The organic language of Arturo Soria. The antecedent of ecological urban planning[1]

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"To each his own. I follow mine, which consists of destroying the weapons of discourse, far more effective than iron and fire, the external form and the internal organization of large cities. New Towers of Babel, erected in the present times by unpredictability and greed, you will fall to the blows of my pick!"

Arturo Soria y Mata, 'La cuestión social y la Ciudad Lineal' in *El Progreso*. Madrid, March 5, 1883.

The politician, inventor, and geometrician Arturo Soria y Mata (1844-1920) is strongly linked to the project that he promoted and disseminated internationally for more than forty years: The Linear City (*Ciudad Lineal*), a pioneering proposal in what its author called 'architecture of cities'[2] [Fig. 01]. Prior to the consolidation of modern urbanism, the principles of this new discipline were outlined in various publications without being conclusively systematized. The core of his thought was presented in a series of urban-themed texts published between 1881 and 1883 in the newspaper *El Progreso*, in which he sought to reveal the laws behind the growth of modern cities while influencing local politics. This unfinished theory, laid down in the form of short newspaper articles, combined theoretical aspirations with the first attempts to come up with a Linear City. In 1892, a decade after the publication of his first texts, Soria announced a matured revision of his proposal, and two years later he began to pave the way for its construction through the company he founded, the Compañía Madrileña de Urbanización (hereinafter CMU). The beginning of his work as an urban developer meant the abandonment of his theoretical ambitions, the intuitions behind which were subordinated to the dissemination and promotion of his company. This research seeks to weaken the correlations of influences on Arturo Soria's thought[3] with the aim of clarifying his most relevant contributions, exposing his principles and contextualizing all in the germinal debate of modern urbanism as well as in contemporary ecological concerns. When the key points of his urban vision are exposed, it becomes clear that, for Soria, the Linear City is the definitive answer, but what are the terms of his question? How does the author explain the phenomena of the origin and expansion of cities? What analysis does

he carry out around urban issues and what tools does he use?

Since the late 1960s, when authors like Fernando Terán, George R. Collins or Carlos Flores stressed the importance of the Linear City, numerous researchers[4] have shed light on the biography of Arturo Soria y Mata, unraveling multiple aspects of his thought and work. In this research, however, we will not focus on his biography, but rather on an analysis of his abundant writings. In studying Soria's written work, the research has distinguished different stages in the development of his thought which correspond to successive languages adopted and the overlap between them. First, a primitive organic language[5] (1881-1883) is identified, on which this article is focused and which we believe to be the most relevant, constituting, as it does, the mental framework in which his intuition of the Linear City germinated. From the dating we glean it is one of the most original and transcendental proto-urbanistic languages, and hence deserves to be recognized as one of the sources of modern urban thought, the influence of which can be traced to the present. Second, we must mention a later, obscure neo-Pythagorean language which was born with 'El Origen Poliédrico de las Especies' (1894), the publication where the author tried to explain the origin of natural forms by means of the combination of polyhedrons, and whose connection to his urban theory remains controversial [Fig. 02]. This theosophy-inspired language manifested Soria's natural inclination towards mathematics and geometry, becoming the vehicle with which Soria profiles his Linear City with a high degree of precision in the details and proportions and an immutable aspiration to an ideal. Finally, Soria developed an eclectic speculative language, where fragments of the aforementioned languages are integrated as scientific endorsement of the invention of the Linear City. The eclectic language was used as much by Soria y Mata as by his followers at CMU in presenting the linear model to the general public as a natural evolution of cities, the genuine product of a scientific invention and a very lucrative, safe investment. This language appeared in 1894 and is characteristic of *La Ciudad Lineal*, the promotional publication of CMU and considered the world's first urbanistic magazine. *La Ciudad Lineal* was the media through which Soria's ideas – mixed with administrative information and real estate advertising – were disseminated in a systematic way for more than three decades (1897-1932).

In the written production of the organic stage we can recognize a mature Soria (he was 37 years old when he began to collaborate with the newspaper *El Progreso*), one with a vast knowledge of American and European technological advances, in addition to plenty of experience in the development and management of urban railway lines which had been operating for a decade[6]. The materials analyzed make up a total of 56 articles published in the column 'Cosas de Madrid'. The language developed by Soria in these texts was the result of a search for an operational instrument with which to carry out a two-fold task: on the one hand, to portray and understand the transformation that modern cities were going through; and on the other hand, to transform municipal policies and the urban form of his hometown, namely Madrid at the beginning of the Bourbon Restoration era. In this local context, Soria's articles supported a critical stance against incumbent municipal urban policies and their corresponding strategies of intervention on the traditional city. Hence, if there were two transformation strategies in the 19th century, namely internal refurbishment and expansion (the so-called '*Ensanche*'), Soria condemned the former, and upheld the latter, with some reservations. Soria faced the challenge of addressing the urban problem with no other tool than an intuition of the potential lurking within the new technological discoveries of the time, in particular the railway's capacity to structure urban growth in a way that differed from the way the 'Plan Castro' expansion had done for Madrid. With the aim of clearly demonstrating the general principles of Soria's thought, we will henceforth ignore allusions to the local urban debate – the subject of other historical studies – and focus exclusively on its conceptual instruments.

The metaphor of the 'Urban Organism'

The cornerstone of Soria's urban approach method is a simple analogy: the metaphor of the city as a human body[7]. This method deploys language as an instrument in naming the basic parts and systems that make up the city, and identifying them using our familiarity with human anatomy. Once they are described and transferred to the field of our corporeal knowledge, all the parts and systems are reassembled in a vision of the city as a single organism, subject to the same vital processes and functions as every living being: birth, growth, reproduction, death. In Soria's writings, the organic analogy grows and branches out until it constitutes what Bachelard calls 'a syntax of metaphors'[8], a system of knowledge of an apparently chaotic and out-of-control phenomenon: the growth of cities in the industrial revolution[9].

The metaphor of the body-city or 'urban organism' became a commonplace in 20th-century urban planning theory, and is so widespread in our thoughts and daily lives that we quite commonly use it unconsciously. We make use of rhetorical figures when we call the urban center the 'heart of the city', the parks 'green lungs', the highways 'arteries', and so on. The first urban texts of Soria, with titles such as 'Anatomía Urbana' (1882) or 'Tisis Municipal' (1882), contain hundreds of allusions based on this analogy: 'the intestinal apparatus of a city' to refer to sewerage, 'bony framework' to refer to streets and railways. He calls urban intervention 'medicine', compares the obsolescence of armor and chain mail to that of medieval walls, seeks inspiration in the 'forms of reptiles, annelids, some crustaceans and other lower organisms'... He even equates the spread of fires caused by population density with the fever of a sick body.

The origin of most of these terms lies in modern biology, a discipline which despite Aristotelian roots developed its current form at the beginning of the 19th century, with Goethe[10] (1749-1832), and culminated in the mid-century years with the formulation of Darwin's theory of evolution (1809-1882). Darwinian theory did not only turn around the biblical morphological hypotheses, but its influence meant a real earthquake with repercussions reaching far beyond the disciplinary field of biology and profoundly transforming all other fields of knowledge. Even before Darwin, the English philosopher Herbert Spencer (1820-1903) developed a conception of evolution that touched on a wide range of disciplines: ethics, anthropology, economics, political theory, philosophy, sociology, and many more. It is commonly catalogued under 'Social Darwinism' and largely configured the substrate of intellectual thought in the second half of the 19th century. Spencer developed the concept of 'super-organism' applied to social organizations, 'organisms of organisms' capable of developing their own properties and functions, beyond the sum of their parts. Likewise, the thought of the German naturalist and philosopher Ernst Haeckel[11], whose works contributed to disseminating and consolidating evolutionary theories throughout the world, was one of the sources of the notion of a progressive universal complexity based on simple geometric elements that Soria y Mata exposed in his work '*El Origen Poliédrico de las Especies*' (1899), and where the author identified the figures of the Tetrahedron, the Betatetrahedron and the Pentatetrahedron as the primitive elements of all forms [Fig. 03].

Genesis

The influence of Herbert Spencer's thought is openly recognized by Soria himself as one of the essential sources of his social vision. It is not difficult to guess his influence after his first reflections on the origin of the city, in which he considers it a living organism (albeit seriously ill, as can be seen from his critical writing) whose birth and growth would be subject 'to perfectly clear and defined laws'[12], although these were never enunciated, and whose natural evolution – 'slow in past centuries, fast in the present' – would lead to the Linear City[13] [Fig. 04]. In order to prove this determinism between the evolution of the urban form and the emergence of the Linear City, Soria sketched in his article '*Cómo crecen las ciudades*' (1882) an account of the morphogenesis of the city which, despite lacking the coherence of a proper urban theory, constitutes one of the most complete exercises in expanding the organic language beyond local political criticism and the mere justification of his project. In it he defends a morpho-biological hypothesis where 'the embryo, egg or principle of the city-capital organism [...] is always a castle or fortress', whose contact with large bodies of water would enable it to develop, and whose 'central position' would provide the prosperity associated with the great Western capitals. Once the conditions mentioned by Soria have been met, the city organism emerges and 'demands a protective wall that

completely isolates it from the territory', and if its growth continues, 'the houses multiply outside the fortified enclosure, and it becomes necessary to build a second, more extensive circle of walls'. For Soria, this phenomenon was proof of the acceleration of the growth of cities, an easily recognizable fact in multiple cases that 'confirm evolutionist ideas' and can be observed 'as the geologist evokes the succession of times in the stratification of the ground, the urban architect can study the complete evolution from the fossil city to the modern city'. The influence of this idea also covered the sociological field in comparisons of the obsolescence of fortified defense perimeters with the process of *'substitution that the citizens have made from the helmet to the bowler hat, from the armour to the frock coat and from the chainmail to the shirt'*. Soria also extended this deduction to observe a general trend in European capitals (Vienna, Brussels, Amsterdam, and some others), the demolition of their old walls for the sake of urban expansion, a process which was for him the definitive confirmation of the universal validity of the organic tropism applied to the city: *'the body grows incessantly, and as the stone belt that holds it grows, it jumps to pieces'*.

Urban Anatomy

For Soria, the urban form *'must be subordinated to the needs of urban life'*[14] and attests to each city's stage of evolution, in its generalized trend towards regularity. He repeatedly used the term 'form' as something equivalent to 'structure', referring almost exclusively to the layout of the road system of streets and squares that constitutes the infrastructural support and negative of the built mass. Soria suggests that in the structure-skeleton of the city there are different categories of bearing-linear elements or bones: the streets, avenues and boulevards that should accommodate the layout of the railways and whose relationship and hierarchy vary according to their width. In this way, Soria clarified that the growth of the city is based on the layout of infrastructures and their coordination with the transportation system as a whole. Consequently, it is only possible to describe the shape of the traditional city as anti-organic, a formless mass (or invertebrate) where *'the variable angles, the sinuses, the irregular contours of the non-crystallized mineral dominate; it is the image of chaos'*[15].

On the contrary, the cities that were planned according to regular grids or checkerboards where *'two series of parallel streets intersecting at right angles'*[16], e.g. the New York City layout, would represent the most advanced stage of urban evolution, which Soria praised as *'the most advanced and closest to perfection'*. He also suggested a stage beyond the hypodamic plan or checkerboard layout: *'The square form of the American ones, thanks to the wonderful intuition of the Spanish conquerors, is a result of the transition from the military to the industrial organization that now predominates. The latter will lean more and more towards the linear form, in which the fact that trams and railways are the same thing takes on extraordinary importance'*[17] [Fig. 05].

The identification of infrastructure as urban structure is followed by the definition of a 'cell', the ultimate syntactic element on which Soria's urban language rests: the house. Soria's predilection for single-family housing has hygienic, political and speculative motivations, but also syntactic ones: the Aristotelian social cell, the family, must have another equivalent architectural unit, the house. The definition of this minimal unit and its association, forming packages called blocks, was where the true architectural and political content of Soria's proposal lies: a social image where we can live together, capable of terrorizing us through its monotony and at the same time dazzling us with the clear promise of a life in harmony with nature, where *'the palace of the powerful, adorned with magnificent gardens, and the poor man's hut, with a modest barnyard simply embellished with useful plants and scented flowers, live close together'*[18] [Fig. 06].

The invention of an organic image

"Perhaps, following Fourier, we should call an inventor (and not a writer or a philosopher) he who brings to light new formulas, occupying, by means of fragments, immensely and in detail, the space of the signifier."

Roland Barthes. *Sade, Fourier, Loyola.* (París: Éditions du Seuil, 1971), 107

By recomposing the fragments of Sorias discourse, dispersed in articles, manifestos and various conferences, we are able to visualize the deterministic and reductionist notions of his urban theory, a theory incapable of satisfying the growing complexity of urban phenomena in our contemporary metropolises, but analysis of which gives us back one of the most powerful instruments developed by urban writing: the possibility of a total urban image. Soria's writings offer an attractive answer with a holistic capacity to bring together advances in knowledge and technique in areas as diverse as locomotion, telecommunications or sanitation, and integrate them in an organic whole, which is necessary if individual projects called upon to transform the city are to be able to support and satisfy the needs of life from the house to the city and from the city to the territory. For Soria, in our cities *'There has been a lack of organization and linkage of valuable elements. It is in the syntactic composition of simple elements, in the synchronized articulation of urban systems that, wisely arranged, they can give amazing results, in the same way that the seed, well fertilized soil and the separated water are inactive riches, and together they are transformed into the infinite wonders of the plant kingdom'*[19].

This text presents a continuous reiteration of basic concepts that come in different time contexts to help push through the developmentalist aims of Arturo Soria. This is fostered by the intertwining, in a continuous reading of Soria's written thought, of concise fragments of information, such as manifestos or lectures, followed by other more elaborate texts focused less on presenting the Linear City project than on studying of phenomena tangential to it. These temporary folds of the text-network are, however, an inestimable help in showing the cracks and interstices of its conceptual sieve, through which many aspects of the urban phenomena pass without being trapped by his critical analysis, giving shape, in some way, to the counter-form of the text's implicit structure.

Also inherent in Soria's organic writing is the search for a notion of beauty that expands the nature-based classical sense of the word, with its exaltation of harmony, proportion and symmetry. Soria, a fervent geometrician, exalts beauty understood as 'classification and harmonious linking of different parts, number, measure, the integral of all integrals', which would no longer rest on what is immutable, but rather embraces the dynamic and expansive, a scalar notion of systems and subsystems coexisting and articulating their operations on the basis of simple, immutable rules of combination and growth that would be present in nature. From the study of Nature and the definition of elements comprising the urban phenomenon, an architectural and urban discipline that had not yet been formulated emerged for Soria, and it was from this that his Linear City many other related projects were deduced. What form did Soria set for these future developments? *'The one that the tree branches draw in the air, the rivers on the ground, the veins in the human body'*[20].

Conclusions

Perhaps Soria's most genuine contribution was establishing a fundamental break with the historical urban thought through the mineral-organic opposition. Soria renounced the historical strategy of intervention in consolidated urban centers through the juxtaposition of parts and 'excavation' in the built mass. Faced with the established tradition of internal refurbishment, Soria envisioned a paradigm shift in the urban transformation of European capitals, one where historical perimeters gave way to structured growth around modernized infrastructural networks. In this way, the mineral-organic opposition achieved the two-fold task: placing the incipient urban discipline in the frame of reference of history, even though to renounce and surpass it; and simultaneously establishing and contextualizing our view of it in the most popular scientific and philosophical thought of his time, the evolutionism of Darwin and Spencer.

In these first writings of Soria, an organic vision of urban phenomena underlies what integrates the processes of consumption of matter and energy that are necessary for the development of urban life in a concept of city that is at once unique and complex. Development of the organic metaphor involves recognizing urban metabolism as a place of opportunity and a project for improving living conditions. The parallelism between the urban organism and the human body is the key to this operational methodology, through which it conceives advanced supply, communication or waste collection systems based on the potential of new technologies to organize and improve urban life. It was from this vision that led to Soria's definitive proposal for urban growth, the Linear City, which was destined to establish

Public intimacy: Architecture and the visual arts

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In *Collection and Recollection: On Film Itineraries and Museum Walks*, Bruno delves into the concepts of memory and imagination from the space of the museum, film and architecture. She underlines the interest in mnemonic processes in cinema, as in the films *Memento* or *Blade Runner*, where memory is portrayed as the sum of "fragments of an archival process porously embedded in our path, part of our own shifting geography". From the angle of this idea, the boundaries between cinema and museum are blurred, with an increasing use of moving images that turn museum rooms into projection rooms. This connection is observed in the experimentation on cinematographic language that artists such as Chris Marker, Douglas Gordon or Bill Viola have carried out. Regarding the urban passage and the transit through the museum, Bruno relates picturesque aesthetics, his legacy of "making feel through the eye", with cinematographic optics, where "a double movement connects the external to the internal topography". There is prominent mention of *Montage and Architecture* (1930) by Sergei Eisenstein and Le Corbusiers 'promenade architecturale', where cinematographic montage and architectural itinerary converge and the observer becomes a consumer of views. The museum, the gallery or the room, therefore, are conceived as "places of texture", "fabrications of visual fabrics" or "emotional archives of the imagination".

"Modernist Ruins, Filmic Archaelogies" runs through "A Free and Anonymous Monument", the installation that Jane and Louise Wilson presented at the BALTIC Centre for Contemporary Art (Newcastle) in 2003. The installation reconstructs through a succession of suspended screens, like a Lev Kuleshov montage, the Apollo Pavilion design by the artist Victor Pasmore. It stimulates the sensory character of the exhibition space itself, as well as acting as suspended memories of the work. Attention is drawn to the relationship that Bruno points out between modernity and landscape culture, where the pavilion, transition between city and nature, is conceived as a privileged spectator of the perceptual, cultural and social transformations of the modern era. The installation, thus, represents the "multiple, fractured, disjointed, fluid and unstable nature" of space and the modern subject – or the 'flaneur', as poetically defined by Charles Baudelaire.

In "The Architecture of Science in Art. An Anatomy Lesson", Bruno establishes a relationship between science and art through forms of observing the human body and the evolution of exhibition spaces intended for this. The origin is located in Naples, in a show of the anatomical lesson as an antecedent of cinema. Its research base and the fragmentation of the human body relate the anatomical with the cinematographic gaze, the latter from a corporeal form of visuality. In this relationship between the cinematographic and anatomical eye, the text owes to *The Work of Art in the Age of Mechanical Reproduction*, where Walter Benjamin pointed out that "the boldness of the cameraman is comparable to that of the surgeon". Bruno analyses José de Ribera's 1631 painting *Magdalena Ventura with Her Husband*, stressing not only high culture's interest in an image of popular (low) culture, but also the interest in anatomical abnormalities, especially those of the female body. This "epistemological movement toward the body-object" from culture has contributed to the regarding of the body as a "privileged object of knowledge, pleasure and power". In contrast, Bruno points out medicin's debt to cinema in terms of observation and perception modes.

In "Mind Works: Rebecca Horn's Interior Art", the work of the German artist serves as a guide for Bruno to delve deeper into the idea of appropriation as an extension of our intimacy, where the human body is shown as an instrument of possession. In "Berlin Exercises", "Dreaming Underwater" or "White Body Fan", corporeal prostheses determine the body's ability to explore space, while in "River of the Moon" or "Station Amoureuses", the hotel room is understood as a superposition of stories where space emerges as a geography of subjectivities. Regarding the relationship between body and technology, Horn explores the coordination of movements and the automation of the body to delve into how technology merges with the body to accentuate a shared intimacy.

"Fashions of Living. Intimacy in Art and Film" begins with the "Femme-Maison" series of Louise Bourgeois, which fuses the silhouette of a woman with a house. The drawing makes explicit the connection between home and female subject, eliciting an emotional gaze linked to the idea of travel, at the same time that this idea triggers a transitory relationship with the home as a wandering cartography. In this journey through the house, the first stop is in Dorothy Arzner's film "Craig's Wife", where the house becomes the protagonist in a domesticity that problematizes the relationship between space and sexuality. In *The New Dwelling: Woman as Creator* by Bruno Taut, domesticity is fused with movement, the planes are interpreted as maps for living, and the female subject as a performative object. The relationship between architecture and living continues with works like the Urban maps of Guillermo Kuitca, "Crying Wall" by Ann Hamilton, "House" by Rachel Whiteread or "Untitled" by Dores Salcedo, resulting in a complete geography of intimacy.