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THE GRID

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Martin Dumont
Andrea Alberto Dutto

PART I

The essence of the norm is abstraction. As it is called upon to respond to indeterminate and undifferentiated cases, the norm is the result of an immense effort of synthesis of the infinite.

With the publication of *«L'esprit de loi»* (1748) Montesquieu formulates the principle of the separation of powers, delineating it as the foundation for building and managing a community. Fundamental to his doctrine is the concept of «spirit» or rather the contextual aggregate of climate, religion, laws, principles of government, past matters, habits, and manners that characterize a community. According to Montesquieu, a community prospers or declines in relation to the degree to which the laws are situated within or without the teleological structure of the whole. In other words, he argues that the legislative framework should grasp the infinite diversity of each community and align itself along the same purposes.¹

The aspiration of the Enlightenment to understand and classify complex subjects greatly influenced the methods and procedures of scientific observation. Cartography and geodesy – thanks to the advancement in mathematics, optics and instrumentation technology – was able to achieve a rational representation of the earth's surface at any scale. In 1801, the metric system became mandatory in France, being derived from an astronomical magnitude rather than anthropometry, thus allowing space to expand in an unlimited mental dimension. Benevolo observes that «the great territorial dimension is explored, no longer on the basis of a perspective perception, but rather in the abstraction of mental representation».² Where the formal appearance of architecture was concerned, however, the authors of the *«Encyclopédie»* (1751) still referred to the historical proportions and orders of classical architecture as a model for stable and abstract forms.

In fact, this paradox was not only present in Europe but was also at stake for the construction of the new American Republic. For the American nation, these concepts, typical for the Enlightenment, can be found in the personality of one of its founding father, Thomas Jefferson (1743–1826). As an architect, he supported the formation of American architecture based both on the universal imagery of classical antiquity as well as on the regional character of materials, climate and habits of the new continent. As a politician, he supported the formation of an

agrarian democracy organized by a strict but egalitarian land division system, collectively known as the Jefferson grid.

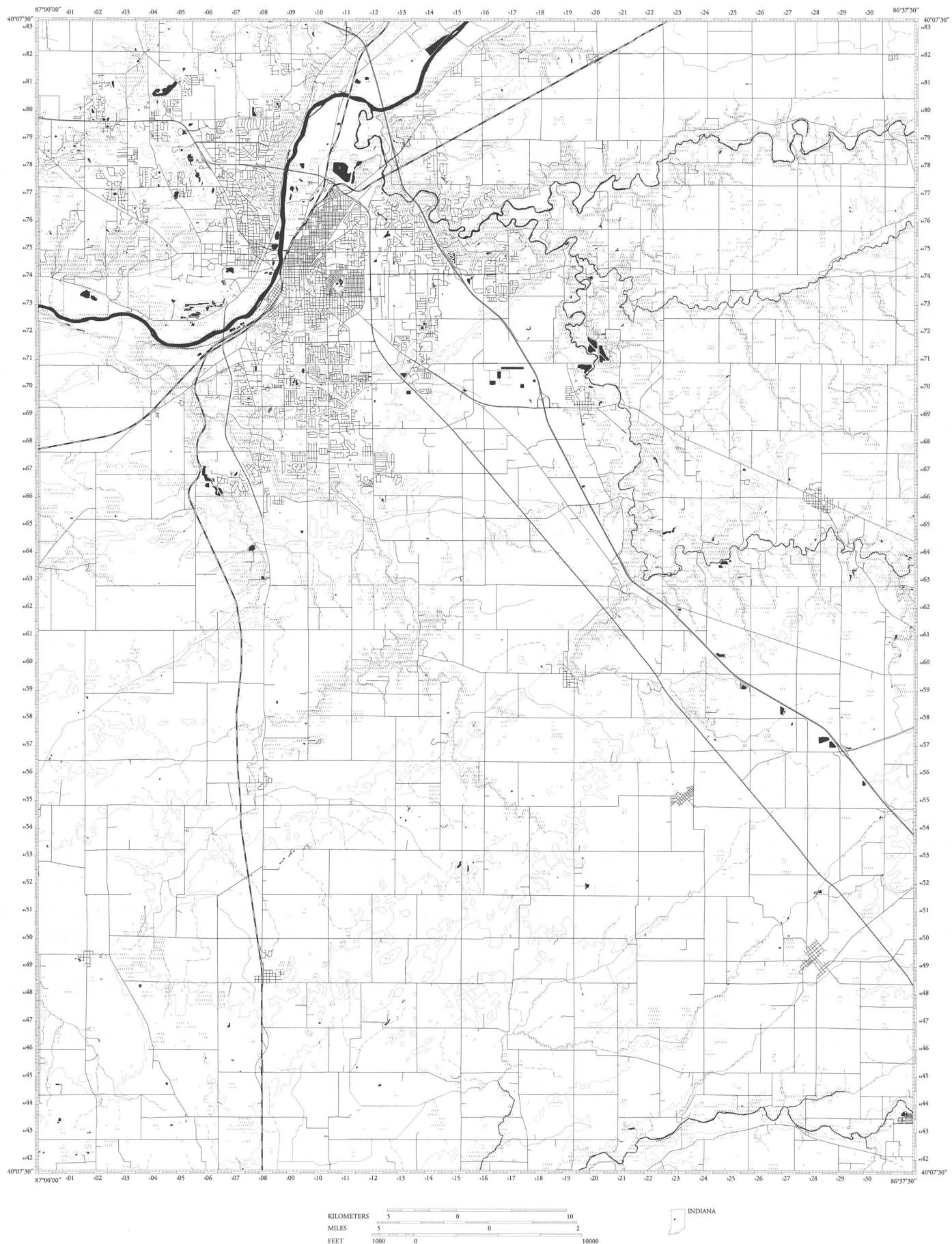
Another fundamental source of inspiration for Jefferson seems to have been the Roman *«centuriatio»*, in which surveyors had realized an imperial territorial division by means of a grid. But unlike this previous model, Jefferson's grid did not consider a gradual adaptation to the morphology of the territory; rather, it was a rational tool for charting and organizing an immense unexplored territory. As Montesquieu affirmed about laws, Jefferson's grid embodied the expanding «spirit» of a new nation through the employment of abstraction.



Map showing the original thirteen colonies and the new territory gained after the Treaty of Paris in 1783. This territory was soon to become twice as large with Jefferson's purchase of French Louisiana in 1803.

PART II

Shortly after the American Revolutionary War (1775–1783), the federal government acquired a vast area of land situated west of the original thirteen colonies. Stretching from the 31st parallel to the Great Lakes until the Mississippi River, this territory constituted one of the main concerns of the young American Nation. The key issue revolved around organizing this uncharted land for governance and exploitation.³ For Jefferson, it was clear that the values of the young nation had to be embodied in the organization of its territory. A staunch defender of Enlightenment philosophy, he was convinced that only a constructed image of reason would be able to unify the heterogeneous society of the United States. In Tafuri's words, the reconciliation of the *«mobility of values»* (individual impulse) with the *«stability of principles»* (the federal government) could be achieved by supplanting any transcendental references with the expression of reason.⁴ In this respect, it is not surprising that Jefferson resorted to geometry, mathematics and geography as the basis for constructing a *«radical America»*.



With this belief, Jefferson directed a series of reports and ordinances that were responsible for the definition of new political entities and the conception of methods for the organization, occupation, and distribution of the land. The goal was to institutionalize, as fast as possible, an operative system that would not only determine the borders of new states but also define how these states were to be subdivided in order to assert and occupy the land. The report of 1784, the «Northwest Ordinance» of 1784 (approved in 1787) and the famous «Land Ordinance» of 1785, laid the foundations on which the entire American territory would be organized.⁵ It is not by chance that the successive reports and ordinances established under the leadership of Jefferson were deeply influenced by his political philosophy.

PART III

Although he never really was a man of the countryside, Thomas Jefferson expressed a strong critique of the city and an unconditional preference for the agrarian way of life throughout his life. In addition to 18th century British thinkers, Jefferson was deeply influenced by the Latin writers of antiquity; in all probability, his rural ambition came from his knowledge of Marcus Porcius Cato's treatise on agriculture «De Agri Cultura» (160 BC). Cato considered the rural life outside the purely poetic realm focusing on the logic of profit; the hard rural life enabled the achievement of economic well-being as well as the moral upbringing of mankind.

According to Jefferson, cities were «pestilential to the moral, the health and the liberties of man»⁶, they were places of corruption and political exploitation. Jefferson's praise of the country is clear in a famous passage from his Notes on Virginia: «Those who labor in the earth are the chosen people of God, if ever he had a chosen people, whose breast he has made his peculiar deposit for substantial and genuine virtue. It is the focus in which he keeps alive that sacred fire, which otherwise might escape from the face of the earth. Corruption of morals in the mass of cultivators is a phaenomenon of which no age nor nation has furnished an example.»⁷ Therefore landowners who lived in the countryside and tilled their own land were the only ones to have the necessary economic and moral independence to be entrusted with the responsibility of the vote. Since cultivators were the most «valuable citizens» and the best guardians of democracy, Jefferson logically provided all the possible means to achieve a nation

of small educated farmers blessed with free institutions. Access to land property and decentralized power became the tenets of Jefferson's political philosophy.

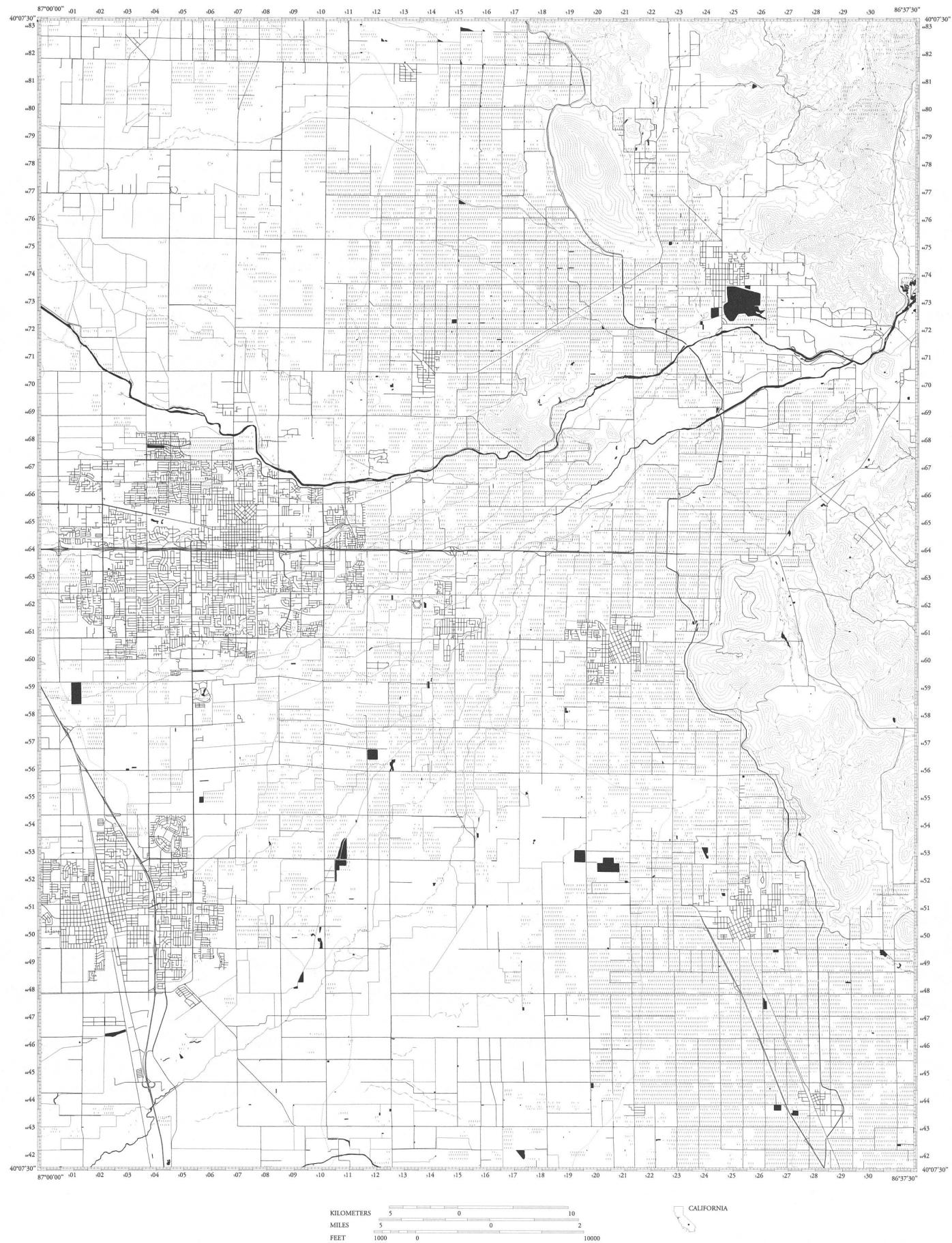
The formal means with which Jefferson hoped to achieve an agrarian democracy was through organizing the federal territory into small political entities with a local political autonomy, an agrarian economy and restrained industrial development.⁸ Once spread over the whole country, Jefferson's final intention was to use the self-sufficient farmers to make the United States economically independent from Europe. In such an economic organization there was simply no need for large cities. This utopian belief in a pure agrarian order was put forward by Jefferson in what is known today as the «Township Grid».



Diagram showing the subdivision of the grid in Townships and Sections.

PART IV

After several modifications of Jefferson's original proposal⁹, the so-called «Land Ordinance» was finally voted on May 20th, 1785. This act officially initiated the system of land division that still today shapes the entire American territory. The system was based on the subdivision of every State into «townships» of thirty-six square miles (9320 hectares), themselves divided into «sections» of one square mile (259 hectares). The «township» and «section» were delimited by straight lines following geographic meridians and parallels and traced with a compass. The use of navigation techniques was deemed the most accurate method to survey and organize a vast territory that



was still completely unknown. Moreover, referring to a geographic coordinate system was a way to legitimize the tracing of *townships* and *sections*. Citizens and local authorities could easily verify the exactitude of the grid and thereby avoid land conflicts. Once again science in the form of geography, mathematics and geometry came to support the construction of the new civil society.

The *Land Ordinance* did not only describe the methods by which the territory was to be organized but also provided the means for implementation. In its wake the *Office of Geographers of the United States* was founded, which was in charge of supervising the survey and transmitting the plans to the government. Furthermore, the office designated a land surveyor that would direct operations in the field.

The first realization of the ordinance started in Ohio with the famous Seven Range survey, followed by six other surveys in rapid succession. However, different interpretations of the norm, the lack of precision of the surveyors' tools and the successive modifications of the *Land Ordinance*¹⁰ led to a patchwork of different patterns with no correspondence between each other. To overcome this problem Jefferson, who had become President in 1801, named the mathematician Jared Mansfield as the head of *Office of Geographers*. Mansfield complemented the system with two geographical lines, the so-called *principal meridian* and the *base line* that were to serve as the new common reference for the spreading of the grid. For every new State, the *principal meridian* and the *base line* now became the compulsory axis on which the land surveyor based his subdivision of the land.

At this point a more fundamental issue appeared, namely how to apply an orthogonal grid on a sphere. Since geographical meridians converge toward the poles, the grid could never be perfectly orthogonal with equal *townships* squares. To face this problem, the *Office of Geographers* introduced *correction lines*. These lines, regularly placed parallel to the base lines, stopped the tracing of the grid from lower latitudes and became the new references on which to base the survey. This system ensured that the *townships* would have the same dimension from Louisiana to Minnesota and from California to Indiana.

It took more than a century for surveyors to reach the West coast of the United States. It was only in 1910 that the profession of state surveyor was canceled by

Congress which judged that not enough land remained uncharted to keep it. The grid that at first had only existed on paper had now been little by little inscribed on the territory. Today the grid shapes the American landscape and constitutes its most important characteristic.

PART V

Jefferson's architecture and planning techniques were closely related. Both disciplines were gathered in his ideal project for the a new republican environment. Classical architecture was no longer considered an all-encompassing institution, as contemporary European Baroque developments showed a strong inefficiency towards the urban environment. Despite this, Jefferson continued to appreciate Classicism as an appropriate reference for American's public buildings, while his territorial grid centered on the efficiency and functionality of the territory. This complementarity between planning and architecture bears on Jefferson's philosophical principles of *formal* (*emotional*) and *functional* (*rational*) beauty.¹¹

The concept of *formal* beauty addressed the sense for architectural proportions and ornaments (*symmetry and taste*) that belongs to classical monuments. Jefferson stressed the fact that facades of the new buildings could inspire a sense of uniformity and elegance. Education to formal beauty became a fundamental responsibility of administrators. Through the image of public buildings they would educate and «improve the taste of countrymen, to increase their reputation, to reconcile them to the respect of the world and procure them its praise».¹² On the other hand, the concept of *functional* beauty focused on rational faculty and utility. In architecture the plan was meant to achieve the most convenient and efficient interior spaces distribution, while in planning cartography lead to a rational and democratic partitioning of the territory. Both representations were considered abstract and separate from the domain of *emotional* perception.

From an operative perspective, both the domains of the *formal* and the *functional* had a specific role for Jefferson in the design process. In fact, he conceived building plans and elevations separately, even referring to both of them as separate models that were often altered during the process, to the point of becoming new prototypes. Indeed, the *Land Ordinance* of 1785 could be considered the first new



prototype for a grid at the scale of an entire territory since the Roman *«centuriatio»*. Theorized by the Roman surveyors of 1st–2nd century BC, it consisted in the orthogonal division of Mediterranean agrarian land and layout of roads and alignments. Like the American society of the 18th century, the Roman state attempted to balance its internal politics and economic situation through the distribution of vast tracts of agricultural land. (In this context it should be noted that this model stands in marked contrast to the democracy of ancient Greece, which defined itself through the urban *«polis»*.) Comparing the Roman and American model leads to some conclusions concerning the fundamental aspects of the geographical grid.

The geographical grid is the most radically laconic expression of the social and political structure of a society. The crossing points of Roman *«centuriatio»* were located to directly coincide with or near a city center. This strict relation with urban settlements was based on the rigid hierarchical structure of society, as the ruling class was located in the city while the rest of the settlers were scattered throughout the territory. In contrast, the democratic ideal of Jefferson about the emerging American society concerned the homogeneous distribution of the land. Therefore, the shape of the American grid can be perceived as uniform and devoid of a center, whether urban or ceremonial. The economic and moral value of the city as a center are denied.

Transposing the geographical grid from cartographical to physical space might induce its own disintegration. While Jefferson's two-dimensional rectangular grid collides with the three-dimensional sphere of the earth, this issue is already tackled by in the *«centuriatio»* by progressive adjustments and morphological adaptations to the earth surface. The orientation of their grid considers the shape of the territory in addition to astronomical orientation. On the other hand, the adjustments of the American grid first operate at the scale of an individual *«township»* or that of its multiples. In both cases the shape of the grid appears compromised.

The geographical grid maintains its abstraction and absoluteness limited to the space of cartography. Its aesthetic purpose was not considered by Jefferson and it took more than a century before the grid emerged in both the work of the avant-garde and figurative art.

- 1 For an in-depth analysis on Montesquieu's thought and his concept of *spirit* see Bernard Groethuysen, *Filosofia della rivoluzione francese*, Milano: Il saggiajore 1967, pp. 133–153.
- 2 Leonardo Benevolo, *La cattura dell'infinito*, Cambridge / Massachusetts: The MIT Press 1967, p. 154.
- 3 In fact, the government was facing huge pressure from a population that wanted to establish itself on the frontier. Moreover exploitation of this territory was required to finally reward the soldiers who had fought in the War of Independence.
- 4 Manfredo Tafuri, *Architecture and Utopia, Design and Capitalist Development*, Cambridge / Massachusetts, The MIT Press 1976, p. 28.
- 5 John William Reps, *The making of Urban America: A history of city Planning in the United States*, Princeton: Princeton University Press 1965, pp. 294–324.
- 6 It must be said that Jefferson address his most virulent attack against the city during the late period of his stay in Paris. Seven weeks before the outbreak of the French Revolution, Paris was the scene of daily tumults and riots. Quotations out of Paul Leicester Ford (ed.), *The Writings of Thomas Jefferson*, New York: G.P. Putman's Sons 1892–1899, vol. VII, p. 459.
- 7 Ibid. vol. III, pp. 268–269.
- 8 Jefferson thought that the abundance of land could provide enough jobs for American citizens and that important manufacturers should rather remain Europe. It is important to note that regarding this statement, Felix Aeppli argues that «before leaving for France, Jefferson came to realize that this theory of agrarian democracy was not the way to economic independence, but that, far away from the economic scene of America, he returned to his purely agrarian view». Felix Aeppli, *Thomas Jefferson: The urban critic*, Zurich: Faculty of Art of the University of Zurich 1975, PhD thesis, p. 52.
- 9 For a complete description of Jefferson's original proposal see: Catherine Maumi, *Thomas Jefferson et le projet du Nouveau Monde*, Paris: Editions de la Villette 2007, pp. 71–98.
- 10 L.P. Conseil, *Mélanges politiques et philosophiques extraits des mémoires et de la correspondance de Thomas Jefferson*, Paris: Paulin Librairie Editeur 1833, tome 2, p. 217.
- 11 For the evolution of the Land Ordinance see Catherine Maumi, Ibid. pp. 83–108.
- 12 K. Hafertrepe, *Thomas Jefferson's Idea of Beauty*, in: *Journal of the Society of Architectural Historians* (2000), vol. 59, No.2, pp. 216–231.

Illustrations: Martin Dumont and Andrea Alberto Dutto

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