

The New
R E P U B L I C

SANTIAGO CALATRAVA'S MOMENT.

For the Birds

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Post date: 01.14.06

Issue date: 01.23.06

Antoni Gaudí, the legendary *modernista* architect of Barcelona, once predicted that the architect of the future "will build imitating Nature, for it is the most rational, long-lasting, and economical of all methods." One could conjure up many descriptions for Gaudí's spectacular, over-the-top, 370-foot-high Church of the Sagrada Familia (begun in 1882, and still unfinished), but "economic" or "rational" will not be among them. The Sagrada Familia--with its spreading, branch-like piers; its enormously complex geometries, based on such figures as helicoids and hyperbolic paraboloids; and its exuberantly naturalistic ornamentation, abundant with sometimes literally colorful imagery drawn from a cornucopia of mushroom heads, palm fronds, oranges, yucca plants, and wheat stalks--elicits thoughts not of rationalism, no matter how you define it, but of a kind of intricately structured Wunderkammer exploded to monumental scale.

Despite the complexity of the Sagrada Familia's forms, Gaudí's message is simple. In his building one is truly witness to nature, regarded as God's most splendid creation. This architectural attempt to poach imagery or structural directives from nature's forms, visible and invisible, is but the most celebrated modern example in a long tradition stretching from Vitruvius through Buckminster Fuller. It is a tradition that has always struck me as slightly ridiculous: a category mistake, like trying to wrest a treatise in analytic philosophy out of Emily Dickinson. Despite Gaudí's architectural premises and the outright sensationalism of his built work, his highly representational Sagrada Familia is one of Europe's most popular and beloved buildings. One of the earliest instances of "destination architecture," every day it swarms with head-shaking visitors, most pronouncing it, in one or another language, incredible.

Santiago Calatrava, a Spaniard born in 1951 who is the spiritual heir to Gaudí, has recently skyrocketed into the ranks of the "starchitects" (Gehry, Hadid, Koolhaas, Libeskind, et al.). Like Gaudí, he insists that his projects are inspired by and founded in nature's underlying geometric structures, both simple and complex, and in its visible forms. Calatrava, also like Gaudí, and like some of his celebrated colleagues, makes architecture distinguished by its aggressive, photogenic iconicity. His buildings project striking images, and they make good logos. (An aerial view of several of Calatrava's buildings graces the official Spanish tourist bureau's promotional materials.)

For this reason, Calatrava's buildings and projects raise an urgent question. Is iconicity integral to good architecture? Can it, in some hands, be a deterrent to good architecture? These architects, practicing what marketing directors admiringly call "branding," are logging a staggering number of airplane hours; and in the process, they are transforming architecture's role in the international political economy by creating universal and instantly recognizable trademarks. In this newly organized professional context, imagery rules.

Calatrava, whose principal office is in Zurich, owes his stardom to his facility for memorable and sometimes even breathtaking form-making, and his unusually multidisciplinary resumé. He trained as both an architect and an engineer, with a doctorate in technical science from the ETH Zurich, the Swiss Federal Institute of Technology. This background enables him to navigate among and interweave several disciplines, especially architecture and engineering, which one might think would logically conjoin but are often, in this country, puzzlingly cleft.

A penchant for eye-catching imagery and an ability to design and to engineer his own projects (offering clients a two-fer) have recently earned Calatrava an impressive handful of honors and commissions. He is the first architect since the Bronze Age to be anointed with an exhibition at the Metropolitan Museum of Art, a large one-room show of his kinetic and static sculptures, drawings, sketchbooks, and architectural models, as well as photographs and computer-animated walk-throughs of various buildings and bridges. Of late his office has been taking on not just the infrastructural projects by which Calatrava earned his reputation, but also architectural and urban ones: master plans for Valencia, Athens (the Olympic Complex), Liège, and Thessaloniki; skyscrapers in Malmö, Chicago, Atlanta, and New York City. And he continues to build ever more bridges, railroad stations, and airport terminals.

Most famously, Calatrava is the only boxer left standing in the catastrophic brawl of squandered opportunities and visions that is the re-building of Ground Zero in New York. He alone sidestepped the appalling political maneuvering and the naked professional and financial huckstering that is driving the World Trade Center re-development (or preventing it from being driven). He somehow massaged his commission into a cordial collaboration with the civil engineers from the Port Authority of New York and New Jersey, with whom he felt a professional kinship. And so ground was recently broken for his \$2.21 billion transportation hub, which through the convergence of fourteen subways and one commuter train line links Lower Manhattan to Brooklyn, Queens, the Bronx, and New Jersey.

Before this recent catapult to international fame, Calatrava enjoyed professional recognition as the wunderkind of bridges. His most famous is also one of his earliest, the Alamillo Bridge and La Cartuja Viaduct in Seville, completed in 1992. Slender and stunningly elegant, this 820-foot-long cable-stayed bridge is stabilized without anchorages. Typically, the horizontal roadway of a cable-stayed bridge is hung off two

sets of steel cables, which are themselves attached at regular intervals, harp-like, to each of its sides, as in the Brooklyn Bridge. These steel cables are then gathered up, slung over vertical elements set into the water or ground below, and stretched toward land, where they are bundled into heavily weighted and often massively built anchorages. For the Alamillo Bridge, Calatrava built a single tapering, vertical concrete pier that lurches backward from the bridge's horizontal deck at an angle considerably wider than the typical ninety degrees. This single pier's wide angle, combined with its curvaceously thickened base, simultaneously stays a single (rather than a coupled) set of cables and provides enough weight to function as the anchorage for the entire bridge.

Although the loads carried by the Seville bridge are so light that the design really amounts to an awful lot of engineering for a very little bridge, the architecture world hailed it upon completion as a harbinger of great works to come, believing (or hoping) that finally it had found a successor to Robert Maillart, the legendary Swiss bridge-builder, and Pier Luigi Nervi, the famous mid-century Italian engineer-architect. The Alamillo project set Calatrava on a professional path of infrastructural projects of larger scale and increasing complexity. Many of these, such as some of his small-scale sculptural studies at the Met, appear to challenge the basic principles of physics with which all architects and engineers contend, such as the inherent properties of various materials and the forces of tension, compression, static and active loads, and shear, which is a static or applied stress on structures (such as wind) that causes contiguous parts to slide.

The WTC transportation hub in Lower Manhattan embodies the strengths of Calatrava's designs. His client, the Port Authority, was aghast at the national calamity in which sixty of its own employees were among the thousands murdered, and so it specified that this enormous transportation complex be nearly or completely free of vertical supports, thinking that every column is a terrorist's opportunity to set down a bomb by its side. Calatrava designed and engineered a nearly column-free, two-hundred-plus-foot-wide span that embraces the underground rail systems converging on the site. This large below-ground space is the central conduit by which travelers ascend to the street.

A soaring birdlike icon rises atop an underground and therefore largely invisible project, dramatically announcing what arguably has always been and certainly is now the cynosure of Lower Manhattan. Whereas the transit hub in the old WTC towers was invisible to passersby, the new one will remind New York's cosmopolites that, even at street level, they often stand on what is effectively the second, third, or fourth level of a multi-story structure that is the metropolis. The project further emphasizes Manhattan's spatial and organizational complexity by specifying that natural light filter first through the glassed-in ceiling, then through several levels of semi-transparent floor planes, falling onto subway platforms even at the lowest level, sixty feet below grade. In Calatrava's native Europe, where municipalities keep infrastructure well maintained, this design might work as planned. It is fair to wonder if, in grimy Manhattan where delayed maintenance is the norm, anyone standing on the N platform several years after the project's completion will register that natural light is falling her way.)

Considered according to the standard structural-engineering criteria, which include not only stability but also economy of materials and construction, the WTC project is overbuilt. Covering this two-hundred-foot clear span could be done with less. But low marks on the economic use of materials do not necessarily negate this or any other project's strengths. One's experience of New York will be immeasurably enriched by the WTC hub's reminders that the city is ever-transforming, spatially complex, and socially diverse, and yet still relies on one-hundred-plus-year-old technologies of transportation.

In the WTC project, as in many others, Calatrava turns pedestrian (often in both senses of the word) infrastructural projects into civic icons. In democratic societies, such icons can play an under-recognized and sustaining social and political role by promoting people's awareness that they are members of a community and a polity. They foster a sense of commonality by their sheer memorability, and by the physical act of drawing people together in a way that celebrates their collectivity. Calatrava understands this. For him, using infrastructural projects to create civic icons is a mission fueled by his ethically grounded (and altogether correct) view that any intervention in the built landscape, and especially a large-scale one, is an intrinsically social and political act.

Not every highway overpass requires an artistic statement. Still, approaching infrastructural projects as potential moments of civic monumentality--the norm in Europe, and also now in parts of Asia--should inspire American urbanists, architects, and engineers, and their patrons, to reconsider certain contemporary norms. And if American policy-makers listen, then Calatrava's work could set a new and far higher standard for the infrastructural projects that soak up billions of federal and state dollars every year. (Congress's recently passed transportation bill designates more than \$300 billion for the maintenance and construction of roads and bridges.)

To make this happen in the United States, professional and disciplinary obstacles will have to be overcome. The money devoted to infrastructural projects will actually have to be spent on them; moreover, some of it will have to be devoted to their design, not just to their construction. But even if local functionaries devote dollars to the appropriate ends, other impediments will remain. Over the past half-century, American architects have watched, at times in horror and at times in apathy, as their credibility and then their role in shaping the public realm have progressively eroded. They have surrendered component after component of what should be within the orbit of their professional practice to structural and civil engineers, to acoustic and HVAC consultants, to value engineers and project managers, to interior architects ... the list goes on. In Spain and other parts of Europe, the profession of civil engineering barely exists because architects are thoroughly schooled in engineering. In the United States, by contrast, top architectural schools rarely emphasize structural and civil engineering, with such topics currently occupying a figurative half-hour's worth of curricular attention. American civil engineers, in contrast to American architects, typically have little or no training in design, and sometimes a barely identifiable interest in it.

Notwithstanding the pecuniary habits of state and local governments and the professional divide between architects and civil engineers, collaborative teams occasionally are assembled, and occasionally they produce splendid things. One small but compelling example is Steven Holl and Michael Van Valkenburgh's recently completed watertreatment plant in Hamden, Connecticut, commissioned by the South Central Connecticut Regional Water Authority. But such projects remain anomalies to an otherwise dismal norm. And if inertia prevails over intelligent change, our landscapes will continue to be littered with projects that range in quality and visual interest from banality to the occasional outright calamity.

When Calatrava plays cat-and-mouse with the unchanging properties of physics, as in Seville, Orléans, or his spectacular pedestrian bridge in Buenos Aires, which pivots horizontally ninety degrees to make way for ships sailing through, his work delivers. So do a few of those small, elegant tension sculptures at the Met, and the white screen of tapering tubular steel rods, undulating in wave-like motions, that edged one walkway at the Athens Olympics. Even in architecture, Calatrava's simpler projects can carry a light touch of humor and elegance, as in the renovated and expanded Wohlen High School in Switzerland, for which he designed an outdoor pergola and two dramatic indoor roof spaces; or in his proposed seventy-four-story tower for South Street in Manhattan, in which four-story, translucent, stacked townhouses cantilever in alternating directions off what appear to be alarmingly slim metal rods.

Yet Calatrava's office is taking on more and more master plans and increasingly complex buildings, including a community hall in Alcoy, Spain, a symphony center in Atlanta, and the recently completed residential tower in Malmö. In his native Valencia, he has laid out a master plan for a geographically important derelict area between the historic downtown and the reclaimed waterfront. He also designed the infrastructure, the landscape plan, and all the buildings in an 86.5 acre complex called the City of Arts and Sciences. After fourteen years of construction, the Opera House and its administrative offices, the Planetarium, the Museum of Science, and a large parking garage are essentially finished, with several residential towers and an outdoor amphitheater yet to come.

In these urban designs, and in much of his architecture, Calatrava's work falls painfully flat. His organic images, which range from re-interpreted versions of Gaudí's palm fronds to running, twisting, dancing bodies to blinking eyes to birds alighting, are perfectly legible and utterly hokey. The style is exuberant but shallow; it is exuberantly shallow. This is true of the WTC transportation hub, which, for all its merits, projects (and is conceptually based on) the almost risible image of a child's hands releasing a bird into flight. It is the case also at the Milwaukee Art Museum, in which an apparently similar bird bedizens actually movable wings; and in the otherwise amusing Valencia Planetarium, a sculpted white half-sphere centered inside a steel-and-glass arc, which, when reflected in water, creates the image of a surrealistically floating Miró-like bluish-white eye. Its "eyelid" even opens and closes.

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Transportation--flight. Planetarium--seeing. Get it? Too often Calatrava's buildings are little more than one-liners, architectural analogues to Roy Lichtenstein's public sculptures. As is the case in the public reception of the work of (the immeasurably more talented) Gaudí, people like the simplicity and the obvious iconicity of Calatrava's architecture. It is popular because it is comprehensible. To be sure, iconicity does not disqualify a building from considered praise, and neither do popular appeal and immediate comprehensibility. But are these really the main criteria by which we should select architects and judge architecture?

There is a word that characterizes the phenomenon that I am describing. That word is "kitsch." And as Calatrava builds more architectural projects, it becomes increasingly apparent that much of this work is not even well-considered kitsch. Consider Calatrava's long-standing interest in kinesthetic architecture. His extremely large structures often sport movable parts: the roof of the WTC hub will open to the sky every September 11, and the flapping "wings" of the Milwaukee Art Museum offer a slow motion image of a bird taking off from the ground. It's cool. But for an architect who claims that his design principles are grounded in the natural world, it is more than slightly ironic that Calatrava exhibits little interest in environmentally responsible ("green") architecture. When in motion, these buildings must consume more energy than others thrice their size.

Calatrava's disinterest in developing design principles that account for the intrinsic properties of his materials and the processes of construction also exemplifies his failure to think through the aesthetic and the conceptual implications of his designs. Consider how he combines steel and concrete. Routinely he disguises the differences between these very different materials--painting, for example, steel members in the opera houses at Tenerife and Valencia to match the whiteness of his concrete. Since the Enlightenment, one strain of modern architecture has mandated that every material be expressed in its essence and no more, which is an excessively restrictive prescription that has been betrayed in practice even by the architects claiming to embrace it. Yet Calatrava's complete disregard for the architectural (in contrast to the technical) nuances of his materials means that he misses opportunities to relate to the user's bodily sense of tactility, materiality, and plasticity, and that he eschews the possibility of edging the user toward the realization that every building is a multitude of human decisions, any of which could have been decided otherwise. He effaces the coloristic, material, tactile, and actual differences between materials because doing so advances his overriding aim, which is to direct the viewer's focus not to the small-scale contingencies of everyday spatial experience, but to the building's overall external image.

His interiors are not better. His train stations, airports, and opera houses are all simple, loft-like, light-filled spaces. Yes, natural light indoors is nice. But these buildings finesse most of the practical, intellectual, or material problems from which great architecture is made. His museums in Milwaukee and Valencia are devoid of spatial complexity, lacking the sophisticated or innovative programmatic and spatial planning of such truly great museums as Henry van de Velde's Kröller-Müller Museum in Otterlo or James Stirling's Staatsgalerie in Stuttgart. At the planetarium in Valencia, Calatrava retains his imagistic eyeball purity only by shoving visitors underground into a depressing, low-ceilinged,

artificially lit narrow corridor where one is successively herded along, invited to linger at predictable stops: café, gift shop, ticket counter, security check. Although in airport hangars (Bilbao) and train stations (Lyons) Calatrava's soaring, loft-like interiors are appropriate, in exhibition spaces such as the Museum of Science in Valencia the same design dodges the museum architect's two most important challenges: thinking through what sort of space best accommodates what exhibit--big or small, open or closed, low-ceilinged or high, naturally or artificially lit; and considering how exhibitions might be organized in relation to one another, and in what sequence.

Nor are these deficiencies and shortcomings limited to Calatrava's projects in the arts. The recently opened 623-foot steel-and-concrete Turning Torso in Malmö, a residential tower based on the image of a twisting human spine, is striking from its exterior, with its four planes twisting ninety degrees from street level to crown. But as a consequence of this torquing, windows are oddly skewed. Some users have found the views outside to be simply disorienting, which seems a less than appealing feature for the interior of one's home.

Calatrava's architecture often fails urbanistically as well. Many of his larger, more honorific buildings are deliberately set apart from their site. Here he is hardly alone among his colleagues, and in certain instances this blinders-on strategy works. After all, many building sites bear little history or immediate context worthy of attention, much less celebration. But to isolate and to monumentalize his buildings, Calatrava chooses the easy way out, as in Valencia, where he places them in shallow reflecting pools. Since the buildings are themselves so organically figurative, this strategy sometimes confers the clearly unintended impression that an enormous, threateningly predatory insect has just landed next to you in a sandy clear-bottomed stream.

Taken in the twenty-year aggregate of his career, Calatrava's work is shockingly, boringly repetitious. It elides the concept of branding into the principle, if not the practice, of mass production. Now, in the world of contemporary architecture, Mies van der Rohe's wise dictum that a new architecture need not be created every Monday morning is too often ignored--but the opposite extreme is not better. Calatrava's organicized arch motif, with only minor variations, appears in BCE Place in Toronto and an outdoor walkway in Athens as well as those in Valencia, the Oriente Station in Lisbon, and the Wohlen High School in Switzerland. The same buried Venus flytrap-like extrusion can be seen in the Pfalz Keller Gallery and the Akoy Community Center in Switzerland. Similarities between the Milwaukee Art Museum and the WTC transportation hub, between the opera houses in Tene rife and Valencia, have already been mentioned. To see these images over and over again, east and west, north and south, in the United States, in Europe, and also in Latin America, is unsettling in every sense of the word.

Perhaps one man cannot be master planner, urban designer, architect, landscape architect, civil and structural engineer, artist, sculptor, and draftsman all at once. Perhaps the stark

discipline of bridge design reins in Calatrava's ebullient predisposition. Perhaps the ideology (and the business) of civic image-making has Calatrava stooping for ever more easily recognizable and quickly executable designs. Perhaps he finds that the disorderly complexity of human interaction poses architectural challenges to which he cannot or cares not to rise.

Or perhaps, in drawing his guiding principles and imagery from nature, Calatrava has chosen misguided premises on which to ground a contemporary architecture. Why, exactly, should a subway station look like a bird (except perhaps to encourage people to take flight from an ineptly re-developed downtown Manhattan)? Why should architecture, in image or in structure, be dictated by nature at all? The great postwar architect Louis Kahn fiddled with this problem in the early 1950s, determining the guiding principles of his architecture by adopting tetrahedral geometries found in natural forms such as snowflake crystals and radiolarian (a type of protozoa). After a few years, Kahn realized that he was careening toward a dead end, and he changed his reference points entirely. Instead, he carefully constructed normative ideals for the social and cultural institutions he built, and looked toward abstract art, historical precedents, and contemporary practices to arrive at forms that architecturally embodied these norms and facilitated the social practices that he envisioned.

Maybe the first architects needed to pay obeisance to nature's designs, >but that primal moment is long gone. Architecture--and "nature," too--is a human construct. Whether or not designers need to acknowledge their buildings' physical and material properties (and for reasons too complex to lay out here, I believe they do), they violate the essence of the art when they fail to design buildings and cities that reflect, accommodate, and symbolize who we are, how we live, and how we think we might or should live. When Kahn abandoned nature as his guide, he began to create his great mature works, such as the National Assembly in Dhaka, Bangladesh and the Kimbell Art Museum in Fort Worth, Texas. Concluding that architecture's essence is social and cultural, Kahn, for the rest of his life, insisted that "architecture is what nature is not."

Shaping his architecture around long-established verities about the biological and natural grounds of the human condition, Santiago Calatrava seems to be afflicted with multiple blind spots that prohibit him from taking on architecture's highly complex intrinsic and non-naturalistic challenges. Whatever its debts to our biological being human civilization is cultural, social, political, and more. And its embodiment in our buildings, our landscapes, and our cities should say so.

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