

# Prologue

The sun was shining bright on that chilly autumn morning in New York City. I arrived earlier than usual at the Yamaha Artist Services offices on the top floor of an office building on 14th street. Michio the piano tuner beat me to it. He was on the phone in his cubicle jabbering away in Japanese. That was fine by me. Too early for socializing. I put down my three-shot espresso on the floor (never put liquids on a \$125,000 piano) and turned on the computer of the Disklavier-PRO reproducing piano. We were alone, the 9 foot behemoth and me. Over the past few months we had forged as close a relationship as is possible between a human and an inanimate object. It was new invention. Only five of them existed in the USA at that time, and I was one of only three musicians in the world with access to it. My project was an attempt to record The Art of the Fugue, Johann Sebastian Bach's monumental, unfinished last work, without using my fingers.

It was not a stunt. It was my last ditch effort to resume my recording career after an injury put a premature end to it.

Waiting for the computer to come online, I picked up the Starbucks cup and wandered to the picture window overlooking lower Manhattan. I noticed a plume of smoke rising from one of the Twin towers. I remember thinking "I wonder how they're going to put out that fire? They'll have to use a helicopter." Just then Michio the tuner burst in pointing frantically at the smoke, still talking Japanese. In that split second of turning away from the window I missed seeing the second plane hitting the other tower.

"I am on the phone with my wife in Tokyo", he said in his accented English. "She called to say she is watching the news on TV about an airplane crashing into the World Trade Center."

By this time the cloud of smoke billowing from both towers was gaining size. We had no TV in the office so Michio and I continued getting the news about what we were seeing out of the window from a woman watching Japanese television in Tokyo. As everyone who was there on that morning would later say, there was an aura of unreality to everything about the scene. Our mind could simply not process such gigantic massive fixtures of the city's skyline simply crumbling as if they were Hollywood props made out of Styrofoam.

We heard knocking on the door. Security was evacuating the

building. The mayor told everyone to get out of downtown and go home by whatever means, walking if necessary. Since walking home to Queens seemed not practical, and since we had a good supply of water for the dispenser, we both decided to stay put, especially once we saw the crowds of refugees streaming northward away from the inferno.

James the scheduler arrived, the only one who made it that morning before the trains stopped running. He was shaking with panic. I must have been in shock because the next thing I knew I was back at the piano continuing my recording of Bach. It was an unpremeditated act. I have often wondered what compelled me to tear myself away from the violent reality unfolding outside the window and like a crab seek shelter in the comfort of the abstract reality of Bach's fugue. Was it cowardice? Was I in denial, incapable of dealing with an incomprehensible reality? Or was it a defense mechanism against the hysteria of my two companions that threatened to engulf and swallow me?

Surprisingly, I did real work that morning. The panic and smoke disappeared from my consciousness. I was focused as usual on the tiniest inflection, the subtle interplay between a voice buried deep in the musical texture and its musical "crab", the same motif crawling backwards in another voice. The essence of a fugue is the interplay of contrasting, independent musical ideas that somehow manage to create harmony between them and yet still retain each its individuality.

I was part of a living fugue that morning, the crumbling buildings, the escaping survivors on the street below, the tactile fear that permeated the space we were trapped in.

I was oblivious to what was happening around me. James the scheduler, an avid photographer, kept taking pictures of the towers collapsing, and as I found out later also of me. There I am in the photo, incongruously absorbed in Bach while the world outside is going to hell in a hand basket. Later, both James and Michio would tell me that my calm and Bach's music were like an antidote to their panic. It was as if the sound waves emanating from Bach's mind over centuries, were being recreated by the electronics of my computer, driving the piano hammers to strike the strings and fill the space with a sound capable of dispersing fear.

An oasis of calm emerged that morning amidst the insanity outside.

\*\*\*

Earlier that year I was thrown a lifeline in that same office. Yamaha agreed to make their new invention available to me to experiment with what we called at the time “fingerless piano recording.” There was little to indicate that my humble quest to complete recording the Art of the Fugue would turn into the epic journey it became. It had the symmetry of a Bach fugue.

How could I have envisaged the insights that that strange marriage between old and new, hammers and strings and bits and bytes, would reveal. So much more than musical discoveries were in store for me, unexpected passageways into the workings of music’s greatest mind, and into those of my own. The Art of Fugue would become in the end a metaphor for the art of living.

Who could have guessed.

\*\*\*

This is how I ended up wrecking my hands. It was a combination of stupidity and bad luck. Years of pounding piano keys had taken their toll. Playing was becoming torture. I needed to give my wrists a break. Having been a pedigreed geek of long standing I decided to use my time away from the piano to work up an electro-pop arrangement of Bach’s Art of the Fugue using synthesizers and a computer program. Settling down for months of mouse clicks and gawking at a computer screen called for redesigning my desk in an attempt to make it more ergonomic. It was a bad plan. The new setup required my wrist to rest on the sharp edge of a pull-out keyboard tray. Lost in the throws of creative euphoria I failed to notice the growing tingling in my right hand finger tips.

I had never heard of Carpal Tunnel Syndrome.

Then one day, to make a bad situation worse, I decided to do the manly thing in our garage. Armed with a tool-belt and a power drill, I endeavored to install shelves all around the garage walls. This was an exceedingly bad plan. It required some ten thousand screws to be drilled into the posts. There is something debilitating in the testosterone surge in men facing a physical challenge that makes them oblivious to their body screaming “Stop!” Perhaps a survival

mechanism useful for wrestling bison to the ground with bare hands. Unfortunately it is counter-productive when toting a ten pound drill like a six-shooter for hours with your already Carpal-Tunneled wrist. The shooting pain and tingling in the fingers was as nothing compared to the self-flagellation that ensued. I was an moron. My hand was toast. Piano playing was history.

Enter the Yamaha Disklavier.

\*\*\*

The concept of a player-piano, or a self-playing piano, harks back to the end of the 19th century. Initially, piano keys were activated by a pneumatic mechanism and a roll of paper that had previously punched through. The air pressure escaping through the holes made the piano keys depress in the right order and reproduce the music accurately.

It did not however sound all that good. The punched holes had no way to reproduce gradations of tone or the fluidity of real playing. It took almost a century for the Japanese piano maker Yamaha to introduce a computer driven “reproducing-piano”, the Disklavier. It allowed a faithful playback of whatever was recorded on it. The onboard computer controlled the force and speed at which the hammers struck the strings, reproducing the tiniest nuance or variation in speed.

At first glance the Disklavier offered no solution for my predicament. It was designed after all for people who, unlike me, *could* play. But then I had my Eureka moment. If I could input the music not with my fingers but via a computer, those notes could be reshaped with software to become to mimic what I would have done in real-time and add whatever expressivity my mind would conjure up. And the best thing – I would be able to hear every change I made to every note, as I was making it, since the notes would be triggering the keys of a real acoustic concert grand! I had stumbled on a whole new way of recording the piano. Instead of perfecting a performance through practicing over and over a passage, I would perfect it through minute manipulation of the data in my computer program.

Once the programming was complete, the piano would be wheeled into a recording studio where *It* would play for the microphones *my* performance, with no one seated on the piano

bench.

The choice of the Art of the Fugue was perfect for my experiment. A fugue is a type of music called polyphonic, meaning that it consists of distinct voices, or lines of music, that harmonize but also retain their independence, their unique personality. Think of an Italian family reunion. Everyone talking at the same time but uncle Giovanni cannot be mistaken for father Alfonso.

In normal playing of a four-part fugue the pianist's ten fingers have a hard time keeping the four lines of music distinct. You can hear some of the conversation but some of it gets garbled. With the Disklavier, since the notes are controlled by the computer, I could easily record each line, or voice, separately. When the piece is finally played in the recording studio it would sound as if each family member around the dinner table had his own microphone.

\*\*\*

Die Kunst Der Fuge, The Art of the Fugue is Johann Sebastian's last testament. In its nineteen fugues and canons he summarized his life's work, and to posterity left a monument for a musical art form that was dying. He was 65, an unusually old age for his time, in bad health and completely blind. His sons, celebrated musicians in their own right, had all but given up on writing fugues. A simpler form of music, tunes and their accompaniments were now all the rage. Old Bach was old hat.

The monumental edifice is built on a single theme and in a single key, D minor. By using every known technique, and many never before tried, of varying, multiplying, expanding, contracting, reversing, upending, and combining these effects in different simultaneous voices, you'd rightly expect either unbelievable tedium or ear splitting cacophony. Yet, the master harmonist, like some god juggling twenty balls, makes it all sound so natural as to seem merely "beautiful music". It is inconceivable that anyone would ever match the scope, inventiveness, and rigor of his accomplishment, and do it so economically. No one ever did.

Legend has it that Bach, who was going blind, dictated some of the Art of the Fugue to a student. Whether that is true or not is beside the point, since clearly he would have had to compute such a complex musical form in his head anyway. The Art of the Fugue is

one work even Bach could not have improvised. Though, come to think of it, how could I be sure?

Many pianists have recorded the Art of the Fugue, and invariably you can hear the struggle of ten fingers trying to cope with too many notes. My intention was to create a rendition that would have no audible sweat. I was hoping to simulate what Bach must have heard in his mind, an Art of the Fugue free of the constraints of the human hand, free of the limitations of a mind unable to follow consistently four or more simultaneous conversations. I was seeking a portal into Bach's mind. And I found it through the unusual way in which I was recording his masterpiece.

I remember the first time I got the eerie feeling of peering directly into that great mind across the span of centuries. It was not at all what I had experienced whenever I would practice a Bach piece or perform it for an audience or a microphone. This was different.

The nature of my programming process required that each note be manipulated in relation to all other notes of the phrase. When a pianist plays a melody not two notes have the same expressive properties. Some notes may be slightly softer or louder. They may be a bit delayed or come a sooner than expected. It is these fluctuations that give the playing its expressive quality and a professional musician does all this instinctively. Playing is like speaking for a musician.

In my process, because I was often entering the notes one at a time, that natural give and take had to be created artificially for each note, one at a time. I would have already shaped the first four notes of a phrase but then, as I added the fifth note, the phrase suddenly did not sound so good, which required me to go back and slightly alter those notes I thought were already in the bag. And so on and so forth.

Now imagine having to adjust each note not only to all the other notes in that voice but also to three other voices moving along simultaneously.

It was tedious and exhilarating. I could hear the effect of the tiniest change as the Disklavier faithfully reproduced it over and over. It was like practicing music at the atomic level. And then the

light bulb came on. *It was like composing.*

One note at a time.

When several notes follow each other to create a melody we have the sense that the melody “moves” forward, like a wave. Yet, just like in a wave, the forward motion is an illusion. Each particle of a wave, in this case an individual note, more or less stays in its place. If you plot a time line you’ll see that each note of the melody stays only at one point along that time line. The note itself does not move. If you set up a bunch of dominoes and then tap the last piece in the row, the row seems to move forward but each piece more or less stays in the same place.

Every composer knows this. Of course you would be a lousy composer if you did not keep the big picture in your mind as you place each of those dots on the paper. Still, I imagined Bach plotting the incredible complex matrix of his multi-part fugues in his mind, then moving a note this way or that, trying this harmony or a different one, to make it all work out, to get just the right expressive effect.

I felt the portal opening a crack.

Over the following months, this sense of being an interloper inside that great musical mind came more frequently. Because the process was so much slower than ordinary piano practicing, I had time to anticipate a particular turn of phrase for instance, forgetting for a moment that I was not the composer, trying to figure out the best way to proceed without looking at the music. Sometimes, I even managed to second guess the old man.

I remember at one particular frustrating point in the project telling James the scheduler, “I must be nuts to waste my life on something no one gives a damn about.” He thought for a moment then said, “What better way to waste your life than in the company of Bach?”

Had he only known...

\*\*\*

# Fugues



**Fugue:** (n. \ˈfyüɡ\ ) *A musical composition in which one or two themes are repeated or imitated by successively entering voices and then developed through the interweaving of the voice parts*

**Polyphony:** (n. pəˈlɪfəni/) *Simultaneously combining a number of parts, each forming an individual melody or sound yet harmonizing with each other.*

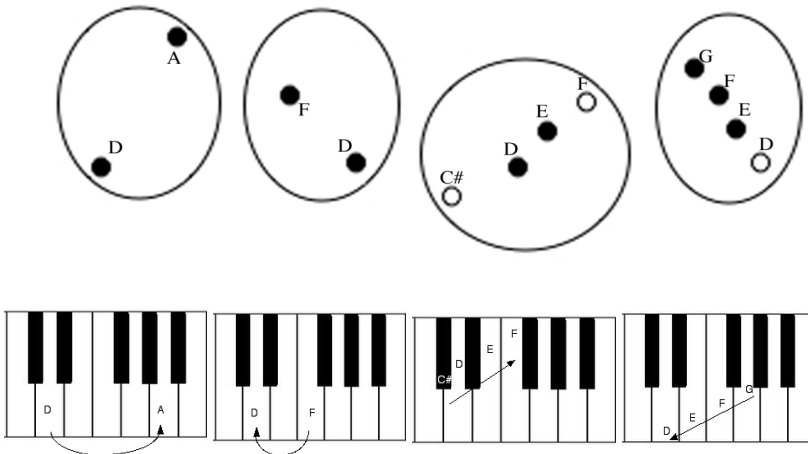
**Counterpoint:** (n. ˈkoun(t)ərˌpɔɪnt/) *The technique of combining two or more melodic lines in such a way that they establish a harmonic relationship while retaining their linear individuality.*

**Contrapunctus:** *The Latinized title of the various parts of the Art of the Fugue, from Contrapunkt, Ger. counterpoint.*

# Contrapunctus 1 - DNA

Memory precedes birth. You remember before you exist. Memory has been there in every cell of your parent's bodies and it has permeated every cell of yours since you were no more than a microscopic zygote. It is such an absurdly simple memory, just four letters, A-G-C-T<sup>1</sup>, and yet it is capable of spawning the most extravagant array of permutations imaginable, the human body. A good thing too that it is so simple, such an easy sequence to memorize, for had it been any more complicated it might have gotten garbled over the millions of years it has been transmitted from individual to individual, like a cosmic game of telephone.

It may be pure coincidence that the Art of the Fugue, just like a living organism, has also just four modest building blocks for its DNA. Imagine that. Nineteen fugues lasting well over an hour in performance wholly derived from just four simple musical gestures.



I remember the first day. I approached the gleaming three-legged black giant with a bit of trepidation. A 9 foot concert grand viewed up close is an impressive sight, but the Disklavier-PRO<sup>TM</sup> was in a

---

<sup>1</sup> Adenine (A), Guanine (G), Cytosine (C) and Thymine (T), the letters used to write the genetic code.

category of its own. For weeks I had been devising the initial approach to programming a fugue. Would I use my left hand to enter the notes in small bursts, or would it be simpler to just enter raw note data via the computer and then provide the expression of each note later? There were pros and cons to each approach, and there was the time crunch to be considered. I was only allowed a few hours each week to work on the instrument.

But today was the day. First take. Would it work? I felt like a surgeon about to make his first incision.

I placed my left hand, the one that was still working, on the keyboard. My pinkie rested on a D which made my thumb naturally rest on the A, a fifth key higher. When a left hand is placed absent-mindedly on the white keys that is the interval the pinkie and thumb would naturally land on. Bach's greatest masterpiece starts out in this almost "absent-minded" way, D to A, pinkie to thumb, like a sea-saw.

The next two notes move in the opposite direction, F (index finger) back down to pinkie (D).

The third element is just as rudimentary, a scale moving stepwise upward from C sharp (C#), the black key to the left of the D, up to an F.

And then, what goes up must come down; a downward scale from G back D, our starting point, completes the theme.

Child's play you say. Some child. Like laying a cornerstone for a Gothic cathedral, Bach will build upon this simple theme the walls, the nave, the stained glass windows, the flying buttresses, and then to crown it all, a majestic spire, the final Contrapunctus 19.

\*\*\*

The old man sips his coffee. Anna adjusts the bandages on his eyes. The Englishman John Taylor promised to come back in April, she tells him, trying to cheer him up. He'll operate again and maybe with God's help it'll work this time. The old man nods distractedly. His mind is elsewhere. The coffee tastes good though. He asks her to brew him a fresh cup. Good thing they have two coffee pots, and the thought amuses him. He remembers earlier, happier days. The house ringing with his children's voices, mingling with his students. Oh what delightful polyphony they produced, what a kaleidoscope of

cheerful sounds. That's what old age does to the memory. They weren't all cheerful. The wails of grief with every death, as common as dropping house flies. But now he wishes for them all, the good and the bad, anything but this deadening silence.

The odor of rotting flesh accosts his nostrils. Another dead rat. He calls out to the maid, then remembers that they had to let her go. The scent intensifies. Ever since he lost his eyesight his sense of smell has become unbearably acute. He hears Anna's approaching footsteps and the whiff of a fresh cup in her hand. It mingles with the stench and a realization shakes the old man to his core. It's the smell of the angel of death and it comes from inside his nostrils. He is a living cadaver. He has outlived his allotted years. Why oh Lord? Why do you refuse to take me? Anna smooths the few tufts of grey hair and kisses his bald head. They are all long gone, his children, his friends, his enemies. And boy, did he have his share of those.

Caffeine is impervious to self pity. It has its own agenda of associations. Zimmerman, the coffee house on Katharinenstrasse, those wild evenings of music making. How long ago? Thirty, forty years perhaps? He isn't sure. It was Anna's idea that comic cantata about a girl who would take coffee over a bridegroom. Boy how they laughed at Zimmerman's when he first performed it. He was a different man then. Still hoping one day to get that coveted job in Hamburg that Telemann got, and spend his time writing operas instead of teaching sniveling orphans at the Thomasschule attached to the St. Thomas church. Oh the humiliations he has had to endure at the hands of those city councilors. They never let him forget that he was their fourth choice, that they gave him the Cantor's job out of sheer despair after Telemann and a half dozen other luminaries turned them down. Well, they're all dead now, he says to himself. Some consolation.

His pupil Agricola shows up breathless and late as usual. He asks his master for the umpteenth time whether today would be the day when they could finally wrap up the work the old man has been dictating to him for months, the Art of the Fugue. They are so close, just a few more bars.

"Oh, not nearly as close as you think, young man, and the answer is no, not today." He gives Agricola a different task, adding that an idea for a new ending has occurred to him, something quite

unprecedented and it will take a bit more time to work out. Besides, the English surgeon was coming back and would restore his eyesight so he would be able, with the Lord's help, to finish the work by himself.

Agricola knows better than to argue. Bach's pigheadedness is legendary, and frail as he is it would be unwise to pit oneself against the old man's temper.

As usual, it would have to be Bach's way or no way.

\*\*\*

So, there we were, old J.S. and I, alone in the dimly lit piano hall of Yamaha, the spooky silence that descends on a bustling space emptied of its daytime occupants wrapped tightly around us. I would have never met J.S. had James the scheduler not moved me from a few daytime hours to an all-night shift. The story of me calmly continuing to record Bach while the mighty World Trade Center came tumbling down must have made the rounds in the company. I am not sure if I was moved in gratitude or to keep a slightly unhinged pianist away from daytime customers. Be it as it may, from that day on I was no longer on the clock. The night was mine, all of it, anytime I wanted.

Sitting there one night, still grappling with Contrapunctus 1, I find myself thinking about shrews. Actually, one particularly old shrew. It is a distant memory, something on the order of a hundred and fifty million years. She is nothing to write home about, this bedraggled little shrew. Were the dinosaurs still around they would hardly notice her. But the dinosaurs are gone, and the land above her burrow, eerily quiet and safe, beckons. That little shrew, or whatever that ur-mammal was, is my and your and Bach's ancestor, the progenitor of all mammals, just like those few unassuming notes that launch Bach's (and my) long journey.

Confucius was not quite right when he said that a journey of a thousand miles starts with one step. A journey of a thousand miles starts with asking for directions. My problem was that there was no one to ask. The rock and disco guys who used computers to make their music would have run had I played them the Art of the Fugue. The classical music cognoscenti *did* run as soon as I uttered the dirty word computer. "Please, not a *deja vu* of *Switched-on-Bach*.

Once the recording was out, the highly regarded editor of the magazine *Piano Today* returned my CD unopened. His note said it all, "I wouldn't touch any classical music tainted by computers." It manifestly made no difference to the esteemed editor that the instrument in question was an acoustic piano.

\*\*\*

We sat there in silence, me thinking about shrews, and evolution, and DNA, and he... who could tell what J.S. thought about? I knew nothing about him, not even his full name. J.S. were the letters printed on his dark blue tunic. When I asked around about him no one knew any J.S. "Might be custodial," they said, as if that settled it.

I never saw him do anything much. A zaftig Bulgarian with a mouthful of shiny gold did the cleaning once a week. Maybe he was with security, I reasoned? He had a key to the place, though I never saw him use it. Most nights he was there before I arrived, seated by the wall-to-wall window looking out on 9th avenue and the lower Manhattan skyline as it gradually lit up like so many electric fireflies.

At first he made me uncomfortable even though he seemed oblivious to my presence. Crafting a musical interpretation is the most intimate activity for a musician. It is like making love. I should have asked him to leave but I just didn't have the heart to do that. In time his presence faded into the shadows, just another dark inanimate object among the hulking pianos spread around the room. I stopped noticing when he got up and walked out or when he came back. He moved like air, like a ghost.

One night between takes I observed him for a while. What was he thinking while gazing fixedly out of the window? From time to time he would tilt his head up to the single light fixture overhead as if listening to some secret transmission, then swivel slightly toward the office cubicles on the other side of the dividing wall. Was he listening to the water cooler which just then kicked in so faintly I would have never noticed had he not looked in that direction.

I asked him if he minded my playing. He said he didn't really notice. It was just part of the magnificent polyphony of sounds. He said this without turning. I watched his back for a while waiting for

him to elaborate, perhaps to explain what the hell he was doing in “my” practice space, not noticing my playing. I was too worked up to continue, so I just sat there. And, as I said, there we were J.S. and I... sitting in what to me was silence and to him magnificent polyphony.

Polyphony? Where did a black cleaner or whatever he was pick up that word? Immediately I felt ashamed of my racial prejudice. Perhaps he was a jazz musician at one time? More racial profiling. I hoped he was not reading my mind, but it seemed he was, because he ambled over to the piano and peered over my shoulder at the open score on the Disklavier.

“Looks familiar,” he said without checking the title page, “Art of the Fugue, right?”

“You a pianist, a composer?”

“Nah, just a listener. I like to listen.”

I asked if he wanted to pull up a chair. Sure, he said, “I’m not too busy at the moment.”

I played the ending of Contrapunctus 1, including the part where the music stops abruptly and a long, uncertain silence ensues before the piece reaches its conclusion. I had wondered about the purpose of that silence. Was it uncertainty, a last minute hesitation before reaching the destination? This time however I heard that silence with J.S.’s ears. I heard it as the magnificent counterpoint of electrical currents, and waves of sirens, and the inexorable hum of New York City. It was like John Cage meets Bach<sup>2</sup>, and the gap suddenly seemed to me too short. I stopped the computer and extended that silence, and then hit play again, and this time there was enough time to register the non-silence hanging in the air, just long enough to wonder “Is there something wrong with the equipment?” and then the sigh of relief as J.S. Bach brought the Contrapunctus to a soft landing.

“It’s a nice piece of music,” J.S. said when I stopped. “Who is the composer, again?”

---

<sup>2</sup> John Cage’s piano piece 4’52” in which the pianist sits at a piano without playing.

\*\*\*

Life is a moment by moment affair. Each moment a crossroads of memory and anticipation. Just like music. To have any musical experience you must have both. You need to remember where you came from and then try to predict where you might be going. “What’s next?” your mammalian brain keeps asking each step of the way, and in life as in music the past always informs the future. If you guessed right you get that surge of gratification. But if you guessed wrong it could go either way. You might get the thrill of the unexpected or get dismayed if it was an unpleasant surprise. The unexpected is slippery in that way. You can never be sure at what point a baby you have flung in the air will go from squealing with delight to screeching with anguish at too much of a good thing. Too much of anything will do it in music too. Too many correct predictions and the music becomes tedious. Too many surprises and it becomes incomprehensible.

I chew on these things as I sit there in front of my Disklavier, contemplating J.S. who is back at his window, silent as the Sphinx. At what point will his presence turn from some low level irritation to outright annoyance? Is he truly there in the dark or is he a figment of my imagination. “J.S.” I think, “Just like Johann Sebastian. A coincidence?”

As if on cue he says without turning, “I was stationed in Leipzig after the war. I visited the St. Thomas church. That tomb they have there on the floor in a side chapel with the name of Bach engraved on it is a fake. It’s got some bones of someone else in there.”

“I beg your pardon?” I say startled from across the room.

He turns his head a bit and says, “Sorry, I didn’t mean to disturb you.”

No amount of coaxing makes him provide a plausible explanation for his random utterance. Is he doing this on purpose? He is gawking out the window again. I wait a while. Nothing. I feel my thrill of surprise quickly evaporating and being replaced by frustration. I shut down the Disklavier, pack my stuff and prepare to leave. I’ll have to talk to James the scheduler in the morning and ask him to change the lock.

I didn’t notice J.S. getting up and standing next to me with his



head down. “I am truly sorry. It won’t happen again,” and he shuffles toward the door. Now I am the one feeling bad. How rude of me. “Hold on J.S.” I yell after him, “It’s not you. I had to leave anyway.”

But he is gone.

\*\*\*

“How old are you?” I asked him another time.

“I don’t remember, could be a couple million years. Just like you.”

“OK, J.S. enough with the riddles. I meant when were you born?”

He furrows his brow, narrows his eyes like a man racking his brain. “You know, that’s funny. I can’t remember the year but I’m sure it was March 21, the spring equinox.” Maybe he is not kidding. Maybe he has Alzheimer’s. His face gives up nothing, it’s a inscrutable mask like Buster Keaton’s. I guess whatever he says is up to me to interpret. It’s not a monologue. It’s polyphony.

There was nothing more to say that night.

\*\*\*

