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Architecture: a new human and technical relationship in the face of climate change.

August (2022)

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Received: May 25, 2022. Accepted: June 30, 2022.

Abstract— Having become an eminently urban species brings with it the already known impacts that feed the main greenhouse effect that causes the phenomenon of climate change. By 2020, activities linked to the construction industry, as well as architectural design, contribute about 38% of Greenhouse Gas – GHG emissions worldwide. The operation of buildings on a global scale, consume 35% of the energy produced worldwide, thus highlighting the responsibility that the architectural design activity has in this scenario. The discussion and reflections of the relationship of the human being and nature, understood as new ways of approaching through political ecology. Nature is now a creditor of rights, which traces a path of constant interaction between the parties involved as technological advances and the discipline of architecture.

Keywords: Architecture; climate change; mechanism; technology.

I. INTRODUCTION

THIS article aims to contribute with an exercise of reflection on what are the main consequences of modern science and technology in the relationship of the human species with its environment atmosphere. The demographic situation in Latin America and the Caribbean has acquired greater relevance because approximately 80% of its population already inhabits its urban centers, thus becoming the most urbanized region of the developing world [1]. This phenomenon has resulted in an increase in the demand for housing at the regional level, which has exceeded the response capacity of public and private actors. In the Ecuadorian case, Guayaquil is currently the city with the largest housing deficit nationwide. This lack of housing has resulted in the fact that in the Buenos Aires city about 28% of its population lives in residential neighborhoods against 72% who do so in self-built popular habitats [2].

II. HOMO SAPIENS: THE ARCHITECTURE OF A NEW URBAN SPECIES

Becoming an urban species has led us to prey on natural resources and generate an unprecedented environmental crisis. Architecture, being in charge of the design of cities -and their buildings-, has a great responsibility in this environmental problem. It should be noted that worldwide about 80% of energy is generated from fossil fuels and buildings and cities consume about 40% of this energy that is produced on the planet [2].

In fact, the architect David H. Clark, in his book "What Colour is your Building?" emphasizes the world's heavy reliance on fossil fuels as an energy source for cities. According to the author, the occupants of buildings have an important influence on the energy performance of buildings, considering that energy consumption in a house can vary by $\pm 50\%$ according to the habits of its inhabitants, and therefore on the carbon footprint that this human activity brings to the planet [3]. Along with the above, another factor that influences the process of environmental crisis linked to the activity of architecture and construction is the amount of energy needed to guarantee the optimum operation and occupation of buildings throughout their useful life.

When the towns and Designs Architectural No Respond adequately to the reality Climate of the place where herself Seat the project herself ago indispensable the use of Systems assets of air conditioning -Aires Conditioners or heating- the which Used energy electric for his operation That which signifies more Emissions from CO₂ to atmosphere, thus contributing to global warming and climate change. To the respect, the report called "Heating global 1.5 °C", try envelope the Impacts of the heating global agreement with the increase of the temperature to level worldwide 1.5 °C with respect to the Levels Industrial and the answer of

the Countries for the development sustainable. In this report herself reflects not only this hangover reality, but the importance of support global and coordinately the actions in the search of the reduction of risks of disaster and the change climatic [4].

As indicated, architects are then responsible for the environmental crisis both for the planning, design and construction of cities and for their operation and consumption once completed. Of this form, the activity of the development real estate of the towns Enters in scene how great responsible of the change climatic to account of the sundry Components, Systems Constructive and Technologies employees in the construction of projects of housing. To his time, these projects herself Run Using matter cousin whose process of production Consumes Large Amounts of energy -by example, steel, cement, Finishes between other-.

III. MERCHANT: ECOLOGICAL PERSPECTIVE AND FEMININE IMAGE OF NATURE

Our current era of capitalist exacerbation and globalization demands both ecological analysis and reflective critiques of positivist models of knowledge. This predation of nature could be exemplified through the construction and architecture industry as an example of shaping the human relationship with nature and, perhaps most importantly, to critique the economies of this activity from an ecological perspective. Against this background, Merchant's messages have a lot of strength, meaning and topicality [5].

Revealing the historical connection between the domain of nature and women is a debt still pending to find a way out of the debacle that we face and that we feed day by day. In Merchant's words, we must "examine the values associated with images of women and nature as it pertains to the formation of our modern world and its implications for our current life." Together, we must defend the need to "re-examine the formation of a worldview and a science that, by reconceptualizing reality as a machine rather than a living organism, sanctioned the domination of both nature and women" [5].

Thus, the pre-modern connection between women and nature infused a utopian thought such as the 1602 work of Tommaso Campanella Ciudad del Sol -Civitas Solis-, which imagined an organic society characterized by exchange, community of goods, property and knowledge. When the imagery Popular of the world green Made emphasis in the nature disorderly of diseases, storms and crops Ruined the Ideologies What Emphasized the need of control both the nature how the women Charged leadership. The mandate by Nicolas Machiavelli of conquer one "fortune wild" and "Female" Was example of one philosophy of domination what Covered the nature and the women. The combination Ideological of the disorder social and natural Reported of way similar to the attitudes towards the witchcraft. Merchant Argued that "the disorder Symbolized in the macrocosm by the dissolution of the frame of the nature and the desert uncivilized of the new world, in the society by the witch who Controlled the forces of the nature and the women What Turned his order, Boded the death of the old order of the nature" [5].

Thus, in Merchant's theory, climate change can well be understood as a new death of the old order of nature, which came into the hands of the capitalist economic system. Of the sixteenth century and of the mechanistic ideology. The main ideologues of the new program were Francis Bacon and Rene Descartes. Bacon's view that religion and science were engaged in a mutual effort to compensate for the harm caused to humanity by the expulsion from Paradise valued the trends towards growth and technological innovation typical of early capitalism. In short, the pre-modern organic view of the female natural world gave way to a mechanistic cosmology that perceived the green world of nature as inert matter, a machine available for human manipulation. Merchant examines the social and ecological changes produced by the new images of nature associated with the Scientific Revolution and there could be found the representation of the tragedy we live today. The theory organic Female dominant of the nature -of great importance in many Systems ancients of knowledge- Gave form to the Metaphors Rulers What Helped to regulate the behavior human towards the earth. Merchant Designates aptly what the organisms and the mechanism herself merged in the shape of the totalitarianism of the century XX.

IV. LATOUR: NEW POLITICAL ECOLOGY IN THE FACE OF CLIMATE CHANGE

The book "Politics of Nature" encourages us to "think differently" about the present and future of science and politics as an effective and necessary tool in the face of the global climate situation and the actions that must be taken from the various levels of governments to coordinate the necessary steps in the face of the climate change scenario [6]. The urgency of launching a new way of doing political ecology based on a constitution that commits rulers, scientists and citizens to guarantee the future of the Earth. The ecology politics, Designates Latour try explicitly issues of politics and culture, science and nature "how one theme unique that arises for all the Collective". Even Scores what already since the century XVIII of any form is Presented one division between nature and society. Designates In addition that the ecology No Should put to the nature by above of the politics but question What Exist something Like this how the order rigid of one hierarchy of Instances and values. [6].

Ecological practice has a high level of controversy because within this term there is no access to a stable and accepted definition of what nature is. This situation often causes the scientists involved to denounce the efforts of colleagues or opponents as biased or politicized, while each claims to be entitled and truly represent nature. What they actually do, according to Latour, is articulate different natures (hybridize) while relying on the belief in the availability of a nature as a factual resource for scientific description and political decision-making (purification).

Latour describes this situation as a version of Plato's cave: each scientist claims to be the only one able to contemplate the spectacle outside, while all the others they are imagined simply seeing shadows on the wall. The allegory of the cave is reinforced,

precisely because these days almost everyone simultaneously claims the privilege of being the only one capable of representing the themes in a way that is objective. In short, it is possible to articulate principles where nature is recognized as a creditor of rights, and based on this structure actions and results that are a significant contribution to respond to the climate change.

V. GIEDION: THE SUBORDINATION OF ARCHITECTURE TO THE CLIMATE CRISIS

By incorporating Giedion's principles, one could understand disillusionment with progress from the analogy of war as a time of rupture, as shown in Fig. 1, with what we currently live as part of a world globalized, impersonal and which we are leading to the abyss due to the industrialization and mechanization of human activities of which architecture is part.

From the interpretation of Giedion's narratives about advances in technology and its machines, it is possible to draw an analogy of the continuous deterioration of the Earth's climatic conditions with studies of the movement -made by Étienne-Jules Marey and Eadweard J. Muybridge where through sequences of juxtaposed photographs they analyzed various movements of human activities-. This was also an inspiration for Marcel Duchamp, who at the beginning of the twentieth century made his work "Man going down a ladder".

The real impact arises when industrialization becomes the automations – of the human body – integral to both factory work and the mechanizations of man in the form of factory worker.

In Giedion's words:

"History is a magic mirror. Whoever looks at it sees his own image in the form of events and novelties. It is never motionless. It's always on the move, like the generation watching that. Its totality cannot be embraced: history is discovered only in facets, which fluctuate with the point of view of the observer." [7]

The crisis of the historian as a subject merges with the crisis of the history of architecture as a discipline and field of research, as well as responsible for the climate crisis. It is about providing – or looking for the proportion – between the exterior and interior reality, between the mechanized and the organic, between the natural and the technological. Emphasized the theme of the movement understood as the struggle between the scientific and the Church, between reason and dogma, actions that in our days have penetrated to the most Sacred of the Holy See as is the Encyclical *Laudato Si'* of the Holy Father Francis on the citizen of the common home and our responsibility in the destiny of planet Earth [8].

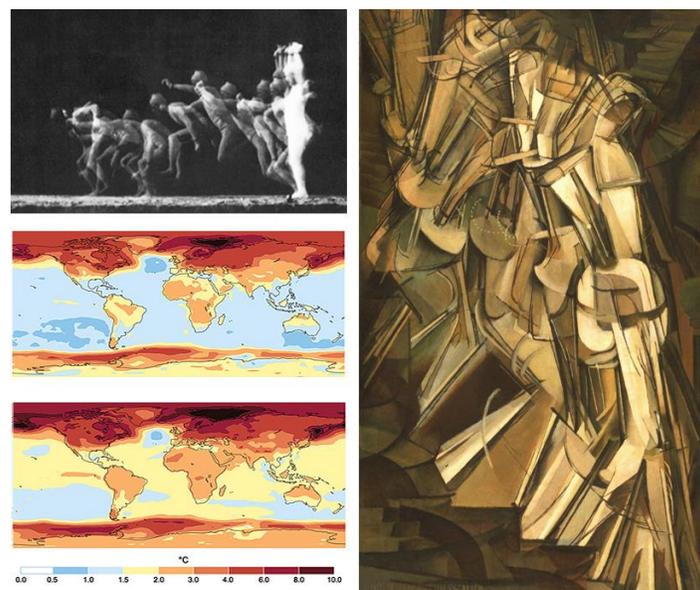


Fig. 1. The similarity of the visual effect through analogies of repetitive patterns described from trajectories of movement over a space and time, described by photography, pictorial art and the projection of average surface temperatures related to climate change. Above: Étienne-Jules Marey movement sequence [9]. Below: Comparison of global average temperatures of +1.5°C and +2°C. Source: [10] Right: Man coming down a ladder by Marcel Duchamp, 1912. Source: [11].

Giedion also proposes the subordination of mechanization to human needs, a recipe that today must prevail to optimize processes, quantities, inputs, energy. The responsibility of the real estate industry and architecture also finds a pessimistic horizon with the analogy of bread. This food, according to Giedion is no longer what it was, mechanization has devalued the character of bread and turned it into a luxury item full of artifices. A simile to today's architecture with vernacular architecture: the first full of that "artifice" understood as active air conditioning systems; the second, as that "bread" of pre-mechanization where passive air conditioning systems prevailed, thus understanding the disadvantages of mechanization.

VI. MUMFORD: THE GOOD USE OF THE MACHINE

The processes of industrialization and mechanization understood through Mumford's writings that describe the stages that gave rise to the evolution of the machine on the human being are divided in three phases. The first is the eotechnical phase where machines have their genesis or origin; the second is the paleotechnical phase in which the great advances are consolidated and systematized and, finally, the neotechnical phase where machines thanks to new mechanical technologies have been perfected.

Mumford further exposes the need for an "organic ideology," which implies an awakening of the vital and organic over the purely mechanical. In response to Mumford's critical approach, collectives throughout the world have developed civic and social actions for some decades in order to improve our relationship with the planet.

To reinforce the above idea, in Mumford's words:

«(...) what are called gains in the capitalist economy often result in losses, from the point of view of social energy, while the real gains, on which all activities ultimately depend of life, civilization and culture are either counted as losses, or ignored, because they remain outside the business scheme of accounting." [12]

What Mumford proclaims, is in tune with Giedion's ideas by understanding the "good use of the machine" as well as economic relations so that they are subordinated to the benefit of people and thus allow their individual and social evolution. It is changing to humanized ways of life, what in architecture is often called "looking to the past to solve the present" – referring to architectural solutions vernacular- and its interpretation and adaptation to our days.

In fact, an improvement in aspects of culture or education would bring, as Mumford rightly states, a "diminishing demand for compensating goods and services." In his writing "Authoritarian and Democratic Techniques," Mumford further argues that the fundamental principle of democracy is to place what is common to all men above all men of everything that any organization, institution or group can claim for itself. Democracy is about giving final authority to everything, rather than to various parts. Only living human beings, as such, are authentic expression of the whole [13].

Thus the article "Technics and the Nature of Man", Mumford aptly challenges the basic assumption that defines man as an animal that uses tools, since many anthropologists have claimed that it was the use of them which led to the development of the human brain. He points out that there are other species that use tools – chimpanzees, for example – and their use of tools has not led them to the same evolutionary situation.

The author claims that it was the creation of meaningful modes of symbolic expression, rather than more effective tools that was the basis of the further development of Homo sapiens. As evidence to support this claim, he points to the creation of the cave paintings by a man who was still quite primitive in terms of the tools he had. [14]. In addition to the above, Mumford would say that, in its origins, the technique was focused on life, not on work or power. It is emphasized that, if it is not changed through actions projected from politics and that permeate to generate good practices in our professional field, the danger of a future Uninhabitable will always be present. Mechanization and regulation of society through industrial and bureaucratic organization eventually replaced religious ritual as a means of promoting the stability of the masses of population. This will ultimately lead us to a present in which the focus of human activity has shifted from an organic environment to the megamachine – that is, when technology is embedded in social relations. In short, for the ecological critique of society to make sense, discourses must promote a system that admits economic and ecological activities in which reasonable consumption allow citizens time to themselves.

VII. CONCLUSION

To put the technique back at the service of human culture we must stop our further expansion of the Mumford megamachine and concentrate on the development of those parts of the organic environment and the human personality that has been suppressed. We must replace automation – the proper end of architecture – with autonomy – the proper end of the human being. In addition, to guarantee in this process the rights of Latour's nature and to return to it that feminine image, of fertility and rebirth discovered in Merchant, linked to the proportionality between the natural and the natural technological inspired by Giedion.

In the Anthropocene the distinction between humans and the Earth can no longer be made. The fixation on man as a tool user lays bare our modern obsession with machines and these, in turn, the mechanism by which - by the exposed throughout the essay - we are taking the planet with our actions within architecture to a very delicate situation. Term suggested in the change of millennium by the Dutch Paul Crutzen, prize Nobel Prize in Chemistry in 1995, with Eugene Sotermer for designate originally to one epoch Geological. However, not Expected have one double connotation respect to «concept cultural" to which ago reference to the epoch in the one that the Activities of man Started to provoke Changes geophysicists and Biological of way Accelerated to scale worldwide and damage Irreversible due to the consumption outrageous of Resources Natural. The above, the Takes to publish "The Geology on Mankind" [15].

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