

# Learning from the Favelas: What Informal Settlements Tell us About the Dissemination of our Knowledge

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## CORBUSIER'S BASTARD CHILD

It's been nearly 100 years since Corbusier's turning point encounter with Tony Garnier. "This man knew that the imminent birth of a new architecture depended on social phenomena. His plans displayed a great facility. They were the consequence of 100 years of architectural evolution in France" (FRAMP-TON, 1983:150) Around the same time he became convinced through his contact with Auguste Perret, that *beton arme* was the material of the future. The birth of modernism's robust approach to the issue of housing had begun there with its most active representative.

Corbusier and consequently modernism's idealist pursuit of radically transforming the built environment may have been the ultimate cause of its own dismissal. The reasons for this self asphyxiation are all known, even if didactically, to anyone with an interest in the field or in the movement. Modernism's proud son (in the sense of its own view of itself as educator to future generations) and hopeful insidious virus never had the chance to truly spread itself at the larger urban scale on the cities of the world. With Brasilia and Chandigarh being the exception and not the rule, it had offspring here and there, more in the elitist realm of institutions and wealthy houses than in accomplishing its initial promise of housing the 20<sup>th</sup> century workers. But the heirs of modernism did, however, had a bastard sibling though, a much powerful and virulent one, even if unconscious of itself as such and perhaps because of it. This bastard offspring has enabled hundreds of millions of people around the world to take matters in their own hands when it comes to the issue of housing.

And when Le Corbusier died in 1965, modernism was being severely attacked for a variety of failures that have been already extensively debated and researched. But lost among all this scholarship that dismissed and later resuscitated modernism, an aspect has been neglected.

At the very same moment of his death one of his most synthetic and efficient creations was spreading so rapidly around the world that we have to call it a virus (although not a deadly one): The Dom-ino virus. It has a very simple DNA: cubic foundations of poured concrete or blocks support a minimum of four columns that are connected above by four beams that support a slab. As any very good virus, this simple DNA is able to invade much more complex cells (like wealthy people's houses or condominiums) and replicate its formula: Columns to beams to slab on concrete (poured in site or pre-fab). By the time the advocates of post-modernism were cheering the death of all large-scale meta-narrative kind of modernity, the Dom-ino was con-

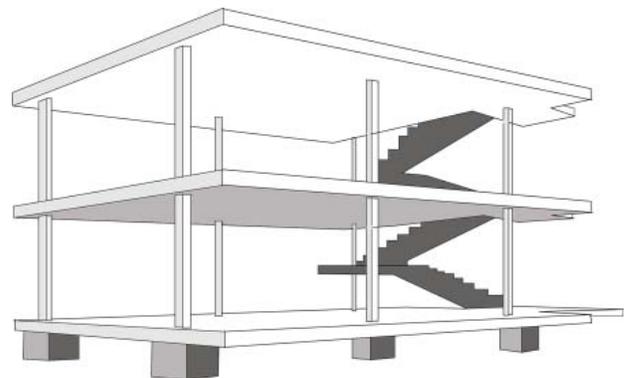


Figure 1. Corbusier's DOM-INO

quering the world as a virulent and mutant spatial structure. There is more irony here than Venturi could ever dream.

We also find that many strands of its utopian possibilities had survived to become a reality of urban life in the 21st century. Not as consciously conceived or predicted by the modernist agenda, unaware of its own elitist tendencies as the ultimate jeopardizer of its ability to have been able to better adapt. The world keeps on moving, populations grow larger and denser, and the need for housing them more urgent. The United Nations predicts that the planet needs 350 million housing units in the next decade. It does not seem an exaggeration to claim that 250 million (a quarter billion!!!) units will have the Dom-ino in its genes in one way or another. Simultaneously, since the, in some ways, tragic end of modernism (not from a philosophical stand point but a social one) housing has become less a concern of thinkers and doers than ever. Generally speaking we, as a society aware of its social obligations, have all given up. The poor, mostly migrant, populations in the rural exodus of the last sixty years have found less opportunity to establish themselves within a legal structure, and housing, the first and most important basic need.

The virus is/was so efficient that, we are speculating here, it infected at least 80% of every new construction done in the world mega-cities since the 1960s. In Rio de Janeiro and Sao Paulo 25% of the population live in illegal settlements called favelas where the building technology is precisely what we just described above. Another 50% live in self-built structures in which the only difference from the favelas is the legal ownership of the land. And the same can be seen in Mexico City, Lagos, Beijing, Mumbai, Manila, Cairo and hundreds of other cities to a lesser or higher degree.

Why was that so? What does it mean? How come the favelas evolved from wooden shacks into Dom-ino structures?

Born from a process of illegal occupation of land in the immediate vicinity of the formal neighborhoods, the favelas started in the first decades of the 20th century as workers migrating from the countryside in search for jobs in the nascent industry solved their housing problems with any means available. When the Dom-ino was developed by Le

Corbusier in 1915-17 Rio de Janeiro already had favelas although built mainly from scrapped wood at that point.

One by one they built their temporary structures in the immediate periphery of the city in any piece of land available. Often removed by the police in a matter of days if the land was of interest to private owners of state agencies, the informal dwellings clustered around some areas where land has been deemed not worthy of developing for a number of reasons: legal ownership disputes; abandoned farmland; site incline beyond permitted by city codes (often above 30%). The occupied land of the favelas was gradually divided in an organic manner, following the steep pathways in the case of the hills or the elevated walkways in the case of the swamp areas. What matters to us here is to understand that by mid 20<sup>th</sup> century those structures were already being built with concrete and the Dom-ino DNA was already guiding its accelerated reproduction. Guedes and Oliveira have captured the dramatic change in their econometric studies, showing that in the 1950s "the houses had no real ceilings... everything was made of wood", while decades later 96% of the structures in the four favelas they surveyed in São Paulo were made out of brick and concrete. (GUEDES + OLIVEIRA, 2006: 3)

The fact of the matter is that the Dom-ino provides an amazing cost/benefit ratio. Easy to build, with plenty of flexibility for expansion, the combination of reinforced concrete and brick walls is relatively durable (much more so than wood in the tropical humidity) and safe.

In the case of Brazil it is important to point out that this construction process is pervasive in every social strata. The wealthy houses of São Conrado and Barra da Tijuca in Rio are also built with the same structure (although richly decorated with finishing materials) as well as the majority of its northern periphery that is not exactly a *favela* for they own their land. *Loteamentos* as they are called are peripheral subdivisions in which a developer lays down a street grid and sell small lots (usually around 10 x 30 meters or 30 x 90 ft) to the working class.

The use of materials is almost the same, exposed brick, concrete slabs, metallic or asbestos-based roof. The inhabitants' occupations are quite the same: house maids, unskilled construction work-

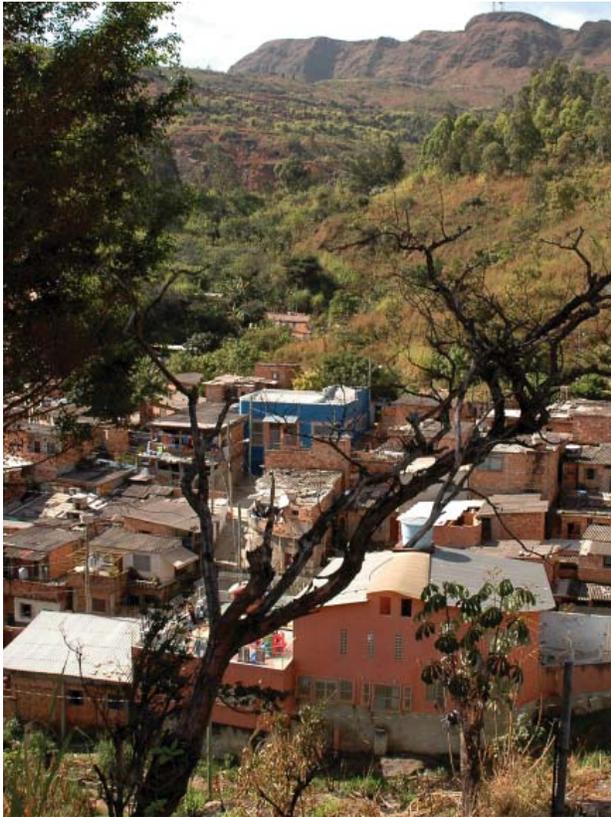


Figure 2. A typical Brazilian favela

ers, supermarket clerks, janitors, with incomes between 200 to 300 US dollars a month. Their educational level is also very much similar, the 40% poorer in Brazil have an average of only 5 years of formal schooling. In summary, *favelas* or *loteamentos* have different degrees of social vulnerability and access to infra structure but share precisely the same construction techniques when it comes to the individual buildings.

### DOM-INO: THE DNA OF INFORMAL SETTLEMENTS

When considering the structures behind the formal organization of those informal buildings, one important component is the small attention to design processes and the predominance of decisions made during construction. The majority of those houses are built upon a very sketchy and un-detailed plan, almost always a simple drawing that is used to calculate the costs of labor and materials. After an initial agreement between the owners and the construction crew led by a more experienced worker,

this very rudimentary plan with basic measurements would be used as guidelines for the foundations. From then on every construction step follows the dimensions of what is already built, allowing for so much flexibility that it seems as if no design is actually necessary. Design decisions are reduced to those simple divisions of the spaces into rooms and later decisions about window and door placement. Given the standardization of cheap metallic windows around 100 x 120 cm and doors around 70 x 210 cm, the main design decision becomes where to place those openings. Little or no consideration is given to solar orientation and/or ventilation strategies.

At this point an interesting parallel with the Dom-ino arises since the abstract scheme by Corbusier also did not had a specific orientation or climatic conditions for it was supposed to be adaptable to any situation.

In the absence of design previous to breaking ground, the main generator of those forms then is the structural system. Foundations on reinforced concrete blocks, columns and beams on poured-in reinforced concrete and a slab on top of everything. The similarity with Le Corbusier Dom-ino system is not a coincidence. The process of laying foundation blocks, building a formwork out of wood, placing the steel reinforcement and pouring concrete is known by every construction worker in Brazil. The dissemination of this knowledge will be addressed later in this article. For now, let's consider the form induced by this system: usually columns are placed 3 to 4 meters apart, giving a certain rhythm to the volumes. Data from the United Nations show that the median household size in Brazilian cities like Rio de Janeiro is 62 squared meters (ANGEL, 2002), coinciding with a rough average of 7 x 9 meters in which a grid of 2 x 3 bays would be the most common. However, there is so much variation with smaller bays where bathrooms and stairs are located that it is very hard to see any logic besides the limits imposed by the equation structure/economy. What is visually perceived is the cubic shape of those volumes, highlighted by the walls of exposed ceramic void bricks, almost always following the planes of the structural grid despite carrying no load. Actually, although the walls are not load bearing, they are built before the upper beams which are poured on top of the last row of brick. Such practice makes for a more economic and faster

structure but joins wall and beams inexorably and reduces the options and advantages of an independent structural system. As the Dom-ino spread as a virus it has also mutated into a more boxed form, fixing walls and beams together. Another limitation of the praxis on the structural system is the overwhelmingly predominant choice of small windows that again do not take advantage of the reinforced concrete structure.



Figure 3. The concrete structure of a regular favela building.

The construction is what we call a wet process, in which the materials are mixed on site and very little pre-fabrication is used. The industrial processes responsible for standard materials like bricks, cement, steel, aggregate stone and wood are not carried any further. Local stores deliver the materials on site and from then on the construction crew is responsible for mixing, cutting, bending, welding and connecting everything. The only opportunity for pre-fabrication is the use (more common nowadays) of using little prefab beams for the slabs. Those beams have an inverted T shaped section

of about 10 x 10 cm and span over 3 to 5 meters. Spaced every 25 cm, they support a row of shallow ceramic blocks especially shaped for those slabs. A 3 cm coat of concrete is poured on top of that system of beams and ceramic blocks, making it more affordable and easier to build than the old poured concrete slabs.

### THE SOCIAL MEANING OF THE SLAB

Moving beyond the formal characteristics of the dom-ino based "barraco" we shall look at the daily life in and on those structures. Since the slab (*laje*) became the pervasive main component of the favelas, a whole culture developed around it. The use of flat reinforced concrete slabs allowed the favela dweller to incorporate more space towards its daily activities. Because the favelas are mainly built in sloped terrain, alleyways and porches were always very narrow and precariously hanging from cliffs and retaining walls. The use of the flat terrace provided by the reinforced concrete slab practically double the amount of leveled area available for activities. The spatial and social culture of the favelas and other informal settlements makes full use of those spaces. In opposition to the private quarters inside the house, the slab terraces are semi-public. Children play soccer there and run kites in the windy months of spring. Housewives hang clothes to dry and communicate with their neighbors from slab to slab. And on weekends the slab is the site of barbecue, music rounds and sun bathing. A complex culture of semi-private / semi-public relationships developed in the slabs. With the proper license for speculation we might say that the social life of the slab is more than Corbusier ever dreamed of when he proposed the terrace-roof as one of his five points and for it is surely more intensely used than any terrace of the hundreds of *unite-d'habitation* cloned throughout the world.

At the *loteamentos*, usually built on flatter terrain, the use of the slab is often protected by a light structure holding a metallic roof that provides shade and protection from the rain. But the use is the same: drying laundry, barbecue, sun bathing, social gathering.

### MODERNISM AS A VECTOR FOR THE DOM-INO

The question that follows is how the Dom-ino scheme became so prevalent in Brazil and most of

the developing world? Reinforced concrete transformed the construction industry in Brazil after its introduction in the late 19th century but it was only after the unique success and dissemination of the modern movement that it became a household solution. The majority of the houses built before the 1950s, even with a professional involved, had solid load-bearing walls and wooden trusses supporting ceramic tile roofs. The dissemination of the water-proof slab, the independent structural system and the thin columns has to be credited to the modernist avant-garde of the early 20th century (LARA, 2008). Initially an elite venture, modern vocabulary (first) and modern spatiality (later) would eventually contaminate all social strata and become the form with which the informal cities were built upon.

One of the most singular characteristics of the built environment in contemporary Brazil is the prevalence of modernism in one way or another. The country has grown fast and urbanized even faster from the 1930s to the 1980s, which coincides with the hegemony of modern architecture in Brazil. On wholesale numbers Brazil had something close to 2 million urban household units in 1940, the year considered to be the turning point towards modernism. In 2005, census data estimates something close to 40 million urban households. Given the fact that it is hard to imagine urban construction in Brazil that do not use modernist technology (independent structure in reinforced concrete) or are not influenced by modern spatiality, then 95% of our built environment is modern to some extent.

In our case what is important to highlight is that the labor force that built the sensuous mid-century Brazilian modernism is exactly the same that built the *favelas*. The same masons, plumbers, carpenters and unskilled hands that were working Monday to Friday in the buildings downtown, would work over the weekend and holidays in their own *favela* dwellings or those of their neighbors. Being the vectors of this dissemination, it is striking to perceive how much they have been overlooked in scholarship at large.

The historiography of 20<sup>th</sup> century Brazilian architecture has barely started to study buildings not designed by architects. While sociologists, anthropologists, economists and demographers have scrutinized the *favela's* social and economical foun-



Figure 4. Highlighting the DOM-INO inside a regular favela building.

ditions, architects have either ignored it or attempted to “solve” the issues with formal solutions that are foreign to the inhabitants. Exceptions are the work of architect Joao Filgueiras Lima with pre-fab elements and scholar Paola Berenstein (2003) on the peculiar aesthetic of the favelas.

If we are going to ask ourselves how the Dom-ino scheme became the prevailing spatial structure of the Brazilian informal cities and of most of the developing world, we should try to trace the path of this information. As much as it seems an impossible task, there is much knowledge to be gain from trying to dissect architectural contaminations. As we say in Brazil, good architecture is contagious; the problem is that bad architecture can also be virulent.

When we think of a design knowledge base and the dissemination of such knowledge it most often implies an intra-disciplinary approach in which the information would circulate between scholars and

practitioners. It means trying to trace and understand how design ideas are disseminated without architects, penetrating social strata that usually do not interact directly with an architect and, in the case of Brazilian *favela* dwellers, build their houses with the help of unskilled construction workers only.

Such evidence of design being disseminated outside the traditional boundaries of what is considered proper architecture (sometimes called vernacular or more appropriately built environment for lack of a more specific term to denote those not designed by architects) might, I shall argue, contribute to the contemporary discussion about the nature of design knowledge. If we believe that design is somehow knowledge, then this knowledge should not be restricted to those licensed or educated in design. It must serve society as a whole and contribute towards a better built environment.

In doing that we hope to take the topic of dissemination full circle back to the schools and offices where the best design ideas are generated. Understanding how our designs ideas get appropriated and spread throughout the world can only make them stronger, not weaker as so many scholars claim. Leaving behind our obsession with purity and authorship we might be able to see how much more architecture can contribute to a better world.

The *favelas* as we tried to argue under this framework is by and large an offspring of Corbusier. Bastard, we should acknowledge since Corbusier himself never assumed the paternity of this housing type. But we might be able to propose the idea that among his prolific body of work, the bastard Domino is the child who best makes up to his father.

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