January 2012 年度 , 修士論文

A research on the inhabited viaduct architecture in Tokyo.

Focusing on its contribution to the vitality of the city center.

Snapir, Arnon

東京大学大学院新領域創成科学研究科
社会文化環境学専攻

Department of Socio Cultural Studies,
School of Frontier Sciences, Kashiwa Campus
Tokyo University

0 INTRODUCTION

0.1 ABSTRACT

Within a radius of 12.5 km Tokyo (23 districts) Tokyo is home to almost 60 kilometers of elevated railways viaducts[1]. These are part of the massive infrastructure network built in Tokyo in the last 120 years. The viaducts, expressways and highways crisscross Tokyo and connect the various towns and neighborhoods and form Tokyo's efficient transportation and traffic system.

Similar to other world metropolises of such scale, the infrastructure network exist to provide the necessary means and routes of connections and platforms for a smooth and efficient movement of private vehicles, buses and trains.

It is impossible to experience Tokyo without being aware of its infrastructure and expressways. In the early 1900's when viaducts and new roads were being built in the city; Tokyo was already a metropolis and one of the largest cities in the world. Therefore the viaducts and roadways had to be superimposed on an already established and dense built environment of housing, commercial areas and also larger lots of aristocrats (Daimyo) and Government buildings, with clear street layout and zoning.

These collisions of scale, style, function, technology and politics transformed Tokyo into a modern megalopolis and resulted in an areas where the infrastructure fractures the city and areas where the infrastructure also enhanced the urban experience. After a while in Tokyo, in spite of the scale and massiveness of the viaducts one tend to ignore the infrastructure as if it was not there.

How much the infrastructure does actually engage the city and its occupants on an urban life level? The answer is that it varies from instances in which the infrastructure stops being infrastructure and becomes a local urban element, belonging to the neighborhood where it is laid to instances where the infrastructure – while highly visible completely ignores the local settings, is a complete alien component actually causing harm, separating sections of the city and essentially serving only one function of providing a platform for the movement of trains or cars. The insertion or juxtaposition of a viaduct into an existing urban landscape results in a large urban - infrastructural element with a dichotomy role as a divider but also as a new anchor or magnate; divider in the sense of disturbing a long established land use and urban order and a magnate in the sense of a new linear lively commercial & social urban element. I believe that the magnate features are stronger than the divider and therefore the viaduct contributes and enhances the vitality of the city center.

The thesis subject is the inhabited rail viaducts in central Tokyo with a focus of the viaducts in Kanda, Chiyoda-ku. The viaduct of Kanda is intriguing for several of reasons:

- The viaducts was superimposed on one of the oldest neighborhoods of Tokyo
- The density of the lots, buildings and houses.
- The viaduct does not conform to the existing street grid, but dissects the lots in a diagonal line
- The complexity of two parallel viaducts which were built during different times.

[1] See research #5069

- The viaduct was inhabited early on and reflected the surrounding needs as well as the historical events such as the war and economic bubble.

The thesis aims at explaining how Kanda's GA DO SHITA interacts with the surrounding; what makes it unique and why it contributes to the vitality of the area.

The research tackles the phenomena of the spaces below the viaducts on four levels of contexts and scales:

- **XL**: World scale, in reference to world examples of inhabited infrastructure and utopian ideas of merging infrastructure, architecture and urban functions all into one encompassing linear system.
- **L:** Metropolis scale, in reference to the elevated railways of central Tokyo, their settings and the way they engage the city.
- **M:** Neighborhood – town scale, in reference to the neighborhood of Kanda, its history before and after the construction of the viaducts and the urban changes brought by the viaduct.
- **S:** Architectural scale in reference to the actual layout, functions, dimensions and characteristics of the spaces below the viaduct in Kanda.

Before selecting the inhabited viaduct as my focus I was intrigued by the dense network of superimposed infrastructure in Tokyo and the way it interacts with daily life and human activities. This point of meeting between an infrastructural element and architecture or human use is my prime interest or how Tokyo reinforced the efficiency of its infrastructure by adding functions and uses and therefore achieved a greater integration between the city and its infrastructure.

Tokyo's superimposed infrastructure in some cases created an urban wound and in other cases enhanced the neighborhood and improved the urban vitality. Such is the case of the railway viaduct in Kanda. This viaduct started as an urban divider but slowly became a magnate and an element of cross connectivity which brought new life to the area and new commercial and social possibilities.

The thesis will try and answer the following questions:

A. **The inhabited spaces under the viaducts of Tokyo add to the livelihood of the adjacent neighborhood - what are the unique attributes of this unusual zone and spaces that makes it unique and unlike normal commercial street areas or a regular lot setting?**
B. **What kind of lessons – we as architects and urban planners – can learn from the inhabited viaducts of Tokyo when working on projects involving existing infrastructure or new infrastructure?**

TABLE OF CONTENTS

0.2 METHODOLOGY

As my first thoughts were of the intense and complex infrastructure superimposed on Tokyo, my thesis also tries to tie this infrastructure to the global context

As a massive linear element crossing and connecting districts in Tokyo, the viaduct engages the city on at least 4 levels:

1. On the Metropolis scale as one part of the vast network of traffic and transportation network.
2. On the town scale as an element superimposed unto an established area since Edo times.
3. On the urban scale of adjacent streets, main roads and commercial district.
4. On the architectural scale of inhabited spaces below the viaduct.

In addition to the above, the elevated viaduct also has a 5th scale that of a global context of an infrastructure with multiple functions.

The methodology, structure and chapters of the research follow these same 5 levels of context:

Scale	Context	Chapter	Objectives		Methodology
XL	**World infrastructure**	1	1	Infrastructure with multi functionality - survey	Literature and online resources
			2	Inhabited infrastructures - examples	Literature and online resources
			3	Linear cities - examples	Literature and online resources
			4	Utopian and futurist ideas of merging infrastructure, the city and architecture - examples	Literature and online resources
			5	Repurposed infrastructure - examples	Literature and online resources

Scale	Context	Chapter	Objectives		Methodology
L	**Metropolis infrastructure**	2	1	Survey & map of the elevated viaducts in Tokyo	Rail maps of Tokyo, Zenrin maps, site visits and Google Earth
			2	Understanding the scale, length and area of spaces under the viaducts	Chart created based on data collected from the map, site visits and photographs.
			3	Characteristics of the rail viaducts in Tokyo	Based on analysis of the data of the above two tasks.
			4	Spaces under the viaducts as an architectural typology	Photographs, reading and site survey.

Scale	Context	Chapter	Objectives		Methodology
M	**Town infrastructure**	3	1	History of Kanda and Chiyoda-ku	History derived from books written about Chiyoda-ku & Kanda.
			2	Land use at Kanda near the viaducts	Based on maps and site survey
			3	History of the viaducts	Based on books, old plans of the viaducts and train station.
			4	Spatial analysis of the area of Kanda where the viaducts	Using the CAD data to extrude understanding of the influence of the viaducts on the adjacent areas of the Viaducts

Scale	Context	Chapter	Objectives		Methodology
S	**Architectural**	4	1	Land use within the spaces below the viaduct	Site survey, photographs
			2	The different zones of the viaduct	Site survey, photographs, reading
			3	The characteristics of Kanda's spaces below the viaduct	Site survey, online resources, photographs
			3	The atmosphere and uniqueness of the inhabited GA DO SHITA	Interviews
			4	JR policy of managing the GA DO SHITA	Interviews and online resources

0.3 PREVIOUS RELEVANT RESEARCH AND LITERATURE

#5069: Relationship of urban areas and function of spaces beneath elevated train line in the 23 districts of Tokyo

Waseda University, September 2010

Committee members: Saki Noumi, Ryota Yoshida, Ko Nakamura, Minhwan Yoon, Hirohumi Hizume, Nobuaki Furuya

Summary: This research collects specific examples of how the space is used along the viaducts in the city, as well treating them together to find universal trends. It looks at continuous sections under the viaducts that exist throughout the 23 Tokyo districts. The results show a total distance spanning 58.9 km, and 4351 locations under the elevated line. While looking at the function of each of these spaces, we also looked at the function of buildings in the area. To further survey the system of how space is used under the tracks, we interviewed the railway companies that own the space along the track.

Results: There are three types of businesses handling the usage of space along the viaducts: development business, real estate business, and management. Companies handling management consist of for-profit subsidiaries and non-profit organizations. The usage of the area and rent is determined by the real estate business branch; depending on the how the area is marketed. Although there are various aspects to the standards that determine the rent and usage for each real estate company, and are not clearly defined, the standards are similar to the methods used to determine rent by the general real estate industry. Specifically, while of course the location of the property and which floor a property is on matters, the distance from the train station is the by far the strongest factor. Tenants closest to the station pay the highest rent.

Conclusions: The spaces under the elevated train line combine spaces with the same functions. There is a trend for the buildings in the area to match the usage of the buildings they face. There is a multiplier effect of the space below the tracks on nearby buildings, creating an architectural space with a single usage. In addition, there are areas where the usage of the space differs so that the buildings immediately under the tracks have a single use, while the buildings that face those under the tracks have a different use. The area in front of train stations today does not create the personality of an area. In looking at why, the complex business facilities that manage the area in front of the station on a large scale is, relative to the exterior, unexpressive walls facing each other, creating an indoor mall with a walkway on the inside. The lack of a position that commits the area, i.e., the lack of a defined side that creates the space in front of the station is a point requiring improvement. On the other hand, it is perhaps the area between stations rather than the area immediately next to the station that can be thought to have some potential. Particularly when it comes to the open spaces and the ways of using space, this is something we must consider when determining how to use the space immediately surrounding a train station. We must suggest ways of using the space so that the function is not solely determined by the perspective of real-estate value.

#5070: Relationship of urban areas and form of spaces beneath elevated train line in the 23 districts of Tokyo

Waseda University, September 2010

Committee members: Saki Noumi, Ryota Yoshida, Ko Nakamura, Minhwan Yoon, Hirohumi Hizume, Nobuaki Furuya

Summary: As a continuation of the previous paper, this research looks at the potential in urban spaces by analyzing the spaces created in public works buildings along elevated train line. This paper conducts an analysis from the perspective of form and space. We will examine the same areas as the earlier paper, extending our analysis to survey the forms of space that include the buildings facing the structures under the viaducts and the form of the roads along the elevated train line. For our analysis, we predicted the following three properties/characteristics of the space beneath the train tracks prior to conducting the survey:

(I) Continuous use of space between stations

In normal railway lines, only the area immediately surrounding a train station is developed, and people cannot walk through the areas between train stations. Elevated track, however runs continuously between stations, and allows people to walk through that area. This makes it possible to [architecturally] connect the spaces between stations. From this perspective we will examine the space under the viaduct and the properties of the neighborhood in the area.

(II) Intersection of the urban area in this analysis

The elevation of the rail lines created a continuous structure with the purpose of moving smoothly through the segmented city. The space below the tracks is thought to possess a greater value than simply being a space through which one passes. These spaces used to pass through the area also serve to connect the various sections of the city in a greater sense. From this perspective, we examine the intersection/segmentation of space.

(III) How the use of space and urban function complement one another

The differences in the surrounding areas that include buildings facing the tracks have an enormous effect on the how the viaduct space is used. It can be thought that these differences fulfill one kind of complimentary role with the surrounding neighborhood. Based on the results of our analysis of properties described above in (I), (II), and based on the concepts presented in the previous paper, this point looks at how the viaduct space is used.

This paper analyzes both specific examples as well as an overall statistical level of the three properties listed above.

Conclusions: Existing in the areas beneath the tracks are both the freedom of extra space and the restrictions of public work structures. Combining those factors creates a non-homogenous city. The characteristics and properties of the areas described show a foothold for using new resources for public works structures, a new perspective on how city and transportation infrastructure coexist. The present usage of the space below the viaducts has not taken advantage of these characteristics/properties, and we hope to promote further research to make it possible to promote more appealing urban space.

#7022: Analysis of the dwelling area located underneath the Hanshin elevated railroad tracks.

By Kadou Kazumi, September 1994

#7074: A research on spatial use under Elevated Railways – Focusing on the JR Chuo Line Elevated Railway

By Miyahara Kazutaka, Tanaka Masaru, Minami Kazunobu, August 2009

Graduate School Shibaura Institute of Technology

Objective: Examine and analyze the JR Chuo line from Nakano to Mitaka as a municipal coalition maturing over approximately the last 40 years. The study interval Nakano to Ogikubo was completed in 1966 and Ogikubo to Mitaka in 1969. The elevated interval straddles Nakano, Suginami Ward, and Musashino City, and the above ground interval are in the vicinity of Ogikubo station.

Summary: In the space below elevated railways, sites, as is, have limited application in terms of the application area and connecting road circumstances. Probability is high these will become open space or parking, and municipalities are taking the lead to make efficient use for public facilities in order to be effective in a continuous space with a busy under-elevated area. In addition, it is necessary to improve the image of buildings under the elevated to improve the image of under-elevated space. Railway companies are cooperating with local municipalities to present master plans and to find methods of utilizing buildings and site boundaries under-elevated railways and, active lobbying is an important aspect.

#7078: Research on space under the Yamanote line's overpass

Authors: Nakano Tomoyuki et. Al (Tetsuji Miyata, Kouichi Tonuma)

Waseda University, October, 1990

Background and Purpose of Research: The loop course of the Yamanote line, which enables the smooth functioning of the metropolis Tokyo, begun with the completion of the elevated railway between Tokyo and Ueno in November of the 14th year of the Taisei era and has continued on until the present; however, there are generally no parts of the Yamanote line underground, and points where it crosses the street are planned as overpasses (*gado*, from "girder bridge") or overhead bridges (viaduct). In the current age, with the layering of structures above and below ground in an effort to pursue functionality and safety in the urban structure, even for the Yamanote line, JR East Japan Railway Company has founded the JR East Japan *Koukashita Kaihatsu Kaisha* (The *Koukashita* (area under the elevated bridges) Development Company) in April of the first year of the Heisei era; the company undertakes the development and maintenance of the *koukashita*, and upcoming improvement and development of the *koukashita* is expected. However, while road improvements progress on the one hand, the current conditions of the spaces under overpasses are dark, monotonous and even dirty, causing only discomfort to the passersby.

This research deals with the overpasses of the Yamanote line, investigating the site, form, and function of each overpass, and then classifying them and organizing them base on their characteristics and problems. It aims to be of assistance to future plans for spaces under overpasses and to plans for enhancing such spaces.

Results and Discussion: Results of the classification are based on the four indices. Of the classifications, the 9 types with over four samples in it were chosen as "overpass typologies."

9 overpasses chosen at random from each were organized based on characteristics and problems observed, and interviews were conducted with the neighboring residents who use the overpass on a daily basis, asking for their image and demands (sample of 95 residents, survey + interview). The following is a summary of the results:

Demands

Of the 95 surveyed, 94 believed improvement was necessary. As for the content of the improvement, problems were noted in the following order: lighting (77.9%), color (47.4%), shape (40.0%), walkway width (38.4%), and maintenance (28.4%)

Impression

When asked for *gadoshita* they can come up with along the Yamanote line, from almost all regions, overpasses along the Ome-Kaido (road) and the Ueno overpass were given. As to the reason, over half replied that it was because "the scale is large."

Maintenance

Even the maintenance responsibilities of the *gadoshita* are layered, with the road surface and those items appended or belonging to the road being the responsibility of the road manager, and the walls and ceilings of the elevated railway being the responsibility of JR East Japan. According to an interview with Toshima-ku about the Ikebukuro overpass, the maintenance of road surfaces for the overpasses under their jurisdiction are conducted in adherence to Road Laws, and while an appointed cleaning company cleans the walls on a daily basis; they are not responsible for its management.

Conclusion: An overpass is necessary for the railway to run on an even level, safely through urban areas in which the topography does not conform as necessary. As a result, it creates unique landscapes. While the spaces below it are dark and dangerous, this is not necessarily an inevitable outcome. It is because it was not suitably managed in terms of use, management, and maintenance. While the steel-frame brick overpasses completed at the end of the Taisei era continue to maintain an attractive landscape even now, I believe this is a result of having sufficiently taken its form and usage on flatland into consideration in its planning. It is best that maintenance of many *gadoshita* spaces and overpasses to develop in the years to come be equipped with the same macroscopic perspective (topography) as well as microscopic perspective (*gadoshita*).

1. CHAPTER ONE: INFRASTRUCTURE OF MULTIPLICITY – HISTORICAL SUMMARY

1.1 INTRODUCTION

Since the 17th century we tend to treat urban infrastructure elements as separated elements with a dedicated and frequently a singular function such as highways for vehicular traffic, railways for trains and aqueducts for the flow of water – devices designed by engineers to serve a specific urban need, a type of a technical device. We rarely see these elements as integrated parts of the city itself or the potential of utilizing these for additional functions and therefore increase their value and integration into the city.

In the past, intentionally and unintentionally infrastructural elements such as Roman aqueducts, castle walls or medieval bridges were used not just for their primary role but also for commerce, social and residential functions. These inhabited infrastructures allowed for an organic growth of the city and for the urban livelihood to penetrate the infrastructure and therefore anchor the infrastructure into the city and the local settings.

Infrastructure coupled with secondary functions

			Secondary function (architecture/open space)							
			Retail	Leisure, food &	Companies, offices	Residential	Landscape, open space, parks	Storage	Parking	Urban icon / political symbol
Primary function (infrastructure)	linear structures	Aqueduct								
		Railway - viaduct								
		Highway								
		Streets / roads								
		Bridges								
		Canals								
	individual structures	Power plants								
		Railway - station								
		Airports								
		Telecom. antennas								
		Ports								
		Dams								

Figure 1

This chapter is mostly a historical survey of built and un-built projects of infrastructure in which an additional program or programs were combined into the infrastructure to shape an urban element which engages the city and its surrounding on other levels than the traffic or transportation form. The chapter is divided to the following:

- Pre medieval and medieval structures such as aqueducts and the early street grids.
- Medieval inhabited bridges
- Early 20th century utopian cities and infrastructures
- Italian futurists
- Late 20th century repurposed infrastructure projects

Tokyo's viaducts in their inhabited form are a partial the utopian ideas of a combined mega structure, in which a linear element encompasses programs from traffic to commercial to residential and includes a complex system of mechanical, electrical &

Figure 2

communication piping, all functioning as a continuous spine of modern urban life.

The objective of this chapter is to give a historical overview of inhabited infrastructure and therefore also bring the inhabited viaducts of Tokyo into context of a global perspective of how an infrastructure can become more then its singular technical purpose of transportation and traffic.

1.2 AQUEDUCTS AND ROMAN STRUCTURES

1.2.1 *ÁGUA DE PRATA AQUEDUCT – EVORA*

Name	Água de Prata Aqueduct	Year built	1531
Type	Aqueduct	Main Function	Supply fresh water to the city of Evora
Location	Evora, Portugal	Combined functions	Houses, shops, cafes., restaurants

Figure 3 The Aqua de Prata further up the hills from Evora

Figure 4 – Inhabited Roman aqueduct, at Evora, Spain (image – Wikipedia)

Figure 5 – Walled city of Evora with the aqueduct entering at the north-west edge

1.3 RAIL VIADUCTS

1.3.1 HOCHBAHN – BERLIN

Name	Berlin Hochbahn	Year built	1900
Type	Elevated railway	Main function	Rail tracks
Location	Berlin	Secondary function	Retail and commercial spaces

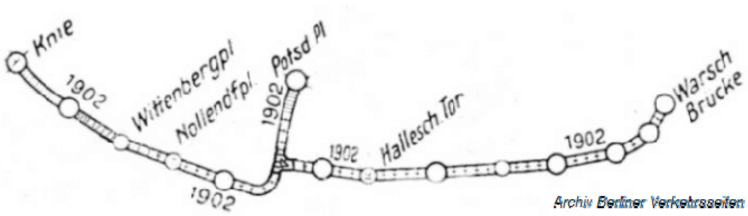


Figure 6 - The Berlin Hochbahn - elevated railway map ~1900 (from website Berliner verkehrsseiten)

Figure 7 the Berlin Hochbahn at *Bülowstraße station (www.berliner-verkehrsseiten.de)*

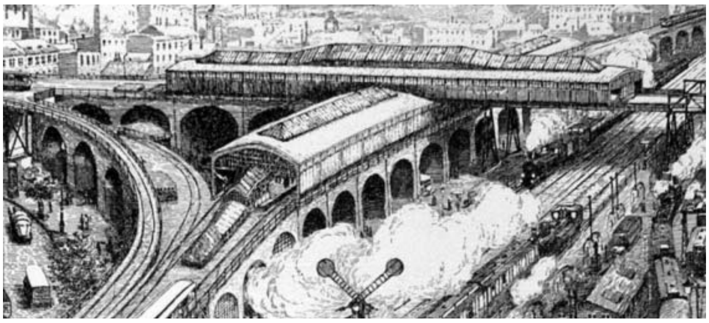


Figure 8

Figure 9

1.3.2 INHABITTED VIADUCTS IN JAPAN

The following are a few examples of inhabited viaducts in Japan. More information and data on viaducts of Tokyo is provided in chapter two.

Figure 10 - Junkman at Nishikigaura Bay, 1951 (Mainichi archive) and a residence at Ueno, Tokyo, 1990s

Figure 11 - inhabited viaducts , Osaka (left) Kobe (right)

Figure 12 - Oimachi, Tokyo (left), and Tsuruhashi, Osaka

1.3.3 *OSAKA LOOP LINE, IKUNO-KU, OSAKA*

Name	Osaka loop line	Year built	1898
Type	Viaduct	Main Function	Rail viaduct for the Osaka loop line
Location	Truruhashi, Ikuno-ku Osaka	Combined functions	Houses, apartments, shops, cafes, restaurants, workshops, logistics.

The Osaka loop line in Ikuno-ku was built at the end of the 19^{th} century it stretches for 3.8 kilometers and the spaces below the viaduct include almost all imaginable urban functions such as residential, retail, food & beverage, clinics and services, logistics and parking.

Figure 13 - residential area within the Osaka loop viaduct


Figure 14 - restaurants within the viaduct of Osaka loop, Tsuruhashi

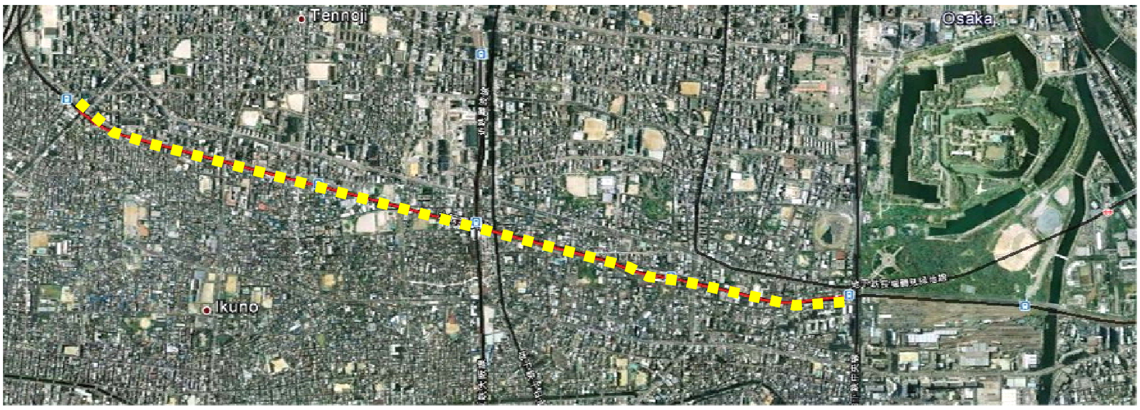


Figure 15 - Osaka loop, running through Ikuno-ku, Osaka

1.4 INHABITED BRIDGES

Inhabited Bridges: *"An in habited bridge – in addition to its primary function of surmounting natural or man-made obstacles, be they rivers or canals, railways or motorways – serves as an organic link between two urban areas by connecting them to each other with a development of buildings erected on the bridge to form permanent accommodation of various social and economic activities". ..In contrast to a purely vehicular bridge, the inhabited bridge provides continuity within the urban fabric that is not only social and economic but also cultural, emotional and symbolic at a point where a natural break would otherwise exist"*.(Murray & Stevens, 1996). Inhabited bridges provided a stronger social and economic connection between two sides of a city or two districts. Instead of just a physical connection for traffic and crossing needs, the inhabited bridge let the city continue from side to side. Being inhabited made the bridge safer and allowed the city to generate revenue from, taxes and maintenance fees. When the bridge connected one developed area to an underdeveloped area, the inhabited bridge immediately created the necessary link and commercial activity which allowed for development to pass over towards the undeveloped side.

Towards the 18th century inhabited bridges began to disappear from Europe, the main reasons are:

1. New military strategies, technology and nationalization at the continent made the bridge lose its importance as a control point or a city border.
2. Rapid economic, expansion of commerce and trade and growth at urban centers brought to the expansion of cities beyond their natural borders (such as rivers).
3. The expansion of trade increased the volume of goods being hauled into and out of the city and therefore huge pressure to get rid of narrow roads and the constricted inhabited bridges.
4. Changing values in Europe: Towards mid 18th century people started to value more the vistas towards the rivers which meant that the inhabited bridge which mostly were constructed with a middle path and no views towards the river became an obstacle to the wishes of the public to have access to see and enjoy the scenery towards the river and beyond.
5. The professional segregation of architects and engineers – this separation between the two related professions pushed the design of bridges towards the pure realm of engineering and architects were left out of the process. *"Bridge engineers have never been attracted to the idea of encumbering their work with structures deemed to them as parasitical"* (Murray & Stevens, 1996).
6. Functional segregation in architecture: *"During the 18th century rationalism in architecture favored the rejection of programmatic complexity and preferred to segregate functions in order to address them in isolation"*.

1.4.1 *PONTE DI RIALTO, VENICE*

The Ponte di Rialto spanning the Grand Canal in Venice, is considered perhaps the most supreme example of an inhabited bridge combining commerce, structural beauty, vistas to the Grand Canal and high pedestrian traffic all in one tight system. Located near the central market, the bridge was planned form the beginning to include two rows of shops with a central pedestrian path and a viewing terrace at the highest point. It combined function beauty and a source of revenue for the city.

Name	Ponte Di Rialto	Year built	1591
Type	Pedestrian shopping bridge	Main function	Bridge / passage
Location	Venice	Secondary function	Commercial market

Figure 16 - Ponte di Rialto, Venice

Figure 17 - Ponte Di Rialto, Venice (Google earth)

1.4.2 *PONTE VECHIO, FLORENCE*

Name	Ponte Vechio	Year built	996 (wood structure), 1117 (wood + stone), 1345 (stone)
Type	Pedestrian shopping bridge	Main function	Bridge / passage
Location	Florence	Secondary function	Commercial street & passage for Florence' aristocratic family

The Ponte Vechio is perhaps the most famous bridge in the world – but what makes it so spectacular besides its setting within Florence? I believe that the main contribution to its survival and its flourish was the coupling of the main function of a passage between the two sides of the Arno River with social and commercial functions. In addition to these public functions, the upper level of the buildings on the south side of the bridge was used as a secrete and secure passage (the Vasari Corridor) for the ruling family passing from the Palazzo Vecchio (Florence's town hall) to the Palazzo Pitti.

Figure 18: Pontevechio Bridge, Florence, Italy (Panoramio)

Figure 19 - Pontevechio, Florence (Google earth)

1.4.3 PONT DI NOTRDAM, PARIS

Name	Pont Di Notredam	Year built	886, 1412, 1507, 1660, 1746 (demolished)
Type	Pedestrian shopping bridge	Main function	Bridge / passage
Location	Paris	Secondary function	Residential, commercial, workshops

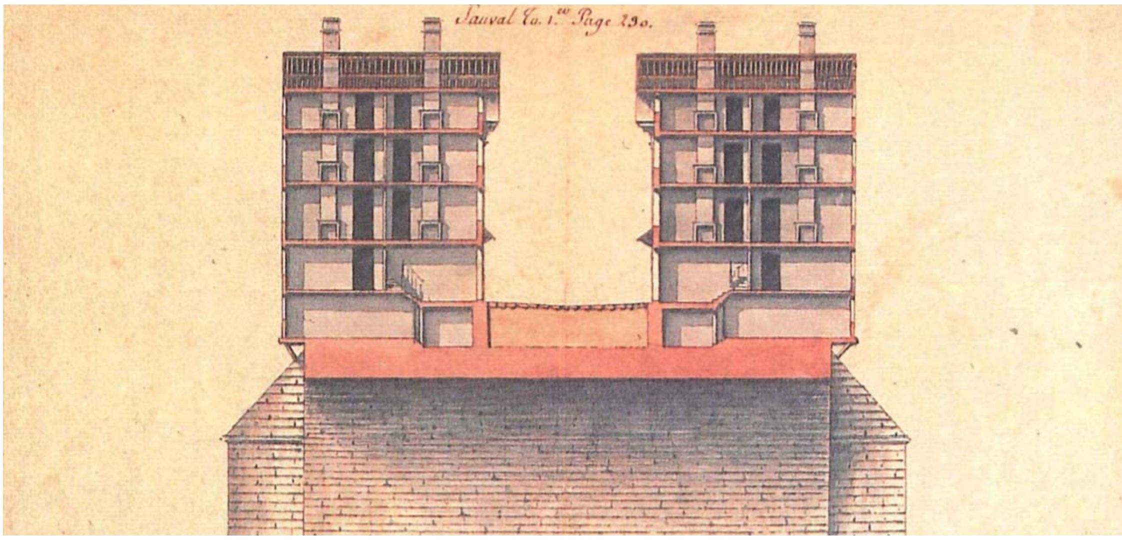


Figure 20 – Cross-section Pont Di Notredam (de Felin and Fra Giocondo, 1792, from the book "Living Bridges)

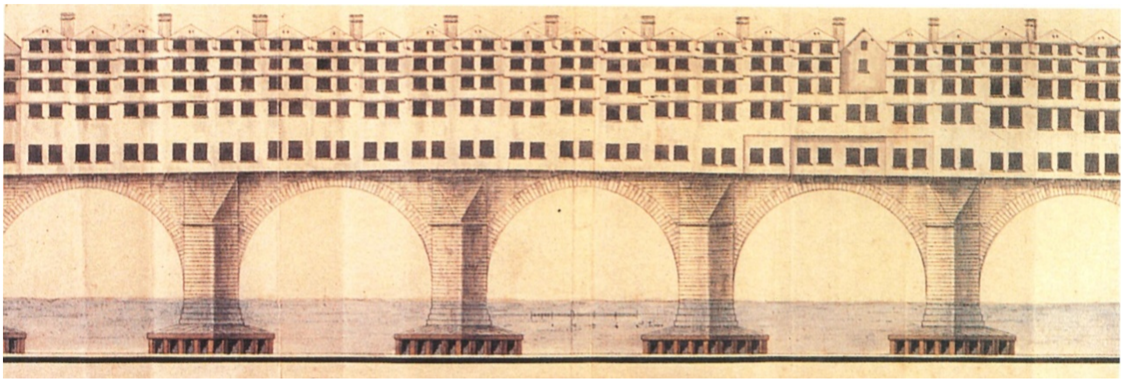


Figure 21 - elevation of the Pont Notre-Dame (de Feline and Fra Giocondo, form the book "Living Bridges")

Figure 22 - Port Di Notre-Dame - current (picture from Wikipedia)

1.4.4 *PONT AU CHANGE, PARIS*

Name	Pont au Change	Year built	12th century
Type	Stone bridge over the Seine river	Main function	Bridge / passage
Location	Paris	Secondary function	Residential, goldsmiths and money changers

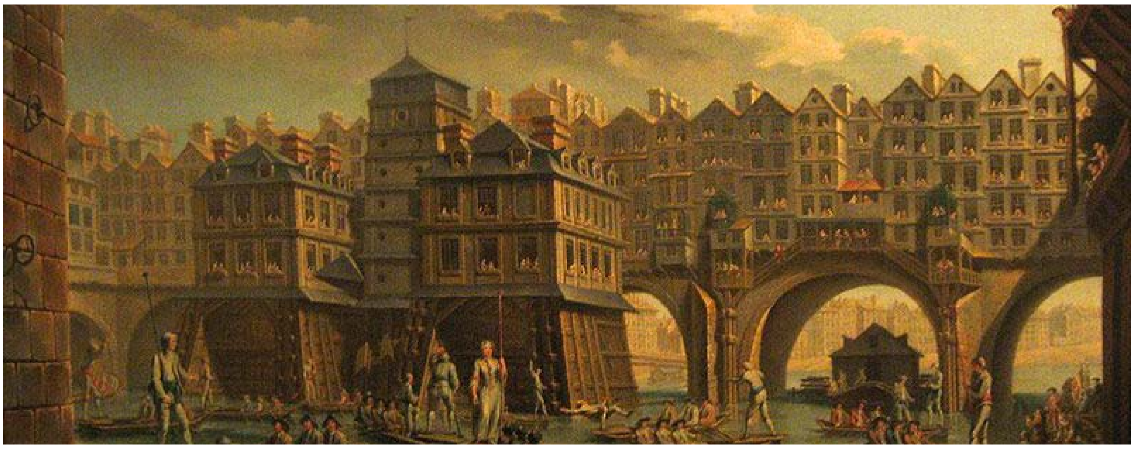


Figure 23 - Pont au Change, Nicolas & Jean-Baptiste Raguenet, from the book "Living Bridges" (Murray & Stevens, 1996)

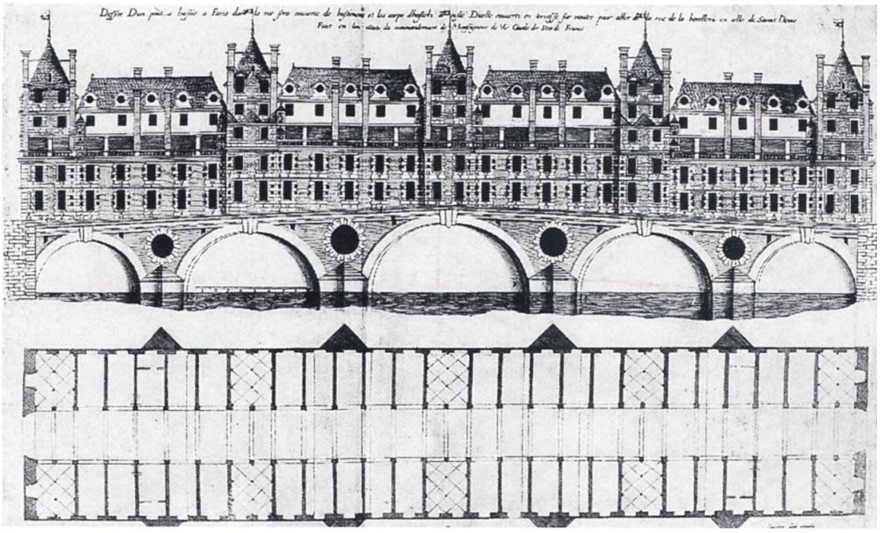


Figure 24 - Marcel Le Roy, design for a bridge to be built at site of Pont au Change 1622 (from the book "living Bridges")

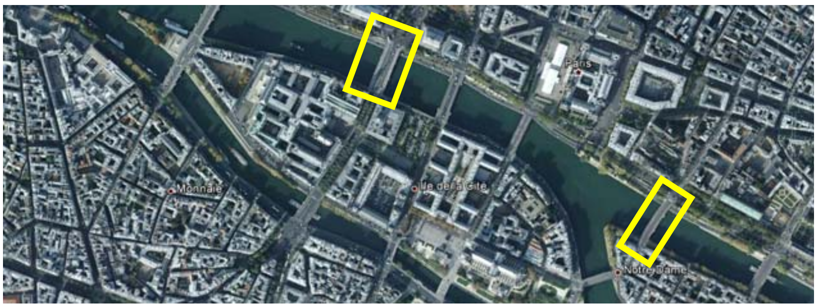


Figure 25 - Pont au Change and Ponte Notre Dame, Paris (Google Earth)

1.4.5 *PONT DE MARCHANDS, NARBONNE FRANCE*

Name	Pont De Marchands	Year built	5th ecentury
Type	Stone bridge	Main function	Bridge / passage
Location	Narbonne, France	Secondary function	Retail and residential

Figure 26 - Pont des Marchands (from Wikipedia)

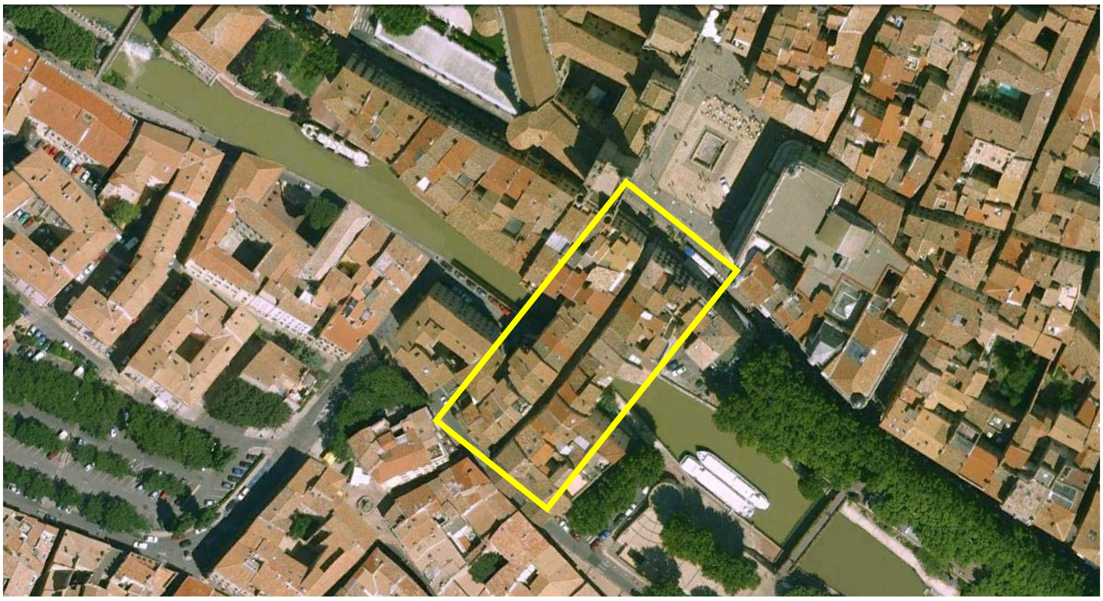


Figure 27 - Pont des Marchands (Google Earth)

1.4.6 PONTE-ALLE-GRAZIE, FLORENCE

Name	Ponte Alle Grazie	Year built	1227, 1345
Type	Stone bridge	Main function	Bridge / passage
Location	Florence	Secondary function	Defense, retail and residential

Figure 28 Ponte Alle Grazie - print from the book Living Bridges (Murray & Stevens, 1996)

Figure 29 location of today's Ponte Alle Grazie (Google Earth)

Figure 30 - current Pont Alle Grazie

1.4.7 *WILLIAM BRIDGE*

Name	William Bridge	Year designed	1793
Type	Stone bridge	Main function	Bridge / passage
Location	Bristol, England	Secondary function	Residential, commerce and workshops

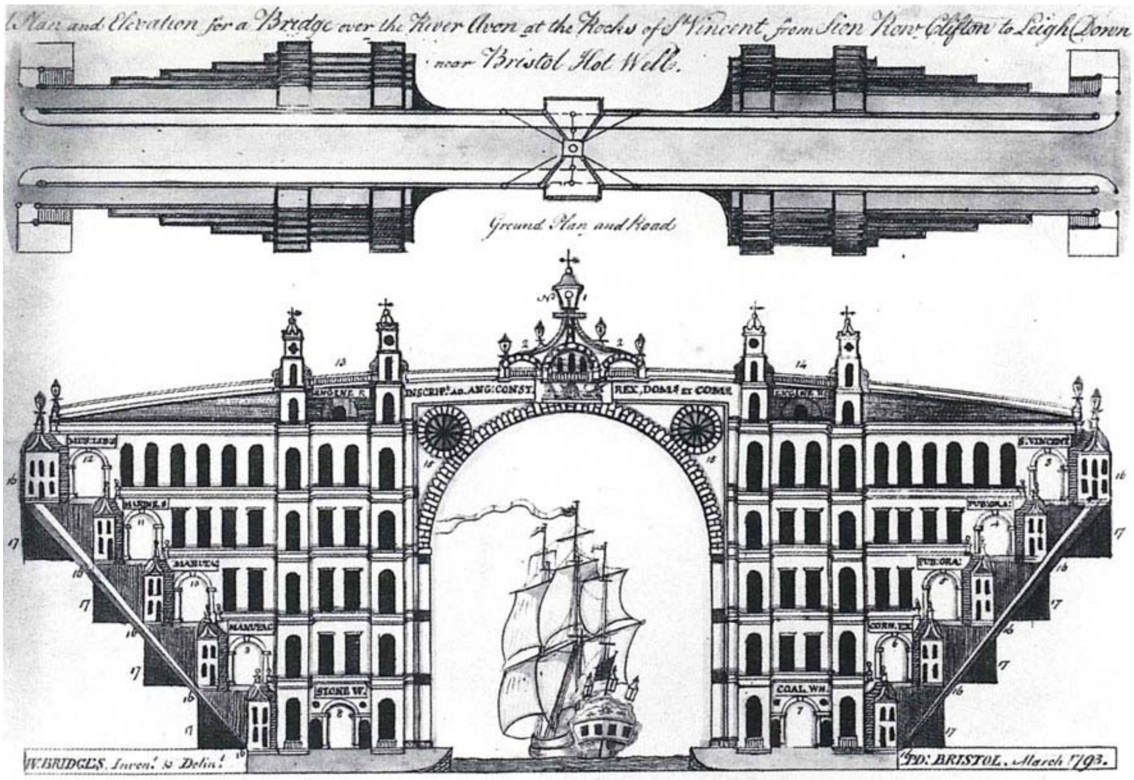


Figure 31 - William Bridge, Plan & elevation, for River Avon, Rocks of St. Vincent's, Bristol, England, 1793 (from the book "Living Bridges"

The William Bridge – an un-built bridge completely integrates infrastructure and architecture into one element a kind of "infratecture". The bridge / building included residential portion all under the connecting road, stacked to provide for a large opening – gate for large ships passing along the River Avon.

1.5 FORTIFIED BRIDGES

1.5.1 PONTE NOMENTANO, ROME

Name	Ponte Nomentano	Year built	552
Type	Fortified bridge	Main function	Bridge / passage
Location	Rome	Secondary function	Military control point

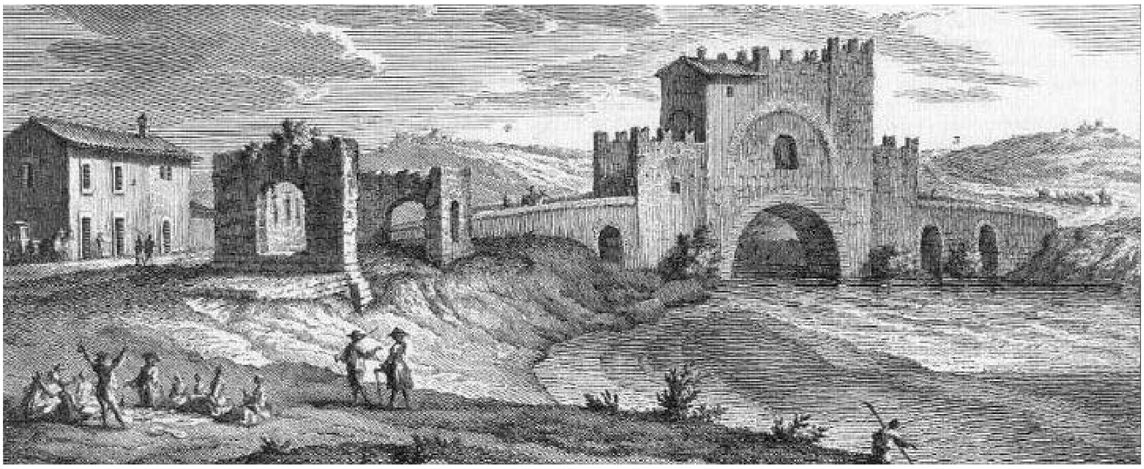


Figure 32 - Ponte Nomentano, Rome (engraving image from Rome Art Lover website)

Figure 33 - Ponte Nomentano (Rome Art Lover website)

Figure 34 - Ponte Nomentano (Google Earth)

1.5.2 PONTE SALARIO, ROME

Name	Ponte Salario	Year built	2nd century BC, repaired 565
Type	Fortified bridge	Main function	Bridge / passage
Location	Rome	Secondary function	Military control point

Figure 35 - Ponte Salario (engraving, Wikipedia)

Figure 36 - today's Ponte Salarion (Google Earth)

1.5.3 PONTE DI SAN FRANCESO, SUBIACO, LAZIO, ITALY

Name	Ponte di San Francesco	Year built	1358
Type	Fortified bridge	Main function	Bridge / passage
Location	Suciaco, Lazio, Italy	Secondary function	Military control point

Figure 37 - Ponte di San Franceso (from Rome's tourist website tesorintornoroma)

Figure 38 - Location of Ponte Di San Francesco (Google Earth)

1.5.4 *PUENTE DE ALCÁNTARA, TOLEDO*

Name	Puente De Alacantara	Year built	1st century
Type	Fortified bridge	Main function	Bridge / passage
Location	Toledo, Spain	Secondary function	Military control point

Figure 39 - PuenteDe Alcantara (Panoramio)

Figure 40 - Toledo map (Google Earth)

1.5.5 *PONTE DE BERCY, PARIS*

Name	Ponte De Bercy	Year built	1863 – replaced the old wooden bridge with stone; 1905 - widened for Metro line 6; 1985 - widened for additional 3 lanes of traffic
Type	Vieduct Bridge	Main function	Roadway
Location	Seine, Paris	Secondary function	Metro 6 line

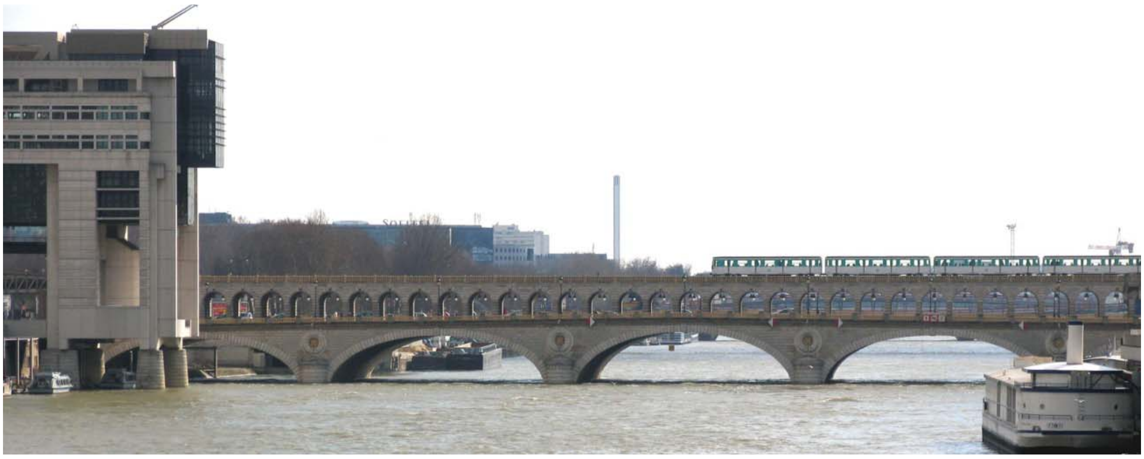


Figure 41 - Pone De Bercy (Wikipedia)

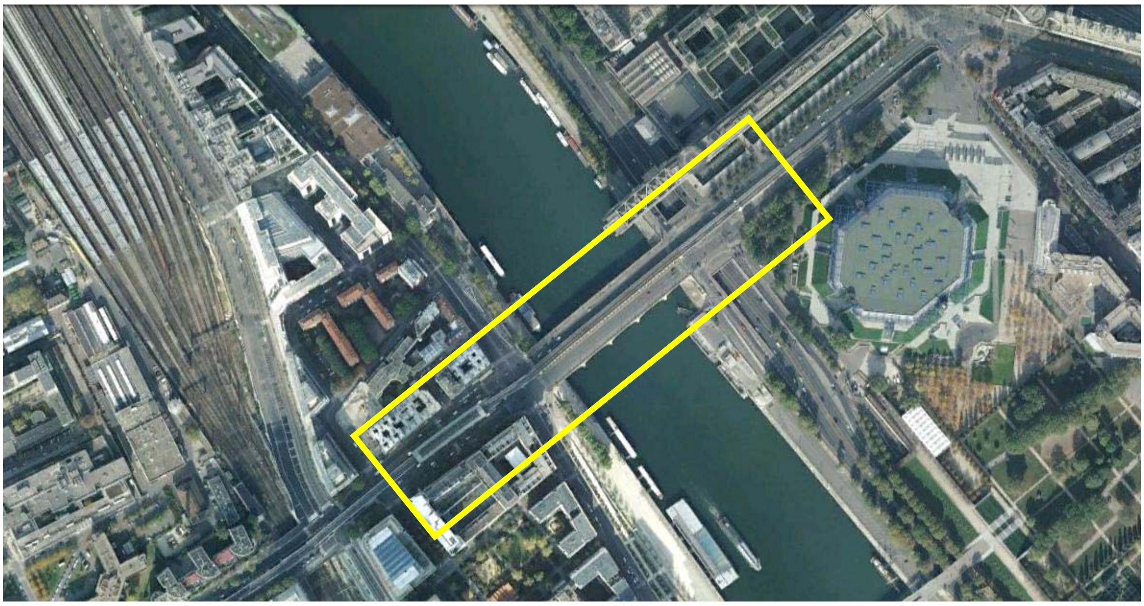


Figure 42 -today's Ponte De Bercy (Google Earth)

1.6 WATERWAYS AND CANALS: THE LOS ANGELES RIVER

The river stretches almost 80 kilometers from the mountains of Santa Susana and the San Fernando Valley and cuts its way through Los Angeles County. The Los Angeles River represents an example of a natural river transformed in which a natural river was transformed into an infrastructure element and its multipurpose environmental functions were reduced into one of water flow and flood control. After a sever flood in 1938 the Los Angeles authorities transformed the river into a concrete channel (1938-1959), this led to the loss of the natural environment and eco system. The river became a one function element of controlling the flow of water and the prevention of floods. Access to the river for the Los Angeles resident is unavailable and illegal. In 1989 a state congressman suggested that the river should be transformed into a truck expressway, this led to sharp public outcry and protest from FoLAR (Friends of Los Angeles River). In 2007 Los Angeles approved a 20 years master plan of revitalizing and restoring of the natural habitats of the river including the removal of the concrete channel; opening the river to access; the creation of parks and recreation areas; change of zoning; improve water quality and preserve flood control. [i]

Figure 43 (image Wikipedia)

Figure 44 (image www.lariverrmp.org)

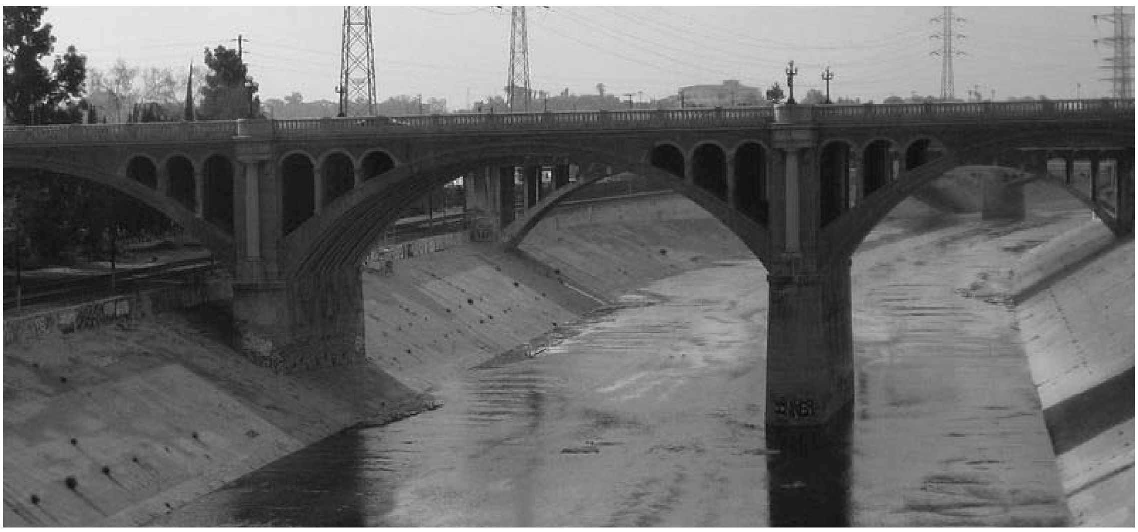


Figure 45 (image Wikipedia)

1.7 ROADS AND HIGHWAYS

1.7.1 ABC RAMPS AT MINNEAPOLIS, MN, USA

The three bridge buildings serve as gigantic parking garages spanning the interstate 394.

Name	ABC ramps	Year built	1980's
Type	reinforced concrete	Main function	Multi-storey car park
Location	Minneapolis, MN, USA	Secondary function	Passage to the sports fields

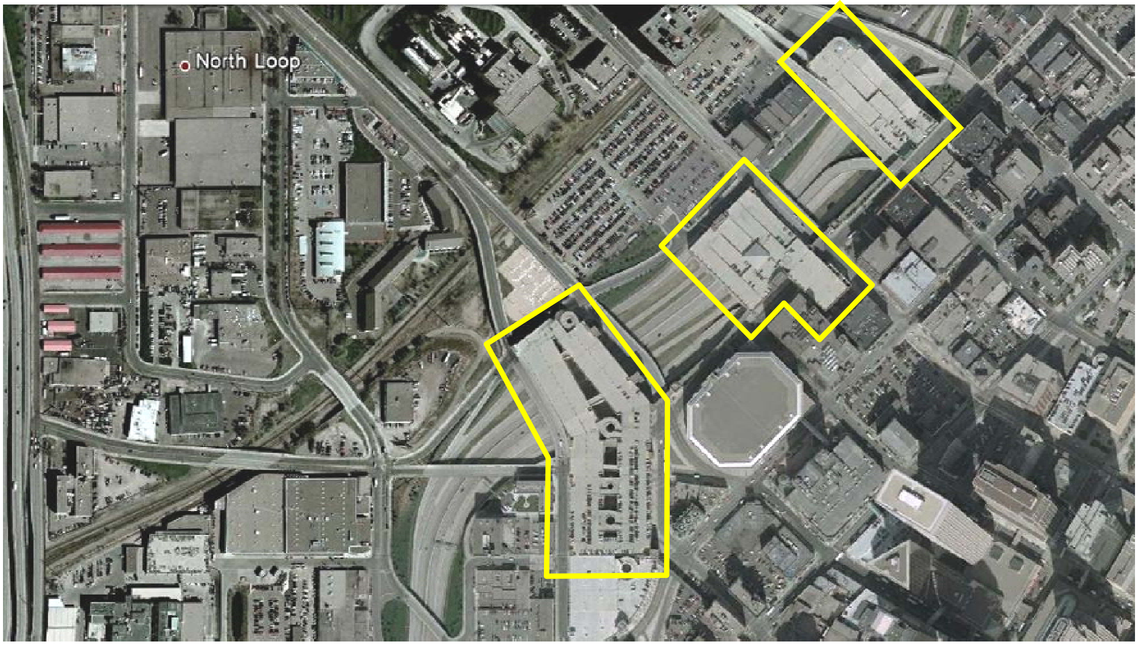


Figure 46 - Three bridge buildings spanning the ___ highway Minneapolis (Google Earth)

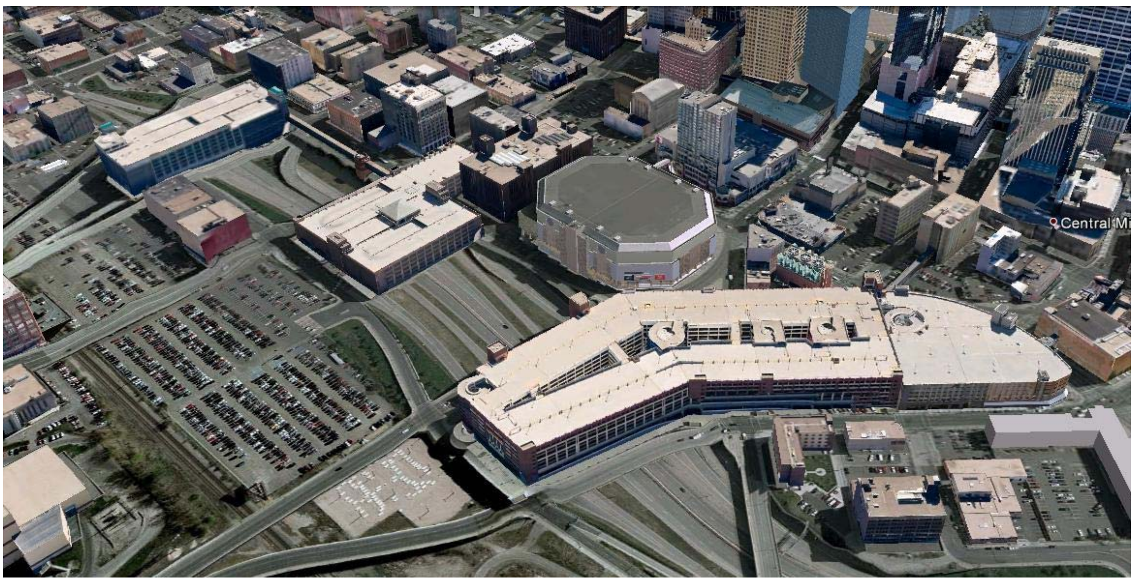


Figure 47 - Animated perspective (Google earth)

1.7.2 FIAT LINGOTTO VEDUTA, TURIN, ITALY

Name	Fiat Lingotto Veduta	Year built	1928
Type	Reinforced concrete	Main function	Car factory
Location	Turin, Italy	Secondary function	Car test track, technological demonstartion


Figure 48 - Fiat Lingotto Veduta-1928 (wikipedia)

Figure 49 - Fiat Lingotto - ramp inside (panoramio)


Figure 50 - Lingotto Test track (left image from NYT, right image from wikipedia)

Figure 51 - Lingotto building today (Google Earth)

1.7.3 OLD CHICAGO MAIN POST OFFICE, ABOVE CONGRESS PARKWAY, CHICAGO

Name	Chicago Main Post Office	Year built	1921
Type	Reinforced concrete	Main function	Post Office
Location	Chicago, IL, USA	Secondary function	Bridge above Congress Parkway

Figure 52 - Congress Parkway, sitting above the Congress Expressway

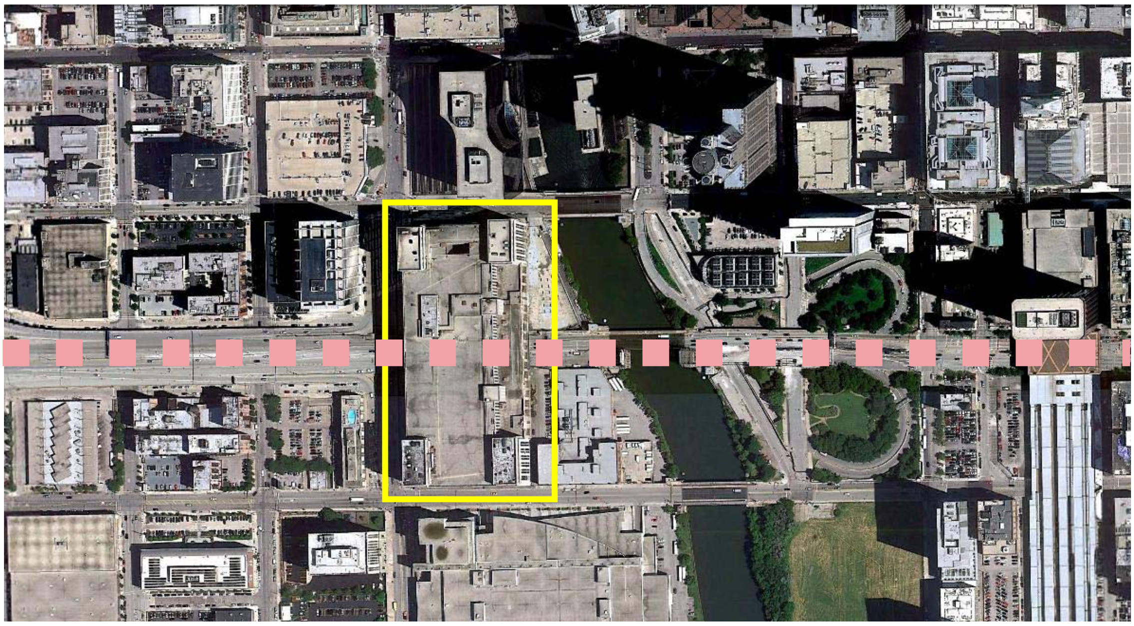


Figure 53 - Old Post Office - above Congress Expressway (google earth)

1.7.4 *ELEVATED HIGHWAY, SHIMBASHI TO GINZA, TOKYO*

Name	Elevated expressway	Year built	1960's
Type	Reinforced concrete	Main function	Expressway
Location	Ginza, Tokyo	Secondary function	Retail and other commercial functions

This is perhaps the only expressway with such a multiplicity of functions below the viaduct.

Figure 54 - Stores and restaurants under the highway, Ginza (photo Arnon Snapir)

Figure 55 - Ginza - Yurakucho - elevated highway (google earth)

1.7.5 GATE TOWER, OSAKA

Name	Gate Tower	Year built	1992
Type	Building over a highway	Main function	Office / commercial building
Location	Fukushima-ku, Osaka, Japan	Secondary function	Tunnel for the Hanshin Expressway

A s a compromise between the city and the landowner where the Hanshin Expressway route was planned an unusual building permit was issued for a building to hover and essentially contain a portion of the road. The buildings lower floors are for parking while the office functions start above the road tunnel.

Figure 56- gate tower

Figure 57 - Gate Tower, Osaka (Google Earth)

1.7.6 ASAHI SHIMBUN OSAKA HEAD OFFICE

Name	Asahi Shinbum building	Year built	?????
Type	Building over a highway	Main function	Office / commercial building
Location	Osaka, Japan	Secondary function	Tunnel for the Hanshin Expressway

Figure 58 – Asahi Shimbun building, above the Hanshin Expressway Route 1 Loop Route (Panoramio, by DVMG)

Figure 59 - Asahi Shinbum, headquarters, Osaka Prefecture, Osaka, Kita Ward, Nakanoshima (Google Earth)

1.7.7 *THE HELMSLEY BUILDING, NYC, USA*

Name	Helmsley Building	Year built	1929
Type	Building over a tunnel	Main function	Office / commercial building
Location	New York, NY	Secondary function	Tunnel for Grand Central Train station

The building is hovering above two tunnels leading to Grand Central Terminal.

Figure 60 - The Helmsley Hotel with tunnel to Grand Central station passing through (Panoramio, Wikipedia)

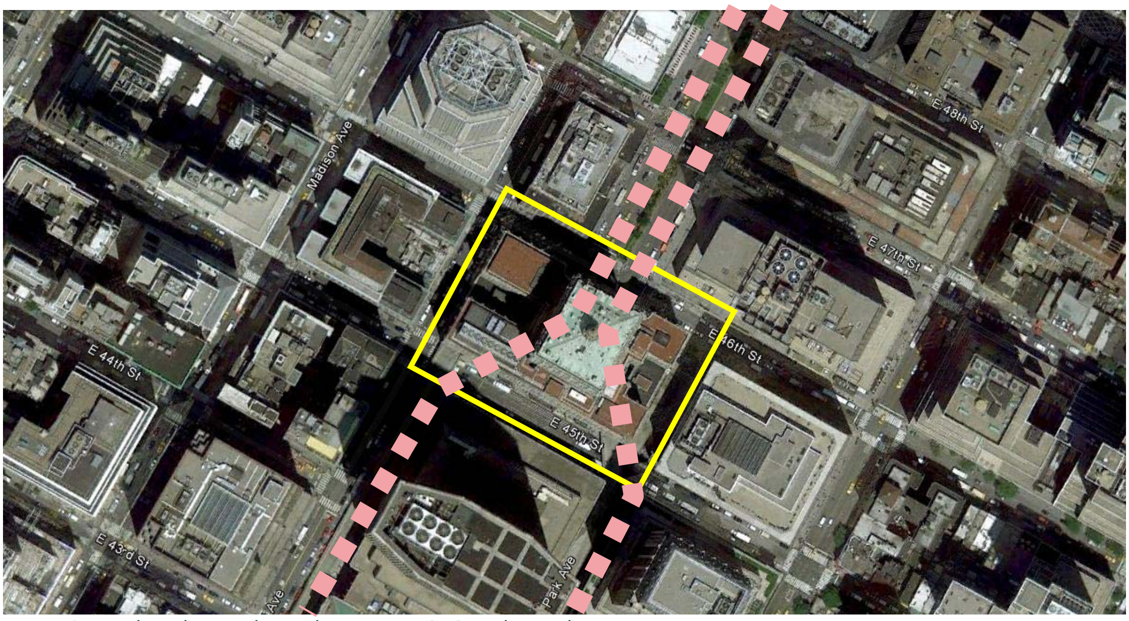


Figure 61 - Helmsely Hotel, Manhattan, NYC (Google Earth)

1.8 UTOPIAN IDEAS OF INFRASTRUCTURAL CITIES

1.8.1 EDGAR CHAMBLESS' ROADTOWN

Name	Road Town	Year designed	1910
Type	infrastructure and urban utopian	Main function	Total living solution
Location	USA	Combined functions	Rail, roads, freight, residential, retail, workshops, factories, farms

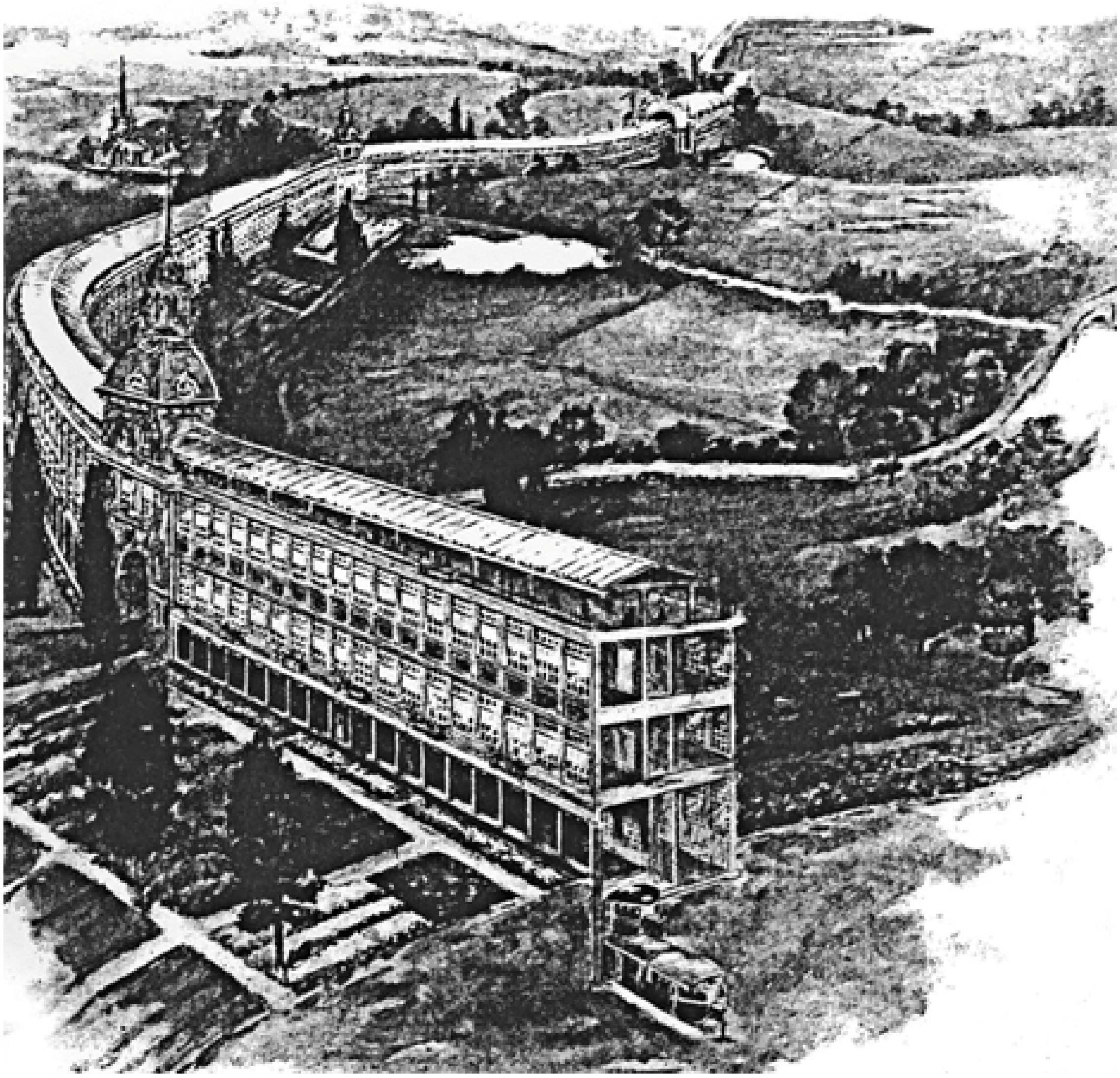


Figure 62 - A bird's-eye view of Edgar Chambless' Roadtown from *The Independent*, 1910

In 1910 Edgar Chambless, an American visionary, proposed a new methods for planning cities based on a one linear system which will include all living, commercial and transportation needs. *"Roadtown is a single unified plan for the arrangement of these three functions of civilization – production, transportation and consumption"* (Chambless, 1910). Chambless believed that the current city was an impossible and uncoordinated system of inefficient distribution of goods, congested traffic, polluted streets and wasteful activities. *"There is no plan, no unit, no mind behind it all"* (Chambless, 1910). Chambless' basic idea was to connect already existing cities with long linear buildings / railways and on other occasions to start at an existing city/town and layout the line into the countryside.

Roadtown main concept:

1. Horizontal is better than vertical.
2. A flexible, extended able, flexible system of a one dimension construction.
3. Reconnecting the people back to the countryside by layout the lines into the farm areas and nature.
4. Linearity of all systems – mechanical, electrical, liquids, residential, and transportation, *"organize production, transportation and consumption into one systematic plan"* (Chambless, 1910).
5. Ease of installation and repairs and growth.
6. Cutting of the middle man of distribution: Allowing the workshop, factory and farm to be right next to the transportation and freight system.

Roadtown: *"A single line of houses, superimposed upon three lines of railway, one on top of the other, underground, two stories of living and working rooms above ground, a continuous promenade along the roofs, and garden and country front and back all the way.... Telephones, telegraphs, teleposts, parcel carriers, freight service, compact, punctual, prompt, accurate, enabling you to live along the line from part to part and from end to end, and be served with the best at the cheapest at all times."*(Chambless, 1910), (Ptak).

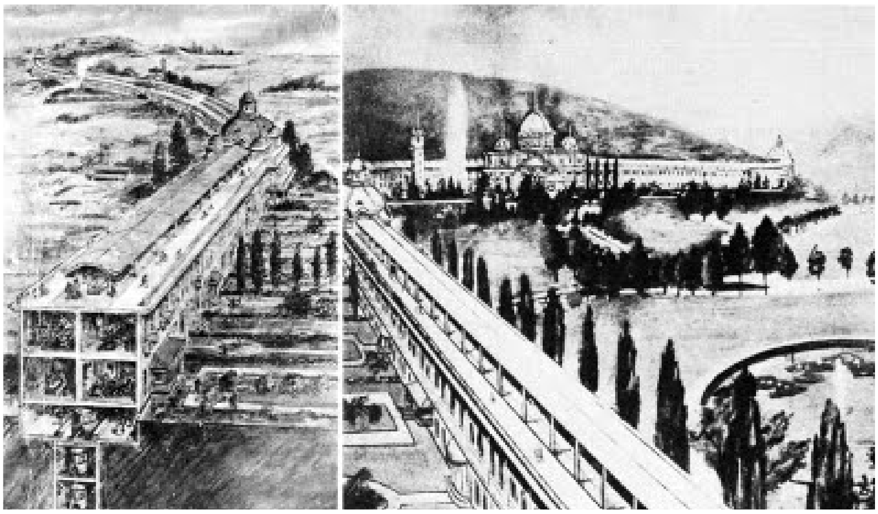


Figure 63 – Roadtown perspectives (from Unbuilt America, by Alison Sky and Michele Stone)

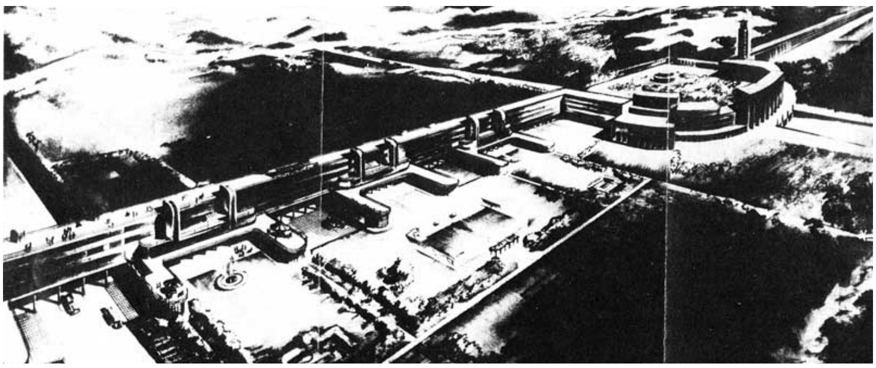


Figure 64 - Roadtown perspectives (from Unbuilt America, by Alison Sky and Michele Stone)

1.8.2 RUE FUTURE, EUGENE HENARD 1910

Name	Rue Future	Year designed	1910
Type	infrastructure and urban utopian	Main function	Total living solution
Location	Paris, France	Combined functions	Railways, underground rail, roads, streets, freight, residential, retail, workshops, factories, farms

Henard was the City Architect of Paris from 1906 to 1907 and envisioned futuritic solutions for the city including this section – encompassing all city life functions.

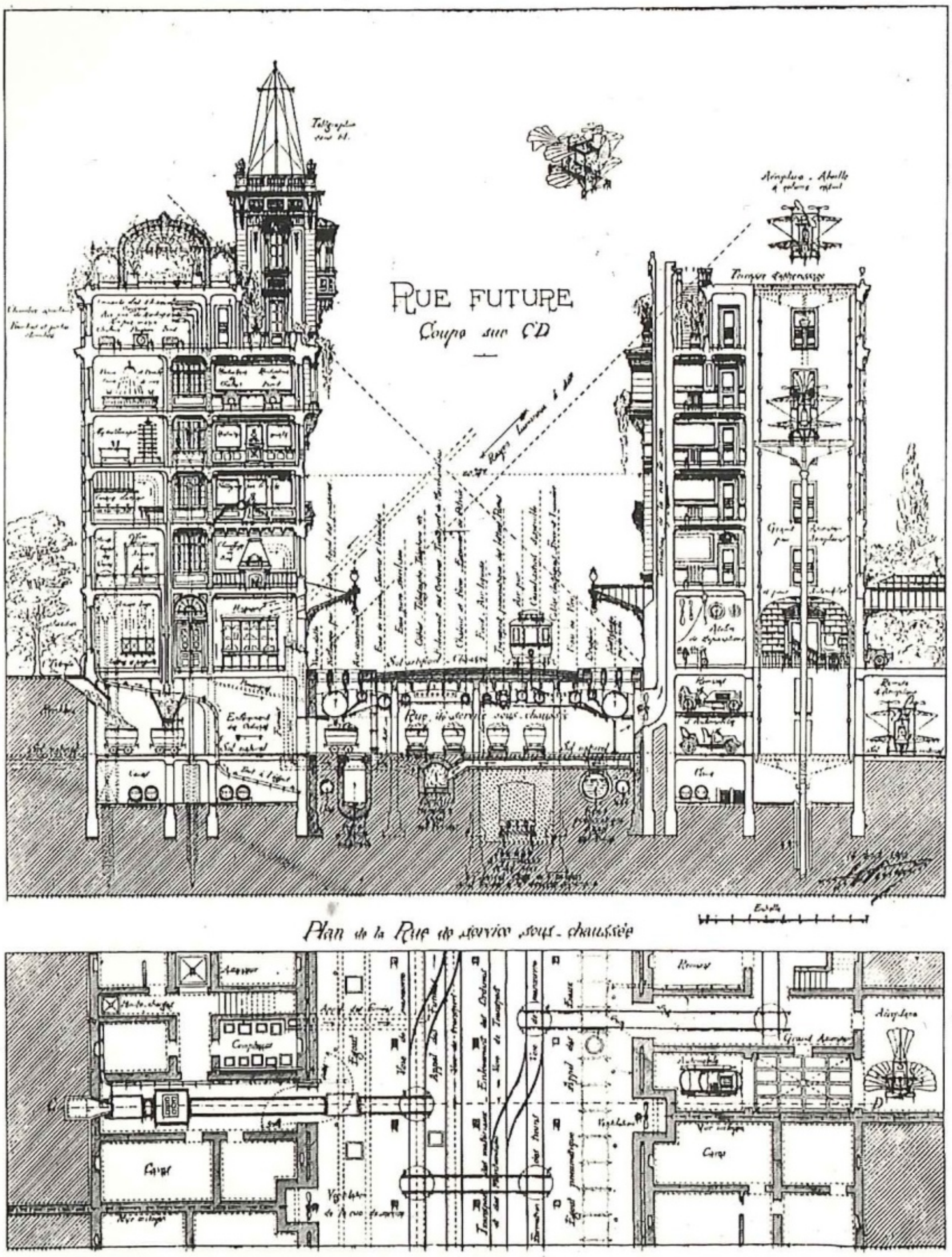
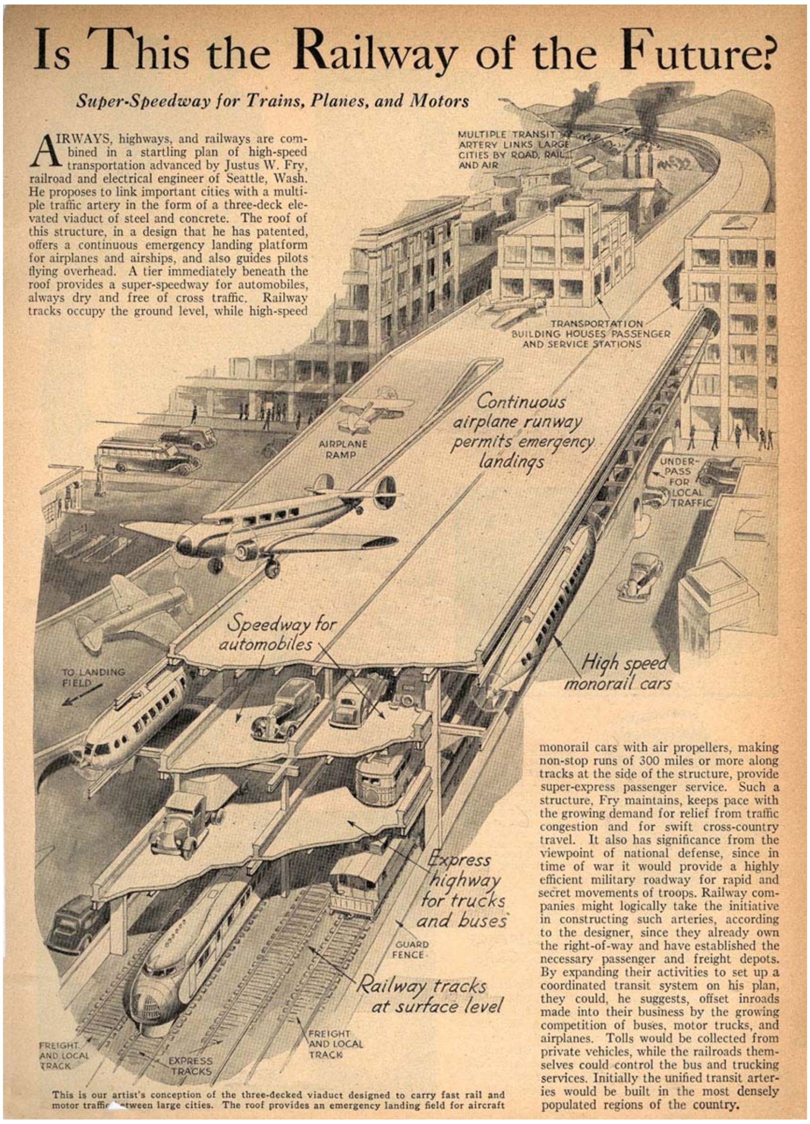


Figure 65 - plan and section from Rue Future, by Eugene Henard (Jean Dethier, 1994)

1.8.3 AIRWAYS, HIIGHWAYS AND RAILWAYS – ALL COMBINED INTO ONE SYSTEM

In 1932 LIFE magazine published an article "Is this the Railway of the Future" 1932 about an imagined mega infrastructure combining runways, highways, and railways. The plan was imagined by a railway and electrical engineer by the name of Justus W. Fry.

Name	Super speedway	Year designed	1932
Type	Infrastructure and urban utopian	Main function	New type of vehicular, air and rail expressway
Location	USA	Combined functions	Emergency landing for airplanes and airships; expressway; trucks and delivery expressway; freight rail tracks; railway; monorail; 'secret' passage for troops during wartime;



Is This the Railway of the Future?

Super-Speedway for Trains, Planes, and Motors

AIRWAYS, highways, and railways are combined in a startling plan of high-speed transportation advanced by Justus W. Fry, railroad and electrical engineer of Seattle, Wash. He proposes to link important cities with a multiple traffic artery in the form of a three-deck elevated viaduct of steel and concrete. The roof of this structure, in a design that he has patented, offers a continuous emergency landing platform for airplanes and airships, and also guides pilots flying overhead. A tier immediately beneath the roof provides a super-speedway for automobiles, always dry and free of cross traffic. Railway tracks occupy the ground level, while high-speed monorail cars with air propellers, making non-stop runs of 300 miles or more along tracks at the side of the structure, provide super-express passenger service. Such a structure, Fry maintains, keeps pace with the growing demand for relief from traffic congestion and for swift cross-country travel. It also has significance from the viewpoint of national defense, since in time of war it would provide a highly efficient military roadway for rapid and secret movements of troops. Railway companies might logically take the initiative in constructing such arteries, according to the designer, since they already own the right-of-way and have established the necessary passenger and freight depots. By expanding their activities to set up a coordinated transit system on his plan, they could, he suggests, offset inroads made into their business by the growing competition of buses, motor trucks, and airplanes. Tolls would be collected from private vehicles, while the railroads themselves could control the bus and trucking services. Initially the unified transit arteries would be built in the most densely populated regions of the country.

This is our artist's conception of the three-decked viaduct designed to carry fast rail and motor traffic between large cities. The roof provides an emergency landing field for aircraft

Figure 66 – Article from Life Magazine

1.8.4 LONDON TRAFFIC IMPROVEMENTS (THE BRESSEY REPORT, 1938)

Also known as "The Highway Development Survey for Greater London".

Name	The Bressie Report	Year designed	1937
Type	Infrastructure and urban utopian	Concept	series of high capacity motorways radiating outwards from the city
Location	London, UK	Combined functions	Roadways with residential buildings underneath.

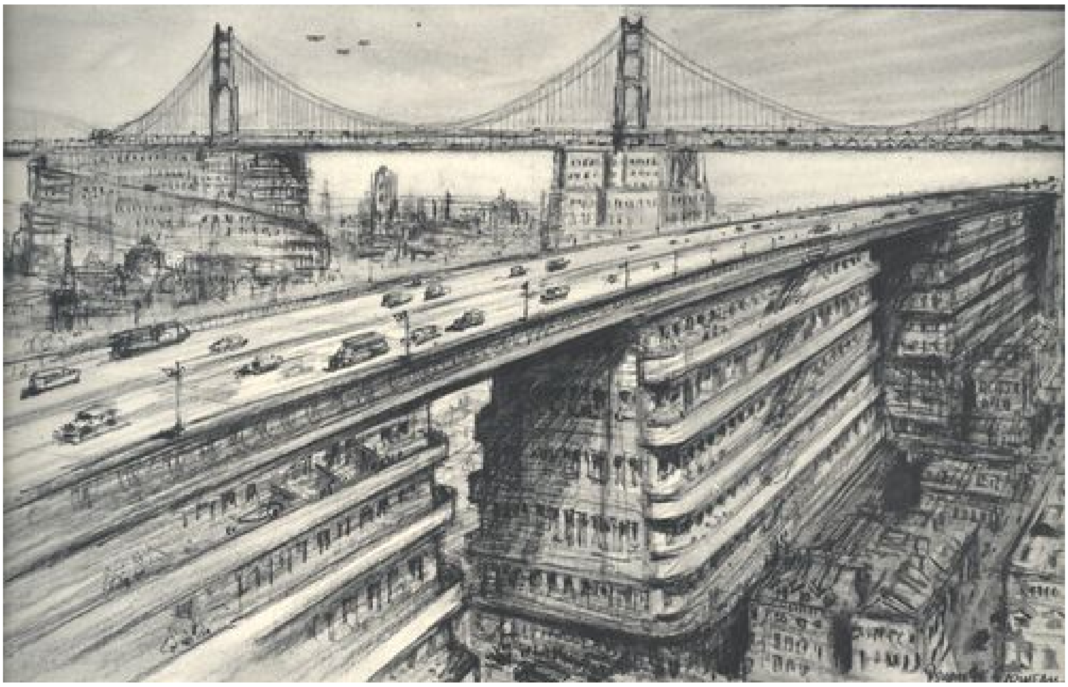


Figure 67 – "The Highway Development Survey" (Wikipedia)

Figure 68 – plan for the London Traffic Improvement

1.8.5 PAUL RUDOLPH'S PLAN FOR LOWER MANHATTAN HIGHWAY, 1967

Name	Plan for Lower Manhattan - LoMEX	Year designed	1967 - 1972
Type	Utopian new cities	Concept	Expressway connecting the Holland Tunnel with the east side of Manhattan
Location	London, UK	Combined functions	Roadways, tunnels, 'people mover', monorails, multi level parking, residential buildings hovering above the expressway.

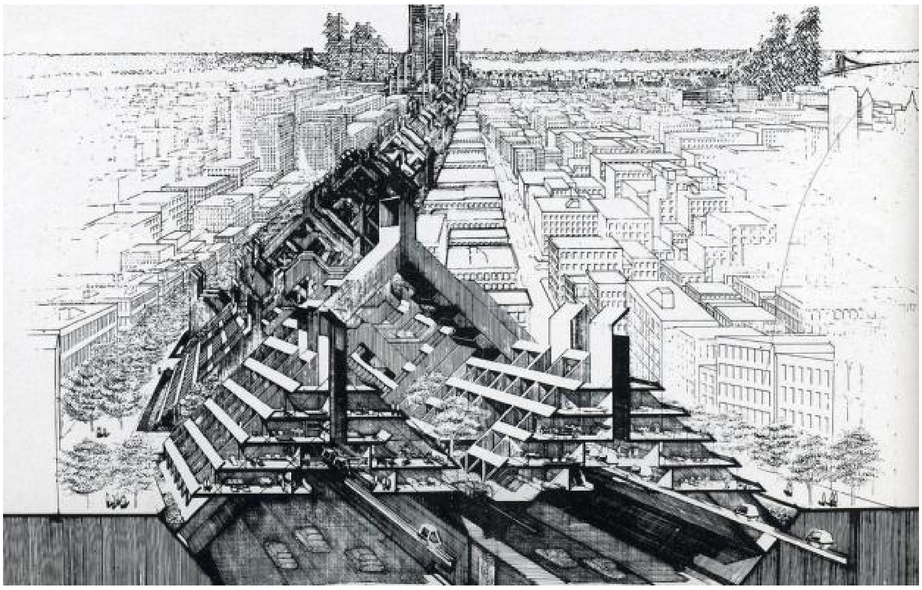


Figure 69

Figure 70[2] – The Hub – with people mover or personal mobility

[2] All images on this page are from the Library of Congress and the Paul Rudolph Archive, (Friedman, 2010), (Rudolph)

1.8.6 Raymond Hood and Hugh Ferris habitable infrastructures

Name	**Apartments on a bridge**	Year designed	1929
Type	Infrastructure and urban utopian	Main function	Bridge
Location	USA - no specific city, but assumed to be in NYC	Combined functions	Residential apartment towers as the supporting structure of the bridge

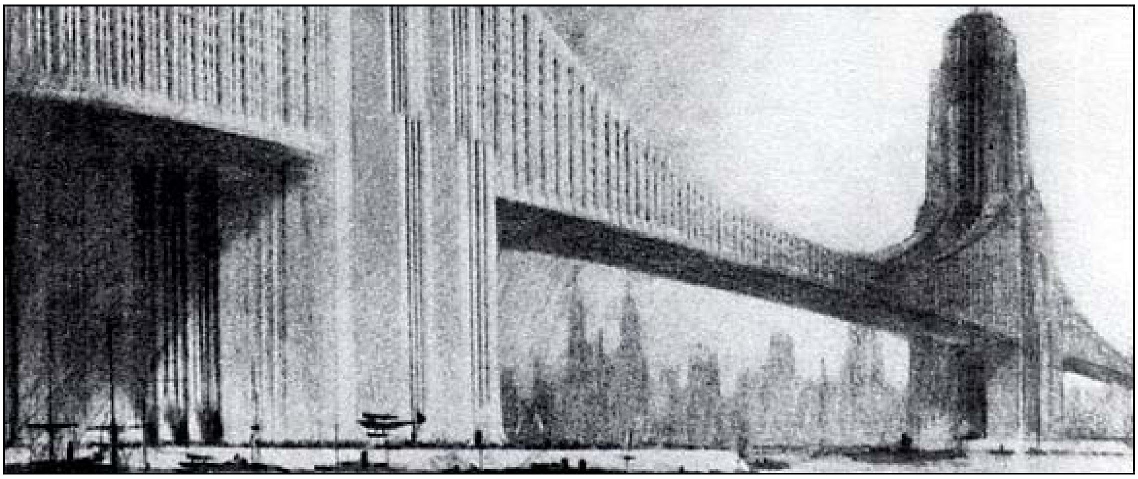


Figure 71 - from the book Unbuilt America

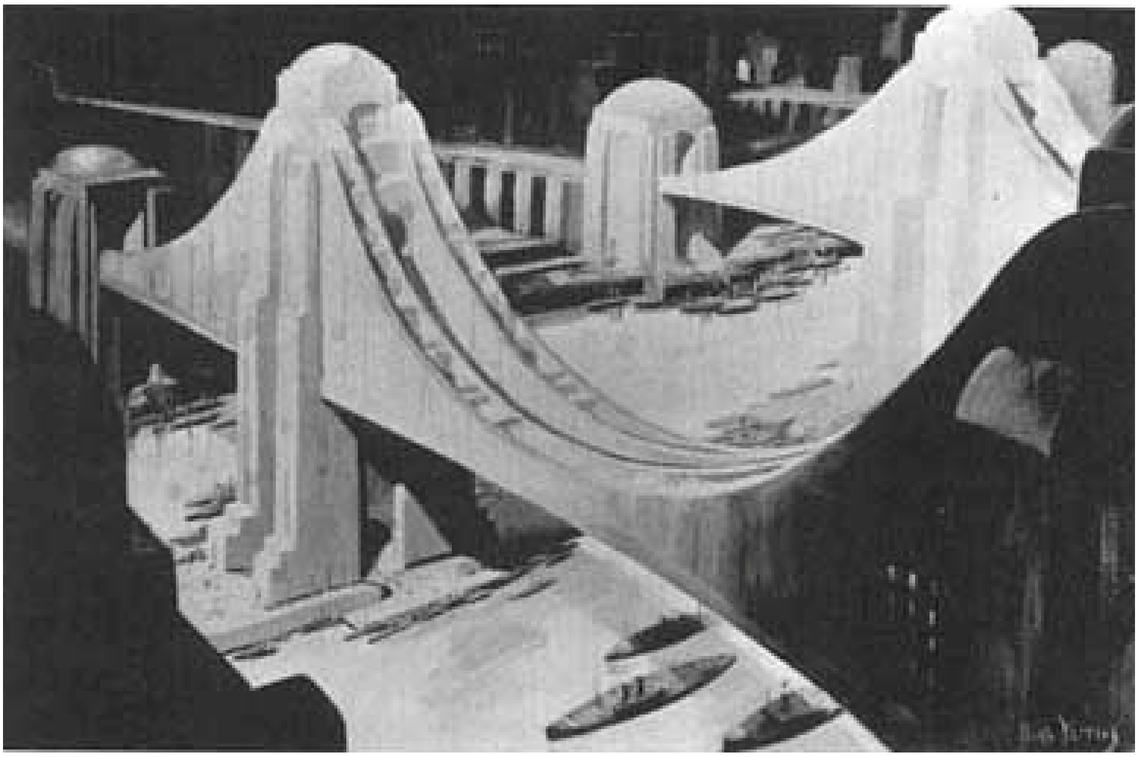


Figure 72 - from the book Unbuilt America

1.8.7 RAYMOND HOOD AND HUGH FERRIS 'MANHATTAN 1950'

Name	Manhattan 1950	Year designed	1925
Type	Infrastructure and urban utopian	Main function	Bridget over the Hudson and East rivers
Location	Manhattan, New York, USA	Combined functions	Residential apartment buildings on top of bridges connecting Manhattan to the other boroughs and to New Jersey

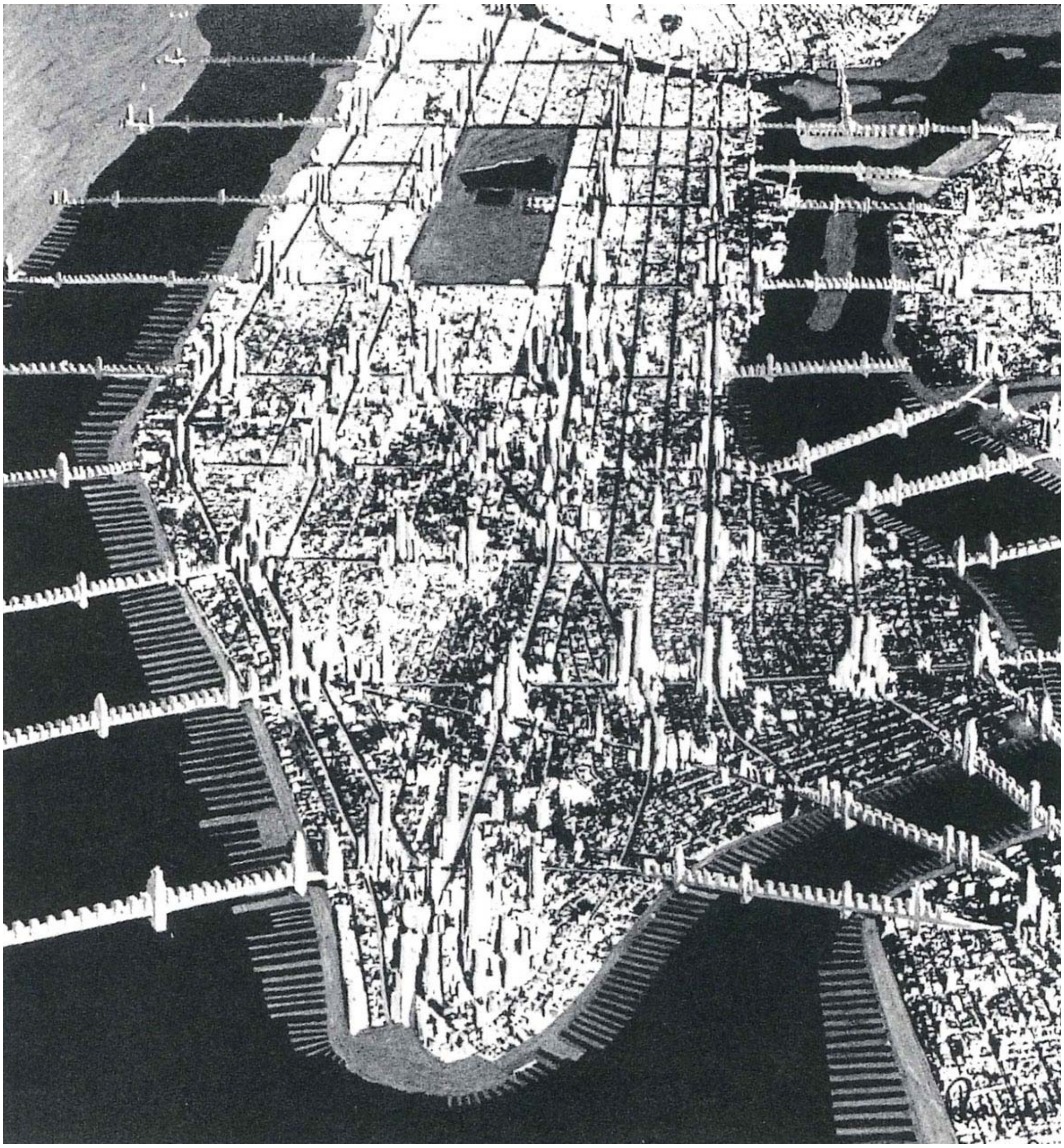


Figure 73 (Alison Sky, 1983)

1.8.8 CIRCULATION OF THE FUTURE, PARIS

Name	Circulation of the future	Year designed	1913
Type	Infrastructure and urban utopian	Main function	Total urban solution
Location	Paris, France	Combined functions	Transportation, the streetscape, pedestrian, rail, busses and car traffic, services, sewerage, and more.

Figure 74 - perspective, published at L'illustrazione italiana, 1913 (Jean Dethier, 1994)

1.8.9 JELLICOE & OVE ARUP - CHRYSTAL SPAN BRIDGE

Name	Circulation of the future	Year designed	1963
Type	Infrastructure and urban utopian	Main function	Total urban solution
Location	Paris, France	Combined functions	Transportation, the streetscape, pedestrian, rail, busses and car traffic, services, sewerage, and more.

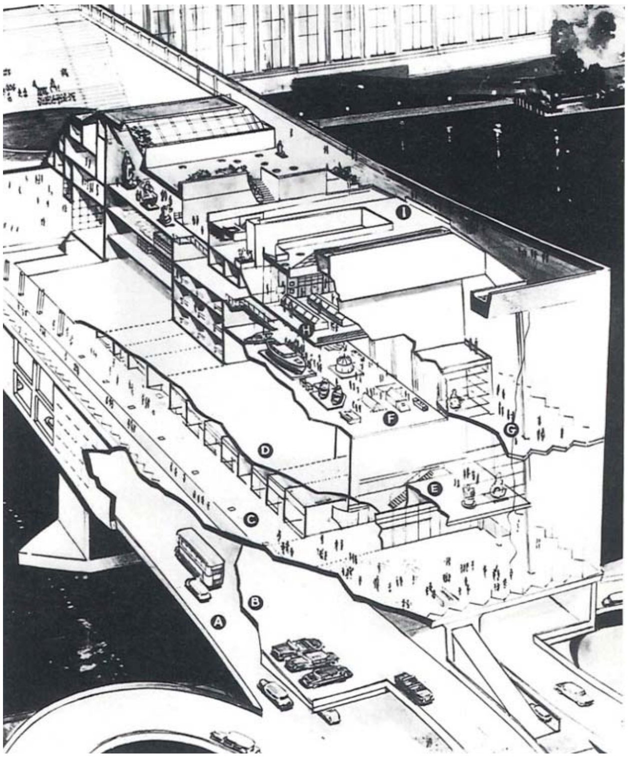


Figure 75 - Crystal Span Bridge (Ove Arup archive)

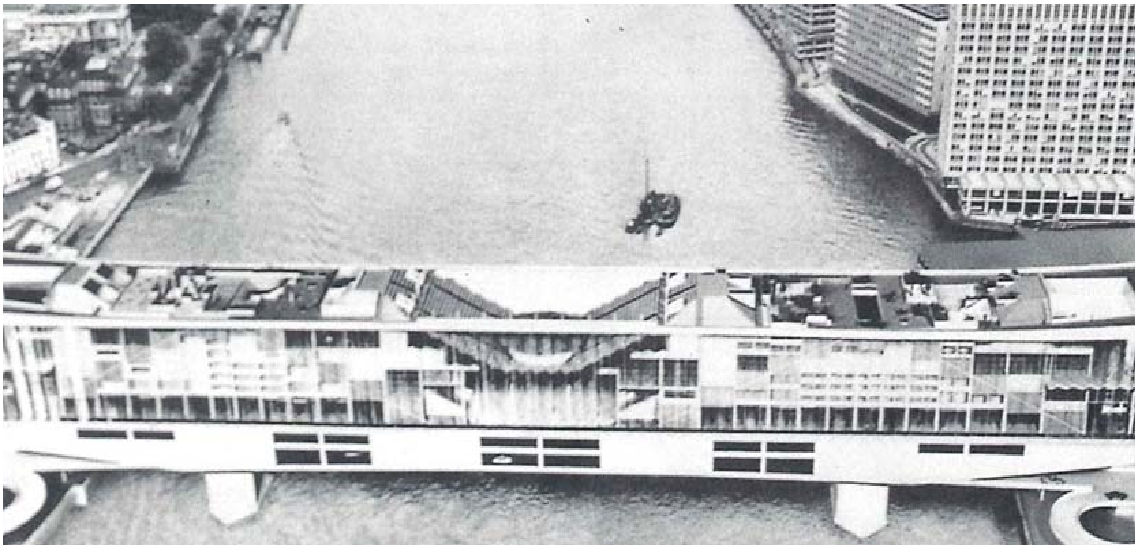


Figure 76 - Crystal Span Bridge (Ove Arup archive)

1.9 FUTURISM & FUTURISTS

The following images belong to the Italian Futurisim movement, founded by the writer Tommasso Mrinetti. Main figures: Umbertor Boccioni, Carlo Carra, Giacomo Balla, Antonio Sant'Ellia, Tullio Crali and Luigi Russolo. These mostly un-built projects of art, design, film, literature and architecture dealt with visions for the city of tomorrow and were on the borderline of art and architecture; urban design and science fiction. None had substantial specific locations and emphasized dynamism, technology and a kind of science fiction images of dense cities in which the notion of speed, aircrafts and movement was the most important aspect of civilized life (Capalbo, 1999).

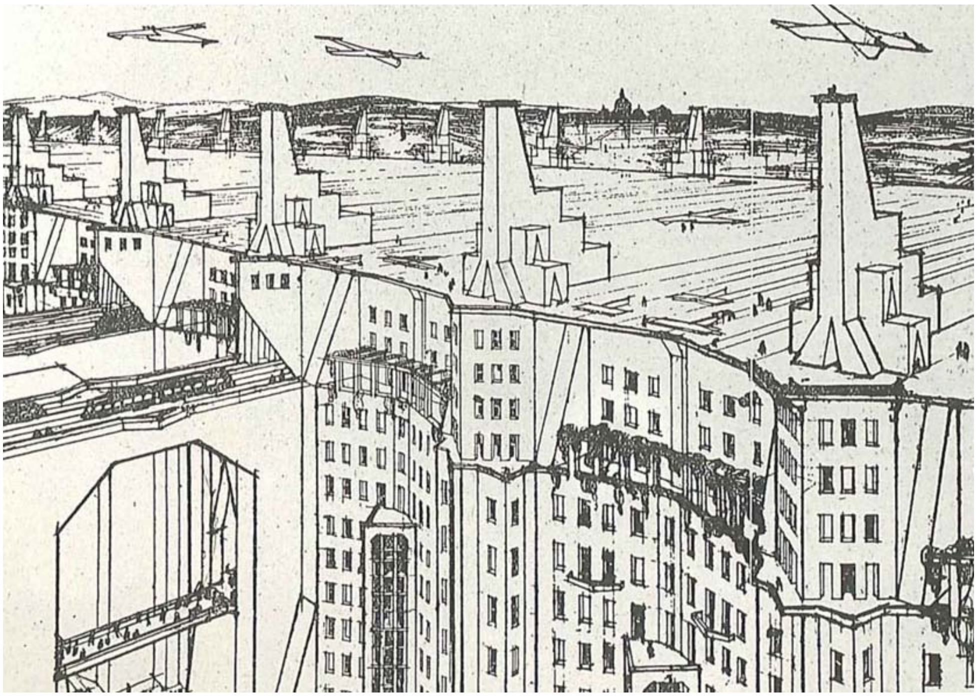


Figure 77 - Perspective by Vigilio Marchi, Cita Superiore, 1919 (Jean Dethier, 1994)

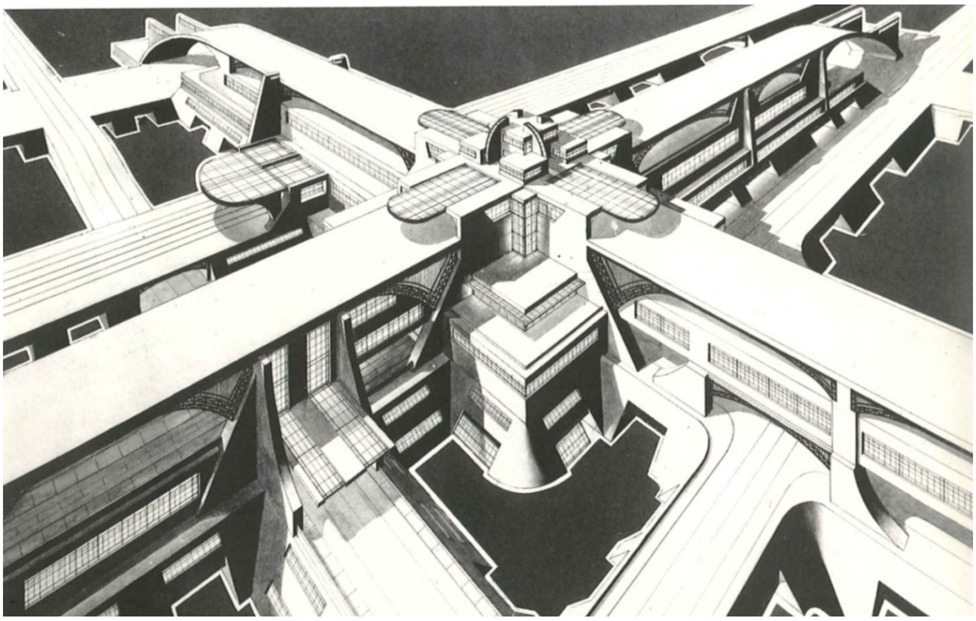


Figure 78 - Tullio Crali, Aeroport urbain, 1931, COll. de lartiste (Jean Dethier, 1994)

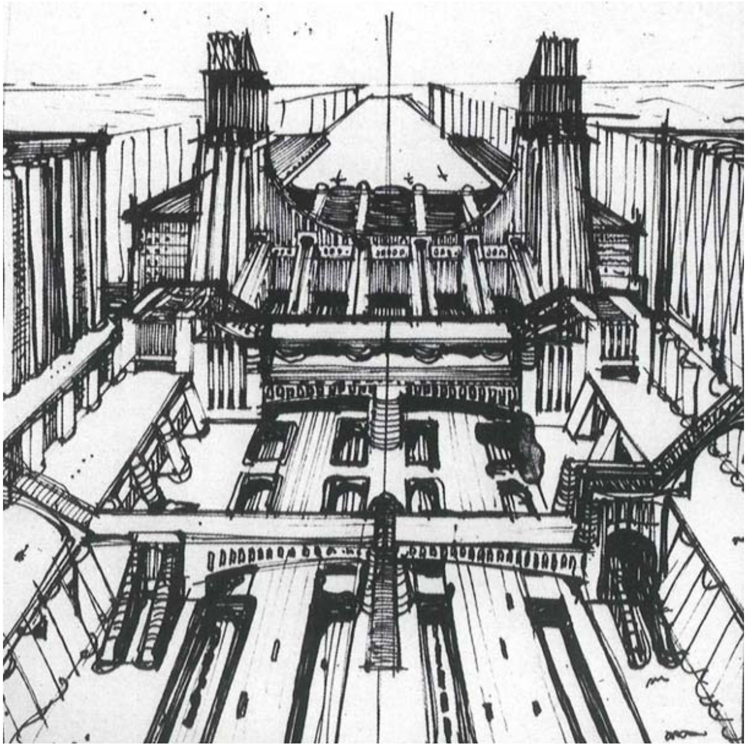


Figure 79 - Stazione per trei, by Antonio Sant Elia 1914 (from the Book Metropoli Futurista)

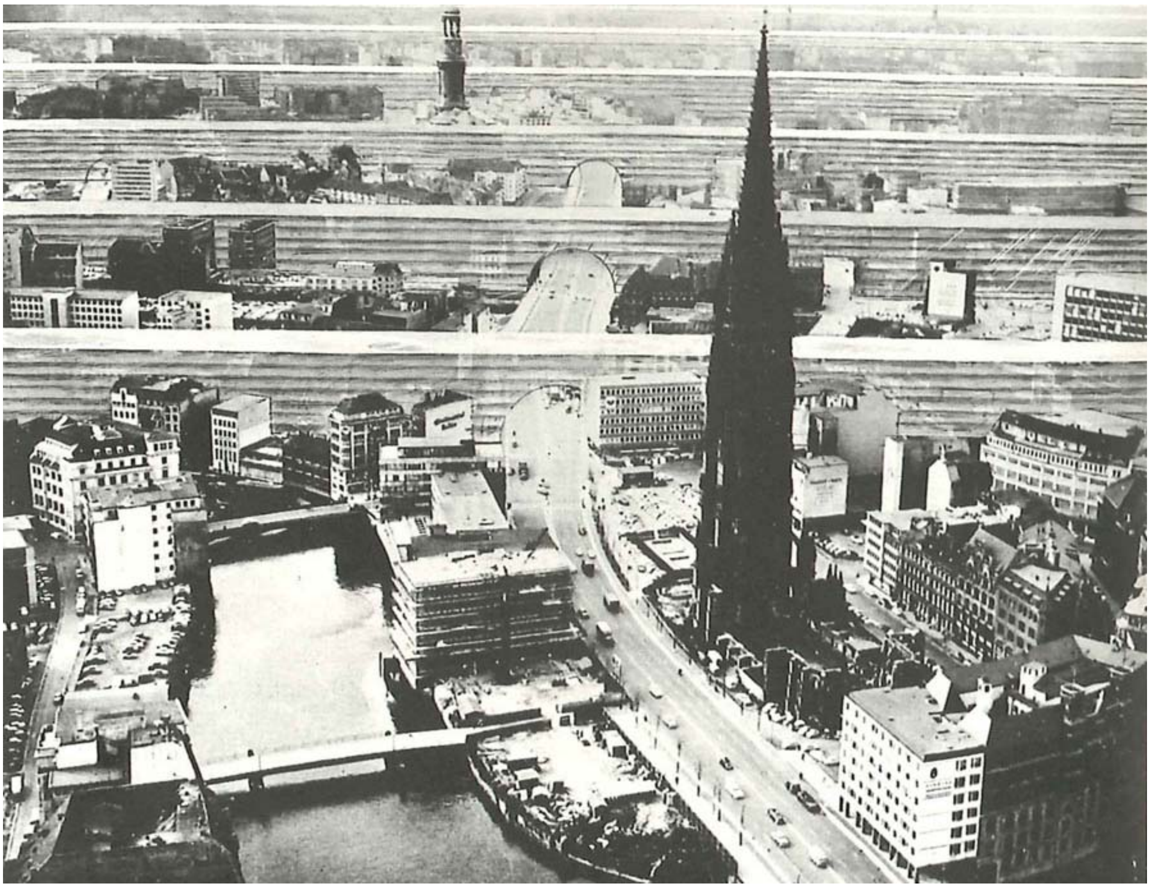


Figure 80 - Archizoom, Parallel Quarters, Berlin, 1969

1.10 DYSTOPIA VISION – *METROPOLIS*, THE FILM

Filmed in 1927, written and directed by Fritz Lang the movie is one of the first science fiction films and also a social political critique of the times, of an authoritarian repressive political system. The film is set within a futuristic megalopolis, in which traffic and movement is constant; the infrastructure and buildings are gigantic and the human scale is minimized and almost disappears.

Figure 81 - scene from Metropolis, Fritz Lang (Jean Dethier, 1994)

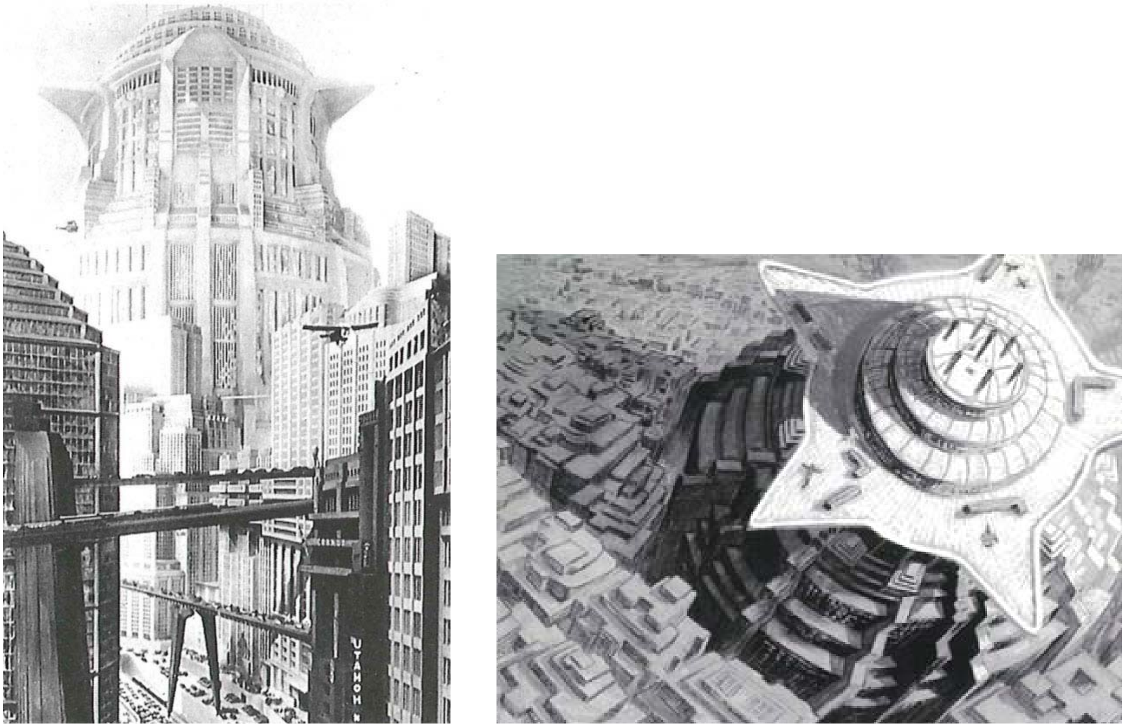


Figure 82 – left & right images, the tower of Babylon from Metropolis: Fritz Lang's film Metropolis (Jean Dethier, 1994)

1.11 *LINEAR CITIES*

1.11.1 CORBUSIER PLAN FOR ALGIERS (~1930)

Name	Plan for Algiers	Year designed	1930 - 1933
Type	Linear cities	Concept	Ville radieuse, or "radiant city": A series of long spine structures which merged roadways with residential (180,000 people) and commercial facilities.
Location	Algiers, Algeria	Combined functions	Residential, commercial and traffic

Figure 83 – master plan for the City of Algiers (Wikipedia)

Figure 84 – model of Algiers (Art, Architecture and Engineering Library, Lantern Slide Collection)

1.11.2 *LA CITE LINEAIR, ARTURO SORIA Y MUTA, 1913*

Name	La Cite Lineair	Year designed	1913
Type	Linear cities	Concept	Replacing the idea of the city center with linear infrastructural streets. Intention: "ruralize the city and urbanize the countryside".
Location	Madrid, Spain	Combined functions	Tramlines, streets, landscape

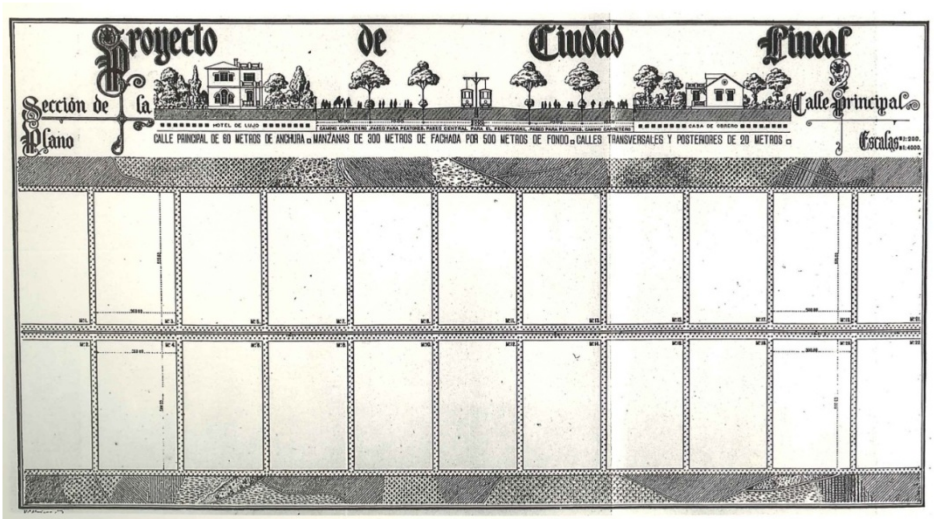


Figure 85 - Plan and section of the Linear City Madrid, 1913(Jean Dethier, 1994)

Figure 86 - Cite Liniar, from "The Problem of the Land of Spain" (Jean Dethier, 1994)

1.11.3 *PETER EISENMAN & MICHAEL GRAVES' JERSEY CORRIDOR PROJECT 1965 - LINEAR CITY*

Name	Jersey Corridor Project	Year designed	1965
Type	Linear cities / Infrastructure utopia	Concept	20 miles long 2 parallel structures and a mile wide containing. One industrial, the other residential, public and commercial.
Location	USA	Combined functions	Factories, residential buildings, town houses, public buildings, commercial and retail, traffic, rail.

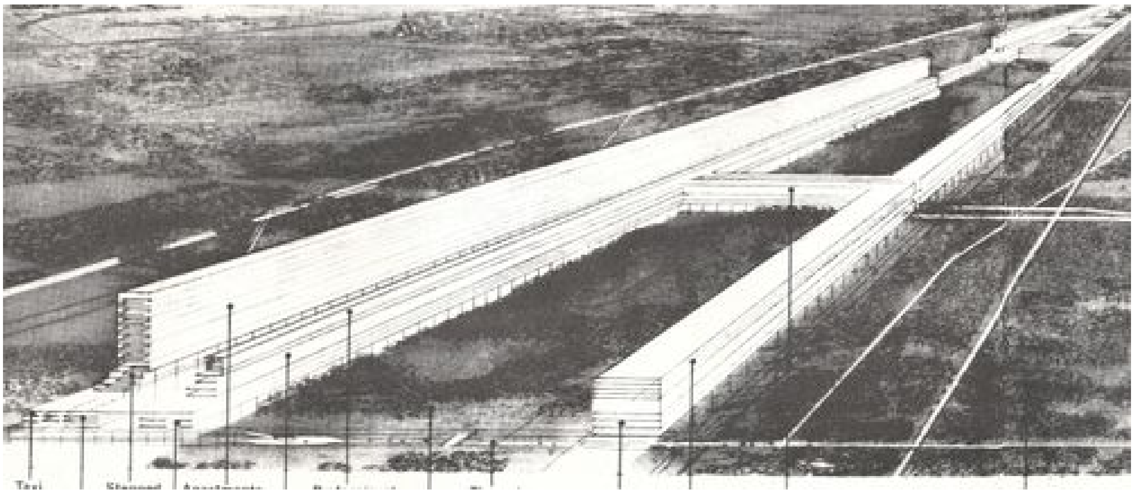


Figure 87 - Michael Graves' linear city (from Unbuilt America, by Alison Sky and Michele Stone)

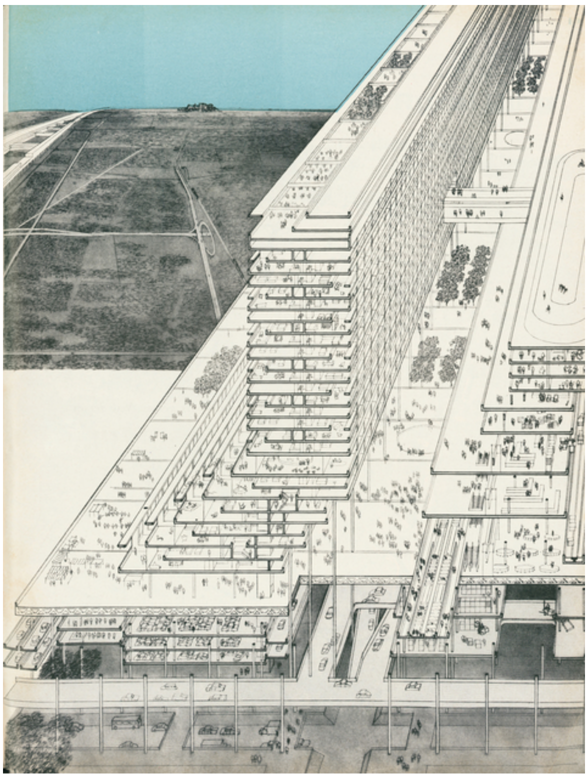


Figure 88 – Michael Graves, (from Dec. 1965, Life magazine "The U.S. City: Its Greatness Is at Stake")

1.11.4 GEOFFROY JELLICOE'S MOTOPIA, 1961

Name	Motopia	Year designed	1961
Type	Linear cities / Infrastructure utopia	Concept	Pedestrianisation - elevated spines of roadways in which all cars are carried at roof top level, leaving the ground below for pedestrians only
Location	Britain	Combined functions	Roads, residential and commercial buildings

Figure 89 (from www.thingsmagazine.net)

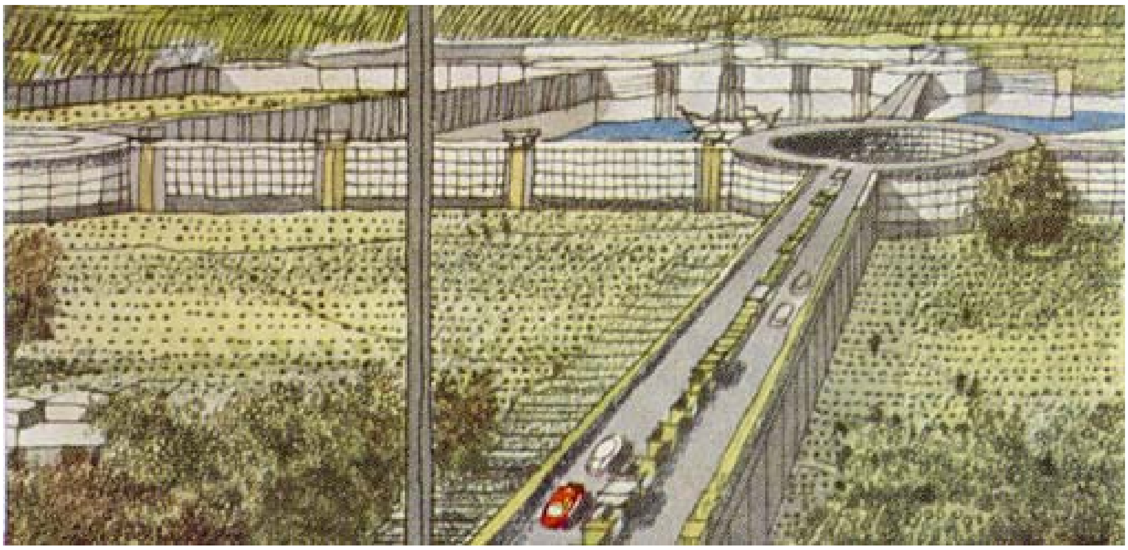


Figure 90 drawing by Gordon Gullen (from www.thingsmagazine.net)

1.12 REPURPOSED INFRASTRUCTURE

In the last 20 years as cities changes and certain infrastructure have become absolute the following are two examples of viaducts which were deteriorating and before demolishing a new purpose was designated in which injected new life into the structure as well as the neighborhood adjacent.

1.12.1 PARIS' VIADUCTS DE ARTS – PROMENADE PLANTEE

Located along the Avenue Daumesnil, Paris, the Viaduc Des Arts is a 1.4 km inhabited viaduct part the old Vincennes elevated railway. The Vincennes line stopped operation in 1961 and fell into deterioration until the renovation which started in 1984 (Paris/articles/viaduc-des-arts). **The viaduct was repurposed in two phases:**

1. 1989 – Architectural: Renovation of the spaces below the viaducts with programmatic restrictions to be inhabited only by artisans and artists with focus on handmade high quality merchandize.
2. 1993 - Landscape and open space: A 4.3 km linear park – the Promenade Plantee, is partially located on top of the viaduct.

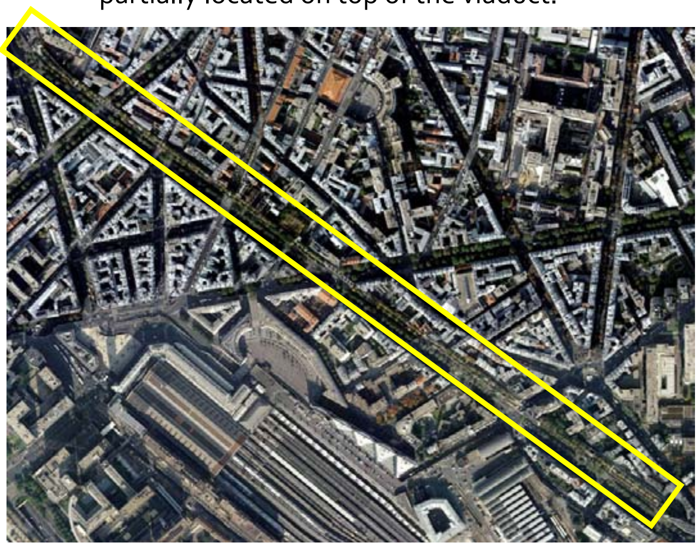


Figure 91 – Viaduc des Arts (Google Earth)

Figure 92 – Vaiduc Des Arts (image from the web site Projects for Public Spaces www.pps.org)

Figure 93 - SEMAEST design for the Promenade Plantee (by Jacques Vergely and Philippe Mathieux)

1.12.2 THE HIGH LINE NY, USA

The High Line in lower Manhattan was originally an elevated railway built in the 1934 to serve the industrial area– a dedicated private freight rail for transporting goods into and out of warehouses and factories mostly processing meat(Org). The railway stopped functioning in 1980 and was closed to the public. The railway

\ was located so that it crossed through the center of the lots instead of above highways or roads and therefore cut through dense urban settings. In the mid 802 landlords of adjacent properties lobbied for the demolition of the high line; this led to a backlash from citizen groups trying to preserve the landmark structure and to transform it into a city public park[3].

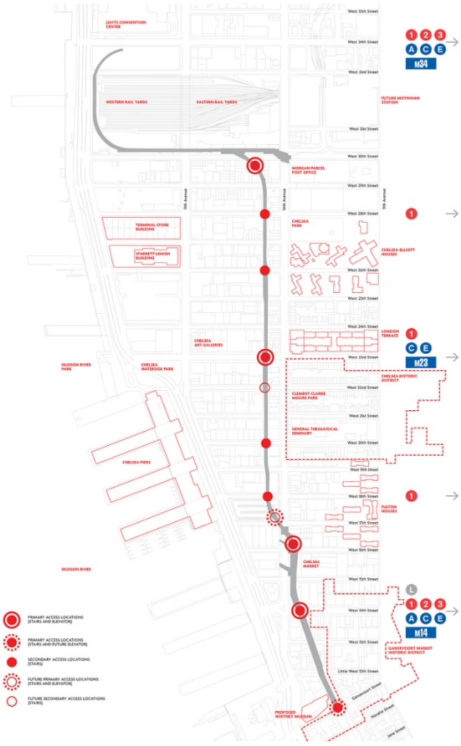


Figure 94- map of the High Line
Figure 95 - the High Line – 1985

Figure 96 - The high Line - 1995

---

[3] All images above and information are from the web site: www.thehighline.org

For some time the High Line was a focus of interest for urban planners and architects – all attempting in giving a new life without destroying its industrial beauty. In 1979 Steven Hall suggested the transformation of the high line into an inhabited upper structure of townhouses built on top of the structure in the shape of gate houses – with large openings at the center to allow for a public pedestrian promenade(Holl, 2009).

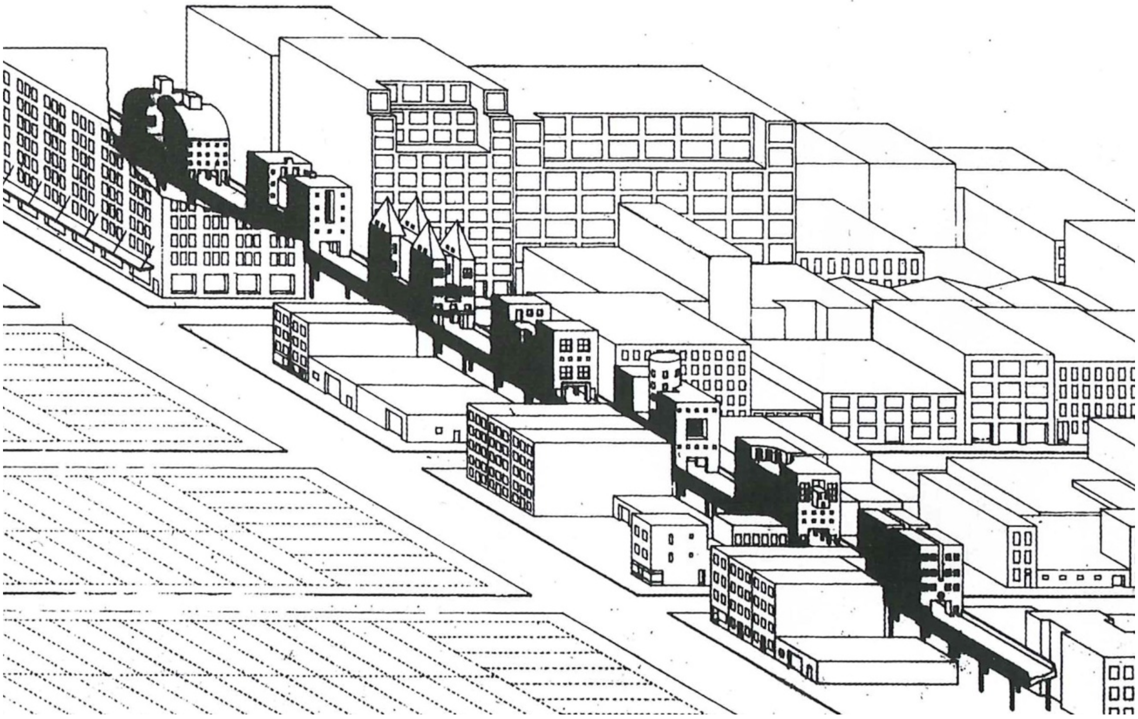


Figure 97 - Steven Hal's proposal or the High Line 1979(Holl, 2009)

Figure 98 - The High Line park (image from the web site www.highline.org) (Org)

1.13 INHABITTED INFRASTRUCTURE – CONCLUSIONS AND CURRENT DISCUSSION ABOUT URBAN INFRASTRUCTURE

This chapter examined examples of built and un-built infrastructure which by adopting multiplicity of functions became more than its singular utilitarian purpose. It demonstrates the great potential infrastructure has when it is considered as a true urban element, part if the urban and social life.

The inhabited bridges of Medieval Europe were anchors of commerce, social life and security; by letting other functions and people inhabit the infrastructure the urban connection between two sides of a river or two neighborhoods became stronger; the security of the bridge itself became less of a concern once it was inhabited and people had interest in protecting their investment.

The examples of repurpose infrastructure demonstrate that even derelict structure no longer being used for their original function can become an urban asset. These old structures which were built for a very specific technical / traffic / transportation reason must be considered as an integral part of the city and cannot just be dismantled once stop functioning, these structure are a historical layer of the city and can be given new life with new functions.

*"One of the new priorities of all planners should be to re-establish an organic link between the various arbitrarily separated urban entities: to revalidate the vital notion of urban complexity; to attempt to reconcile diverse and complementary activities in one and same place; to create spaces favorable to social interaction and places symbolically expressive of a desire to unite a city's inhabitants and their various occupations… **the historically inhabited bridges created that very urban complexity so lacking in contemporary cities by superimposing several functions and concentrating them in the same spot**…..**Every city possesses many possible ways of reconquering space and revitalizing land that is presently being stifled by bureaucratic, unimaginative planning"***(Murray & Stevens, 1996)*.*