DL: Well it's evidenced by people's interest. Nobody said that people should go there in the millions, and had it been just a regular memorial with some big office buildings in the center, I think people would not have come. I think there's a renaissance because, globally, people are interested in cities and in interesting places. And this is not an orthodox place, it's an unusual place in every way. It's unusual, in any city, to have a connection to memory that also develops a sense of something new.

DH: Is this sense of a renaissance different in New York than it is in Europe or Asia?

DL: No, I think it's global. I think people have rediscovered that cities are not luxuries, that they need cities, that the world will not survive if we just continue exploiting nature and building indiscriminately. There's got to be a new idea of the future. Today there's a return to the creativity of the city. I think that's something that began globally with Ground Zero, because it was kind of a gong for the public. Originally there was no competition for the site. They had invited local architects to give them different ideas, and the Port Authority was going to decide, just kind of do their own thing. But the public interest in the site, by the people of New York, and even globally, drove the Port Authority to places they never thought they would go to implement a scheme. That was not their original idea at all. The design study was not even called a competition. It showed the mobilization of public interest. But people don't stay interested forever in a master plan. As long as people are interested, a project is protected. The minute the public loses interest, the politicians and others take over. That's inevitable in any city, but it was a very interesting phenomenon here.

DH: Before we wrap up, is there anything else you would like to say about your role in the project now or anything else you'd like to add?

DL: When I said in the beginning, many years ago, that I'll outlast all of these politicians and governors, it's actually true. I'm virtually the only one remaining who knows the history of the site because new people have come in. That's the nature of a long-term project. But it's kind of interesting to contemplate because, unlike a building or a large project, you have to have true faith to do a project like this. You can't just do it by your mood. You have to be a marathon runner. I'm a believer in New York and a believer in struggle. You don't get everything you want, there are compromises. But compromise is not a dirty word. It's not the aggressive one who is the winner, it's those who are able to cooperate. I would have never expected all these characters to come together with such solidarity to do something good on this site. It might not be perfect, but it's a far cry from what people thought it would be, and it's pretty close to the intent, absolutely.

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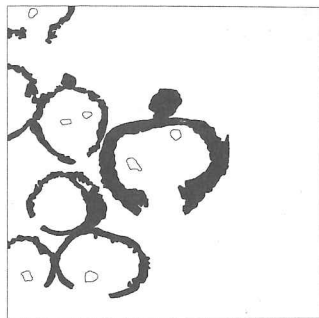
Pier Vittorio Aureli

Appropriation, Subdivision, Abstraction: A Political History Of the Urban Grid

1. I do not intend to search for the "origin" of the grid, and thus I don't want to repeat here the universalizing and "diffusionist" interpretation of the urban grid made by previous historical accounts such as the seminal 1946 study of the grid by geographer Dan Stanislawski. My intention is to trace a possible genealogy of the kind of urban grid that originated as a system of land subdivision and later became instrumental in enforcing the regime of property that emerged with modern Western colonialism, which is arguably the basis of modern and contemporary capitalism. See Dan Stanislawski, "The Origin of the Grid-Pattern Town," *Geographical Review* 36, no. 1 (January 1946): 105–20; for a critical account of Stanislawski's history of the grid see Reuben S. Rose-Redwood, "Genealogies of the Grid: Revisiting Stanislawski's Search for the Origin of the Grid-Pattern Town," *Geographical Review* 98, no. 1 (January 2008): 42–58; for a general cultural history of the grid see Hannah B. Higgins, *The Grid Book* (Cambridge: MIT Press, 2009).
2. See A. Nigel Goring-Morris and Anna Belfer-Cohen, "A Roof Over One's Head: Developments in Near Eastern Residential Architecture Across the Epipalaeolithic-Neolithic Transition," in *The Neolithic Demographic Transition and its Consequences*, ed. Jean-Pierre Bocquet-Appel and Ofer Bar-Yosef (Berlin: Springer, 2008), 239–86. See also Kent V. Flannery, "The Origins of the Village as a Settlement Type in Mesoamerica and the Near East: A Comparative Study," in *Man, Settlement and Urbanism: Proceedings of a Meeting of the Research Seminar in Archaeology and Related Subjects Held at the Institute of Archaeology, London University*, ed. Peter J. Ucko, Ruth Tringham, G.W. Dimbleby (London: Duckworth, 1972), 23–53.

The urban grid is perhaps the most ubiquitous and resilient method of spatial organization in history: from cartography to urbanism to architecture, we see, understand, and construct our world by inscribing it with grids. While the grid has been amply discussed as a formal, functional, and cultural figure, its political significance remains opaque. To trace the political history of the urban grid is to question, in general terms, the possibility of defining the grid not as a form but as a spatial apparatus. In a provisional attempt to define the grid spatially, I argue that it first and foremost consolidates land appropriation through subdivision. Of course, this general definition does not imply that all grids have one origin or purpose.[1] The use of the grid can be seen in many different contexts and civilizations, and each instance presents very specific characteristics. However, I will try to show how the common thread that links many examples is the shared goal to organize the space of collective living through a clear subdivision of land ownership. In doing so, I want to challenge the conventional reading of the grid as a system of distribution and circulation, and instead highlight its crucial link to the organization of land possession, which in some parts of the world ended up as property. As archaeologists have noted, the rectilinear subdivision of land appeared for the first time with the rise of sedentary societies whose main concern was twofold: to give a permanent form to their possession of land and to define a template for coexistence.[2] In subdividing the land, the grid abstracted the relationships between man and man and between man and land into a readable and measurable form whose antithesis to nature was immediately recognizable. Yet, in the course of history, this highly artificial

Plan of Natufian Dwelling, Nahal Oren, Israel, 11500–10000 BCE. Drawing courtesy the author.

3. Rosalind L. Hunter-Anderson, "A Theoretical Approach to the Study of House Form," *For Theory in Archaeology: Essays on Faunal Remains, Aquatic Resources, Spatial Analysis, and Systemic Modeling*, ed. Lewis Roberts Binford (New York: Academic Press, 1977), 287–315.
4. See Ofer Bar-Yosef, "The Natufian Culture in the Levant, Threshold to the Origins of Agriculture," *Evolutionary Anthropology* 6, no. 5 (1998): 159–77.
5. Kent V. Flannery, "The Origins of the Village Revisited: From Nuclear to Extended Households," *American Antiquity* 67, no. 3 (July 2002): 421.

system ultimately naturalized the possession of land to the point that we now take for granted that the urban world is an immense grid of lines that parcels the earth into myriad indoor and outdoor enclosures.

Thus the grid is a spatial apparatus that consolidates appropriation and subdivision into a permanent system through which many sedentary societies impose their order on the land. Yet the grid also translates appropriation and subdivision into the abstraction of measurement, through which land becomes a quantifiable item. As a social force, abstraction is therefore the mechanism that transforms the grid from an order first traced on the ground to an apparatus whose ordering impact invests in and orients the totality of human relationships.

1. Subdivision

The act of subdividing space with rectilinear lines goes back to a fundamental shift in prehistoric forms of life, from circular to rectangular house layouts.[3] It is impossible to reduce this transformation to a certain place and moment, as it occurred in many different places and at different moments in time. But one can argue that this shift often coincided with the gradual beginning of sedentary life, a process that is ongoing in many parts of the world.

What is at stake in the shift from the circular to the rectangular house? To answer this question it is useful to look at the remains of Natufian residential structures. As a "complex foraging society," the Natufians of Palestine and southern Syria occupied a unique position between two distinct forms of life: the nomadic existence of hunter-gatherers and the sedentary life of farming communities (12500–9500 BCE).[4] Natufian dwellings were built into hillsides and consisted of circular stone walls and timber posts that supported a roof made of organic material. Notably, Natufian dwellings did not present any internal subdivision. The houses were loosely aggregated to make the best of the topography, which made for many interstitial spaces between them. Kent V. Flannery suggests that societies such as the Natufian had little incentive to produce food resources because whatever was reaped had to be shared.[5] This means that their dwellings were simple structures, each inhabited by groups of a few people. Things changed with the consolidation of sedentary life. For example, at the Neolithic site of Byblos (8800–7000 BCE) dwellings are arranged in a seemingly scattered pattern, but the houses have a rectilinear form with rounded corners that seems to be motivated by a more efficient use of the interior as a permanent space.

6. Ibid., 424.
7. E.B. Banning, "Housing Neolithic Farmers," *Near Eastern Archaeology* 66, no. 1–2 (March 2003): 4–21.
8. Hunter-Anderson, 297.
9. Erhan Bıçakçı, "Çayönü House Models and a Reconstruction Attempt for the Cell-plan Buildings," *Readings in Prehistory: Studies Presented to Halet Çambel*, ed. Halet Çambel (Istanbul: Graphis, 1995), 101–25.

Indeed, with the human passage to sedentary life, the house becomes not only a place for living but also for accumulation. The rectilinear form is easier to subdivide than the interior of a circular dwelling. Flannery maintains that where people inhabited circular huts, storage was shared outside of the buildings, but with the rise of rectangular houses, storage was "privatized" inside the dwelling.[6] The rise of sedentary life is connected to the development of agriculture, which led to increases in productivity and a need to store the surplus production. It has also been observed in different parts of the world that with the rise of surplus production there is a shift from the nuclear to the extended family, because increased productivity can only be achieved by larger groups of people.[7] This also means an increasing complexity in the spatial organization of the house, which now includes different rooms. In hunter-gatherer cultures, many activities took place outside the house, but with the development of sedentary communities, the house becomes a space for multiple activities often performed simultaneously. In her seminal study of domestic form, archaeologist Rosalind Hunter-Anderson defines the rectangular house form as a "warebox" whose function is to contain its contents in an orderly manner.[8] This warebox is subdivided into rooms, each potentially hosting a different activity or function.

The Neolithic rectangular house thus became a storage space with an internal complexity that mirrored the social complexity of developing farming communities. Its form eases the process of subdivision, and facilitates the addition of new spaces, thus allowing dwellings to be more adaptable and to evolve with communities. It is in this process of internal subdivision of the house that an early incarnation of the grid as a subdividing apparatus takes place.

In many examples found in the Near East, rectangular storage is often the very structure upon which the house was built. This is clearly visible in Neolithic cell-plan buildings found in Çayönü, Turkey (6000 BCE), where the house was probably built with mud bricks laid on top of a stone basement. The basement is subdivided into small cells that archaeologists have interpreted as storage spaces.[9] In the remarkable archaeological site of Tell Sabi Abyad in northern Syria (6000 BCE), the architecture of storage as a warebox influences not only the organization of the household but of the village itself. The heart of the village was dominated by a large-scale storehouse made of pisé walls that enclosed a large number of cubicles. This building was most probably used as centralized

10. Peter M.M.G. Akkermans and Marc Verhoeven, "An Image of Complexity: The Burnt Village at Late Neolithic Sabi Abyad, Syria," *American Journal of Archaeology* 99, no. 1 (January 1995): 5–32.

11. E.B. Banning, "Housing Neolithic Farmers," *Near Eastern Archaeology* 66, no. 1/2 (June 2003), 4–20.

12. A form of planning that involves one comprehensive grid, from the rectilinear subdivision of the house to the organization of the entire settlement, can be seen in one of the earliest known examples of a gridiron city: Mohenjo-Daro in Pakistan. This city, which was part of the Indus Valley Civilization, is made of rectangular houses divided by a quasi-orthogonal system of alleys. It is believed that the growth of settlements in the Indus Valley Civilization was linked not just to agriculture but also to trade. This economic condition was reflected in the growing need for work and storage spaces and it is reasonable to think that the gridlike subdivision of houses accommodated these functions in the most efficient way possible, to the point that the gridiron of the house was extended to the block and then to the city. See Robin Coningham and Ruth Young, *The Archaeology of South Asia: From the Indus to Asoka, c. 6500 BCE–200 CE* (Cambridge: Cambridge University Press, 2015), 183–95.

13. See Mario Liverani, *Uruk: The First City*, trans. Zainab Bahrani and Marc Van De Mieroop (Sheffield: Equinox Publishing, 2006).

14. Ibid., 34. See also V. Gordon Childe, "The Urban Revolution," *The Town Planning Review* 21, no. 1 (April 1950): 3–17.

15. See Mario Liverani, *The Ancient Near East: History, Society and Economy*, trans. Soraia Tabatabai (London: Routledge, 2014), 61–81.

storage for the community.[10] It is interesting to note that the structure is akin to circular plan structures that were likely used for storage.[11] The two types found at this site may be indicative of the transition from circular to rectangular forms, but the prevalence of the rectangular plan shows that when it came to organizing storage space, orthogonal subdivision was preferred. Moreover, the quasi uniformity of the cubicles' size may be related to the fact that they were not just deposits but also a method of quantifying surplus production. Large-scale storage implies a centralized authority able to both build such a structure and manage its content. From early Neolithic sedentary dwelling, we can see how subdividing rectangular spaces into rooms implies some form of planning, which gradually extended from the house to the village.[12]

The rise of agriculture as a surplus-creating economy manifested itself not only through the subdivision of houses and settlements but also through the parceling of rural territory into rectangular fields. This process was documented in Mesopotamia just before the rise of Uruk, known as "the first city."[13] Around 4000–3500 BCE, population growth gave rise to an outburst of technological innovation in cultivation, including the parceling of rural territory into long strips of land perpendicular to canals. This system allowed for efficient irrigation of the land and aided the animal-drawn plow because it reduced the frequency of the animal's rotation. The making and maintenance of this rectilinear hydraulic system, which caused agricultural production to skyrocket in Mesopotamia and led to what archaeologists called the urban revolution, required a large-scale agency for which the subdivision of land into fields soon became a fundamental unit of measure.[14] Through this example we can see how large-scale surplus agriculture and rectilinear subdivision are part of the same system of geometric regularity that allowed a centralized authority to relate the extension of plots of land to quantities of labor and product. According to archaeologist Mario Liverani, the new scale of economic transactions fueled by agricultural surplus required a more objective and impersonal system based on counting and measuring, which was meant to give concrete value to commodities, labor, time, and land.[15] The definition of surplus as the quantity that remains after subsistence is satisfied has always implied systems of measurement in order to give this surplus a precise economic value. It is not by chance that early forms of writing are related to bookkeeping for the production and distribution of agricultural produce and cadastral records. In tablets found in
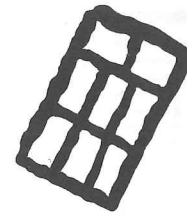
Plan of cell-plan building, Çayönü, Turkey, 8250–5000 BCE. Drawing courtesy the author.

16. Herodotus, *The Histories*, trans. Aubrey de Sélincourt (London: Penguin Classics, 2003), 95.

17. Alfred Sohn-Rethel, *Intellectual and Manual Labour: A Critique of Epistemology*, trans. Martin Sohn-Rethel (Atlantic Highlands, NJ: Humanities Press, 1978), 90–91.

18. Nadine Moeller, *The Archaeology of Urbanism in Ancient Egypt: From the Predynastic Period to the End of the Middle Kingdom* (New York: Cambridge University Press, 2016), 249–300.
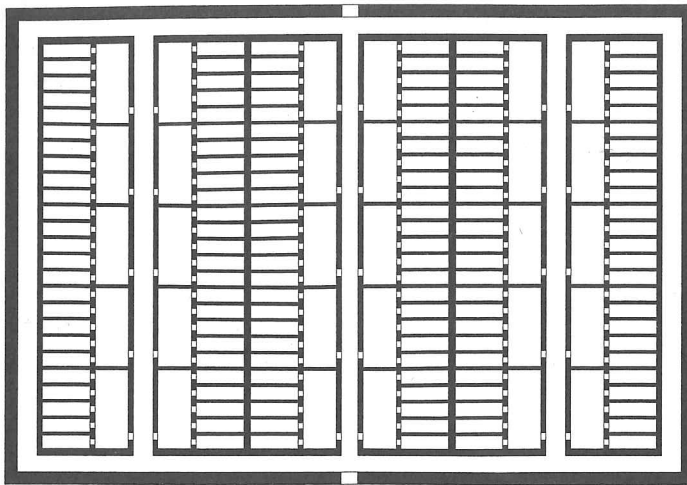
Mesopotamia, the organization of the writing – pictographic signs inscribed in rectilinear strips – seems almost to replicate the linear organization of the fields' cultivation. Rectilinear subdivision becomes a dominant feature in the organization of the Temple Complex of Eanna Precinct in Uruk, an unprecedented monumental architecture whose development began in the fourth millennium BCE. In Mesopotamia, we see a logic in which rectilinear subdivision starts to develop the spatial organization of society at different scales: from irrigation to monumental architecture to writing. From those examples, we can also see how rectilinear subdivision as a general principle marks the rise of societies characterized by a strong tendency toward political unification and economic accumulation.

2. Colonization

In narrating the origins of geometry, Herodotus explains how, in ancient Egypt, the pharaoh's officials stretched a measured rope over land to lay out areas for building dams, granaries, temples, and, most important, to parcel out the soil when it reemerged from the Nile's seasonal flood.[16] The philosopher Alfred Sohn-Rethel remarked that this technique of measuring and parceling out was invented not for the sake of the cultivators but for reassessing the peasants' tributes to the pharaoh after a flood.[17] Geometry may have been invented before Egyptian civilization, but Herodotus's explanation of its origins reminds us how measuring and imposing an intelligible order on the land is linked with the ability to quantify land and attach an economic value to it. In parceling out rectangular plots of land, the ancient Egyptians perfected the use of the right angle, a feature that would become dominant in every aspect of Egyptian urbanism, from architecture to settlements.

As archaeologist Nadine Moeller writes, during the Middle Kingdom the pharaohs and state officials took a deep interest in settling communities along the Nile Valley in places where they would function as colonies of the state.[18] These colonies were conceived of as towns to house workers for specialized labor, such as cultivating the fields, working at quarries, or building funerary complexes. The most striking feature of these settlements was their strict orthogonal geometry, which was often based on the repetition of a module. In some cases the module is the household unit, which gives unprecedented geometric consistency to these settlements. The most remarkable examples of these planned towns are found at Tell el-Dab'a in the Nile delta and Kasr es-Sagha in

the northern Fayum region, both built in the second millennium BCE. In these two settlements, orthogonal geometry dominates everything, from the use of modular mud brick to the predefined domestic layout to the organization of the settlement as a grid of perfectly rectilinear walls. This strict geometric order was motivated not only by the desire for efficiency in building but also by state officials' need to strictly control the reproduction of the labor force – an extremely important aspect of state governance.[19] In Egyptian urbanism, rectangular subdivision was thus instrumental in defining a form that would integrate workforce and household as a coherent whole, a kind of social factory in which not just work but life itself is rigidly disciplined.[20]

For this reason I would argue that the planned workers' settlements of ancient Egypt can be seen as an early incarnation of an urbanism that we can define as colonial.[21] The word *colony* comes from the Latin *colere*, which means to cultivate. The Latin term also refers to ancient Rome's tendency to encourage veterans to settle on and cultivate newly conquered land as a way to occupy it. A colony is thus not just a form of military occupation but also – and especially – a form of civilian appropriation of land mobilized by a state in order to expand its political and economic power. The regularity of form that characterizes colonial settlements is a consequence of the fact that colonial appropriation – the origin of many state formations – requires planning before construction. Colonization often involves the mobilization of a large number of people in a potentially hostile territory, thus it is only effective when there is efficient and swift management of resources. For this reason, the history of colonial

appropriation, from the early gridiron cities in the Indus Valley, built in the third millennium BCE, to the conquest of the Americas beginning in the 16th century, coincides with the history of the grid. The grid provides a spatial template for coordinating planning operations at different scales, from household unit to settlement to the efficient division of land.

The colonial logic of the urban grid was perfected in the ancient Greek civilization, which, since the first half of the first millennium BCE, had made colonization its method for founding cities. Even though this civilization was a constellation of autonomous city-states that never became an empire, many poleis were active in founding colonies across the Mediterranean basin.[22] Unlike the "mother cities" that grew organically over long stretches of time, colonial cities were built in a relatively short time, which required many of them to be planned. The planning of these colonies was often achieved by imposing a grid of paths on the site to divide the land into equal plots. Because establishing colonies was a risky business, it could only be sustained by rewarding the participants with a plot of land. The Greek colonial gridiron was influenced by the principle of *isonomia*, meaning equality of citizens before the law, which was translated spatially into the even distribution of land tenure to each household.[23] Moreover, in Greek colonial cities we see the beginning of a strategy of subdivision in which public space in the form of a street or path is used as a way to give regular form to private property.[24] Since emerging as significant urban forms after the seventh century BCE, Greek poleis were organized around the distinction between public and private spaces, the latter being the space of the *oikos*, or household, governed by its owner. The geometry of the grid in a planned city shows how public and private interests – polis and oikos – are no longer in opposition but become mutually dependent. This dependency is visible in the plan of cities like Olynthus (fifth century BCE), in which the subdivision of the city into regular blocks is reflected in the standardized internal subdivision of the houses.[25] It is precisely through the predictable order of the grid that the managerial logic of *technè oikonomiké* (the administration of the house) determines the overall form of the city. In Greek colonial cities, the grid of intersecting streets becomes the most effective means of land division. For this reason, the popular understanding of street grids as a way to ease circulation is questionable, for it completely overlooks the importance of the role that rectilinear subdivision played in defining land tenure in the Greek polis.

19. Barry J. Kemp, *Ancient Egypt: Anatomy of a Civilization*, 2nd ed. (London: Routledge, 2006), 163–244.
20. On the organization of labor in ancient Egypt, see Micòl Di Teodoro, *Labour Organisation in Middle Kingdom Egypt* (London: Golden House Publications, 2018).
21. Of course colonial tendencies are manifested earlier in Mesopotamia, but the Egyptians of the Middle Kingdom developed this form of urbanism in an astonishingly systematic way due to their constant need of resources and their bureaucratic mentality. See Kemp, *Ancient Egypt*, 211–31.

22. Although colonies were founded as independent city-states there was always a strong political and economic alliance between the newly founded colony and the city from which it came. For powerful poleis, founding colonies was not just a way to resolve social discontent and political conflicts by allowing some of the population to leave the mother city and relocate elsewhere, it was also a way for mother cities to expand their political and economic influence by establishing friendly outposts useful for military campaigns and trade. See Paolo Morachiello, *La città greca* (Bari: Laterza, 2003), 52–69.
23. J.P. Vernant, *Mito e pensiero presso i Greci. Studi di psicologia storica*, trans. Mariolina Romano and Benedetto Bravo (Turin: Einaudi, 2001), 216–17. See J.P. Vernant, *Myth and Thought Among the Greeks*, trans. Janet Lloyd and Jeff Fort (Brooklyn: Zone Books, 2006).
24. On the planning of Greek colonies, see Aidan Kirkpatrick, "The Image of the City in Antiquity: Tracing the Origins of Urban Planning, Hippodamian Theory, and the Orthogonal Grid in Classical Greece" (master's thesis, University of Victoria, 2015).
25. Kirkpatrick defines Olynthus as an "experiment in social cohesion" in "The Image of the City in Antiquity," 52. On the construction of the domestic environment at Olynthus see Nicholas Cahill, *Household and Social Organization at Olynthus* (New Haven: Yale University Press, 2002).

26. Aristotle, *Politics: A New Translation*, trans. C.D.C. Reeve (Indianapolis: Hackett Publishing, 2017), 36–40, 174.
27. For an incisive reading of how Hippodamus subtly subverted the isonomic order of the grid, see Luigi Mazza, "Plan and Constitution – Aristotle's Hippodamus: Towards an 'Ostensive' Definition of Spatial Planning," *The Town Planning Review* 80, no. 2 (2009): 113–41.

The relationship between the orthogonal grid and city subdivision was theorized in the fifth century BCE by Hippodamus of Miletus, who is depicted in two brief passages in Aristotle's *Politics* as a political philosopher and planner concerned with the organization of the polis.[26] Because Aristotle mentioned Hippodamus while discussing forms of constitution, we should understand Hippodamus's grid as a political rather than formal principle. According to Aristotle, Hippodamus proposed dividing the population into three classes: artisans, farmers, and soldiers. He then proposed to divide city land into three parts: one sacred, one common, and one private. Sacred land is for the customary offerings to the gods, common land is for providing food for the soldiers, and private land is for the farmers. This means that artisans are landless and thus dependent on farmers for their subsistence. This organization of the polis slightly subverts the isonomic order of the grid by differentiating land use according to social classes. In fact, the novelty of Hippodamus's theory is his use of the grid as a way to distribute profits from land use to support the organization of the polis into distinct social classes.

This means that Hippodamus challenges the isonomic nature of the grid (and isonomia itself) by using the grid as a way to ease the subdivision of the city into different parts rather than equally distribute property.[27] In his theory the principle of subdivision immediately reflects the relationship between social groupings and land ownership and thus defines power relationships among the citizens. For example, in Hippodamus's polis, soldiers are more powerful than artisans because soldiers can count on the use of common land for their subsistence while artisans must depend on the farmers' products. This situation inevitably establishes a hierarchy that disrupts the seemingly egalitarian order of the grid. At the same time, it is precisely the abstract character of the grid as a means of subdivision that allows Hippodamus to plan and articulate these subtle social differences in terms of land use. Although his adoption of the grid is indebted to the tradition of the isonomic gridiron of colonial cities, his use of it departs from equal distribution and introduces social difference. Hippodamus adopted the geometric rigor of the grid in order to objectify social differences, rooting them in the way land is subdivided and distributed.

3. Res Privata

Ancient Rome made the grid its most important urban template when, in the sixth century BCE, it initiated its aggressive politics of conquest. As is well known, Rome ensured its
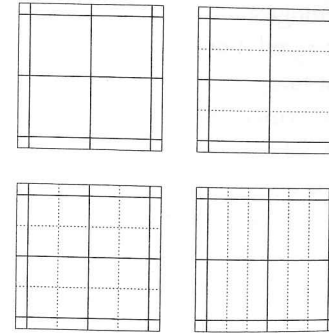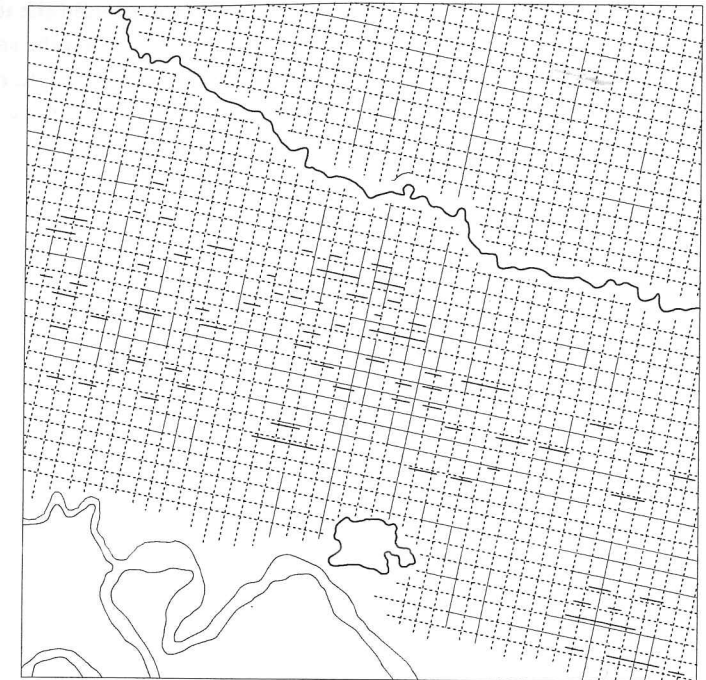

Diagram of the Roman centuriation. Drawings courtesy the author.

0   3 miles

28. See Neville Morley, "Cities in Context: Urban Systems in Roman Italy," in *Roman Urbanism: Beyond the Consumer City*, ed. Helen M. Parkins (Routledge: London, 2005), 42–58.
29. On the process of centuriation, see Rolando Bussi, ed., *Misurare la terra – Centuriazione e coloni nel mondo romano: Città, agricoltura, commercio – Materiali da Roma e dal suburbio* (Modena: Franco Cosimo Panini, 1985).
30. Ibid., 20–27.

domination in newly conquered territories by establishing colonies and filling them with populations that were often mobilized from elsewhere. Rome's use of the grid was influenced by Greek colonial planning, but unlike the Greeks, the Romans organized the grid around the crossing of two main axes, the cardo and the decumanus. In this way, they countered the isotropy of the grid with the strong centralizing logic of the cross, a figure dear to the Romans because it evoked the power of the center.[28] Moreover, the *cardo* and *decumanus* were the organizing axes not only of the town but also of the surrounding territory, thereby forming a coherent whole in which the grid defined land use both inside and outside the walled city. This unification of city and territory became even stronger when the Romans conquered the flat land of northern Italy and reordered this territory through the process of centuriation, a method of subdivision based on the delineation of land into regular squares known as *centuria* (710 by 710 meters).[29] Through centuriation the state distributed and allocated newly conquered land as private property.[30] As soon as new land was conquered it was divided and assigned to farmers that the state moved from elsewhere to replace or integrate the indigenous population. The process of settling new territory was directed and paid for by the army,

31. Ibid., 81.
32. Ibid., 82.
33. On the practice of surveyors in ancient Rome, see O.A.W. Dilke, "The Roman Surveyors," *Greece & Rome* 9, no. 2 (October 1962): 170–80.
34. See David Gilman Romano, "The Orientation of Towns and Centuriation," in *A Companion to the Archeology of the Roman Republic*, ed. Jane DeRose Evans (Hoboken, NJ: Wiley-Blackwell, 2013), 251–67.
35. On the concept of res in Roman law, see Yan Thomas, "La valeur des choses: Le droit romain hors la religion," *Annales: Histoire, Sciences Sociales* 57, no. 6 (December 2002), 1431–62.
36. Ibid., 1440.

and as such, it manifested the ideological impetus behind colonial settling based on the strong relationships between war and farming.[31] We should not forget that the Roman army's main pool of recruits was farmers. Moreover, the state had to take care of a large number of veterans who expected some form of welfare after serving as soldiers in the always belligerent Roman army. On the one hand, land ownership rooted farmers and their families in newly conquered territories, and on the other, it made adult male farmers recruitable, since to be a soldier in the army, one had to own property.[32] Thus the main purpose of centuriation was to efficiently control land and to form a class of landowners, however small their parcels might be.

The precedents for centuriation were the methods of land subdivision already practiced by Egyptians, Greeks, and Etruscans, but significantly the Roman version almost systematically applied the same grid across different territories. Whether for military camps or colonial towns, centuriation involved a careful survey of land that only the state could undertake using authorized surveyors known as *finitores* or *agrimensores*.[33] The main feature of this survey was the use of the *groma*, an instrument that allowed a surveyor to ensure that perpendicular lines would meet at right angles. The survey process was immediately followed by the tracing of *limites*, the lines that divided the *centuria* into submodules such as squares or strips of land known as *strigae* and *scamna*. Only when the land was properly divided into modules could it be assigned to its owners as a *sorte*, a plot of land that was clearly measured and limited. To make the subdividing lines permanent and immediately legible to the owners, stone markers were placed where the lines intersected.[34] The centuriation organized the *ager publicus*, or public land violently seized or conquered, in a carefully subdivided tapestry of holdings sold to individual owners who – for this reason alone – had no choice but to remain loyal to the state. The core of this system was the Roman understanding of land through the category of *res*. *Res* refers to the process through which objects, places, and human relationships become objectified as "things" or commeasurable entities. For the Romans, the designation of something as res publica or res privata indicated ownership status: the first was owned by the state, and the second, by individual citizens. Although res could define the totality of things that could be owned, it primarily referred to land ownership.[35] Once designated as res, land was understood primarily in terms of its patrimonial value.[36]

37. Ibid., 1440.
38. Cicero, *Tusculan Disputations*, trans. John Edward King (Portsmouth, NH: Heinemann, 1927), 70.

The Egyptians' and the Greeks' use of geometry to measure the earth was instrumental in developing land surveys. For the Romans, the relationship between geometry, ownership, and monetary value was even tighter because it was mandated by the universalizing force of law itself. As legal historian Yan Thomas points out, Roman law was essentially a process in which the contingent properties of an object or a person were abstracted in order to fit generalizable cases.[37] Objects and land were intelligible entities under law only if they were considered purely as economic quantities. This means that everything that was res – and land especially – was subjected to immediate translation into financial value. The grid of Roman centuriation, with its potentially infinite extensive logic, is the ultimate embodiment of the economic implications of res as a spatial datum. With its standardized system of measurement realized in the orderly placement of stone markers, roads, canals, lines of trees, walls, and fences, centuriation abstracted land as a geometric figure, which made it easy for state officials and landowners to translate land possession into financial assets. The deployment of the grid is thus the clearest example of how geometry supported ownership by allowing not only the neat subdivision of land as measurable parcels but also the abstraction of land into monetary value. While the expansion of the Roman Empire is typically thought of as the ongoing spread of troops and infrastructure, the very core of this expansion was the res extensa of property as a legal framework in which domination was exerted through the force not only of soldiers but also – and especially – of law.

4. Civilian Occupation

As we have seen, geometry is the crucial link between land and money. Talking about the art of geometry, Cicero made clear that its utility was in the measuring of land.[38]

The rebirth of urbanization in Europe after the 11th century was paralleled by a renewed capacity to map and measure land. With the increasing importance of agricultural production, Greek geometry and Roman *planimetria* (the art of measuring fields) again became fundamental sources of knowledge for abbots, lords, and kings seeking to master their own territories. During the 13th century, in the context of the increasing appropriation and systematic exploitation of rural land initiated by monastic enterprises and other institutions, the prototype of colonial planning in modern Europe known as *bastides* took form in southwest France. The
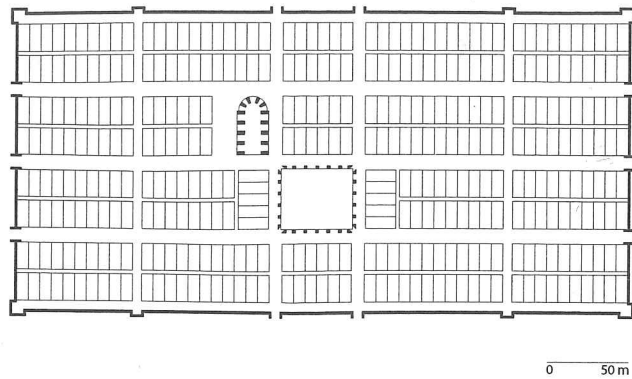
main purpose of these settlements, which can be considered
neither villages nor cities but towns, was economic. Bastides
flourished in France at the time of a population surge, as well
as during the Hundred Years' War, when the French region
of Aquitaine was under English rule.[39] Both the French and
English monarchs consolidated their possessions in France by
establishing cities that would attract people, develop agricul-
ture and commerce, and, in case of conflict, provide military
support. The originality of the bastides lay in their entrepre-
neurial nature. Their foundation was defined by a contract,
known as *paréage*, between the crown and a local authority
such as a lord or abbot: the former would provide order and
security and the latter would provide the land.[40] Once a bas-
tide was founded, the king and landowners attracted settlers
by giving each of them property both inside and outside the
town. For this reason many bastides were planned as compact
rectangular settlements defined by a uniform grid of streets.
Those who invested in founding the bastides made money
by taxing the properties and trade of the residents. Today,
extant bastides like Monpazier in Dordogne may look like a
picturesque medieval village, but when planned and built in
the 13th century they were conceived as the mere subdivi-
sion of saleable plots of land – a model sustained in the sale
of suburban estates today. Apart from facilitating the sale
and taxation of private property, the regularity of the grid
helped to speed up construction and prevent conflict among
settlers. Because these features recur in many bastides, art
historian Adrian Randolph suggests that the grid plan was
the product of a centralized form of planning directly initi-
ated by the rulers of kingdoms.[41] Therefore, the bastides, like
Roman colonial cities, were the result of a repeatable urban
type flexible enough to allow local authorities to introduce ad
hoc adjustments. Yet, unlike the Roman precedents, which
were enclosed by defensive walls and primarily served a

39. See Adrian Randolph, "The Bastides of
Southwest France," *The Art Bulletin* 77,
no. 2 (June 1995): 290–307.
40. Ibid., 292.
41. Ibid., 304.

42. John W. Reps, *Town Planning in Frontier
America* (Princeton: Princeton University
Press, 1969), 15.
43. Ibid., 19.
44. See David Friedman, *Terre nuove: La
creazione delle città fiorentine nel tardo Medio
Evo*, trans. G. Dardanello (Milan: Einaudi,
1996). For English, see David Friedman,
*Florentine New Towns: Urban Design in the
Late Middle Ages* (Cambridge: MIT Press,
1989).

military purpose, bastides were often planned without walls
and were meant to be expandable should the enterprise suc-
ceed. Moreover, bastides proved to be an efficient form of
urbanization because their simple form required minimal
investment from the founders, who would leave building to
the inhabitants. For this reason, the towns became a fun-
damental precedent (and perhaps a direct source) for colo-
nial urbanism in the Americas and in Asia, where speed and
efficiency in establishing a city became a crucial goal. In his
important study *Town Planning in Frontier America*, John W.
Reps notes that before the English began colonizing America,
the plans of 13th-century towns established in England by
King Edward I appeared in William Camden's 1586 book
Britannia.[42] Edward I was behind the building of many bas-
tides in France, and the towns he established in England, such
as Flint, Hull, Carnarvon, and Winchelsea, also had rectan-
gular plans with straight streets intersecting at right angles.
Reps also argues that the siege town of Santa Fe, built in 1490
near Granada – the last Moorish stronghold in Spain – may
be one of the main sources of the Law of the Indies, the body
of laws issued by the Spanish Crown in 1573 for the empire's
American and Philippine possessions.[43] Even though the law
was a summa of ancient Rome and Renaissance planning prin-
ciples, its rationalizing impetus was certainly informed by the
tradition of the standardized bastides, which, beginning in the
14th century, became a model for many planned towns, from
the Terre Nuove in Tuscany to Dutch colonial cities in Asia.[44]
A contributing factor to the success of the bastides and colo-
nial settlements in the Americas and Asia was their minimal
planning, which allowed anyone with a rudimentary knowl-
edge of surveying land to immediately start a city. It is not by
chance that maps of colonial towns in the Americas were often
simple diagrams in which the outlines of plots of land with
occasional location names is the only information recorded.
This can be seen in cities such as Yorktown (1691), founded
under the Virginia Ports Act, where the drawn plan provides
only minimal topographic information about the settlement.

Despite the facility through which they were planned and
built, the defining aspect of the bastides and many colonial
cities in the Americas and Asia is the way their regular subdi-
vision concealed the asymmetry of power behind their mak-
ing. The equality suggested by these town grids appears to be
true only when the grids are considered from a morphological
point of view. The regular distribution of property was not
the result of a local agreement among settlers but the mark of

a sovereign's control of social and spatial negotiation. Grids are also deceptive in another way: in their apparent uniformity they often articulate subtle forms of spatial hierarchy. For example, in the French bastides, public buildings such as the church, the meeting hall, and the market square were inconspicuous and aligned with the order of the grid, yet their position affected the commercial value of nearby properties. Inequality within the grid was also easily achieved by zoning different sectors for different uses, making some areas more valuable than others. This logic was at work in most colonial cities built by European powers in the Americas and in Asia. One of the most remarkable examples of the grid as instrumental in inequality is the colonial city of Batavia, built in Indonesia by the Dutch East India Company as a trading post to facilitate the seizure of spices from the region.[45] The plan of Batavia is an adaptation of the more abstract town model known as "Ideal Plan for a City," drawn by the Flemish mathematician Simon Stevin in 1650.[46] In his plan, which strongly resembles a French bastide, Stevin proposed to complement the grid of rectilinear streets with canals. While canals are a main urban feature for drainage and transportation in the Netherlands, their use in Stevin's abstract model seems to serve a more subtle purpose, for they also subdivide the rectangular form of the town into four sectors. Moreover, as in the bastides, the placement of public squares and buildings introduces hierarchies into the isotropic order of the grid. Additionally, the subdivision of the Ideal Plan into plots of land continues beyond the town's perimeter wall, suggesting that part of the population is kept outside of, but close to, the city. Stevin's plan is thus a subdivision through which the planner could calibrate hierarchies and proximities without disrupting the seemingly "egalitarian" form of the grid. A similar situation can be seen in Batavia. Here, canals divided the city into different sectors, and since there were very few bridges crossing the canals, movement from sector to sector was controllable. Moreover, as in Stevin's plan, part of the population – mostly the indigenous people working for the Dutch company – was settled outside of, but close to, the city walls. They could work in the town but were kept outside to avoid the threat of revolts. The plan of Batavia and Stevin's Ideal Plan are examples of how the geometric order of the grid was instrumental in fostering segregation and inequality in colonial cities. Yet the root of inequality was not the grid per se, but the legal framework the grid enforced, which was centered on the principle of private property.

45. Marsely L. Kehoe, "Dutch Batavia: Exposing the Hierarchy of the Dutch Colonial City," *Journal of Historians of Netherlandish Art* 7, no. 1 (Winter 2015).
46. Ibid., 12. See also Charles van den Heuvel, *De Huysbou: A Reconstruction of an Unfinished Treatise of Architecture, Town Planning and Civil Engineering by Simon Stevin* (Helsinki: Edita, 2006).
47. Nicholas Blomley, "Law, Property, and the Geography of Violence: The Frontier, the Survey, and the Grid," *Annals of the Association of American Geographers* 93, no. 1 (March 2003): 121.
48. See Gary Fields, *Enclosure: Palestinian Landscapes in a Historical Mirror* (Oakland: University of California Press, 2017), 143. See also John L. Comaroff and Jean Comaroff, "Law and Disorder in the Postcolony: An Introduction" in *Law and Disorder in the Postcolony*, ed. John L. Comaroff and Jean Comaroff (Chicago: University of Chicago Press, 2006), 30.
49. Brenna Bhandar, *Colonial Lives of Property: Law, Land, and Racial Regimes of Ownership* (Durham: Duke University Press, 2018), 3.
50. Alessandro Bava, "The Grid and the American City," in *Rituals and Walls: The Architecture of Sacred Space*, ed. Pier Vittorio Aureli and Maria Shéhérazade Giudici (London: Architectural Association, 2016), 34–39.
51. Fields, *Enclosure*, 45.
52. Ibid., 93–170.

5. Lawfare

Property is not appropriation *sic et simpliciter*. Property is defined by a legal apparatus enforced by the state that gives people the right to use or benefit from something they own. If someone has the right to own something, it means that the use of that thing by others is not possible without the owner's consent. As Nicholas Blomley puts it, "Property's 'bundle' of rights includes the power to exclude others, to use, and to transfer. Such rights are enforceable, whether by custom or the law."[47] Even if today property takes a myriad of forms both material and immaterial, I would argue that the most important form of property is still land. To legally own land allows owners to enclose it and regulate its use and the life that unfolds upon it. This is why, as economist Gary Fields has argued, the ultimate weapon of conquest in the Americas by European colonizers was not warfare but *lawfare* – the imposition of land ownership defined by law against possession of land defined by custom.[48] Indeed, as argued by Brenna Bhandar, the modern concept of property emerged from colonial modes of appropriation.[49]

In Spanish colonization, often settlers would not receive an absolute title to land but rather were given land in perpetuity according to prescribed duties of cultivation. In New England, 17th-century Puritans faced a similar situation. In towns such as New Haven, the use of the grid to subdivide land had more symbolic than economic purpose. Here the nine-square grid replicated the plan of Solomon's Temple in Jerusalem as reconstructed by the Jesuit priest Juan Bautista Villalpando in his *Ezechielem Explanationes* (1596).[50] Such a city plan, with its symmetric form and large town common at the center, was supposed to be the realization of the *Civitate Dei* on earth. The situation was different in the English possessions of North America where the grid was the main tool for appropriating land under the discipline of individual property.[51] However, private property was not introduced simply as a right to own land, but as the "virtuous" act of cultivating land that the colonizers perceived – or wanted to perceive – as land *without* owners.

The settlement and cultivation of land on a vast scale required surveying and parceling land, and to make that land productive, not just for subsistence, but for profit, requires intense labor. For this reason, the English made the virtues of cultivating and thus "improving" land the main ideological basis for the exclusionary right to own property.[52] While Spanish and Portuguese colonization was contingent on the

53. Ibid., 115–18.
54. David Armitage, "John Locke, Carolina, and the 'Two Treatises of Government,'" *Political Theory* 32, no. 5 (October 2004): 602–27.
55. Fields, *Enclosure*, 129.
56. Ibid., 97–144.
57. W.E. Tate, "The Cost of Parliamentary Enclosure in England (with Special Reference to the County of Oxford)," *The Economic History Review* 5, no. 2 (December 1952): 258–65.

duty to convert natives to Christianity, English colonization was motivated by the idea of settling a territory by improving its productivity.[53] The construction of the American landscape as an orderly grid of cultivated fields was a fundamental "imaginary landscape" that both British and, later, white American colonizers projected on the land that they violently appropriated from the native populations. Instrumental to this appropriation was the idea, promoted by liberal thinkers such as John Locke, that unowned land was poorly cultivated and akin to lying in waste.[54] For Locke, only private ownership by individuals could guarantee cultivation and thus economic growth. Indeed, for Locke, land improvement and land ownership were two faces of the same coin. This idea was echoed by the popularity among colonizers of res nullius, one of the forms of res introduced by the ancient Romans. For the Romans, res nullius described ownerless objects that were available for appropriation. In the colonizer's imagination, res nullius became terra nullius – that is, ownerless land that could be appropriated without committing an act of dispossession. Such a juridical apparatus could only be supported by representing North America as a wide "empty space" populated by indigenous people who, in the words of Locke, knew no enclosure.[55] It is here that we fully understand how the British – like ancient Rome – imposed a grid of boundaries on the land to make the theft of land from indigenous communities lawful.

The walls and boundaries of different civilizations have a long tradition as political territorial markers. Boundaries often embodied rights of occupation, yet – with the exceptions of the Romans and, later, modern Europe – this kind of occupation was never enforced legally, only justified by custom. As Fields writes, native populations of North America had developed a sophisticated system of land tenure manifested by a dense network of boundaries demarcating areas of possession, access, and trespass alongside rules for rights of use, occupancy, and circulation.[56] With the colonists' introduction of private property as an individual right to land ownership, the tracing of boundaries is invested with a completely different meaning. The boundary that encloses land as property is not simply a physical element, but also the embodiment of an "abstract" legal right with the power to exclude that is far stronger than any physical barrier. One of the most remarkable examples of a legal/physical boundary is the tradition of building drystone walls to enclose property that English landowners started in 17th-century Britain.[57] From a physical point of view, these walls look like archaic

boundaries, more symbolic than functional; in fact, their building technique was inspired by ancient drystone walls built to define the boundaries of common pastureland. Yet the purpose of these walls was not only to contain animals but also – and especially – to physically manifest the legal power by which landowners had subtracted this land from common tenure. The laying of stone walls materialized a careful survey through which landowners would ultimately have their acquired property legalized by parliament bills. It is this kind of "legal" approach to boundaries that the English colonizers brought to the "New World," continuing the theft of common land that they had initiated in the 15th century. Marx called this method of appropriation "primitive accumulation," which he defined as the process through which possessors accumulated the wealth that formed the initial backbone of their investment.[58] Classical political economy represented such a process as the virtuous labor of one part of society, but Marx emphasized how primitive accumulation was essentially theft effected by the enclosure of land and the ensuing appropriation of resources that deprived large segments of the population of their livelihood. Yet, as a legalized process, the forceful act of appropriation led to a surge in land surveys and cartographic representations in which scientific mapping replaced the more idealized and pictographic representation of land. These estate maps became the precondition for knowing one's own land. This cadastral vision of the rural world was soon translated into a landscape in which property lines took the form of an all-encompassing grid of lines made by fences, shrubbery, canals, and rows of trees.[59] Indeed, the image of "landscape" as we know it, as a picturesque composition of lines and fields, is the very product of the exclusionary violence of enclosure.[60] We should not forget that the British colonization of North America was parallel to the method of enclosing common land that the empire first pursued in its own territory. Enclosure and colonization are both part of the same process of appropriation for the monetization of landed property.

When the British colonies along the east coast of America gained their independence from the British Empire, the new nation continued the process of dispossession initiated by the British at the expense of indigenous people. Against native collective land tenure, the colonizers mobilized an imagined landscape subdivided by legal boundaries and sold to new owners.[61] It was precisely this image that prompted the leaders of the newly formed United States government to choose

58. Karl Marx, "Part Eight: Primitive Accumulation," in *Capital: Volume I*, trans. Samuel Moore and Edward Aveling (Champaign: Modern Barbarian Press, 2018), 506–48.
59. John Pickles, *A History of Spaces: Cartographic Reason, Mapping and the Geo-Coded World* (London: Routledge, 2004), 92–106.
60. Ann Bermingham, *Landscape and Ideology: The English Rustic Tradition, 1740–1860* (Berkeley: University of California Press, 1986).
61. Fields, *Enclosure*, 143.

the rectilinear grid as the proper spatial template for land appropriation. While traditional colonial gridiron settlements – including early colonial cities in the Americas – were finite settlements surrounded by land for cultivation, the United States' colonization of the West transformed the grid into a potentially infinite extension of property rights, a grid that still underlies the prevailing American tendency toward the geometrically regular disposition of roads and fields. The origin of this grid was the Land Ordinance of 1785, which established a standardized system through which settlers could buy legal title to farmland west of the Appalachian Mountains and north of the Ohio River. As is well known, this system was adapted from Thomas Jefferson's proposal to parcel out the western territory in squares. Jefferson's initial grid subdivided land into what he called *hundreds* – a 10-by-10-mile unit enclosing 100 square miles. In his vision, the hundred was also made of 100 individuals and their families, who would form a self-governing township. The strict roundness of these figures was based on Jefferson's attempt to introduce the decimal system into American life.[62] Whether for his architecture or for measuring or coinage, Jefferson adamantly advocated the use of the decimal system for its ease of calculation. It is interesting to note how Jefferson's design of the Rectangular Survey System was parallel to his proposal to divide the dollar into tenths and hundredths.[63] The resulting grid was an all-encompassing system that coalesced geometrical order, surveying, and financial value into one efficient apparatus. To make the grid an absolute system not determined by any local condition, Jefferson also adopted an unprecedented unit of measure for land, the geographical mile, which was derived from sea navigation. Such an operation implied the projection of the sea's "emptiness" on a territory that was far from empty. Another striking aspect of Jefferson's land survey system was its alignment with the global grid of longitude and latitude that would give the survey grid the "objectivity" of a scientific fact.

The grid of the Rectangular Survey System allowed any settler using the most rudimentary instrument of measurement to survey his own property.[64] In this way Jefferson rooted his republican agrarianism to the individual's possibility to own and quantify his own plot of land. The implementation of the Land Ordinance of 1785, however, ultimately stripped Jefferson's land survey system of many of its features, including the hundreds and decimal divisions, but the rectilinear grid remained the basic principle of its

62. William D. Pattison, "Beginnings of the American Rectangular Land Survey System, 1784–1800" (PhD diss., University of Chicago, 1957).
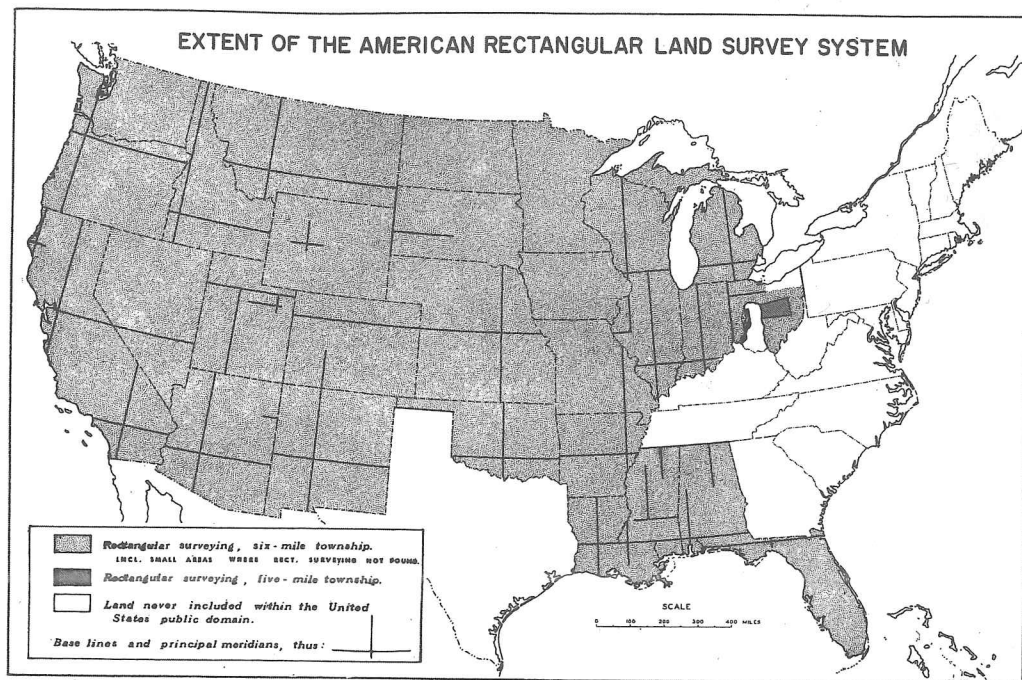63. Ibid., 45–50.
64. Ibid., 50.
65. Ibid., 67–80.
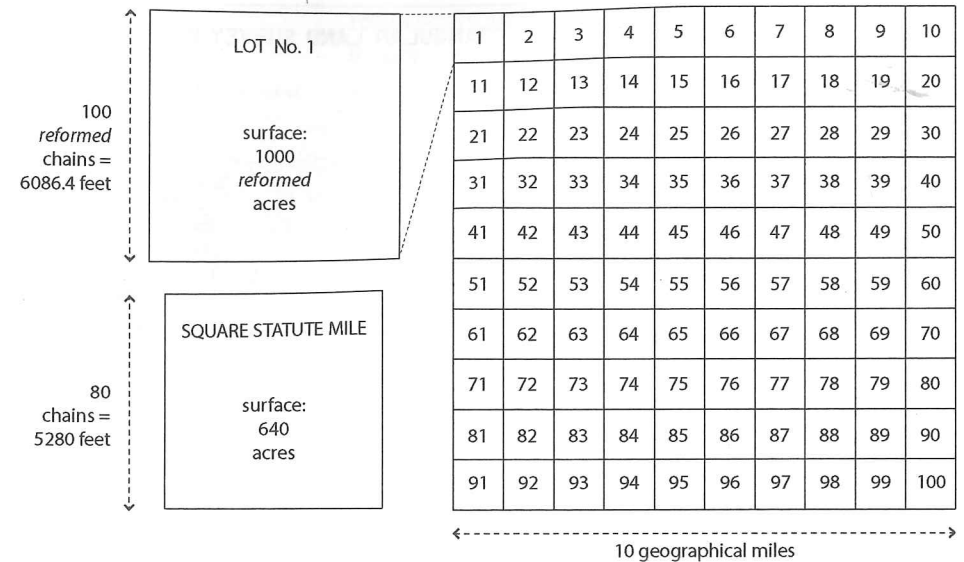
Jeffersonian Units of Land Subdivision, adapted from William D. Pattison, "Beginnings of the American Rectangular Land Survey System, 1784–1800," 47. Drawing courtesy the author.

organization. The hundred was replaced by the concept of a township measuring six miles per side and subdivided into 36 squares of land, which were sold through government auction to private owners in order to repay public debt. Parcels were identified only by numbers, but this relentless abstraction was the product of a far-from-peaceful survey campaign. Between 1785 and 1788, a team surveying the notorious Seven Ranges – a tract of land in eastern Ohio – met resistance from natives who understood how the surveyor's simple act of leaving marks on the ground and on trees was also the very act of dispossessing them of their land.[65] While on a map the Seven Ranges looks like a supremely serene gridded landscape, on the ground this landscape was fiercely contested and required the US government to deploy troops and build forts to protect the survey operation.

Although the survey of the Seven Ranges failed to meet the government's primary goal of paying down the national debt through land sales, it represented an important step for surveying methodology in the appropriation of the American West. Above all, the Land Ordinance of 1785 demonstrates that urbanization of a territory was not primarily about circulation – although infrastructural systems, such as the railway, played a fundamental role in the colonization of the West – but about the violent act of appropriation and the consolidation of that appropriation through subdivision.

The grid plays an ambivalent role in urbanization. At first its geometry is ostensibly artificial, which makes clear that it is anything but a natural order. Neither the Law of the

EXTENT OF THE AMERICAN RECTANGULAR LAND SURVEY SYSTEM

Rectangular surveying, six-mile township. INCL. SMALL AREAS WHERE RECT. SURVEYING NOT FOUND.

Rectangular surveying, five-mile township.

Land never included within the United States public domain.

Base lines and principal meridians, thus:

SCALE
0   100   200   300   400 MILES

Extension of the Land Ordinance of 1785 across the continental United States along global meridians and parallels. From William D. Pattison, *Beginnings of the American Rectangular Land Survey System, 1784–1800*, 1979.

Indies nor Jefferson's grid hides its overt political mission to bring civilization to a land imagined as populated by people incapable of such spatial mastery. In addition to enforcing the idea of property, the grid was an ideological tool used to impress and overwhelm indigenous populations with the colonizers' unlimited power to master the land. But when grids became the rule of colonial settlement, this ostensible geometry became so ubiquitous as to appear almost natural, therefore hiding its actual instrumentality in the commodification of land.

6. Urbanization

Even though Jefferson's grids and those of the Land Ordinance of 1785 were aligned with the global system of meridians and parallels, their scope was limited to one country. With the rise of industrialization in the 19th century, the idea of a gridiron encompassing the entire world was envisioned as unlimited urbanization. Today, the word *urban* is casually used to address something "related to cities" as distinct from rural areas. When Spanish engineer Ildefons Cerdà coined the term *urbanization* in the second half of the 19th century, he meant something very specific.[66] In his book *Teoría General de la Urbanización* (General Theory of Urbanization), published in 1867, Cerdà defined urbanization as a "vast swirling ocean of persons, of things, of interest of every sort, of a thousand diverse elements" that work

66. For a discussion of Cerdà's concept of urbanization, see Andrea Cavalletti, *La città biopolitica: Mitologie della sicurezza* (Milan: Mondadori Bruno, 2005). See also Pier Vittorio Aureli, *The Possibility of an Absolute Architecture* (Cambridge: MIT Press, 2011); Maria Shéhérazade Giudici, "Inconsiderate Hardness: The Avenue and the Grid, Paris-Barcelona 1853–1970," in *The Street as a Project: The Space of the City and the Construction of the Modern Subject* (PhD diss., Delft University of Technology, 2014), 237–41; Ross Exo Adams, "The Burden of the Present: On the Concept of Urbanisation," *Society and Space*, February 11, 2014, http://societyandspace.org/2014/02/11/the-burden-of-the-present-on-the-concept-of-urbanisation-ross-exo-adams/.
67. Ildefons Cerdà, *Cerdà: The Fives Bases of the General Theory of Urbanization*, ed. Arturo Soria y Puig (Berkeley: Gingko Press, 1999), 79.
68. Francesc Magrinyà and Fernando Marzá, eds., *Cerdà: 150 Years of Modernity* (Barcelona: Actar, 2017), 23.
69. Soria y Puig, *Cerdà*, 50.
70. Ibid., 79–80.

reciprocally and thus form a totality that cannot be contained by any previous finite territorial formation such as the old walled city.[67] For Cerdà, the urban condition implied a completely new kind of design, which he called *urbanism*, the focus of which was no longer just city form but the whole functioning of the inhabited territory as a large-scale infrastructural system. His approach to urbanization meant that urban design would involve the use of statistical data, diagrams of circulation, and mappings of natural resources – in short, all kinds of information that would allow for the comprehensive knowledge of human dwelling beyond the physical evidence of the city as built form.

The project that inspired Cerdà to write a theory of urbanization was his plan for the extension of the city of Barcelona in 1859. With the large influx of immigrants attracted by the growing industrialization of the city in the first half of the 19th century, unprecedented numbers of people, epidemics, and social unrest plagued Barcelona.[68] These conditions prompted city authorities to implement a plan to expand the city far beyond its medieval limits. Cerdà understood that industrialization required an altogether new model of living and working, and he was critical of traditional city-making and its focus on the design of urban form.[69] Moreover, he was critical of the tradition in which monumental buildings and squares connected by large avenues were deployed as the main structure of the city. He considered this approach obsolete because it reflected an overly hierarchical organization of society that could foment class antagonism. To overcome these issues and to introduce more efficient management of circulation, Cerdà proposed to expand Barcelona through a grid of 133-by-133-meter blocks that would allow for the even distribution of services and roads throughout the city. These were distributed according to a density of 250 inhabitants per hectare, the standard he recommended to guarantee maximum hygienic social order. It was precisely this ordering of urban space as a potentially limitless tapestry of housing, workplaces, and public services linked by efficient circulation routes that constituted the core of Cerdà's urbanism. For him, this model could extend beyond the idea of the city as a finite urban artifact and become a new entity that was neither city nor countryside.

The urban world was not a sudden revelation for Cerdà, as its premises had been in the making for centuries. Indeed, the historical model on which Cerdà based the neologism *urbanization* is the Latin word *urbs*.[70] For the ancient Romans,

urbs designated the city less as a political entity – that is to say, the civitas, or congregation of *civis*, citizens – and more as the material artifact made of buildings and infrastructure. In his explanation of urbs, Cerdà not only erased the subtle difference between the terms *civitas* and *urbs* but also proposed to replace the Spanish word *ciudad* (city) with urbs. This manipulation of words implied that he abandoned the idea of the city as a political entity in favor of an all-encompassing technocratic system of houses, mobility, and industry. With urbs, Cerdà addressed a prepolitical generic condition of cohabitation whose structural principle he termed *vialidad*, or circulation.[71] Suspicious of politics, which he saw as unnecessary agency, Cerdà had great faith in technology as a means of social amelioration. We should not forget that Cerdà wrote his theory in the midst of a century of working-class revolutions; against the possibility of class conflict, he believed that technically efficient planning, not politics, would allow workers and capital to peacefully coexist, and that new technologies such as automated locomotion and mass communication would lead to the disappearance of limits and boundaries and make the world a single, peaceful global entity.

The core of Cerdà's urbanism and grid plan for Barcelona was his concept of *intervia*, a spatial template that included both block and street and, if his intentions were realized, would bring together multiple stakeholders such as the state, the municipal council, landowners, and tenants. In other words, the uniform grid was not intended to ease property subdivision but to integrate private and public interests in a coherent and legible governmental apparatus. Cerdà also made innovative and extensive use of statistics, which he presented in a graph format that reflected the abstraction through which he represented his plan. Yet the abstraction of his planning system is not the result of an a priori measure, as in Jefferson's grid, but the extreme synthesis of myriad data. Everything in Cerdà's plan is broken down into elements whose measure and quantity are optimized according to specific empirical data obtained from the extensive surveys he made on behalf of the city. The grid allowed Cerdà not only to evenly distribute population and public facilities but also to correlate predefined elements such as intersections, housing types, and land use schemes with economic opportunities and population conditions. Thus Cerdà's plan is informed by an unprecedented abstraction in which every architectural or urban fact is planned by following a strictly economic logic. In both his plan for Barcelona and his *General*

71. Ibid., 5.

72. Miguel Corominas i Ayala, *Los orígenes del ensanche de Barcelona: Suelo, técnica e iniciativa* (Barcelona: Universitat Politècnica de Catalunya, 2002), 169–70.

73. Ibid., 120.

Theory of Urbanization, city-making is no longer focused on a specific form. Indeed, the ever present template of the grid becomes the spatial device needed to reduce formal decisions as much as possible. In Cerdà's schemes and diagrams, the grid rules everything, from planning to architectural details. Every aspect of human life – from living to working, culture to healthcare, retail to parks – is abstracted according to the relentless rectilinear logic of the grid so that the urban becomes manageable as a gigantic and all-encompassing oikos.

The key factors of Cerdà's urban grid were its low density and profusion of public amenities. As a reformist planner, Cerdà firmly believed that for the social good, everybody, from workers to capitalists, would willingly take part in the social equilibrium of the intervia. But insufficient public funding forced the city to turn to private investors to fund the extension, and landowners' eagerness to profit from their holdings radically altered Cerdà's egalitarian urban field. With their large capital investment in the extension, they were de facto empowered to drive the realization of the plan.[72] In some cases, cartels of investors and developers acquired entire blocks or even groups of blocks, thus privatizing parts of the grid. Moreover, in order to speed up development, city authorities decided that municipal taxes collected from the owners would go directly to urbanization of the public space adjacent to their property rather than to a municipal fund for the development of the entire extension.[73] For Cerdà, the grid was a way to equally distribute capital and resources, but in reality it was used to subdivide land in a way that helped developers and landowners capitalize on the building of the new plan. For example, the famous chamfered corners of the typical block – which Cerdà designed to ease circulation at intersections – garnered premium rents for ground-floor commercial space located at the quasi squares opened by these corners. Ultimately, how Cerdà's grid was used was not that different from how the American Land Ordinance of 1785 was implemented. In both cases, the government was the great legal appropriator working for the benefit of private owners who then charged tenants for land and building use. It is precisely under those terms that today's total urbanization of the world has been achieved. The contemporary urban grid is the enforcement of a total regime of property. Cerdà may have tried to make circulation the most important datum of urbanism, but it was the idea of property, with its relentless appetite for the appropriation of resources and economic valorization, that took over his rational grid.

7. Circulation and Property

Perhaps the most quintessential North American city grid is in Philadelphia. Founded in 1682 by William Penn, Philadelphia was one of the most important settlement ventures in the British colonies promoted by King Charles II, who gave Penn land patents to lead the initiative. The city plan was designed in 1683 by surveyor Thomas Holme, who, at Penn's request, also drew a detailed map of the city's surroundings in order to advertise the territory to potential settlers, or "first purchasers." The remarkable feature of Holme's map is the city grid, which becomes the figure that organizes property rights both inside and outside the city, where the urban territory is presented as plots of land to be sold.

Nearly 300 years later, between 1952 and 1953, we find Louis Kahn working as a consulting architect for the Philadelphia Redevelopment Authority, drawing a series of urban plans focusing on the organization of automobile traffic.[74] Kahn made these drawings when Philadelphia was undergoing urban renewal, the kind of transformation that was taking place in all major cities in the US. The urban renewal program sought to maintain the dominant economic position of city centers in the face of suburban growth in the decades following World War II. But its most implicit (and effective) agenda was the takeover of city centers by private capital, an operation actively supported by local authorities and the federal government. The ultimate goal of urban renewal was to raise the commercial value of downtown areas, which consequently led to displacing local populations, especially African Americans. With the excuse of improving dilapidated housing districts mostly inhabited by minorities, urban renewal agencies gave city land to private investors to rebuild to produce greater profits. Even though Philadelphia's urban renewal program was less aggressive than that in other cities, its main objectives remained the same, and the city was largely taken over by private developers who transformed the city by dispossessing minorities of their neighborhoods.[75]

It is precisely the context of such urban renewal transformations that makes it interesting to look at Kahn's 1950s drawings for Philadelphia. Kahn abstracted the existing city as series of symbols, using dots to indicate what he called slow "staccato" circulation, arrows for fast "go" circulation, spirals for parking, and crosses for intersections. With everything else omitted, Kahn's Philadelphia is nothing but symbols indicating traffic flow. He observed that the main problem for Philadelphia traffic was the city's many intersections.[76]

74. See Heinz Ronner, Sharad Jhav/ eri, and Alessandro Vasella, *Louis I. Kahn: Complete Work, 1935–1974* (Basel: Birkhäuser, 1987), 26–27.

75. See Kathryn E. Wilson, *Ethnic Renewal in Philadelphia's Chinatown: Space, Place, and Struggle* (Philadelphia: Temple University Press, 2015).

76. Ronner, Jhaveri, and Vasella, *Louis I. Kahn*, 26.

Thomas Holme, *A Mapp of ye Improved Part of Pensilvania in America*, 1682. Image © Historical Society of Pennsylvania, 2017.

Anyone who has experienced driving in a grid city knows that the high number of crossroads slows traffic and makes driving an ordeal. To solve this problem, Kahn proposed reordering traffic flows by establishing a hierarchy of speeds, ranging from expressways to pedestrian streets, and dramatically reducing the number of crossroads to only a few. Moreover, a key architectural element in his proposal was the strategic positioning of parking structures to encourage the use of private transportation to reach the city center, thereby conceptualizing the city as the orchestration of vehicular movement through the organization of expressways as "rivers" and parking structures as "harbors." Once drivers reached the harbors, they would be freed from the need for cars and be able to walk on pedestrian paths, most of which Kahn understood to support retail activities. Such an idyllic image of "civic life" was meant to convey the idea that downtown was not a hostile territory for those activities that, starting in the 1950s, investors addressed as the condition sine qua non of successful urbanity: driving and shopping. Although Kahn's proposal was never realized, its logic epitomized the very philosophy of the urban renewal project. If a chief goal of urban

renewal was to upgrade city infrastructure to make it more fluid and able to absorb greater numbers of private vehicles, such a goal was ultimately instrumental to leveraging private capital, which sought to consolidate its hold on the city. Again, the urban grid played an important role in this process, since it allowed city authorities to easily and clearly subdivide the city into neatly bounded sectors to be sold to private investors. Once priority areas had been established, the major concern of urban renewal agencies was traffic, because they understood that the key to increasing land value was rapid access by car. While the explicit goal of Kahn's traffic studies was the smooth orchestration of movement, its implicit goal was to make the city a more profitable ground for investment. Kahn's elegantly abstracted traffic studies are the unwitting image of the appropriation of the city by postwar capital. Even if Kahn's urban form seems to be abstracted from property, his proposal shows the strategic role played by traffic "improvement" in waging war against urban minorities determined to fight displacement.

It is here that we see the affinity between Holme's 1685 map and Kahn's 1952 traffic studies. In both cases the urban territory is reduced to diagrammatic grids. In the first, the diagrammatic grid is property lines; in the second, it is lines of movement. The concept of the diagram is key to understanding these representations of the urban territory and the grid. *Diagram* is here understood – as in Michel Foucault, Gilles Deleuze, and Félix Guattari – as a machine that directly produces the effects of power, not as a synthetic representation of concept and form.[77] The grids by Holme and Kahn – in which the city is abstracted as thin lines, dots, or arrows, thereby shifting attention away from the physical structure and toward functional and spatial organization – are not representations but instances in which power is legible and effective. In Holme's map, power is effective in clearly delineating the landscape as a tapestry of properties, while in Kahn's traffic studies power is effective in directing traffic in ways that make downtown more welcoming for land speculation. Here we understand the logic of urban grids in history: the grid is not just a form; it is also an abstraction of social relationships as property relationships. The urban grid abstracts the city as a composition of properties, and everything that exists within the grid has to obey the asymmetric power relationships that property, enforced by law, implies. The intersecting lines of the urban grid are not for the sake of circulation but for the appropriation,

77. See Michel Foucault, *Discipline & Punish: The Birth of the Prison*, trans. Alan Sheridan (New York: Vintage Books, 1995). See also Gilles Deleuze, *Foucault*, trans. Sean Hand (Minneapolis: University of Minnesota Press, 1988).
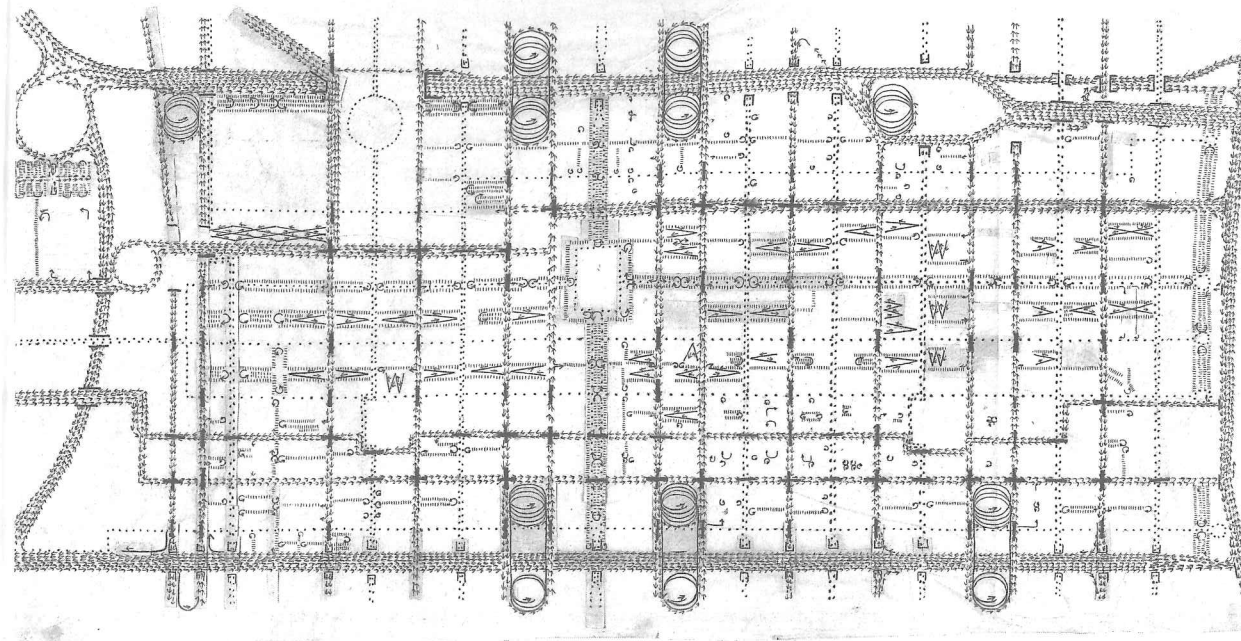
Louis I. Kahn, Traffic Study, Philadelphia, 1952. Ink, graphite, and cut-and-pasted papers on paper, 24 1/2 by 43 3/4 inches. © The Museum of Modern Art/Licensed by SCALA / Art Resource, NY.

subdivision, and abstraction of land into property. This means one can argue that urbanization is nothing other than the realization of space as a diagram of "lawful" property.

8. The Grid and the Island

In his book *The Nomos of the Earth*, Carl Schmitt argues that when the earth was no longer understood as a mythical idea but was scientifically perceived as a globe, those who wanted to appropriate the world began to trace lines at a global scale.[78] These lines were instrumental in the European powers' subdivision of the world into the large geographical domains of north, south, east, and west. The grid of meridians and parallels through which the world was made scientifically intelligible were lines traced not only as a system of geographical orientation but also as a vast geographical subdivision of land to be conquered and exploited. The geographic exploration and cartographic representation that reinforced these lines constitute the ultimate scale of colonial appropriation. That very idea of colonial appropriation continues to reproduce itself in the myriad lines that still subdivide the world into endless enclosures: the fields, streets, squares, houses, and rooms we presently inhabit.

This is why the present debate about borders and walls seems to completely miss the point. The much debated border walls that pretend to stop people from moving through nations or territories are just one of the consequences of the whole system of subdivision that organizes our urban world

and, as we have seen, is founded on the regime of property. Not just nations or gated communities, but any cadastral parcel of the urban world we inhabit – from a forest to a home to a room – is potentially an enclosure. Any of those spaces – charged with the legal power of ownership – can include or exclude people. The urban grid is thus an apparatus that remains resilient, not because of its inherent rationality, as many planners and architects still believe, but because it serves so well the proprietary logic of ownership based on the principle of subdivision. This proprietary logic has been fed by millennia of colonial appropriation, so that even if we inhabit a place where this appropriation is no longer legible, the very "ground" on which we stand is the result of that process. Thus the issue at stake is not the rejection of boundaries and walls but of the subdividing logic of the grid and its link to land property, be it private or public.

As Brenna Bhandar argues, "There is an urgent need to grasp other ways of relating to land, those obscured and repressed through the imposition of the cadastral survey and imperial modes of mapping, through systems of title registration, through the rendering of entire communities as illegal squatters based on their ways of living."[79] At the moment, many social movements – from urban squatters to indigenous populations defending their land tenure against corporate and state appropriations – are contesting the way in which the exclusionary logic of property affects land tenure. The question is, what kind of urban figure can embody the instances put forward by these movements, not as an episodic gesture, but as a stable form of settling? In other words, what spatial principle of settling can challenge the hegemony of the urban grid and allow for ways of land tenure in which confrontation and negotiation among communities are not subsumed within a totalizing urban framework, but acknowledged as the principle of coexistence?

We don't need to reject the grid altogether, only to imagine how its logic can be gradually eroded and modified by a different nomos. In this sense, a possible counter-colonial figure that challenges the topological ubiquity of the grid is the "island," a finite settlement form whose relationship to the whole is never rigidly defined but always open to confrontation and negotiation. Unlike the grid, which conforms the local to the global, the island opens a gap between these two conditions. Rather than a place of containment, like the plots of a grid, the island is open to external movements and influences. Rather than an abstract system driven by the

79. Bhandar, *Colonial Lives of Property*, 193.

quantifying rule of geometry, the island engages directly with features of a territory. Rather than reducing a territory to a totalizing system of measured relationships according to economic opportunity, the island opens up the possibility to reinvent multiple ways of measuring space. The island can be a place where alternate rules, protocols, and rituals of living together can be tested and constantly adjusted without resorting to some universal law. In this way the figure of the island is a call to think of an urban form with values no longer tied to economic optimization but to political decision. Crucial to the architecture of the island is the idea of boundary not as an enclosure but as a threshold that allows communities to physicalize forms of land tenure and rules of access. Examples of such islands are present in many different contexts, from the Ottoman *maidan* to the Persian *caravanserai* to the English village green. Beyond their differences, these forms are all finite but permeable, neither public nor private. In our current regime of ownership, the establishment of such islands can be at best temporary, as seen in the many recent occupations of public spaces, such as the Acampada Puerta del Sol in Madrid, which, in 2012, transformed a traffic node into a space of communing, or the Sacred Stone Camp at Standing Rock Reservation in North Dakota, where natives and activists tried to stop the building of a pipeline. While media portrayed these events as ephemeral forms of protest, I would argue that, like the occupation of public squares during the Arab Spring and the Occupy movement in 2011, they were attempts to define alternative forms of dwelling in spaces outside the binary logic of public and private. As such, these events should be understood not just as protests but as the slow emergence of a spatial nomos against the logic of property.

In an island, architecture is no longer the extrusion of property lines but a system of thresholds that defines spaces of use rather than ownership. The invention of such figures is today the most urgent task of urban design. It entails a radical act of architectural imagination that questions the very premises that underpin and dominate our current forms of coexistence.

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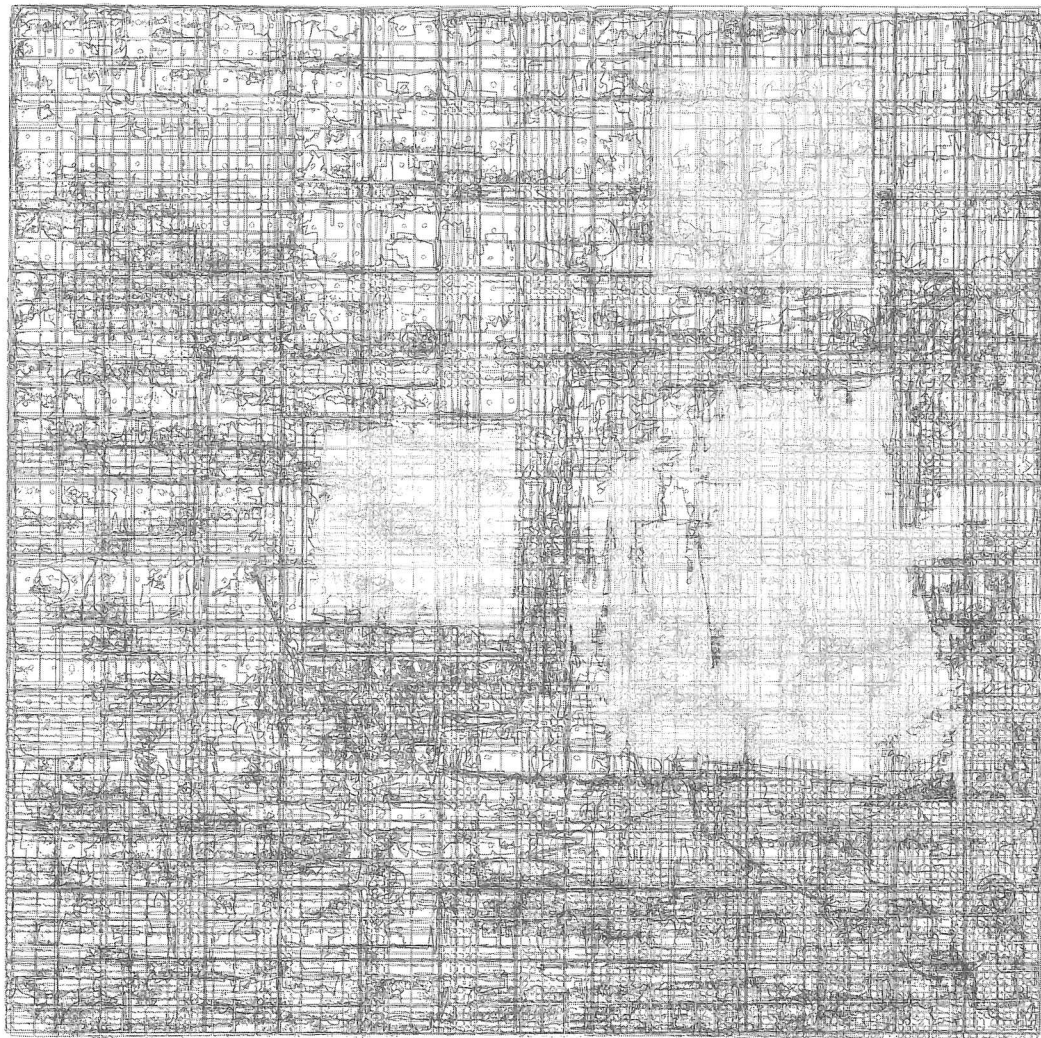
Daisy Ames, MRL, 2018. This drawing is a superimposition of three infrequently referenced artworks produced in the 1960s and '70s that demonstrate how the grid is spiritualized, deprioritized, and serialized. The sources for this drawing are: Agnes Martin, *Summer*, 1964; Robert Ryman, *Drawing with Numbers*, 1963; and Sol LeWitt, *Successive Rows of Horizontal, Straight Lines from Top to Bottom and Vertical, Straight Lines from Left to Right*, 1972.