50-Entry Lexicon for a 21st Century Urbanism

The Lexicon for 21st Century Urbanism was developed by re-visiting notions, concepts and coined phrases used in related disciplines during the past few centuries. It is premised on the idea that the current mainstream vocabulary in fields involved with the built environment is no longer useful for either understanding contemporary challenges or developing the necessary radically innovative responses to them.

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A

1. Adaptive reuse

Most commonly, adaptive reuse refers to the change of an existing building's use when its former function has become obsolete. More recently it has been expanded to include the reconfiguration of large brownfield sites and the creative recycling or reuse of building materials. In more successful projects, a degree of "industrial archaeology" pervades and layers of the past are echoed in contemporary cities and landscapes. As well, the burgeoning green movement within the building industry has also led to the adaptation and retrofitting of existing buildings to meet optimal energy efficiency standards.

2. Agro-ecological zones

Since the mid-1980s, a collaboration between the Food and Agriculture Organization of the United Nations (FAO) and the International Institute for Applied Systems Analysis (IIASA) have developed the modeling of 21st century agricultural development. The conceptualization of agro-ecological zones (AEZ) enables rational land management on the basis of an inventory of context-specific land resources and an evaluation of biophysical limitations and potentials – as opposed to subsidy and politically-driven agricultural practices that systematically require artificial fertilizers. AEZs exists as open-source and dynamic digital global databases of climatic parameters, topography, soil and terrain, land cover and population distribution that also includes AEZ calculation procedures. AEZ metrics hark back to earlier times when customary ways of understanding land and its resources were not standardized. Contemporary urbanism can build on the logic of AEZ as a foundation for future development, where variations in locational assets define both levels and types of territorial occupation (and exploitation) and sufficient areas to safeguard them from development in order to guarantee an ecological balance.

C

3. Climate mitigation / climate adaptation

As the consequences of climate change have ravaged natural and human ecologies worldwide, there is increasing attention in both mitigation and adaptation, with a particular focus on the protection of human health. According to NASA, mitigation – reducing climate change – involves decreasing the flow of heat-trapping greenhouse gases into the atmosphere. Adaptation – adapting to life in a changing climate – involves adjusting to the actual or expected future climate. Contemporary urbanism must simultaneously develop mitigation (through enhancing "sinks") and adaptation strategies (combining the intelligent management of resources, hard and soft engineering and new settlement morphologies and typologies).

4. Climate refugees

In 1990 the Intergovernmental Panel on Climate Change (IPCC) noted that the greatest single impact of climate change would be on an ever-rising tide of human migration – with millions of people displaced by environmental hazards, including shoreline erosion, coastal flooding, extreme heat, drought and agricultural disruption. Since then, various analysts have tried to put numbers on the future flows of climate migrants – the most widely repeated prediction being 200 million by 2050. The stress on areas receiving refugees is not only socio-economic and political, but also ecological and spatial. Host locations are often overwhelmed by population influxes and can only offer limited access to housing, social infrastructure and services. Climate mitigation and adaptation are necessities and the crisis can be an opportunity for architecture and urbanism to boldly rethink conventions, innovative systems and typologies.

5. (Re-)Commoning

From the Victorian economist William Forster Lloyd (1833) to ecologist Garrett Hardin (1968) and on to noble-prize winning economist Elinor Ostrom (2009), there has been a notion of the "tragedy of the commons". Lloyd's description of a hypothetical area of common grazing land, in which villagers all took their cows, eventually led to overgrazing and a loss of the resource. Hardin expanded the notion to other resources and popularized the term. Ostrom took the conceptualization one step further to "common pool resource management". Reclaiming the commons is considered a paradigmatic response to dispossession triggered by neoliberal practices and policies. As a process it involves renewed social cooperation. Spatially, it revolves around repurposing spaces for new kinds of access and value, and includes new collective/public forms of governance or stewardship.

6. Critical regionalism

For architecture historian Kenneth Frampton, the professions of the built environment have a responsibility to resist the flattening out of cultures and places through re-engagement with landscape. In his 1983 "Towards a Critical Regionalism: Six Points for an Architecture of Resistance" Frampton wrote of "the victory of universal civilization over locally infected culture ..." and pleaded for critical regionalism as "engagement in the act of 'cultivating' the site ... (where) the idiosyncrasies of place find their expression without falling into sentimentality" (Frampton 1983:17, 26). He underscored the importance of topography, climate and tectonics and drew attention to the richness of the non-Western canon.

7. Critical zone

A National Science Foundation (NSF)-sponsored workshop (Frontiers in Exploration of the Critical Zone) at the University of Delaware in 2005 marked the worldwide introduction of the concept of the critical zone. More recently the French philosopher Bruno Latour has popularized the term. Critical zones are the near-surface environments of the world. Rock, soil, water, air and organisms interact in the critical zone and define or regulate natural habitats. In a particular way the interactions produce life-sustaining resources and are, as such, critical for the survival of (almost all) terrestrial life. Originally a wide range of life forms transformed the geologies of the Earth into critical zones, which were, in turn, impacted by human intervention. The systemic study of critical zones in the last decades both illuminates the complexity of this thin layer as well as its extreme vulnerability, hence the adjective critical. One could think, perhaps as von Humboldt would have centuries ago, of the critical zone as the area where the web of life anchors itself to the world.

8. Cyclic systems

Building on research from the 1970s, William McDonough and Michael Braungart published "Cradle to Cradle: Remaking the Way We Make Things" (2002), where they underscored the need for biomimetics – the emulation of natural processes in the design of products and territories. Cradle to cradle (C2C) is a wordplay on the phrase "cradle to grave", implying a cyclic nature of that which benefits future generations. Integrated resource management and 21st century circularity focuses on the elimination of the notion of waste (and wastelands) through the three Rs – recycling, renewing and reuse. Materials are likened to nutrients that circulate in healthy metabolisms and ecosystems. It entails a fundamental value shift that upsets the classic contest between ecology and economy. Circularity and cyclic thinking are an invitation to transform function as well as the meaning and value of space. A resource-cycling circular economy implies the capacity of space to accommodate a multitude of successive and/or simultaneous uses and the power of natural ecologies to regenerate.

D

9. Deep decarbonization

Decarbonization is the reduction and elimination of carbon dioxide through strategizing and recalibrating development. In the historic December 2015 Paris Agreement, delegates from 195 nations voluntarily pledged to curb carbon emissions in order to avoid the worst effects of climate change. Deep cuts to carbon emissions in every major sector – power, agriculture, industry, transportation, building and infrastructure – of the world's economy is required. Concrete and steel construction is responsible for over 10% of the world's carbon emissions. There is an urgency to both retrofit existing buildings (with green roofs and green walls) and reimagine new construction through employing new technology and reappropriating climate-sensitive and passive heating/cooling methods. There is great promise in engineered timber or cross-laminated timber (CLT), which is renewable, lighter and less noisy to construct. Within the built fabric, urban vegetation and forestry can not only sequester carbon, but also improve biodiversity and water management, mitigate the heat island effect and contribute to a healthier environment.

10. Deep ecology

Arne Næss, a Norwegian philosopher, coined the term "deep ecology" in the early 1970s. He differentiated between "deep" and "shallow" ecology. The shallow ecology movement was succinctly summarized as a "fight against pollution and resource depletion. Central objective: the health and affluence of people in the developed countries". Conversely, the "deep, long-range ecology movement (DEM)" rejected "the man-in-environment image in favour of the relational, total-field image". The principle of the relational, total-field image is that every organism is defined by a complex web of interrelations with other organisms – humans and other living beings. The inherently anti-anthropocentric notion embraced what Næss termed "biospherical egalitarianism". Fieldwork was considered an essential component of deep ecology and was an indispensable complement to political action and policy development that focused on the long-range sustainability of natural systems. Næss' recognition of the necessity of a deep and total view of ecology to address the global ecological crisis is as relevant today as it was when he initiated the notion half a century ago.

11. Desakota

Desakota – from Bahasa Indonesian, "village" (desa) and "city" (kota) – is a term developed by the geographer Terry McGee in 1987. For McGee, Desakota described the extended metropolitan region of Jakarta (Jabotabek), an area unamenable to conventional urbanization models. Rather than drawing a population from rural areas to the city, Jakarta's in-situ urbanism was invigorated by (post-) industrial activities into densely populated agricultural regions. A spatially fragmented peripheral settlement pattern resulted with the overlapping of functionally independent entities, materializing in traditional agriculture existing alongside industry (capital-intensive and cottage industry), entertainment (film, themes parks and golf courses), retail (malls and strip shopping) and housing (from squatter housing to gated communities). Desakota regions are often considered to have a degree of ephemerality and are often "blind spots" in which planning regulations are not enforceable in any uniform way. They resist being taken-up into a more formal system of inter-connected, functionally specialized zones. In the abstract, Desakota represents a synergy between urban and rural, the consumptive and productive landscapes, and can become a deliberate form of urbanization.

12. Disruptive technology

Disruptive technology was a term coined in 1997 by Clayton Christensen, a Harvard academic and business consultant, in his book "The Innovator's Dilemma". It focuses on revolutionary change, as opposed to incremental change, and supersedes an older process, i.e. project or habit. Christensen discussed how "upstarts" (often related to technological innovation/innovators), rather than established companies, are the usual source of disruptive technologies; they have flexibility, take risk and are capable of instigating profound change. Notable disruptive technologies of the past have included steam engines, electricity and computers; all have had a major impact on the structure and function of cities. Machine learning and artificial intelligence (AI) are the next major disruptors, ranging from the widespread use of algorithms to robotics.

E

13. Ecological floors

The notion of ecological floors developed in the Andes from the early expeditions of Alexander von Humboldt (1769–1859) to the anthropological work of John Murra (1916–2006), topographically determined "floors" which embody specific climatic conditions, relief, (sub)soil, hydrology, sun and wind exposure, flora and fauna. Ancient populations occupied a multitude of dispersed fertile pockets and established discontinuous vertical archipelago settlement configurations. Field dispersal, food storage and preservation techniques improved survival chances during bad years.

The complementary resources across ecological floors led to mechanisms of reciprocity and regional interchange. The notion of ecological floors reappears currently in landscape urbanism approaches that advocate anchoring land use to locational ecological assets that have the capacity to regenerate.

14. Ecological infrastructure

Two canonical books, one by the Scottish-American landscape architect Ian McHarg, "Design with Nature" (1969) and another by the British-American historian Reyner Banham, "Los Angeles: The Architecture of Four Ecologies" (1971) challenged the then-prevailing paradigms of designing and understanding urbanism. McHarg offered an alternative to development which relentlessly flattened territories and disregarded ecological systems by advocating strategies that conformed with ecology rather than competed with it. Banham juxtaposed natural ecologies with artificial ecologies and embraced a concept of dynamic equilibrium. They both brought ecology to the forefront and both implicitly and explicitly referred to the performance of infrastructure with and as natural ecosystems. In more recent decades, water and vegetal (blue and green) ecosystems have gained traction as infrastructure – to both guide new urbanization and to restore disturbances. Amongst the plethora of terms linked to contemporary ecological infrastructure is urban forestry, constructed wetlands, rain gardens, bioswales, green/blue roofs and green facades. Since the time of McHarg and Banham, and continuing to today is the notion that ecological infrastructure is for the benefit of humankind, a way to live with nature. The concept must also be tailored to other than human species to become a robust ecological infrastructure for a damaged planet.

15. Environmental history

Environmental history studies human interaction with the natural world over time. The well-known environmental historian William Cronon underscored that nature and culture cannot be separated into distinct units and that it is fundamentally wrong to assume "wilderness" as the equivalent to a nature apart from humans. It developed in the wake of the environmental movement of the 1960s and was founded on conservation issues. However, it quickly broadened its scope to include, amongst others, cities whose intertwinement with the natural environment has only been increasing. As a reaction, the disciplines of architecture and urbanism expanded their perspective to natural environments. Architecture and urbanism were repositioned as forms of environmental design (as exemplified in the renaming of the School of Architecture the College of Environmental Design in Berkeley) – with environmental design conceptually understood as an instrument to more radically and consciously direct environmental evolution. As such, environmental history is an inherent attribute of the narratives that environmental design produces.

F

16. Forest urbanism

Forests are self-regenerating ecosystems. For centuries, forests have been planned, systematically exploited and maintained; often this management predated and was more extensive and sophisticated than town planning. At the same time, throughout the history of urbanism, there has been an interweaving of structures of forests and patterns of trees with urban armatures and tissues. Forests have traditionally formed the counterfigure of the city (sometimes as forms of urban forestry), been embedded in the city or complemented the city. Contemporary research in land management, forestry and urban ecology can more vigorously inform urbanism. Urbanism can more radically integrate urban forestry into its domain.

17. Frontier thesis

The "frontier thesis" advanced by Frederick Jackson Turner (1861–1932), a historian of America's Great West in the 19th century, critically depicted the process – the moving frontier line – of expanding populations across a territory. He unraveled the myriad changes implicated in crossing a continent, including the domestication of nature, internal colonization of other peoples and the interdependencies of settled/unsettled and culture/nature. Despite his geographical focus and Turner's link of the process to a distinctly American democracy, his insights underscore a primary driver of development, namely the promised land of the unknown, uncivilized "free land" replete with abundant resources.

H

18. Half earth

The bold environmental prescription proposed by the evolutionary biologist Edward O. Wilson in his impassioned 2016 book "Half-Earth: Our Planet's Fight for Life" is to set aside roughly half of the planet as a permanent natural preserve, undisturbed by humans. Although Wilson gives no clear practical propositions, he claims that already identified areas of ecosystems with strong biodiversity need to be conserved at all costs, while (particularly in the industrialized world) nature can be restored through the linking of patches to create vibrant non-human wildlife corridors. He pleads for the re-establishment of the interconnectedness of systems, of flora and fauna, in the manner in which thinkers like Alexander von Humboldt once described as the "web of nature".

19. Heterarchy

The concept of heterarchy was primarily developed from the political ethnographic and anthropological work of Pierre Clastres' study of Amazonian communities who have no hierarchical political relations. In the Amazon, chiefs are at most arbitrators and mediators. Heterarchical society defies hierarchical institutions, spatial centralities and consumerism of any kind, hence it induces neither linear production nor consumption processes. It is closely related to James Scott's conceptualization of anarchism. Heterarchy becomes extremely relevant when understood in relation to Bruno Latour's notion of collectives comprising humans as well as non-human entities. As such, the concept of heterarchy – absent in Marxism as well as in liberalism – is key to an alternative ecological understanding of the world that becomes more and more urgent to grasp.

20. Hydraulic civilization

In the 1950s, the historian and sinologist Karl Wittfogel set forth a thesis that "hydraulic societies" and despotism were functionally connected. In naturally arid regions, he argued, only an absolutely obedient, virtually enslaved regime can mobilize the concentrations of labor needed to operate and maintain the irrigation canals and dikes on which intensive agriculture depended. Wittfogel also commented on regions of wet-rice cultivation, which require a relatively equitable distribution of water and necessitate a system of canals, dykes, irrigation canals, terraces and locks to regulate water levels. The comprehensive system of the "hydraulic civilization" employed extensive labor to not only create productive water works (for irrigation and drainage) and protective water works (for flood control), but also to provide drinking water and communication conduits. Urban water control in Asia reveals highly structured rural and urban (territorial) systems that are physically and symbolically linked to technologies, religious beliefs, cultural and social practices and power structures all related to water. Wittfogel's hypothesis of a "hydraulic civilization" clarified a nature/human, water catchment/settlement relationship that, leaving the despotism argument aside, needs to once again become a fundamental series of relationships to be understood, interpreted and (re)designed.

I

21. Indigenous landscape urbanism

Despite claims of novelty, landscape urbanism has at least two, millennia-old roots: One grounded in an intelligence borne of necessity that led ancient civilizations to seek a balance in creating their settlement structures with, by and through the (constructed) landscape, and a second stemming from the history of both landscape architecture and urbanism themselves. Bernard Rudofsky's "Architecture Without Architects: A Short Introduction to Non-pedigreed Architecture" (1964) and numerous works of the British architecture historian Paul Oliver (1927–2017) on vernacular architecture document the ingenuity of humankind's ability to adapt to the environment through patient, pragmatic adjustment to circumstances using sophisticated means and logic that work with nature. Indigenous landscape urbanism created marvelous civilizations – whereby the landscape was the strategic asset for development. Indigenous landscape urbanism was inscribed within territories where the slightest differences of topography and relationship to vegetation, soil and hydrology was all-important. Non-nostalgic lessons from history can inform contemporary projects that (re)balance human and natural ecologies.

22. Innovation ecosystems

During the 1990s, the notion of ecosystems – the flow of material and energy – infiltrated numerous fields, even including business and economics. The coupling of innovation (newness and value creation) with ecosystems was a move away from linear and/or hierarchical systems towards a dynamic open constellation of inputs and outputs interacting with the environment. In business, innovation ecosystems depend on embracing technological innovations with an interconnected set of stakeholders, including governments, civil society, the private sector, universities and individual entrepreneurs. With regard to contemporary urbanism, it is clear that the field must maximally exploit the potentials of smart technology and include state-of-the-art investment economies and natural ecologies. However, it is not enough to merely plug in alien and independent "innovations" as a formula that can be applied and simply expected to qualitatively change territories. The ever-evolving ecosystems of innovation need to complement healthy and robust natural ecosystems in order to develop a truly sustainable transformation, and the application of innovations always has to be tailored to the specificities of local environments.

L

23. Land ethic

The term "land ethic" was coined by Aldo Leopold (1887–1948), known as the father of wildlife ecology, in his canonical "A Sand County Almanac" (1949). Most simply, it can be described as a moral responsibility humans have to the natural world – land and animals. Leopold presented the land ethic not as an absolute, but as a product of social evolution, part of an intellectual and emotional process: "An ethic to supplement and guide the economic relation to land presupposes the existence of some mental image of land as a biotic mechanism. We can be ethical only in relation to something we can see, feel, understand, love, or otherwise have faith in". The land ethic can be understood by "thinking like a mountain," which stemmed from his experience of a wolf's death as viewed from the perspective of a mountain and how the removal of a single species could have negative consequences for larger ecosystems. He concluded that "in wildness is the salvation of the world. Perhaps this is the hidden meaning in the howl of the wolf, long known among mountains, but seldom perceived among men". To think like a mountain is to profoundly appreciate the deep interconnectedness of individual elements within ecosystems. Since Leopold's coining of the term "land ethic", there have been numerous studies about the subject, perhaps culminating in a number of countries (New Zealand, Bolivia, Ecuador) including "rights of nature" in their constitutions.

24. Landform/Earthwork

Traditionally, the workings of urban and rural regions are the result of a subtle and fragile balance between water and land and permeable and impermeable surfaces, organized by territorial hydraulic systems of water management and soil stabilization. The primitive logic of "cut-and-fill" and differences in micro-topography were a deliberate and powerful design tool for transforming the surface of the earth. Levels of inundation determined distinct land uses, and therefore the definition of wet/dry, productive/inhabited, and safe/unsafe component parts of the land mosaic was considered essential. Today there is a need to reimage landform and explicitly design sectional richness: the creation of micro-topographies for water to flow and ecologies to thrive in; for steps and ramps for people to gather and circulate; for dry season programs in flood-prone areas; and for architecture to have a topographical character and animate sites. Interestingly, as expressed by Kenneth Frampton, the megaform (as a landform, as ecology) also offers a form of resistance to the endless homogenization of the environment "as an element which due to its size, content and direction has the capacity to inflect the surrounding landscape and give it a particular orientation and identity".

25. Limits of growth

In 1968, a group of scientists, business leaders and academics from around the world founded the Club of Rome. They were concerned that continuous growth had to be kept in check in order to avert a planetary collapse. "The Limits to Growth: A Report to The Club of Rome" (1972), by Donella H. Meadows, Dennis I. Meadows, Jorgen Randers and William W. Behrens III, predicted the collapse of the world economy in the 21st century. The group created elaborate computer models of the future using five parameters: accelerating industrialization, rapid population growth, widespread malnutrition, the depletion of nonrenewable resources, and a deteriorating environment. Their work was premised on that of their MIT colleague Jay Forester, who developed "system dynamics" which recognized that the structure of any system – the many circular, interlocking, sometimes time-delayed relationships among its components – is as important in determining its behavior as the individual components themselves. The book called for a zero-growth policy which would require the worldwide redistribution of income and wealth, both within and between countries. Its central message is today more relevant than ever before: Humanity can create a society to live indefinitely on earth if, and only if, limits are imposed on the use of resources and the production of material goods. The renewal of natural resources and reuse are conditions sine qua non.

M

26. Managed retreat

Throughout history, settlements have prioritized sites with locational assets – near natural resources, on higher terrain, areas with favorable climates, etc.

Location, location, location was a 20th century mantra, but it has in fact propelled territorial organization for millennia. Today, the consequences of climate change drive a fundamental reassessment of appropriate sites for territories of both settlement, infrastructure and production. Existing and planned development must genuinely consider risks associated with wildfires, tsunamis, typhoons, earthquakes, erosion/landslides as well as increased river flooding, sea level rise (with inundation and saline intrusion), rising temperatures and drought, among other things. In recent decades, the notion of managed retreat – the purposeful, coordinated movement of people and assets out of harm's way – has gained traction as a proactive adaptation strategy. To date, many instances of managed retreat have occurred following a disaster, where post-storm property buyout programs skip the rebuilding process and relocate "en masse" to safer areas. A remarkable exception is in the low-lying Pacific nation of Kiribati, where the government has bought land in Fiji to secure future refuge for its citizens. Evidently, managed retreat is as much a technical issue as it is political, economic and ethical. There are a host of questions that need to be seriously considered in order to benefit from managed retreat (including the re-establishment of ecosystems) without exacerbating existing burdens to economically vulnerable populations and devouring new greenfield sites.

27. Mosaic

In landscape ecology vocabulary, mosaics (or matrixes) are defined as the overall structural and functional integrity of landscapes. Water and vegetal corridors interconnect and form networks and enclose other landscape elements. Networks, in turn, have various connectivity, circuity and mesh sizes. Networks demonstrate the functioning of landscapes and can be manipulated to facilitate or inhibit flows and movements across a land mosaic. Landscape changes across different spatial scales need to be addressed in order to maximize the protection of biodiversity and natural processes. The language of landscape ecology provides a means with which to rethink urbanism; its terminology can easily be translated into strategies and techniques for the analysis and design of territories. Landscape ecology's interconnected notions of structure, function and change are invaluable concepts in understanding and designing the dynamic restructuring of mosaics of the future.

N

28. Nature preservation/ conservation

The United States has long been credited for beginning a popular movement to protect open space. At the turn of the 20th century, there were two radically contrasting views on how to manage wild lands. John Muir (1838–1914) – a Scottish-American naturalist whose work resulted in the founding of the National Park Service (1916) – promoted preservation while Gifford Pinchot (1865–1946) – the first Chief of the US Forest Service (1905) – advocated conservation. Preservation was a land management system which sought to protect iconic open spaces and permitted little to no industrial profit from designated lands. Conversely, managed conservation allowed the "sustainable" use of nature by humans, for activities such as hunting, logging and mining. The international conservation movement was formalized by the International Union for the Conservation of Nature and Natural Resources (IUCN) in 1948 and the subsequent creation of the World Wildlife Fund (WWF) in 1961. From the onset, both nature preservation and nature conservation were inextricably tied to colonialism and the suppression of indigenous communities. Privileged modes of knowing and relating to nature trumped local knowledge and ways of organizing socio-natural life. Horrific acts were committed in the name of preservation and conservation. In the contemporary era of the "sixth extinction", as ecosystems collapse worldwide, the protection of nature has taken on renewed urgency and demands fundamental reconceptualization.

P

29. Palimpsest

In his canonical text, "The Land as Palimpsest", Andre Corboz starts from the observation that land is not a given commodity, but results from various processes, not the least of which is human activity – from the most drastically heavily engineered infrastructures, such as dams, to everyday agricultural practices – that turn the land into an increasingly remodeled space. Inhabitants of land "tirelessly erase and rewrite the ancient scrawls of the soil". Land has become the object of construction, a type of artefact, however, it is a form that perpetually changes. The breadth and thickness of land is similar to a palimpsest – an ancient text in which writing has been removed and covered or replaced by new writing. During the Industrial Revolution, the land as "tabula rasa" was commonplace. Fortunately, in recent decades urbanism has included an understanding that land actually results from lengthy and slow stratifications that are essential components of its nature, which must be considered before any new transformation is pursued. Understanding land as a result of consecutive operations gives urbanism the opportunity to develop its considered and meaningful use. Ultimately, land is a limited and irreplaceable resource. Each piece of land is unique, and not a disposable consumer product. It is an element, a richly layered palimpsest, that needs to be recycled, "perhaps after scraping clean the ancient text where men have written across the irreplaceable surface for the soil", as Corboz would say, in order to make it available again so that it meets today's needs. It goes without saying that humans are not the only manipulators of land, but that nature, in the broadest sense of the world – from geology to hydrology to botany – is also a strong agent of change.

30. Patches

Again, referring to ecological terminology, patches are defined not as islands, but as (non-linear) surfaces differing in appearance from their surroundings and exhibiting a degree of idiosyncrasy. They are sub-categorized as remnants, introduced, disturbance and environmental patches. The size, location and number of patches in a territory influences the "sustainability" of the patch. Explicit relationships between different spatial and temporal scales of patches, with patches embedded in patches, has reformulated simplified notions of the so-called balance of nature, stability and equilibrium. "Patch dynamics" refers to the complex processes (natural and anthropogenic) of scale-dependent hierarchical patches and their contribution to the rich heterogeneity of landscapes and relative degree of patchiness in the environment. Patchiness is both scale and organism-dependent. The importance of the relatively new conceptualization of patches for urbanism is that scale and time critically matter in the reading and transformation of ecological systems – natural and urban ecologies. The reading of territories as having heterogenous and disconnected patches merely underscores the notion of transient dynamics, nonequilibrium and instability, as well as the importance of pattern and process.

31. Polytechnicity

In his monumental "Technics and Civilization" (1934), the American historian and philosopher of technology Lewis Mumford (1895–1990), made a categorical distinction between monotechnics and polytechnics. For Mumford, monotechnics are technologies that for their own sake oppress humanity. Monotechnics concentrate on a conventional and narrow understanding of technology. The highway could be considered as a prototypical example, in that it relies solely on cars. Conversely, polytechnics combine a multitude of technological modes. As such, they provide comprehensive frameworks that are flexible by nature and can hence better solve human problems. The boulevard is a prototypical example that can accommodate very different modalities of transport (pedestrians, bikes, cars, motorbikes, buses, tramways, etc.) and function simultaneously as a connector and as a collector, as well as simply being a space of transformation and action. Polytechnical structures adapt themselves over time to accommodate new uses (for example, the boulevard was once a military defense structure). In the era of expanding technology that will be unleashed on the world, an emphasis on polytechnicity is essential and should always include the expansion of the public realm as a necesssary additional benefit.

32. Promiscuous landscapes

The British-American geographer Denis Cosgrove (1948–2008) elaborated on the notion of promiscuous landscapes while comparing the Veneto region with Los Angeles. He has traced the transformation of the Veneto's Palladian landscape into the "citta diffusa" of the late 20th century, when the successful postindustrial economy grafted its own residues onto the territory inherited from antique Roman occupation, the mid-sixteenth century Palladian landscape and successive waves of water-engineering projects. He compared the Veneto to the more recent history of the "post-modern landscape" of Los Angeles in order to understand and manage "the new cultural economy of space". In the Italian context, "promiscuity" refers to the looseness and apparently improper combinations of programs and structures that shook up the mix of farming villages with their characteristic "campanili" and family farms. Nowadays, they are colorfully and often rather brutally accompanied by new residential, commercial, service and industrial buildings, ranging from high-tech to banal. In addition to the blurring of the canonical dichotomy, i.e. urban/rural, artificial/natural and figure/ground, the Veneto has also turned conventional zoning concepts upside down, which is most clearly evident through its proliferation of small and medium-size enterprises that are indiscriminately scattered like confetti over the agricultural territory. This area has now turned into what Paola Vigano would label a "horizontal metropolis" and could certainly be qualified as heterarchical.

R

33. Reciprocity

The Ukrainian-American anthropologist John Murra (1916–2006) drew attention to the notions of reciprocity and solidarity through his study of Andean civilizations. Murra characterized Andean settlements as an archipelago model of vertical control, intelligently making use of the complementary locational assets offered by different ecological floors, and which were simultaneously dependent on reciprocal exchange relations between different groups occupying different floors and having complementary skills of specialization. It is evident that the vertical archipelago is embedded within the majestic Andean landscape. Karl Polanyi (1886–1946), an Austro-Hungarian economic anthropologist, considered reciprocity as one of the

three fundamental forms of (societal) integration besides redistribution (i.e. a public mechanism of solidarity) and market exchange (that was alien to Andean civilizations). Societies, according to Polanyi apply a combination of these three patterns to acquire unity and stability.

34. Rewilding

Contemporary ecological science has its own lexicon built upon a re-word: ecological restoration, river restoration, re-naturalization, re-earthing, etc. The Society for Ecological Restoration defines ecological restoration as "the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed". In 1991 the Wildlands Project/Wildlands Network in the United States heralded in the notion of rewilding, defining it as "the scientific argument for restoring big wilderness based on the regulatory roles of large predators," and premised on the notion of three Cs,i.e. cores, corridors and carnivores. The return of keystone species – those with a disproportionately large effect on its natural environment relative to its abundance – is central to rewilding in terms of holistic landscape restoration. At the same time, there has also been a focus on the plant community rewilding of agricultural and managed forest areas, which seeks to return them to their pre-clearance state. In recent years, rewilding has become part of popular environmental discourse and combines productive land abandonment with species introduction. The European Rewilding Network (established in 2013) promotes projects that manage succession in order to allow nature to do more and humans less.

S

35. Sheds

Sheds are part of a geographical understanding of space and encompass the flow of a substance from its origin to its ultimate destination. A watershed is the land area that "sheds" water into a body of water, which is determined by topography and links ridgelines to valleys. Food sheds, on the other hand, are defined as the area that produces food for a specific population, linking cycles of production and consumption. Recently, food sheds have become nuanced to include food deserts (an area with limited access to affordable and nutritious food), food mirages (an area which appears to have adequate food access, but which is actually obscured by social exclusion) and food swamps (an area where fast food and junk food are much more available than healthy alternatives). Finally, there are waste sheds. From the 1970s onwards, environmental consciousness motivated many public authorities to restructure conventional waste management, shifting from the indiscriminate dumping of ever-increasing waste flows in landfills or incinerators to the differentiated collection of materials such as used paper, household biodegradables, wood, glass, biomass waste from agriculture, gardens and landscape management, and metals, etc. Material by material and step by step, waste sheds initiate cyclic processes. The layered logic of waste sheds restructures urban territories into more metabolic environments. Finally, it is evident that sheds of different natures (watersheds, food sheds, biomass and waste sheds) are interdependent.

36. Shifting cultivation

Shifting cultivation is a traditional agricultural system in which patches of land are cultivated temporarily, are then left fallow for long periods to regenerate and are eventually recultivated in a circular process that occurs over decades. In opposition to the use of modern technology or artificial fertilizers in sedentary agricultural systems, the restoration of soil productivity simply relies on nature. Shifting cultivation includes the subtle development, often occurring over generations, of environments – as for example palm groves which arise from left-behind palm seeds. Sometimes fallow lands are in fact orchards or secondary forests which increase their resourcefulness (plants and animals useful for humans) in comparison with primary forests. In shifting cultivation, land patches are often (temporarily) cleared by slash-and-burn methods. Ashes add potash to the soil. Although critics blame shifting cultivation for deforestation and advocate conventional modern agriculture and forest logging, which are seen as more appropriate techniques, interest in it is growing as a sustainable approach that embeds human activity within a natural system. Ultimately, shifting cultivation is one way to reverse the destruction of nature by modern cultures and instead develop a hybrid construction of nature.

37. Small is Beautiful

In 1973, German-British statistician and economist E.F. Schumacher published "Small is Beautiful: A Study of Economics as if People Mattered". He critically investigated neoliberal capitalism and what he dubbed a 20th century fascination with "gigantism" and the dehumanizing systems that accompanied it. Schumacher opposed the ubiquitous belief that technology could solve all of humankind's problems, and fundamentally questioned the dominance of profit-based economics. He disparaged the widening gap between the rich and poor and the squandering of non-renewable resources. He advocated "distributed intermediate technologies" – more efficient and productive than primitive technology and more labor-intensive than advanced technology – as an alternative to large-scale capital-intensive development, particularly in developing economies. In addition to the intelligence embedded in Schumacher's advocacy for dispersed, small-scale infrastructure, he also stressed the indivisible link between the health of cities and the health of the countryside.

38. Soft engineering

Most generally, soft engineering uses living material and natural elements, as opposed to the fabrication of an organized structure with static, human-made materials, in civil engineering projects. For millennia, various cultures throughout the world have developed ingenious methods of traditional engineering. In the past half a century, soft engineering has been formally developed as environmental engineering and ecological engineering. Although similar, the former can be understood as a variation of conventional engineering that is designed from an anthropogenic perspective, albeit with living materials, while the latter embeds the natural process of self-organization and the logic of ecological systems. Ecological engineering demands coevolution with the environmental context. The challenge is to create non-linear and adaptive systems which can withstand unpredictability and thrive through inherent flexibility. In the face of contemporary challenges, it is evident that ecological engineering is the way forward.

39. Soil conservation

Scientifically defined, soil conservation is the prevention of topsoil loss due to erosion or the prevention of reduced fertility caused by overuse, acidification, salinization or other chemical soil contamination. Since time immemorial, soil erosion has significantly altered landscapes and their occupation. The decline or demise of numerous civilizations has been closely linked to major environmental disturbances (such as massive deforestation), and soil erosion has been recognized as part of a complex causality leading to socioeconomic instability. The development of agriculture with the progressive removal of natural vegetation and flattened and compacted soil in increasingly large fields has accelerated surface runoff and erosion on hillsides. As human activity became a significant agent of geomorphological transformation, knowledge in soil management grew, as did soil protection and soil conservation techniques. The 20th century's accelerated replacement of traditional small-scale farming by industrial agriculture is largely acknowledged as a recipe for both ecological and socio-economic disaster. A wide range of experts – from agronomists like Wes Jackson, who promoted perennials, to environmental activists like Vandana Shiva, who champions small, independent, biologically diverse farms and a revival of age-old practices – are passionately underscoring the importance of soil health and demanding alternatives to industrial agriculture.

40. Spaceship Earth

Buckminster Fuller popularized the term "Spaceship Earth" in the 1950s and it became widely used by scientists, economists and politicians during the 1960s and 1970s. At the time, it was evident that nature had become a technologically mediated artifact and an object of contention during the Cold War. At the same time, Spaceship Earth was employed as a rhetorical device to emphasize the common plight of humankind and life and helped propell the global environmentalism movement. For Fuller, "We are all astronauts on a little spaceship called Earth," and in dire need of new strategies to create a more symbiotic relationship between humans and the natural world. His novel cartographic projection, the Dymaxion map, reveals a "one-world island in a one-world ocean," without any visually obvious distortion of the relative shapes and sizes of the land areas, and without splitting continents. Spaceship Earth propelled a view of the world as one interdependent system of relationships and was an important component of the ensuing environmental movement.

41. Stewardship

The word stewardship first appeared in English during the Middle Ages. It denoted the office of a steward, or manager of a large household. In recent decades it has evolved to mean the careful and responsible planning and management of resources. In the ongoing discussion of the environment, stewardship implies an ethical responsibility for entire ecosystems. Environmental stewardship includes the actions taken by various stakeholders – individuals or groups with various forms of motivation and levels of capacity – to protect, care for or responsibly exploit the environment. Nature conservation and preservation were long considered as acts of stewardship. Today, there is also a more pro-active and radical notion of stewardship of the earth that seeks to realign socio-ecological change across multiple scales in order to enhance ecosystem resilience and redefine humankind's relationship to the planet.

42. Succession

In ecology, succession is defined as the natural, orderly progression of a directional community species replacement process over time. It results from modification to the physical environment and culminates in an ecosystem where maximum biomass and interactions among component organisms are maintained. Eugene P. Odum, an ecosystems ecologist, developed a novel framework of succession in 1969 where he related the development of ecosystems to both the biology of organisms and the development of human society. Odum felt that "in the pioneer society, as in the pioneer ecosystem, high birth rates, rapid growth, high economic profits, and exploitation of accessible and unused resources are advantageous, but, as the saturation level is approached, these drives must be shifted to considerations of symbiosis (that is 'civil rights,' 'law and order,' 'education' and 'culture'), birth control and the recycling of resources. A balance between youth and maturity in the socio-environmental system is, therefore, the really basic goal that must be achieved if man as a species is to successfully pass through the present rapid-growth stage, to which he is clearly well adapted to the ultimate equilibrium-density stage, of which he as yet shows little understanding and to which he now shows little tendency to adapt". By stressing the relationships between man and nature, many have credited Odum for transforming ecosystem ecologists into environmentalists and for grounding environmental ethics in ecological science.

T

43. Topophilia

The term topophilia (literally 'love of place'), "the affective bond between people and place, or setting", was popularized as the title of a book by the Chinese-American human geographer Yi-Fu Tuan ("Topophilia: A Study of Environmental Perception, Attitudes and Values", 1974). Tuan used the term to articulate the human coupling of sentiment with place and accentuated both an innate, universal bond of humans and non-humans and an acquired local, habitat-specific cultural learning – through lived experience in a particular time and place. He underscored the importance of the experience (physical and cognitive) of environments (at the level of individuals and communities) in the formation of cultural identity for places. In the contemporary era of neoliberalism and the attendant flattening of cultures and places, revisiting the notion of topophilia can offer a way to unemotionally recover a sense of territorial belonging.

44. Traditional ecological knowledge

Traditional ecological knowledge (TEK), also known as indigenous ecological knowledge (IEK), is a highly localized understanding of the complex web of relationships between humans, animals, plants, natural forces, spirits and landforms within a particular territory. Indigenous peoples worldwide have adopted the notion of ecosystems as a negotiated order, with all species being interconnected and handed down a cumulative body of knowledge and beliefs through their songs, stories and locally-shared values. Traditional ecological knowledge includes the intimate and detailed knowledge of the natural world in order to develop and use appropriate technologies for hunting, fishing, trapping, agriculture, forestry and other uses of natural resources. It is an inherently cyclic mode of land management which sustains rather than exploits resources. It is considered a holistic knowledge, or "world view" which parallels the scientific discipline of ecology.

U

45. Urban countryside/ rural metropolis

There is an age-old nature/culture dialectic which is often referred to in the distinction and naming of countryside and city. However, as geographer William Mitchell and environmental historian William Cronon insist, there is a complex inter-dependence of the instruments of cultural power representing created, artificial worlds, and the contemporary condition has blurred the once valid distinction between city and countryside. Worldwide, there are many territories with high-density land occupation, primarily pegged to agricultural production. The urbanization patterns in such places are usually of an organized dispersal, thus contrasting significantly with compact, high-density cities. In many instances both their densities as well as a hybridity of programs and the territory itself calls into question the stereotypical dichotomies of urban and rural,

city and countryside. In the late 1990s, Moura Quayle, a professor of public policy at the University of British Columbia, dubbed the term "urban countryside/rural metropolis" – the mix of consumptive and productive dispersed landscapes – referring to their omnipresence in Canada.

46. Urban forestry

As a field, urban forestry emerged in the 1960s in North America. It entails the multidisciplinary design and management of all forest and tree resources – from street trees to peri-urban woodlands. Its goal is to progressively, and sometimes even radically, bring vegetation back into urban environments. The field builds on long-standing traditions of the intertwining of nature, and particularly trees, with the city. Trees are key to humanizing the climate of cities and are also responsible for its pleasant atmosphere, hence livability. The urban forestry tradition can be dramatically upscaled in order to respond to the consequences of climate change – countering the inevitable pollution of urban environments and helping to increase carbon sequestration, offsetting the urban heat island effect and enriching habitats and biodiversity. The urban forest must be understood as a larger system that extends as a continuous, interconnected regional system.

V

47. Valley section

The "valley section" created by Scottish polymath Patrick Geddes (1854–1932) in 1909, is a model for interaction between human action and the environment that has gained renewed relevance. The valley section is a transect which begins high up in the mountains, follows the course of a river to a plain and culminates in an estuary. For Geddes, the valley section, which he depicted with humankind's development through the four stages of hunting, pastoralism, and agriculture toward commercial societies, expressed a relation of city and nature where "it takes a whole region to make the city". The triad of "folk/work/place," a combination of organism, function and environment, was a key to understanding human settlement and civilization and the connection of natural and human ecologies. Geology and geomorphology conditioned biology and human settlements were rooted to the logic of the territory.

W

48. Water urbanism

Historically, many of the world's cities have had an inextricable connection to water. Seacoasts, inland rivers and coastal deltas have always been magnets for development, providing geographies easily amenable to cheap transportation. They are extremely productive territories and offer valuable resources in themselves. Evidently, all areas of settlement inherently implied a certain degree of water management. Complex water management not only intertwined social-cultural and political organization, but also afforded the settling with water – literally the construction of a settlement as well as settling with, as in dealing with water's very unpredictable nature. However, over time, water-based settlements gave way to road-based ones and water infrastructures were made invisible (underground) and disconnected (from the local natural water systems). As waterways were filled in impervious surfaces exponentially expanded and industrial and agricultural pollution became dominant, water simultaneously came to be viewed both as a finite, precious resource and more of a threat than an asset. Once the consequences of climate change – particularly flooding, drought, rising sea levels and salination – are added to the list of perilous situations, it became clear that new ways of dealing with water are urgently required. There is thus a renewed possibility for water urbanism – where the DNA of settlements is once again water.

49. Weak urbanism

In the 1980s the Italian post-modernist philosopher Gianni Vattimo coined the term "weak thought", representing the erosion of the traditional metaphysical and rational foundations of modernism. Vattimo identified circular time in which compulsive renewal in the short term coexists with a substantial immobility in the long term. In "Agronica" (1993–94), Andrea Branzi tested Vittamo's concept in the formulation of "weak urbanism", modeled on agriculture that works on a rotational basis and is able to quickly adjust to the change of needs and seasons. Weak urbanism structured land as a highly evolved industrial system, capable of adapting to production cycles that change over time and utilize reversible modes of organization. It promoted a hybridization between town and country, agriculture and urbanity. Consequently, weak urbanism can be aligned with dispersed urbanism. In Branzi's view, the city would consist of a set of contradictory elements and logic, a complexity that cannot be solved but merely managed in order to develop into a state of unstable equilibrium. Agronica was a hybridization proposal between the rural and the urban, wherein agriculture is valued as an advanced productive reality, compatible with the urban condition and fully integrated into a unified economic system that lacks any opposition. The result is an open, light and adaptable constructive system that gives rise to diffuse territorial organizations, lacks representative function and is consistent with the changing conditions of a society in constant renewal.

50. Wildland-urban interface

A wildland-urban interface (WUI) is an area where human settlement intermingles with, or abuts, unoccupied wildland vegetation. According to the University of Wisconsin-Madison's SILVIS Lab, interface areas have more than 1 building per 16 hectares, have less than 50 percent vegetation, and are within a 2.4 kilometer distance of an area larger than 500 hectares that is more than 75 percent vegetated. The WUI is a focal area for human-environmental conflicts, such as destruction by wildfires, habitat fragmentation, the introduction of exotic species, and biodiversity decline. Although the term is often related to forestry, it can be conceptually expanded to include other wildlands, including wetlands, deserts, grasslands, etc. It is essential that urbanism has a renewed focus on the explicit design of the wildland-urban interface, at the territorial and typological scales, in order to re-establish disrupted ecologies.

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