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The Slurry Wall

“The most dramatic part of the Trade Center to survive the attack was the great slurry wall, an engineering wonder constructed on bedrock to hold back the Hudson River. Somehow, it had withstood the unimaginable trauma of the twin towers’ destruction, asserting, as eloquently as the Constitution, the durability of democracy and the value of human life.”

—Daniel Libeskind, architect
of the Ground Zero Master Plan

HOW OFTEN DOES ONE GET to see a retaining wall that asserts the durability of democracy as eloquently as the Constitution? It’s a question to consider as I descend the ramps and stairs into the subterranean exhibits of the 9/11 Memorial Museum. I’ve dragged a friend with me to New York from Boston on a pilgrimage to see the slurry wall.

What would James Madison say if he could stand with me at the slurry wall in the cavernous Foundation Hall gallery? Or the Thomases—Paine and Jefferson? They engineered America’s democracy to balance competing forces, tensioning a triangle of power among the executive, legislative, and judicial branches.

Engineers must plan for catastrophe. I wonder if their secret, worst-case-scenarios, the ones that keep them up at night tapping virtual calculations against a quilted bedspread, are filled with terrors from beyond the edge of our known world, with ocean-treading Godzillas and ascending apes, with eternal electro-magnetic blackouts, and with fires that burn like the core of the sun.

I don’t possess the hubris required to design a skyscraper.

Sky.

Sky.

Scrape.

Sky.

Newspaper articles about the slurry wall point to Libeskind’s “democracy” and “value of human life” symbolism as the impetus to preserve part of the slurry wall as an

artifact. Other large-scale pieces of the towers, including a staircase and the “Last Column” are also displayed as artifacts.

A framed letter from Daniel Libeskind is displayed in the hallway of my parents’ home, alongside the framed book cover from my father’s memoir and clippings of the book’s reviews. In his letter, the architect expresses his heartfelt admiration for my father’s book.

Maybe engineers deploy hubris like a force-field against their anxieties, all those god-damned variables of catastrophe. Or maybe it’s the math, the confirmable columns of figures they can erect as a buffer. I don’t know. I’m not an engineer. I’m a museum exhibit developer.

I do know that I try to indulge in only rational, useful fears. Irrational fears forge irrational shields.

The World Trade Center towers were initially criticized for their “architecture of gigantism.” But even ungainly giants grow familiar over time. They certainly couldn’t be ignored, and “soon became a landmark, looming large in the public imagination as an icon of New York City’s audacity and vitality.”

This is who we are, said the people of New York, craning back to take in the view, *love it or hate it*. The towers didn’t glide above the skyline like the spires of the Empire State and Chrysler buildings sipping high-altitude air. Instead, like two blunt-fisted, muscled forearms, the twin towers punched at the sky.

The towers took root in the seven-level excavated basement, or the bathtub, as they called it during construction in the 1960s. It was actually a bathtub in reverse—built not to hold water, but to hold back the waters of the Hudson River only 200 feet west, and the water-saturated landfill of lower Manhattan.

If you’ve ever tried to scoop out a deep hole of wet sand at the ocean’s edge, you know how tricky it is to excavate when water keeps seeping through. Faced with a similar problem, the World Trade Center engineers turned to a relatively new Italian technique called a slurry wall. They dug deep trenches and coated them in a thick slurry of clay and water that held back leaks and kept the soil from collapsing. When the intended depth was reached, concrete was pumped through long pipes into the trenches, displacing the lighter slurry and hardening into a three-foot-thick barrier. This concrete wall was further reinforced with 1,500 steel anchors, or tiebacks, driven 35 feet into the surrounding bedrock.

When the jet-fueled inferno on 9/11 melted the towers’ intricately engineered structures into a shocking collapse, the slurry wall held. If it had failed, the waters of the Hudson River would have breached the bathtub and swept through the neighbor-

hood's understructure in a ferocious sprint toward equilibrium, flushing trash and rats and train cars through the subway and PATH train tunnels, along with the scores of people who waited underground to be taken someplace else.

I love the sound of *slurry wall*, full and round in the mouth, how the term, like the bathtub, is a contradiction; slurry is made from particles of pulverized solids (clay, coal, or even manure) suspended in liquid (usually water). *Slurry wall* sounds like something it's not.

Libeskind's quote is from his winning (albeit, mostly abandoned or revised) 2003 Ground Zero Master Plan, and I grant that a certain amount of bullshit is *de rigueur* in these documents. I've been a museum exhibit developer for over twenty years and have similarly worked on many history museum projects, although much smaller and less fraught, and most have required some level of blah blah blah in their public narratives. Sometimes I'm completely sincere, other times, not so much. But Libeskind's analogy, his endorsement of this Constitutional spokeswall transcends mere public relations nonsense. Comparing the wall to the durability of our democracy sounds like an admission of defeat.

Years before the 9/11 Museum even opened, its president, Joseph Daniel, said, "We think the slurry wall could take on the resonance of the Wailing Wall." That Jerusalem site, it so happens, is also the remains of a retaining wall, but one that had surrounded the Second Temple, the holiest site of an ancient religion, not towers of commerce and finance.

The limestone blocks of what's now called the Western Wall held no prior significance until the Temple was set aflame and brought to rubble by an enemy in a religious conflict with the city's residents.

I have a silver-framed, black and white photo of my father standing at the Western Wall. He's a lone, dark figure dwarfed by the scale of the wall that rises at least four times his height to the photo's top edge. The enormous blocks are pocked and worn, and tufts of vegetation grow from between the cracks. The stone plaza is shiny from recent rain. My father's wearing his cowboy hat and looking up at the wall, his hands in his pockets. It's a remarkable photo because my father's completely alone. It was taken in December, 1990, a month before the U.S. deadline for Iraqi forces to withdraw from Kuwait. Jerusalem was empty of tourists and restless with coiled waiting. Fear had washed the plaza clean of people.

Authentic artifacts exude an almost magical power, extending a temporal bridge that links us to a specific stitch or snag in history. I've stood in front of the silver Liberty

Bowl on display at Boston's Museum of Fine Arts and imagined Paul Revere's hand shaping its curves and engraving the names of the Sons of Liberty into the soft metal, leaving traces of his DNA forever embedded in the object.

Among the Smithsonian's "101 Objects That Made America" are those that represent a categorical change, like the accelerated killing capacity of the Colt Paterson, the five-shot, modern revolving pistol patented in the mid-19th century. So much easier than reloading a single-shot rifle astride a horse mid-battle. Thus armed, the Texas Rangers finally bested the Comanche's rapid-fire arrow assaults from horseback. Yet, as an artifact, any one Colt Paterson revolver can represent this brutal arms-race advantage as well as another.

For some serious time-traveling frisson, seek out a very specific object from the 101 listed, like the compass that guided Captain Meriwether Lewis and William Clark 7,000 miles across the American West. I'd like to cradle its mahogany case in my hand as Lewis must have thousands of times, to orient myself westward and imagine the Rocky Mountains through his calculating perspective as he mapped the mighty range.

The power of these objects resonates from their original purpose, no symbolism required. Not to say that some artifacts aren't preserved for their symbolic power, such as the Star Spangled Banner flag that inspired our national anthem. But the bullet that killed Lincoln is just a bullet. It's preserved for what it did, nothing more.

The slurry wall is such a singular object. But it was barely exhumed before its reason for being, its perfect functionality, its utmost performance of *wallness*, was somehow not enough.

The museum's web site describes what is still fundamentally one of the largest and most well-engineered basement walls you will ever likely stand before as "a testament to survival and determination."

What's the moment at which the slurry wall was forced to pivot from the functionally extraordinary to the symbolic?

When the decision was made to build the museum?

When construction workers clearing the tower rubble exposed the slurry wall to daylight for the first time in decades?

When the first airplane hit and we thought it was an accident?

When the second plane hit and we knew it wasn't?

That Tuesday morning broke open upon a blue sky so lovely that the museum takes pains to quote multiple witnesses marveling at its beauty.

I'm working in my cramped second bedroom with my exhibit partners, three people at three desks and file boxes underfoot. A story pops up on *The New York Times*

website about a plane crashing into a building. I click and click, but all the news sites jam. I give up and reopen my work document. My best friend calls: *Turn on the TV.*

I watch the first tower fall. I think, *This is it.* Catastrophe. But not one I've planned for.

A few days later, stuck in traffic on the New Jersey Turnpike, I hold my breath as a large commercial jet seems to just miss a distant overpass, a trick of perspective heightened by my anxiety. Hundreds of cars crawl down the lanes, the audience for this revival performance of mechanical flight. We watch this gryphon alight: too big, too heavy to fly! We hold the plane aloft with our united will, focused like lasers and anonymous behind sun-glared windshields. Watching a high-wire artist with no wire, we wait for it to fall from the sky.

Libeskind and I both design interpretive spaces for the public. He's exponentially more accomplished than I am. How can he not know what I know? He should know what he can say about a thing, like the slurry wall, and what he should not.

I'm torn. I want to cut him some slack, not only because we both design museums, but because he and I are both children of Polish Holocaust survivors. (He's closer to the edge of war, born in Poland in 1946, while I was born in New Jersey almost twenty years later.) More so, after my father pressed a copy of his published Holocaust memoir into Libeskind's hands at an event, the famous architect wrote him that lovely hand-written letter:

It is an unbelievable and seminal document—one which shows the mystery and heroism that shines with the light of the Jewish spirit—your spirit!

I have a soft spot for the man; however, it's because Libeskind's parents are survivors that I feel he should know better.

Why was the bespectacled architect clapping on the sideshow-barker top hat, as if the slurry wall, a legitimate trophy of engineering, needed to be sold to a wide-eyed public as something more?

Step right up folks and see *The Durability of Democracy!*

You won't believe your ears listening to *The Constitutionally Proficient Concrete Wall!*

My father's cowboy hat along with his cowboy boots were a quirky constant of his wardrobe. He was born in Poland and lived most of his life in New Jersey, not Texas, but he'd sold televisions in the cowboy town of Pueblo, Colorado in the 1950s—taking a stranger's advice that a young, New York-based immigrant should “go west”—and the cowboy spirit of America suited him and stuck.

I don't know what he was thinking in that moment, looking up at the Western Wall. I've never known him to truly pray. Who knows, maybe he was wondering what we were having for lunch. I think he was just content to be standing at the Wall, it

having survived over 2,000 years, and he, before it, having survived longer than expected as well.

“[Artifacts or objects] continually assert their presence as simultaneously material force and symbol. They frame the way we act in the world, as well as the way we think about the world.” — Anthropologist Daniel Miller

Yes, indeed. But symbolism shouldn't be ordained from above, from the architect or the museum president. The knowledge-bearers, the museum professionals, we're here to ply you, the visitor, with goodies—with context and perspective telescoping from micro to macro, with delicious bits of cultural or scientific information.

I can tell you what the slurry wall is, but I can't tell you what the slurry wall means.

Until that September of 2001 I hadn't excavated the apocalyptic terrors of my subconscious—a festering, embarrassing mash-up of the science fiction novels I've read since adolescence, mixed with my parents' personal histories as Holocaust survivors, stories I've known since the beginning of my memory. Although (now that I force myself to think about it), in anticipation of the Y2K computer meltdown predicted to ring in the new millennium, I had secreted under my staircase a stash of vacuum-sealed tuna packages, many gallons of water, \$600 in cash and a 100-count box of latex hospital gloves. My parents, the actual Holocaust survivors, ignored my pleas to do the same.

This is it, I think, suspiciously eyeing a low-flying, single engine plane as I run errands, as if I alone can detect a plume of bio-horror in its contrails. *This is how society collapses*, like towers, one layer crushing the next. Like Europe a generation earlier. One month, people were riding trolleys to their offices or unfurling their shop awnings or worrying a test at school and the next month they were fired, fire-bombed, expelled. The month after: herded, contained, transported. The source of apocalypse varies—Nazis, terrorists, plagues, galactic aliens shaped like blue elephants—but the end always begins like this: in something unthinkable that becomes darkly familiar.

What makes my city of Cambridge more robust than Warsaw, where my father was born and raised, ghettoed, and transported to a concentration camp?

My not entirely unreasonable extrapolations are bolstered (or poisoned) by all those post-disaster science fictions, where survivors cling to trivial simulacrum of their long-gone world, like the coconut-manipulating castaways on Gilligan's Island, but abandon truly valuable constructs, like feminism and an impartial judiciary. Like democracy and the Constitution.

After the planes and the towers, letters arrive with anthrax. There's talk of biological terrorism. Everything seems as a fragile as ash.

I've always seen Jerusalem's Western Wall as a literal touchstone and less as an artifact. I don't believe in a God who reads the paper prayers tucked between the stones, as if the Western Wall is serving up the universe's worst-ever fortune cookie to an insatiable deity, but I do believe in the ritual of the act, one that's evolved over thousands of years by millions of people speaking to the stones through their fingertips and releasing their slips of prayers. Each caress of skin to stone and each rhythmic bow accumulates layers of meaning, like invisible mortar building a monument of resiliency—still here, still here—that binds generations to each other.

The New York Times' art critic, Holland Cotter, wrote how even as far back as 2003 the slurry wall, "had already served as a multipurpose symbol of urban recovery, democracy, communal strength, the human spirit, not to mention the virtues of sound engineering."

The art critic, the museum director, and the architect want the slurry wall to stand in for whatever they can't or won't interpret about 9/11 and its aftermath.

Each plastered meaning onto the slurry wall before they'd even unlocked the museum doors. Before visitors could decide where to lay their hands.

"But thank God the structure held. And I've always said, it held because it wanted to." —Artur Ressi, a World Trade Center engineer who oversaw the slurry wall's original construction.

Triangles are one of the strongest forms in construction. Structural braces placed diagonally across the rectilinear face of a skyscraper create triangles that balance stretching and compressing forces. Structurally, the individual planes of a triangle are its weakest elements. Exert force upon a single plane and it will buckle. The strength is at the points, where two sides meet. Regardless, the twin towers were super-skyscrapers, too tall, too heavy, and too exposed to high winds for triangular diagonal bracing.

I think about sneaking into the museum as a guerilla exhibit developer and putting Holland Cotter's and Daniel Libeskind's quotes up on the slurry wall as the basis for a "talk-back" exhibit, a way museums invite visitors to share their opinions. I want to hand out Sharpies and yellow sticky notes to visitors. I want to see the soft riot of lightly-adhered sentiments marking the wall.

How is the slurry wall an eloquent symbol of the durability of Democracy? I'd ask visitors who've just passed through the museum's intense security screening reminiscent of every airport trip since 9/11.

How is this slurry wall a symbol of The Human Spirit? I'd ask after they've viewed the personal effects of the survivors and the dead, the charred wallets, confetti of office documents, and the lemon-yellow high-heeled pumps stained with the blood of a multi-mile flee uptown.

Actually, no. I don't really consider putting up my own guerilla exhibit. That's after-the-fact professional hyperbole. My sample questions are almost as bad as the quotes I've pulled them from. I'm leading the visitors. Dragging them through my pique while pretending to elicit their opinions.

Rather than manipulating these imaginary visitors to write what I want to say, I'll just say it: Libeskind's quote is sideshow act, diverting attention from the legitimate fear of whether democracy can withstand the stresses exerted upon it by the forces of terrorism. Makes me wonder if he fears our democracy is more fragile than the towers.

I get that.

At the end of September 2001 I take a sharp plunge into the irrational. I silently condemn my fellow Americans for their unquestioning faith in an enduring, functioning society, like golden retrievers who believe that no matter what stupid thing they've done with the ball, the world will magically produce a never-ending supply of the ball.

I build a disaster-superiority bunker, population one (1), and renew my perseverating from 1999, rehearsing all the possible ways I can talk myself past the gate of a post-apocalyptic survivalist conclave. As an archivist? A writer? A cookie-baking, ukulele playing morale officer? Maybe I could join one of those traveling Shakespearean theater troupes that inexplicably wanders through every nuclear-blasted or plague-decimated landscape.

I'm doomed. No takeout-ordering, handyman-hiring, mostly useless "creative worker" will be welcomed behind the palisades—no matter that I once memorized the St. Crispin's Day speech from *Henry V*.

As I walk around the 9/11 museum with my friend, she observes: *Everyone is performing patriotism. They're all performing sadness.*

The museum is a misery scrapbook. The exhibits pile on the evidence and objects to excess. So many gigantic pieces of rusted, twisted tower steel are dropped throughout the exhibits that they come to seem as unremarkable as tilted telephone poles along a switchback road. The museum is obsessed with documentation but stingy with contextual interpretation. You don't know what to think. I feel as if we aren't supposed to think. (Out of professional respect, I'll say that the exhibit techniques are, for the most part, artfully employed and the text well written. With all sympathy to the museum design team, designing this museum was a no-win proposition.)

Emotionally, the exhibits are relentless. Little exploratory mallet-taps to the knee, probing for a reaction. Tap: Audio recordings of the hijackers shouting orders over the airplane PA system. Tap: Phone messages from tower floors too high to survive. Tap: Photographs of horrified witnesses covering their up-turned faces.

How can visitors respond but to kick back?

The twin towers actually held as designed. We forget that. They were meant to withstand an accidental commercial jet crash. The attacks destroyed more than half the support columns on each wall of impact. But each tower's ingenious external column system, connected to the internal floor trusses and core supports, redistributed the building's weight, transforming each impact hole into a structurally-sound arch that held, until a cascade of events led to collapse.

The crash knocks fireproofing from steel beams; fireproofing overall is insufficient; jet fuel ignites fires beyond the capacity of the sprinkler system to control; upper-floor water pipes are severed.

The steel softens in the heat. Floors sag; external walls buckle.

It happens slowly. Then quickly.

Here's something else I forgot, or never even knew. Because the towers did not collapse at impact, because they withstood forces as designed, almost 10,000 people working below the crash holes escaped and survived. Thousands more did not drown because the slurry wall held.

The slurry wall delivers. I admit it. I'm a bit breathless.

It's magnificent in scale and quiet power. Sixty feet high and over sixty feet wide. The rough concrete face looks battle-scarred. In the dimly lit Foundation Hall, overhead spotlights slap dramatic, spiky shadows down the wall's face from the rows of tiebacks poking through.

I want to place my palms against its rough surface, trace the rusty water stains with my fingers. But visitors aren't allowed to touch the wall.

I stand instead behind the low barrier rail, hands in pockets looking up at the wall. It's flanked by two newly constructed foundation walls, similar in design but smooth-faced, unmarked by trauma. It's hard not to anthropomorphize the wall, to genuflect at the foot of a superhero supporting the city on its shoulders, patched up and quietly back at work.

Of course, the slurry wall is immune to hyperbole. What does the slurry wall care? But museum visitors, or any one of us, are no more immune to suggestion, to the peckings at our subconscious fears, than I was. Than I am.

Maybe that's what Libeskind was doing—unconsciously building a wall, a bunker of words. For all I know he has a secret file cabinet at his studio stuffed with cans of sardines and rolls of duct tape. Who am I to criticize someone else's security bunker?

Our families survived, Libeskind's and mine, and America offered us a haven, a home. So I cling to the best ideals of America with both the side-eye skepticism and the unabashed love of an east-coast, liberal Jewish daughter of refugees. But I can't watch from the bleachers as the cheerleaders yip and fling themselves into another crowd-pleasing chant. It's as counterproductive (and as ridiculous) as my secret apocalyptic dread.

I'll try to follow the lead of the engineers. Plan for the worst. But also, why not pick out some nice valance window treatments for the floor-to-ceiling glass on the 100th floor?

Hail the structural grace of the intact slurry wall as a confluence of ingenuity and workmanship paired with luck. Throw a parade for all the people who construct sturdy foundations anchored to generational bedrock. Let's build a museum for those who seek both harmony and strength in the tension of opposing forces.