

## FROM STONE DEVICE TO TECHNOLOGY DEVICE

### Paweł Grodzicki

Senior Lecturer

Institute of Design and Theory of Architecture

Faculty of Architecture Warsaw University of Technology

ul. Koszykowa 55, 00-659 Warsaw, Poland

[pawel.grodzicki@arch.pw.edu.pl](mailto:pawel.grodzicki@arch.pw.edu.pl)

+48 601 266 429

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### Abstract

The paper investigates the impact of rapidly growing communication technologies on the city physical structure and hypothesizes the conceivable scenarios for its spatial form in the future. The methodology is be the analysis of past and current city forming processes.

### The node in stone

The primary cause and purpose of cities was the concentration of all sorts of networks: social, economic, political – in a single point in space. This was a trigger for skyrocketing of human civilization and the glue cementing the city spatial structure. Therefore density was always an implicit condition of the existence of the city.

Traditional city is a low-tech solution: *a network node made of stone*: physical space and matter used to create a material, *stone connectivity device* enabling accumulation of people, contacts, cultural transmission, diverse skills etc. This accumulation allowed enhanced exchange of ideas, products, knowledge and thus formed fertile environment for progress.

Like the force of gravity, the more “mass” the city accumulated the more it attracted new mass to migrate. Therefore the early, though long lasting, phase of the evolution of settlements was marked with constant growth in density and compression. Like black holes, cities swallowed more and more material jamming it inside of their boundaries.

The Hobbesian near-state-of-nature, nasty and brutish condition of human at the time backed the process with the existence of city walls. The walls, like chains, constrained the size, and disciplined spatial expansion of early cities. Hence keeping high density within. In a “stone device” connectivity resulted from density and compactness.

Yet, unlike a black hole a city is not able to compress material forever. As migrations kept on, cities became ready to explode.

### Breaking the wall

Under constant pressure of migration and as the walls appeared to be useless and were torn down, cities poured out. Still keeping their densities they spread over wider and wider areas.

But breaking the wall was not enough – a new device was needed to enable cities to operate regardless of their size. Fortunately, being a furnace of civilization progress cities themselves were the bedrock for innovations that helped to cure their growing pains. Roads, infrastructure, all technologies developed in their fertile industrious environment allowed them to grow in size and still be effective.

However, with the technologies created by the successive industrial revolutions the traditional urban structures themselves began to morph. As more and more transport and communication machines were invented, the less was connectivity (and thus: cities) dependent on proximity of locations. With the advent of the automobile cities needed not to be dense anymore.

### **A car city**

American cities rushed into this possibility and soon became endless suburbs with needle sharp downtowns or even with the absence of them – and still preserving high performance. Locations disconnected physically remained highly connected by constant movement of cars. Man could fulfill his ultimate dream: to benefit from all advantages of the city but still live in a country house surrounded by nature. A new and very distinct kind of city emerged. *A car city.*

Those who criticize sprawl often forget to admit, that it is just a byproduct of what is considered by vast majority an urban wonderland, perfect environment to live in. Own tiny house with own tiny piece of nature attached to it.

The reasons it happened in America were simple: the urban structure was relatively young and not constrained by historical legacy, availability of new land, and the society driven by liberal market laws of demand and supply ensured, that whatever was dreamt of by all - would be granted to the extreme. Thus American cities became laboratories of new potential and clinical example that can be studied.

The innovation resulting in emergence of a car city was adopted by wide population and was supported by business and government. Millions of people wanted to participate in, benefit from new (and seemingly perfect) way of life, there were devices at hand to realize the dream (automotive industry, mass production of affordable homes – with icons like Ford T or famous Levittowns) and finally: the huge infrastructure (roads and highways) was created to support the trend by means of national policies.

It is important to note, that current technological breakthrough has similar characteristics. All at stake are in favor of it: individuals want them, industries are busy providing devices, enormous global infrastructure is being created. Therefore the process may not be easily stopped or reversed.

### **A scratch on the picture**

But there was a downside to a dream too. The streets – once the most vibrant symbol of the city life - became highways and, being abundant with cars, ceased to exhibit any sign of human presence. The disconnection between the city spatial structure and the realization of its civilizational purpose has begun.

The dominant feature of a car city is that it destroys the logic of arrangement of places. As distance becomes no obstacle, and travel is inherently built in, programs may be located anywhere as people will commute to them anyway. A famous restaurant, jazz club, attended church – may function regardless of their immediate neighborhood and particular location in the geography of the city. There is no need for a traditional logic and discipline of urban space. All rules and hierarchies become relaxed or obsolete, as there is no natural pressure to enforce them. A very typical American picture is concentration of several individual churches in one urban location. As worshippers may commute from far away there is no need for a church to be located in proximity of the congregation or the latter to be located in one neighborhood. Anyone can drive anywhere from any place of origin. As this applies to all kinds of programmatic relationships, the traditional hierarchy and structure of urban fabric is not needed any more.

Another crucial consequence of overcoming the distance is flattened form of a car city: vast, nearly endless landscapes of very low density, 1-2 story detached buildings surrounded by parking lots.

Car cities can exist only if rely on massive use of cars. There is no other way that people could connect with places they work, learn, shop – from the places they live, as those places are loosely distributed over enormous unhuman distances. Physical geography of places and structure of space become less and less important.

### **A book city**

Contrary to the other precedents mentioned before, a book city never really existed. But it is a very useful concept to illustrate the new era that came with the dissemination of print. It was the first detachment revolution. This revolution was hardly noticed by urban historians and feebly reflected in urban form. It started long before any signs of modern technologies but its impact should not be neglected as it was a foretaste of the real revolution of the future technology era. A book city is a name for *connectivity device made of paper*.

Before the book connectivity was fully united with material space. Any real contact or exchange was not possible if it didn't take place in real physical location involving presence and meeting of all stakeholders. The interdependence of space, individuals, flows and activities was complete.

The book, for the first time in history, allowed contacts to be indirect, detached from spatial channels of exchange. Links established via books did not require physical presence or proximity (in both space and time), neither they needed specific urban structures to support (like plazas, meeting places of any sort).

The book is a repository of compressed connectivity that can be released any place and any time, involving anyone - thus replacing a great deal of real world contacts that would have been previously needed. In this sense a book became a first terminator of compactness of cities as it broke ties of direct relationships happening in real defined urban setting.

The book revolution that seems almost invisible from present perspective was forerunner of technological revolution of today. It preceded by centuries its successor which finally has power do transform entirety of human behavior in the city and consequently – the city itself.

## A technology city

Nowadays, the rise and exponential growth of virtual communication technologies brings a new level to this change. With them societies can now maintain the highest level of connectivity regardless of any notion of geographical proximity or density in spatial structure. The glue once keeping the cities tightly together turns out not to work for their future. The disconnect of space and life may become ultimate. What kind of cities will emerge as a result of this process?

A new kind of city - a *technology city* – is a model of a city highly connected by means of advanced and broadband communications technologies. Having discussed the features of some of its precedents it is now possible to analyze its overall characteristics. A technology city will demonstrate some similarities and dissimilarities to the earlier model of car city:

- In a technology city connectivity is increasing as a result of technology in the same way as it increased in a car city comparing to its predecessors.
- Connectivity, that in a car city required constant physical movement of population, in technology city is secured by movement of virtual data through communication networks.
- Thus, in a technology city highest levels of connectivity are provided with no need for physical presence, contacts or material exchange.
- Consequently, communication and cooperation of teams, groups and organizations does not have to be based of physical gathering in certain defined location (like in an office).
- Furthermore, as connectivity does not require physical presence or contact, it does not require physical movement either. Commuting is not necessary in technology city.
- In a technology city part of communication is mobile – it connects people not places.
- In technology city any physical movement is guided by algorithms of navigation programs or augmented reality and not by features of real urban space.
- Significant amounts of resources that previously needed material space to be stored are stored in virtual space.

The above list of features is not exhaustive but gives enough observation to grasp the most crucial consequences for spatial structure of a technology city.

### *Detachment*

The primary conclusion must be that technology will not be a cure to sprawl. Just the opposite: it will eliminate any former limits to it. Even a car city set restrictions to its size as distance is limited by time of travel. In technology city communication between any given locations is immediate, it requires 0 travel time, as if also the distance were 0. The last existing bounds to size are gone.

As it was stated before, a car city caused disintegration of rules and hierarchy of physical city structure by making any place easily accessible by anyone in short time and therefore making no difference where elements of programs are located in space. In technology city any given location will be accessible, in practical terms, immediately. Though virtual, this kind of connection is enough for many types of activities (it's even richer, as it may include unlimited additional data packages). Thus location will be even more indifferent to program. Any element

may be located anywhere and will still remain a functional part of the whole, being accessible for all interested. So the decay of spatial organization and hierarchy will continue.

This instant accessibility dismisses importance of dimension and distance and therefore – geometry, shape or form in urban terms. Relationships, previously carved in stone of urban structure, thus constant and fixed are now virtual, flexible, subject to change. Moreover, those relationships, networks become *pure topology* - they are nodes and connections with no need to refer to any real geometry. Released of bounds of material structure the networks may connect denser, faster, morph and adapt. Now – connectivity may be entirely detached from material stuff the cities are built of.

In technology city there will be no more pressure on density or compactness, than we could observe in its car predecessor. Rather, decay of need for physical contact will relax the material structure of a city even more. A paradise paradigm of home-and-lawn that was propped by massive use of car will be yet more easy to achieve in a world where no car is needed to maintain contacts. The compactness may be supported by other causes like overcrowding or high value of land, but technology alone is a strong factor for further decompression and suburbanization of urban structure.

As detachment (of networks from material structure) becomes more and more apparent, yet far more reaching hypothesis might be drawn. If high connectivity can be now achieved regardless of properties of material structure it used to be attached to, if only places matter, not their configuration in space, if, considering mobility, we might even disregard places in favor of place-free individuals, and as, finally, a city is nothing more than configuration of places – then: what kind of reason is there still for a city as a material structure to be necessary? Is it possible that stone connectivity device is being superseded by technological device? In other words – do we still need cities? Will detachment be ultimate?

If true, the chain of events would be truly Darwinian: first, material structure of cities emerged ensuring density and connectivity that triggered technological progress. Hence that progress generated technology that will make the first instance – a city physical structure – obsolete. High connectivity causing disconnect from and of the material structure of the city.

### *Movement*

There is another group of consequences related to ceasing of physical movement.

As it was noted, virtual connectivity dismisses to large extent the necessity of movement. The dwellers of technology city are able communicate very effectively not needing to be present or group in specific places. They can connect with any place or person to work, learn, entertain, buy - not moving from their own location. Though this does not refer to all possible reasons for movement in the city, it covers a significant portion of them.

But in a car city commuting, though usually detested, is by some means a cementing factor in large cities. Dwellers, if not perceive the city physically, at least travel through it and in that way experience, memorize, build mental maps of the structure, connect distant parts of it with their own movement. Absence of it will be another factor strengthening atomization of space and disintegration of large scale cohesion of urban tissue.

The diminishing of motion brings the dispute to interesting question: what if needs for transportation were limited to movement of goods and produce, and only occasional travels of humans? Specifically: what if all everyday compulsory commuting to the office, school etc, suddenly stopped or was reduced significantly? All this caused by simple fact, that all or most of necessary connectivity were provided by easy and broadband access to communication network at one's home location. This would mean that much of infrastructure and space needed nowadays to provide daily displacement of crowds of city dwellers from one place to another, to and fro, will prove to be superfluous, redundant, unnecessary. A High Line case extended to global scale... What would this regained amount of land be used for? And what about released floor area of huge concentrations of office space freed from its former occupations?

### *Perception of space*

In technology city the perception of space, instead of being a result of direct experience and interaction, is commanded by navigation programs and augmented reality. These are not just computer versions of traditional guides and maps. They represent a radically different concept of human relationship with real space. They are databases and process numeric information. Navigation does not understand the urban composition. It does not honor great avenues if they are jammed with traffic. It will guide through the tiniest local street if it's not busy at a particular moment and the route may be cut by few seconds. Thus causing "flash mobs" of cars in unexpected places and times. The algorithms optimize travel time regardless of any other factors, were they compositional presumptions, former habits, common sense or else. They do not care about landmarks.

Navigation does not see, but it knows. It may suggest good places to go, not minding whether they are exposed in urban structure or not, if they are in front or in deepest cul-de-sac. The actual location is irrelevant for the accessibility. Navigation distorts a natural hierarchy and structure of urban space, replacing it with a digitally calculated routes and paths, mapping or ranking places despite of their physical locations. *The image of the city* generated by algorithms is radically different from what we see with our own eyes and from what are used to. On one hand it's wiser, richer in valuable information, on the other - this kind of information is inconsistent with the language and iconography of urban space developed throughout centuries of human habitation.

### *Locality*

As impact of communication technology seems rather disintegrative to large scale properties of urban structure, it may have surprisingly good outcomes in local scale. It may help restore many of traditional qualities of vivid neighborhood. As people lose need for long distance travels they will be much more connected to their local environment due to simple fact, that they will allocate much more of their life time to it. The reason that in a car city neighborhoods are often neglected is that their residents are such only by name, not really "residing", but spending most of their conscious and active time somewhere else, and therefore not being able to establish meaningful connections to places they "live" in. Not having to commute on daily basis, and thus not having to share their time and devotion between distant, scattered localities, dwellers of

technology city will be attached to their own place and its surroundings in a similar way as dwellers of medieval city were committed to theirs. The difference being, that now they are not entrapped in them but may also freely benefit from potential of wider structure at will.

Consequently, the importance of locality will grow resembling strongly the pre-car era of urban history. Instead of strong but spread widely long distance ties and much weaker local ones typical for car city - a technology city will exhibit contrary qualities: strong local ties will be primary again and distant links of lesser significance. Dwellers will be less global more local which may result in reinforcing of urban tissue at human level scale. The city as a whole will constitute of succession of small localities overlapping and intertwined, forming a fabric-like structure, the strength of which depends on tightness of a weave. This may be considered a much more effective glue to the city matter, that even the strongest stitches connecting distant scattered realities of an endless car city.

### **End of geography and the fall of the stone device**

All the observations presented here lead to the presumption, that the coming urban era will be the era of no geography. The disconnect of civilizational flows from material structure of the city, detachment of places, urban hierarchies built on virtual pure topology instead of physical space – all this makes traditional notions of urban geography and space inappropriate and apparently wrong. The city material form tends to turn to more and more indifferent, neutral, passive underlay for all vital processes of society that transfer from real to virtual space.

Progress means that we do not use hammerstone anymore, though it was extremely useful for thousands of years. It also gave birth to plentitude of sophisticated tools in history, but its own history is long over. The direct encounter of technological device with stone device must result with defeat of the latter. In this story a stone connectivity device (a city) gave birth to technological connectivity device (a network). Now the latter does no longer need the former. Enhancing connectivity to highest level results in disconnect from the real matter of the urban structure.

But we are being pushed in that direction not only by technological advance. We need to disconnect from the actual magnitude of contemporary cities because we are not able to comprehend the whole anymore. In order not to get ultimately lost we need to detach and reconnect: closer to one place, own neighborhood, local community and affairs. In many ways technology that kills numerous features of known cities may also be a tool to restore some of the most profound bonds with our immediate vicinity. Taking over the burden of global connectivity it leaves space for local, real world relationships.

### **References**

For speculative nature of the thesis presented there are no references given. However, the reader may refer to other papers of the same author exploring the topic:

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