

Do we want houses or “dwelling machines”?

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The (dis)comfort in Portugal

Even nowadays, a frugal relationship with climate still persists in rural areas; Orlando Ribeiro synthesized this clearly in one sentence: "Bearable in the street or in the countryside, winter is hard indoors, where cold builds up and remains; houses are poorly heated due to the lack of firewood, but also because severe cold is so rare that it does not justify preventing it. Thus, while cold in the middle Europe invites intimacy within, here it is fought either by a sunbath or a quick walk." (Ribeiro, 1987)

And so did Fialho de Almeida who commented on this matter: "Yesterday, it was so unbearable cold indoors, that I went for a walk around the far suburbs of the city." (Almeida, 1924). At the time, it was March in Lisbon. The thermal rusticity that prevailed in the countryside, was in this way also extended to the urban bourgeoisie: the same interplay between the behavior of houses and people against cold snaps, in generally mild and sunny winters.

According to Aldous Huxley, South Europeans have a cultural component that improves their adaptation to climatic conditions. But it is not hard to guess, that behind this thermal rusticity, there are also strong technical constraints. It seems contradictory, that in a country with mild winters and hot summers, we are more affected by the cold than by the heat. However it is not so paradoxical, if we think that the great mass of traditional buildings in stone, earth, raw or baked, with few sunny windows and leaky roofs and floors, resists better heat than cold. There are relevant examples of traditional houses that keep cool in the summer and scarce examples of houses that keep warm in the winter, since there was not enough knowledge, thermal insulation, good weather stripping, neither the capacity to build large windows (sunny in winter).

It is also not hard to perceive strong economic constraints behind this thermal rusticity, as exemplified in the detailed Rural Housing Survey coordinated by Lima Basto and Henrique de Barros (Lima Basto and H. Barros, 1943). This is patent in the houses, in the household inventories and in the tight family budget where the firewood, when charged, represented a large proportion of the housing expenses.

The situation would be less severe in houses of the urban bourgeoisie where privacy and some kind of convenience were already at home. However, even Fialho relied on physical exercise, and going out of the house looking for the sun!

It is in this framework of traditional (dis)comfort that modern comfort will penetrate.

The penetration of modern comfort

The "comfort onion"

Comfort - modern comfort - is an invention and a cultural artifice and, therefore, like all ideas, has a past: it cannot be understood without reference to its specific history. One-dimensional technical definitions of comfort that omit history, are inherently inadequate. According to Witold Rybczynski's history of modern comfort (Rybczynski, 1989), domestic comfort – which is what is discussed here - is compared with ... an onion. It seems simple from the outside, but “if we cut it, we end up with lots of skin and the initial form is gone; if

we describe it layer by layer we lose sight of the whole. To make it even more complicated the layers are transparent, so when we look at a whole onion we see not only its surface, but also part of its interior. In the same way, comfort is simple and complicated at the same time, incorporating many transparent layers of meaning - intimacy, convenience, tranquility, one after the other.

The analogy of the onion not only suggests that comfort has several layers of meaning, but also that the idea of comfort has evolved historically. It is an idea that has meant different things at different times. In the seventeenth century comfort meant intimacy and also domesticity. In the eighteenth century more importance was attributed to leisure, to convenience, and in the nineteenth century to elements where mechanics intervened: light, heat and ventilation. The 'domestic engineers' of the twentieth century embraced the efficiency and convenience." By the way, it is interesting to note that following Catherine Beecher, they wanted to get rid of domestic tasks, in order to achieve personal fulfillment (Giedion, 1978).

"But most importantly, while it was changing, the idea of comfort - unlike what happens with technology - kept almost all of the previous meanings", says Rybczynski. Each new meaning adds up to the previous layer underneath (...) At any moment, comfort is composed of all these layers, rather than just the latest. "

And here's the Onion's Theory of Domestic Comfort. "It's not a definition but maybe we don't need a more precise explanation." Rybczynski notes that the majority of people may not know why, but they can recognize comfort once they experience it. "This recognition entails a combination of sensations - many subconscious and not only physical but also emotional and intellectual, which makes comfort difficult to explain and impossible to measure."

We find in the Mediterranean world, genuine examples of wise relationships with the climate in which the architecture naturally regulates local weather conditions playing with this mix of sensations.

Washington Irving wrote about the palace and gardens of the Alhambra and Generalife in Granada: "Those who know the fiery southern climates can imagine the delight of such a shelter. The mountain breeze joins the greenery of the valley. While the town below suffocates under the burning heat (...) the breeze from Sierra Nevada runs through the patios of the palace, bringing the scent of the surrounding gardens." (Irving, 1973) The cooling sensation is increased by the murmur of flowing water in cozy, quiet and shaded courtyards that constitute pockets of fresh air, feeding the natural ventilation of the surrounding rooms, accentuated by the scent of roses and jasmine, spread over the four quarters of the garden.

An Al-Andalus Islamic jewel, more subtle and enchanting than grandiose! Only by deception can we decouple what appeals to the eye from what appeals to the other senses, in this play of multiple sensations, prevailing those that fall in the thermal experience. Of course a palace! But this wise adaptation to climate is incorporated into the traditional architecture of arid Islam that Hassan Fathy tried to bring even to the poorest people in Gournah (Fathy, 1973).

Richard Neutra was a pioneer of modern architecture. In his book *Survival Through Design* (Neutra, 1968), supported by a great copy of cases and reflections, Neutra defends the idea of an "omnisensorial" experience embodied in an architecture for survival, countering the abstraction of the "euclidean architect". This is perhaps surprising to those who know him from the tidy pictures of Julius Schulman, the first great photographer in architecture, that covered some of his spectacular houses located in the region of Los Angeles, California. On the topic of thermal experience, Neutra says: "One can, from the very start, design a room, its orientation and material selection, in such a manner that heat losses, irradiation, and air currents are salient parts of the scheme. In this manner one can achieve a differentiation richer and more pleasant than when a design is concerned merely

with visual perception and ignores all other potential sensory aims. "

Neutra reveals that his childhood experiences were wordless lessons about the appreciation of space involving all the senses, including the taste! Basic sensory experiences not even touched latter in college lectures on architecture, as he says. In fact, this was not the main path of modern architecture and comfort. From the nineteenth century, the "layer of efficiency" was to be separated from the others and won a "opacity" of his own, to use the image of Rybczynski, towards the "mechanical comfort" offered by technological progress. With it came the "neutralization" of comfort, our increasing dependence on technology and the increasing energy consumption by machines in buildings, as well as all the adverse social, environmental and energy impacts that so much concern us nowadays.

The modern platitude

According to Lewis Mumford, "our contemporaries are so conditioned to accept the technological 'progress' as absolute and irresistible, however painful, ugly, mentally cramping, physiologically damaging its results, that they accept the latest technical offer with smiling consent, particularly if the equipment is accompanied by a 'scientific' explanation and seems technologically an 'advanced' type" (Mumford, 1964). "This general aberration was satirized by Tolstoy a long time ago in his treaty 'What is Art'. There he pictured the modern man ingeniously sealing up the windows of his house and mechanically exhausting the air, so that he might, by utilizing a still more extravagant mechanical apparatus, pump air back again – instead of merely opening the window". And, Mumford comments on this subject, "Tolstoy did not suspect that within a generation this folly would actually be committed, not only as a permissible dodge for screening out dust and poisonous gas exhausts, or temper the excessive heat, but it would even be used by designers of houses and college buildings in the midst of the open country, where fresh air is available and the natural noises are at a lower level than that of the exhaust fans used by a ventilation system." He did not suspected of these and other efficient homes that experts are conceiving today!

More recently, Richard Sennett acknowledges that the penetration of mechanical inventions in sealed houses has also a social cost. "For these inventions isolated buildings from the urban environment." (Sennett, 1994)

Thus the mechanisms of modern civilization lead us to a neutral environment ... disturbed as our tranquility, by operating machinery. Mumford's commentary on the mechanical ventilation could not be more appropriate!

Jacques Dreyfus comments about the French, citing Norbert Elias: "By becoming civilized the French entered a padded world, some call it aseptic, where all sensations other than visual tend to disappear (...)" (Dreyfus, 1990). Aldous Huxley represents this world, in the future, as a huge featherbed for snoozing buried minds, where we end up suffocated like Desdemona.

Regarding extra-visual experience and the olfactory one in particular, E.T. Hall notes that the United States is a neutral and uniform country as no other. "This platitude contributes to the monotony of our spaces and deprives everyday live from a substantial source of richness and variety. It also affects the functioning of memory, in the sense that odors are able to awake deeper memories than images or sounds." (Hall, 1971)

The hypersensitive Marcel Proust extensively explored the link between memory and the senses that is an intrinsic part of our daily lives.

Thus it is important to accept that thermal neutrality is part of the neutrality ingrained in modern society in a broader sense. As today we are not so sure that the door to happiness is open to all through the cornucopia of abundance, we do question the modern society, its objective neutrality and therefore the concept of comfort as *thermal neutrality*.

Thermal neutrality

Thermal neutrality definitely relies on a biological basis in the physiology of thermo-regulation: as an homeotherm, the human being is able to maintain a constant inner temperature, advantageous for his development. The thermal neutrality lies in the temperature range in which he is able to perform this adjust; an interval between critical high and low temperatures.

Standard EN ISO 7730 defines thermal comfort in the first place as the state of mind which expresses satisfaction with thermal environment, but after that, based on the concept of thermal neutrality, centers it in a "sensory deprivation". The "zero" on the Fanger PMV sensory scale, for the initiated. "I don't feel either cold or heat." By relating the sensory comfort with this sensory absence, he defines it in the negative, the negation of its negation.

How many of us accept or wish to eat every day the same tasteless meal? Continuous thermal neutrality can be perhaps good for frail people or "robots", but usually it is not desirable. Neither it is healthy, which led André Missenard to fear an abusive generalization of artificial climates... more than seventy years ago (Missenard, 1937). It is worth noting that Missenard promoted in theory and in practice, the radiative heating combined with lower air temperatures, for being healthier than heating the air as it happens today with air conditioning and mechanical ventilation. This issue has led him to publish in 1935, in the fifth volume of the – recent at the time - *Architecture d'Aujourd'hui*, an article on this topic, that was regarded with interest by architects of that time.

The neutral and binary logic of thermal neutrality, undoubtedly facilitates the quantification of thermal comfort conditions in a "comfort zone" and therefore the design and control of HVAC systems and even the selection of bioclimatic strategies according to the method of Victor Olgyay (Olgyay, 1963). It can even be conditionally applied to health facilities or, in view of labor productivity, to workplaces where we are confined, in the same way that were the thirteen hundred human "guinea pigs" that subjected themselves voluntarily to the laboratory experiments of Fanger.

But according to what has been observed by monitoring the use of passive houses or not, even in the colder regions of Europe (Henning, 2006), it is very simplistic and counterproductive to apply it exhaustively to all buildings, in particular to housing.

ISO 7730 belongs to the growing number of standards that specialize in a "frozen" and shattered ergonomic comfort. The recent revision of ISO 7730 and of his older relative ASHRAE 55, does not limit its scope only to workplaces and maintains the analytical interpretation of mechanistic comfort: Fanger's general model plus a sum of additional provisions. It is solely a point regarding "adaptation" that opens a small door to the complex and dynamic reality of the real comfort, that the buildings are part, and that in technical language translates into "free-floating mode" of "adaptive comfort".

The same seems to happen to the young EN 15251 which, guided by the energy-environmental objective of the EPBD (Energy Performance of Building Directive) integrates thermal, lighting, acoustics and air quality. This is what appears from the criticisms, for example by Fergus Nicol (Nicol, 2009) within the group COMMONCENSE, that was created to discuss the norm.

It is this mechanistic interpretation of comfort, without that "small door", that is passing through the portuguese regulation of the energy systems, to the Energy Certification System that handles houses as if they were refrigerators: super-insulated and weatherstripped thermal boxes controlled by a machine. This system gives its signal to the market through a note based on the *nominal energy needs* of the machines.

There is a long way between nominal and real, from the conception of what is nominal to the actual use of buildings and machinery in Portugal, in southern Europe and in a changing world. On the difference between nominal and real, that only an inveterate theorist can disregard, lies (for now) the difference between real comfort and mechanical

comfort emphasized by the architect Rybczynski, being now appropriate to complete an earlier quote in which he does not stand next to the experts and architects, but next to those who use the houses. After all, each one of us:

"Most people recognize the comfort when they experience it. 'Maybe I don't know why, but I know I like it!' This recognition entails a combination of sensations - many subconscious, and not only physical but also emotional and intellectual, which means that comfort is difficult to explain and impossible to measure. But that does not mean it is less real. We do not have to accept the insufficient definitions that have been given to us by engineers and architects. Well-being is far too much important to be transferred to the hands of experts; it is, as it has always been, a family and people business. We have to rediscover for ourselves the mystery of comfort, because without it our dwellings will actually be machines, not houses."

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