

Land as Project: On Territorial Construction

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The scale and speed at which earth-work projects can now be implemented warrants an examination of the *problematic* of land reclamation for territorial expansion. Touching upon the role of major infrastructure projects that have reshaped Singapore's coastline, Milica Topalović charts a route through the history of what are not just constructions of land and infrastructure, but also of political power relations.

When Chinese military ships and warplanes took position in the South China Sea in 2014 in order to ensure an undisturbed realization of an infrastructural project, the earthworks filling the shallow waters and coral reefs of Spratly Islands suddenly found themselves at the center of media attention worldwide. It was fascinating to see the photographs of a typically unnoticed landscape of land reclamation—sandy islands growing in the sea, surrounded by batteries of dredgers and sand barges—garnering so much attention. Of course, these new patches of *terra firma* being constructed in the middle of the South China Sea are more than infrastruc-

ture: the newly built sites for Chinese bases controlling the maritime basin constitute a territorial encroachment, in “violation of the United Nations Convention of the Law of the Sea” and “causing ‘irreparable harm’ to the marine environment.”

Apart from provoking an international uproar in disturbing the global geostrategic hierarchies, this case also speaks in a clear, and even spectacular, manner about the nature of earthworks. This example helps lift infrastructure and land construction out of the mundane world of engineering and muddy construction pits in order to remind us of what philosophers of land or territory have long since established: that land (and infrastructure) are never innocent, or purely technical and utilitarian, but always strategic, political, and ecological.



Fig. 1: Land construction is political and strategic: Reclaimed land in the South China Sea at the service of China's campaign of territorial claims.

What has taken place in the South China Sea illustrates that ecology and politics of land are intertwined in ways that lead to fundamental

questions about the nature of governance in the globalized world, capitalist urbanization, and urban sustainability. For example, new land construction often involves increasing the scale and complexity of resource politics; a growing patch of new land often links to long distance resource extraction and transport, to networks of sand trade and geopolitical games in transnational sand hinterlands: “sand wars” among governments and other entities, corporate, local, and international.²

This case also shows that new land construction exceeds the commercial motivations behind, for example, Dubai's Palm Islands, or the purpose of environmental engineering for transport or industry, as seen in Chinese and South Korean ports, such as Shenzhen and Saemangeum. Land construction is also a tool of territorial appropriation and even of encroachment on sovereign borders. Enabled by ever more powerful construction technology, earthworks now serve as a strategy of colonization—much more than infrastructure works were thought or meant to do.

Importantly, the South China Sea case also helps remind us that earthworks, and infrastructure in general, still constitute an activity lacking public visibility and critical study, in particular from the social sciences and design disciplines. “Many aspects of infrastructure are singularly unexciting,” points out ethnographer Susan Leigh Star, launching her call “to study boring things.” Many characteristics of infrastructure “appear

as ... technical specifications, or as hidden mechanisms subtending those processes more familiar to social scientists. It takes some digging to unearth the dramas inherent in ...” these systems, and “to restore narrative to what appears to be [a] dead...” bulk of data. But to study a city or an urban territory and to neglect its sewers, power supplies, or reclaimed lands and landfills, is to miss essential aspects of aesthetics, change, distributional justice, and planning power.³

In one of his seminal essays on philosophy of land, French-Swiss urban historian André Corboz describes land as a multidimensional entity, not solely physical in nature. Land, according to Corboz, originates from culture and politics as much as it is shaped by direct human intervention, and by “nature's forces” deriving from climate or geology. In other words, land is a *process*, a *product*, and a *project* at the same time.⁴ There is no doubt then that land can be understood as problem of critical research, and of design. But how can we elevate earthworks out of the realm of the utilitarian and rethink them in the domain of the political and the ecological? How can we approach land as project?

Land Construction: A Lexical Entry

A great many concepts are used to describe human interaction with the surface of the earth, its transformation, exploitation, structuring: *land*, *landscape*, and *territory* are the most

essential. None of them connote only “nature,” but always imply some degree of “construction”—of “the transformation of earth into land.”⁵ Herein are phenomena both physical (natural and man-made) and social. *Land construction* describes extensive morphological alterations of the earth’s surface by displacing large quantities of material—soil, gravel, rock, etc.—in order to create a buildable or inhabitable land, often in shallow water or swamp, where no land existed previously. Terms such as *man-made land*, *artificial land*, and *artificial landscape* are used with similar meanings, while expressions such as *earthworks* and *terraforming* point to techniques and technologies of land construction, such as cutting and filling, levelling, dredging sand, and stabilising and compressing soil. All of them relate to the many types of modified landscapes including polders, reclaimed lands, and landfills.

Land construction abounds throughout history—the notable projects are never seen as purely technical achievements, but as reflections of socio-cultural value systems and political priorities. The high culture and prosperity of Egypt’s Old Kingdom is thought to be evidenced by alterations to the Giza plateau, starting in 2650 BCE—the Cheops Pyramid alone consisted of 2.6 million cubic meters of gigantic blocks, weighing in total some 7 million tons.⁶ Distinctive cultures developed around the problem of constructing the interface between the sea and the land in naval states and cities—the water-and-land

matrices of Venice and Amsterdam are remarkable works of engineering. While being a cultural and technical artifact, man-made land is also understood as a means of expression of power—absolutist rulers intervened in a territory to bestow upon it royal or imperial character. Louis XIV, for example, had Versailles built on swampy terrain, which he had cleared, filled, and redesigned—a demonstration of personal power subsequently emulated by many other rulers in Europe. Similarly, Peter the Great founded St. Petersburg in 1703 and built the city on swampy floodlands in an extremely raw climate—he then extolled the virtues of his new capital city as “Eden,” a splendid “paradise” on the Neva river.⁷

Highly elaborated land and water landscapes in agricultural civilizations—such as Angkor and Nile Valley—have indicated stable, if not harmonious, socio-cultural systems and practices. In the eleventh century, Dutch polder landscapes of drained wetlands, sea inlets, and lakes were associated with evolving social structure and governance—a society whose image took the form of its territory. The water board—*het waterschap*—was the first democratic form of Dutch society, and corresponded precisely to the organization of water management in the landscape, while the metrics of agricultural polder land were seen as the ideal measure for the organization of cities and buildings.

Unlike today’s infrastructures, which are by definition invisible and

commonly understood only as systems of substrates forming merely a background for other kinds of activity, in the sophisticated practice of polder-making, the water network is open and visible, and it structures the land—the technical (the infrastructural), the ecological and the social are interwoven with each other to create an aesthetic (land) form.

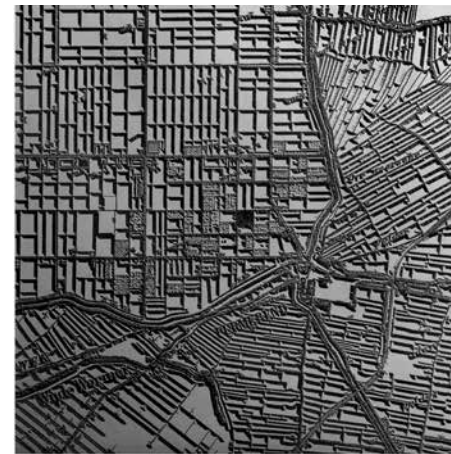


Fig. 2: Land tectonic as imprint of social organization: This reconstruction of the landform of polders near Purmerend, North Holland, in the early seventeenth century, reflects one of the oldest forms of Dutch governance: The water boards. During the twentieth century, the landscape has lost much of its clarity, due to urban growth, modern irrigation technology, and mobility infrastructures (source: Reh, 2005).

With polders and other intricate socio-cultural landscapes in mind, André Corboz wrote of “land as palimpsest”—this is the land (or territory,

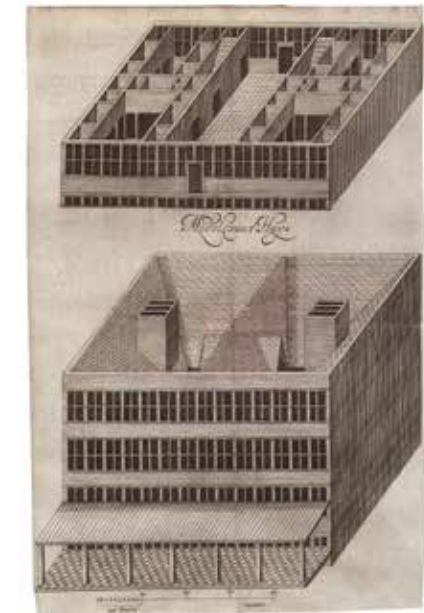
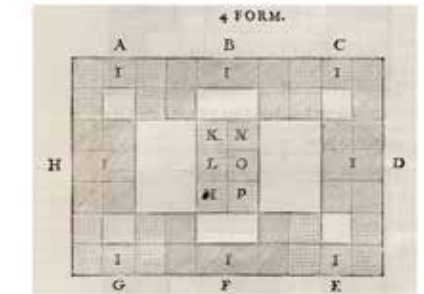
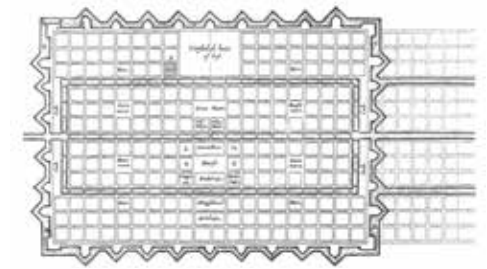


Fig. 3a-c: Simon Stevin, Plan for an Ideal City, Ideal Metric of a City Block, and Model for a Town House, c.1600; co-evolution of land, city and society. The measurements of constructed polder land in Holland were seen as ideal measures for the laying out of cities and buildings (source: Reh, 2005).

or landscape), seen not as a passive object of construction, but as an entity evolving through social practice. Land bears a name; it can be parsed and semanticized, and projections of all kinds are attached to it. It therefore transforms from a passive object of construction, into an active *subject* that exerts its own will—and that may contribute to the stability and the reproduction of social relations.⁸

During the nineteenth century, the industrial revolution, the rise of industrial capitalism, and the creation of modern (national) states gave rise to new conceptions of land, as well as greatly increased human ability to transform land. Laying infrastructures and land-shaping became conjoined operations with enormous physical impact—*de facto* able to set new topographic laws for the modern times. For railway lines, or any infrastructural system, to achieve optimal performance with minimum expenditure of energy, a considerable levelling of terrain must take place. The new conditions of flatness and horizontality coupled with the space-time compression as a result of acceleration of movement shaped the new spacetime topology of industrial modernity.⁹

Mediated via technology and the machine, perceptions of nature—and of land—began to oscillate between the views of Positivism and Romanticism—between the land seen as an *object* available to humanity for industrial exploitation and extraction of profit, and the land seen as a divine *subject* with whom relationship is lost and needs to be restored.

American cultural historian Leo Marx observed, in *The Machine in the Garden* (1964), that spatial ideologies of modernity have dual and contradictory character and lead to a new kind of hybridity in the landscape. Marx observed that “the free economic competition and technological progress are valued equally with the tradition of landscape pastoralism”; thus, “in our landscape the machine is accommodated in the garden.” Today it is fair to say that machine has become indistinguishable from the garden,¹⁰ the land is inextricably intertwined with technology. Infrastructures and soils blend together with human and other ecologies in hybrid, engineered systems, the planet’s second skin.

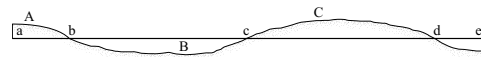


Fig. 4: Flatness and horizontality—the fundamental diagram of urbanization and modernization: Laying out any modern infrastructure, such as a railway, requires leveling the irregularities of the terrain. Modern infrastructures and tabula rasa are direct correlates.

The processes of industrialization and urbanization translate into new scales and morphologies of land and landscape. The morphological figures registering social practices in the form of land—“the material record of

humans upon the landscape and the areal association of the physical and cultural phenomena”—such as land use and the water system, settlement and property patterns, continue to change through the agency of modern industrial culture.¹¹ Since the first steam-pumping station was used in reclaiming the Zuidplaspolder in 1825, for example, Dutch communities have been steadily liberated from their duty to control water, resulting in a more arbitrary relationship to the land, and ultimately in more random and dispersed land-use patterns. Similarly, modern transportation and the mechanization of farming have relativized or loosened social ties to the land everywhere.

At the turn of the twentieth century, the consequences of the Fordist organization of the economy and of the nation state’s interventionist policies in the territory, such as land nationalization, mono-functional industrial land production, or the opening of fast transportation corridors, have completely reshaped the morphologies and metrics of the land and landscape. André Corboz noted that, “under these conditions ... land can no longer serve as the unit of measurement of human phenomena.”¹²

Now, at the onset of the anthropocene, with population numbers and the use of modern machinery growing, scientists have pointed out that “our ability and motivation to modify the landscape by moving earth in construction and mining activities have also increased dramatically. As a consequence, we have now become

arguably the premier geomorphic agent sculpting the landscape, and the rate at which we are moving earth is increasing exponentially.”¹³

Land and the City: Promiscuous Stories of Tabula Rasa

In the realm of architectural and urban design, the concept of land (or territory) does not appear as part of modern architecture’s repertoire during the twentieth century, save for the intermittent interest during the period of critical reappraisal of the modern movement in the 1960s, ’70s, and ’80s, for example in the work of Vittorio Gregotti (*Il territorio dell’architettura*, 1966) and Aldo Rossi (*Costruzione del territorio*, 1979).¹⁴ Rather, it appears that for much of the twentieth century, the land as concept disappeared in the “blind spots” of modern architecture and urbanism. Instead, modern technology gave architecture the instruments to revolutionize its relationship with the land and reinvent it as an artifact, disengaged from nature. This new relationship can be traced through the idea of the *ground*. In modern architecture, ground is not in any measure an external natural given, but a fully controlled surface, an object of conception and construction.

The romantic current of architectural modernism cultivated a reverent relationship to the idea of ground, emphasizing efforts to “liberate” it, in order to minimize the impact of buildings and cities. In his description of the design principles structuring Villa Savoye, Le Corbusier described the

first of five modern canons as the “recovery of building ground,” achieved by lifting the house on *pilotis*. The ground that would have been lost to building is in this manner “recovered”; a garden or a landscape can pass under the house, and the same ground can be doubled on the roof.¹⁵



Fig. 5: Land as emblem of resistance: In 2007, the Chongqing nail house, and other similar cases, became emblematic of neoliberal recklessness and resistance to it, in the redevelopment of Chinese cities.

Now lifted and detached from the ground, the modern building also embraced its newfound emancipation from the physical site, the metaphor of “weightlessness,” and the levitation of the *bel étage*.¹⁶ The consequence of this conceptual and factual detachment from the ground has been the removal of context. The (natural) conditions of the site—topography, soil, water, vegetation—generally ceased to define the building. Instead, modern architecture can presuppose and construct a quasi-abstract site or context, which corresponds to the

vision of architecture of non-specific, universal characteristics. Throughout the twentieth century, the idea of the ground appears in modern architecture in many different forms, their common horizon being the building of an artificial plane or of a more complex system of surfaces and infrastructures often completely detached from the actual ground level. In the process, the artificial ground develops as a refined technological instrument for organizing all elements of urban life.

There is thus a deep and uneasy affinity between modern architecture and (artificial) land. The idea of land in its long-term dimension, as a result of slow processes of stratification of human and natural traces, a palimpsest, generally stays in architecture’s “blind spot.” Instead, it could be said that in modern architecture and the modern city, every land is constructed land—a product of urbanization and an urban mentality that creates land surface as a projection of its desires, goals, and needs. These are governed in turn by different sets of relationships than in traditional societies. The effort that bound rural inhabitants to the land has dissolved; the city-dweller has assumed a more emancipated and arbitrary relationship to the land. Artificial urban land—a *tabula rasa*, a *clean slate*, an *unscripted tablet*—is thus not an exception—it is the central concept of the modern city: the product and the habitat of urban culture.

In cities across the globe, the *tabula rasa* was often deployed as urban strategy in the hands of the state



Fig. 6: Ashael Curtis, *The Leveling of the Hills to Make Seattle*, 1910. Cut-and-Fill: The basic earthworks technique used to realize a buildable urban plane consists in breaking hills and dumping them into the sea, swamps or other low-lying areas.

and other protagonists, for different symbolic and political purposes. In Seattle, a staggering work of erasure, the so-called “regrading” of the city, was portrayed in the photographic work “Levelling of the hills to make Seattle,” by Asahel Curtis in 1910. (Fig. 5). Arguably one of the largest physical alterations of terrain ever performed—outside natural disaster and wartime destruction scenarios—it mobilized America’s tremendous technological capabilities and can-do spirit, in a fervour to modernise the city’s infrastructures and buildings as a response to the gold rush and rising real-estate values. In some places the ground level in the city was lowered by nearly 90 feet (nearly 30 meters),

with the help of steam shovels and hydraulic mining techniques.¹⁷

In recent examples, the idea of land as unscripted tablet was also connected with neo-liberal forms of urban development radicalism, for example in the cases of “flattening of the Riyadh” for building villas¹⁸ and the Chongqing nail house in 2007.¹⁹ In both, cut hills and levelled terrain surfaced as synonyms of state-organized destruction and appropriation of land and property for the benefit of political-economic elites.

Many other cities today—including highly visible cases of terraforming spectacle from Bahrain and Dubai to Hong Kong and Shanghai—have embraced *tabula rasa* and land con-

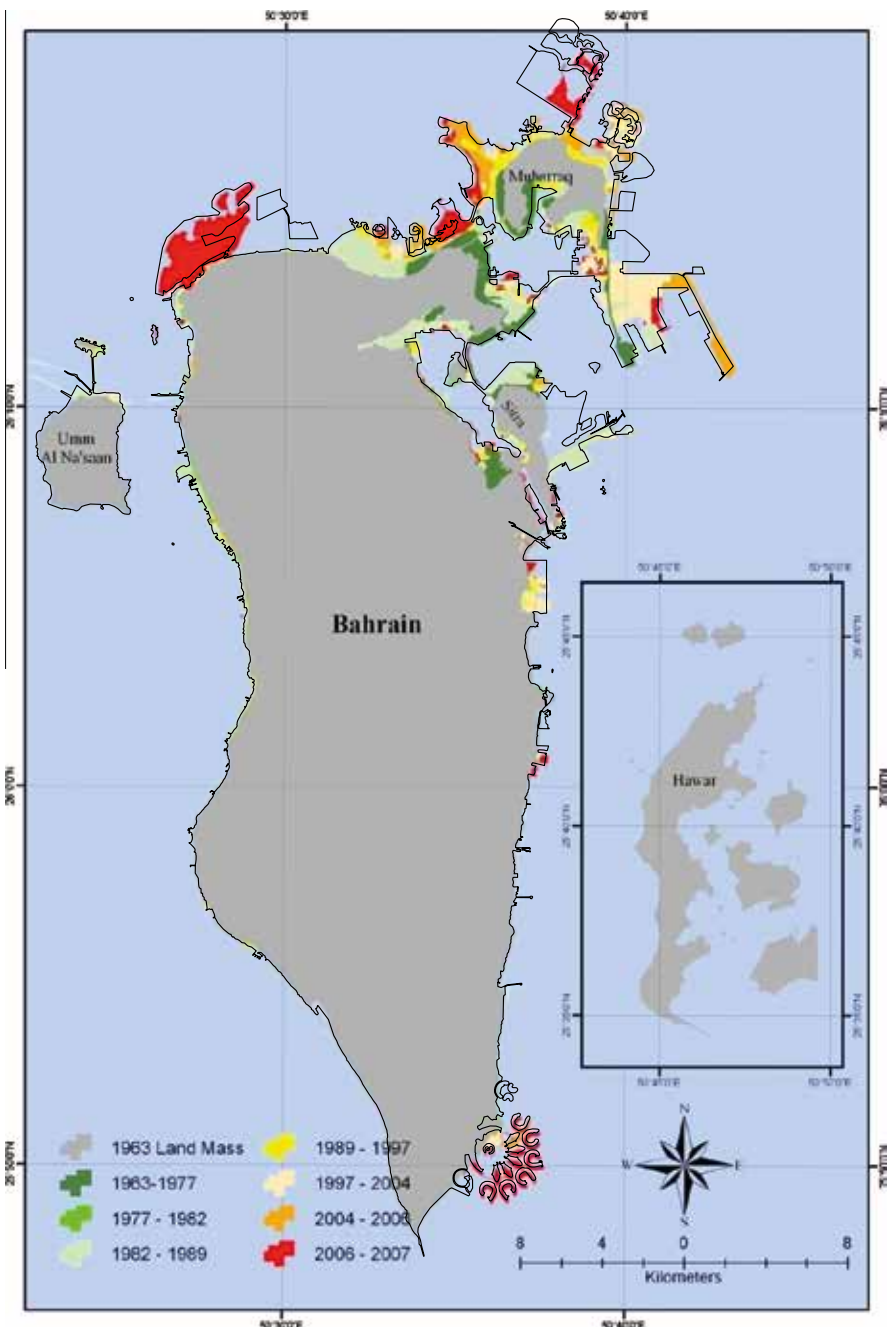


Fig. 7: Territory liquefied—Bahrain’s land reclamation 1963–2007: Owing to the radically liberalized authoritarian state, stabilizing ideologies such as soil and ground have lost any meaning. The black line shows the extent of Bahrain in 2016. In forty years, Bahrain’s land area has been enlarged by 315 square kilometers, doubling its original size (source: Khadija Zainal et al., 2012).

struction as a key element of their development repertoire (Fig. 7). The generic character of the reclaimed land projects—their often-repeated forms (palms, islands, and other protrusions) found all over the world—may seem surprising. The urbanistic logic of the reclaimed land is equally generic and widely shared. The basic programmatic ingredients are the same—large-scale facilities involving logistics, oil and gas, and extravagant real estate for investment—only the relative amounts vary. These resonances are in part due to long-distance sharing of experiences and know-how in the field, disseminated by the multinational dredging industry. Dutch dredging company Van Oord, for instance, has taken part in every major land-reclamation project of the past few decades from Singapore’s Tuas and Changi to Palm Jumeirah.²⁰

But, there are other affinities: most of the leading land reclamation cities are coastal cities (or city-states), sharing high population density, strong economic growth, and scarcity of coastal land—these characteristics make them prone to land reclamation. Ultimately however, it is their common political feature of entrepreneurially minded and authoritarian state governments with unrestricted authority that are able and willing to push territorial expansion forward.

The state governments and agencies exploit—legitimately or not—the economy of the reclaimed-land prototype, which offers remarkably low prices for building land. The total

reclamation costs are usually below 250 EUR per square meter (by comparison the seafront land prices in Singapore are more than twenty times higher, in Hong Kong even a hundred times higher).²¹ Additional revenues from activities at those sites can further multiply the profits. Thus, for a select group of cities where politics and geography come together in the right formula, land reclamation amounts to a form of alchemy for creating prime sites and exorbitant returns “out of nothing” (Fig. 8a).

The case of Bahrain, where more than 90 percent of the reclaimed land (315 square kilometers in total, half of the original land area) is in the hands of private investors,²² also illustrates the shameless affinity that has developed between terraforming and private security. Private estates on reclaimed land, protruding into the sea like castles surrounded by defensive ditches, speak of the fact that exclusive access has become a *bon ton* of the real estate business, in which the high-security regime functions as a business compliment paid by the government to the private entities and multinationals residing and operating in their territory. As a result, less than ten percent of Bahrain’s coastline is now accessible to the public.²³

Indiscriminate land reclamation has also been linked with wide-ranging cultural and ecological destruction, from the depletion of marine life and the demise of local fishery, to the erasure of cultural heritage sites and the lack of drinking water. Ironically, it appears that, in the process of the

Fig. 8a: Bas Princen, Bahrain (Durrat Marina), 2016

State-organized terrain for speculation: Despite vehement public opposition, Bahrain continues with land reclamation. Critics claim that the ruling elite has benefited personally from land deals; more than 90 percent of the reclaimed land is in the hands of private investors.



Fig. 8b: Bas Princen, *Bahrain (Investment Gateway)*, 2016
Terraforming for Security: Private estates on reclaimed land, protruding into the sea like castles surrounded by defensive ditches, illustrate the fact that exclusive access has become a *bon ton* of the real-estate business. Less than ten percent of the newly created coastline in Bahrain is accessible to the public.



territorial overhaul, some of the same resources have been appropriated by the ruling class and economic elites. But this is not a surprise: *tabula rasa* and the reation of new land routinely bring about the erasure of local history and ecology—in exchange, they open space for construction of new historical narratives and ecological imaginaries, reinforcing the given social order. For example, the private estates occupying Bahrain's new coastal areas have access to an abundant water supply, ensuring their verdant oasis experience in contrast to the conditions of the water scarce-city;²⁴ and the erasure of the historical pearling economy and sites is compensated symbolically by “The Pearling Trail”—Bahrain's successful inclusion into UNSECO heritage register in 2012—that will allow its government to (re)construct some of the previously erased culture and heritage. The issues around access to the land, the sea and to their resources came into focus during the public anti-government protests in Bahrain in 2011, during the events of the Arab Spring.²⁵ These issues, elsewhere correctly framed as issues of human rights and social justice in relation to the landscape—“the right to the landscape”²⁶—point to the vital importance of, and necessity for, a democratic politics of (urban) land: questioning and negotiating who ultimately has the right to imagine it, to transform it, and to use it.

By contrast to Bahrain, Singapore's new land is not identifiable as a spectacle of image-urbanism in

the littoral zone. Singapore deploys *tabula rasa* as a long-term strategic project of “nation building”²⁷—an all-encompassing three-dimensional transformation of both old and new land and landscape, used as a fundamental tool of social, political, and economic transformation following post-colonial independence in 1965. The process of change from a backwater colonial port, predominantly rural, to the new nation of industrial middle class housed in public high-rise, was dubbed a “territorial revolution”²⁸ with many layers: the social, political and economic dimensions of the national territory have been sculpted by the hand of the state, using topography as the main medium (Fig. 9).

Singapore also shows that construction of urban land usually doesn't come without a (vast) hinterland. The city-state is known as the world's largest importer of sand for construction, as is located at the center of the sand-trade region whose radius extends to South China, Cambodia, and Myanmar. With nearly a quarter of its land area, around 140 square kilometers, added over the years, it has been estimated that three-quarters of this is “built on foreign soil.”²⁹

Up to the 1970s, the material for construction of land and buildings used to come from the island's granite quarries, levelled land, and clay pits. But in the 1980s, the flows of sand, gravel, and rock to the city-state began to extend across the border to Malaysia and Indonesia, and further afield—in other words,

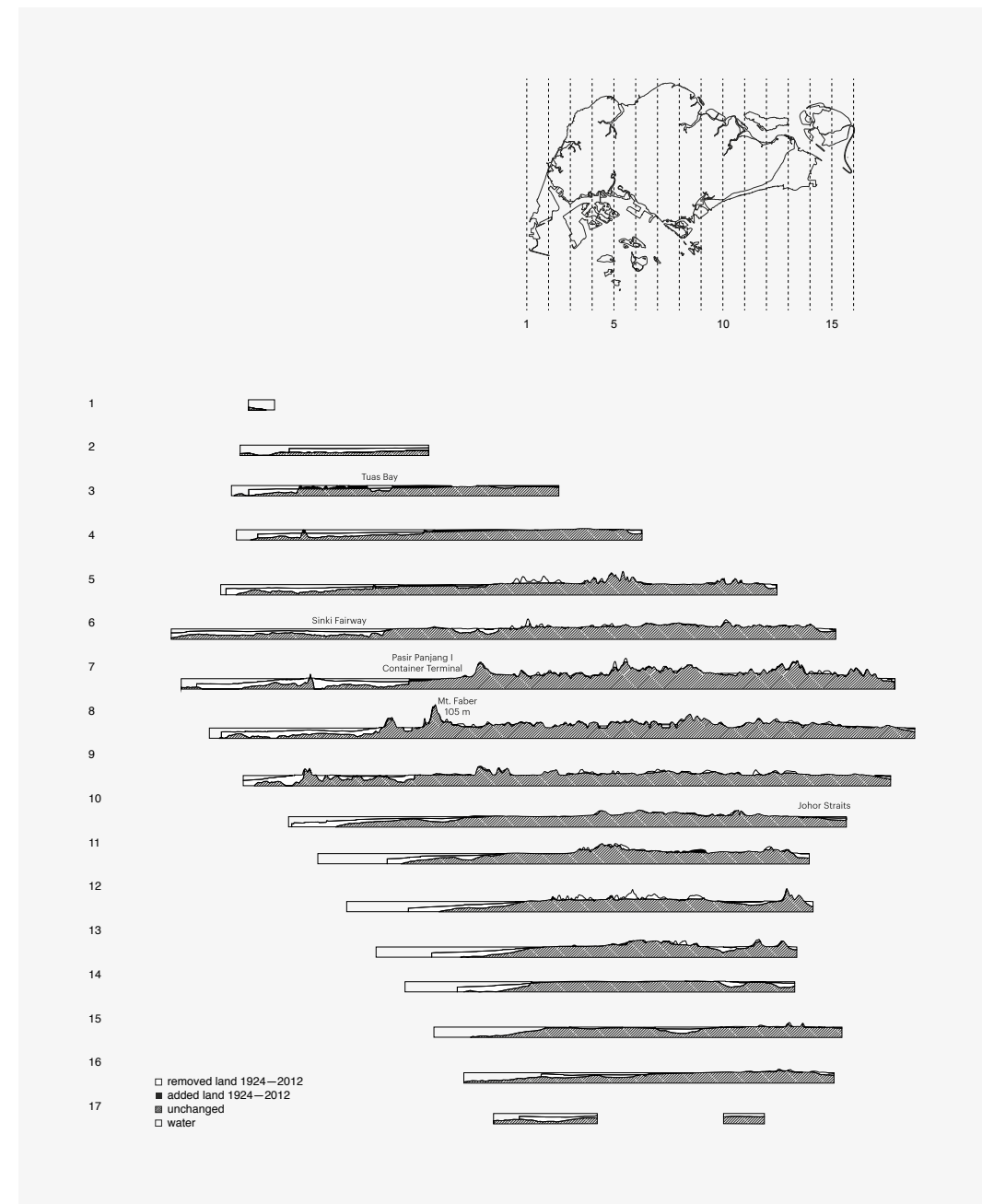


Fig. 9: Constructing the Nation—Sections through Singapore in 1924 and 2012: Constructed land should be understood as a central paradigm on which Singapore's urban development has been based. The socio-political, economic and cultural spheres are “sculpted” by the hand of the state, together with the territorial form (source: Hassler and Topalović, 2014).

Fig. 10a: Bas Princen, *Sand quarry (Batam)*, 2013.

Sand hinterlands: In the booming industrial periphery of Singapore, on the Indonesian island of Batam, a hill is cut in order to obtain sand for land reclamation and to level the terrain for development. Singapore is known for having razed and remodelled its own terrain in the 1970s and '80s.



Fig. 10b: Bas Princen, *Oil cavern (Jurong Island)*, 2013.
Going underground: Despite the vast land area claimed from the sea, the territorial expansion vector in Singapore increasingly points underground, as in the recently completed artificial caverns for storing crude oil on Jurong Island.



Singapore's sand hinterland begun to "disintegrate,"³⁰ and assume geopolitical scale (Fig. 10a, b).

The expanding sand hinterland has problematized Singapore's claims to sustainability. Critics have pointed out that the state must do more to reduce the negative impacts of its demand for sand—the reliance on illegal trade, on corruption of its trading partners, and on ineffective national and international regulation in the field.³¹

The shifting sands and the liquefied territorial contours in the region have also exposed national tensions and older colonial and postcolonial borders that continue to problematize the current geography of governance. For example, land reclamation and dredging in the Singapore Straits led to national border disputes (Singapore-Indonesia and Singapore-Malaysia) in front of international arbitration, and at huge collateral costs. This and other similar reasons were cited by Indonesia and Malaysia when they introduced successive bans on sand trade with Singapore, followed by Cambodia and Vietnam.³²

Analogous to diaspora, a barge of traded sand floating in the sea from one country to another is an offshore territory symbolically attached to the mainland. Just as newly reclaimed land can become synonymous with "territorial expansion" and "occupation," selling sand to a foreign country has been rendered equivalent to "sell-out of the nation's pride" and an "act of treason."³³ In the unstable political geography of the region, sand trade

and reclaimed lands have become themes of war-gaming exercises and conflict simulations—negotiation agents testing and localizing frictions.

Proponents of globalization have argued that the world is becoming "flat": a level playing field in terms of commerce where all competitors have an equal opportunity, and where historical and geographical divisions are being neutralized due to communication technologies, transport, and the worldwide synchronization of various systems of rules.³⁴ This has been coupled with more lamentable manifestations of cultural flattening: a widespread acceptance of generic cultural production and consumption at the expense of authentic forms of culture. This discussion can gain unexpectedly when approached from the angle of physical geography: If not economically or culturally flatter, the world is becoming flatter, literally.

In Bahrain, Singapore and other cities attached to flatland production, economic and technical rationalities have often taken precedence over other values in urban space; the priorities of speed, efficiency, and profit have brushed other concerns aside. Heritage, ecology and social equality have been assigned lower priorities, but the cases show that the shortage of gravitas can also help liberate the city's identity from restrictions. The preference for artificiality and newness, and the untroubled pursuit for more, also constitutes a specific flatness (Fig. 10c, d).

The question is, do these choices matter? Does twenty-first century cul-

ture permit, or possibly even favor, the innocent charm and frivolity of instant history, ready-made identity, do-it-yourself nature, and topography on demand? Ultimately, can design make a difference in these decisions?

Epilogue: Designing Land Better?

Cities inevitably modify their surroundings—their actual sites and their hinterlands. Over the last century, despite the extraordinary increase in our ability to transform land and topography through the construction of urban structures and infrastructures, both land and infrastructure as problems of design—as "wilful configuration(s)"³⁵—have barely been articulated. Neither architecture and urbanism nor landscape architecture seem to have a firm grip on the problem; among the three disciplines, the (under)world of messy earthworks, machines, cables, and pipes, exists largely unnoticed.

The reasons for this can be sought in the way land is constituted as an object of modern scientific and technical expertise, the ways different fields of knowledge interact with one another, and the ways their authorities are engaged in urban space. Since the late nineteenth century, expert cultures dealing with land multiplied, from those engaging with the earth's dynamic processes (geology, hydrology), or the chemical processes and biosphere (soil science, ecology), to those engaged in the new ways of mapping the earth (areal archaeology, geomatics) and projecting new so-

cio-spatial realities (geography, planning). Among this growing number of expert cultures, land as object of study and intervention has been fragmented: generally speaking, design disciplines now focus on the surface; science and engineering capture the "subsurface." In the gaps between the fragmented disciplinary pursuits, knowledge and opportunities are lost. For example, scientists now recognize that built areas have been ignored and omitted in soil mapping and in studies of soil formation and behavior.³⁶ Other researchers have pointed out that "through the hegemony of efficiency and scientific positivism, civil engineering has become central to the design of urban environments as the premier design service discipline," despite the lack of attention in this professional segment to social conditions, ecology, politics, theory, etc.³⁷ These and similar symptoms hinder the possibility of a holistic approach to (urban) land, and of transdisciplinary work in the potentially new and exciting areas of contact among sciences, engineering, and design.

No doubt, land does invite opportunities for design—precedents abound. Sensibility to territorial form goes back to the Italian Renaissance, which invented landscape as a pictorial genre and looked for ways to reconcile the necessities of production and "beautiful landscape."³⁸ Agrarian landscapes grown over time became cultural artifacts of great value and are sometimes protected as such. For expressionist architect Bruno Taut, who envisioned the reconstruction of

Fig. 10c: Bas Princen, *Straits (sand trade)*, 2013.

Sand trade: Sand travels to Singapore largely over water from the Southeast Asian hinterland. Each sand barge carries approximately 1,500 tons of sand, used for land reclamation and building construction.



Fig. 10d: Bas Princen, *Artificial island (Garbage of Eden)*, 2014.
Landfilling: Since the 1950s, through the building of coastal retaining walls, most of Singapore's coastline has transformed from soft to hard. At Pulau Semakau, dubbed the "Garbage of Eden," these walls enclose ash shipped from Singapore's incineration plants to form the landfill island.



Alpine summits into crystalline cities, land was a medium through which human society could shape itself—the work of art by the state and the people. For land artists such as Robert Smithson or Michael Heizer, land became the medium of artistic protest against the perceived artificiality, plastic aesthetics, and commercialization of urban life.

Inevitably, land is always a project, a made entity. “The necessity of a collective relation between a topographic surface and a population established in its folds permits drawing a conclusion that there is no land without imagining a land.”³⁹ The value attributed to the land and landscape, its form and configuration—its design—is and can only be cultural. Culture supplies the program, the underlying vision to any design.

The question of the city’s relation to the land is essentially the question of its relation to its place, its geographical and cultural setting. The choices with which the city approaches these specific limitations are political. It may seem that these choices are indifferent, but this would be a simplification—cities are always forms of their politics, the signs of their collective will.⁴⁰

Land (or territory) is not merely a utility or a product, part of the invisible infrastructural (under)world we have created, but an entity with highly complex performance and function, and an object of relations of appropriation that involve geo-strategic, economic, symbolical, and other intentions. Instead of maintaining the distance be-

tween infrastructure as a problem of engineering, and city or urban space as domains of landscape architecture and urban design, these areas need to be brought together. In addition to the currently simplified conception of (urban) land as an abstract surface with technological character, land has to be recovered in terms of its stabilizing ideologies⁴¹—soil, fertility, history, place, permanence. Conversely, infrastructure is not a neutral technical apparatus, but a political, ecological, and ethnographic entity.

This is an expanded field where previously remote disciplines—from soil science to geomatics, and from transport engineering and biology to landscape, urbanism, and architecture—have a chance for coaction.

This essay is based on: Milica Topalović, “Constructed Land: Singapore in the Century of Flattening,” in *Constructed Land: Singapore, 1924–2012*, ed. Uta Hassler and Milica Topalović (Zurich and Singapore: ETH Zurich D-ARCH and Singapore-ETH Centre, 2014), 56–57.

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Uta Hassler and Milica Topalović, *Constructed Land: Singapore 1924-2012* (ETH Zurich DARCH and FCL, Singapore, 2014), 25-41. Reworked drawing based on first publication.

A Visual Atlas

Part 2

Compiled by Something Fantastic

Image Sources:

Wouter Reh, Clemens Steenbergen, and Diederik Aten, *Zee Van Land: De droogmakerij als atlas van de Hollandse landschapsarchitectuur*, (Stichting Uitgeverij Noord-Holland: 2005), 14.

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