2.8

ELECTIVE AFFINITIES

The Recovery of Historic Seminal Ideas of European Urbanism for a Sustainable Urban Design in the Late 20th Century

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Sustainable Cities, Urban Sustainability and Sustainable Urban Design: A Selective Approach

The concept of sustainable development has permeated our societies with extraordinary speed. After its publication in 1987 the Brundtland Report shook the fields of economy, science and culture, as well as urban planning, worldwide.

It is well known that the conceptual background of sustainability, connected with the idea of development, belongs to the fields of economy and natural sciences, with particular precedents in forestry (Michelsen *et al*. 2016) and in applied ecology (The Land Ethic, in: Leopold 1949). The "World Commission on Environment and Development" was born for a better understanding of the interactions between ecology and economy, in "a new context" of global change. Under the motto of "our common future" (common concerns, challenges and endeavors), the concept of sustainable development was introduced, defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Report 1987: 41). With an emphasis on two "key concepts", needs and limitations, the report establishes an inseparable liaison between environment and development: "the 'environment' is where we all live; and 'development' is what we all do in attempting to improve our lot within that abode" (Brundtland Report 1987: 7). There was continuity with "The Limits to Growth" report (Club of Rome) and the first UN Conference on the Human Environment in Stockholm, both in 1972, but also innovation. Influenced by the ecological economy of steady-state (Daly 1977) and with optimism about the potential of scientific-technological adaptation, the report proposes an innovative connection between economy and energy. It promoted the advance in a more efficient, less entropic and less harmful use of energy (Georgescu-Roegen 1971; Nicolis and Prigogine 1977; Odum and Odum, 1980). Although the concept of "climate change" only appeared ten times in a document of 300 pages, the sources and uses of energy established the new way of thinking about relations between the economy and the environment. Very soon, the target of CO_2 emissions reduction hit the existing patterns of urbanity, demanding new responsibilities with regard to resources and consumption, with the idea that "enough is best". Although cities were not at the center of the report, the challenge in terms of growth, size and inequality impacted the basis of planning.

When I was in charge of the Spanish translation of "Design With Nature", I was distressed by the delay in which ecology becomes a habit in planning. Ian McHarg's book was the first, in 1969, to establish a method for connecting ecology and urban planning. At a time when applied ecology was a quasi-American-only issue, thanks to A. Leopold, L. Mumford, R. Carson, B. Commoner and others, McHarg (1920–2001) wondered how man can be a negentropic agent. The idea of negentropy was proposed in "What is life?", a little essay about the physics fundamentals of the biological world (Schrödinger 1944). The possibility of a negative entropy will remain in the science paradox: however, McHarg was wondering how humans could manage their environment as creators of order or equilibrium, and not as mere exploiters. While the questions with regard to sustainability are used to going to the What, Why, and Where, architecture and urban design are wondering about How: the search for negentropy by design.

McHarg was aware that economy and ecology share their etymological root, Oikos, which means the family house: Oikos-Logos, the science about home, and Oikos-Nomos, the rules governing the home. In "The House We Live In", a CBS popular and pioneer TV program on ecology, hosted by him in the 1960s, McHarg demonstrated great confidence in the role of science in managing the human environment. With several of his relevant contemporaries, he shared the wish for change in both economy and mind, with an anticipation of the circular economy, "the closing circle" (Commoner 1971), or with the demand for a mental turn towards understanding the ecology of cities (Bateson 1972). Because our urban regions belong to that house, the Earth. We can find all these references in the bibliography of Christopher Alexander's "A pattern language" (1977), another piece of the innovative script where urban planning set up a clear connection with ecology, anticipating the sustainable urban project.

However, we have to wait for the Aalborg Charter, in 1994, to find the first official statement on "sustainable urbanism" in Europe, proposed with a specific meaning: "We, cities & towns, recognise that sustainability is neither a vision nor an unchanging state, but a creative, local, balance-seeking process extending into all areas of local decision-making" (Aalborg Charter 1994: 1.4). Inspired by the Local Agenda 21 proposed in the Rio Earth Summit, 1992, the Aalborg Charter boosted urban sustainability as a local commitment by municipalities and cities. In 1991, the EU created the Expert Group on Urban Environment which published its first main report in 1996. Those initiatives and other documents about urban sustainability were related to visions and principles. Words were prevalent. In spite of the compilation of good practices and the generation of updated criteria, only green strategies seemed to define the common ground of sustainable design. In any case, sustainability goes to change, step by step, the vision about cities, but how does it change urban design?

In addition to the new tools and technological innovations, one of the answers to that question could rest in a quiet hypothesis: there is a shared tradition, rooted in town and regional planning, which has always been very close to the "new" objectives of urban sustainability. When in 1809, in Weimar, J.W. Goethe published his *Elective Affinities* (*Die Wahlverwandtschaften*), he ventured into the idea, thanks to the new scientific thinking, that science can control human feelings, that it was a question of chemistry. In our case, the chemistry of elective affinities in urban planning is rooted not only in precedents like those already mentioned but in a selective narrative of contemporary planning history: planning history understood as a progressive sequence of planning discoveries, made by planners.

We can confirm this in three episodes related to urban morphology, to the regional scale in town planning and to the surgical intervention in historical cities. All of them can be viewed today in the mirror of sustainability. These old urban design resources, revised and adapted, are

still useful for sustainable targets. Perhaps their peculiar chemistry can also stimulate a deeper understanding of planning history.

The Grid and the Rule of Proximity: Revisiting Cerdà's Urban Geometry

Ildefonso Cerdà (1815–1876) occupies a key space in the origins of contemporary urbanism, which has only recently been internationally recognized, however, it was François Choay who established, worldwide, the role of Cerdà in the invention of urban planning as a new autonomous discipline. The singularity of Cerdà is related to his pioneering interaction between theory and practice, to his "Teoría general de la urbanización" (1867) in addition to his plan for Barcelona (Figure 2.8.1). In them he combined the normative perspective, the rules, with the proposal for the city, the model, blending critical approach with the spatial anticipation (Estapé 1971; Choay 1980).

But there is also something extraordinary in the basic geometry with which Cerdà proposed a rational structure for Barcelona's *Eixample*, its grid of 133 × 133 meters between street axes, and its blocks (*manzanas*) of 111 × 111 meters (Figure 2.8.2). It is true that Cerdà was thinking of open blocks, and that their compaction is the result of a complex historical process, with successive urban codes that favored the increase in density. However, the layout itself demonstrated the adaptability of the block system in irregular situations, as occurred when incorporating the Paseo de Gracia, which existed previously to the Exaimple. This adaptability rested on the dimensions chosen for the urban block and in the talent with which Cerdà deployed the grid
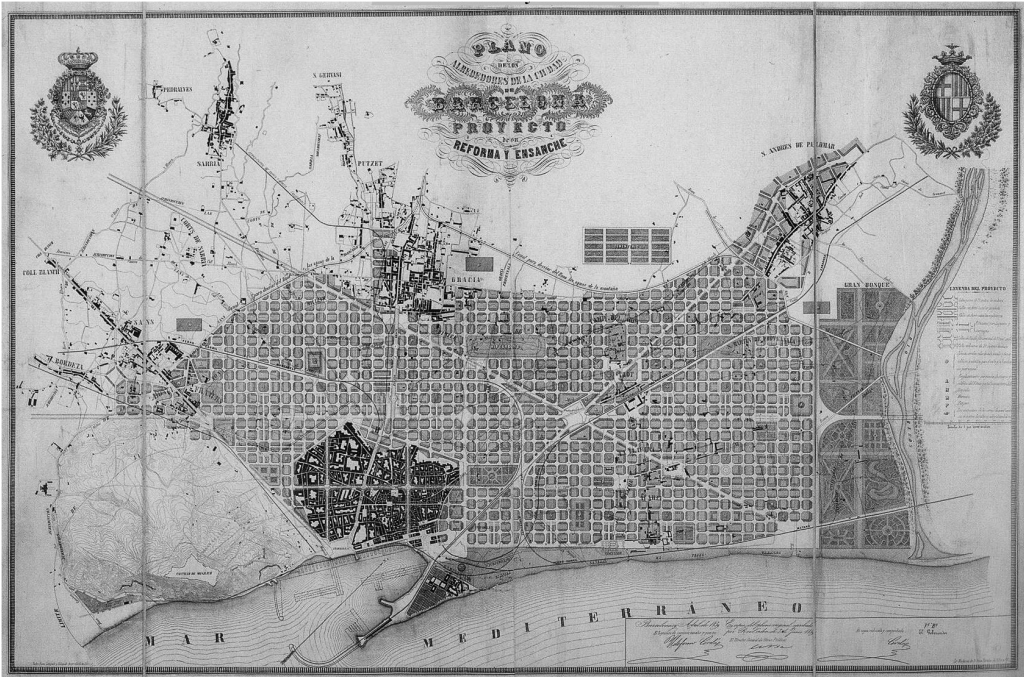

FIGURE 2.8.1 "Plano de los alrededores de la ciudad de Barcelona y Proyecto de Reforma y Ensanche", Ildefonso Cerdá, 1859.
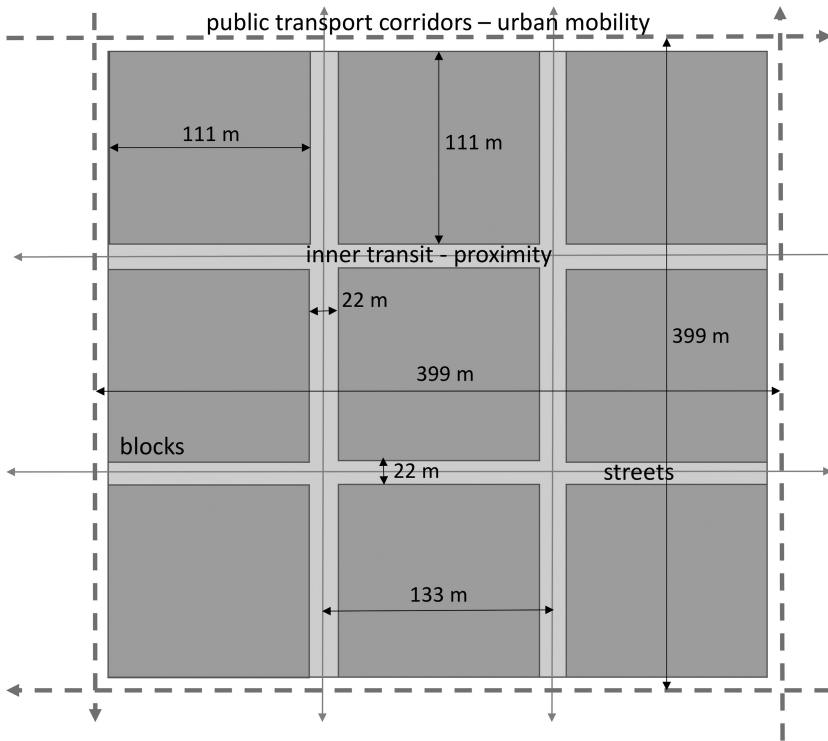
Source: City Museum of Barcelona.

FIGURE 2.8.2 "*Supermanzana*" applied to nine Cerdá's blocks (399 × 399 meters). Environmental area with inner pedestrian-coexistence traffic and proximity relationships.

Source: The author, from BCN-Ecologia concept.

on the existing site, the "campo" of Barcelona around the old city, included the diagonals and the Gran Vía.

I cannot discuss the question of density here, which was essential to Cerdà's proposal and its later evolution. The new urbanity that appears at the end of the 19th century developed diverse perceptions about urban density but with a clear preference for urban continuity, also in peripheral suburbia (Sonne 2017).

Returning to the formal qualities of Cerdà's layout, Salvador Rueda and his team at BCN Ecologia have analyzed the Eixample in terms of urban ecology, benefiting from the mixture and diversity that history has produced in it. His idea of the "super-block" (*supermanzana*), founded in the grid dimensions, the mix of uses, and the offer of local services, is nuclear in a regenerative project for managing urban metabolism from sustainable mobility and proximity relationships. The idea is an heir to the "environmental areas" proposed by Colin Buchanan for traffic regulation compatible with urban heritage preservation and the concern with the environmental qualities of historical areas (Buchanan 1963). However, Cerdà's geometry and dimensions are the ones that ease the circulation scheme and permit the restriction of traffic within the area and the maintenance of diversity and urban life in it.

Actually, Rueda finds in the *Eixample* the dimension for his super-block, with the aggregation of nine Cerdà blocks, a square of 400 × 400 meters, suitable to establish the requirements of mobility, mixture of uses, and environmental quality (Rueda 2019). It is no surprise that this dimension coincides with the new urban grid proposed in the *Plan Macià* for Barcelona, presented in 1935 by Le Corbusier with the GATCPAC (Catalan group associated with the CIAM).

In fact, this rule of 400 meters has recently been developed by the experienced Salingaros research group in urban structure, proving the success of Cerdà's geometry:

> Based on our observation of historic cities from different cultures, and the work carried out by the Italian morphologists… we propose that the maximum edge length for a sanctuary area (the area between major thoroughfares) is governed by a surprisingly small 400-metre rule. An extensive case-study research is presently being carried out by the authors that will provide empirical support to the '400-metre rule' idea ….
>
> *(Mehay et al. 2010: 23)*

The search for the environmental unit dimensions in cities is relevant for the design of sustainable neighborhoods. Highlighting the comparative method in planning history, we can draw a conclusion: it is useful for urban design to re-interpret the geometry of Barcelona's Eixample (Solà-Morales, 1978). It is true that today Cerdà could criticize the existing density, ten times higher than he proposed. Not surprisingly, the neighborhood unit for Cerdà was made up of twenty-five blocks. The question as to ideal urban density remains open. A minimum density is necessary to guarantee urban life, but "nothing gained by overcrowding", as R. Unwin wrote (1912). We regard the 400-meterrule as a guideline for the human scale in the city; however, density management depends on each individual culture or specific situation.

The Model and the Valley: Howard and Geddes' Echoes in the City-Region

"Today, it is sustainability which drives the new planning agenda", we read in *Towards an Urban Renaissance* (Urban Task Force 1999: 128). This report, led by Lord Richard Rogers, is recognized as a landmark for urban design at the beginning of this century. In its desire for a transition to sustainability, the report harshly rejected formless and deficient urban peripheries as a result of urban sprawl. However, for reshaping urban peripheries the report laid down as new the old polycentric model of the Garden City (Urban Task Force 1999: 25–26).

The regional perspective, in that report, is a scale reference for political action rather than the need to understand the city geography. The concept of "city-region" is practically absent: regional planning and urban planning seem to be two different activities. In fact, the meaning of Howard's Garden City model has a clear connection with the city's insertion in the territory. This is the reason why Osborn saw Unwin's replacement of the "Garden City" concept and its regional ambition with the easier idea of "Garden Suburb" as a betrayal (Osborn and Whittick 1963).

It is also possible to wonder why the most remarkable diagram among those proposed by Ebenezer Howard (1850–1928), his initially named "social city" (diagram 7, Howard 1898), does not appear in the second edition of his book. That extraordinary model, defined by a central city and six surrounding garden cities, with their middle spaces and connections, continues to fire the imagination of architects and planners. At least two factors must be taken into account: it is not a physical or spatial but a conceptual model; and it is not an urban scheme but a territorial concept. Howard was a social reformist with an outstanding concern for social justice and collaborative work. The city is the tool. With a tenuous geographical approach, he envisioned a healthier society with better working and living conditions in a singular intuition, his third magnet: the town–countryside symbiosis.

Close to that, with a pioneer ecological view, Patrick Geddes (1854–1932) also defended the regional perspective in spatial planning, today essential for city sustainability. Geddes considered

the city and its region, the human factors and the natural conditions and resources to be inseparable. The region embodied the organized knowledge of his "interdisciplinary perspective", in which the city is a human organization rooted in history and environment. He introduced the "regional survey" (Geddes 1911), affirming the foundation of (today sustainable) urban planning in local geography.

The regional approach was even recognized by the CIAM Charter of Athens, but it barely progressed until ecology acquired relevance in spatial planning. The Geddessian idea of the "city in its region" evolved, with Lewis Mumford and the RPAA, to the "city-region" concept (Luccarelli 1995). When Mumford introduced the first edition of "Design with Nature" (McHarg, 1969), he placed the book in a family whose origin was in the Hippocratic tradition of "Airs, Waters and Places". The Howard reformist perspective advanced in Geddes toward a "sense of place" determined by his relational thinking. The region is the sphere of human activities and relationships that create the city. Geddes and McHarg anticipated the current planning goals regarding the relationships between ecology, health and urban habitat.

The connection noted by Anne Whiston Spirn between the "valley sections" of these two Scottish planners (Spirn 2000) is apposite. It reflects a marvelous continuity of ideas. McHarg knew the work of Geddes, and he taught in Glasgow in 1952. However, Spirn remarks:

> Though McHarg does not acknowledge him as an influence, Geddes's "valley section" the model by which he organized his analysis of a city and its region… That Geddes's work, its aims and methods, prefigured much of McHarg's does not diminish McHarg's contribution, but failure to appreciate the importance of Geddes's work as a precedent is telling.
>
> *(Spirn 2000: 102)*

Indeed, this disconnection is revealing. They both advance in the same direction because they both share the need to go further in their common commitment to an integrated understanding of the city place. The river basin expresses the regional approach to read the city that unfolds in the valley. They did not have another alternative. Like a historian but also like a landscaper, Spirn perceives how intuition merges with knowledge in planning thanks to the ecological focus.

Howard, Geddes and McHarg anticipated, with others and in different ways, the approach to sustainability in cities from the regional dimension (Figure 2.8.3). Beyond historical continuity in planning ideas, the city's connection with its regional geography is a way to create a suitable spatial framework for the imagining of the urban.

The New and the Old in Historical Cities: Giovannoni's Legacy

It was François Choay who established the relevance of Gustavo Giovannoni (1873–1947) in European urban culture. To Choay, Giovannoni would be decisive in the invention of "urban heritage" (Choay 1999). Hardly known outside of Italy, his recovery has had to overcome the oblivion to which he was subjected after the Second World War because of his closeness to Fascism. The contradictions of the post-war understanding of urban heritage, in a period of reconstruction dominated by functionalism, increased the distance to Giovannoni's conservative approach to architecture and the city.

Highly cultivated, this architect, civil engineer and historian was also an important scholar of the University of Rome and a recognized heritage preservation and urbanism practitioner. Today he is mainly noted as a restoration theorist, with a remarkable role in the promotion of
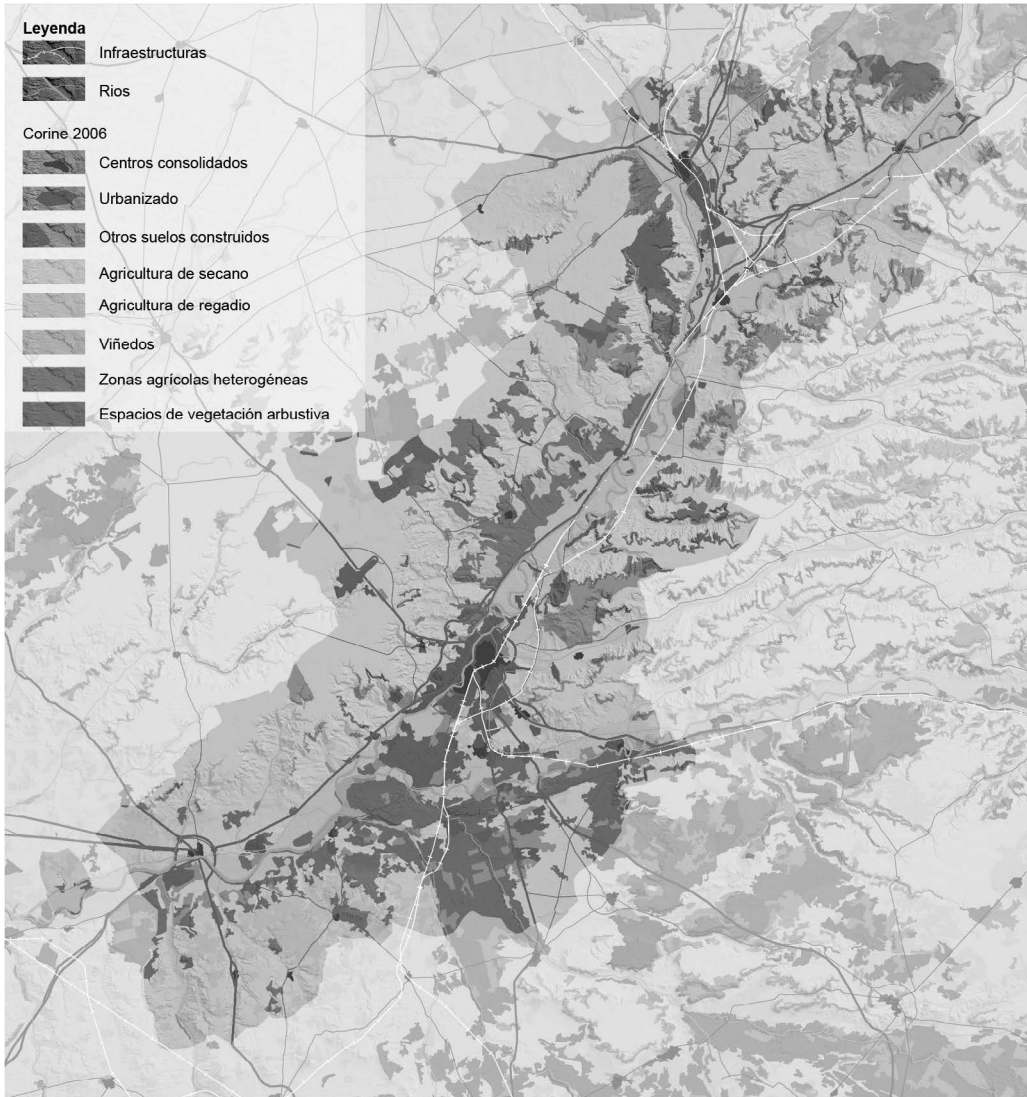
FIGURE 2.8.3 The Pisuerga Valley, in the Valladolid–Palencia industrial corridor (Spain). The "valley" as a field of territorial analysis remains from Patrick Geddes.

Source: Juan Luis de las Rivas and Mario Paris, 2013.

the first Charter of "*restauro*" (restoration), accorded in 1931 in Athens. But Giovannoni's vision about heritage was extended to the entire urban realm, with an innovative understanding of the role of historical centers in the future of Italian cities.

Modern urbanism had slowly permeated Italy in the 1930s. Italian urbanism during this period was dominated by the Fascist regime just before the war, marked by two contradictory experiences: planned towns, like the Agro Pontino new villages and the EUR in Rome, and an intense urban renewal in historical centers. The new urbanism is posed vis-à-vis historical revival. In the two cases, the scenery prevailed over the theoretical reflection.

Sabaudia is perhaps the best known of the newly founded rural towns created by the sanitation strategy (*bonifica*) for swampy areas in the Lazio Region. Several of the most relevant Italian

urban planners of the post-war period, like Luigi Piccinato, participated in Sabaudia. It had an advanced urban design, capable of adapting both the garden city and the German working-class neighborhoods to the Italian rural environment. At the same time, it introduced a peculiar rationalist space marked by the Italian monumental tradition. Meanwhile, Giuseppe Pagano and Edoardo Persico had proposed the "Programma, 1933" (Casabella, 1932), a prominent effort to decipher the new codes of modern architecture. All the contradictions between tradition and innovation emerged in the imposed monumentality of the more representative projects, with a simplified neoclassical style. Not in vain, for as Giovannoni expressed, "*the conciliation between modernization and conservation*" can only be possible from "*the base of solid competences and a deep culture*" (Finotto 2001: 228)

Since the end of the 19th century, hygienic laws had guided transformative interventions in the historical centers of Italy. This argument was maintained in order to justify destructive actions in the principal historical centers. The panorama was dominated by Marcello Piacentini and his followers: demolitions of the historical cities' cores, named "*sventramenti*" (destructions of the urban belly), for introducing the monumentality demanded by Fascism.

Far from this imposed urban renewal was the technique of "*diradamento*" (thinning out, the action of cleaning urban fabric) proposed by Giovannoni:

> He acknowledged the need for public health and circulation; as such, he was not against demolitions per se, but rather against the indiscriminate destruction of buildings. He developed guidelines for a more sensitive approach to the old urban core, specifying not only what should not be done but also what should be done.
>
> *(Zucconi 2014: 79)*

Very close to the idea of "conservative surgery" that Patrick Geddes had developed for Edinburgh's old town, *diradamento* offered an intermediate path between rigid conservation and simplistic renewal. In commitment to historical continuity, it was an urban program in which the restoration of historical buildings becomes compatible with the clearance of old slums. Working in the *Quartiere del Rinascimento* in Rome, around 1910, Giovannoni discovered in this selective tactic the convergence between building restoration and urban planning, in a city where modern planning perspectives were uncommon.

The book "*Vecchie città ed edilizia nuova*" (Giovannoni 1931) was the first modern handbook of urban planning in Italy (Finotto 2001). Giovanonni was worried about the adaptability of the existing cities to the new demands of mobility and the improvement of living conditions. As a result of his experience, he understood the city as a whole and discovered the need to recognize the role of history in its planning. It was not only love or nostalgia for Italian history, but the recognition of the complexity and the potential of the historical urban fabric in the future of the city (Saviero Muratori was one of his students). Like Geddes, Giovannoni viewed the historical city as "the ideal place for commingling old (through preservation) and new (through creation), at the same time that he sought to minimize the discord between art and technique" (Zucconi 2014: 79). If we keep a certain distance from his picturesque taste, his concept of "*ambiente*" is today a useful reference for sustainable regeneration projects. The correct translation of Italian *ambiente* is not exactly environment. The Italian concept is more perceptive, closer to the notions of atmosphere or ambience, better related to contemporary urban design.

Current historiography has rescued the idea of an alternative modernity, to which Giovannoni could be enrolled. His open vision of the future did not neglect his preference for the tradition of Italian architecture; however, stylistic factors apart, he was not an anti-modernist. The tactical
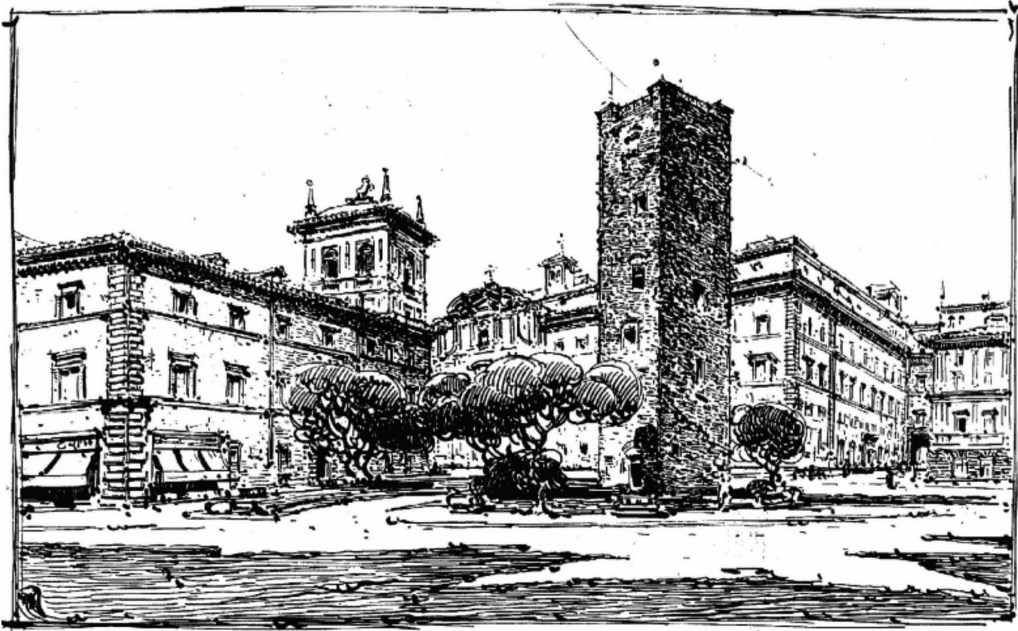
FIGURE 2.8.4 Isolation of a medieval tower named Sanguigna, intervention not performed. Drawing of Giovannoni for explaining the "*piano di diradamento*".

Source: Zucconi (2014: 80), Figure 2.8.2. Gustavo Giovannoni in "*Vecchie città ed edilizia nuova*", in Nuova Antologia, June 1, 1911.

tool of *diradamento*, with a selective attitude for dealing with ancient quarters, but also the strategic revision of old centers like vital spaces of integrated functions, maintain their topicality (Figure 2.8.4).

The historical urban fabric is, in its complexity and *per se*, a distinctive component of quality in our urban life, regardless of the heritage value of certain monumental fragments of the past city. As Choay pointed out, the contradictory debate between creativity and fidelity in cultural production has a particular mirror in the course of urbanization. The question about how the new appears in our existing cities will always be open. In the presence of Giovannoni, the expectations of sustainable urban regeneration will also be burdened with the unavoidable nostalgia.

Conclusive Hypothesis: Affinities Versus Long *Durée* in Urban Design

Today, issues such as sustainable mobility, energy efficiency, affordable housing, green infrastructure and smart governance dominate the debate on urban sustainability. However, the "Leipzig Charter on Sustainable European Cities" also contains a unique and non-innocent mention of "the necessity of a '*baukultur*' for the city as a whole":

> Baukultur is to be understood in the broadest sense of the word, as the sum of all the cultural, economic, technological, social and ecological aspects influencing the quality and process of planning and construction.
>
> *(Leipzig Charter 2017: 3)*

Planning history belongs to that *baukultur*. The main issue resides in discovering how the past can help us to think the future (Hein 2018). In episodes like the ones discussed here, there is a path of response: in the geometry and dimensions of proximity, with Cerdà, Buchanan, and Rueda; in the regional survey for supporting city planning, with Howard, Geddes, and McHarg; or in the selective interventions in the old urban fabric, understanding the city as a whole, with Giovannoni. These three urban concepts, here explained only in outline, belong to a specific design culture, a result of interaction between architecture, infrastructure planning and urban planning, and especially attentive with regard to public spaces and quality in the living environment. They represent the *long durée* of good ideas in planning and the potential connection between history, theory and practice in urban design.

For the Leipzig Charter, sustainable urban design must be integrated and inclusive. With emphasis, it ties "integrated urban development" to the priority of action in the "deprived urban areas". These preferences are very close to Cerdà, Geddes or Giovannoni. Sustainability is not only a program, a field of desire; it also has to be the scenario to improve urban design practices. Alongside the better urban experiences and good practices, Western *baukultur* is also an open archive into which we can inquire permanently.

Bibliography

Aalborg Charter (1994). *Charter of European Sustainable Cities and Towns towards Sustainability*, European Conference on Sustainable Cities & Towns in Aalborg, Denmark.

Alexander, C., Ishikawa, S., and Silverstein, M., (1977). *A Pattern Language: Towns, Building, Construction*. New York: Oxford University Press.

Bateson, G. (1972). *Steps to an Ecology of Mind*. Chicago: University of Chicago Press.

Brundtland Report (1987). *Report of the World Commission on Environment and Development: Our Common Future*. New York: United Nations.

Buchanan, C. (1963). *Traffic in Towns. A Study of the Long Term Problems of Traffic in Urban Areas (Buchannan report)*. London: H.M. Stationery Office.

Choay, F. (1980). *La règle et le modèle. Sur la théorie de l'architecture et de l'urbanisme*. París: Seuil Ed.

Choay, F. (1999). *L'allegorie du patrimoine*. Paris: Seuil Ed.

Commoner, B. (1971). *The Closing Circle. Nature, Man, and Technology*. New York: Knopf.

Daly, H. E., (1977). *Steady-State Economics*. Washington, DC: Island Press (2nd ed., 1991).

De las Rivas Sanz, J. L. (2019). *City turns toward Nature*, Territorio (Polimi-DASTU- Franco Angeli) n 88: 89–98.

Estapé, F. (Ed.) (1971). *Teoría General de la Urbanización, y aplicación de sus principios y doctrinas a la Reforma y Ensanche de Barcelona. 1867*. Barcelona: Instituto de Estudios Fiscales.

Finotto, F. (2001). *La città aperta. Storia delle teorie urbanistiche moderne*. Venice: Marsilio Editori.

Geddes, P. (1911). *The Valley in the Town*. Survey, no. 54.

Geddes, P. (1915). *Cities in Evolution. An Introduction to the Town Planning Movement and to the Study of Civics*. London: Williams & Norgate.

Georgescu-Roegen, N. (1971). *The Entropy Law and the Economic Process*. Cambridge, MA: Harvard University Press.

Giovannoni, G. (1931). *Vecchie città ed edilizia nuova*. Torino: UTET (re-edited by Francesco Ventura in 1995, Milan: Città studi).

Hein, C. (ed.) (2018). *The Routledge Handbook of Planning History*. Oxford, New York: Routledge.

Howard, E. (1898). *Garden Cities of Tomorrow*. London: Swan Sonnenschein and Co. (1898, *"Tomorrow: a Peaceful Path to Social Reform"*).

Leipzig Charter (2007). *Leipzig Charter on Sustainable European Cities*. EU, Member States' Ministers responsible for Urban Development.

Leipzig Charter (2017). *Ten Years after the Leipzig Charter*. Federal Institute for Research on Building, Urban Affairs and Spatial Development.

Leopold, A. (1949). *A Sand County Almanac, and Sketches Here and There*. London, New York: Oxford University Press.

Luccarelli, M. (1995). *Lewis Mumford and the Ecological Region. The Politics of Planning*. New York: Guilford Press.

McHarg, I. L. (1969). *Design with Nature*. New York: John Wiley & Sons (25th Anniversary Edition, 1995).

Mehaffy, M., Porta, S., Rofe, Y. and Salingaros, N. (2010). 'Urban', in: McHarg, I. L. (ed.). (1969), *Design with Nature*". New York: John Wiley & Sons (25th Anniversary Edition, 1995).

Mehay, M., Porta, S., Rofe, Y. and Salingaros, N. (2010). 'Urban nuclei and the geometry of streets: The "emergent neighborhoods" model', *Urban Design International* 15 (1), 22–46.

Michelsen, G., Adomßent, M., Martens, P. and von Hauff, M. (2016). 'Sustainable Development. Background and Context', in: Heinrichs, H., Martens, P., Michelsen, G. and Wiek, A. (eds.). *Sustainability Science. An Introduction*. Heidelberg, New York: Springer.

Nicolis, G. and Prigogine, I. (1977). *Self-Organization in Nonequilibrium Systems: From Dissipative Structures to order through Fluctuations*. New York: Wiley.

Odum, H. T. and Odum, E. C., (1980). *Energy Basis for Man on Nature*. New York: McGraw Hill.

Osborn, F. J. and Whittick, A. (1963). *The New Towns: The Answer to Megalopolis*. London: Leonard Hill.

Rueda, S. (2002). *Barcelona, a Mediterranean City, Compact and Complex. A Vision of More Sustainable Future*. Barcelona: Ajuntament de Barcelona & BCN Ecologia.

Rueda, S. (2019). 'Superblocks for the Design of New Cities and Renovation of Existing Ones: Barcelona's Case: A Framework', in: Nieuwenhuijsen, M. and Khries, H. (eds.) *Integrating Human Health into Urban and Transport Planning*. Berlin: Springer, 135–153.

Solà-Morales, M. (1978). *Los ensanches (I)*. Barcelona: Escuela Técnica Superior de Arquitectura.

Schrödinger, E. (1944). *What Is Life? The Physical Aspect of the Living Cell*. Cambridge, UK: Cambridge University Press.

Sonne, W. (2017). *Urbanity and Density in 20th-Century Urban Design*. Berlin: DOM Publishers.

Spirn, A. W. (2000). 'Ian McHarg, Landscape Architecture, and Environmentalism: Ideas and methods in context', in: Conan, M. (ed.). *Environmentalism in Landscape Architecture*. Washington, DC: Dumbarton Oaks.

Unwin, R. (1912). *Nothing Gained By Overcrowding!*. Westminster: P.S. King & Son - Garden Cities and Town Planning Association.

Urban Task Force (1999). *Towards an Urban Renaissance*. London: Department of the Environment, Transport and the Regions, UK (Chairman, Richard Rogers).

Wheeler, S. M. and Beatley, T. (2014). *Sustainable Urban Development Reader*. New York: Routledge.

Zucconi, G. (2014). 'Gustavo Giovannoni: A Theory and a Practice of Urban Conservation'. *Change Over Time*. 4 (1), 76–91.