

SATELLIGHTS

orbiting over an extremely thin layer of life

[zenith and horizon]

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scale for authorship

Architecture is also about dialogues with a clear goal: to achieve an agreement whose result could be framed into a buildable proposition. In this process, the idea of authorship is intrinsically related and limited to the position and expertise of each interlocutor who take place in some point on successive spheres of dialogues during the design process. Therefore, there is a clear limit to the idea of authorship. Beyond all legal issues and liabilities, this boundary is important to preserve the possibility for architecture as a human manifestation. The notion of authorship can insert thoughts and context in a work that plays in a broader scenario, it can relate a piece of architecture with preexisting and upcoming works. In this sense, an architectural work would be able to embody humanism and each work would play as an interlocutor in the scene of human culture. Due to this humanism, a work of architecture can last for centuries keeping, and updating, its validity precepts; differently, the design that generated it, as an action plan so defined by the context and time, is quite ephemeral.

Two ways to dehumanize this process lean on the same strategy of prolonging artificially-because it is no longer related to anyone- the functionality of a project: [1] by repeating it [reproducing] extensively or [2] by extending [scaling] its procedures as to keep building with no limits, even in those totally different contexts. In both cases, it secludes the idea of an author or vulgarizes the notion of authorship. Faking a longer life to a project, these strategies also fake authorship. It suppresses the author as a live interlocutor. In this sense, scale holds a trick issue. This is why, for a large scale as a city for instance, we expect to perceive an authorship from its entire population, all people that live or have once lived there. [A book for the scale of an author, the entire collection of a library for the scale of the humanity].

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[modern] architecture, imagination and abstraction

The entire built world is the field of architecture. Each fragment of it and the whole. Built as knowledge, therefore geography or everything we can name, describe or understand or perceive with a physical presence is also part of it. This built world so well represented by a city is the source and the target, it is the field in and with which we act and interact in a process to produce the world itself. The world as whole and as limit.

Modern is an intrinsic approach, it is related to the way we unescapably understand and apprehend, aesthetically, an expanding world.

Abstraction is a cultural achievement shaped in the modern age, which was inaugurated by the great navigations. Four hundred years later, it was the possibilities of changing the world opened by the Russian Revolution that launched the basis of the modern architecture. Two founding abstractions: [1] the first event had as its site the place where we weren't, a new world overseas completely unknown; [2] the second, has

taken as a precedent a possibility for the future. Combined both of these events built a notion of freedom regarding time and space, autonomy for the architecture regarding traditions and privileges. As a result, for an architect, inheritance became also a matter of choice. This collaboration shaped modern condition quite comprehensively, as if at the moment of action [designing] time and space had been flattened in a way that everything existing in the built world, in any time or place, even in a future time or in a place where we have never been, is part of our field of possibilities to arrange new configurations.

This built world keeps evoking architecture and provoking the imagination of an architect nowadays.

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[2] AN EXTREMELY THIN LAYER OF HUMAN LIFE

Horizontal Plane / Continuity

The horizontal plane is a whole and it lies attached to the surface of the planet.

Made by axes, it tends to weave a mesh that is increasingly overlapped and closed. As such it presents itself as a plane.

In São Paulo, this shifting horizontal plane is thick. Its thickness is borne of the geography of how the city was when first settled. It is therefore about twenty meters, or six stories high. The bridges have consecrated this uncommon thickness. Yet the plane grows above and below this surface, taking a more and more thickness.

In São Paulo, geography transformed the bridge into one single urban landscape.

The force of the shifting horizontal plane and its thickness dissolves each of the two vertical axis. Yet the extensions of its horizontal axis dissolve the city so that it merges into other cities, regions and countries. The entire infrastructure, which allows the “operation” of the city, is included in this horizontal plane. The thickness of the plane is greater than what is contained at the surface: it grows into the earth, underground and above, but it is always obedient to the horizontal plane of the planet’s surface. Railways, roads, waterways, or tubes, electrical cables, fiber optics, air routes and satellite orbits – everything forms a superimposed mesh and is part of the same horizontal plane defined by the ground. And in São Paulo, this mesh is particularly thick.

The city is a special moment in this mesh where the density increases.

In the city the plane tends toward consistency.

The scale of this plane is planetary, linked to the environment upon which all cities are sited and dependent for air, water and earth – everything produced by these primordial elements. This scale is present in the Roman aqueducts, in the cisterns of Istanbul and in every merchant ship ever launched into the sea. Each man walking on a path of compacted dirt has, potentially, this same planetary monumentality.

Despite the planetary origin of the horizontal plane it is redefined by the current order.

How thick could be the human horizontal plane in the world scale?

It is not exactly a matter of choice. The beacons for its limits were already defined. Based on cultural parameters, they were given by the range of altitudes of the cities around the world. If limited to the highest and lowest national capitals they would be represented by La Paz on the Andes, Bolivia, 3,640m, and Baku on the Caspian Sea Depression, Azerbaijan, -28m of altitude. They are followed, respectively, by Quito, Ecuador, 2,850m; and Amsterdam, Netherlands, -2m. Therefore, the thickness was defined by the history of human settlements as about 3,500m. La Paz and Baku could be taken to frame this thick horizontal plane.

It seems incredibly thick for architectural scale, assuming this consistency, 3.5km thick, might happen in metropolitan areas, once its density in each point varies according to the circumstances.

However, when seen in the scale of the world it is negligible. Indeed, facing the diameter of the Earth, its thickness fits into one single line.

The more its thickness disappears, zooming out from this stratum, the more the planet's curvature is devised. Considering this scale of the whole world, the stratum in which human life was settled, it made an incredibly thin layer.

ZOOMING OUT THE 3.5 km STRATUM

radius of the outer arc 6,374.5 km

chord of the inner arc 23 m

length of arc 35,000 m
radius of the inner arc 6,371.0 km

3.5 km thick between the inner and outer circles

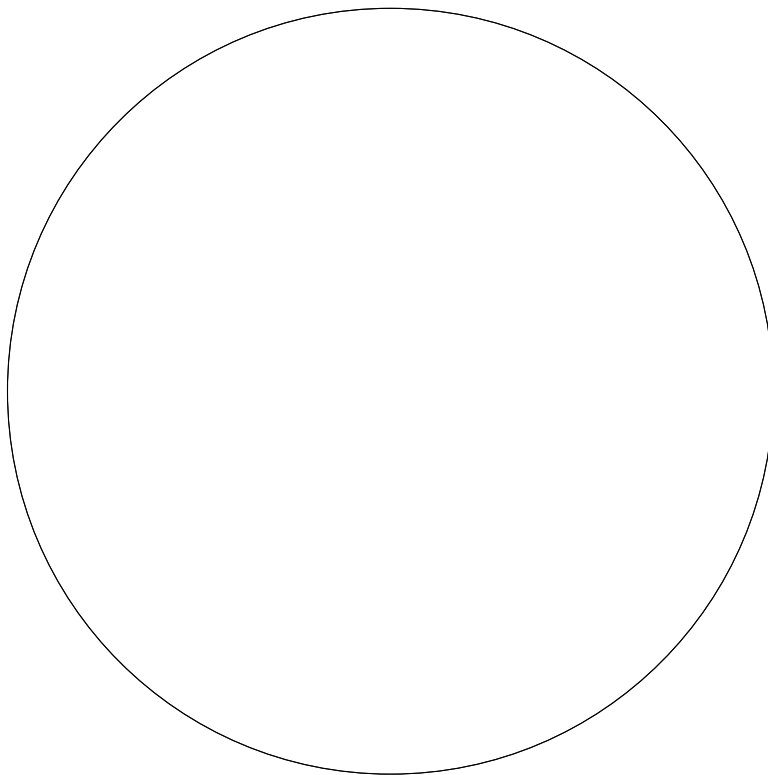
Zooming out it will show up: a perfect circle, drawn with an extra fine line, as a beautiful project under construction for thousands of years. However, it is not a project. It is a fact, an evidence. It is a limit; not a choice, it is a field we are able to live. For this reason, this perfect circle is already built, even if too sparse to be noticed from inside, even if not realized. It is there in a clear correspondence to the possibility of human life.

It is required to zooming out to be able to realize the perfection of this circle.

Therefore, my motivation for this text, it is important to highlight, is not to take an evidence as a project. I mean, there is no plan to complete it. No needs to make it fully built in extension or thickness. It is not to build a Kalmykov ring attached to the ground, not to boost in high and extension the Le Corbusier proposal for Sao Paulo, not to double the one-mile tower by Frank Lloyd Wright, not to upside down the 3,5 km deep gold mines in South Africa. Despite of how beautiful each one of those projects could be, but it is not the case here.

The purpose here is different. First because the perfect circle is already completed. Each break in it just confirms it, instead of disturbing its shape makes it more interesting: an ocean, a forest, a chain of mountains or a desert play as a piece of landscape at a world scale. Thus, the purpose here can be limited to add an approach that just becomes possible at a world scale, but once making it visible to go back to the apparent insignificance of its thickness where lays the whole possibility for architecture.

THE HUMAN THIN LAYER



3.5 km thick between the inner and outer circles

Vertical Axis / Discontinuities

There are many vertical axis and they tend to escape the planet.

Each of these axis is isolated within itself. Together, they can compose fragments of planes, yet they always tend toward the isolation of the void in the direction of the zenith to which they are oriented.

While the vertical axes in São Paulo accumulate, they cluster without merging.

In São Paulo, the sheer quantity of vertical axes undermines the singularity of each so that a single value is imposed to the resulting whole. The vertical axes carry, like inverted volcanoes, the vitality of the shifting horizontal plane to points that become higher and more isolated each time. Part of the infrastructure present in the shifting horizontal plane is vertical-like service runs within each of the vertical axes for the function of skyscrapers. Verticalized, some of these “service runs” extend beyond the actual skyscraper to pass through the total thickness of this horizontal plane to radio signals, satellites, etc. Thus, each vertical axis acts like a device connecting the available infrastructure of the horizontal plane, sometimes below and sometimes above.

The city is a special moment in which density of these axes increases.

The vertical axis tends to exist, to accumulate, in the city.

[1] SATELLIGHTS

Moonlight tower, Austin, Texas

Spread in the late 19th century over United States and Europe, 17 of them still remain as a state landmark in Austin, Texas, since 1894. The lighting structure is 50m high, its original carbon light arc was bright enough to illuminate a 920m of diameter, covering 66.4 hectare! If we could consider a density standard of 500 person/ha, potentially it would correspond to 33,000 inhabitants under one single source of light. That tower is a great example of those works called ‘engineer’s architecture’, from that same time and belonging to the same group of works in which Eiffel Tower is the most famous example. The moonlight tower structure is clear and precise: six lamps disposed in a ring on the top, a triangular steel space truss to finally touch the ground in one single point through a very thin single column. It is quite an elegant structure. At same time, a generic industrial structure, not specifically designed for Austin or any specific site. Actually, those ones in Austin were bought as second-hand pieces previously used at the city of Detroit. Definitely, it is its name, moonlight tower, probably coined by people addressing poetically to the earth [natural] satellite, what offers the most powerful image.

Ring City Saturn

In 1929, Viktor Kalmykov proposed a Ring City Saturn orbiting earth. His proposal is placed in between science-fiction and architecture represented with just a few ‘cartoon style’ sketches was not an isolated event. Others Russian constructivist architects explored similar topics. It is the case of Flying City, by Georgy Krutikov, 1928; or even designed in a planetary syntax the proposal by Lenin Institute, 1927, both thesis projects at the VKhUTEMAS Art and Technical School. Although so detached from its time, as a possibility to be built, it was totally inserted in the context to be imagined. Those few images produced by Kalmykov remained in our imaginary and influenced some movements, notably Archigram and Metabolists in the 60s, the decade of the conquest of space fever.

The first modular space station MIR, which was assembled in the space from 1986 to 1996, operative until 2001, it was replaced by International Space Station Continuously inhabited. MIR could be considered somehow as the cornerstone of Kalmykov proposal, once its modules could work as stones in an arch, that in theory would make possible to complete the ring dreamed by Kalmykov as in an endless span in his Saturn city.

An imagination trigger as a precedent thinking:

The images produced by a set of observation satellites with different orbits defined in different parallels can generate a continuous image of the planet, north to south, between its two meridians. A set of such images taken at night from various standpoints could produce a montage of the entire planet over the course of its night: There, the earth is sky.

This image would show the entire planet at night, as if that were possible! This montage, which can construct movement from a series of still images, like frames of a film, reveals the impossible moment of a planet in motion. A large, relatively isolated concentration of lights reveals the city of São Paulo. In this image, the city is like a constellation, whose magnitude is maintained by 20 million people who light the lights of the night. About 50 cities in Brazil have more than 100,000 inhabitants, and all of them would appear in the image. There are at least 100,000 people at any given time of day or night, flying over the Atlantic Ocean. Yet the lights of air traffic and sea or land passage do not appear in this representation of cities. The typical image of a city does not account for these flying moving lights, even when they are equivalent in population to entire cities in motion.

It is an absurd and lovely image, but perhaps it is also revealing.

In it, the boundaries between continents and oceans disappear and give way to another geography. In place of land and water there is darkness and light. Billions of points of light. It is the planet lit by small light bulbs that were, each and every single one, screwed into their sockets with the palm of a hand!

One might consider that it is as if the light, in its technical universality, erases all cultural differences in the world. But it is worth noting that it was Galileo himself who alerted us to the fact that “the essential phenomenon for the telescope is that of motion,” or, it is fundamental to consider the dimension of time in celestial observations.² Here from our inverted telescope, we are the observer from the sky and we look across the land. Note Galileo’s advice regarding what is essential in observation: movement. This is equivalent to saying that it is essential to consider the dimension of time in space, the route of images in their progression. In this sense, the observed lights, although not glued to the ground, are the surface of the planet seen from above. They are what emanates as the most recent expression of our world: the shallowest archeological layer in the construction of cities. Beyond this luminous layer there is much more. For as large as the resolution of those satellite images becomes, we will forever be overshadowed without being able to see the glow of billions of light bulbs.

If, at first glance these lights give the appearance of homogeneity, up close they are a precise measure of the fundamental inequality of our world. Because they glow with the consumption of electricity, they concentrate according to consumption: it is the consumption of goods that turns on those lights. Therefore, the brightest areas are the wealthiest. This is the perfect image to illustrate Guy Debord’s thesis 34: “The spectacle is capital accumulated to the point that it becomes images.”³ – It is possible to measure with the same precision as that with which we measure the brightness of stars in the sky, the magnitude of capital concentrated in some points of the planet and, conversely, the economic abandonment of the dark points.

Again, it is worth remembering that beyond the lights there is much more, even where no light exists, in completely dark areas surrounded by very bright areas.

A century ago not one of these lights existed, much less the satellites. However, if we consider, hypothetically, an existing satellite one hundred years ago that had captured nighttime images of the planet at that time, the land would not have had lights. Yet, there was a world. The lights are a sign of recent transformations, but they hide a world beneath their glow. To understand what lies beneath this thin layer, one must turn off the lights and get closer.

What if with no light bulbs?

Clarke orbit

There is a unique correspondence with the surface of the Earth orbiting 35,786km above the sea level. As so precisely described by Arthur Clarke, in 1951, as a proposal for communication satellites, any object on that orbit, to not decline or escape, must travel 3.07km/s, no matter its weight, shape or size. The uniqueness about that orbit is that the required orbit speed fits the exact same angular speed of the planet. Thus, spinning around the same axis of the Earth, an object orbiting there looks frozen when observed from the surface of the world. Arthur Clarke's sharp eyes saw before anyone else on the geostationary orbit the perfect location for the telecommunication satellite. His orbit defines a sphere whose radius is 6.61 times bigger than Earth, it could mirror the planet's surface in the sky: Equator, Capricorn and Cancer tropics, poles, each meridian and parallel could be reflected on that orbit. A continent, a country, a city or any physical component at the surface of the planet could be somehow corresponded there.

measuring the city of Sao Paulo

1,521 sq km = area

11,253,503 = population

560,000 = number of light bulbs installed [1 lamp each 2.716 sq m or each 20,1 person]

17.000 km = public light total length

49 GWh monthly = energy consumption [133 MWh hourly]

237.5 W = average power of each light bulb

133 MW = full power installed

Based on these data it is possible to estimate roughly the numbers for the metropolitan region of Sao Paulo in the proportion of population

9,298 sq km = area

20,893,053 = population

1,039,686 = number of light bulbs

90 GWh monthly

247 MW = full power installed

Satellite

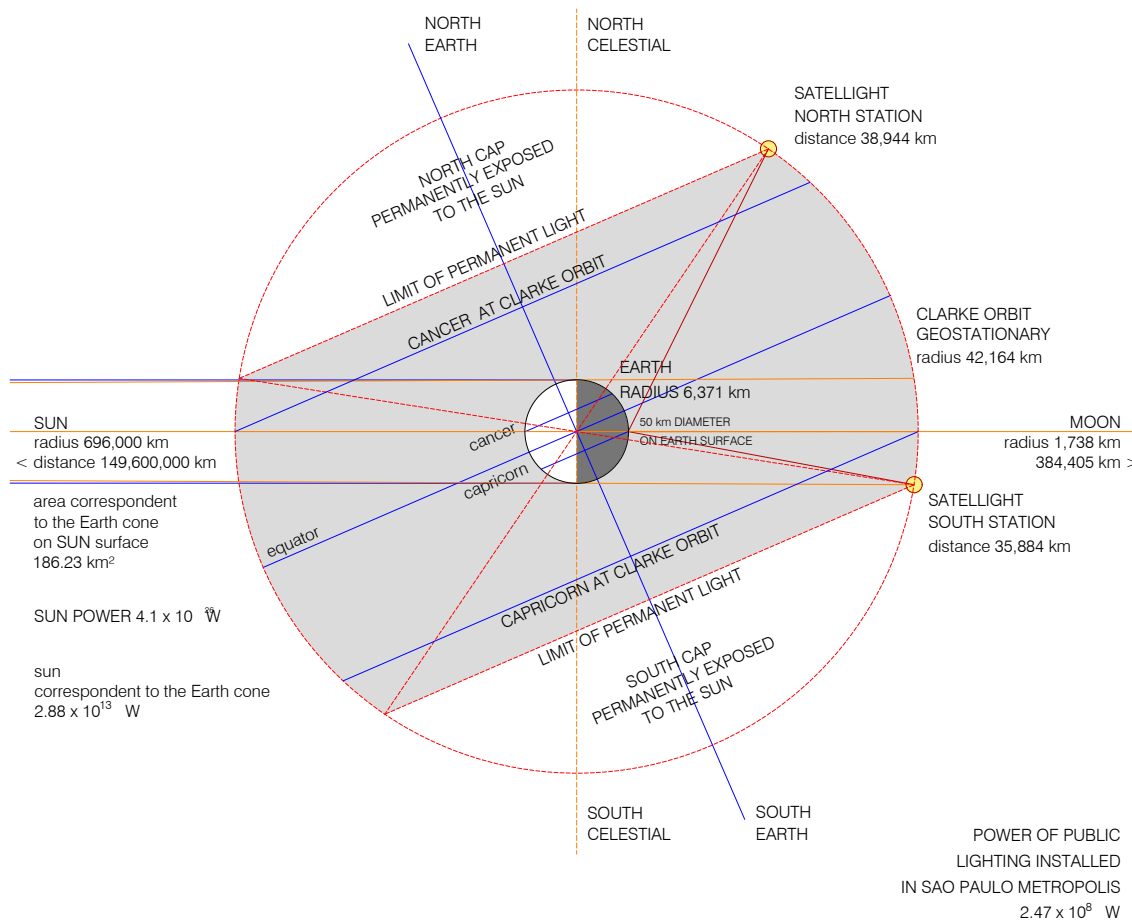
Imagine if we could replace those 1.039 million of light bulbs, thousands of kilometers of cables, hundreds of thousands of light poles with a pair of geostationary satellites. An equivalent to 250MW power light, as installed on the metropolis of Sao Paulo, orbiting on Clarke.

Assuming that, an incredibly bright source would project light over the entire city. If powered by sunlight, this device should be placed in a region of that orbit permanently exposed to the sun, which correspond to a vast cap on north and south on that sphere 45 times bigger than Earth. The pair of satellite stations could be placed on the north and south border of these caps. In such situation, the city by night would be lighted by a pair of light spots placed on fixed orbit at the border correspondent to winter and summer solstice.

For sure the scheme would be largely affected by the adverse weather condition. However, actually this natural filter would produce beautiful effects as we are familiar experiencing that under the sun or moon light. It can happen that a cloud will be blocking the north light but not the south one; some clouds could spread the light of both sources, other really dense would block both of them, producing night in the night. Under those satellites, the darkness of the night sky would be preserved because of its throw of light, so oriented and quite vertical, would mitigate refraction and the atmospheric blue light spread.

When it comes true the source of light would be fully combined with all the already existing system of information orbiting there, also controlled by that system. Based on the accuracy of the throw of light, that could frame a circle with a few meters of diameter or, extremely coherent as a laser, a multiplicity of points as imprinted million of pixels on our cities surface. Millions of sources in each station focusing places, recognizing events as a concert, a celebration date. Each person having their own dedicated light in each one of both satellite stations, as personal stars.

SATELLIGHT POSITIONS FOR SÃO PAULO



Let's zoom in back to our place, at some point along that circle. Just from inside of it we are able to share with others, to act and react in the process of building the world, to enjoy some masterpieces, to design for others whose name we know.

Yes, it may happen that one day that extremely thin layer of human life, our place, will be illuminated by satellights. And then, even if at the scale of the reach of our voice, we will know: a perfect circle is the drawing that better represents the entire existence of humanity.