

Picking up where we Left off the Typological Diagram as a Fundamental Tool for a Conscious Architectural Design Process

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After a XX century largely devoted to the *avant-garde* and an explicit will for the modern, the stern rationalism, the functionalism, and the minimalist spirit of modern architecture was finally questioned. By the mid-sixties, a new spirit moved towards a re-valorization of the historical precedent and the fundamental (millenary) values of architecture as a discipline. The Postmodern proposal (along with the neo-rationalists, their European counterpart) recognized the importance of tradition, historical precedents, and fundamental principles of architecture as a discipline, ruling over both building design and urban design alike. A faction of the postmodern theorist, led by Alexander Tzonis and Liane Lefaivre postulated theories on *critical regionalism*, promoted an intelligent approach for the appropriation of valuable traditional methods and their possible adaptation into a contemporary proposal. A most instrumental discourse on the proper handling of *typical* procedures was developed based on essential values of design such as convenience, efficiency and pertinence to the problem at hand.

The typological discourse recognized valuable formal convergences within programs, cultures and regions, all based on a quintessential truth of design: whatever is deemed as typical, has proven its convenience. The idea of the *type* held the key to understand formal transformation through the distinction of what is permanent. It was a most valuable discourse on design method and applied-theory fundamentals; a discourse that was abandoned back in the late 80's due to the application of somewhat questionable theoretical and practical priorities. The whole critical regionalism proposal was short-lived, as the postmodernist discourse quickly spun out of control. The sensibility towards the historical precedent was reduced and distorted into formalist excesses leading directly into kitsch. The typological discourse was discarded as it was deemed to be a simplified approach to design-by-selection from a typological catalogue, much like following a recipe. By the end of the XX century, the postmodernist discourse was exhausted and defeated. As a reaction to the formalist/fundamentalist excesses of postmodern architecture, the so-called deconstructivists presented a new standpoint directly questioning the origins, need, and means for application of meaning and intention in architectural composition. It purported consideration to the possibility of chaos and utter randomness. Architectural meaning was questioned as a necessity, while architectural intentions where to be derived from pretty much any randomly unrelated events.

The arrival of deconstructivism into the architectural scene some thirty years ago, coincided with the arrival of the digital revolution, in the form of Computer Aided Design (CAD) software programs. Disparate deconstructivist proposals were most impertinent with a direct disregard towards meaning, purpose, and scale (whether human or urban). The CAD software provided the perfect environment to foster and pursue architectural designs with little or no interest in feasibility, practicality, and altogether reality. Much like the technocratic utopia promoted by the futurist and constructivist drawings of Sant'Eliá and Chernikov, the first deconstructivist proposals by Hadid, Tschumi, and Eisenman, though of little feasibility, proved truly revolutionary in affecting the aesthetic sensibility, architectural theory, and design during the last part of the century. Their proposals however, were mostly limited to digital images of an architecture that was never to be built. This was not the first time architectural production was led from a visual agenda (think of the famous architectural fantasies by Sant'Eliá), but this was the first time that architecture was being proposed from and for *cyberspace*. Cyberspace provides a virtual reality where the laws of physics (static and strength of materials), the building code, budget restraints, and even customers' demands, are not real considerations in the design process.

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This delicate scenario is proposed from a strictly representational standpoint, it is based on the realm of drawings stemming from a new technology. Never before in the history of design, have the possibilities of the means overwhelmed the feasibility of the end so blatantly.

In the case of architectural design, the significant effect of the digital revolution is felt (mostly and almost exclusively) at the representational level. When compared to other realms, such as photography, the music record industry, or land surveying, the digital revolution seems to have affected architecture in a rather marginal fashion. While the means, methods and possibilities for the representation of a project have changed significantly in the past thirty years, construction means and methods remain very much the same. As a result, in recent years, many *avant garde* proposals, firmly based on the skillful use of available computer programs, have little concern with reality, questionable feasibility, and very little or no practical application.

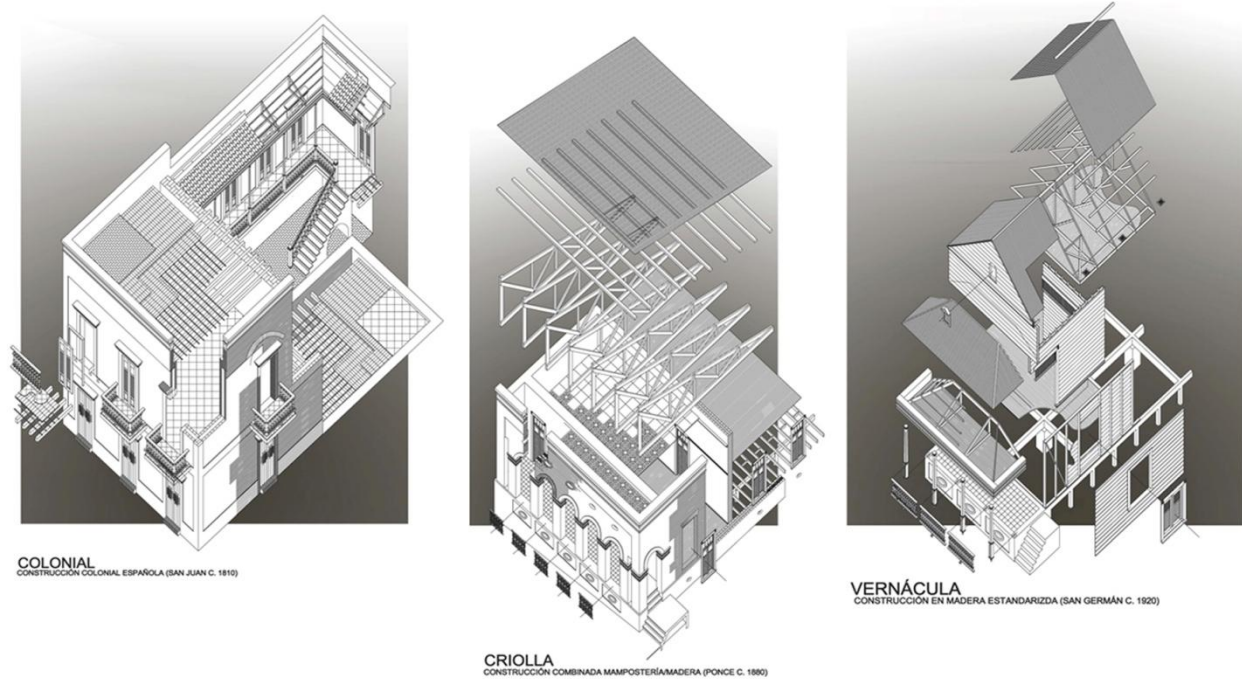


Z. Hadid parametric design proposal for the Olympic Arena in Tokyo (2014), ultimately proved impossible to build.
K. Tange's reasonable version of 1964 was built after 20 years of losing a war in the worst possible way.

Allowing the drawing instrument to subdue and overrule any design intention (instead of the other way around) may have terrible consequences in the pedagogy, the epistemology and ultimately in the execution of architectural design. Instead of the traditional (logical) scenario where drawing serves a proposal based on functional, spatial, contextual, or aesthetic considerations, this is a strange world where the proposal is based on what can be drawn. Seduced by the possibilities of the tool, the craft values are abandoned and the apprentices misled. Recent advances in the application of CAD programs, allow junior students to produce rather seductive images (in many cases incredibly rendered) of spaces of which they know very little. A lack of constructive sense (proper hierarchy and sizing of elements) as well as scale (human, urban, structural), spatial sequence, building envelope and regulatory concerns such as corridor widths, location and frequency of staircases...are all abandoned in favor of eye-candy proposals of what seems to be instant architecture. At the professional level, it is notable how the latest architecture (pick your magazine here), although designed with all digital advantages, seems to be comprised of rather dull volumes or simplistic shapes combined with interesting patterns or seductive textures.

There is, of course a blessed side to digital illustration. Nowadays, computers can generate a wide array of images ranging from the conceptual to the technical. CAD-drawn construction drawings are not only more precise, but –if intended- can also be exquisitely detailed. Like never before, rendered images can accurately resemble watercolors, as well as photographs of future realities. Simple filters carefully applied over digital photography can recreate a rather convincing, hand-drawn effect. It seems whatever your illustration needs may be, computers are ready and able to tend them. Furthermore, the possibility to produce these drawings is no longer the privilege of those few talented in the proper handling of a pencil, but truly accessible to a much larger audience.

Computer Aided Design software is here to stay; no one will plea a case for nostalgic use of triangles, technical pens and French curves. The ever-increasing variety of software programs has served to facilitate, expedite and enhance architectural drawing, while making it more accessible than ever before.



Exploded axonometric views of traditional Puerto Rican architecture, showing construction materials and assembly procedures. Drawn using strictly AutoCAD.

In 1948, Bruno Zevi (1998) noted a crisis regarding the representation of what is substantial in architectural space: *“the problem of the representation of space, far from being solved, is not even properly stated. The lack of a precise definition of the consistency and character of architectural space, results in a lack of intent for its representation and publication. Architectural education, for this same reason, is rendered inadequate.”* (Zevi, p.34). That same crisis, it is safe to say, is still awaiting resolution.

To this date, latest developments in architectural representation tools and techniques have had a significant effect in the conception and proposal of new buildings. Latest trends in architectural design seem to stem from the possibilities offered by the latest software more than responsibly tending to the problems the design is called to solve. The conventional approach to design as a conscious process of decision-making to solve multiple, simultaneous problems has been challenged. Parametric software promotes the possibility of designs based on the algorithmic application of parameters completely foreign to the problem at hand. The resulting proposals are so impertinent in every sense (form, function, context, constructability...) that are simply removed from the realm of architecture. Designers accepting this as a possibility are not more than sorry image crafters. Their rather dull and unmoving proposals typically disregard purpose and intent (as they are not design), while lacking a sense of freedom and dexterity of execution of a craft (since they are not art either).

A careful examination of the different kinds of drawings customarily used by architects will prove that despite the significant penetration of computer-aided design in the design process, a fundamental part of it, to this day, remains very much impervious to the digital revolution. Based on their purpose, role within the design process, and level of literal specificity, architectural illustrations can be classified into three categories:

Diagrams (how it's conceived/how it works) – these are drawings of a more abstract nature intended to illustrate an idea or intention, focusing more on the conceptual and less on the factual. These drawings may serve different purposes tending to the procedural (one-line diagrams) to the operational (bubble diagrams) to the conceptual (parti/typological diagrams). The variation on diagrammatic purposes allow for a complete spectrum ranging from the literal to the abstract. These drawings are based on a more subjective epistemological basis.

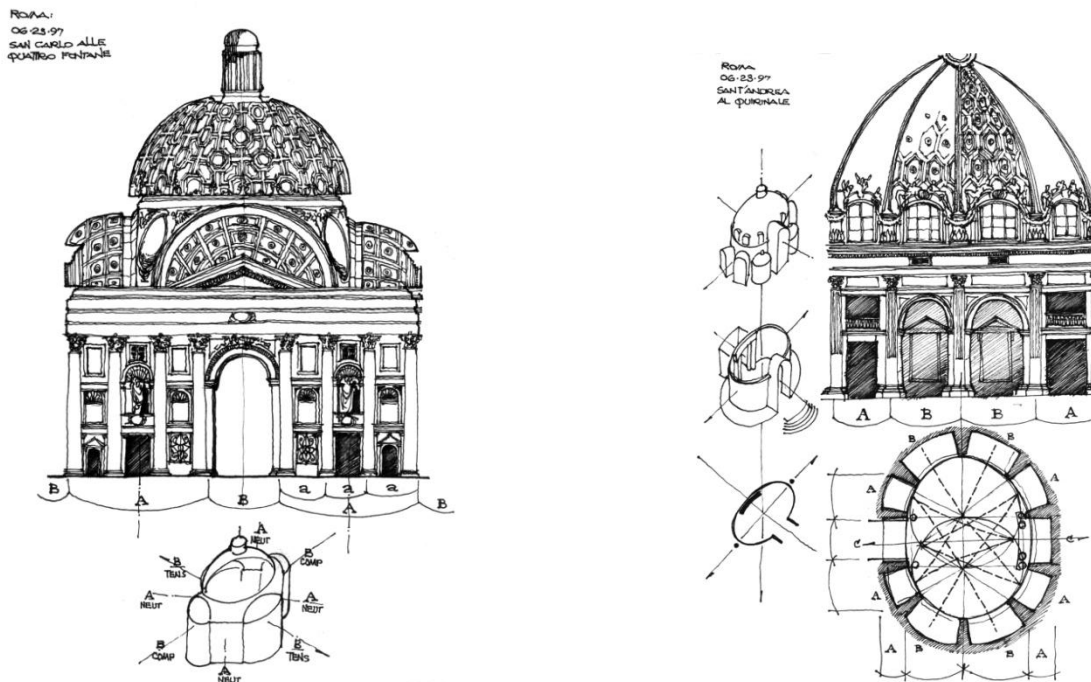
Renderings (how it looks) as are all drawings intended to factually illustrate the proposed design's overall appearance and physical characteristics.

These drawings are based on the understanding of important geometric principles such as proportions, perspective construction, and cast shadows; all of which are founded on a rather objective mathematical basis.

Technical drawings (what it is) – concerning all drawings conceived to illustrate all building systems and components specifying materials, dimensions, quantities and performance characteristics. These drawings are based on the understanding of Cartesian space, involving two-dimensional and three-dimensional projections, isometric constructions, and the orthogonal relationship of dimensional axis on X, Y & Z. Needless to say, these are also based on a rather objective mathematical basis.

Since software programs share this objective/mathematical nature, they have significantly contributed and improved those drawings concerning rendering and technical information, while they have not had much effect at the diagrammatic level. Most CAD contributions focus on the realistic rendering of a known design (as is the case of Sketch-up and its array of applets for rendering); or they pursue the correct coordination of a set of construction drawings (as is the case with any BIM platform, such as REVIT). Regarding, computer-generated conceptual illustrations, the so-called parametric design (as is the case with RHINO or Grasshopper) probes the possibility of basing an architectural proposal on parameters of little or no pertinence to the problem at hand; simply because we have the technology to do so. However, a responsible and coherent design process (at least to this date) is still far from being fully CAD-based. To this date, there is no software to help us better understand, interpret, or explain what we see, or yet more important to a designer, to establish what we want.

The intricate relationship between drawing and designing is based on the relevance these two operations bestow on both *understanding* (illustrating/interpreting what you see), and *purpose* (stating what you want). In order to draw you need to **understand what you see** (when you draw by sight), as much as to **understand what you want** (when you draw from your imagination). Similarly, in order to design, you need to understand what you want and what your options are to attain it; you need to understand your purpose. In the end, not only can you not draw what you don't understand, but also drawing serves as a mean to attain understanding. Once you can draw it, you can claim proper understanding.



Analytical sketches on two exemplary churches of the Baroque in Rome. The analytical goal is to derive the underlying principle/idea which is written in the language of architecture.

As a matter of visual communication, any drawing recognizes a common codex (grammar) between the designer and the user, much like that between the author/composer and his reader/audience. The proper use of a diagrammatic sketch serves a double purpose: it facilitates the statement of a designer/author's purpose and intentions, while also serving to clarify the user/reader's understanding and interpretation. Whether writing or reading an idea, a diagrammatic sketch is the only tool immediate enough (and quick enough) to capture it before it fades again into oblivion. Spanish writer and journalist Rosa Montero (2006) masterful description of the creative process, recognizes that "*words (or ideas) are as abyssal fishes, hinting a flash of scales amidst the dark water*" (Montero, P.17).

The design process stems from very abstract mental procedures. Whenever facing an architectural design, our mind must be able to identify compositional procedures, whether intentional (from the author) or interpreted (from the reader). Italian semiotician, Umberto Eco (1990) recognizes the *intentio lectoris*, the reader's interpretation as valid as the author's original intention, when it comes to deriving meaning from a piece of work. (Eco, p44). Drawing meaning from a composition entails an act of intellectual **analysis**. Our mind must observe, abstract and ultimately interpret what it sees. It is a reductionist process leading to what is essential. On the other hand, whenever proposing an architectural design, our mind must draw a pertinent intention (both formal and functional), from the prevalent conditions calling for the design. Proposing a new design entails an act of intellectual **synthesis**. Our mind must establish a *strategy* (what to do), and derive its corresponding *tactics* (how are we to achieve that goal), in order to ultimately compose a coherent solution. It is a cumulative process stemming from what is essential. Whether reading/interpreting or writing/composing, a pertinent, clear, and distinct intention is of the essence to any design process. Analysis and synthesis are two abstract processes, actioned and communicated through the immediate relationship between the eye (directly or indirectly controlling the input to the mind), the mind (in charge of whether imagining/visualizing), and the hand (as the ultimate translator). For both these processes, the diagrammatic sketch proves instrumental.

Design requires to swiftly pinning down an idea by means of its illustration; you need to be expeditious to draw an idea. It requires the real-time (yet careful) coordination between what you see, what you think/understand, and what you draw. This can only be attained through quick free-hand sketching, as it allows you to measure, assess, review and discard as you go; meaning shifts in a hand-controlled drawing by simply pressing harder, splitting; touching, crossing, or not touching lines. Everything is loaded with meaning in an intense interchange between eye/mind/hand. There is simply no room to think; "line, from point... offset this many inches...." it's not fast enough. For the time being, the genesis of design is still a free-hand sketch.

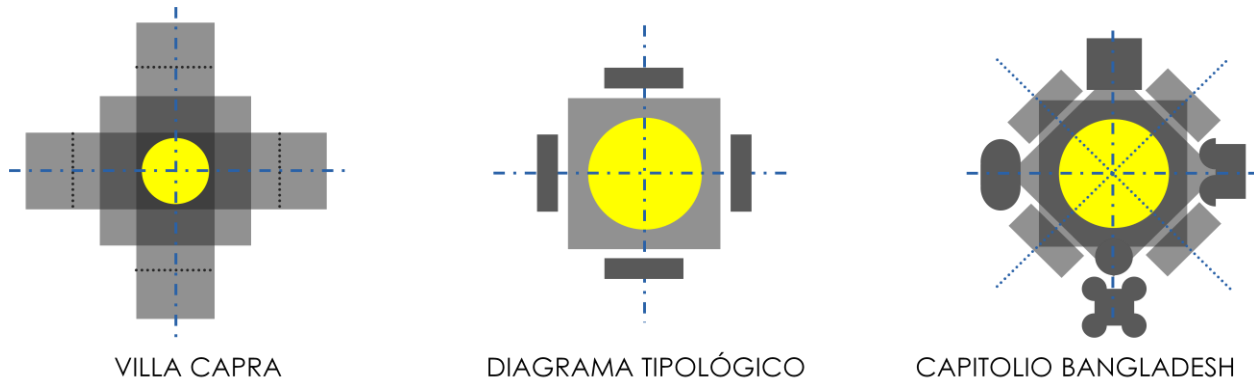
At the early stages of the design process, the understanding of the pre-existing conditions may yield an initial sketch (*parti*), establishing a pertinent composition (intentional arrangement of parts) that could effectively tend to the problems to be solved by the design. Two hundred years ago, JNL. Durand (1988) argued in favor of the diagram sketch:

(Upon establishing an overall design intention) "*You must fix the conceived ideas by means of a quick sketch, which both, alleviate our memory and makes the ideas available for careful and exact examination, thus allowing us to move on confidently to other considerations.*" (JNL Durand, p.62). Précis de Lecons, (Part III, On composition).

The fundamental diagram is indeed, an illustration of an idea; it is a rather abstract undertaking. As such, this kind of diagram tends to be a rather simple drawing, easy to execute yet difficult to conceive and develop. Since it requires to be quickly executed, this drawing is usually rather small in size and consists of very few simple lines. Its minimalistic nature loads each line with very specific meaning regarding the overall ordering intention as well as the particular relationships between the parts (and sometimes the constituent parts of the parts, if you will).

That initial sketch commits the compositional intention to rule over all decisions in the design process. It is the fundamental diagram of the *generatrix* idea, and as such it should be regarded, not as a representation of a design, but as the design itself, though in embryonic form. It holds the fundamental DNA of the composition. These simple sketches are extremely valuable in the design process since the generatrix idea they communicate can be regarded as the ultimate reductive goal of any analytical exercise, but also as the initial departure point for any design proposal. As such, these are a much needed map and compass to tend the complexities of the design process. While the *generatrix diagram* holds the fundamental intentions of any specific design undertaking, it can be furthermore reduced into the *typological diagram*. This diagram recognizes the essential formal classification of the design. As such, it is correct for a given example, but also sufficiently non-descript to be applied to many other examples sharing a common formal structure or *type*.

The typological diagram, although loosely related to any specific individual, is important in as much as it encompasses certain characteristics which hold true to a group of repetitive/similar examples. When its repetition is observed with regard to a program, culture or region, the word *typical* (sharing its root with *typological*) comes forward.



Generatrix diagram of Palladio's villa Capra (explains the main compositional intention) is reduced into the typological diagram (which holds true to many examples at a fundamental level); Kahn's Capitol building at Bangladesh, is "built" upon the same typological scaffold.

Typical procedures are based upon experience, which makes them most valuable to designers. Anything that is regarded as typical had to prove its convenience first. It is precisely this convenience that ties any typical design solution to the problem from which it stemmed, as well as –at the ontological level- to the culture and the region that recognizes and embraces it.

An argument in favor of the type relevance in the design process is a thirty-year old discourse, previously discarded due to superficial evaluation of its proposal. Yet it deserves revisiting. The relevance of the typological thinking lies not only in recognizing its proven pertinence and adequacy to common problems, but also in its possibilities as an adaptation device balancing what is permanent and what changes within a transformation process.

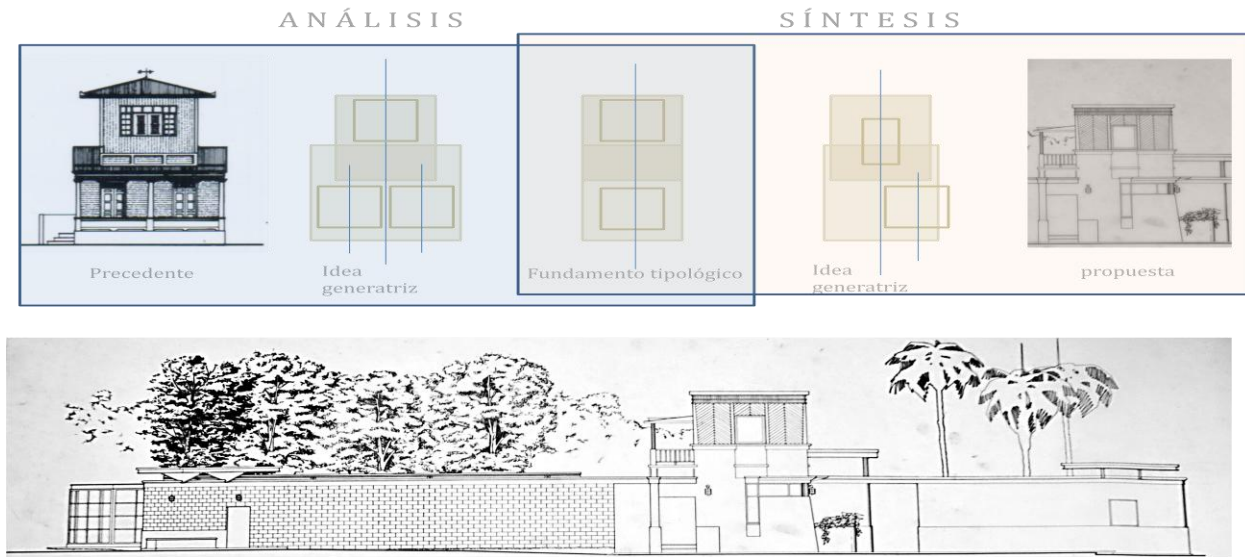
The ability to observe, reduce, and ultimately capture an architectural composition into its fundamental ordering idea (free from scale, style, and purpose) can lead to a better understanding of processes of transformation/adaptation within what is regarded as a suitable/permanent design solution. A sketch diagram proves essential to attain clarity and focus at this fundamental level of the design process. Once the fundamental diagram is attained, it may serve as the basis of a new proposal willing and able to respond to the specific parameters of the new problem at hand, yet respectful and responsive to the essential commitments of the type.

Diagrammatic thinking (and its expression by means of quick free-hand sketches) proves instrumental at the onset of the design process. Whether observing -analyzing a precedent, (reading), or by establishing a responsible/pertinent *parhi* (writing), our mind must conquer clarity by means of abstraction and synthesis at a diagrammatic level. Through diagrammatic reduction a building's fundamental idea (and its typological classification is revealed, understood and manipulated). The grammar of architecture operates at a diagrammatic level. This particular sensibility towards design and composition recognizes the importance and value of historical precedents. The building is regarded as a document, and the thus, the history of architecture becomes a legitimate library of resources, where the typological diagram serves as a much needed card catalog.

Despite the array of CAD options, to this day, hand drawings are still regarded as an essential tool for the practice and execution of the architectural craft. If you are an architect, it goes without saying that you (better) draw. To pretend that the mouse has supplanted the pencil, and that you can be an architect who doesn't know how to draw, is too far-fetched. Up to this date, no CAD program actually knows how to draw, or what to draw for that matter.

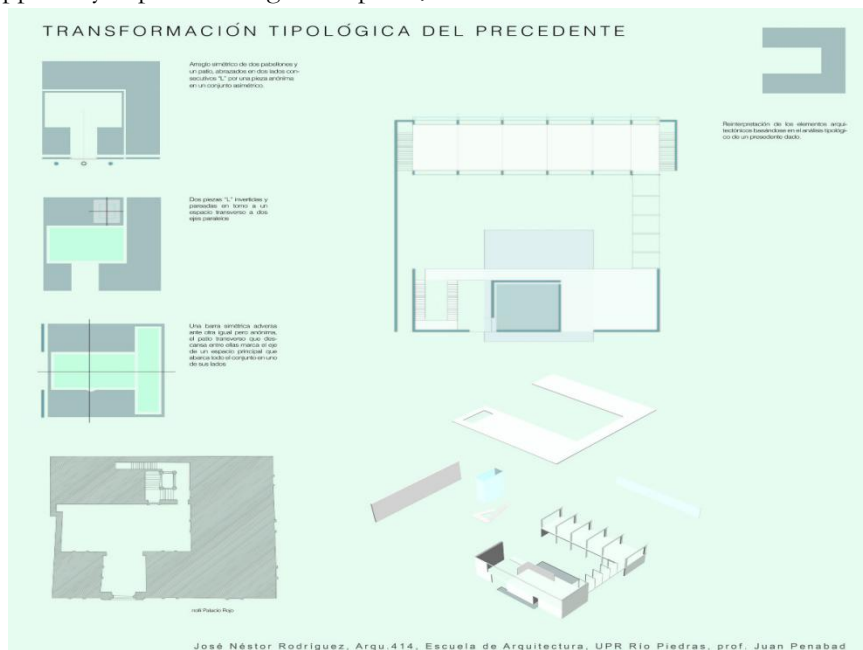
Whether it be the output of reading an existing building, or the onset of writing a new one, the sketch diagram is always the illustration of an idea. These simple drawings encompass both meaning and intention in a compact few lines based on a mental process of observation, abstraction, interpretation, and synthesis.

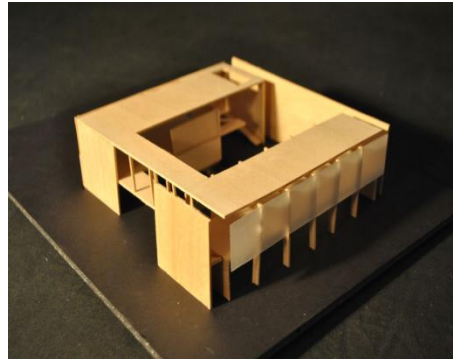
The immediate link between the eye/mind/hand is established and recognized within a diagram. The importance of clarity in this fundamental level of design cannot be underestimated.



A typical Puerto Rican house of the turn-of-the-century is analyzed and reduced to its fundamental idea, and further reduced into the typological essence. This last instance of the analytical process, is the starting point of a new – typologically related- proposal.

Architects are still within the initial learning curve on mastering the power of computer-aided design tools. At this early stage, in return for the overwhelming possibilities offered by CAD programs, architects are producing the most questionable architecture ever. The possibilities offered by the digital world seem to have blinded us to the essentials of the task at hand. Basing a proposal on a pre-conceived image abandons the sense of purpose and intention indispensable to a sound design process. Without clarity of intention, there can be no responsible design. Even in the world of computer-aided design, the diagram remains relevant, as the diagram sole purpose is to clarify intentions. And yet, to this day, no CAD software tends to the diagrammatic. Architects face the risk of becoming image crafters, a sorry imitation of an artist, whose creative process is compromised by outside rules and restraints since they supposedly depict buildings and spaces, which will never be built.





Third-year undergraduate project on typological transformation of a historical precedent. Student Jose N. Rodriguez, School of Architecture, University of Puerto Rico, Rio Piedras, 2015

To recover a sense and pertinence through a conscious design process is of utmost importance at this moment in time. To maintain their significant role in the production of the built environment, architects must return to the fundamentals, insist on a responsible design process, yielding pertinent proposals with diagrammatic clarity. Timing is critical. Nowadays, our profession is being challenged as never before by economic factors fostering new procedures (design-build-manage), and new characters (project managers, consulting/advisory officers, building inspectors) all overlooking and undermining the architect's original role as designer/creative mind. But none of these can draw. The architect's essential ability to draw what he/she means remains its definitive power over all else.

Diagrammatic clarity is essential to a sound design process, and it remains the uncontested realm of the hand drawing. Thirty years into the onset of computers in architecture, Design is mostly taught by architects who learned to design without them. But we approach a moment of transition. A first-generation of computer-trained architects is coming of age these days. For the first time, someone may truly accomplish the task of full-digital design process. However, for the time being, free-hand drawing (mostly diagrammatic sketches) are still our sharpest tool to tackle the elusive task of capturing an idea.

References

1. Zevi, Bruno, *Saber ver la Arquitectura*; Ediciones Apóstrofe, Barcelona, España, 1998
2. Montero, Rosa; *La loca de la casa*; Santillana Ediciones Generales, Madrid, Spain, 2006
3. Ecco, Umberto; *The Limits of Interpretation*; Indiana University Press; Bloomington, IN, USA, 1990.
4. Durand, J.N.L; *Precis de Lecons, c III sur la Composition*; Pronaos, Madrid, Spain; 1981