Aesthetic Audio Systems, Inc.™

In the news

Custom audio programming for public, patient and clinical spaces in healthcare institutions

Learn more about Aesthetic Audio Systems, Inc. and our custom audio programming at Exempla Good Samaritan Medical Center in Lafayette, Colorado. Read this feature article "The Sound-Track of Healing" from the March/April 2005 issue of the magazine *Spirituality & Health.*

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The Sound-track of Healing

PICTUREQUEST

BY LOUISE DANIELLE PALMER

A new hospital in Colorado is programmed with 9,000 musical selections — one for every place, time, and stage of recovery. It's the start of a revolution that may make the iPOD a health essential.

Outside the main entrance to the 80-acre campus of Exempla Good Samaritan Medical Center in Lafayette, Colorado, the air is filled with the sweet serenade of chirping bobwhites and whippoorwills. These recorded sounds are heard only at dusk; if it was a little earlier, you would probably hear the afternoon wind whistling through the trees or, if it was a lot earlier, the sound of birdsong at day break. Enter the reception area, and the living sounds of nature give way to a friendly, inviting, and pleasant light jazz, the soothing piano concertos of Keith Jarrett.

At the information desk, receptionists direct you to take the elevators, where there is always guitar music playing, to the ER, where excruciating hours of sitting and waiting lie ahead. The music here is light classical, flowing into a tranquil, ambient jazz that eventually becomes an Irish, harp-driven melody. You aren't pushed from one piece of music to another, nor are you stagnating in the same tiresome Muzak retread that makes you want to run screaming from the room. In all likelihood, you don't even notice the music, any more than you noticed the bird sounds on the way in. Noticing isn't the point. What's important is that the sound around you has subtle benefits, uplifting and calming you, helping you find your way around the hospital when you are stressed, making the time pass more quickly.

This soundscape is the brainchild of Don Campbell, musician, researcher, teacher, and author of the

bestselling book, *The Mozart Effect*. The culmination of 30 years of investigation into the ways music affects our mind, body, and spirit, this subtle "audio environment" is the first of its kind designed specifically for a healing or hospital setting. It is a quantum leap beyond Campbell's world-famous repertoire of CD collections which use the science of music to enhance the ability to learn well, concentrate easily, study effectively, or relax deeply.

Campbell and his partners at Aesthetic Audio Systems, Inc. and Aesthetics, Inc., a multidisciplinary San Diego-based design firm, have put together a vast library of world music tailored to the unique function of each area of the hospital, from the intensive care unit to the chapel. Music will be used in each space to speed up the healing process, assure optimal performance by hospital staff, and help visitors best pass the time and find their way around.

This revolutionary approach to hospital design comes at a critical time. In September 2004, the Robert Wood Johnson Foundation released the findings of a report based on 600 studies showing that design in hospitals, including sound and light, can have a dramatic impact on how fast and how well patients recover from illness. Better design characteristics, including less noise, amount to fewer errors, fewer drugs, less stress, and better sleep. The report comes at a time when the Unites States is engaged in one of the largest booms in hospital building in its history ($16 billion spent in '04, and a projected $25 billion in '05). This once-in-a-lifetime construction program provides an opportunity to rethink hospital design, according to the report, entitled "Designing the 21st Century Hospital Project."

Exempla Good Samaritan, which opened in December, is ahead of the curve: Its designers hit upon the idea of "prescriptive sound" last year, as part of their effort to create a new, holistic healing environment. It is the first hospital to do so, but a dozen already have approached Campbell for the same custom-tailored service.

"We knew music was a very important part of this environment," explains Sandy Cavanaugh, vice president of community development at Exempla. "We had lots of offers for canned music from different companies but nothing felt right, so we kept looking until we found Don Campbell. With him, we realized we could do something that has never before been done."

The Science of Music

Two hundred years after Wolfgang Amadeus Mozart's birth, a French physician named Alfred Tomatis, M.D., began researching the connection between music and the brain. Of course, we don't need science to tell us that music — and sound generally — influences our tempo and our behavior. But we didn't really understand how it worked until Tomatis, often referred to as the "Einstein of sound" or "the Sherlock Holmes of sonic detection," came along. Tomatis, who died in 2001, is credited with creating the field of music therapy, which has touched more than 100,000 head injury patients, mental health patients, and people with auditory and vocal disabilities. Over the course of decades of hands-on work, Tomatis discovered that certain melodies carried by certain frequencies stimulate the brain, helping it to develop speech and improve movement. He also came up with the theory that music is energy food for the brain, as well as an instrument for healing.

"A hidden and primary function of the ear is to charge the brain with electrical potential," said Tomatis in an interview in *Music: Physician for Times to Come,*

The man behind the science and the music is Don Campbell, author of the bestselling The Mozart Effect.

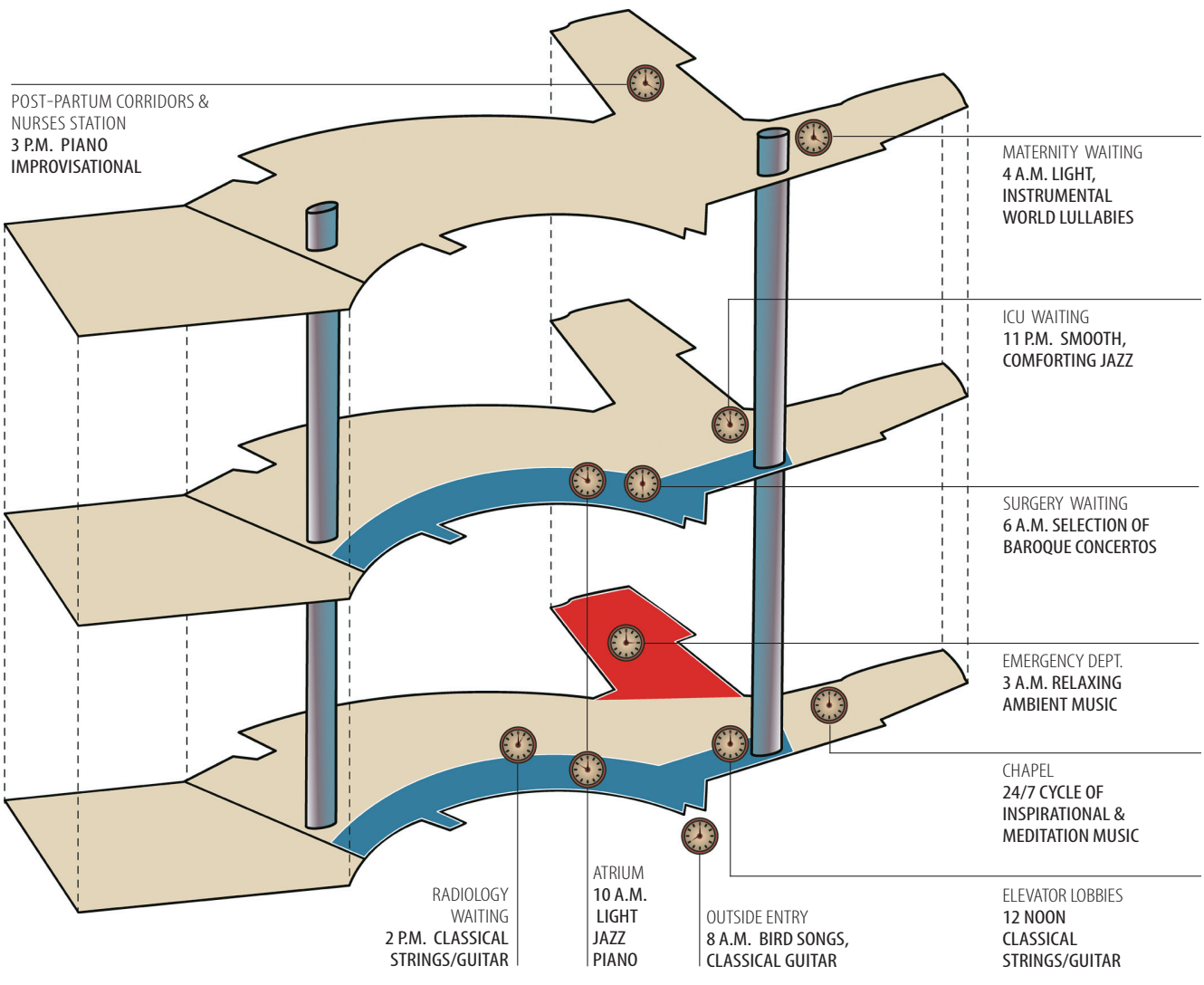
PHOTO COURTESY OF DON CAMPBELL

Design in hospitals, including sound and light, can have a dramatic impact on how fast and how well patients recover from illness.

Campbell's 1991 collection of essays by doctors, therapists, and musicians. "It's thanks to the ear that external stimuli are able to charge the cortical battery." He later applied this theory to listening to Mozart and many other forms of music, discovering that it "charged" the brain with stimuli that brought clarity and organization to the mind, improving its function and creating what became popularly known as "the Mozart Effect."

Two years later, Tomatis' theories were put to the test by researchers at the University of California at Irvine's Center for the Neurobiology of Learning and Memory. These ground-breaking studies revealed that students' scores on spatial IQ tests jumped significantly after 10 minutes of Mozart's "Sonata for Two Pianos in D Major," leading one of the researchers, Gordon Shaw, to conclude that Mozart's music may "warm up" the brain. Shaw, a physicist, theorized that complex music facilitates complex neuronal processes associated with higher brain activities such as mathematics and chess. The researchers, Campbell said, likened the Mozart

Exempla Good Samaritan Medical Center's 80-acre hospital campus in Colorado is the first hospital in the nation to be sound-programed 24 hours a day to enhance productivity for staff and healing for its patients, according to our ever-changing body cycles, the time of day or night, and the particular function of each area in the hospital. Dozens more are likely to follow suit during the current hospital construction boom.



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Effect to a "Rosetta stone for the 'code' or internal language" of higher brain function.

Further tests followed the Irvine experiments, including one that found that pattern recognition among students listening to Mozart improved 62 percent compared to students who listened to other kinds of music. Scientists expanded on their earlier theory about why the Mozart Effect works, proposing that the music organizes the firing patterns of neurons in the cerebral cortex, strengthening right-brain processes associated with spatial-temporal reasoning (higher-brain functioning).

Campbell, whose life work has been inspired by Tomatis, popularized these findings in his bestselling 1997 book, *The Mozart Effect*, showing the multiple ways in which different kinds of music can enhance learning and creativity — from our earliest perceptions in the womb (we become aware of high frequencies at five months). The research continues. For instance, music has been found to be stimulating to all forms of life, including plants and flowers. In one experiment, plants experienced exuberant growth when exposed to Indian sitar music; in contrast, plants in the rock-n-roll atrium withered on the vine.

PHOTODISC®

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Even four-legged friends respond to music. The latest breakthrough in music science came in April of last year, when geneticists at Stanford University uncovered the molecular basis for improved learning and memory while listening to Mozart — in rats. Rats hearing Mozart sonatas made use of higher levels of genes involved in stimulating and charging the connections between brain cells. The researchers hope to apply their research to music therapy to treat people suffering from Alzheimer's as well as other neurological diseases.

Harmonic Zones

At Exempla Good Samaritan, Campbell put this body of research to use in a novel way by working in a large public space and using Tomatis' rule of thumb: We live in sound, and sound lives in us, so it's best to choose the sounds that surround us. "Your own inner sound system — your ears, voice, and choice of music or self-generated sounds — is the most powerful healing medium available," writes Campbell in *The Mozart Effect*.

Campbell separated the hospital into unique musical "harmonic zones," each of which has a different function and "beats" to a different tempo and rhythm. First, however, he conducted extensive surveys and interviews with hospital workers about everything from the average waiting time and stress level for visitors to the particular duties of staff.

Armed with a storehouse of information from the surveys and his lifelong study of the science of sound, Campbell began creating Exempla's music library. It contains 9,000 (yes, nine thousand) pieces of music — all of which had to be licensed — to feed each harmonic zone around the clock, seven days a week, in an order that never repeats itself, with a peak and release every hour.

"This is about the psychology of listening," Campbell says. "It's important not to force it because people didn't come to the hospital for a concert. The music should be enhancing the environment, so there is an ease about it. Like feng shui, it works when it works as a whole, and not because of each component. The goal is to empower the healing process, to build the healthiest environment possible for all three constituents — patients, staff, and visitors. I believe this will be a ground-breaking innovation in hospitals."

A better soundscape is key to improving the experience of the hospital for visitors but, perhaps more importantly, it raises the quality of health care. By

To see and hear how Don Campbell's audio environment helps patients and the people who care for them, tune in to New Morning on the Hallmark Channel on Wednesday, April 6 at 7 a.m. EST.

reducing industrial and clinical noise in the hospital, patients, who have a hard time resting and sleeping in a noisy environment, heal more quickly, according to the Robert Wood Johnson Foundation report. Their report also found that staff is more prone to make critical (as in life-threatening) mistakes in hospital settings where distractions occur often and where noise and sound levels are high. Creating a health care environment in which staff can focus and concentrate is one of Campbell's most important tasks.

In addition to time of day, flow of movement and people, and waiting time, the emotional tenor of the space is important. In the entrance area, for instance, Campbell wanted to create a space that is heart-opening without being too emotional, one that is safe, comfortable, and stimulating at the same time. In musical terms, this is called "awakened" or "stimulated relaxation." Creating this effect involves moving the listener from a comfortable, easy pace into a faster pocket of music with an upbeat to keep the body from feeling sluggish. Vocals are fine, but Campbell ruled out music with words in all areas, except the chapel.

"Songs with words click in a story line and open up another part of brain," Campbell explains. "We may take a wonderful song but find an instrumental version so the tune is familiar, but words can't get in the way. What if you are waiting for your husband in the ICU waiting room and hear 'You'll Never Walk Alone'? Or you're waiting for your wife to recover from cosmetic surgery and 'I've Grown Accustomed to Your Face' comes on?"

Jokes aside, the tempo, beat, and frequency of a piece of music are also key to determining the optimal soundscape. Each one affects the mind and body — and consciousness — in particular ways. If a piece has a tempo that is below heartbeat or with the heartbeat, for example, it tends to relax the listener. Music with an upbeat (faster than the heartbeat) tempo is stimulating and energizing. Tempo and rhythm also need to be altered often — and altered according to the time of day and night — so that the beat doesn't "entrain the brain," causing it to lose its ability to induce certain body-mind responses, Campbell explains.

Campbell must also consider the way in which music affects the brain itself. Music that induces beta waves is stimulating and invigorating to the mind. Music that has low beta and high alpha content is relaxing without being soporific. A deep relaxation state is created by music that induces both alpha and theta waves.

Music Theory in Action

At the nurse's station next to the chapel, the music is designed to keep the staff in a relaxed, on-their-toes state. The last thing Campbell and Aesthetic Audio want to do is play soporific music that makes the nurses nod off, or time pass too quickly when they already are running out of it. Enya is out. Chamber music, particularly Mozart and Segovia, or The Chronos Quartet, is ideal. In the Intensive Care Unit, where people are waiting for someone just coming out of surgery, however, the music is deeply relaxing and calming, below heartbeat, low beta and high alpha. In Pediatrics, where kids are on the floor under the chairs, a different level of tension exists, requiring fresh and uplifting music that runs with the heartbeat and is beta-stimulating. Jazz, which has an unpredictable and creative pulse, works well here. Dave Brubeck might be in order. Or Liz Story.

The chapel area, a safe, heart-opening interior space in which to pray or be silent, has the most sophisticated and carefully arranged aural environment in the hospital. Every two or three hours, there is one piece of music for deep meditation that lasts about 20 minutes. Campbell's choices run from Brian Eno to unusually beautiful arrangements of "Amazing Grace" (without the words).

"You aren't there to take a journey through world religion," he jokes. "You don't want to put a Mexican-American Catholic family through a Koranic chant and you have to figure that there probably aren't too many Tuvan shamans in the area. That's why I would go for something more neutral and wordless, but inspirational like a flute rendition of "Ave Maria," or something transcendent like [Andrew] Lloyd Weber. It must be something that is spiritual to you, whatever your religion."

Campbell breaks his no-words rule in the chapel because sacred music is constructed in a subtle but sophisticated pattern, which often includes words sung repetitively. There's a reason for this: Certain sacred music, like Gregorian chants, uses words to set the rhythm and has no tempo or interruption. As a result, Tomatis discovered, the singers sound as if they are hardly taking a breath. This "slowest possible breathing" is what the music doctor called "a kind of respiratory yoga" requiring the singers to be in a state of absolute tranquility and peace. The "sacred effect" of the music

is achieved by inducing the listener to enter into the same deep breathing pattern and tranquil state as the singers.

"You lead [listeners] into a chant of serene and supple respiration, and at a given moment, you'll see [their] whole cardiac pattern calming," Tomatis explained in *Music: Physician for Times to Come*. "And little by little a feeling of well-being comes over [them]." That's a good thing, especially in a hospital.

Campbell is elated — and exhausted — by his creation. "No one has done this before because no one has had either the wisdom or the tomfoolery, not sure which," he mutters. But the work is hardly over. Campbell and Aesthetic Audio are in negotiations to individually wire a dozen more hospitals by the end of next year — but not before they conduct extensive surveys of staff, patients, and visitors at Exempla to determine if the soundscape is working optimally in each area of the hospital.

"We will ask lots of questions, including what kind of attitude are we creating over a 20 minute period, and how do we allow people to feel better as they pass their time thinking, reading, worrying," Campbell says. "We will ask staff if the music got in the way or enhanced their ability to work, and whether it helped patients or not."

A revolution in music technology — digitizing music — has made this project possible, notes Annette Ridenour, president of Aesthetics, Inc. "The biggest problem, pre-digital technology, was that someone would always forget to change the CD," she says.

Now, four massive computers in the hospital's basement take care of the job, running and remixing the music according to complex programming created by Campbell and Aesthetic Audio to determine what plays when and where in the hospital. It's like having a music doctor in the basement, spinning all day and night.

Once the public areas at Exempla have been musically perfected, Campbell is going to introduce phase two: allowing patients to choose what kind of music they want to listen to in their hospital rooms. The music doctor's selections will be chosen as much for pleasure as for therapeutic potential, and sound will be piped in — through your pillow. ❖

Louise Danielle Palmer is the deputy editor of *S&H*. She contributes to a range of national magazines and newspapers, and is a former staff political writer at the *Boston Globe*, as well as a nationally syndicated feature writer for Newhouse Newspapers.

The Sound of Music: Stories from Unlikely Places

- **In Washington State, Immigration Department officials play Mozart and Baroque music during English classes for new arrivals from Cambodia, Laos, and other Asian countries; they believe it speeds up their learning.**
- **At St. Agnes Hospital in Baltimore, Maryland, critical care patients listen to classical music. "Half an hour of music produces the same effect as 10 milligrams of Valium," reports Raymond Bahr, M.D., director of coronary care. At Nathan Goldblatt Memorial Hospital in Chicago, Illinois, music precedes anesthesia in the operating rooms.**
- **Ohara Brewery in northern Japan claims that Mozart makes the best sake. When played, the density of yeast used for brewing the traditional Japanese rice wine increases by a factor of 10 (more yeast equals better sake).**
- **Monks at monasteries in Brittany who play music to the animals in their care have found that cows serenaded with Mozart produce the most milk.**

—*From The Mozart Effect* and *Music: Physician for Times to Come*

Aesthetic Audio Systems, Inc. creates custom audio programming for public, patient and clinical spaces in healthcare institutions using therapeutic principles of music and listening.

www.aestheticas.net

Studies have shown that acoustic environments affect how we feel, work and balance the body's health and well-being. The design of appropriate auditory environments creates positive mental, emotional and physical experiences and impressions.

Aesthetic Audio Systems, Inc. introduces Harmonic HealthCare® auditory environments in healthcare spaces to enhance and reinforce the healing experience for patients, visitors, caregivers and staff.

Features

- Custom designed audio systems address the specific needs of each zone
- Beautiful and artistic quality settings encourage "sound health"
- Reduce the "time–space experience" of waiting
- Camouflage or mask the noise of electronic medical technology, shift changes, traffic and other disturbances

Benefits

- Reduce stress and anxiety
- Invigorate and refresh the minds of patients, visitors, caregivers and staff.
- Increase satisfaction and enhance the healing experience
- Emphasize the institution's focus on compassion and caring

Our Method

- Use evidence-based methodology as we carefully consider each institution's unique architecture, geographic location, and culture
- Assess the auditory and acoustic environment of every room – from the lobby, to emergency waiting, to the chapel, to the administrative offices – and each outside space
- Consider the wellbeing of patients, their families and visitors, as well as staff, through the therapeutic principles of music and listening
- Study the waiting time, patterns of flow and movement of people at various times of day
- Recommend a blended design of light classical, smooth jazz, ambient and world music to provide a variety of harmonic experiences and to produce an atmosphere of "energized relaxation"
- Implement a system of Harmonic Zones™ so that each area has a unique personality, modified through the day and night

Our Process

- Comprehensive on-site sound and acoustical evaluation of the environment, on a per zone basis
- Interviews with administrative and clinical teams
- Noise audit to determine auditory problem areas
- Hardware and software audit to determine existing systems
- Assessment of the auditory goals and objectives of the healthcare facility
- Music and sound recommendations for each zone
- Hardware and software specifications
- Installation and implementation of the Harmonic HealthCare system
- Site training and employee orientation with troubleshooting guides
- Local technical support
- Periodic system updating

Contact us to learn more about how Aesthetic Audio Systems, Inc. can bring this life enhancing experience to your institution.

Aesthetic Audio Systems, Inc.

Aesthetic Audio Systems, Inc. is a combined venture of three internationally known experts in their fields.

Don G. Campbell

www.mozarteffect.com

Principal, Musical and Acoustic Services, Don is a well known composer, author of 18 books including *The Mozart Effect®*, and an international speaker on the healthy properties of sound and music. He brings over 35 years of experience to the selection of appropriate music for each public space based on the needs of patients, visitors and staff.

Annette Ridenour

www.aesthetics.net

President of Aesthetics, Inc. and Principal, Marketing for Aesthetic Audio Systems, Inc., Annette has designed multi-sensory healing environments for healthcare institutions for nearly 30 years. A leader in her field, she is a sought after lecturer on the effects of the arts in healthcare.

David M. Corbin

www.davidcorbin.com

President of The Performance Technology Group and Principal, Operations for Aesthetic Audio Systems, Inc., David is an author and lecturer on how to create and maintain brand impressions for corporations. He has advised healthcare institutions on how to develop customer service programs that reinforce branding and exceed customer expectations.

Rev. 04.16.08