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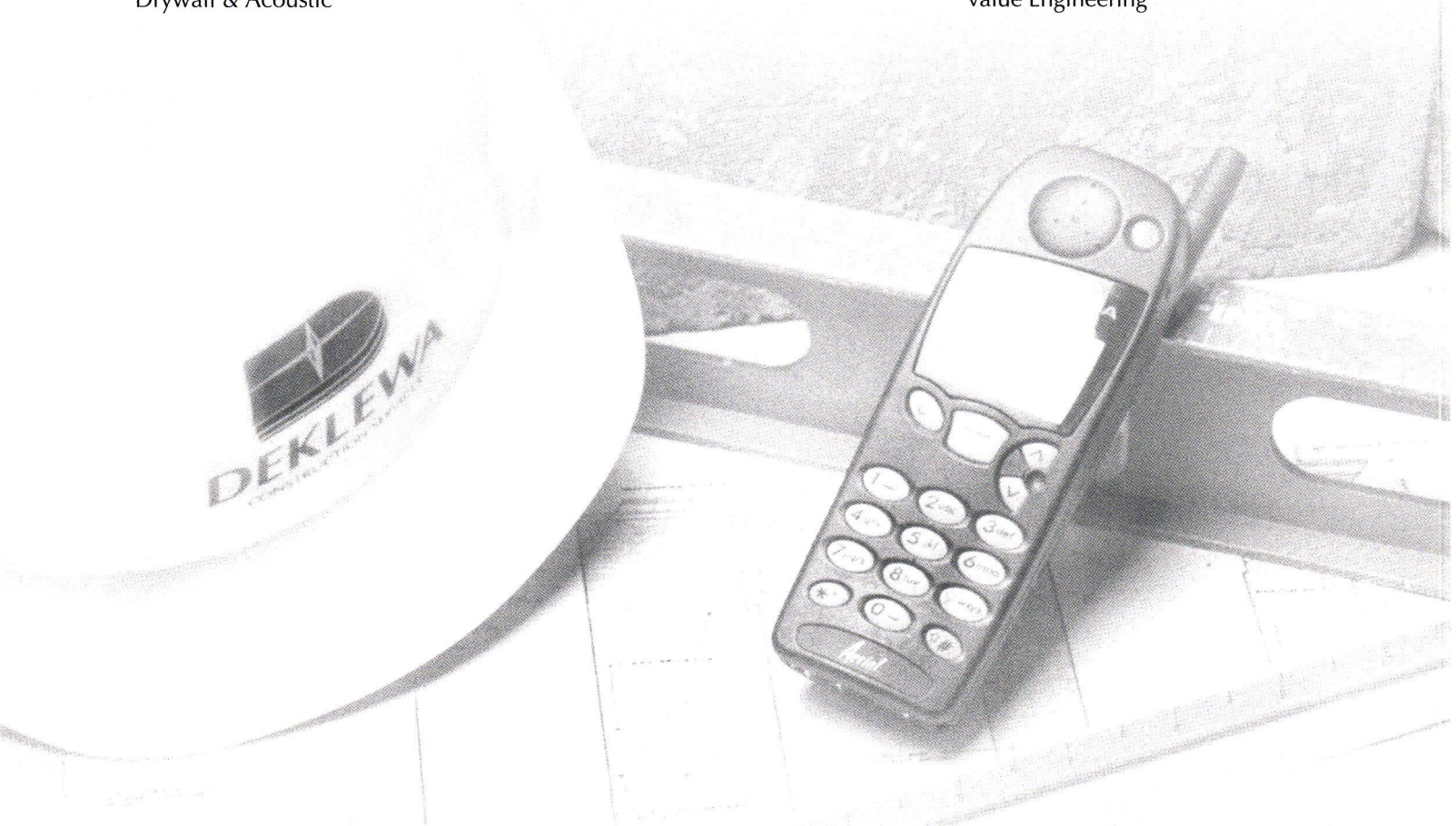
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Do You Hear What I Hear?

By Tracy Certo



If you like music, history and architecture, this is the column for you.

Can architecture be heard?

In the book *Experiencing Architecture* (1959), author Steen Eiler Rasmussen writes that some would argue that since architecture doesn't produce sound, then it can't be heard. Yet, he counters, architecture doesn't radiate light and we can see it.

"We see the light it reflects and thereby gain an impression of form and material. In the same way we hear the sounds it reflects and they, too, give us an impression of form and material. Differently shaped rooms and different materials reverberate differently," the author writes.

David Vater, AIA, thoughtfully copied this book chapter for me as I went to work on performing spaces and acoustics for this issue. He was enthralled with the book in college and I can see why. He also sent me another, equally interesting article by Dankmar Adler, an architect and partner of Louis Sullivan, who died in 1900 but who had a remarkable sense of acoustics that was unheard of in his time (p. 10). Adler and Sullivan designed the Auditorium Theater in Chicago, which was then the largest in America. David, who is a font of knowledge, told me that Sullivan was only 24 at the time of the theater's opening which the President attended. Heady stuff for such young architects who were leading members of the Chicago Movement of Architecture.

I learned this and all kinds of interesting things in researching acoustics and interviewing two architects—Al Filoni, AIA and Syl Damianos, FAIA who are coincidentally both Fulbright scholars—on designing for performing spaces. In a break from format, I'm presenting the crux of Rasmussen's chapter here. If you like music, history and architecture, this is the column for you.

If I were to interview Al and Syl today I would ask them: can architecture, indeed, be heard? The author of the book David sent me seems to think so. He offers the final scenes of the movie, *The Third Man*, as an example—of the gangster hunt through the endless underground tunnels of Vienna's sewer system.

"The characteristic sounds which tunnels project are clearly heard in the splashing of the water and the echoes of the

men hunting the third man. Here architecture is certainly heard. Your ear receives the impact of both the length and the cylindrical form of the tunnel."

A similar acoustical effect of passageways and tunnels is present in Thorvaldsen's Museum in Copenhagen, writes Rasmussen. Originally, a barrel-vaulted coach house, the museum's floors, ceilings and walls—even the sculptural residents—are all made of stone. A gift from the Danish king to house the famous sculptor's work, each barrel-vaulted room houses a single statue.

"All these hard, sound-reflecting surfaces give the rooms their hard, long-reverberating tones. When you enter this home of statues you are in a world that is very different from the rather provincial little capital of the nineteenth century which built it," the author says, comparing it to a great and dignified Rome with its vaulted ruins of Antiquity "or the stone corridors of the grandiose palazzos from which ease and comfort were debarred."

When the spectacular entrance hall is used for concerts, the acoustics are converted completely by covering the floor with matting and hanging fabrics on the walls.

"Then if the audience is large enough to compensate for the lack of upholstery in the austere hall the room changes its manners, gives up its stentorian voice and becomes so civilized that it is possible to distinguish every tone of each instrument."

So, the acoustics are sub-par unless improvements are made...or are they? Provided the right kind of music is performed, the museum has excellent acoustics, argues Rasmussen who references Hope Bagenal in her book, *Planning for Good Acoustics*. The chants from the Early Christian church in Rome are well-suited for this acoustic space, for instance. The old basilicas had the same hard character, with their mosaic floors, bare walls and marble columns. They were so huge and so empty that sound long reverberated back and forth between the massive walls.

In another example of hearing architecture, the author notes how the enormous, five-aisled structure of St. Peter's Basilica in Rome demands a definite kind of music, like the museum, as well as a distinct speaking voice. The priest

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On the cover: Heinz Hall in 1992 after acoustical renovations by MCF.

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addressing the congregation couldn't use his normal speaking voice if he wanted to be heard clearly.

"If it were powerful enough to be heard throughout the church, each syllable would reverberate for so long that an overlapping of whole words would occur and the sermon would become a confused and meaningless jumble," Rasmussen explains.

Instead, the priest had to speak rhythmically, "to recite or intone". In large churches with great reverberation, there is usually a "sympathetic note" present, which is defined as a pitch in which tone is apparently reinforced. So the priest would begin on a reciting note—somewhere near A or A flat—"and then let his voice fall away in a cadence, going up and down so that the main syllables were distinctly heard and then died away while the others followed them as modulations. In this way the confusion caused by overlapping was eliminated."

A prayer or psalm reading would be delivered in a "slow and solemn rhythm, carefully adjusted to the time of reverberation." The Gregorian chants were custom created for the old basilica of St. Peter's. In old churches the walls became instruments which people learned to play.

Every large church has its own voice. St. Mark's in Venice has a special acoustical effect. Built over a Greek cross in plan, the church has five domes, one in the center and one over each of the four arms of the cross. This produces unusual acoustical conditions, says Rasmussen.

"The organist and composer Giovanni Gabrieli, who lived around 1600, took advantage of them in the music he composed for the cathedral. St. Mark's had two music galleries, one to the right and one to the left, as far from each other as possible and each with its dome as a mighty resonator. The music was heard from both sides, one answering the other in a Sonata Pian e Forte. The congregation not only heard two orchestras, it heard two domed rooms, one speaking with silver tones, the other responding in resounding brass.

After the Reformation, changes had to be made in many churches to accommodate the new focus on preaching. Here, the author showcases St. Thomas church at Leipzig, where Bach was the organist. Much of Bach's music was composed specifically for the church which features a large, three-aisled Gothic edifice with level vaults. Large areas of resonant wood were added to absorb sound and reduce the period of reverberation.

The side walls were lined with tiers of wooden galleries and richly carved numerous private boxes or "swallow's nests" as they were called. Due to the Lutheran system of church government, which placed the church under the town council, each member had his own family loge or box, just as one might at the opera.

All this wood helped to create the acoustics that in turn led to the creation of the development of Cantata and Passion. The absence of a note or region of response cleared the way for Bach to write his music in a variety of keys.

During the Classic and Gothic revivals of the late eighteenth and early nineteenth century, when eclecticism came into vogue, much that was gained acoustically in the past was ignored and then forgotten. "There was no longer any personal conception behind the rooms the architect planned and therefore he gave as little thought to their acoustic function and acoustical effect as to the texture of the materials he used." Although the exteriors of Classic and Gothic revivals were precise copies, the interiors were no longer designed with auditory or music functions in mind.

Flash forward to Rasmussen's present day—the book was written in 1959—and he argues that architects began to study acoustics but much attention was given to absorbing sound and shortening the period of reverb. "Too much interest has been given to these easily attained effects," he said. With a lack of interest in designing room with different acoustical effects, he believed all rooms sounded alike.

Just as I was finishing the piece on acoustics and performing spaces, I attended a concert at the newly renovated Levy Hall at Rodef Shalom in Squirrel Hill. Peter Guroff, violist for the Pittsburgh Symphony and a good friend of mine, is also the artistic director of the Ionian Chamber Players which performed—masterfully, I might add—that night. Syl Damianos told me if you want to know a concert hall's acoustics, ask a musician. So I did. Peter's take? He thinks Levy Hall's acoustics were much improved with the renovation, making for a nice space for chamber music groups. His wife and my bud Maureen, no slouch in the music department, told me the group sounded spectacular practicing Brahms in her living room the other night. Great acoustics or not, that's one performance I'd love to experience.

Here's to many more in the coming New Year. Hope it's great.

