

# **ON HEARING SPACE: ECHOES IN JAZZ**

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*for Charlie, King Coltrane*

Recently I listened to *Miles in Europe*, recorded at the 1963 Antibes Jazz Festival (*Festival Mondial, du Jazz Antibes*), and chanced upon an intriguing personal discovery. I make no claim that what I heard was the intention of the musicians who played—but merely report on avenues of thought the musical experience led me to consider, including the nature of the relationship between music, space, and architecture.

This concert is an historic moment, featuring the group that would become the next step in Miles Davis' evolution from the cool jazz *Kind of Blue* era into the world of jazz fusion. The personnel includes Miles on trumpet and George Coleman on tenor sax, with the remarkable rhythm section of Herbie Hancock on piano, Ron Carter on bass, and Tony Williams on drums. After the opening theme statement, Miles plays over the changes. Like any good jazz improviser, he depends on the listener to hear the implicit harmonies against that original theme. Piano bass and drums maintain a steady beat and cadence, so Miles can follow a line to where it leads.

Then George Coleman takes his turn, and one can't help but think he had John Coltrane over his shoulder. Not only was he playing a straightforward improvisation over the melody line, but also he had to manage Trane's implicit influence-- so much so that you might say he started by simply channeling Trane. Those upsides into leading tones have fooled more than one listener into thinking it IS Coltrane playing.

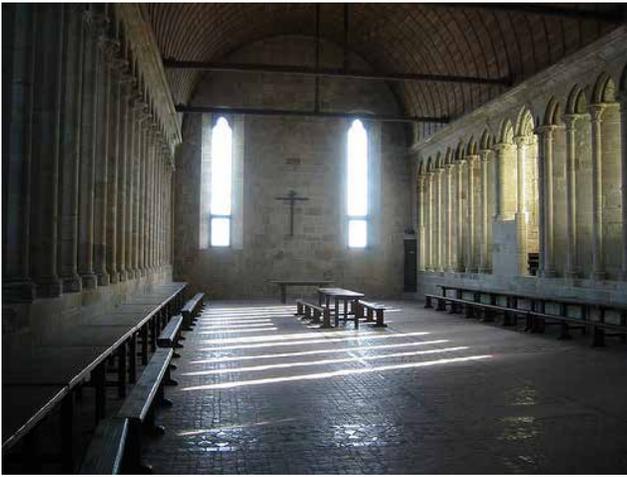
On the unenhanced recording you can hear some of the echo of the hall, but the position of the recording mikes favors taking in the instruments' sounds directly—cutting out most of the sustain and reverb that might have been naturally produced by a concert hall's physical environment.

I was curious about how the music would sound with more presence, so using the computer's equalizer and other digital tools I altered the acoustic settings to hear what might happen to the sound. Using my Voyetra Turtle Beach software, I adjusted its Santa Cruz equalizer, pushed the bass, added reverb, and selected "Large Hall" \* as the ambient environment-- and the 17 minutes of Miles Davis and George Coleman solos on the track *All of You* sounded "right" to me. \* I am an architect, not a trained musician, but the young American composer Adam Schoenberg heard it and sensed and confirmed the sound experience too. The digitally enlarged space produced an echo and overlap of reverb that not only created a very full tone, but also, to my ears and mind, transformed the already rich soliloquies of the solos into dense dialogs of layered rhythms and harmonies-- canons, if not more complex musical forms.

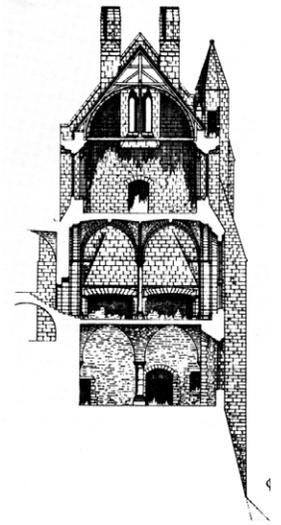
Coleman's solo in particular, (from around 7:00 minutes to 9:08, especially from 8:40 to 9:08) seems to remake the complex melodies and arpeggios into an unpremeditated contemporary form of counterpoint, even fugue. It becomes a tapestry of woven lines layered via time delay atop one another that sounds (to me) that for a brief and blessed moment Coleman is truly playing the ultimate realization of Coltrane's celebrated "sheets of sound." George Coleman clearly is under Trane's enormous influence, but as he gets into it, one of his best recorded solos ever, he goes further into his own thing—with the reverb that reed/register song is indeed a new thing. I can imagine that in his "mind's ear", that's how Coleman heard it, just as I live it large hearing myself sing in the shower— full, rich, with all the overtones. A tenor's tenor, a baritone's baritone.

My distinct impression is that what Coleman is doing is talking to himself, as if the solo and harmonizing at same time make him more the conductor of his own orchestra than merely a one-voiced singer. I admit that both Monk soloing on piano or just Coltrane soloing himself have sometimes conveyed this impression, but to me they were filling space more in imagination than actual acoustics. But that is what full reverb does, it seems to fill the volume, and not just present something to us, but surround us, overwhelm us.





It recalled for me the astonishing space of *La Merveille*, at Mt. St Michel (c. 1228) where decades ago my single gentle push to close one of the centuries-old perfectly balanced window frames created a sound in that great stone hall that must have been sustained for at least 5 seconds. Instantly I had an insight into the era of Gregorian chants (an insight borne out in numerous albums I've heard since) —those sequential solo tones are meant to overlap, so that one can sing harmony with oneself!



## REVERBERATION SPACE

The phenomenon I experienced at *La Merveille* is called reverberation.

A reverberation is somewhat different from an echo. When you shout from a mountainside or in a large canyon, where the walls are more than 50' away from you, the time delay between your shout and the returning reflected sound will be more than 0.1 second. Since our perception of a sound only endures in memory for 0.1 seconds, we perceive this returning sound as distinct from the original. This is what we call an echo. When the reflected sound comes back to you in less than 0.1 second, for example when you sing in the shower, you experience multiple sound reflections that overlap. This is reverberation. We feel a room to be spacious when the reverberations that reach each of our ears are slightly different. Sound in a room with a low ceiling will reach both ears at the same time. Thus a concert hall will often have high ceilings so that the first sound to reach your ears comes from the walls, which are usually unequally distant from each ear.

Musicians have deliberately exploited these phenomena in their work. For example, inside the Taj Mahal the flautist Paul Horn used both near reverb and and far echo sound reflections off the myriad marble surfaces to amplify his lone melody line into dancing arpeggios overlaid onto long meditative sets of overtones to create beautiful and haunting music. The Native American flautist Carlos Nakai, uses a similar strategy outdoors in the American Southwest, where distant walls of mesa and canyon create the outdoor echo chamber. These near and far voices mixed with the wind and the natural calling of birds, crickets, and other insects creates a profoundly introspective yet visionary mood in the listener. One cannot help but imagine his recording *Canyon Trilogy* was made at night.

Space can be vivid when we listen. (One thinks of Paul Claudel's evocative title *The Eye Listens*.) Reverberation and echo are important cues for our sense of space. Another setting I made for my equalizer is adjusted to create the feel of a small intimate space, with virtually no echo or reverb, among other changes. I call this customized setting "Village Vanguard." In the other direction, we can expand our sense of a great volume even into becoming a space without visible boundaries. One can only imagine what space must mean to the great whales of our oceans. But I can report that with my large hall/reverb settings on *So What*, from another recording of Miles in Europe at the same time, George Coleman's solo sounds very much like the recorded songs of the Humpback Whale!

MAGISTER LUDI: can the enlightened master weave counterpoint with him or her self into continuous improvisation? George Coleman improvising fugue-like patterns over himself brings to mind the the violin lesson of *The Glass Bead Game*, as described in Herman Hesse's novel *Magister Ludi*. My own conceit is that Acoustic Space plus Optical Space equals Vestibular Space, the space the inner ear experiences-- without visible boundaries, but rather sensed through echo and reverb, as well as through balance and translation of position. This may be similar to the echolocation used by bats and dolphins as they navigate their oceans of Void and Dark. Might it be dark matter and/or dark energy that allow these musical reverberations to fill all dimensions of a space? I can only say that the music fills me in ways that I wish architecture did, but I honestly find much more intensely in music. (Note: In Coleman Hawkins Encounters Ben Webster, track 8 = track 1, but no reverb!)

## RESONANT [MIND] SPACE

*“I play exercise every morning, but my specialty is to play exercise only with one hand and improvising in the right hand,” Solal says. He demonstrates on the keyboard. “See what sort of music it is? It’s very enjoyable, because it’s never the same. ... I could play for 100 years. It would be never the same, because right hand is very free to do what she wants, and left hand plays just the melody.” Martial Solal*

When the sound waves that create reverberation bounce back from their boundary surfaces in a closed space in such a way that they continue with little loss, they create a standing wave. As more acoustic energy enters the chamber, it can combine with and reinforce the standing wave, increasing the intensity or volume of the sound. This space is called a resonance chamber. It occurs within musical instruments, which is why a bowed violin string can sound much louder than when it is plucked. The string’s vibration generates standing resonating waves in the soundbox of the instrument which build upon each other as the bow continues to stretch and vibrate the string. An entire space can be a resonance chamber which is of course the basis for acoustic design of concert halls.

There is another kind of resonance fundamental to music. With all due respect to Robert Slutzky and Colin Rowe, we may term this a kind of *phenomenal* resonance, to distinguish it from the physically literal acoustic resonance discussed above. Phenomenal resonance is the reinforcement of musical structures that we perceive when our brains transform the sound signals from our ears into musical order. Bob Dylan once wrote a poem is anything that can walk by itself. By the same token, a piece of music is something that has an identity-- a memorable order.

Musical forms that assist in this process include counterpoint, fugue, and canon. **Counterpoint** is the relationship between two or more voices independent in contour and rhythm but harmonically interdependent. **Fugue** is a contrapuntal composition for a fixed number of parts or “voices”. **Canon** is a contrapuntal composition that employs a melody with one or more imitations of the melody played after a given duration (e.g. quarter rest, one measure, etc.). The initial melody is the leader or *dux*, the imitative melody, played in a different voice, is the follower or *comes*. The follower must imitate the leader, either as an exact replication of its rhythms and intervals or some transformation thereof. Rounds are repeating canons with all voices are musically identical such as “Row, Row, Row Your Boat” and “Frère Jacques.” Thus counterpoint, fugue, and canon can create mental resonance.

So we may say, without too much stretch of the imagination, that the mind itself is a resonant chamber. Given the right cues, the brain in its cranium, perhaps linked by nerve communication with hollow heart and soul-viscera is the integrating organ of the senses the most sensual of all the organs. Simply put, the head is the resonance chamber of the intellect.

Since it is now possible to digitally separate the spaciousness of the room (chamber) from the spaciousness of the music, as I did with the reverb settings on *All of You*, we can consider the unique contributions of each to the overall composite effects. Adding increased physical reverberation to the original musical line may give us a window into the improviser’s internal singing using the “voice-over” compositional techniques of varieties of counterpoint, guiding tones, and the like. It is as if we are hearing with the performer George Coleman’s “inner ear” how he talks to himself, soloing and harmonizing at the same time. This kind of mental resonance can intensify the musical form as well as the sound. As all inputs interact and that ultimate sense organ the brain feels itself, the music can create an intensity of feeling, opening the intellect feeling one thing with another, empathy, compassion-- emotion.



## DARK SPACE

*Don't play what's there, play what's not there.*

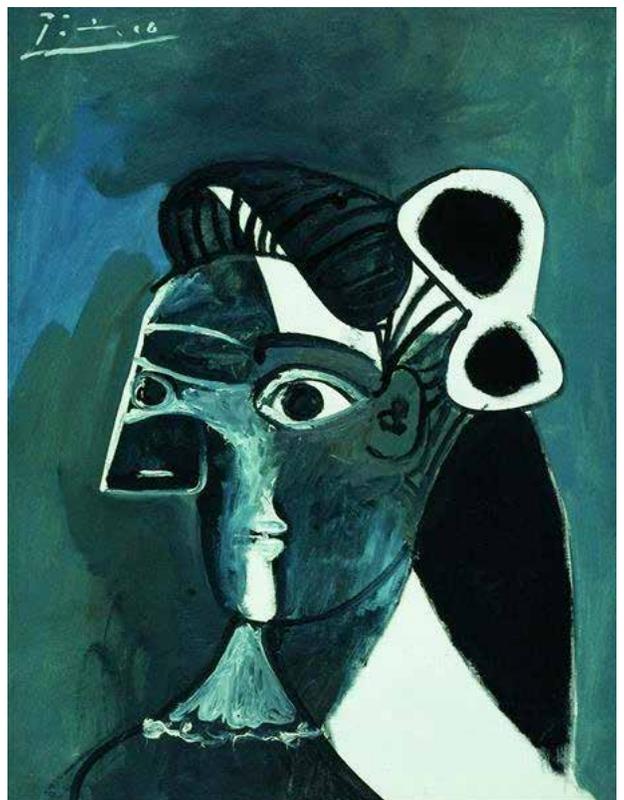
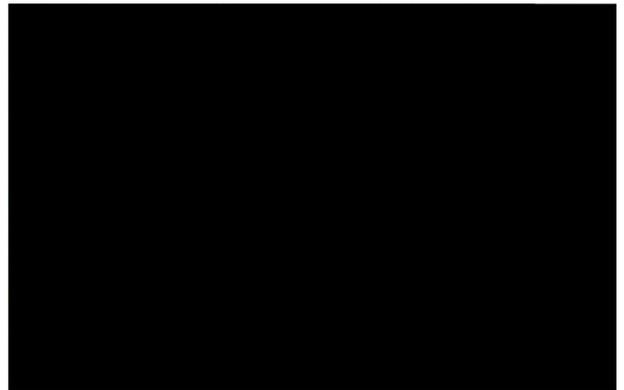
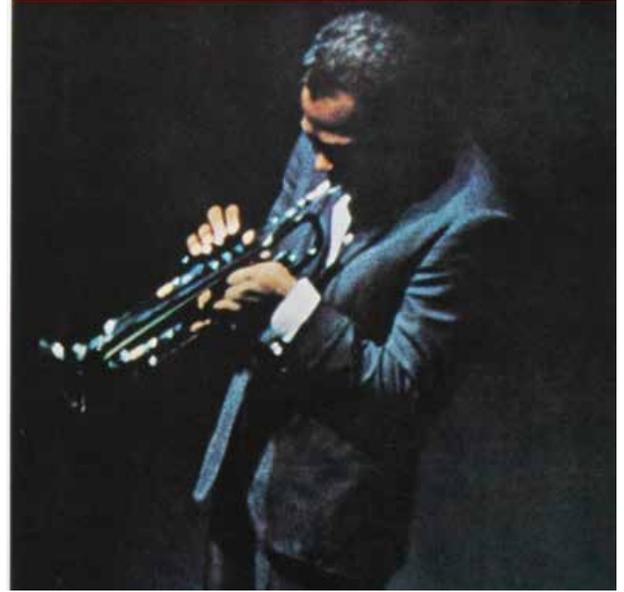
*Miles Davis*

A current mystery in physics is why is the visible energy and matter we can account for such a small proportion of the total? Or to put it another way, why is almost all the energy and matter in the universe **dark**?

Is it any surprise that the means for conquering the dark, electricity, was also the means to for universal access to contemporary music, including jazz, a genre with a distinct affinity for the dark. *Round Midnight, Blues in the Night, Lullaby of Birdland, We Kiss in the Shadows, East of the Sun, Set 'em Up Joe, Strangers in the Night*, even *Brilliant Corners* are easy and obvious modern titles that allude to the emotional power of nocturnal space.

Dark space seems immeasurable-- we cannot see its boundaries, only sense its immensity through well-trained ears. But dark space does not have to be empty. Quite the contrary. If we think of a desert as an empty space filled with silence and light, then do we not also think of the forest as a space filled with dark and sound? As Turnbull observes in his study of the Mbuti, *The Forest People*, the tree-filled rainforest eliminates horizon *and* perspective. Perhaps a fully Radiant city would be resonant as well, but the hardline clarity of modernist renderings in black on white, from Le Corbusier's birds-eye views of the City of Tomorrow to the New York Five's analytic axonometrics seem a far cry from the lights-down-low colors of the music of Barry White, *Kind of Blue*, *Q's Juke Joint*, or indeed in George Coleman's *All of Me*. The modern architect's comprehensive overview came at a cost, which was that one saw the space at a distance, from without, rather than within.

The cool detachment of the luminous overview was considered a virtue in the Heroic Era of Le Corbusier's Cartesian Skyscraper. Le Corbusier's famous composite icon of the Apollonian Sun and the serpent headed Medusa seemed to offer no other alternative. But perhaps the subdued dark and blue light of jazz, subtle as moonlight, offered a synthesis-- precision and emotion in the space of darkness. The water in front of the Greek stage at theaters like Delphi was there to amplify the voices of actors and chorus. It was an early attempt to make the listening space an extension of the resonator in the speaking or musical instrument. The black holes in the guitars of the Cubist works of Picasso, Braques, Gris, and even Le Corbusier are powerful dark spaces-- resonators both precise and boundless. Is not Jacqueline's eye in this late Picasso portrait also the door into the dark space of the music of the guitar?



## MUSIC EMOTION SPACE

*My house is practical. I thank you, as I might thank Railway engineers, or the telephone service. You have not touched my heart. But suppose that walls rise towards heaven in such a way that I am moved. I perceive your intentions. Your mood has been gentle, brutal, charming or noble. The stones you ave erected tell me so. You fix me to the place and my eyes regard it. They behold somnething which expresses a thought. A thought which reveals itself without word or sound, but solely by means of shapes which stand in a certain relationship to one another.... They are a mathematical creation of your mind. They are the language of architecture.*

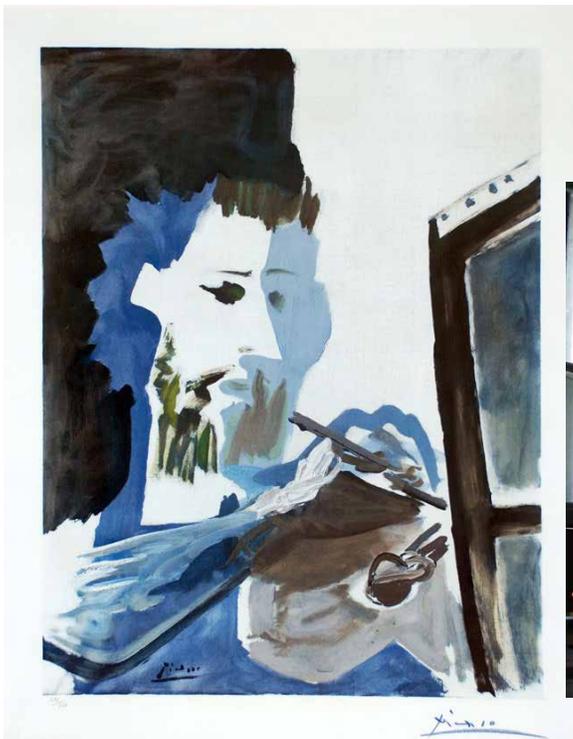
*Le Corbusier Towards a New Architecture p. 179 Etchells translation 1931.*

*Herbie Hancock helps turn the standard "I Thought About You" into an impressionistic and free-flowing ballad allowing Davis to spread wide swaths of tonal color and deep note bends across the stage.... Hancock builds on the lyricism of Bill Evans (another Davis alum), yet introduces an extremely spare chordal technique that gives the music a free-floating, spacious feel. The blistering cross-rhythms of Carter and Williams ... add intriguing complexity to the ballads "All of You" and "I Thought About You." Saxophonist George Coleman is a formidable player with a light, fleet-fingered, and harmonically inventive approach.*

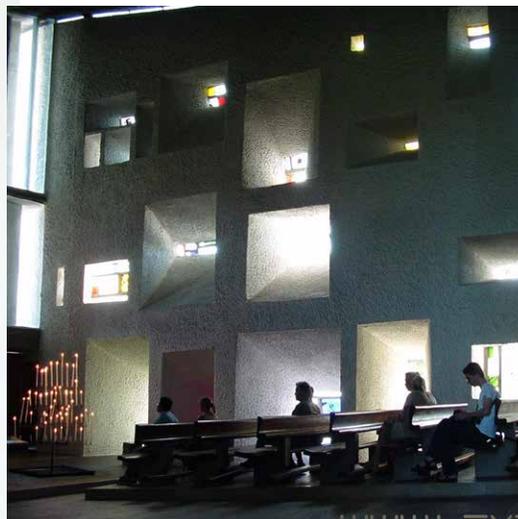
*From Liner Notes to the album by Harvey Pekar and Ralph J. Gleason;  
Festival Mondial Du Jazz Antibes, Juan-Les-Pins, France (07/27/1963)*

My grandfather had an orchestra. He was conductor and concert-master. He played violin and piano. I have always loved music but am not very good at playing it. My family says that when I play *Joy Spring* it sounds like a dirge. However, my 3D sense was always strong, and ultimately I became an architect. But I have always been jealous of the emotional power that music has. Yes Le Corbusier says "passion can create drama out of inert stone," but whoever made love because of a space? Yet every generation has its "make-out" music. Music echoes, reverberates, resonates. These tones FILL space. Music FILLS me in ways that I wish architecture did, but I honestly find much more intensely in music. I have experienced many dramatic and wonderful architectural spaces including Chartres and Mont St. Michel, Borromini's San Carlo alla Quatre Fontana, Michelangelo's Ricetto at the Laurentian Library, the Blue Mosque, Wright's Unity Temple, and all 3 of Le Corbusier's sacred spaces, the Chapel at La Tourette, Ronchamp, and Firminy.

So I have known first hand the emotional power of architecture, but in me it has not come close to the emotional power of music. Lack of sight is not at all a hindrance in music. Not only do the ears suffice but it seems the mind and yes even vision grows without the distraction of sight. If 90% of our brain is devoted to sight processing, of course sound processing can get easily overwhelmed. The liberation of music without sight has well served Ray Charles, Doc Watson, Stevie Wonder, Rahsan Roland Kirk and so many others.



Stereo means "solid." We listen IN the sound, the sound surrounds.



We exist IN resonant space, literal and phenomenal. Improvizing master musicians like George Coleman on *All of You* not only design space from the inside out, they build it in real time as they explore the structures they invent. Enlarging that space through enhanced reverb and other digital means intensified my musical experience. I wonder if we shall find similar revelations for architecture.



*Night Fishing at Antibes*  
Pablo Picasso August 1939

*"Miles Davis is the Picasso of jazz."* Duke Ellington

Miles Davis' painting *Shape Shifter* overlays his painting *Naked Profile*

