Philharmonic asked Fisher if he would consent to his donation being used for a major makeover of the hall. Fisher agreed.

Philharmonic Chairman Amyas Ames asked acoustician Cyril Harris to design the renovations to the hall. Harris was well regarded for his work on the Kennedy Center Concert Hall, Washington, DC (1971) and Orchestra Hall, Minneapolis, Minnesota (1974). He initially demurred, fearing he would not be able to make the changes he deemed necessary. Ames persisted however, and Harris ultimately agreed subject to three conditions:

- That Lincoln Center give him as much space in the building as he deemed necessary.
- That Harris has ultimate decision-making authority in the event of a dispute between the architect and the acoustician.
- That Philip Johnson be given the architectural commission for the renovation (Bliven Jr., 1976).

Audiences returned to a dramatically different hall in the fall of 1976 (see **Figure 4**), and the initial acoustical reviews were fairly positive, with music critics Schonberg (1976) and Henahan (1976) and architecture critic Ada Louise Huxtable (1976) all remarking favorably about the acoustics of the hall. Curiously, reverberation times in the new Avery Fisher Hall were actually shorter than what Beranek reported for the original Philharmonic Hall, particularly at low frequencies (see **Table 2**). Here lay the seeds of future discontent with the renewed hall.

1992 Stage Renovations

By the early 1990s, musician dissatisfaction with the stage acoustics surfaced again. Music Director Kurt Masur was well-known for his exacting standards, and the musicians of the Philharmonic were frustrated that they could not hear one another on stage, inhibiting their ability to meet Masur's expectations.

The last thing Lincoln Center President Nathan Leventhal wanted was to reopen the matter of acoustics in Avery

Figure 4. *Avery Fisher Hall after the 1976 Renovation. Photograph by Norman McGrath, courtesy of the New York Philharmonic Shelby White & Leon Levy Digital Archives.*



Table 2. Octave-band reverberation times: Avery Fisher Hall with audience

Octave-band center frequencies, Hz					
125	250	500	1,000	2,000	4,000
Reverberation time, s					
1.60	1.76	1.78	1.74	1.74	1.80

Data from Beranek, 1996.

Fisher Hall, but in 1990, he reluctantly allowed the Philharmonic to commission an acoustical study, provided all parties agreed that the exclusive focus would be the stage acoustics.

J. Christopher Jaffe and Paul Scarbrough conducted this initial study, which assessed three changes:

- Extending the stage approximately 16 feet out into the audience chamber.
- Suspending lower acoustical reflectors over the downstage part of the orchestra.
- Adding diffusive panels to the upstage wall behind the brass and percussion sections.

The assessment included eight configurations tested over the course of two special orchestra rehearsals. These ranged from the orchestra in its normal position with no added canopy or diffusers to the orchestra on the stage extension with the canopy and diffusers in place.

To obtain more reliable subjective responses to these changes from the musicians, the rehearsals were recorded using three binaural heads placed on stage: one among the violins, one near the woodwinds and brass, and one among the cellos and double basses. One binaural head was also set in the audience. Masur and a jury of musicians then ranked a series of A-B comparisons assembled from the binaural recordings.

Jury testing confirmed that the combination of the overhead canopy and upstage wall diffusers together produced the most positive responses from the musicians, although nearly a third of the musician jurors preferred another configuration under some circumstances. This diversity of responses suggested that more was at play in

the musicians' stage experience than the three elements under test.

Comprehensive acoustic measurements with and without the test elements also yielded revealing findings. A sense that a lack of diffusion on the stage was giving it a brittle and harsh acoustic quality seemed to be confirmed when the musicians reported a marked improvement with the addition of the upstage wall diffusers. These subjective impressions correlated well with measurable reductions in Zwicker sharpness, a psychoacoustic metric not usually considered relevant in concert hall acoustics.

Disturbing, however, were the room acoustic findings in the auditorium itself. These confirmed a long-standing critique of Avery Fisher Hall, namely its poor bass response. Analysis of octave-band decay characteristics showed a marked decrease in reverberation time and strength at low frequencies (250 Hz and below) compared with midfrequencies (500 and 1,000 Hz). Increased strength at low frequencies has been correlated with subjective impressions of bass warmth in symphony halls, so this finding was not surprising. Although the charge had been to focus strictly on the stage acoustics, the observation about the poor bass response was included in the final report, something that Lincoln Center did not appreciate.

When the time came to act on the report findings, Lincoln Center engaged Russell Johnson and ARTEC Consultants to conduct further studies and implement changes. ARTEC's changes, which included quite large diffusive elements on the side walls of the stage and a complex overhead acoustical canopy, debuted with the start of the 1992–1993 Philharmonic season (Kozinn, 1992). Philharmonic musicians from that era gave these changes decidedly mixed reviews.

A New Hall for a New Century

With the approach of the 40th anniversary of the opening of Philharmonic Hall, Lincoln Center began planning a comprehensive \$1.2 billion redevelopment of its campus. Renovating Avery Fisher Hall would kick off the effort, with London-based Foster + Partners tapped to lead the design in 2002. Initial planning moved forward into 2003, but the effort stalled when the New York Philharmonic stunned the music world on June 1, 2003 by announcing that it

would leave Lincoln Center and return to its former home, Carnegie Hall (Blumenthal and Pogrebin, 2003). Negotiations between the Philharmonic and Carnegie dragged on into the fall of 2003, but by October 7th, the deal was dead (Pogrebin 2003a). Carnegie Hall, which had not had an orchestra in residence since 1962, had not anticipated just how much the Philharmonic would dominate its schedule and unacceptably curtail Carnegie's own program of internationally renowned touring orchestras and soloists. The Carnegie debacle also had an unfortunate consequence, poisoning the waters between Lincoln Center and the Philharmonic and souring Lincoln Center President Reynold Levy's enthusiasm for the Avery Fisher Hall renovation (Pogrebin, 2003b).

In May 2004, the Philharmonic announced that it would proceed with interior renovations to Avery Fisher Hall based on plans developed by Foster + Partners. Unfortunately, by this time, renovation plans for Alice Tully Hall, the smaller concert hall at Lincoln Center, were nearly complete. Lincoln Center could not countenance both Avery Fisher Hall and Alice Tully Hall being out of service at the same time, and so work at Fisher would have to be delayed until the Tully renovation was complete (Pogrebin, 2004). This stalled momentum for the project and the plans were quietly shelved.

The Mostly Mozart Experience

In 2004, Jane Moss, artistic director for Lincoln Center, was looking to refresh the Mostly Mozart Music Festival, an annual music series that Lincoln Center had started in 1966 to fill the hall while the Philharmonic performed elsewhere in the summer. She charged theater consultant Josh Dachs and acoustician Mark Holden with rethinking how the festival could be presented in Avery Fisher Hall. Dachs proposed moving the orchestra onto a 30-foot extension to the stage. And because Mostly Mozart used a much smaller ensemble than the New York Philharmonic, space to the sides and rear of the orchestra could be populated with audience seating. To provide acoustical support for the orchestra, Holden designed an overhead array of 19 eight-foot-diameter fiberglass discs. Dachs added attractive light fixtures to the mix, which together with the discs appropriately scaled the massive stage to the smaller ensemble and the more intimate repertoire it performed. The new setting, debuting in July 2005, was a hit with the public and music critics (Tommasini, 2005), once again

demonstrating how moving the orchestra forward into the auditorium yielded significant acoustical benefits.

Third Time the Charm?

In 2013, a joint committee of Lincoln Center and the New York Philharmonic selected our consultancy, Akustiks, to work with theater consultant Fisher Dachs Associates on plans for a makeover of Avery Fisher Hall. Early work focused on studies of the many concert halls that had been completed in recent years. A team of Lincoln Center and Philharmonic board members and staff visited many of these halls, including those in Reykjavik, Iceland (see bit.ly/48viMGO); Helsinki, Finland (see bit.ly/465Mu3R); Paris, France (see bit.ly/3teLueX); and Hamburg, Germany (see bit.ly/462X1MV) while also studying other successful examples such as the Schermerhorn Symphony Center, Nashville, Tennessee (see bit.ly/3PSQY8n), the Walt Disney Concert Hall, Los Angeles, California (see bit.ly/3t2OFX3), and La Maison Symphonique, Montréal, Quebec, Canada (see bit.ly/3EWPlzS).

To frame the issues for Lincoln Center and the Philharmonic, Fisher Dachs and Akustiks began developing renovation scenarios. One critical issue to be resolved was the form of the new concert room. Many newer halls in Europe and the Disney Hall were of the vineyard type, with seating surrounding the orchestra in steeply raked terraces. This concept was pioneered by architect Hans Scharoun and acoustician Lothar Cremer in their designs for the Philharmonie Berlin, Germany (see bit.ly/48qpe1Z). Design studies quickly revealed that a vineyard concert hall seating at least 2,000 patrons would not fit within the exterior walls of Avery Fisher Hall, but everyone also agreed that the rigid shoebox form of the existing hall placed too much of the audience at too great a distance from the stage to the detriment of visual and acoustical intimacy.

By late spring 2015, a consensus had emerged around a 2,200-seat shoebox concert hall with audience seating wrapping around the sides and rear of the orchestra stage. The hall would feature an orchestra floor with two side tiers and balconies. By late July 2015, a project brief outlined the parameters that would govern the design of the new concert hall. This plan would essentially gut the interior of the building to the iconic perimeter travertine colonnade and construct a new building within its framework.

Propelled in part by the announcement that the renowned music producer, film studio executive, and philanthropist David Geffen (see en.wikipedia.org/wiki/David_Geffen) had donated \$100 million to jumpstart the renovation, the selection process for a new architect gained momentum. After a diligent vetting process, the team of Thomas Heatherwick of London and Diamond Schmitt Architects, Toronto, Ontario, Canada, emerged successful in December 2015. Excitement around the selection of the architects was soon tempered by management changes at Lincoln Center and the Philharmonic, with both institutions now finding themselves without chief executives as the daunting task of raising hundreds of millions of dollars bore down on them.

Fortunately, the search for new leadership did not take long, with Lincoln Center tapping Debra Spar to take their helm, while the Philharmonic enticed Deborah Borda to return to New York. Borda was well versed in the Philharmonic from her stint as its president in the 1990s. She also possessed deep experience with concert hall building projects, being widely viewed as the driving force who put the Los Angeles Philharmonic's Walt Disney Concert Hall project back on track and brought it to a successful conclusion in 2005 (Cooper, 2017a).

One of Borda's first actions was to thoroughly assess the plans for the Geffen Hall renovation with her Lincoln Center colleague Spar. They did not like what they saw. The project budget, initially set at \$500 million, was on track to top \$750 million. Meanwhile, the construction schedule, which had originally been pegged at 27 months, was expanding past 33 months, ensuring that the Philharmonic would lose not two but three full seasons in the hall. No orchestra had ever weathered such a prolonged absence from their principal concert venue. Concerned that audiences would not return to Lincoln Center when the hall reopened, Borda and Spar abandoned the Heatherwick/Diamond Schmitt scheme (Cooper, 2017b).

Within six months, Lincoln Center and the Philharmonic recommissioned key members of the previous design team including Diamond Schmitt, Fisher Dachs, and Akustiks to reconceive the project, working within some key constraints that included a project budget not exceeding \$550 million and a phased construction plan that minimized the amount of time that the Philharmonic would be out of the hall. Heatherwick was released from the team.

A workable plan was in place by early 2018. The concert hall would essentially be gutted to the perimeter of the original 1962 concert hall and a new room built within its shell. Taking cues from the Philharmonic "Rug Concerts" and Mostly Mozart, the stage would push out into the auditorium by almost 25 feet. Most importantly, the seat count in the room would be cut by over 500, to just around 2,200. The side tiers would be rebuilt and a sizable chunk of the third tier removed. The cubic volume would increase by pushing the sidewalls at the third tier out and by demolishing the original stage ceiling and creating acoustic chambers above a new 10-piece acoustic canopy. The public spaces would be improved and refreshed but would remain largely within the confines of the original floor plates.

The construction schedule relied heavily on offsite prefabrication of key components and would unfold in two phases. A first closure would happen in May 2022, with the hall reopening the following November. The orchestra would then play an abbreviated season in the partially finished hall. The building would close again in May 2023 for some 10 months, with a gala reopening planned for March 2024.

Detailed design work for the scheme resumed in early 2019, at which time the architectural firm Tod Williams Billie Tsien Architects joined the design team and Lincoln Center welcomed a new president, Henry Timms. While Diamond Schmitt remained the architect of record and retained primary responsibility for the design of the concert hall interior, Williams and Tsien took the lead in redesigning the public spaces of the building, with a charge to make these spaces more welcoming. In December 2019, Lincoln Center and the Philharmonic unveiled the designs to the press and public (Cooper and Pogrebin, 2019).

With the designs sufficiently advanced to allow construction of a 1:20 scale model of the design, Christopher Blair undertook extensive acoustical model testing, confirming the soundness of the overall design concept. Simultaneously, work proceeded with the musicians and operating staff of the Philharmonic to finalize the layout for new stage risers for the musicians, a system of platforms that elevate groups of musicians so that they can all better see and hear one another. The riser system was to be fully mechanized, meaning it was critical to get the layout

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correct. To vet the riser layout, the stage crew taped out the new stage shape and riser layout. The orchestra then rehearsed in that configuration, allowing the design team to consult with the musicians to understand what worked and what didn't work about the layout. The session proved invaluable, yielding subtle but important refinements to the layout. Close collaboration with the architect resolved other important details, including diffusion on the walls of the hall and the designs for sound-transparent mesh panels to conceal the existing plaster ceiling, one of the only elements retained from the 1976 hall.

With drawings and specifications nearly complete and fundraising progressing well, it seemed that a renewed David Geffen Hall might finally be within grasp. Then disaster, in the form of the Covid pandemic, looked like it might derail the project yet again. In March, New York Governor Andrew Cuomo closed theaters throughout the state. No one suspected that the disruptions caused by Covid would last not weeks or even months but rather years.

Project leadership saw opportunity in the forced closure of Lincoln Center. They asked the design and construction teams whether the project could be accelerated and collapsed into one construction phase. The design team and contractors soon concluded that the project could be accelerated. Some costs would increase to accelerate the work, but others would decrease, particularly the costs associated with staging a shortened Philharmonic season in a partially completed hall. And the best news? The new hall could be completed and reopened in October 2022, some 18 months earlier than originally contemplated. Lincoln Center and the Philharmonic saw this as a win-win scenario, one that would send a message of hope and confidence to a city reeling from Covid. By the end of 2020, Lincoln Center and the Philharmonic had agreed to move forward, and wholesale demolition and reconstruction of the old concert hall proceeded. For the next 18 months, daily supervision by the architects with weekly site visits from the acousticians kept the construction work moving forward at a brisk clip.

As the late summer of 2022 closed in, the moment of truth arrived for acoustics. On Monday, August 15, 2022, promptly at 10 a.m., Maestro Jaap van Zweden raised his baton to lead the Philharmonic in the fourth movement of Beethoven's *Symphony No. 6* (see **Figure 5**). Initially,



Figure 5. *The New York Philharmonic on stage for the first rehearsal in the new David Geffen Hall on August 15, 2022.*

van Zweden experimented with different seating arrangements for the strings to see what sounded best. He finally settled on seating first and second violins on stage right, cellos across from the second violins, and violas across from the first violins. On Tuesday, pianist Emanuel Ax played portions of Mozart's *Piano Concerto No. 17*. Other tuning repertoire included excerpts from Bartok (*Concerto for Orchestra*), Bruckner (*Symphonies No. 4 and No. 7*), Strauss (*Don Juan*), Stravinsky (*Firebird Suite*) and Rachmaninoff (*Symphonic Dances*).

As tuning week proceeded, surveys of the orchestra gathered impressions about on-stage hearing and the overall sound of the hall, leading to several changes to the elevations and attitudes of the overhead acoustic canopy panels. Requests to improve cross-stage hearing resulted in changes to the angle of the canopy panels flanking the sides of the stage, increasing their tilt angles to direct more sound energy across the stage. By the end of the week, there had been substantial progress.

On October 8, 2022, the New York Philharmonic inaugurated the renewed David Geffen Hall with Etienne Charles' *San Juan Hill*, a new multimedia work featuring Etienne Charles, his Creole Soul ensemble, the Philharmonic, images, and video. The work was amplified, so it was not a true test of the symphonic acoustics, but it did show off the versatility of the new hall and the ability of a new adjustable acoustic banner and curtain system to dampen the reverberance of the hall to better facilitate

amplified sound, something that had been quite problematic in the old hall.

A few days later, on October 13, the Philharmonic gave the natural acoustics a proper workout with a concert featuring Marcos Balter's new work *Oyá*, John Adams's *My Father Knew Charles Ives*, Tania León's *Stride*, and Respighi's *Pines of Rome*. The response of music critics has been overwhelmingly positive and that of musicians even more so. Over the course of the first season, there have been occasional adjustments to the acoustical elements around the stage, and the Philharmonic continues to hone and refine its sound in response to the new acoustics. The adjustable features incorporated into the designs allow for dramatic changes to the sound of Geffen Hall. With the Philharmonic in a transitional period as Music Director Jaap van Zweden winds down his tenure at the end of the 2023–2024 season, further adjustments may wait until 2026 when Gustavo Dudamel takes over as music and artistic director of the New York Philharmonic.

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Contact Information



Paul H. Scarbrough
pscarbrough@akustiks.com

Akustiks, LLC
93 North Main Street, Suite 2
South Norwalk, Connecticut 06854,
USA



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