

# PROBABLE ARCHITECTURES OF IMPROBABLE REASON

**Confluence in the Work of Eladio Dieste:  
A Belated Book Review**

**Nader Tehrani**



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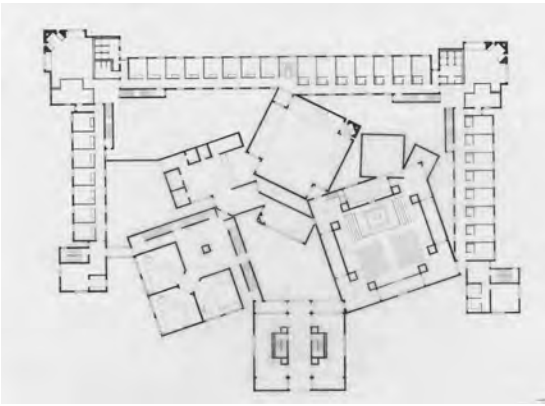


- 1 "The Collective Invention", 1934, René Magritte
- 2 "Bottle of Vieux Marc, Glass, Guitar and Newspaper", 1913, Pablo Picasso
- 3 From left to right: "Cadavre Exquis" (Exquisite Corpse), 1938, André Breton, Jacqueline Lamba, Yves Tanguy and "Photomontage", George Grosz

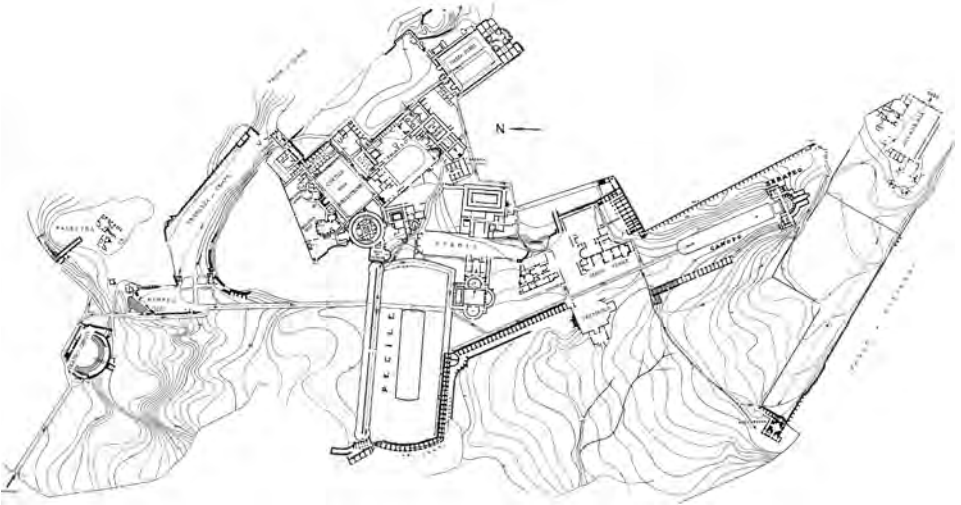
1 *The Collective Invention* by René Magritte and Exquisite Corpse with André Breton by Steve Wolfe, Ashley Bickerton and Jan Hashey.

## CONFLUENCE: FROM THE SEAMLESS TO THE EXQUISITE CORPSE

Confluence, from the Latin “confluere,” signifies the idea of “flowing together,” a concept that is central to how artistic production is often conceived: as fragments of ideas, artifacts and narratives woven together to create another reality. At the same time, what is interesting about the idea of confluence is that beyond the recognition that two (or more) elements are brought together, it connotes that they somehow ‘flow’ together without indication of conflict, predicament or friction. Thus, while many historical passages of art have had to contend with the challenge of composing varied pieces together, not all find meaningful ways to bring out the conceptual difficulties in the act of reconciling differences. In the 20th century, Cubism, Collage, Montage and Surrealism were just four movements that dealt with the question of difference in significantly varied ways, and each played out those theoretical positions in accordance with the medium at work. Whether in painting, sculpture or photography, the medium was often instrumental to the possibility of eventual interpretations. As such, the dispersed nature of the ‘objet trouvé’ in the Cubist collage contributes to an aesthetic of fragmentation that is central to the expression of collage as medium. The identification of irreconcilable realities in one image, the concurrence of multiple perspectives in one view and the simultaneity of front and back views of the same artifact are just some of the tropes that characterize the ways in which these aesthetic practices were composed of multiple realities, but deliberately denied of the possibility of fusion, natural flow or normative reconciliation. Alternatively, in the montage of photographs, this idea takes on a significantly different dimension, as we witness the medium address heterogenous realities that are blended, grafted or fused together seamlessly to create images that, while semantically divergent, were nonetheless formally confluent. The same could be said of the paintings of René Magritte, whose depictions—in contrast to the techniques of the exquisite corpse—are formed as singular, whole and seamless realities even when their semantic aim is to disrupt, de-stabilize and challenge the very canons of classical realist representation.<sup>1</sup> [ 1-3 ]



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4 The Dominican Motherhouse, 1965 - 68, Louis I. Kahn, Plan. Image courtesy of Robert McCarter, Louis I. Kahn, Phaidon Press, 2005, 294.

5 Hadrian's Villa, Rome, Plan

## ARCHITECTURE: BETWEEN CONSTRUCTION, REPRESENTATION, AND PERCEPTION

In the context of architecture, the question of compositional difference has historically played itself out through a range of scales, techniques and aligned debates. Among them, the challenge of synthesizing multiple typologies (from configurations in Hadrian's Villa to organizations in Louis I. Kahn's Dominican Motherhouse), the difficulty of reconciling dissonant geometries (the circle, the square and the structural invention of pendentives and squinches) or the difficulties of developing a communicable language out of dissonant grammatical fragments (from Nicholas Hawksmoor's stacked totems to Robert Venturi's complex and contradictory iconographic assemblages) are three different modalities of engaging difference, composition and reconciliation. A discussion on typology invariably deals with the morphologies of organizational systems, the perpetuation of certain patterns of configuration over a long period of time and the persistence of formal tropes over material, functional and urbanistic differences. [ 4-8 ]

The latter two categories, however seemingly unrelated, gain an uncanny connection to each other because of the distinct way in which the idea of tectonics is construed within architectural discourse, between the actuality of construction and the expression of a building. Commonly construed as the confluence between the arts and sciences, the nature of construction is such that it is characterized by a combination of two fundamentally distinct imperatives: the actual technical resolution of material and geometric parts on the one hand, and on the other the expression of that reconciliation: something that is arguably rooted in the invention of an architectural language in combination with what I will call the "optics of perception." These optics invariably deal with a mix of illusion, scenography and trickery, and are not reducible to the actualities of construction. It is this rift between the dual-function of tectonics that problematizes the way in which architecture operates as a discipline: effectively what makes the building stand up is necessarily not the same as what makes it seem to stand up and, as such, architectural debates have internalized the relevance of each category in completely different ways, and in accordance to the relative techniques deployed.

A classic example of tectonics is rooted in the idea of the 'entasis' of a column, whereby the perception of weight is produced in the creation of a 'bulge' in the Doric column: a feature cast in stone, as if it were a function of the flesh. In other words, tectonics deals with the slippery relationship between fact and fiction, where the cold calculation of technical solutions (stereotomic stone carving) comes into conversation with the artful crafting of perception (the effect of gravity). Part of the curious sophistication of



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6 Hagia Sophia Pendentive, Photo by Steven Zucker

7 Isfahan Squinch

2 Eladio Dieste was not a registered architect, so my argument does not dwell on his professional status, but rather on his disciplinary insight, which most often out-merits the greatest of architects.

tectonics deals with the intelligent moral standards it has to negotiate as it weighs questions of truth versus narrative. As such, the entasis of the column effectively absolves us, as architects, from the guilt of believing in the fiction of its construction; the narrative of ‘weight’ that bulges through the stone has its own veracity, notwithstanding the actual material performance of masonry and, thus, architecture’s moral compass internalizes this fiction as a central part of its value system. This interpretation of tectonics also casts a more challenging light on the theme of confluence, disallowing, us to naturalize the pairing of heterogeneous sensibilities, materials and organizational systems together uncritically: whether in service of an organic whole, or the revelation of discrete parts, the technical protocols of construction and their effects remain two parallel constructs, in both dialogue and friction. [ 9 ]

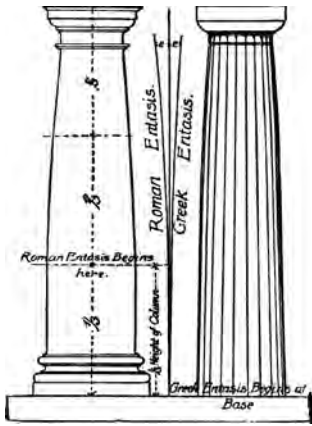
### ELADIO DIESTE: FROM STRUCTURAL DETERMINISM TO IMPROBABLE ARCHITECTURES

The purpose of this essay, then—by way of detour to Uruguay—will be to re-examine the question of confluence in the work of ‘designer’ Eladio Dieste on the occasion of the twentieth anniversary of his passing. Belatedly, it will also offer an occasion to revisit Stanford Anderson’s book *Eladio Dieste, Innovation in Structural Art*, which still serves as the critical benchmark on the work of a great, yet lesser known, 20th century thinker who operated outside of the modernist canons. In revisiting the past, this is also an occasion to construct a historical perspective around the work, and even interpret it through a different lens. Identifying Dieste as a designer does not do justice to his protean abilities, but here it serves provisionally to problematize the various characterizations that have been cast onto him in prior texts. As a professional ‘engineer,’ Dieste worked an entire lifetime, addressing challenges of structural design in an Uruguay of restricted means, putting his knowledge and speculative spirit towards the combination of material exploration, calculations, graphic statics and the construction of prototypes to advance the proposition of some of the most extraordinary structures built to date. However, his status as an architect is almost always left open-ended, in part, because of the ingenuity of his structural insight, such that all arguments are led to the inevitable positivist slant proffered by structural determinism thus leaving some of the complexities of his architectural decisions unaddressed.<sup>2</sup>

There is little scholarship that misses the target in identifying the engineering ingenuity of each of Dieste’s structures, and without exception Anderson, Allen, Ochsendorf, Pedreschi, Larrambebere and Caceres all capture the detailed relationship between structural analysis, material speculation



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8 St. Mary Woolnoth, Nicholas Hawksmoor

9 Column Entasis



and formal invention; but few focus on the architectural in any detail. They identify, with clarity, the disciplined and methodical way in which Dieste worked, and the many structural typologies he tested through multiple iterations, composed of four categories: Gaussian Vaults, Self-supporting Shells, Folded Structures and Ruled Surfaces. While each author is distinct in their approach, working in depth through varied areas of scholarship, what is consistent about the five essays is the way in which art and science are brought into confluence, revealing with great analytical precision how Dieste worked with the science of engineering to achieve geometric and structural feats that are deemed great works of ‘art.’ There is also an ideological dimension to these essays because their point of departure is characterized by a pre-ordained and loving acceptance of the ‘affect’ of these projects: insofar as the projects genuinely transcend the terms of everyday buildings, the devices behind these transformations are also left to some degree of wonder. They are always treated with scientific fidelity, but alternatively, they are also left in the ineffable fog of artistic value as an aftermath. Somewhere in between, the nature of the architectural discourse and rhetorical intentionality of the language Dieste produced is left open, and this is an opportunity to engage that liminal intellectual space.

#### THE PRESENCE OF THE STRUCTURAL FIGURE: BETWEEN PERFORMANCE AND SIGNIFICATION

Anderson appeals to Dieste’s own metaphor of a “dance without effort” as the basis for the juggling act between the efficiencies of engineering and the kinetic qualities attributable to his structural shapes. The figurative nature of the metaphors are a central part of that identification, like the “Sea Gull” canopy in Salto, whose form appears as two half-arches, but upon examination, is revealed to work as a singular beam, operating in a perpendicular axis to the arch because of its pre-tensioned members. Imbedded behind the idea of the figure is an artistic notion that is somewhat of a self-fulfilling prophesy: on the one hand, the positivist idea that these figures are the result of structural determinism, and on the other, that they achieve a certain symbolic potency because of their projected alliance with nature—whether as ‘sea gull,’ ‘wave’ or ‘gill’—all allusive figures that are encrypted within his various projects. Here, nature and technology are brought together in an ideological entwinement, each legitimizing the other in what I have characterized prior as the confluent: that which appears to naturally flow from one state to another. I will try to argue that the efforts of Dieste were far from natural, nor confluent in the ideological sense of the term: instead, he introduced devices and architectural instruments into these projects that were deliberate not only in their artifice, but also in producing effects that



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10 Door of Wisdom ("The Gull"), Salto, Uruguay

11 Church of Christ the Worker, 1958 - 60,  
Atlántida, Uruguay, Eladio Dieste. Photo by  
Ing. Gonzalo Larrambeber, Courtesy of  
Dieste Y Montañez S.A.

12 Gymnasium, Durazno, Uruguay, Eladio  
Dieste. Photo by Nader Tehrani

brought the actual and the perceived into a more complex and contradictory set of results. I borrow Venturi's theoretical apparatus here with the idea of extending the richness of Dieste's architectural operations beyond the deterministic and, in turn, to underline Venturi's own intellectual latitude beyond the semantic. Though left unwritten, one can imagine how the forces of structure could work into the complex and contradictory, to reveal the power of improbable reason, and the possible architectures it could produce—especially under the auspices of Dieste. [ 10-12 ]

## INVERTING THE HOST AND PARASITE: THE SEMANTIC ALLURE OF COMPOSITE SYSTEMS

Ed Allen's contribution to the book identifies the important connection between graphic statics and the development of masonry vaults, linking the layered ceramic work of Guastavino—who radicalized the efficiencies of material usage—to Dieste, whose further work on numerical theory in the context of mathematics established morphologies that were completely impossible in the times of Guastavino. What is important is how Allen speaks to the confluence of the intellectual and the practical to reveal how key moments in history are able to catalyze radically new inventions and the production of new forms of knowledge; he effectively links Dieste's depth of knowledge in mathematics to the history of construction from the point of view of labor. It is no secret that Dieste's agency in advancing his research was primarily through 'practice,' and that the profession was somehow a vehicle to deliver on a social contract that overcomes the rarefied nature of the actual research itself. Dieste's work was deeply imbedded in the idea of labor, the communities it upheld and the technologies that were available to them. Thus, his focus on masonry was central to his social engagement, drawing the raw matter from the very earth of Uruguay, and placing it in the hands of the many local craftsmen to serve as basis for the extraordinary structures he conceived.

With impeccable detail, Allen captures the importance of the vicissitudes of masonry vaulting, but here it would be important to point out a detail that is somehow missed, even if well-articulated in the work of Dieste himself. It is a commonly held notion that Dieste was a master of masonry, and that he certainly was. At the same time, it was the strategic way in which he brought the confluence of mathematics, geometric thinking, the protocols of construction, material innovation and historical knowledge into dialogue that made possible the types of inventions he unleashed. Of the many things he enabled, arguably the most powerful—and timely—of them was the strategic use of steel, not masonry. Given the cost of steel being relatively high in comparison to masonry, it is poignant how Dieste adopted

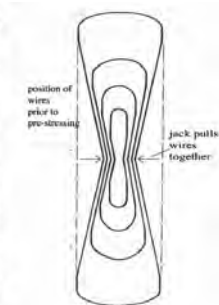


a limited, but strategic use of steel—whether through rebar or pre-tensioning cables—to support his structures. With labor being affordable, he was able to absorb the costs in a way that yielded maximum benefit to the very structures he sought to optimize. And though our eyes only see masonry on the surface of Dieste's work, his actual contribution lies underneath it, in the difficult insertion of steel pre-tension members that work in dialogue with ceramic units. In this sense, Dieste's main contribution to structures resides in the medium of 'composites' in the first instance (much like Candela's concrete shell structures), and his use of masonry is arguably secondary to it. The masonry was a 'given:' it came from the earth, it could be handled within an affordable labor economy, and each unit was easy to carry, thus requiring minimal cranes. The steel, instead, enabled the masonry to fly. From a historical perspective, it is interesting to imagine Dieste's thought process in establishing his curious inventions. If his education had predisposed him towards the calculation of steel and concrete construction, then the idea of composites was actually germane to his ongoing thinking; thus, the steel reinforcement was a given, and the masonry a deviation from the very concrete that the academy would have presented to him as a foundation. Alternatively, if his historical knowledge of masonry, as load-bearing structures, was the launching pad of his thinking, then the steel would be seen as a radical agent in enabling a form of performance that is entirely alien to the conventional masonry structure. No matter the perspective, the presence of the masonry grain, in contrast to smooth concrete, offers a stark tectonic contrast, and one that is familiar and strange at the same time: familiar because masonry is commonly used in the region and part of a known vocabulary, strange because the new configurations of masonry layout produces a behavior that radically belies its conventional image.

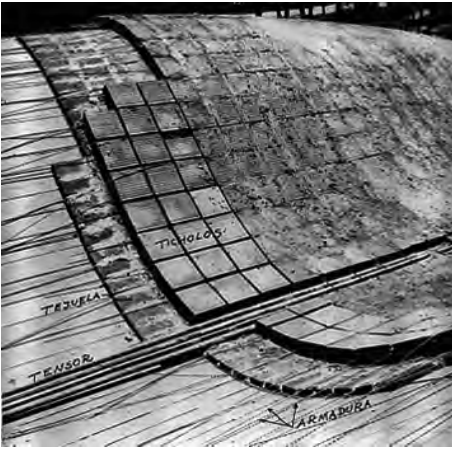
The power of composites, as history has demonstrated, lies in their versatility of formal and dynamic performance. For this reason, we witness the use of fiberglass and carbon fiber composites in the construction of airplanes, cars and boats, understanding the strength of both compressive and lateral forces on these vehicles. Within the sectional profile of the composite panel, the honeycomb shell offers simultaneous depth and lightness as well as a medium through which compressive and tensile forces are balanced, while the carbon fiber skin offers a counter-bracing to the prevailing forces on the core, whether in tension or compression; the sum total of the composite panel gives an efficiency like no other. Dieste's roofs were composites first, masonry second, and here it is important to identify the layers at work in his various vaults. While they are all a combination of masonry as a lower layer, steel rods laid in between or on top of masonry units, with a pour of concrete to cap it off, the actual sectional composition of the vaults varied from structure to structure. If the Church of Christ the



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3 John A. Ochsendorf, *Eladio Dieste as Structural Artist*, Princeton Architectural Press, 94-105.

13 Julio Herrera y Obes Warehouse, 1979, Montevideo, Uruguay, Eladio Dieste. Photo by Ing. Gonzalo Larrambeber, Courtesy of Dieste Y Montañez S.A.

14 Julio Herrera y Obes Warehouse, Montevideo. Photo by Ing. Gonzalo Larrambeber, Courtesy of Dieste Y Montañez S.A.

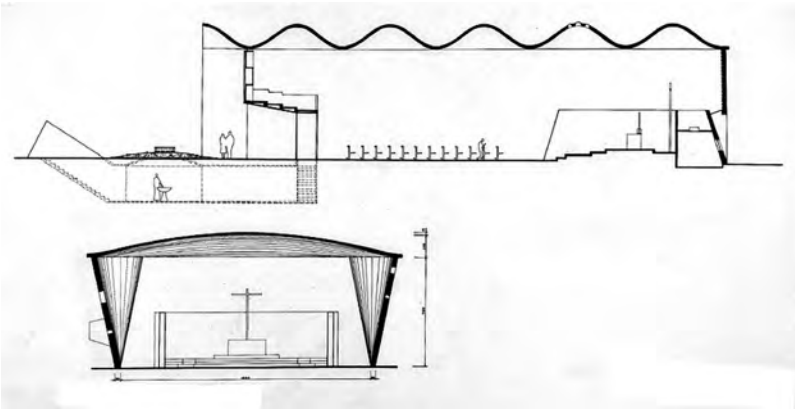
Worker in Atlantida was composed of solid masonry as a substrate, the Gaussian Vaults of the Julio Herrera y Obes Warehouse are composed of voided blocks, making the connection to honeycomb panels much more legible. Accordingly, since the vaults in Atlantida work as beams, the steel tension rods that are inserted within the valleys of the cross section help to cancel its horizontal thrust, and the Gaussian vaults of the Julio Herrera y Obes Warehouse contain steel primarily for the lateral and eccentric forces to address the tension on the surface. If the steel in Atlantida is concealed, it highlights the sacred aspirations of the space –to magically float, whereas in the Warehouse, the unpretentious revelation of the steel tension rods displays the utilitarian quality of a workspace without rhetoric or spectacle. In both cases, we may be led to change the narrative that guides our understanding of Dieste’s conceptual terms, inverting the role of the host and parasite: Dieste, the great engineer of steel construction, who used geometry as structure, masonry as skin and concrete as glue. The confluence of these elements is also a necessary mechanism for the success of his compound structures, as the size of the brick allowed for ‘pixels’ small enough to build up surfaces that could curve in two directions, using the elasticity of mortar to flex the geometry where the brick unit cannot. [ 13-14 ]

## BEYOND CONVENTIONAL OPTIMIZATION: THE ARCHITECT OF THE HORIZONTAL BEAM

John Ochsendorf refers to Dieste as a “structural artist,” in effect, pairing up the two disciplines, with engineering giving reason to art, and art embodying the tenets of engineering. As such, aesthetic deliberations on beauty and elegance tend to affirm that which is bound to reciprocal notions of the fidelity between material usage and performance, with the idea that structural engineers pursue “works of art through their pursuit of efficiency, economy, and elegance in construction.”<sup>3</sup> If Anderson appeals to the organizational principles behind typology to explicate Dieste’s compositional decisions, he also attempts to historicize it in the context of other modernist precedents such as Le Corbusier’s *Maison Jaoul*, a building that in appearance resembles Dieste’s own house, though rooted in fundamentally different structural premises. Ochsendorf, on the other hand, helps to place Dieste within a lineage of great engineering masters, all of whom were committed to researching the relationship between form and structural behavior; from his own research on Gusatavino to the extended works of Eiffel, Torroja, Freyssinet, Maillart and Isler, he appeals to the incremental advancement of material sciences and structural innovations as the basis of what makes Dieste so unique. In the thinking of Ochsendorf, the exemplary elegance of Dieste’s work emerges as a result of the expression of thinness of its masonry shell,



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4 Agustin Dieste explains the structural logic of this beam with conceptual ease, binding its form to its performance

15 Church of Christ the Worker, Atlántida, Cornice detail. Photo by Ing. Gonzalo Larrambeber, Courtesy of Dieste Y Montañez S.A.

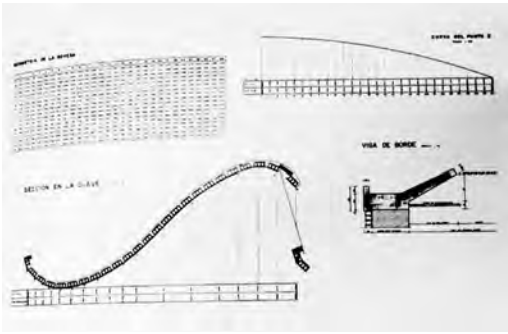
16 Church of Christ the Worker, Atlántida, Sections. Image courtesy of Dieste Y Montañez S.A.



for instance, as witnessed on the edges of the Atlantida church. A common trope also in the concrete shells of Maillart, Candela and Isler, the thinness of concrete is the result of an innate 'plastic' medium, with the liquid state of concrete being the matter from which forms and geometries may be molded.

In contrast, and by choice, Dieste was regulated by the cadence of the masonry unit, and he understood that he was a servant not only to its physics, but also its unitized means and methods of construction. If the finished state of concrete conceals the presence of steel by necessity (protecting the steel from the elements), it also tends to naturalize the pristine crust of concrete that is characteristic of classic modern structures. In contrast, Dieste's disciplinary—and stubborn—use of exposed brick produces an edge condition of aggregated masonry that floats perilously—and mysteriously—off the edge of the Atlantida Church, without evident recourse to reason.

Here, the contradiction between performative and optic evidence is poignant: if conceived as a masonry structure, the edges of the Atlantida Church would simply crumble under both compressive and lateral forces. However, since we know that the instrumental protagonist in these structures is steel, we also know that the brick edges are not slabs in the traditional sense, nor a mere extension of the roof vaults. This is where Dieste's deliberate role as 'architect' becomes evident: as required, he decides to establish a perimeter beam around the church, such that it takes the necessary compressive and lateral forces. Yet, contrary to the expected orientation of a beam, normatively optimized on a vertical axis, he shrewdly rotates the beam into a horizontal format. Seemingly irrational, this results in the now-famously thin masonry edges of the Atlantida Church. We also know that the masonry edge is held in tension by the very steel reinforcements within the vaults that require the beams on the perimeter of the church: a symbiotic set of structural forces acting upon each other, akin to isometric body training where the symmetrical forces of the body are pitted against each other. If, in general, the mathematical formula dictates that the height of a beam is elevated to the power of three for the moment of inertia, opposing the deflecting action of a force, in this vault, the horizontal thrust of the whole roof is proportionally higher than any vertical load that the ridge beam carries, resulting in the inevitable horizontalization of the perimeter beam.<sup>4</sup> Thus, the curiosity of the building's edges becomes understood as part of the tectonic grain of the building. The brick bonding of the crust slaloms back and forth, establishing an exact reciprocity between the figure of the building and the configuration of its construction. And yet, these very edges appear implausible, the result of a contradictory rationality, a feature that adopts the steel reinforcement to contain the building's edges in order to support the vaults. [ 15-16 ]



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17 Port Warehouse, Montevideo, Uruguay,  
Eladio Dieste, Gaussian Vault Section. Image  
courtesy of Dieste Y Montañez S.A.

18 Gymnasium (Estadio Ernesto de Leon),  
Durazno, Uruguay, Eladio Dieste. Photo by  
Nader Tehrani

## THE CONSTRUCTIVE INTUITION: THE RULED SURFACE AND THE SADDLED BEAM

Pedreschi and Larrambebere's essay on technology and innovation helps to further elaborate some of the central themes of Dieste's work, again couched in the ethics of truth, honesty and service to humanity to which masonry innovations are commonly attributed. With rigorous detail both address Dieste's development of a constructive intuition, creating an alliance between his design sensibilities in relation to his persistent engagement with construction as a central feature of his intellectual evolution. Among other elements, this essay deals with the ingenious invention of the Gaussian Vaults, the evolution of which can be tracked through numerous projects over the years of Dieste's panoramic career. With the ability to withstand forces beyond what a typical vault can achieve, the Gaussian Vault is defined by a single surface double curvature whose spring-point edges are flat, while the vault saddles both up and down as it spans vast dimensions.

Beyond Pedreschi and Larrambebere's argument, what is remarkable in this structural trope is its architectural ability to discover reason amidst a host of varied yet confluent alibis. Evacuated entirely of any structural beams in the conventional sense, the thin compound surface is called on to span extraordinary lengths, purely through its own figural distortion. The asymmetrical deformation of the vault is defined by the added value of the introduction of natural light into a large open space. The asymmetry of the skylight introduces a slope in the roof that invariably forces drainage to one side. Hence, the moment of ingenuity: the introduction of a saddle—in the form of a counter-curve in the vault—is such that in one formal swoop, the vault reorients itself vertically to connect with the plane of the clerestory window while also producing a constructed swale that redirects the water away from the glazing, while providing added structural strength at the bottom of the vault. In this sense, both saddles serve as flanges for the vault, reinforcing it through a surface figure while allowing the reinforced steel to add composite strength. The multiple narratives that are woven into this single surface describe the kind of phenomena that I like to call architectural confluence: the form is not determined by a single alibi, nor a linear form of reasoning, evading simplistic determinisms, whether structural, functional or semantic. Instead, the technique involves something deeply rooted in the architectural discipline: beyond the obligation to solve problems, the elaboration of a tectonic language, the integration of multiple contingencies, and the invariable synthesis of heterogeneous parts. What is extraordinary is that Dieste's functional fragments cannot be seen: the beam, the drainage and the skylight are all absorbed into one formal, spatial and material system, suppressing their contradictory functions towards a singular figure. [ 17-18 ]



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By extension, what is particular to Dieste is a single-minded quality we see in few other architects: the penchant to work in a single medium as a means to radicalize the performance of material and programmatic behavior. Insofar as traditional tectonics is defined by logical differences in materials in accordance with conventional functions, it is also a deep-seated and historically grounded attitude that is imparted as part of the academy. Gottfried Semper's *The Four Elements of Architecture* comes from one such ideological foundation. For this reason the obstinate adherence to a medium—to make materials go beyond what they are meant to do—is also a significantly defiant intellectual act. Since nothing can work in accordance with normative adaptations, it forces the architect to transcend the terms of both material and social conventions to produce new forms, whose use will, in turn, challenge everyday rituals and practices. We witness something similar in the St. Petri Church of Lewerentz, where floors, walls and roof are all cast in brick, forcing each to display the predicament of difference through the elaboration of brick bonding, in both structural and iconographic terms.

#### THE CATALYTIC DETAIL: THE STEPPED TOWER OF ALTANTIDA

What none of the writers addresses directly, but which they insinuate throughout, is the degree to which the structures of Dieste are bound to particular material rules. His direct reliance on, and engagement with, the construction site is central to his research. Yet, none of the historians speak directly to the part-to-whole relationships created by the masonry logics he deploys. In part, Dieste's initial adoption of brick is rooted in the principle that links it to the cost of labor: first, the idea that labor was relatively economical, second that the brick, as a unit of construction, is designed around the dimension of a hand, and third that an edifice of sizable dimensions can effectively be built by an individual if a self-sustaining part-to-whole constructive principle is at work.

The most direct and fascinating architectural display of a catalytic material detail can be seen in the tower of Atlantida. From the outside, the tower is composed of monolithic vertical brick piers that are incrementally interrupted by what seems to be a vertical running bond pattern, albeit at a monumental scale. On closer inspection, and as is revealed by a view into its interior, we discover that the horizontal brick bands that make the so-called running bond pattern are merely the extruded brick treads of a spiral staircase that navigates all the way up the tower. The logic of the spiral stair, the bonding of the brick wall and the scale of the tower are all interwoven, but the seed for its inception lies in a small detail of a stair



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20 Church of Christ the Worker, Atlántida, Interior View of the Tower. Photo by Nader Tehrani

21 Church of Christ the Worker, Atlántida, View Up the Tower. Photo by Nader Tehrani

- 5 It is important to distinguish Dieste's tell-tale detail from that of Carlo Scarpa, as articulated by Marco Frascari. Scarpa's details do indeed tell a story, but each an essay onto their own, drawing in his arcane use of materials, crafts and singular moments, the sum of which rarely tells the story of the building at large. In contrast, Dieste's details operated as the genetic code of a construct, without which the building is not possible as an organic whole. For Scarpa, the detail was the exceptional moment of artistry, for Dieste it was the rule-set and inventive code.
- 6 It should be mentioned that over his career, Dieste enjoyed a long and fruitful relationship with artist Joaquin Torres Garcia, whose work spoke to some of the same preoccupations of "aggregation" and "assemblage" that is evident in Dieste's own work, especially in his more abstract paintings where latent readings of masonry impress themselves onto the surface of the canvas.
- 7 Agustin Dieste notes that a similar staggering of the horizontal links between vertical sections is seen in the Maldonado TV Tower. Here the scale is much larger, and thus not determined by the dimension of steps. Instead, they serve the purpose of supporting working platforms, as it was built without scaffolding, while shortening the continuous span of the vertical wall/column elements, to avoid buckling.
- 8 Julian Palacio notes that the plan layout of Atlántida redefined the liturgical protocols at a time ahead of the changes introduced by the Vatican Council II, making the community participant in the mass celebration.

tread and riser, whose engagement with the wall defines the logic of an edifice far greater. From a discursive perspective, the architectural allure of this strategy speaks as much to the logic of Trajan's Column in Rome as it does to the horse ramps at the Chateau de Chambord, both in their own ways weaving the configuration of the stair into the figure of a tower. In the case of Dieste, with an austerity of religious restraint, his buildings thrive on the richness of abstraction, and the refusal to ornament outside of the tell-tale detail<sup>5</sup>: his catalytic details are both structure, ornament and the genetic code that releases the logic of how these curious buildings work.<sup>6</sup>

Given his protean abilities, the details do not necessarily repeat themselves, but remain a critical part of the logic of each structure.<sup>7</sup> For instance, if the Atlantida Tower establishes a tight reciprocity between tectonics and the function of the stair, in the Gaussian vaults, Dieste develops a loose fit between the grid of tiles and the geometry of the vault. The loose fit allows him to contain the same number of tiles in each row, while using the mortar as the elastic dimension that permits the geometry of the vault to expand and contract—in effect, an embodiment of a wire mesh model. In contrast, Dieste's self-supporting shells are commonly cut at the end of their extrusions, slicing against the grain of the grid, if only to underline the cantilevered logic of the arches. They are not arches as such, but cantilevered beams. [ 19-21 ]

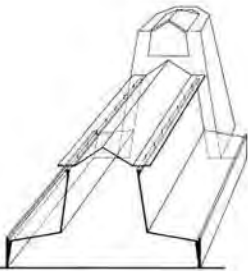
## THE TYPOLOGICAL FIGURE: A BASILICA IN ABSTRACTION

It is commonly held that the San Pedro Church in Durazno is Dieste's most accomplished architectural work, but also somehow an outlier in relation to the others. A mere visit to the space is enough to silence both the architect and the believer; I can attest to that myself, having just returned from a pilgrimage. Set behind an old neo-Romanesque façade, the remains of a fire that gave rise to this commission, the new space of the basilica is concealed behind this historic relic, and yet locked into it as both structures reinforce each other on the longitudinal axis.

In contrast to the church in Atlantida, the figure of this church gains traction from a deep-seated fidelity to the church as an architectural type. The plan of Atlantida, architecturally ingenious as it is, draws from the sensibilities of the free-plan, and yet each and every figurative element, whether wall or roof, has a structural purpose, and there is no identifiable reference to cultural conventions beyond that—it's almost an entire invention.<sup>8</sup> Upon entry into San Pedro, the basilical 'impression' of the church as a culturally encoded space is immediate and identifiable, though at the same time allusive, abstract and disciplined. The extruded sectional profile of the basilica is unmistakable, yet all the elements that support its systems of structure,



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22 Church of San Pedro, Durazno, Uruguay, Eladio Dieste, 1967-71. Photo by Nader Tehrani

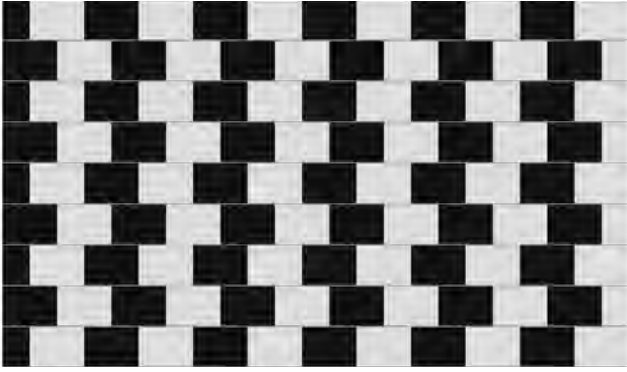
23 Church of San Pedro, Durazno, Axonometric Section from *Eladio Dieste: Innovation in Structural Art* (2004), Stanford Anderson



illumination and spatial organization are somehow missing...entirely evacuated actually. Effectively framed within a monolithically stacked-bond masonry organization, the figure of a column-less basilica is suspended in space; the bonding system amplifies its structural ambiguity. The effect of suspension is heightened by the fact that the roof over the nave mysteriously floats about two feet above the very walls that would conventionally support it. The longitudinal walls of the nave are canted out ever so slightly, angling towards the tilted roof of the side-aisles, whose compressed wings spatially buttress the nave. What is heretical about this space, in part, is its consciousness of the historical role that structure has played in the conception of a basilica, whereby the side-aisles of its antecedents were not only support spaces for the nave, they were also the space of structure, lodged in alignment with the flying buttresses, set within the same zone. Dieste replicates the spatial layout of this religious type but evacuates all finer grain elements: the structural piers, the bay organization, the clerestory windows, side chapels, among other things. Abandoning the part-to-whole relationship of the elements within the type, he reveals something irreducible about the spatial gestalt of the profile of a basilica, and in doing so, is able to dispense with any architectural surplus in service of a structural strategy that absorbs the structure and skin into one extend folded system, enveloping the entirety of the interior.

Indeed, the framing walls around the nave are not merely walls; instead, they are deep beams, running the length of the church—from the main façade all the way to the supporting wall of the apse—with a depth of about 20 feet. The brick of the interior captures the stark light that comes through the reveals of the roof, heightening the effect of weight, and depth. At the same time, the levity of its composition beguiles, because one is unable to understand how the figure of the church can be supported in a structure-less enclosure.

The effect of this space is resonant with a sense of absence: all the architectural elements, iconography and elaborations of the basilica are missing, and yet what resonates about the basilica as type, remains profoundly discernable. In linguistic terms, we might analogize the operations on this space to that of an ellipsis: the rhetorical device that communicates through omission. And herein lies the core of my argument: that while Dieste's profound knowledge of structure was undeniable, his contributions were in service of an even more sophisticated understanding of tectonics, whose premise was to reconcile the relationship between structure and its expression. Given his sometimes-mannered sense of rationality—and here, I would not want a confusion with the mannerisms of architecture—his self-conscious visual tropes establish a difficult and sometimes illusory relationship with the reality of the building, even when he is operating with absolute faithfulness to its structure. Often cited in the context of the baroque and



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24 Worker's Kindergarden Illusion

25 Church of Christ the Worker, Atlántida,  
Entrance Wall. Photo by Nader Tehrani

mannerism, Dieste is anything but; the linguistics of his masonry work are not of a language of scenography, but rather meticulously tied to a construction system to which they were married—and revealed to be as such. [ 22-23 ]

## THE OPTICS OF TECTONICS: A WORKER'S KINDERGARTEN ILLUSION

Lucio Caceres, a former student of Dieste, caps the book with a final essay as a tribute to his mentor. Its message is a generous one, reflecting on Dieste as a man, an engineer and creator. It speaks of the harmonious relationship between architecture and engineering in the vast body of work that Dieste leaves behind. Much is to be appreciated in this appraisal, and yet the insinuated harmony helps to camouflage some of the more heretical delights that I argue are the central pleasures of this work.

In one of Dieste's most articulate architectural feats, he separates the front façade of the Atlantida Church from its sidewalls, such that one can witness their structural independence through a reveal that allows a stream of light to enter from the north. As such, he identifies how the undulations of the sidewalls connect to the roof as a pinned frame, a pure manifestation of a moment diagram. The front façade then, is conceived as a deep monumental portal that is spanned by a masonry screen wall composed of an aggregation of smaller stacked diagonal walls. The diagonals disallow views into the church while ensuring the passage of light. In turn, the diagonals produce depth, as each layer stacks in the opposite direction of the layer above and below it, producing a coffering that functions virtually like a truss. From a visual point of view, this screen wall appears to undulate, created by an optical effect that is commonly known as a “kindergarten illusion”—also known as a café wall or chessboard illusion—the offset patterning of an optical illusion cited first in 1898 as a graphic device. Here, this graphic device takes on a charged role, as the two media come into direct confrontation: a structure embodying stability is faced with its own image as something kinetic, vulnerable and unstable. From the inside, the beauty of this wall can only be described in optical terms, as the pattern of light obfuscates the figure-ground relationship between solids and voids. Since the eye is not permitted to see the actual windows, one can only intuit the depth of the wall through the cadence of light, a stark reminder that the certainty of structural reason is in the service of a transcendent quality of illumination and illusion, and one that underlines the crafty way in which tectonics creates an alliance with optics over actuality. With this, the laws of physics and optics come into and improbable alliance—not natural, nor harmonious or obvious—but a masterful aplomb of artifice to witness. [ 24-26 ]

- 9 Stanford Anderson, *Eladio Dieste: Innovation in Structural Art*, op.cit., 32.



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- 26 Church of Christ the Worker, Atlántida,  
Interior View Towards Entrance Wall. Photo  
by Nader Tehrani

“I too obey the laws of physics.”<sup>9</sup> Stanford Anderson quotes Dieste, who towards the end of his life was suffering from illness and had reckoned with the imminence of his passing. That he did; he forecasted structures through an impeccable understanding of physics as much as his body would succumb to a degenerative disease that he, himself understood to be his yield point. But beyond that, he disobeyed a myriad of other laws requiring a sophistication of mind to bridge the art of rhetoric, optics and perception to overcome the very laws of physics at work, drawing out the architecture contained within the structure.

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