

## CHAPTER 2

# THE CITY IS NOT AN EGG: WESTERN URBANIZATION IN RELATION TO CHANGING CONCEPTIONS OF NATURE

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CEDRIC PRICE'S THREE-PART DIAGRAM, "The City as an Egg" (1982), shows the evolution of the city from a boiled egg (the ancient city) to a fried egg (the industrial city) and finally to the modern city depicted as a serving of scrambled eggs (fig. 2.1).<sup>1</sup> But what about the city of today? What could Price (1934–2003) have sketched to capture its essence? Perhaps the much-vaunted compact, transit-oriented city would be a Spanish frittata; instant cities such as Dubai and Shanghai's Pudong might be egg-white soufflés; and Andrés Duany's "Seaside" in Florida would surely be a pavlova and Detroit . . . a broken eggshell? Certainly, postmodern urbanism is all these things and more; but, to bring Price's cartoonish diagram up to date, we need to zoom out and somehow convey megaregional urban networks—effectively all the egg dishes now linked into larger arrays. What is also missing from Price's egg cities, as regards our conception of contemporary urbanism, is any reference to the various natural and cultural environments in which the eggs exist. Price's cities are all egg and no chicken.

For this book, we authors were indirectly asked to consider eggs *and* chickens, and so, in this essay, I reflect on the history of the relationship between the city and nature, emphasizing the way cities have primarily manifested a nature/culture divide. Alongside this, I run a cursory history of natural science (physics) to remind us that *landscape* and *nature* are not one and the same thing. My purpose is to arrive at the contemporary city where it is no longer a case of the *city and nature* but a question of the *nature of the city* on a global scale. Indeed, in the contemporary city, the important issues are less about the form of the egg per se and more about the chicken, the farm, and the landscape in-between and beyond.

For most of its history, "the city" has stubbornly resisted the flux of the landscape into which it was originally sown (fig. 2.2). Whereas the nomad travels lightly, the walled city and

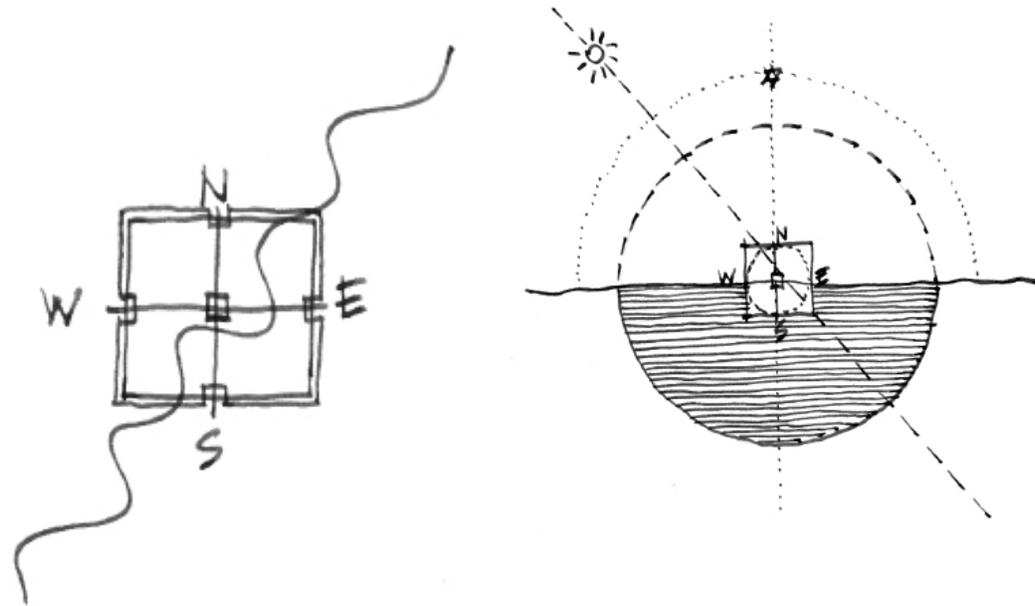


Fig. 2.1. Tracing of Cedric Price's original 1982 diagram, "The City as an Egg." Drawing by the author.

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Fig. 2.2. Traditionally, the city has resisted the flux of landscape. Drawing by the author.

Fig. 2.3. The cities of antiquity reflected cosmological order rather than ecological flows. Drawing by the author.



its star-gazing citadel are rooted in the perpetual problem of agriculture. Despite the munificence of the world's great rivers such as the Nile, Tigris, Euphrates, Indus, and Huang He, their associated cities of antiquity became (and still are) trapped in a Malthusian law of diminishing returns. As Lewis Mumford (1895–1990) explained, ancient cities invariably drained their surrounding landscapes of nourishment, and thus they had to expand their agricultural ambit, leading inexorably to territorial conflict.<sup>2</sup> In short, cities became war machines; war, in turn, excited technological innovation, and sacrifice required monuments. Thus, the city became a patriarchal stage set, and the land around it became “other,” not mother.

Historically, the city must not only feed its polity, but also secure its labor force by impressing upon its workers the glories of the monotheistic heaven above, lest they drift back to the pagan forest or desert beyond. To find its place in the greater scheme of things, the city (in both the East and West) literally lies on its back and carves celestial pathways into its body (fig. 2.3).<sup>3</sup> As such, the city becomes profoundly connected to cosmology but disconnected from the landscape. Consequently, the slaves and citizens of the city lose their memories of how to survive without it.

Although a sacred Earth lingered in the remnant groves of the Greek imagination, it was its Ionian, prototypical scientists and philosophers who, during the sixth century BCE, first subdivided the world into culture (*nomos*) and nature (*physis*), accomplishing conceptually what the city wall manifested physically. Through the invention and application of the logic of reductionism, the Greeks questioned how mind and matter related and, in order to do so, rent the two apart.<sup>4</sup> It was Pythagoras (570–495 BCE) who established the extraordinary notion that the human mind could penetrate Nature’s veils to uncover its mathematical essence and, in so doing, ultimately free itself from corporeal existence altogether (fig. 2.4). Plato (428/427 or 424/423–348/347 BCE)—through the analogy of humanity chained in a cave, mistaking shadows for the truth—argued that human intelligence should literally “see through” Nature’s ephemeral, material manifestations to contemplate the eternal beauty of the forms—signatures of the Demiurge (fig. 2.5). Taking this to its logical conclusion, Democritus (460–370 BCE) concluded that Nature is nothing more than atoms in a void.

These abstractions could then be crystalized in the architecture and social structures of the Greek city (*polis*). As Plato declared in *The Republic*, Western culture’s seminal utopian text, “. . . the city will never know happiness unless its draughtsman are artists who have the divine as their pattern.”<sup>5</sup> With their heads in the heavens, the Greeks ignored the thin soils slipping away under their very feet, and, in *Critias*, Plato describes the Greek landscape as “. . . bones of the wasted body.”<sup>6</sup> Their ignorance of what we now refer to as landscape ecology is encapsulated by Socrates, who famously said, “I’m a lover of learning, and trees and open country won’t teach me anything, whereas men in the town do.”<sup>7</sup> This diminution of the land as a source of knowledge was a mistake of epic proportion and one that plagues Western and global culture to this day.

As for our location and orientation in the grander scheme of things, Aristotle placed Earth at the center of a system of concentric planetary rings, a false but beautiful diagram befitting an intelligent Creator (fig. 2.6).<sup>8</sup> Even though empirical observation of the planets (wanderers) and Ptolemy’s (127 CE) mathematics never quite correlated, Judeo-Christianity and Islam would cling to the conceit of centrality at least until the sixteenth century, when Nicolaus Copernicus (1473–1543) declared, correctly, that the sun is, in fact, the true center of our universe.

The world that was (we imagine) spiritually and materially one in the nomad’s sense of self is, for Judeo-Christianity and Islam, rent apart by the Fall. Upon temptation, so state *The Holy Bible* (Genesis, Chapter 3) and *Quran* (Chapters 7 and 20), Man and God and Man and Animal become estranged. Continuing what the Greek enlightenment had begun, after the Fall the individual body is split into spirit and flesh, head and loins. For her part, Eve is conflated with a bestial nature, punished with the pain of childbirth and subjugated.<sup>9</sup> Adam (Man of the Earth) and later his sons must convert the wilderness beyond the garden into an agricultural landscape. The farmer, Cain, murders the seminomadic shepherd and builds the first city. The once-sacred,

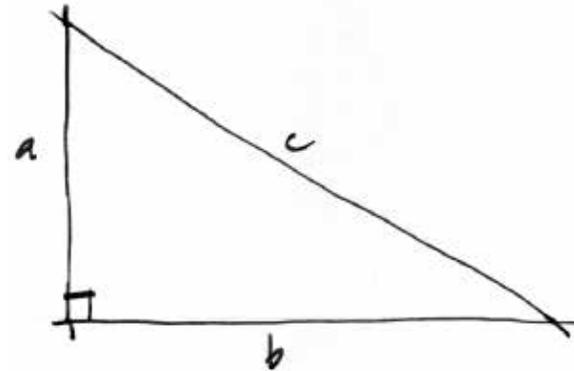


Fig. 2.4. A Pythagorean view of the mathematical essence of nature and the human mind. Drawing by the author.

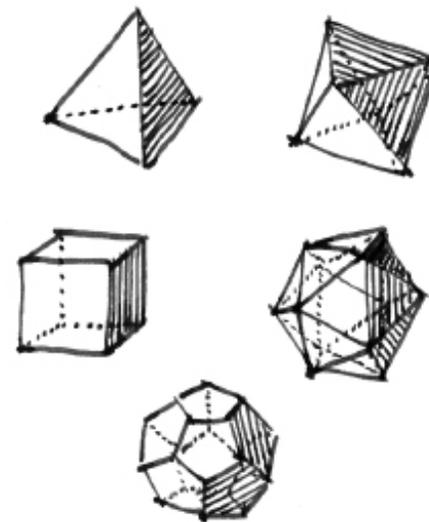


Fig. 2.5. The Platonic forms. Drawing by the author.

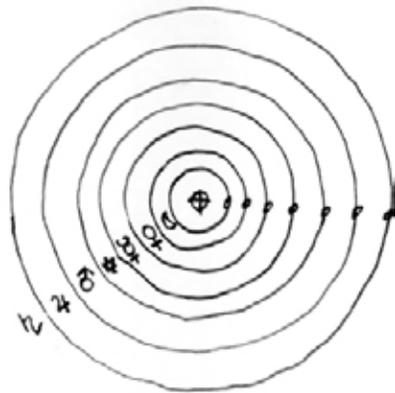


Fig. 2.6. Aristotle placed Earth at the center of planetary rings.  
Drawing by the author.



Fig. 2.7. In Judeo-Christianity and Islam, the once-sacred, serpentine “earth spirit” became a snake associated with evil.  
Drawing by the author.

serpentine “earth spirit” is now a snake that slithers over Earth’s surface, licking at the horrid dust (fig. 2.7).<sup>10</sup> The once-fecund and-feminine earth is rendered evil by association—a denigration that prepared the way for the scientific revolution, which would eventually render it inert and, in theory, infinitely malleable according to our desires.

From the epicenter of the *hortus conclusus* (enclosed garden) to the horizon, the Christian landscape becomes a treacherous trilogy of garden, farm, and wilderness. Secured by the surrounding city (or, better still, the monastery), the garden becomes an ascetic symbol of paradise lost, the farm a cursed field of redemptive toil, and the forest (from the Latin *foris*—literally outside) is full of fear and aberration.<sup>11</sup> The “higher” reality of ecclesiastical space is then organized vertically from Earth’s satanic interior through a terrestrial “limbo” beyond the planetary orbs to the empyrean and, ultimately, into a place where reunification with the divine was theoretically guaranteed (fig. 2.8). Along this axis was inscribed the Great Chain of Being: humans at the top, earthworms at the bottom, and everything else Noah crammed into the ark in-between.

Christianity reframed the beauty Aristotle had seen in every living thing as a symbolic order based exclusively on scripture. Medieval culture retreated from the world into the sanctity of the book—inside the garden, inside the city—and set itself on a finite, temporal span from the Creation at one end to redemption at the other. The city that really mattered was Augustine’s (354–430) superlunary City of God; and, despite arguments by some that, since God had authored all life-forms, they must be worthy, the natural world was held predominantly in contempt (fig. 2.9).<sup>12</sup> Pope Francis’s recent (and revolutionary) encyclical notwithstanding, the three great monotheistic religions of Judaism, Christianity, and Islam are, to this day, still more focused on the ruins of Jerusalem than they are on the world’s ever-diminishing biodiversity.<sup>13</sup>

Whereas the medieval *hortus conclusus* shut out the horizon and held back forests of fear, the “avenue of perspective” at Pirro Ligorio’s (1514–1583) Villa d’ Este (1572), in Tivoli, near Rome, reached out to it. The development of perspective during the Renaissance was a mixed blessing for cities and their relationship to the world around them (fig. 2.10). On the one hand, perspective enabled the creation of many of the most beautiful European urban compositions ever made; on the other, perspective broke through the medieval city’s walls and fixed everything mystical in its now objectivist gaze (fig. 2.11). As if to compensate for the loss of celestial centrality announced by Copernicus and confirmed by Galileo (1564–1642), perspective positioned “Renaissance man” at the centerpoint of his own emerging powers, leading him ultimately over the horizon to new worlds. Artists such as Raphael (1483–1520) also turned perspective toward the heavens, implying, perhaps, that “up there” was just the same as “down here.”

Borne of perspective, urban design has also drawn its cues from design experiments first conducted in gardens; but it was the form and not necessarily the meaning of gardens that was appropriated. The ideal synthesis of culture and nature that the Italians had expressed in their

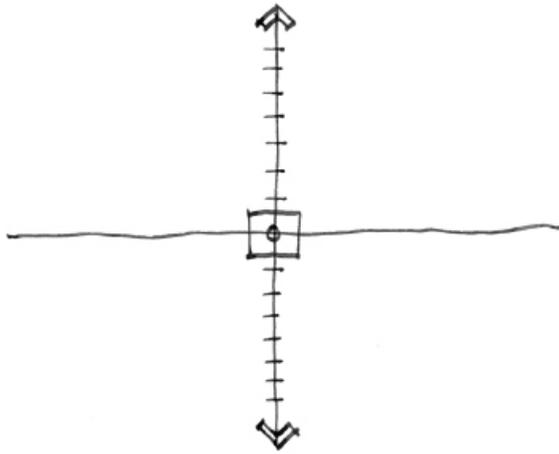


Fig. 2.8. The Great Chain of Being organized all living things hierarchically. Drawing by the author.

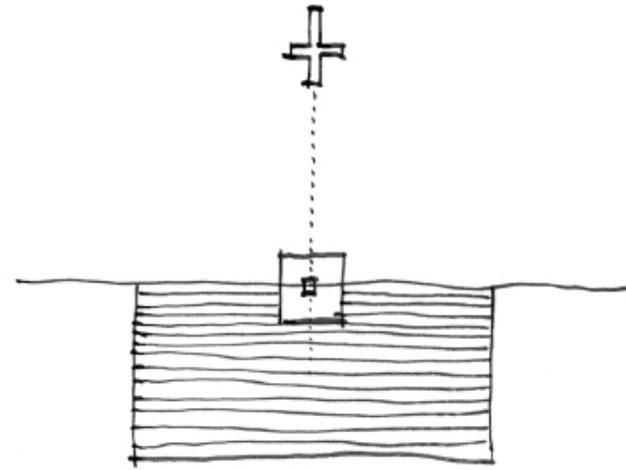


Fig. 2.9. Saint Augustine's City of God. Drawing by the author.

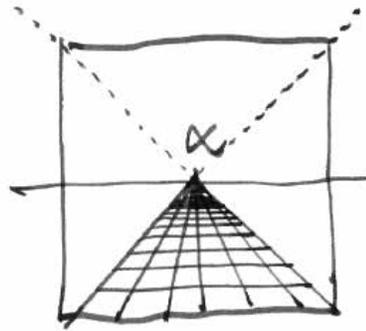


Fig. 2.10. During the Renaissance, infinitude is located at the vanishing point of perspective. Drawing by the author.

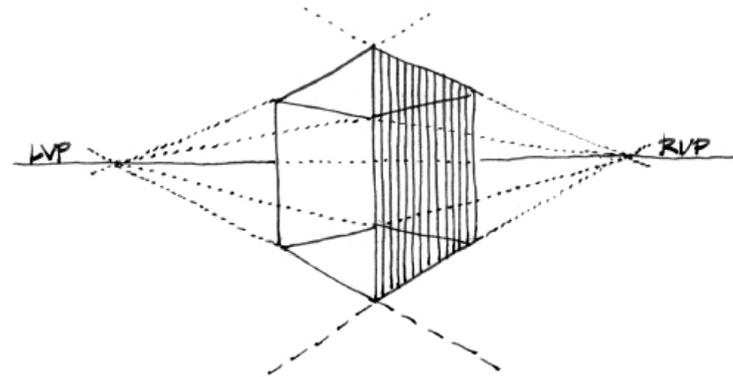


Fig. 2.11. The construct of perspective begins to objectify nature. Drawing by the author.

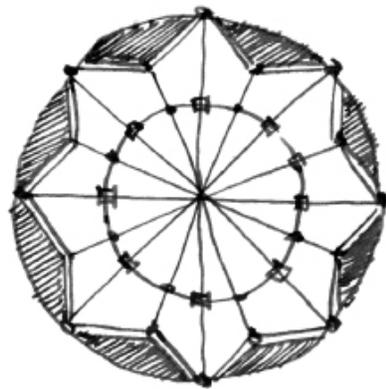


Fig. 2.12. Vincenzo Scamozzi's Palmanova, a new fortress town in the shape of a nine-pointed star. Drawing by the author.

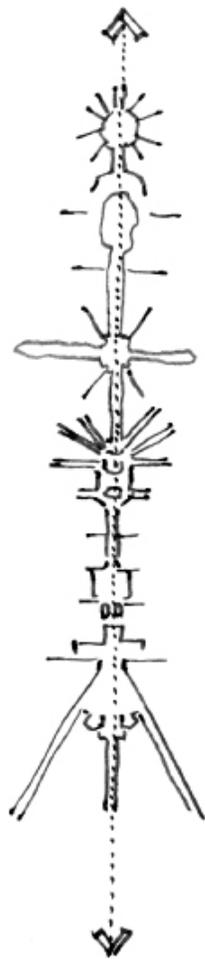


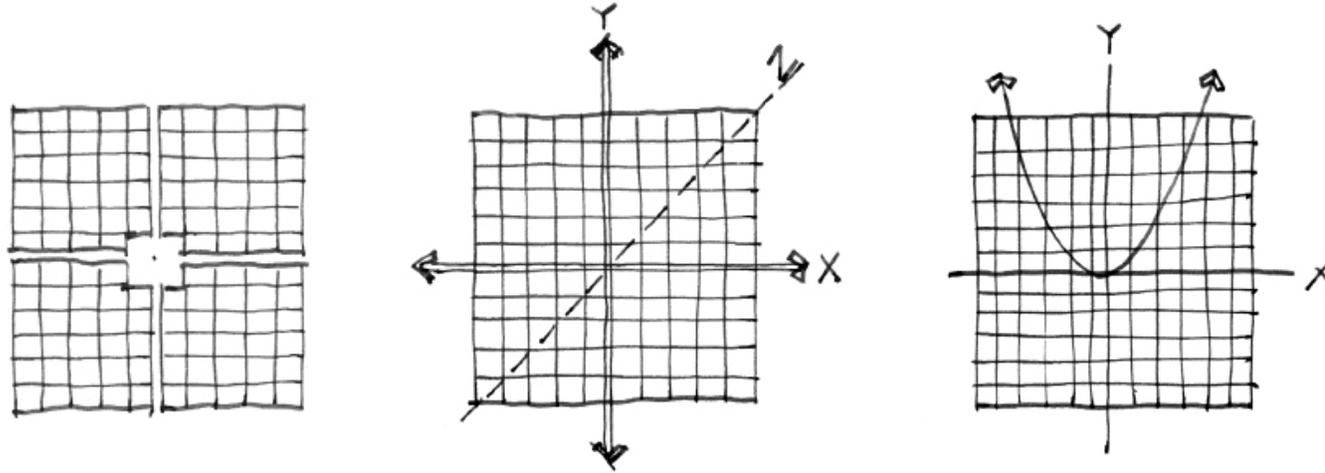
Fig. 2.13. Platonic order was revealed in the extreme by André le Nôtre's garden at Versailles. Drawing by the author.

gardens was lost on ideal new Renaissance cities conceived in plan and on paper. Cities such as Vincenzo Scamozzi's Palmanova (1593), near Venice, were militaristic and geometric impositions on the landscape, with little regard for either people or place (fig. 2.12). Apart from notes on topography and sewerage systems, Alberti's (1404–1472) and Palladio's (1508–1580) influential treatises on urban design (*De Re Aedificatoria* and *I Quattro Libri dell' Architettura*, respectively) make scant reference to, and had barely any conception of, the city's ecological relationships as matters of design.<sup>14</sup> And how could they? Certainly, Leonardo da Vinci (1452–1519) was looking to nature (rocks, water turbulence, and bodies) for deeper order, and Vitruvius (ca. 80–70 BC–ca. 15 BCE) made much of site planning; but, at the time, there was no systemic understanding of how nature and culture are ecologically intertwined, nor was there evidently an ecological crisis to force such a conception.

The intricate weave of culture and nature (and classicism and Christianity) that the Italians modeled in their gardens became excessive displays of hubris by the time the same geometry was stretched across the lowlands of France a century later. Nowhere does the desire for Platonic order become more extreme and more absurd than at André le Nôtre's (1613–1700) garden of Versailles (1664), outside Paris (fig. 2.13). There, in the guise of Apollo, Louis XIV (1638–1715) peeled back the forest, drained the wetlands, and propped himself upon a solar axis that not only made it all the way to the horizon, but also pretended to circumnavigate the globe. The straight line that began in his (back) garden returned to the other side of the chateau as a city, and its power of organization would be carved into old urban fabric and used to set out the new for centuries to come.

Where Renaissance and Baroque gardens ultimately demystified the horizon in the symbolic order of things, it was urbanization through the agency of the grid that would fill in the middle ground. Dating back to Hippodamus's (498–408 BCE) ideal city of Miletus, the gridiron that had served the Roman Empire's imperial ambitions so well would now effectively take the world (fig. 2.14). In 1569, Gerardus Mercator (1512–1594) enwrapped the globe with longitude and latitude, and, three years later, the same logic—enshrined in the “Law of the Indies”—would dictate the morphology of Spanish new towns in the Americas.<sup>15</sup> Indeed, the grid became the preferred system of colonization the world over, and, as the emblem of enlightenment *par excellence*, it was flung across both France and the United States with revolutionary zeal at the close of the eighteenth century.

The x- and y-axes of the grid also provided the armatures of Rene Descartes's (1596–1650) eponymous system of calculus, and it was upon this and Galileo's mechanics that Isaac Newton (1642–1727) constructed his universe (fig. 2.15). An infinite void of absolute space and time, Newton's nature was one in which any moving object could be accurately described and its future predicted with the equation: Force = Mass x Acceleration (fig. 2.16). This became



the crowning intellectual achievement of the scientific revolution. As the poet Alexander Pope (1688–1744) wrote upon the occasion of Newton’s death: “Nature and Nature’s laws lay hid in Night and God said let Newton Be! And all was light.”<sup>16</sup> Although Newton remained a mystic throughout his life, the radical conclusion to be drawn from his three (universal) laws of motion was that heaven and Earth were not different after all. In this regard, Newton wrote human nature into the very fabric of the entire universe; the problem, however, was that this universe was now terrifying in its infinitude and emptiness.<sup>17</sup>

Whilst the scientific and political revolutions of seventeenth- and eighteenth-century Europe placed great faith in nature as a model of order, that very nature was simultaneously reduced to a mere machine. For Descartes, animals were “mere automata” and, for Newton, God a watchmaker (fig. 2.17).<sup>18</sup> These most dangerous of metaphors were translated by more practical men into the actual machines that fired the Industrial Revolution across Europe and with it the veritable inferno of ecological exploitation that continues apace in most parts of the world to this day.<sup>19</sup> Driven by the Industrial Revolution, the trilogy of Christianity, capitalism, and reason, known otherwise as Colonialism, fanned out across the globe with disastrous consequences. From the eighteenth century onwards, European colonizers would survey the “virgin territory” of foreign lands through the lenses of the sublime, the picturesque, and the beautiful only to pillage it. As new cities were planned, peoples and ecosystems were eradicated in terms of these imported and often inappropriate aesthetic denominations.

Appalled by the violence of the Industrial Revolution, aristocrats and artists in both the Old and New World retreated into the landscape’s more picturesque clefts and dreamt of arcadia.<sup>20</sup> The romanticization of landscape as modernity’s “other” gave us the poetry of

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Fig. 2.14. The purest and most enduring expression of urban order is the grid. Drawing by the author.

Fig. 2.15. Cartesian coordinates signify and enable a scientific cartography of space. Drawing by the author.

Fig. 2.16. The parabolic arc of any moving object can be accurately predicted with Newtonian mechanics. Drawing by the author.

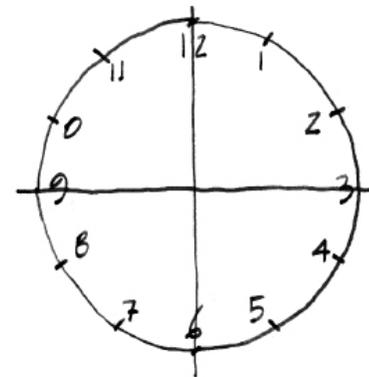


Fig. 2.17. After the Scientific Revolution, the universe was conceived as a clock and God a clock maker. Drawing by the author.

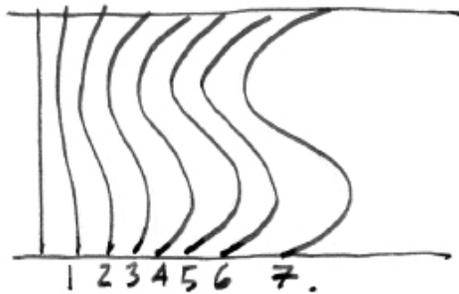


Fig. 2.18. Variations of William Hogarth's line of beauty (1735). Drawing by the author.

Wordsworth, the English garden, and, later, Henry David Thoreau (1817–1862), John Muir (1838–1914), and national parks (1872), but so, too, it reinforced a nature-culture divide and inadvertently reduced landscape to scenery. Landscape became the industrial city's innocent backdrop and, in the hands of the emerging discipline of landscape architecture, its veil. Where landscape entered cities by design, it did so along William Hogarth's (1697–1764) line of beauty (1753) as pastoral parkland, a domesticated nature from which to draw both spiritual and physical refreshment while the real landscape beyond the city was plundered (fig. 2.18). Different though they are in context, both Yosemite and Central Park enshrine the same culture/nature—city/landscape dialectic. Neither tells the truth, but both are beautiful fictions.<sup>21</sup>

Confusion over what nature is, and, therefore, what culture should and shouldn't be was tensioned between John Locke's (1632–1704) belief in a fundamentally benign nature and Thomas Hobbes's (1588–1679) conclusion that the natural state of man is “solitary, poor, nasty, brutish, and short.”<sup>22</sup> This polarization was later exacerbated by the various ways in which Charles Darwin's (1809–1882) explanation of natural selection was interpolated into the sociopolitical arena.<sup>23</sup> Although Darwin could explain evolution's mechanics, he refused to assign direction and purpose to it, and it was into this void that sexist, racist, and speciesist assertions of hierarchy and rights quickly moved. The notion of “survival of the fittest,” as it became known, lent itself to the *naturalization* of capitalist economics and colonial culture. Equally (although he refused a request by Karl Marx to sign a copy of *The Communist Manifesto*), Darwin's theory was used to justify the socialist ideal that society would “evolve” toward the supposedly higher state of communism.<sup>24</sup>

Darwin showed that humanity is made by and subject to the same forces as all living things. As Newton had conjoined culture to the cosmos, Darwin now rooted it in the earth. For science at least, there was no longer any nature-culture divide; but, for society at large, as any trip to the zoo would quickly confirm, nature and culture were on different sides of the fence. Queen Victoria (1819–1901) expressed the somewhat confused sentiment of the times when, upon seeing “Jenny,” the orangutan dressed in nursery clothes and drinking Darjeeling tea at the London Zoo in 1842, said, “He (sic) is frightfully and painfully and disagreeably human.”<sup>25</sup> Despite Darwin's conclusion to *On the Origin of Species* that there is “grandeur in [the evolutionary] view of life,” the deep fear of evolutionary theory was and is because it describes a world that is random and quite possibly meaningless. Darwin leaves us, however, with the seeds of an ecological sensibility when he writes that “. . . disinterested love for all living creatures, [is] the most noble attribute of man.”<sup>26</sup> This “noble attribute” would course through the burgeoning natural sciences of the nineteenth century, culminating, in the twentieth century, in what Paul Sears would refer to as the “subversive science of ecology.” Writing in 1964, Sears explained that ecology “. . . mounted a powerful threat to established assumptions in society and in economics, religion, and the humanities, as well as in the other sciences and their ways of doing business.”<sup>27</sup>

The metaphysical void of modern cosmology and anxiety as to the purpose of consciousness in evolution was largely absolved by the teleology and sheer busyness of industrial progress. From Sir Francis Bacon's (1561–1626) insistence, in 1609, that all of nature be interrogated in order to build a utopia of knowledge to the economist Adam Smith's (1723–1790) theory in 1776 that, through wealth creation, we could reconstruct paradise, the central tenet of modern humanism was that we could make the world on our own terms.<sup>28</sup> By the close of the nineteenth century, Modernity (the process Marx referred to as “creative destruction”) was unstoppable, and, if humans had now decided to become gods, then Faust, as Goethe (1749–1832) had predicted, was indeed their broker.<sup>29</sup>

The various utopian cities that were conceived during the early twentieth century to mitigate the chaos of rapid growth and secure affordable mass housing in an industrial age were also overtly concerned with some form of reconciliation between the city and landscape. For example, the generous greenbelts, transportation networks, and agrarian socialism of Ebenezer Howard's (1850–1928) “Garden City” of 1902 were as close to integration with nature-as-landscape as the city had yet intentionally tried to come (fig. 2.19).<sup>30</sup> Howard's relatively compact villages could not, however, hold their ground against the exponential growth of people and cars during the twentieth century, which, when put together, formed the vast tracts of suburbia now known pejoratively as sprawl (*aka* Price's scrambled eggs).

Seen from the air, suburbia is, for its critics, a malignancy that stands accused of producing the highest ecological footprint and carbon emissions ever known. For its apologists, this city-of-choice for a majority of the developed world's citizens, replete with private gardens and bucolic open spaces, is a relatively innocuous interweaving of natural and cultural systems: a happy hybrid (fig. 2.20). Both perspectives contain aspects of the truth, but the important questions today are: “How can suburbia be ecologically retrofitted in time to come?” and “How can the petrochemical culture of consumption that suburbia manifests be reinvented with renewable sources of energy?” Given that so much of what now constitutes “the city” is suburban, it is remarkable that the avant garde of the design professions both admonish it and do so little to challenge and improve it. Here, the critique and practical alternatives put forward by the Congress for the New Urbanism (CNU), irrespective of their neoconservative aesthetics, warrants acknowledgment.<sup>31</sup>

What suburbia achieved horizontally, Le Corbusier's (1887–1965) unrealized *Ville Radieuse* (1924) tried but evidently failed to achieve vertically (fig. 2.21). Approximately 100 times the density of typical suburbia, Corbusier's city for 3,000,000 was a machine lifted into the air on *pilotis*, so that “primordial” nature could serve as its psychological counterpart on the ground below. This model of urbanism led to the destruction of both natural and cultural landscapes the world over, only to replace them with vast swaths of useless grass and car parks. Nonetheless, the general for-

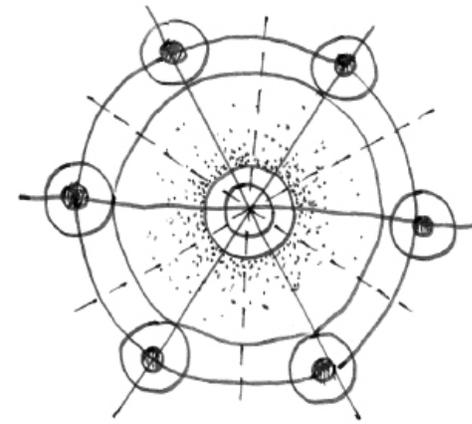


Fig. 2.19. Ebenezer Howard's Garden City (1902) attempted to integrate nature-as-landscape with the city-as-village. Drawing by the author.

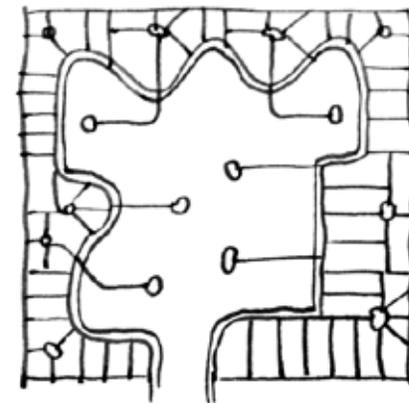


Fig. 2.20. Suburban layouts echo pastoral idealizations of landscape. Drawing by the author.

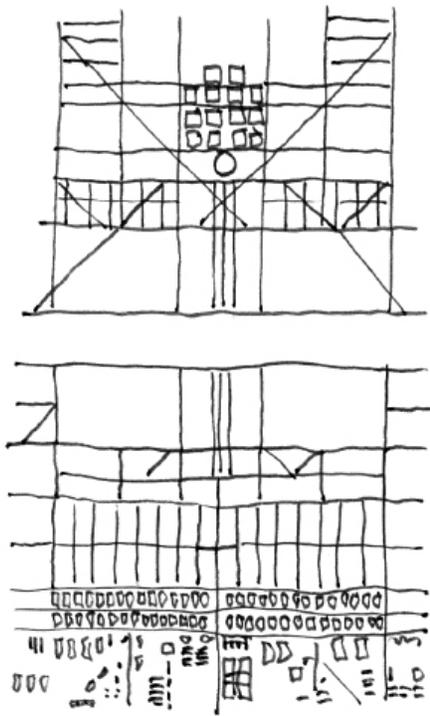


Fig. 2.21. Plan of Le Corbusier's Ville Radieuse (Radiant City). Drawing by the author.

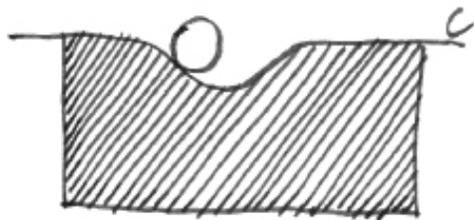


Fig. 2.22. In Albert Einstein's universe, every object shapes and is shaped by space. Drawing by the author.

mula continues to be applied in the developing world so as to absorb the largest rural emigration in history; and, as with suburbia, the design professions have yet to reimagine it significantly on its own logistical terms. From the contemporary perspective of urban ecological performance, the “towers in the park” model could have much to commend it.

While Howard and Le Corbusier conceived of new cities and worried how they would relate to landscape, Albert Einstein (1879–1955) wondered what Nature really is by asking what the world would look like if he were to ride a beam of light. The answer, according to the weird world his mathematics opened up in 1905, is that, as you approach that terminal velocity (186,000 miles per second), you begin to see objects from multiple sides (as Cubism later illustrated). Those objects then lose their shadows and their color, and, more dramatically, what you normally consider to be in front and behind you morphs into a two-dimensional infinite plane to your side. In other words, the future and the past become one.<sup>32</sup>

Most famously, Einstein proved that the amount of energy embodied in something equals its mass multiplied by the speed of light squared. For example, an average human being contains subatomic energy equivalent to thirty large hydrogen bombs. His theorems (1905, 1907, and 1915) showed that all objects have their own space, and their own time, and are related to energy, mass, and velocity. In Einstein's universe, every object is uniquely shaped by space, which, in turn, shapes space (fig. 2.22). Einsteinian space is not an empty absolute backdrop against which events occur (as it was for Newton), nor is it a mysterious ether that holds the planets in their orbits. Although invisible to the eye, Einsteinian space is full—full of electromagnetism and full of gravity—itself the result of how objects and space-time are connected to one another. Just as Newton and Darwin had done, Einstein's description of reality profoundly integrated humanity with its spatial and temporal realities. The ensuing problem, of course, is this: Everything that Einstein explained by way of that integration is imperceptible and barely conceivable. As such, because we habitually perceive a landscape of objects disconnected from one another in a Euclidian void, the essential architecture of the nature-culture divide endures, despite all evidence to the contrary.

Whilst Einstein built his theories on light, its fundamental subatomic properties evaded scientific determination in conventional (Newtonian) terms; that is, at the subatomic level, particles could not be measured without the act of measurement itself affecting the result (fig. 2.23). Insofar as we (can) know, light is both wave and particle. Furthermore, because a given particle's “next move” couldn't be accurately predicted, the possibility that nature is, at its core, indeterminate became both a scientific and cultural reality. Refusing to accept this vagary, in a letter to Max Born in 1926, Einstein wrote famously of quantum physics that “. . . he [God] does not throw dice.”<sup>33</sup>

Unlike Euclidian-Newtonian space, Einsteinian space is curved (fig. 2.24). The geometry of curved space contradicted and transcended the Euclidean geometry that had structured our

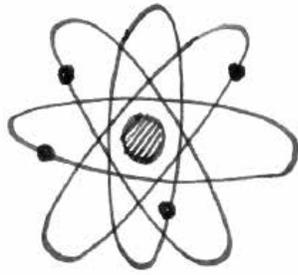


Fig. 2.23. During the twentieth century, interpretations of nature at the sub-atomic level deny predictability. Drawing by the author.

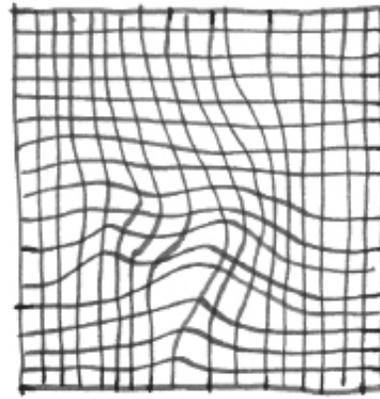


Fig. 2.24. Unlike Euclidean-Newtonian space, Einsteinian space is curved. Drawing by the author.

perspectival and orthogonal sense of space since the time that Euclid's works were published in Alexandria circa 300 BCE. This, along with an acceptance of entropy, is presumably what Marcel Duchamp's (1887–1968) sister was expressing when she strapped Euclid's *Elements of Geometry* (ca. 300 BCE) to her brother's balcony on the Rue Condamine in Paris in 1920 for the weather to wear it away. Meanwhile, Duchamp gave up art for chess—a game of anticipating the probability of the next move.

Indeterminacy resonated throughout twentieth-century art and culture. Jackson Pollock's (1912–1956) paintings, John Cage's (1912–1992) music, and Robert Smithson's (1938–1973) sculpture all explored aspects of chance, as it opened up to entropy and chaos theory (fig. 2.25). The quantum fact that the observer affects the result of the observation also reduced the authority of science as objective truth and encouraged postmodern culture's general inclination to emphasize the subjectivity and context-dependent “construction” of knowledge.<sup>34</sup> As a broad cultural shift, postmodernism thus favored the particularities of “place” over modernist, universal “space,” and it was this emphasis on geographic, biological, and ethnographic specificity that formed landscape architecture's primary theoretical and practical basis during the ensuing century. It would not be until the twenty-first century, however, when landscape architecture would finally begin to free itself from the production of (more or less) static scenery and develop design and planning

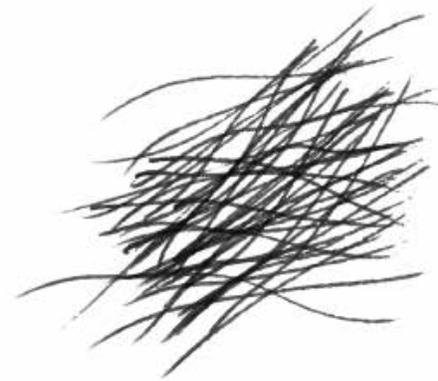


Fig. 2.25. Indeterminacy resonated throughout twentieth-century art, opening up new explorations of chance, entropy, and chaos theory. Drawing by the author.

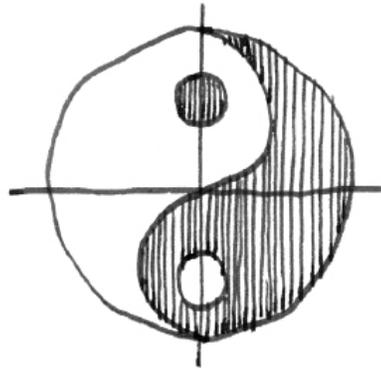


Fig. 2.26. Physicist Fritjof Capra articulated connections between quantum physics and Eastern mysticism such as Taoism. Drawing by the author.

techniques that foregrounded indeterminacy and the fourth dimension as the prime mover of both ecological and cultural processes.

Along with the Holocaust, the detonation of atomic bombs in 1945 marked a terminus between modern and postmodern culture. The epitaph to the modern project of humans becoming gods was aptly provided by the physicist J. Robert Oppenheimer (1904–1967) when, on the occasion of testing the nuclear weaponry he helped design, he concluded: “Now I am become death, destroyer of worlds.”<sup>35</sup> That he quoted the *Bhagavad Gita* and not the Gospel of Saint John can be taken as a symbolic turning point not only for science, but for Western culture more broadly. In Buddhism and Hinduism, the West found a nonlinear universe still full of the spirit it had otherwise drained from its world ever since the Greek enlightenment of sixth century BCE.

Committing a form of postmodern scientific heresy, Fritjof Capra’s *Tao of Physics* (1975) captured the zeitgeist by articulating the poetic connections between quantum physics and Eastern mysticism (fig. 2.26).<sup>36</sup> Capra’s belief in the interconnectedness of all things, which he referred to as *holism*, personified an emerging ecological paradigm shift in the sciences, the humanities, and popular culture at large. Transcending either a capitalist cornucopia or a communist utopia, both of which had by now proven environmentally destructive, the big idea that came to unify and shape global culture during the late twentieth century (and will surely continue to do so) was that of the ecological interconnectivity of all things and global environmental limitations to linear models of growth.

Buckminster Fuller’s (1895–1983) *Operating Manual for Spaceship Earth* (1968), followed by the Club of Rome’s book-length report, *The Limits to Growth* (1972), made the seemingly obvious point that our Earth is finite whilst modern ideas of progress are not.<sup>37</sup> Also, for the first time in urban history, utopias such as Aldous Huxley’s (1894–1963) *Island* (1962) and Ernst Callenbach’s (1929–2012) *Ecotopia* (1975) suggested reconciliation not only between the urban and the rural, but between culture and nature and, more broadly, spirit and matter.<sup>38</sup> These utopias exhibited a deep nostalgia for animism, a so-called “return to nature” that intersected with ecofeminist interests in preurban matriarchy and long-since repressed conceptions of a feminine earth deity.

The Newtonian mechanics, which gave accuracy to weaponry, also put human beings on the moon with a camera in hand, and it was from that distant vantage point that ecofeminism and the modern environmental movement at large would find its ultimate icon. Images from V-2 rockets as early as 1946 had shown the curvature of Earth against the void of space, but none had shown the entire planet as a beautiful object in space until Apollo 8 astronaut William Anders’s photograph known as “Earthrise” on Christmas Eve, 1968. This was followed by the now-ubiquitous “Blue Marble” image taken by the crew of Apollo 17 on December 7, 1972. What Newton, Darwin, and Einstein had described, with their various theories of the precise interconnectivity between humanity and its environment, was now popularly comprehensible in one image.

For the first time in history, instead of looking up humans looked down upon themselves and their terrestrial environment and saw them as one. And if that is so, then it follows that what we do to the Earth, we also do to ourselves. Accordingly, what many scientists such as James Lovelock and many planners such as Ian L. McHarg (1920–2001) pointed out now seemed obvious: We were slowly but surely extinguishing ourselves—and much more besides. Thus, Lovelock argues that the planet’s self-regulatory systems (which wax and wane between ice ages and are perfectly suited to the production and sustainment of diverse life-forms) are now jeopardized by atmospheric carbon levels of more than 400 parts per million.<sup>39</sup> Not to put too fine a point on it, Lovelock predicts that, because of irreversible climate change, Earth, which he refers to as the Greek earth goddess, “Gaia,” will in all likelihood become, as he puts it, “like her dead sibling, Venus.”<sup>40</sup> After reviewing a range of geo-engineering solutions, such as altering the chemical composition of the atmosphere, cultivating algal blooms in the ocean, and launching orbiting shade structures, Lovelock recommends that we simply lock up all remaining habitat *and* construct new ecosystems to sequester carbon.<sup>41</sup>

Given that, currently, more than 15.4 percent of the world’s terrestrial area is presently under some form of protection—7,900,000 square miles (20.6 million square kilometers) across 209,429 different sites in 235 different countries). The Convention on Biological Diversity (to which 195 nations are committed) only requires that another 1.6 percent be secured globally by 2020.<sup>42</sup> This amount might, on first impression, seem paltry but 1.6 percent of Earth’s terrestrial surface is 898,769 square miles (2,327,800 square kilometers), the equivalent of 695,835 Central Parks (fig. 2.27). That is a Central Park with a length of 1,729,989 million miles (2,783,343 million kilometers) at .497 mile (0.8 kilometer) wide stretching seventy times around the world!

The target of an extra 1.6 per cent of protected habitat must also be seen against the rate of ongoing habitat loss, which a recent report in *Science* estimated at 579,153 square miles (1,500,000 square kilometers) or 439,882 Central Parks, between 2000 and 2012.<sup>43</sup> The “project” of now maintaining and restoring habitat on a global scale is unprecedented and quite possibly landscape architecture’s most important calling in the present century.<sup>44</sup>

Restorative measures will find opportunities, where rural landscapes are emptying, as well as threats, where cities and their related infrastructure are expanding. If restoration is planned in a manner that is unrelated to the more powerful processes of urbanization occurring worldwide, then they will be fragmentary, fragile, and unlikely to deliver substantive ecological gains. As studies by the Yale School of Forestry estimate, there will be approximately another 296,526, 457 acres (120,000,000 hectares) of land subsumed into urban development globally by 2030, and much of it in the world’s biodiversity hotspots.<sup>45</sup> Although it is much easier said than done, landscape architects should be on the frontline of this development.

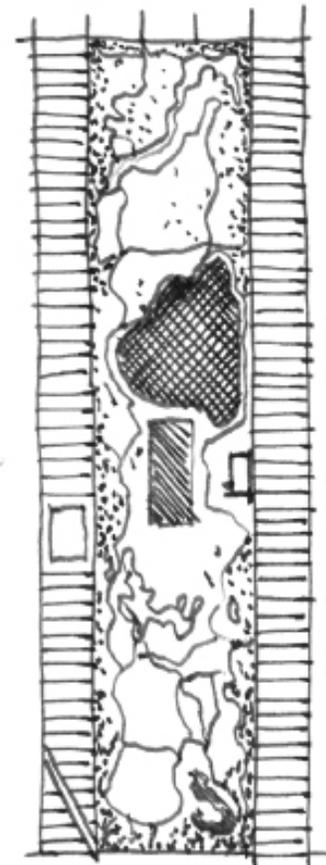


Fig. 2.27. Plan of Central Park (1857) in New York City. Drawing by the author

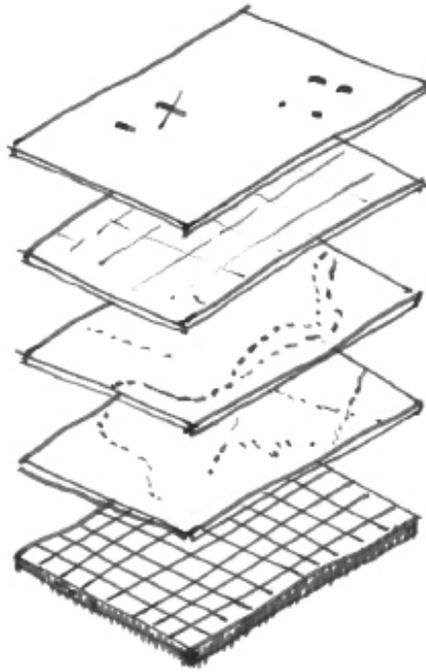


Fig. 2.28. Ian L. McHarg's "layer cake" model for landscape analysis, design, and planning. Drawing by the author.

Although ecofeminists may well agree with Lovelock's essential hypothesis that Earth is a singular, living meta-organism to which we humans are secondary, some have balked at the return of a gendered Earth popularized by his Gaia hypothesis. Scholars such as Donna Haraway perceived the biological conflation of women and nature and the ideal of a return to organic wholeness as both reactionary and impossible. Haraway put it most succinctly when she wrote, "I'd rather be a cyborg than a goddess."<sup>46</sup> As if to pick up where Mary Shelley's (1797–1851) *Frankenstein* (1818) had left off, Haraway embraced the monstrous hybrid of nature and technology that the world had by now become.<sup>47</sup> For Haraway and, soon enough, for Hollywood, the cyborg became a figure of potentially liberatory forms of postnatural identity. Haraway's invocation of the cyborg shifted the politics of ecology and identity from the preurban and prelapsarian to the very frontier of contemporary science. Indeed, if twentieth-century physics had reached a certain impasse inside the atom, it was the scripting of the human genome in 2000 that ushered in the twenty-first, and it is there, in the new splicings of technology and organisms, where the Nature of the present century is being determined. The questions Haraway rightly asks are, "Who is designing this new nature and for exactly what purposes?"

Following Haraway, the whole planet could now be conceptualized as a cyborg.<sup>48</sup> If so, then the image of Earth as "blue marble" is deceptive, for it bears no obvious trace of its denatured condition. A more accurate image of Earth would reveal the jaundiced haze of a carbon-saturated atmosphere replete with space junk. Through this, we would just make out the white-hot glows of the world's forty or so megaregions linked by the pulsing neural system of the Internet. We would also be able to see that this prosthesis is woven through a pallid, scabrous skin, with the world's rivers showing up as varicose veins and our landfills as septic lesions adjacent to the bright green steroid tissue of the world's foodbowls. A spate of books, including Kate Soper's *What is Nature?* (1995), Alexander Wilson's *The Culture of Nature* (1991), Bill McKibben's *The End of Nature* (1989), and Carolyn Merchant's *The Death of Nature* (1983), began to account for this new Earth. The question they posed was not, "How do we return to a pure nature?" but, rather, "How do we now manage the denatured?"<sup>49</sup>

Landscape architecture's most important manifesto in this regard remains *Design with Nature* (1969) by Ian L. McHarg (fig. 2.28).<sup>50</sup> Although he occasionally displayed the traits of an ideologue, McHarg was a complicated thinker, and his impassioned writings are suffused with many of the still-unresolved intellectual and creative tensions between art and science at the heart of the discipline he came to represent. Disgusted by Judeo-Christianity's founding narrative of the "dominion of man over the earth" and its other-worldliness, McHarg articulated a vision of oneness with our Earth instead of the Creator. Reflecting on the target of his critique and the scale of his thinking, McHarg's language was of biblical proportion; and, although he

never mentions it exactly, his thesis is an invocation of the second reading of Genesis in which we are instructed not to dominate the Garden but to “dress and keep it.”<sup>51</sup> In *Design with Nature*, McHarg refers repeatedly to the ideal human as the “good steward.”<sup>52</sup>

McHarg’s world is Aristotelian: biological, creative, and teleological. For McHarg, creativity is not just what artists do, it is the way the world works. Creativity is evolution’s mechanism for resisting entropy or, as he put it, “raising matter up” to new levels of order (negentropy).<sup>53</sup> Creativity is the function by which organisms achieve form, and that form is a direct result of the reciprocal ‘fitting’ of organism to environment. Recognizing this, caring for this, and ultimately “fitting” in with this is, according to McHarg, humanity’s purpose. For McHarg, the city designed *without* nature was “God’s junkyard,” an aberration in the natural order of things.<sup>54</sup> The problem for which McHarg is now routinely criticized, however, is that he reduced culture to a scientific reading of nature. As Ursula Heise explains:

[Th]e basic goal of cultural studies for the last twenty years has been to analyze and, in most cases, to dismantle appeals to “the natural” or “biological” by showing their groundedness in cultural practices rather than facts of nature. The thrust of this work, therefore, invariably leads to skepticism about the possibility of returning to nature as such or of the possibility of places defined in terms of their natural characteristics that humans should relate to.<sup>55</sup>

Even McHarg recognized the deeper problem in his thinking when, in his magnum opus, he confesses that nature is “finally unknowable.”<sup>56</sup> Then how can a prescriptive method of planning ever be so resolutely based upon that which is unknowable? Of course, McHarg wasn’t asking that we design cities in accordance with the ultimate mystery of nature; he was showing how development can be adjusted to fit with the basic flows of landscape ecology, but, even so, the theoretical flaw in his thinking remains.

The twenty-first century movement of landscape urbanism emerged, in part, from this critique of McHargian planning. Whereas emotionally McHarg rejected the city even as he tried to improve it vis-à-vis ecological design and planning, landscape urbanists embraced the city and began to appraise it as a “natural” system beyond good and evil. Whereas McHarg tried to determine the broad-scale future form of the city predominantly through biophysical data and a mimesis of the scientific method, landscape urbanists embrace the subjectivity of the designer and attempt to integrate a diversity of data from across both the sciences and the arts. Whereas the ecology that McHarg based his future city on was a system approaching equilibrium that humans tend to disrupt, the ecology of landscape urbanism is more inclusive, chaotic, indeterminate, and emergent. As Rod Barnett explains in *Emergence in Landscape Architecture* (2013), “[s]ince



Fig. 2.29. The “butterfly effect” of chaos theory.  
Drawing by the author.

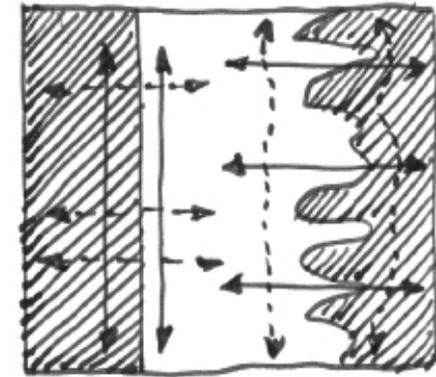


Fig. 2.30. One example of ecologist Richard Forman’s basic principles of landscape ecology.  
Drawing by the author.

neither nature nor cities are in a state of equilibrium, both natural and social structures emerge and converge in a complex process that involves changes from one state to another.”<sup>57</sup>

The important thing then, as with any proposed model of nature throughout history, is to assess and anticipate how theory is transformed into design values and design agency. If the city is now conceived as part of an endlessly “emergent” and partially unknowable nature, then any image of an ideal end point for the evolution of that city necessarily dissipates. The widespread appreciation of indeterminacy in the sciences and the arts has led landscape urbanists to focus less on final forms and grand master plans and more on catalyzing the initial conditions of developmental, ecological, and economic processes. The renowned “butterfly effect” of chaos theory also relates to an ecological (relational) understanding of things, wherein everything that is created or consumed is now best appraised in terms of its life cycle and, in so far as possible, its relational consequences (fig. 2.29).<sup>58</sup> This approach to the design of any given territory is neatly summed up by ecologist Richard Forman, when he instructs, “. . . look at the invisibles and start with the flows” (fig. 2.30).<sup>59</sup>

By extension, designers and planners are now beginning to model entire cities less in terms of their aesthetic morphology and more in terms of their metabolic flows.<sup>60</sup> It is this that makes the discourse of landscape urbanism and its attendant literature of urban ecology most relevant; but, as with all new conceptions of the way the world works and, in particular, with what cities are and how they should be designed, landscape urbanism has met with some vociferous resistance. Most notably, Andrés Duany, the figurehead of the Congress for the New Urbanism

(CNU) and co-author of the edited volume *Landscape Urbanism and Its Discontents* (2013), argues that by trying to incorporate landscape into cities, landscape urbanism threatens the efficiency of those cities.<sup>61</sup> Because of its walkability and density, Duany lauds Manhattan and argues that today's landscape urbanists would not create such a city, because, instead of applying a mechanistic stormwater system and the grid as per the 1811 Commissioner's Plan, they would attempt to daylight the site's original "3,000 streams and wetlands" (fig. 2.31).<sup>62</sup> Rightly, he argues that, if more open space is woven through a city such as Manhattan, its transport systems would be jeopardized and New York overall would sprawl farther afield. Certainly, some misty-eyed landscape architects cannot see the forest for the trees, but Duany exaggerates Manhattan's virtues and underestimates landscape urbanism's potential to reimagine productively the contemporary city.

So what would Manhattan be if a landscape urbanist approach was taken? First, landscape urbanists would zoom out before they zoomed in. As such, a McHargian analysis (which was the progenitor for the now-ubiquitous technology GIS, or Geographic Information System) would be effective in creating a regional framework for the city. Such an analysis may well reach the conclusion that a dense city should be located where we find it today, but such an analysis would almost certainly have precluded development on all the low-lying lands: lands of high ecological value and lands that (as McHarg forewarned with great accuracy) are now threatened by sea-level rise and storm surge.

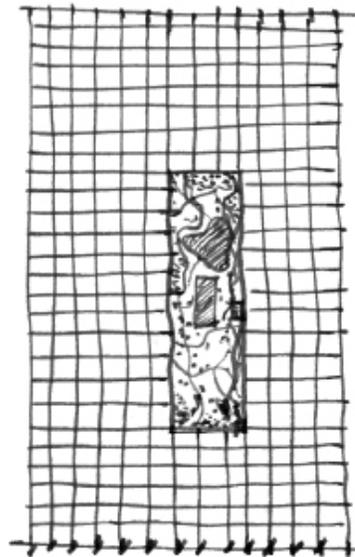


Fig. 2.31. Central Park (1857) sits within New York City's Commissioner's Plan (1811). Drawing by the author.

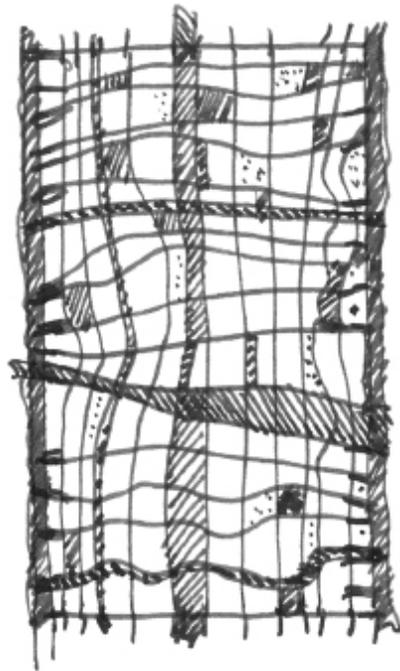


Fig. 2.32. The Manhattan grid reimaged, as if adjusted to topography and with a greater variety of public open spaces. Drawing by the author.

At the scale of urban design, however, Duany has a point: A slavish application of McHargian planning may not give rise to a great city. But landscape architects have long known the design limitations of McHargian analysis, and it is largely out of this experience that landscape urbanism has emerged. Landscape urbanists look not only to hydrology and topography, but to all visible and invisible ecological flows for clues as to how new forms of hybridization between urbanism and landscape can be developed. For example, were Manhattan to be designed again, the behemoth of Central Park could be reconceived as a distributed yet connected system of smaller, public open spaces. This “system” could incorporate some of the “3,000 streams and wetlands” Duany mentions so as to cleanse and retain water, grow trees, cool the air, and support biodiversity. It could also inspire and guide a different plat for the city, which, in turn, would yield new street sections and new building typologies aimed at metabolic performance whilst maintaining density (fig. 2.32).<sup>63</sup> Even as Central Park is iconic and successful, it is not the best of all possible worlds, nor is the machine of Manhattan that surrounds it a model twenty-first-century city just because it isn’t sprawl. In asserting the city as such, as is the case with all the urban models that Duany typically endorses, he runs the serious risk of arresting urban evolution at the turn of the nineteenth century.

When Duany sees Manhattan, he sees streets and blocks. When landscape urbanists see Manhattan, they see a coagulation of matter in otherwise global material and cultural flows. If we limit “sustainability” to LEED (Leadership in Energy & Environmental Design)-rated buildings and walkability, then it is easy to repurpose “new urbanism” as “sustainable urbanism”; but if we appraise the city in all its systemic, global complexity (as, I believe, we must if we are to understand it ecologically), then the prospect of what is meant by landscape (or green or ecological) urbanism cannot be found in historical precedent.

It is unhelpful and even dangerous to continue to see the city set against nature’s backdrop or as something that can be reductively categorized into exclusive types along a New Urbanist transect that fixes “nature” at one end and “culture” at the other (Central Park here and Manhattan there). The city is now *everywhere*, and the world is a hybridized, denatured, co-evolving ecology of our own making. The global city, spread across vast landscapes of resource extraction and waste, is the new nature, and this new nature is suicidal unless we transition cities from their basis in nineteenth-century engineering and move them toward twenty-first-century understandings of ecology. This is, first and foremost, an instrumental project of reducing the ecological footprint of our cities so our planet can absorb an estimated 10,000,000,000 people by the end of this century; but so, too, it is a political *and* aesthetic project of invention. In this sense, the sustainable city is not punitive, moralistic, or merely instrumental; it is a problem awaiting new design solutions ready to be cast in creative and desirable terms.

As I have attempted to show in this essay's historical sweep, for better or worse the design of the city has always reflected larger ideas of natural order and humanity's role and position in relation to that perceived order. This history also teaches us that Nature is always a cultural construct. This knowledge should temper our appropriation of nature in ideological or absolutist terms and question the reduction of the city to cosmological or biological metaphors; but so, too, it should encourage us to build and renovate a city that is appropriate to our times. It matters not whether that city is boiled, fried, or scrambled, but about where the egg comes from and where it is going (fig. 2.33).

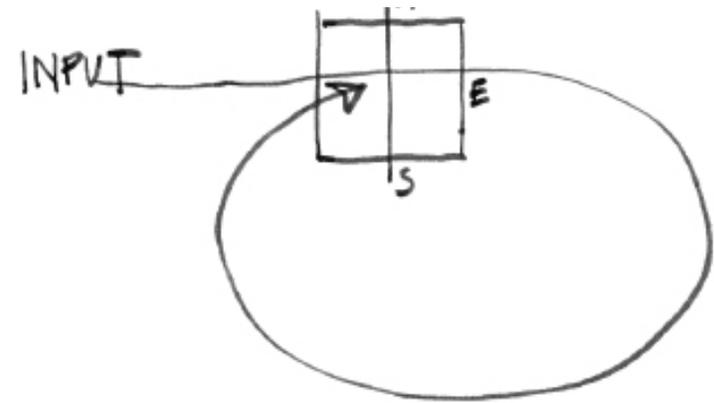


Fig. 2.33. A new paradigm of urban design emerges from understanding the complex and systemic nature of the city's metabolic flows. Drawing by the author.