

# Fugue No. 16

G minor

*Well-Tempered Clavier Book II*

Johann Sebastian Bach

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**Subject:** Fugue No. 16, *Well-Tempered Clavier*, Book II

Aristotle taught that wisdom begins with wonder, and that the spirit of philosophy--the love of wisdom--flourishes in the sunlight of beauty, transcendence, and majesty. In that spirit I liken the fugue to a most wonderful place:

- Grand Canyon
- of the Colorado
- with its layers upon layers
- of counterpoint
- and voices

## **Grand Canyon**

In 1963 Colin Fletcher became the first man to walk the length of the Grand Canyon below its rim. Beginning at Hualpai Hilltop, Fletcher trudged eastward through the rift canyon of Havasupai Creek, across the Esplanade, around Great Thumb Mesa, through Conquistador Aisle, on to the Tonto Platform, past the Palisades where he swam the Colorado, then proceeded up Nankoweap Creek to Point Imperial on the North Rim.<sup>2</sup> As the crow flies, Fletcher's journey

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<sup>2</sup> The broad terrace of Bright Angel Shale, known as "The Tonto," separates precipitous cliffs of the outer gorge from the even more sheer cliffs of the inner. The Tonto trail runs the length of the south Tonto plateau, more than seventy miles.

spanned forty-three miles. But "as the foot slogs," more than four hundred!

Why did he do it? In *The Man Who Walked Through Time*, Fletcher wrote that it had "something to do with the colossal sameness of the Canyon...a sameness not of monotony but of endlessly repeated yet endlessly varied pattern" (p. 101). How like the fugue! Just substitute fugue for canyon in the foregoing sentence and you've got it!<sup>3</sup>

Fletcher develops the fugal analogy as an interweaving of the "scattered and disparate strands of life," an underlying "counterpoint to the unique basic rhythm of the universe" (p. 177). He uses the Canyon to illustrate "multiple parallels that permeate everything we know," a "rhythm of rocks" in "point and counterpoint" (p. 113).

Our "subject" is the magnificence of rock sculpted by water. It receives "exposition" in views from the south rim, one continuous transformation of a single theme--a chasm filled by a river and bounded by cliffs. Our first panorama is from Yuma Point, a thousand feet below the south rim, overlooking the Hermit basin. The subject is answered in a view of the Bright Angel fault, bisecting the Canyon's inner gorge north to south. The Exposition closes with vistas from the top of Horseshoe Mesa, east toward the Desert Palisades, then west across Cottonwood Creek toward Grapevine, one of the deepest of the Canyon's countless side canyons.

The fugue's 1st development begins with an early morning shot toward Boucher basin, just before you drop over the Redwall (see the redbud in bloom?). While the 1st sequential episode ascends, we go in the opposite direction, deeper into the canyon, to the Tonto Plateau looking northwest, followed by views of Shiva Temple and Hance Rapid, where we cadence on the dunes in c-minor. This will be our low point. From here it's all up--a vertical mile to the rim!

## **Of the Colorado**

When García López de Cárdenas discovered the Canyon in 1540, he called it, and the river that made it, Colorado--*in many hues of red*. These colors were painted by the river, carving its way through layers of limestone, shale, and sandstone impeding its path to the sea. From the rim, the Colorado looks like a tiny stream; but it is one of America's most powerful rivers. At peak flows of

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<sup>3</sup> Before reading Fletcher's book the impulse to make this comparison had overtaken me once on the Tonto trail between Boucher and Hermit creeks. I was backpacking with my brother Mark and three of his buddies, Jeff, Denny, and Grady. Thanks to these guys for the photographs used in this movie! At the moment of inspiration, the subject of this fugue was looping through my head at precisely the tempo one moves with fifty pounds on his back. I remarked to Jeff, who was scouring the trail for trilobites, how much the Tonto reminded me of a fugue. "How so?" he replied. I muttered something about transient keys within keys within keys, but Jeff was obviously more interested in fossils. Six months later I read Fletcher's description with great delight: "Every step was zig or zag: zig along a sidecanyon; zig again for a side-sidecanyon; then zag along its far side to resume the first zig; almost at once, a new zig for a new side-sidecanyon; and then another zig up a side-side-sidecanyon. And the going was almost never level" (p. 71).

210,000 cubic feet per second, it could move boulders the size of small houses.<sup>4</sup> Grand Canyon was made by it.

If water made it, water also brings Grand Canyon to life. In the fugue's 2nd development we return to the Tonto Plateau, pausing to explore shaded ecosystems of Grapevine Creek, at this time of year not really a creek, but a trickle, mostly underground, emerging only to gloss the slickrock or mist the ferns as it cascades around a boulder, or pools around a precariously planted cottonwood. The water that brings it life will, in the next 50-year flood, bring death.

Here the water is, by desert measures, plentiful--enough to keep the algae and tadpoles, ferns and cottonwoods, and us, alive. If the many layers of sedimentary rock are the Canyon's subject, water is its countersubject (low voice) always accompanying the subject if you only know where to look. So don't assume that the Canyon is "grand" just for the scale of it all. Its 2nd development reveals a grandness of intimacy; its subject and countersubject are grand even in their smallest dimensions.

Reemerging on to the sun-baked Tonto, we encounter the Canyon's countersubject in another guise: life-giving water in cacti beautifully adapted to find it in adverse conditions. The 3rd development blossoms in proof that life will always find a way; just don't get too close--Ouch! To show that he too can devise ingenious variations on a theme, Bach has strettoed his subject and countersubject, for the first time, in double counterpoint with two measures of separation.

In the fugue's Exposition we started at the south rim looking into the chasm, north. In the Coda we stand on the Tonto looking in the opposite direction. This is my favorite vista! At any point on the Tonto you'll be overwhelmed by the magnificent limestone Redwall--the thickest and most sheer of Grand Canyon's many layers.

### **With Its Layers Upon Layers**

First-time visitors to the Canyon are awed by its brightly-colored layers of sedimentary rock. By some estimates, every inch was hundreds of years in the making! Park Rangers help visitors to learn the order of these layers by memorizing this sentence: *Know The Canyon's History; Study Rocks Made By Time.*

**Kaibab Limestone**  
**Toroweap Formation**  
**Coconino Sandstone**  
**Hermit Shale**  
**Supai Sandstone**  
**Redwall Limestone**

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<sup>4</sup> This volume was recorded in 1884. Following the construction of Glen Canyon Dam, flows rarely exceed 31,000 c.f.s. There is evidence in the geological record of spike flows in the range of 300,000 c.f.s. every one thousand years. This information courtesy of Dr. David Best, geology professor at Northern Arizona University.

Muav Limestone  
Bright Angel Shale  
Tapeats Sandstone

The parts of a fugue are also layered. Most fugues have four layers, named for the voices in a choir--**Soprano, Alto, Tenor, Bass**--or SATB. The *Well-Tempered Clavier* has one fugue for two voices, several in three voices, and two in five voices.

On my second night in the Canyon, we camped at Hance Creek (deep inside the Tapeats fissure just beyond the yucca plant). There was a full moon and it was glorious. At about three in the morning we were awakened by some young fellows hiking out the Grandview Trail by moonlight. Without flashlights, they had become separated from one member of their group, and another had broken his arm. They couldn't locate where the trail resumed on the other side of the creek, so we showed them, and promised to look out for their friend.

After they left, I couldn't sleep, so I sat on a ledge and savored the beautiful night. Even by the brightest of moonlight, I could barely discern the Canyon's layers--only the broad shapes and outlines of its cliffs and terraces. How different it was by sunrise; now I could see the layers! To help you see the layers in this fugue, I've provided toggle buttons at the bottom right.

This is an SATB fugue. On both the score and timeline the soprano layer has been represented in gold, the alto in blue, the tenor in dusty rose, and the bass in green. These colors make the fugue's layers visible, even to persons who don't read music. But there are times when even skilled music readers find it difficult to determine which layer represents which voice. Just remember this rule: the layers never cross. The soprano is higher than the alto, which is higher than the tenor, which is higher than the bass--the Coconino is above the Hermit, which is above the Supai, which is above the Redwall. They don't get jumbled up.

But they do sometimes drop out. It can be tricky, then, to determine which voice is which when one has temporarily stopped sounding. This happens to the tenor in m. 16 and m. 40, to the alto in m. 23, and to the bass in m. 28. In m. 67 the soprano and bass both take their leave. Study these measure using the Colorado version of the score and see how the colors are always in the same order, top to bottom, with one color missing. To determine which voice is missing, study the ranges of the remaining voices, how they interact with each other, and how Bach has notated rests.

The fugue's subject, when not perceived as being "in a voice," is like the Canyon's moonlit shapes, of imperceptible depth and elevation. Multiple shapes merge, becoming indistinguishable from each other. With the rising of the sun, and its colors, it becomes possible to discern the height and distance of each ridge, butte, and side canyon. Shapes become three-dimensional.<sup>5</sup> Similarly,

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<sup>5</sup> One of my hobbies is collecting stereo cards of the Grand Canyon. These sepia-toned photographs, typically a hundred years or more old, can be viewed in three dimensions through a stereopticon. I have some rare cards of Bill Bass who built the trail that bears his name (the ruins of Bass Camp are beautifully described in Fletcher's book). The grayscale photos of this movie are inspired by this 19th-century technology.

the fugue's voices lend color, allowing us to distinguish each entry from the others by its depth, timbre, and elevation.

### **Of Counterpoint**

This fugue, of all the 48, is most famous for its double counterpoint. Many fugues have double counterpoint at the octave (8va). But this one has it at the 8va, 10th and 12th! Double counterpoint (also called contrapuntal inversion) is a complicated subject, but I'll try to make it easy.

Suppose that you and I are hiking out the Bright Angel trail; each step toward the rim is higher on the musical scale. You are standing on step G, and I'm six steps behind you, on B-flat. Now you sing the subject starting on G, and I'll sing the countersubject on B-flat. That sounds great!

Imagine that, by tremendous jets of energy, we both leap in opposite directions and land octaves away from where we started. Whereas before, I had been six steps *below* you, now I'm three steps *above*. My countersubject is now above your subject rather than below. Again it sounds beautiful!

The fact that we still harmonize means that your subject and my countersubject are invertible at the 8va. What's so special about that? Well, not every melody can do this. So composers have to think hard to find ones that work.

In the foregoing inversion we both jumped an octave. But contrapuntal inversion also works if we leap by other intervals. Before proceeding to these subtypes, let's learn how to calculate the interval of inversion. The formula,  $dc = (di + ai) - 1$ , reads as follows: "the interval of double counterpoint (dc) equals the sum of the descending interval (di) plus the ascending interval (ai) minus one. Put into plain English: Subtract one from the total of both jumps.

For example: you go down six and I'll go up five; now we're in double counterpoint at the 10th ( $6+5-1=10$ ). You go down seven and I'll go up six; now we're at the 12th ( $7+6-1=12$ ). You go down five and I'll go up four...you figure it out. How high would I have to leap if you tumbled down a 4th and wanted to hear double counterpoint at the 10th?

Now we're ready to see how this fugue employs double counterpoint at the 10th and 12th. Returning to our starting steps on the Bright Angel, you leap down a 6th and I'll leap up a 5th. That puts you on B-flat and me on F. Now you sing the subject starting with B-flat while I sing the countersubject on F. Surprise! We still sound great! Our interval of inversion is  $(6+5)-1$ ; we are in double counterpoint at the 10th.

For our final example let's return to our starting steps on the Bright Angel. You leap down a 4th and I'll leap up a 9th. Again we harmonize! We are in double counterpoint at the 12th:  $(4+9)-1=12$ .

Because its subject and countersubject (low voice) are invertible at the 8va, 10th, and 12th, this fugue is one of the most important in the *WTC*. If this topic interests you, then click the Double Ctpt. button at the bottom right to see models of each subtype. The graphic is clickable, especially the highlighted intervals. Observe how the last line is memorable for its pungent 7ths on the downbeats. With m. 5 as the prototype, this fugue exemplifies contrapuntal inversion at the:

8va (m. 13, m. 20), 10th (m. 32, m. 36), and 12th (m. 28, m. 67).

In addition to the above, this fugue contains hyperstretto, where two voices sing the subject, simultaneously, in parallel motion. In m. 45, the tenor and alto repeat the subject in parallel thirds, with its counter in the bass. In m. 51 there's "double" double counterpoint between the tenor/soprano (10th), and the tenor/alto (8va). Counterpoint is at its most complex in m. 59 and m. 69 where we hear simultaneous statements of double counterpoint at the 8va, 10th, and 12th!

One final observation. While on the Bright Angel Trail, you and I were doing the leaping. But what's leaping in the fugue, its themes or voices? If you answered *themes*, you are correct. Like the Grand Canyon's layers, the fugue's voices never change places. But the fugue's themes (its subject and countersubject) continually migrate from voice to voice, exchanging positions with each other. This exchange is called "double counterpoint."

### **And Voices**

Wisdom begins with wonder, and the voice of wisdom echoes from places of great solitude. There is a reason why the world's prophets have continually gone to the desert. Grand Canyon is such a place. Seeing it for the first time takes the breath away. Pondering it for any length of time brings one barely to comprehend how incomprehensible is the scale of time. Grand Canyon is a fugue of endless exposition and development, sung by countless voices.

Its first entry is heard in the voice of Puebloan basket makers, the Cohonina people. Abandoning their rock art, cliff dwellings, and granaries, they sing, "We were here...we have significance." In counterpoint the Hopi sing of their emergence from the center of the earth at the *Sipapu*, a travertine dome above a spring in the lower reaches of the Little Colorado. "We belong to *this* place," they sing, "for we have lived in no other."

Finding an impassable route to fabled cities of gold, Captain Cárdenas exclaims "¡Que magnificente, la fuga!" Then there were the Englishmen, naming peaks and promontories for old-world gods--Nordic, Hindu, and Egyptian names like Walhalla Plateau, Cheops Pyramid, Isis, Tower of Ra, Brahma, Zoroaster, Vulcan's Anvil, and Wotan's Throne. "May we join your fugue?" they sing.

The Canyon's first development is heard in the voice of one-armed Civil War veteran, Major John Wesley Powell, who shoots the Colorado not knowing if the next rapid will be his last. Of his beloved subject Powell writes: "The Grand Canyon is a land of song. Mountains of music swell in the rivers, hills of music billow in the creeks, and meadows of music murmur in the rills that ripple over the rocks. Altogether it is a symphony of multitudinous melodies. All this is the music of waters."

The Evangelical Sisterhood of Mary strettos Powell's voice by displaying Psalms on bronze plaques at Hermit's Rest, Lookout Studio, and Desert View:

Sing to God, sing praises to His name;  
Lift up a song to Him who rides upon the clouds;

His name is the Lord, exult before Him.<sup>6</sup>

Colin Fletcher's is one of the Canyon's most eloquent voices. Two months alone, blazing a sometimes-terrifying trail, makes of him a wise man speaking of rocks as "imprints of a flowing process," and likening them to old men's faces. He hears the Canyon like a Bach fugue: as endless unity in variety, point against counterpoint.

*The Man Who Walked Through Time* will stand the test of time because Fletcher does not content himself with mere description. To be sure, his book reads well enough for its descriptions alone. But Fletcher wants more. He scours the Canyon for meaning. Realizing that he had "come to accept towering magnificence as the natural state of the world," Fletcher begins to look at the rocks no more as sculpture, searching instead for the strata that give them meaning (p. 108). He has become a philosopher, a lover of wisdom reborn of wonder.

Of Fletcher's many wisdoms, three are priceless. Toward the end of his trek he comes to a profound realization. To understand his *significance* he must first understand his *insignificance* (p. 219). This realization brings him peace, assuaging a fear that had briefly overwhelmed him when, pondering the Redwall, he had felt "hopelessly insignificant and helpless...a mere insect" (p. 33).

Fletcher's fear is understandable. The Canyon's relentless counterpoint reveals nothing if not inexorable forces driving changes over which we have no control. We sense that it was made by something bigger than ourselves, and before which we are but a breath, come and gone. So Fletcher feels insignificant and afraid.

But he cannot reconcile fear with a second wisdom--one that wells from within: "One of my reasons for wanting to go down into the Canyon was the hope that by immersing myself in its vastness I might find a way to reconcile the apparent insignificance of man with our own individual and undeniable convictions of vitality" (p. 217). While the Canyon shouts, by my scale you nothing, Fletcher shouts back, but I *am* something...I know this because I believe it about myself: "In spite of our conscious selves, [we] have to believe in something" (p. 216). So, compelled to believe, he searches for meaning.

The vision of the Canyon's fugue--the wisdom of its wonder--is that we *must* believe in something. Such beliefs motivate everything we do. They prompt the Cohonina to weave their baskets, the Hopi to leave gifts of feathers at *Sipapu*, Cárdenas to search for El Dorado, Powell again to pull his drift boat into the swiftest current, the Sisters to display their Psalms, Fletcher to descend alone into the depths, Bach to compose another fugue, and David Korevaar to play it. In so doing we declare, "We are here...we have lived, voices in a single fugue! In

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<sup>6</sup> Three plaques were given to the Park in 1970 by the Evangelical Sisterhood of Mary, a contemplative order that has displayed more than 2000 such plaques at scenic places throughout the world. Thirty three years later they were removed because of a complaint by the American Civil Liberties Union, an organization that thinks the Canyon isn't big enough for "hermeneutic readings" and "theological catechisms" (see Christensen's words on the bigness of Bach at the conclusion of this essay). The plaques were quickly restored following a public outcry. The Park Service is now awaiting definitive instructions from "higher-ups in the food chain."

spite of relentless forces and ceaseless change, our lives have meaning!" This is the vision of Grand Canyon.

"Such a vision," writes Esolen, "is never chosen. It is felt as something given. A man can choose not to see, and then, when he comes to his senses, he can choose to stop choosing not to see. But he cannot choose to see. Wisdom bloweth where it listeth."<sup>7</sup>

My poet daughter, Joanna, recently "swamped" (work exchanged for a ride) a rafting expedition down the Colorado. Upon completing her chores one numinous Canyon evening, Joanna engaged another poet in conversation, an elderly Englishman with cancer. He had embarked upon this quest to fulfill, at last, a lifelong dream. As the sunset splayed its colors cross the North Rim they wondered of the eons required to lay the Canyon's layers. They read poetry, Joanna of the rocks that existed long before us, and that will remain long after we're gone. Upon hearing her poem the Englishman paused, in long silence, then replied, "But we are here, now."

At the beginning of his journey, and again at the end, Fletcher quotes Emerson: "There is a relation between the hours of our life and the centuries of time.... The hours should be instructed by the ages, and the ages explained by the hours." This too is like a fugue. An understanding of the whole informs each measure, and each measure informs the whole.

A rightful understanding of our place in the scale of time is the third of Fletcher's wisdoms: "You cannot escape the age you live in: you are a product of it. You have to stand back from time to time and get your perspective right. But then you have to come back and resume the task of contributing in your own way to your own age" (p. 228).

The Grand Canyon is a wonderful place for broadening one's perspective. It makes modernity's clock seem irrelevant and its dragons slayable. Its desert plateaus and riparian gardens lend themselves to contemplation and peace. Bach's *Well-Tempered Clavier* is a plateau of its own, a "grand" and wonderful garden--big enough certainly to make one wise in the ways of music. In Christensen's words:

His [Bach's] music constitutes a spectrum--really a whole musical ocean, to paraphrase Beethoven--that is large enough to accommodate all the harmonic theories, theological catechisms, and numerological encodings his listeners have found in it over the ages. It is also large enough to accommodate our concerns today, our own peculiar postmodern urges to project upon it differing hermeneutic readings, political allegories, and social or gender hierarchies. That is perhaps Bach's most tenacious theoretical legacy, and one that promises not to exhaust itself any time soon.<sup>8</sup>

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<sup>7</sup> Anthony Esolen, "The Lovely Dragon of Choice," *Touchstone Magazine*, October, 2004.

<sup>8</sup> Thomas Christensen, "Bach among the Theorists," *Bach Perspectives* 3, University of Nebraska Press, 1998, pp. 45-46.