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Cloud Megastructures and Platform Utopias

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From subterranean cloud computing infrastructure to handheld and embedded interfaces, planetary-scale computation can be understood as an accidental megastructure. Instead of so many different genres of computation spinning off one by one, perhaps they cohere into something like a global Stack, with *Cloud*, *City*, and *User* layers. If so, then at the scale of the city, this Stack retains its fondness for megastructures.

What kind of cities are our major *Cloud* platforms actually building? How do they choose to make architectural-scale footprints at the scale of the city? We will find that instead of heterogeneous and open interfacial platforms, they prioritize instead urban-scale walled gardens. The Stack, as a whole, structures its *City* layer through the consolidation of urban nodes into megacities, and also through the consolidation of both public and private urban systems in megastructures. The border, the gate, and the wall bend into closed loops containing fully interiorized gardens, sometimes in pursuit of utopian idealization and isolation. The megastructure provides a bounded total space in which architectural and software programs can be composed by complete managerial visualization. The megastructure is an enclave within the city that holds a miniaturized city within itself, and the specific terms of that miniaturization are the vocabulary of its utopian agenda, explicit or suppressed. Its curation of opacity as both a spatial strategy and an affectation operates not only in and on the skin of its closed physical envelope but also within its capturing claims on the virtual territories of the *Cloud polis*.

As we will see, these closures are often interdependent, one closing off a
site into an artificial island for which the inward bend of envelope might
gather the intended polity into form, and the other recognizing the elec-
tromagnetic spectrum itself as the equally vital megastructural territory to
be cordoned off and monopolized.[1] Their geographic secession provides
the megastructural social totality one measure of sovereignty, beginning
as a function of its autocratic enclosure, but which can be leveraged well
beyond physical jurisdiction and into the realms of charismatic mobiliza-
tion. For this, its politics are utopian and dystopian at once, neither ever
able to purge itself of the other, always able to flip into the other and back
again, as urban geopolitics dictate.

The image of global urbanity as a single contiguous body is drawn at
the scale of the whole spherical planetary surface, and we certainly have
no shortage of depictions of it, especially at night, as a throbbing weave
of life, light, movement (what telecommunications brand can make it
through one fiscal quarter without advertising itself with this image?).
It is less clear, however, what this obligatory *geo-graphy* might commu-
nicate other than communication itself. Like the Incan geoglyphs of
pre-Columbian Chile, does the global urban weave have pictographic
content to be read from above, or, like the Earth Art and maps of
Robert Smithson, does it make a pedagogic point about geologic time
and perspective?[2] The image of urban neural nets draws more specifi-
cally on an *aesthetics of logistics* and from an admiring contentment with
network topologies as a final form and format. In such renderings, net-
works more than cities (and specifically *the* meta-network of The Stack)
are indeed monumentalized. The pronouncement may be that "we are
those who have wrapped the planet in wire. This is the signal accom-
plishment of our time. Our pyramids are gossamer shaped." This image
infrastructure tries to capture some important change in the local-global
telescoping between anthropometric habitat and the wider urban enve-
lope. The *City* layer of The Stack operates as a massively distributed
megastructure and draws upon, however obliquely and opportunistically,
the reservoir of speculative, even utopian megastructural design projects
of years past (built and unbuilt), even realizing them after the fact in
sometimes perverse inversion of their original intent. In and around the
years when the first photographs of the Earth were taken from space,
speculative architectural design was inspired by the visual scale of the
whole Earth as a comprehensive site condition, and spawned scores
of now-canonical megastructure projects. Many proposed total utopian
spaces (islands cut off from the world, per Fredric Jameson's discussion
of the utopian genre in sci-fi), including The Office for Metropolitan
Architecture [OMA]'s Voluntary Prisoners of Architecture (1972) and

Superstudio's planet-spanning Continuous Monument (1969), while others sought the utopian through the maximal perforation of boundaries by ludic interfaces and absolute grids, including Archizoom's No-Stop City (1969) or Constant's New Babylon (1959–1974), already discussed. The merger of cities into planetary-scale conglomerations was imagined, among others, by Constantinos Dioxiadis as *Ecumenopolis*, a single planned urban form across the whole world, and Paolo Soleri as *Arcology*, enclosed megacities rising into the lower atmosphere, so large that they constitute their own ecosystems. The impetus for these massive, even planetary-scale architectural propositions may be a positive or negative reaction to the Buckminster Fuller-esque modeling of "spaceship Earth" as a single design problem, and attempts to see the whole of society in terms of the whole of space (part of the desire for totality important to Jamesonian utopian desire and dystopian anxiety).[3] They provide a link between the grandiose progressivism of high modernity (such as the massive Karl-Marx-Hof in Vienna, a neighborhood-sized building from 1930 holding over 1,300 apartments) and ideas for extra-planetary colonies on Mars (dating at least to the late nineteenth century, and perhaps best articulated in their political complexity by Kim Stanley Robinson's Mars trilogy, 1993–1999.) For many of these projects, the goal is a wholesale replacement of the modern geopolitical order of nested and individuated buildings, cities, and states with new models of bio-political program, perhaps along a continuum from strong architectural authority (Voluntary Prisoners of Architecture) or to an open, ludic urban field (New Babylon), for which megastructures serve a new spatial authority more appropriate to a properly global society.[4]

The composite form of the *City* layer of The Stack (composite both in the interweaving of physical and informational infrastructures in a given site, as well as in the differential integration and disintegration of continental urban sites) is itself a kind of megastructure. In some ways, it is a realization of Apollo-era architectural mega-utopianism (total envelope, universal interfacial grids, superimposition of quasi-sovereign layers, etc.), and in other senses, an almost complete inversion of it (regularization of production and consumption cycles, strong filtering of individual mobility, intensive capitalization of every encounter and gesture, etc.) We can see afterimages of these megastructures in the *City* layer today, and recognize their evil doppelgängers as well. This is possible perhaps because The Stack itself is a meta-architecture of totalization, and a *platform for totalities* to superimpose themselves upon it. Like any platform, it works both as a control mechanism and as a means to open up and flatten access, providing one because it provides the other. It is not surprising that the legacy of utopian megastructures would be situated by this reversibility.

For example, Foxconn is the largest private employer in China and assembles much of the human-scale digital electronics equipment that connects urban society to The Stack. Its largest factory city in Longhua, Shenzhen, situates an estimated 300,000 employee-residents in a massive live-work complex. It is a megastructure by sheer architectural scale and by social totalization; one could also say that Foxconn is an "island" and therefore prone to both utopian and (as has been more the case) dystopian imaginations. Along the spectrum of platform openness versus closure, Foxconn's regimented cycle of life passing from one phase to another, perhaps until death, places it at the end of a dotted line leading through Voluntary Prisoners to the present, each the prototype for the other. Its factory floor is responsible for the physical assembly of much of the world's consumer devices, laptops, and smartphones, and as these are the essential physical interfaces between *Users* in motion and the recombinant landscapes they strategize, it is also a realization of Archigram's Plug-In City (1968) and Computer City (1966). We see Superstudio's fabulous Continuous Monument realized by Global Crossing's massive deployment of transoceanic fiber optics during the dot-com frenzy in the late 1990s. Superstudio's was successful as a project but unbuilt: the telecom was built but busted its investors. We can measure No-Stop City in the compulsive speed of ambulatory urban computing, and the interfacial city without beginning, end, or middle. We imagine Cedric Price's Fun Palace (1961) turned inside out by North Korean stadium pageants where the audience itself is the media content, but instead of free play, each actor is instead rendered a disciplined pixel within a larger choreography of the spectacular image. How to mark the ancestral trace from Yona Friedman's La Ville Spatiale to the new Asian smart cities such as New Songdo City ("a ubiquitous city," so says its brochure) in South Korea's Incheon development, or Soleri's Arcology as a first pass at Masdar, the massive "green" smart city in Abu Dhabi (incidentally both Songdo and Masdar were built with Cisco and IBM as key partners)? Is situationist cut-and-paste psycho-geography reborn or smashed to bits by Minecraft? What binds the hyper-libertarian secessionism of the Seasteading Institute, which would move whole populations offshore to live on massive ships floating from port to port unmolested by regulation and undesired publics (the Facebook funder Peter Thiel is a key funder), with Archigram's Walking City project from 1967, which plotted for Star Wars' land walker-like city machines to get up and amble away to greener pastures as needed? For that matter, as models of programmable planets and embryonic matrioshka brains, how should we link projects like Cisco/NASA's Planetary Skin, which would blanket the globe's epidermal crust with ubiquitous physical sensors, on one hand, and the Death Star, on the other? As any Star Wars nerd could

tell you, for the Death Star, like for the animal brain, the most important information-processing and mission-critical tasks all take place on the outer surface of the sphere, on the *skin* and not in the core. Palm Jumeirah, Tatlin's Tower, USS *Enterprise*, The Pentagon, Noah's Ark, Le Corbusier's Plan Voisin, The New South China Mall, Ryugyong Hotel, San-Zhi Pod Village, Sim City, Irvine, etc.: it gets harder to keep all these walled mega-gardens straight.

Just like the *City* layer does and does not generate new forms of sovereignty as a function of a specific politics of the envelope, both physical and virtual, that is itself defined by the reversibility of its interior and exterior, the urban *platform* of the envelope is also defined by the reversibility of a design gesture's ultimate effects. The utopian and dystopian will invert one into the other without even switching places. The aspiration to the comprehensive "content management" of everything that lives inside its fold drives the *City* platform to open and close, to centralize and decentralize, over and back again, instituting control though the universality of its interfacial protocols, and vice versa. It may be that the *agonistic* logics of the political—drawing lines between friend versus enemy over and over—make it more difficult to see how the technical achievements of constituencies that we might oppose may form to basis of the real alternative systems we seek to design. For the geopolitical rupture of "Free Soil," we can be sure that reversibility sloshes both ways: if Involuntary Prisoners can become Foxconn, then the Foxconn apparatus-assembly archipelago could also provide the genesis of further inversions and utopian opposites. If it does, would we be able to notice them, and if so, so what?

The Obama era started with a new vogue for infrastructural investment and governance, but the fashion proved short-lived and easily diverted. The over-leveraged early 2000s "Bilbao effect" projects were supposed to give way to massive public spending on large built systems that actually did things, but the new New Deal did not happen. For some bets, attention turned toward CNG development at the expense of more difficult-to-solve renewable energy sources and systems, and for others to actively *preventing* infrastructural development of, for example, airport expansion or the Keystone tar sands pipeline from Canada into the United States. For the most part, the new infrastructuralism sought less to mitigate against the risks of algorithmic capital and anthropocenic growth than to update their armatures: think Sir Norman Foster's Beijing Airport (built) versus the North Sea wind farms proposed by OMA (not built). Around the time of Obama's second inauguration, we also received word that Foster had received a most extraordinary commission. His office was asked to work with the European Space Agency to design structures to be

3-D-printed on the moon. The prospect of constructing new civilizations from whole cloth on nearby planets and moons has inspired no shortage of utopian schemes, but in this case that cloth is the moon itself, turned into the printed matter with which off-Earth habitations might be mechanically excreted.[5] Such a project should be called robotic terraforming as much as off-planet urbanism, because instead of sending designers and building supplies across the vacuum of space, the mission calls instead for *programs* (call them what you like: scripts, recipes, algorithms) that would instruct a robotic printer to build up new structures layer by layer of lunar soil, and in time filling the sunny southern lunar pole with new airport cities.

The choice of Foster's office for a project like this is not surprising, as he is arguably the preeminent architect of the Google Earth era; he might terraform the Moon because he has already, project by project, terraformed Earth. Irrespective of the originality or quality of the projects, from Masdar to the new Reichstag and The Gherkin, few contemporary offices have done more to expand the perspectival scale of architectural figuration than his. Architectural students now include "satellite" view along the required plan, section, elevation, and axonometric perspectives on their projects, and his office's portfolio suggests one reason why. While a building's "face" has usually been read from the view of a pedestrian front or entrance, Foster's projects (especially but not uniquely) are best considered from tens of thousands of feet in the air, and as landscape-scale interventions in relation to the urban regions that they gather into their midst. The megastructural scale of the projects also confirms a gathering of social totality into a single envelope (as drawn from high above, instead of in section, as for the Palace of the Soviets or OMA's CCTV— or Dürer's *Triumphal Arch*, for that matter) for which that massive closure inhales utopian aspirations (of the client and their publics) into the mega-machine. At the same time, the universal management platform of the smart city, such as Foster's Masdar plan, gathers its world into itself less through the anthropometric technique of the envelope than through the anticipatory and parametric management of the discrete energy event. By circumscribing and rationalizing a local polity of the electron as the core constituency of urban governance, the smart city supervises not only a social totality of humans, but also a closed ecology of urban energy flows. For these, a preference for "green" infrastructural systems that can sense and regurgitate data suitable for macroscopic total images of flow (images that when made interfacial also become instruments for the recursive management of those flows) equates to the governmental rhetorics of the mega-dashboard promising a complete visual and instrumental index of the urban metabolism. As legacy cities are slow to acquiesce to this

managerial and ecological reason, megastructural architecture refers back to the Apollonian-scale image of the Earth to prosecute on behalf of its synthetic ecologies, now so much more manageable because delimited by the building envelope.

A case in point is Foster's unbuilt Crystal Island in Moscow, a massive hyperboloid, Christmas tree-like tower, which would contain a myriad of residential, cultural, and educational programs under its glass skin and within its 27 *million* square feet, 4 times the size of the Pentagon. After the financial crisis, development financing was now frozen, and the tower is not likely to ever be built. Keller Easterling also links the project to utopian schemes of yesterday and today, some now registered into architecture's critical canon, others still languishing in the historical junk pile of unacknowledged visionary cranks. Like Masdar, Foster's secessionist Island recommends itself as an exemplar of green urbanism in that it can generate much of its own energy needs, allows for carbon-friendly internal transportation from home to work to leisure, and, as a city within a city, offers a centralized economy of scale and density for the consumption of resources. Easterling's critique, however, draws on a Sloterdijkian trope of the planetary condition seen as vast interlocking layered interiors, and she argues that "capital A" architecture's response to the challenge of the anthropocene is not properly met by bubble-era *faux*-Arcologies such as these. Ultimately, it may well be that The Stack's intensive global mesh of megacities will support mega-dense-resource economies, which in turn drive the development of larger and larger buildings, like the larger and larger bombs of the 1950s and the larger and larger airplanes of the 1970s. Both of those arms races were "won" by the Soviet Union, with the absurd 50 megaton Tsar Bomba and the 300 ft Antonov 225 airplane, neither put to any real use, and now Moscow could someday add Crystal Island to this collection of hypertrophic trophies. It may also be that this scalar recalibration of built interiors will realize the positive effect of drawing more and more networks, and even territories, within one building's single, intelligent interfacial design scheme. Even so, the proper architectural address of the design challenges of the anthropocene, and its now permanent ecological exception, remains with the still-unfinished Copernican conceptual recalibration that the planet itself *is already* the megastructural totality in which the program of total design might work. The real design problem then is not foremost the authorship of a new envelope visible from space but the redesign of the program that reorganizes the total apparatus of the built interior into which we are thrown together.[6] At best, flightless spaceships, such as Crystal Island, will be the failed but necessary interim experiments that clarify the imperatives for more ambitious and meaningful geo-design. At worst they are alpha versions of

Elysium, post-crash storage facilities for dead currency notes, or props for the closing shot of the next *Planet of the Apes* remake. However we choose to read the lessons they provide, the architectural representational imaginary has become a key technique for prototyping the forms of governance that would result from this more comprehensive reprogramming, which might posit a Promethean *subtractive modernity* as a guiding principle of speculative infrastructural work. That said, there is no expansion or any single building envelope that can actually accomplish this by itself: "architecture" is perhaps the wrong metaphor for architectural thought to lean on. As the larger architectural imaginary tries to shift from what the professional assembly of buildings asks from it, and toward the conceptual and technological reassembly of the territory itself, we join it in groping toward a design brief for the governance and geopolitics of The Stack, especially in regard to the anthropocenic ecological exception. In doing so, we realize that Foster's building is simply way, way too *small*.[7] It is actually a *miniature* in comparison to what is needed, and far too beholden to the traditions and economics of urban programs from a bygone era (Foster himself may or may not understand this quite well). Instead, we would do better to draw energy from artificial envelopes that do less to seal off and subdivide urban polities, and to more enable the appearance of programs that we cannot already anticipate, measure, or rent and resell in advance: a megastructuralism based not on the metaphor of the *ark*, but of the atmosphere and on the scale and ubiquity of the *clouds*.

PLATFORM CITIES

We do have *Cloud* companies building smart cities, and key architects designing enclaves for *Cloud* companies.[8] They provide some additional clues to that design brief, both by what they get right and by what they get wrong. It is in this context that we can tally how global *Cloud* platforms imprint and express their terrestrial presence through the medium of architecture, not only by marking the imprint of their subterranean data centers but also by a close reading of the new megastructural headquarters built to house the embodied human intelligence of the *Cloud* corporation in Silicon Valley, California. By comparison, recall the Chrysler Building on 42nd and Lexington, designed by William Van Alen for Mr. Chrysler himself in the late 1920s, as exemplary of an older contiguous and self-contained organizational body. The preponderance of a company's executive staff co-inhabited a vertical castle, summoned into a singular, internalized corporate hierarchy, modeled in the stacked floors and rigid posture of the tower. In his ponderous film *Cremaster 3* (2002), Matthew Barney takes on the construction of the Chrysler Building as an

occult epicenter of bygone symbolic economies of industrial power, old money, and natural class hierarchy. The conspiratorial conflict involves "the architect," an "entered apprentice," and some other stuff related to Masonic lore and the grandiloquent opacity of deep wealth. Now in considering, for example, the Googleplex in Mountain View, or the proposed new Apple headquarters in Cupertino, we might well wonder if some future Matthew Barney (just a horrible thought in and of itself) will dance through their hallways with similarly reverent obsequiousness? Do the old and the new headquarters even traffic with the same denominations of spirit and cash? The answer leads mostly to other questions. Below then is a bit of architectural phrenology and corporate-scale palm reading (or at least a biased interpretation of platform model replicated as organizational space and form) of current headquarters plans understood as an expression of the *Cloud* layer into the *City* layer.

"In the plex," Google's footprints seem less determined by architectural innovation than by the nuts-and-bolts accommodation of an elite, idealized corporate elective community. Prioritized over new style is the compound's performance as a support system for the extraordinary cognitive labor that is staged there. Instead of being stationed with magisterial Art Deco appointments as were Chrysler's executive elect, Googlers lunch together on artless, dot-com furniture, but while they do, they enjoy free and nutritious gourmet meals.[9] Why fuss with the aesthetics of money when something far more valuable is being hatched during the meal? Available on-site amenities include massage, free bikes, indoor rock climbing, and regular symposia with thought leaders on a range of topics. Efforts are made to couch the programmer lifestyle in its own idiosyncratic luxuries and to dampen any distraction or discomfort that might interrupt collaborative innovation, including perhaps going home. The Googleplex may already serve as a kind of model sub-urban spatial system for the maintenance of global software platforms, but it is highly selective of the population of *Users*. Unlike some utopian communities, Google's infamous and seemingly obtuse interview questions guarantee that entrance into this rarified colony is filtered according to demonstrable cognitive acumen, creativity, and academic pedigree. By contrast, looking at Frank Gehry's early proposals for a new Facebook headquarters in Menlo Park, we see a plan for a corporate campus designed, it appears, to ensure the staged contact between employees in motion. Winding pedestrian pathways, strategic lines of sight connecting interior and exterior views, all embedded in a multilevel landscape where sub- and super-terranean greenery twists and turns onto and under the collection of buildings. The aggregate "social graph" of the employee population is framed and displayed to itself as it moves and involves itself within

itself in what may be a hangar-scale open-plan work space. It is an obvious but valid observation to note that the collected body of Facebook employees is here mediated by Gehry's proposal as an observable "network" of people in motion, one that will perform at a higher level were its undulating edges given a single supportive program. Unlike Google's site defined by robust services in a generic, no frills context (like Google itself), Facebook's seems more tuned to the advantages of the active performance and the structured monetization of human networks (like Facebook itself).

For their part, Amazon recently singed a 16-year, $1.5 million lease on a huge high-rise campus in the South Lake Union neighborhood of Seattle. There, they will consolidate their scattered executives into one big storefront.[10] Traffic issues aside, the urban headquarters will integrate the company into the fabric of a "real city" in ways that the Silicon Valley campuses will not. Amazon's society will have comparatively blurry boundaries between itself and the rest of the world, similar perhaps to how the mega-retail platform is a more agnostic medium of supply, demand, and algorithmic recommendation, defined by engagement with its outside suppliers and *Users*. This is fine and well, but the far more important architectural-urban footprint of the Amazon *Cloud* platform is not in Seattle, but distributed among the company's many fulfillment centers, and especially in and around the logistics plantations near the airports of Louisville, Kentucky (UPS' hub), and Memphis, Tennessee (FedEx' hub).[11] Amazon's platform logic is based on the massive coordination of pricing, retail display, storage, and delivery of its flat commerce ontology of objects. If Google's mission is to organize the world's information, Amazon's may be to organize the world's commodities. This places them on a direct collision course with Wal-Mart, but that company has been slow into e-commerce and still largely uses its supply-chain omniscience to guarantee itself economies of scale with a limited range of downmarket goods—a very "short tail" strategy—sold through its network of grim retail warehouses to people who may not have other options.[12] Amazon uses the physical supply-chain itself (especially *Cloud* infrastructure, airports, warehouses, and third-party delivery services) *in lieu* of any Big Box retail holdings.[13] These networks, taken together as a composite Amazonian territory, are the platform's megastructural play at the *City* layer, all but invisible to its *Users* save for the vast Amazon.com website. Greg Lindsay goes inside those object-airport-network machines and finds poetry in the airport-adjacent logistical mechanisms so precise and responsive that they should be described as form of artificial intelligence. This description will become more true as Amazon's warehouses and sorting and distribution facilities become further populated by robotic

systems and "workers."[14] We might anticipate that in a few years, an Amazon platform *User* could choose an item online, have it retrieved (even manufactured), mailed, and delivered with no human touch, at least until the last postal mile.[15] This may be welcome or terrifying news to the precarious population of current Amazon warehouse workers. Many are nomadic part-timers coming and going with the ebbs and flow of retail demand. Those with relatively permanent positions, "Amazon Fulfillment Associates," are divided between those on the "receive lines," the "pack lines," the "stockers," and the "pickers," who are directed by handheld devices to find your order wherever it may be among the stocks of children's bicycles, shoe repair kits, and physics textbooks. By all accounts, Amazon space is already built on the nimble precision of a logistical flow that engineers the movements of human workers with a repetitious efficiently probably better suited to robots. In describing the stress and precariousness of work in Amazon fulfillment centers, Gigaom, a Silicon Valley technology blog, went so far as to characterize employment at Amazon as a "dystopian model of neofeudalism."[16] As Amazon (and really all the major Cloud platforms) absorb, centralize, and consolidate production labor into tighter strata of proprietary commerce-logistics algorithms, the future of work is made that much more uncertain, and along with it the real economic power of their workers to also be their customer-*Users*.[17]

Perhaps the boldest "design statement" made by a *Cloud* platform is Campus 2 in Cupertino, as proposed by Apple and our Sir Foster during Steve Jobs' last years (though when Jobs pitched the plans to the Cupertino City Council, he neglected to mention with whom exactly his vision sought collaboration; Foster was not named). Plans show a giant toric "spaceship" (Jobs' own word) landed among apricot groves in apparent pre-launch posture.[18] The design harkens to Eero Saarinen's Watson Research Center for IBM (1961) and the many mid-twentieth-century suburban corporate exurban campuses, but instead of a set of buildings, Foster's closed ring fits an entire campus inside one curving arc.[19] To me, it resembles an austere relative of Herzog & de Meuron's Allianz Arena (2005) as transplanted from Munich into a more bucolic Northern California, or, better, a cult-inspired interplanetary escape craft straight from a Michel Houellebecq novel.[20] The vast closed (Infinite) loop contains 2.8 million square feet of interior space, but appears to have no face to the outside world, no real front or back, no beginning or end. Perhaps this replicates the looped border of the Westphalian state or of the utopian island. Descriptions used in the proposal like "integrated," and claims that it will "create a physically unified community" radically understate the insularity of this habitat with its central plant, cavernous underground,

and off-site parking. Once employees have made their way back to the surface from the subterranean automobile rump state, they will look out and see only the trees for the forest. Withdrawn into this island package, Apple citizens will enjoy the benefits and suffer the fragilities of the reserved enclave.[21] Bunkers imply security, control, purification, and impenetrability, but like the walled garden of iOS itself, it can also suffer from having to serve as both platform and content at once. As others have observed from the distant sidewalks across the entrance roads, this sort of suburban walling off of a corporation's population may be less futuristic than a throwback to the 1950s. As opposed to the "creative class" strategies of urban contact and stimulation, here Apple recedes and secedes into the controlled space of the curated megastructure. As the price of total interiority is "the disappearance of the outside," for utopian platforms like Apple's, the price of curation is closure.[22]

Perhaps the gesture is working at a much larger scale, not in relation to any one nearby downtown, but as for all of Foster's projects as part of a higher stakes process of terraforming the Earth and building his own distributed portfolio of Earth bases (in many cases directly on behalf of The Stack's expression). Things of Shape to Come? The Apple *Cloud Polis* is seen here extruded into an architectural programming strategy: curated and closed off, affectively perfected, explicitly branded, secretive and opaque, totalizing and majestic, theologic in rhetorics if not actually cultish, etc. The utopia on offer to its *Users* is, for some, an ecstatic platform that transcends mere computation and extends toward a realm of full creative self-realization. That the social contract of that experience would demand such secrecy, silence, restriction, and exclusivity is not necessarily unusual as a form of political theology, but that it would be invested in branded equipment that connects *Users* to the *Cloud* layers of The Stack is an important novelty. In anticipation of the ultimate footprint and expression of the Apple *Cloud* platform into the *City* layer of The Stack, we also note that the integration of the closed megastructural platform model is now planned to include Foster's refresh and redesign of Apple's most public terrestrial presence, its hundreds of brand retail stores. That Foster's office would become the "house architect" of the Apple platform's human-facing Earthly permeation suggests that his acumen with megastructures serves to organize the physical expression of the Apple *Cloud Polis' City* layer more generally. Apple has invested in the biological extravagance of the megastructure in ways that the other platforms have not, including its resolute ambition to utopian totality. Certainly the data centers, warehouses, and logistics parks that give shape to Google, Amazon, and Facebook are no less geographic in scope, but they are not foregrounded as the *face* of the *Cloud Polis* in the same

way.[23] The incipient *Cloud Polis* of these other platforms does not rely on the ethics and aesthetics of total design closure with nearly the same intensity as Apple does. Google's networks surely are megastructural in their scope and universality, but they do not observe the guardianship of interior borders as an essential principle and promise of *User* experience, whereas Apple's do.

With Foster's other commission to design printed structures on the Moon, we see the Apple *Cloud polis* as part of a collection of megastructural Earth-bases? However, per Crystal Island, is this design properly suited to post-Apollo logics of geographic scale and the recognition of any project's expanded planetary situation, or is it Ark-building for paranoid withdrawal designed to sustain life on a hostile alien planet, even if that planet is our anthropocene Earth? There are surely many ways to characterize how the megastructure works at the *City* layer and from these to draw out different implications. Unlike a real Moon Base or Buckminster Fuller's "domed city," for example, many such structures are not *only* designed for the permanent or even semi-permanent housing of people in settled encampments. Like the temple at Göbekli Tepe, they may also be monumental landscape switching stations through which we might pass on our way. Their scale and centrality demands this passage, and the arcs of our movements are composed in their bending toward the gigantic nodes. We do not *reside* in Foster's Beijing Airport but we must pass through its digestive system if we are to reach the next level of our passage into or out of China. Many are not only impermanent but are not designed for the mediation of humans at all. Most of the very largest buildings in the world accommodate and express the algorithmic resorting and distribution of inanimate objects, commodities, and cargo from sites of extraction, to assembly, to consumption, and back into landfills or the production cycle. The relative freedom of objects to cross borders and gather global materials into themselves is less restricted than the passage of people, bound as we are to the rights and restrictions of formal political citizenship. The physical object becomes the exemplary non-citizen *User* of the *City* layer, as the most intensive impact of algorithmic capital into the physical realm of The Stack is in the molecular reassemblage of valuable *matter*, its global redistribution as manufactured objects, and the computational optimization of their itineraries through supply chains. All these enjoy their own megastructural theatres. At the *City* layer, this object-oriented economy of molecular logistics is expressed in "planetary super-surfaces" such as the warehouse in San Bernadino, California, which is so large that its floor has been laser-leveled against the curvature of the Earth.[24] Instead of walls and windows, these spaces are

programmed by bar codes, radio frequency identification [RFID] chips, and scanners, and populated by robotic platforms, shelves, and stockers that can easily lift over a ton of goods at once.[25] From the perspective of The Stack looking *out* at the Earth, these architectures of and for things are perhaps more essential than those rendered for the benefit of human appreciation.

As a whole, these *Cloud* platform megastructures concentrate the *City* layer, by drawing economies of flesh, information, energy, and symbolization into a web of settlement and displacement as vast as it is uneven and asymmetrical. Some megastructures have a special, more directly interdependent relationship with another, such that its enveloping closure belies dependence on a *doppelgänger megastructure*, perhaps a continent away for its own energy, purpose, and support. For example, Apple's spaceship in Cupertino, California, where design and strategy live, cannot possibly exist without the Foxconn factory campus in Longhua, Shenzen, where Apple's products are assembled from parts into the perfected slabs that tether *Users* to the *Cloud* platform.[26] Even as they occupy different corners of the globe and remain selectively ignorant of what goes on in the other site, the two megastructures are intimately paired. They share a unique bond across the strange distances of the *City* layer, binding them together in ways that penetrate the total closure of their envelopes by doubling and mimicking one totality and another. Foxconn's fences sit next to suicide nets as Apple's do to apricot fields, Foxconn's dorms occupy Apple's subterranean parking, and Foxconn's massive assembly lines tag along with Apple's customer service training programs. Together, these megastructures, along with the network of mall-based retail embassies, constitute the terrestrial urbanity of the Apple *Cloud* platform, but their relationship may rest on a fragile symbiosis. Like the Eloi and the Morlocks from H. G. Wells' *The Time Machine*, the megastructures' two paired populations share the same world but inhabit different spaces, one above ground and the other underneath: one living in the perpetual innocence of play and leisure, experience, and design and innovation, staying strategically distanced, oblivious, or uninterested in how it all appears every morning for them, while the other runs the machine underneath, toiling against the Earth, forcing it to produce the bounty over and again. It is perhaps a bad omen for Cupertino that the bargain between the subterranean world of the Morlocks and the surface world of the Eloi is maintained only because, periodically, the Morlocks harvest Eloi like cattle and eat them. Lesson: the cannibal economies between networks of megastructures at the *City* layer of The Stack are not always what they first appear.[27]

Notes

1. Much of Usman Haque's art design practice is based on activations of Herztian space as an ambient megastructure, making it visible, drawing it into new electromagnetic petroglyphs. See http://www.haque.co.uk/.

2. As compared to, for example, Aaron Koblin's Flight Patterns; see http://www.aaronkoblin.com/work/flightpatterns/. For a more nuanced discussion of the telescopic scales of planetary striation, see Reza Negarastani's lecture, "The Topos of the Earth, Telescopic and Stereoscopic Visions of the Abyss-in-One," http://centerforthehumanities.org/james-gallery/events/The-Topos-of-the-Earth-Telescopic-and-Stereoscopic-Visions-of-the-Abyss-in-One.

3. See Frederic Jameson, *The Geopolitical Aesthetic: Cinema and Space in the World-System* (Bloomington: Indiana University Press, 1995).

4. See Reyner Banham, *Megastructures: Urban Features of the Recent Past* (New York: Thames and Hudson, 1976). The recent lineage includes the "New Monumentality," Fumihiko Maki's "Collective Form," Kenneth Frampton's "Megaform," Italian neo-rationalists' "typological piazza," Oswald Mathias Ungers' "Grossform," and Rem Koolhaas' "Bigness." See Antonio Negri's essay "On Rem Koolhaas," as well as *Exit Utopia: Architectural Provocations, 1956–76*, eds. Martin Van Schaik and Otakar Macel (New York: Prestel Press, 2005) and *Megastructure Reloaded*, eds. Sabrina Ley and Markus Richter, (Berlin: Hatje Cantz, 2008).

5. Perhaps a future Erich Von Daniken will interpret Foster's structures as proof of alien intelligence on Earth's Moon.

6. Yes, "Ladies and Gentlemen, We Are Floating in Space."

7. Easterling reaches the same conclusion for different reasons, in "New Monuments: Keller Easterling on Norman Foster's Crystal Island," *Artforum International*, Vol. 46, No. 10. Summer 2008.

8. There is no lack of attention in the popular press as to how *Cloud* platforms impact Bay Area urbanism. See, for example, http://gizmodo.com/how-the-tech-industry-is-quietly-changing-the-face-of-a-513266451 and http://arch-unfrozen.tumblr.com/post/51615608029/the-spell-of-hot-desk.

9. At the time of this writing, Google is working with the architecture firms Gensler and NBBJ, among others. Both practices are known for extraordinarily ordinary corporate spaces, risk-free modernistic design management, and artless monocultural blandness. http://venturebeat.com/2013/07/13/google-delays-new-campus-for-up-to-a-year/.

10. See http://www.nytimes.com/2013/08/26/us/as-amazon-stretches-seattles-downtown-is-reshaped.html?pagewanted=all.

11. For a partial list of the locations of Amazon fulfillment centers in North America, see http://outright.com/blog/locations-of-amazon-fulfillment-centers-2/.

12. In the essay "Utopia as Replication," Fredric Jameson draws links between Wal-Mart and certain infrastructural utopian potentiality. See his *Valences of the Dialectic* (New York: Verso Press, 2010).

13. On the Amazon/Wal-Mart conflict, see http://www.bizjournals.com/louisville/blog/morning_call/2013/07/amazoncon-walmart-e-commerce.html.

14. On Amazon's ongoing implementation of robotic systems in its warehouse and distribution chain, see http://www.businessweek.com/articles/2012-11-30/amazons-robotic-future-a-work-in-progress and http://www.dailymail.co.uk/news/article-2286227/Amazons-human-robots-Is-future-British-workplace.html. Amazon also purchased Kiva Systems, a leader manufacturer of warehouse automation systems. See http://www.boston.com/business/technology/innoeco/2012/03/amazon_buys_warehouse_robotics.html.

15. Despite my interest in the robotics of Amazon, the drones ploy seems like just PR.

16. See Stowe Boyd's Gigaom article "If Amazon Is the Future of Work, Then Be Afraid" at http://pro.gigaom.com/blog/if-amazon-is-the-future-of-work/.

17. This dynamic is the central problem drawn out by Jaron Lanier in *Who Owns the Future* (New York: Simon & Schuster, 2013), and it leads him to advocate for, among other things, a revaluation of human cognition and its reward by ubiquitous micropayments. See http://www.edge.org/conversation/the-local-global-flip.

18. See Jobs' presentation of the proposed Campus 2 to the Cupertino City Council at http://www.youtube.com/watch?v=gtuz5OmOh_M.

19. See Alexandra Lange's article for *Design Observer*, "New Apple HQ, 1957," at http://observatory.designobserver.com/feature/new-apple-hq-1957/28018/.

20. See *The Possibility of an Island* (New York: Vintage, 2007). More than one person has also remarked to me that their first reaction to seeing Jobs'/Foster's proposal was to recall the "silver seed [flying] to a new home in the Sun" from the Neil Young song "After the Gold Rush."

21. An impression that is not discouraged by the company's international tax avoidance strategies; see http://nyti.ms/10fOPRF.

22. Again Whole Earthinfi.

23. Summed up well in a slightly indignant comment to Price's *Design Observer* article in which "Mitch" concludes that "Apple thrives being in control of information, product releases, the market and the user experience. Seclusion is ideal for their corporate culture."

24. In Geoff Manaugh's words.

25. See http://bldgblog.blogspot.com/2013/04/the-planetary-super-surface-of-san.html.

26. For a glimpse into the everyday life of workers at "Apple City" in Zhengzhou, see the photo essay by Gilles Sabrie published by *New York Times* at http://www.nytimes.com/slideshow/2013/07/16/world/asia/20130717-CHINA.html?ref= asia#2. The accompanying text states, "Day-shift workers leaving the Foxconn factory. Unlike Apple's modernistic new campus in California, which will be surrounded by apricot trees, the Zhengzhou facility has all the charm of a penal colony. Employees, who must wear matching uniforms, say supervisors routinely curse and yell." Despite

it all, many of these kids may be having more actual fun than their more comfortable doppelgängers in Cupertino.

27. Before conclusion, it must be said that perhaps the most significant *Cloud* megastructure is not one built to house the higher brain functions of a private global platform, but one built to house the intelligence and surveillance operations of a global platform in the form of a state, namely the United States, and specifically the National Security Agency [NSA] Utah Data Center. See http://en.wikipedia.org/wiki/Utah_Data_Center, http://nplusonemag.com/leave-your-cellphone-at-home, and the helpful http://nsa.gov1.info/utah-data-center/. If there is one building the in the world where The Stack lives, it might be here. We cannot really say, because obviously we do not *really* know what will go on there, or even if it is the most important installation of its kind. One would expect that it is not. The implications of this structure's very existence, given what we know, for the real conjunction and disconjunction of "software and sovereignty" are surely more profound, dire, and essential than those of Google, Facebook, Amazon, and Apple headquarters. I will be expanding on those implications in another essay.